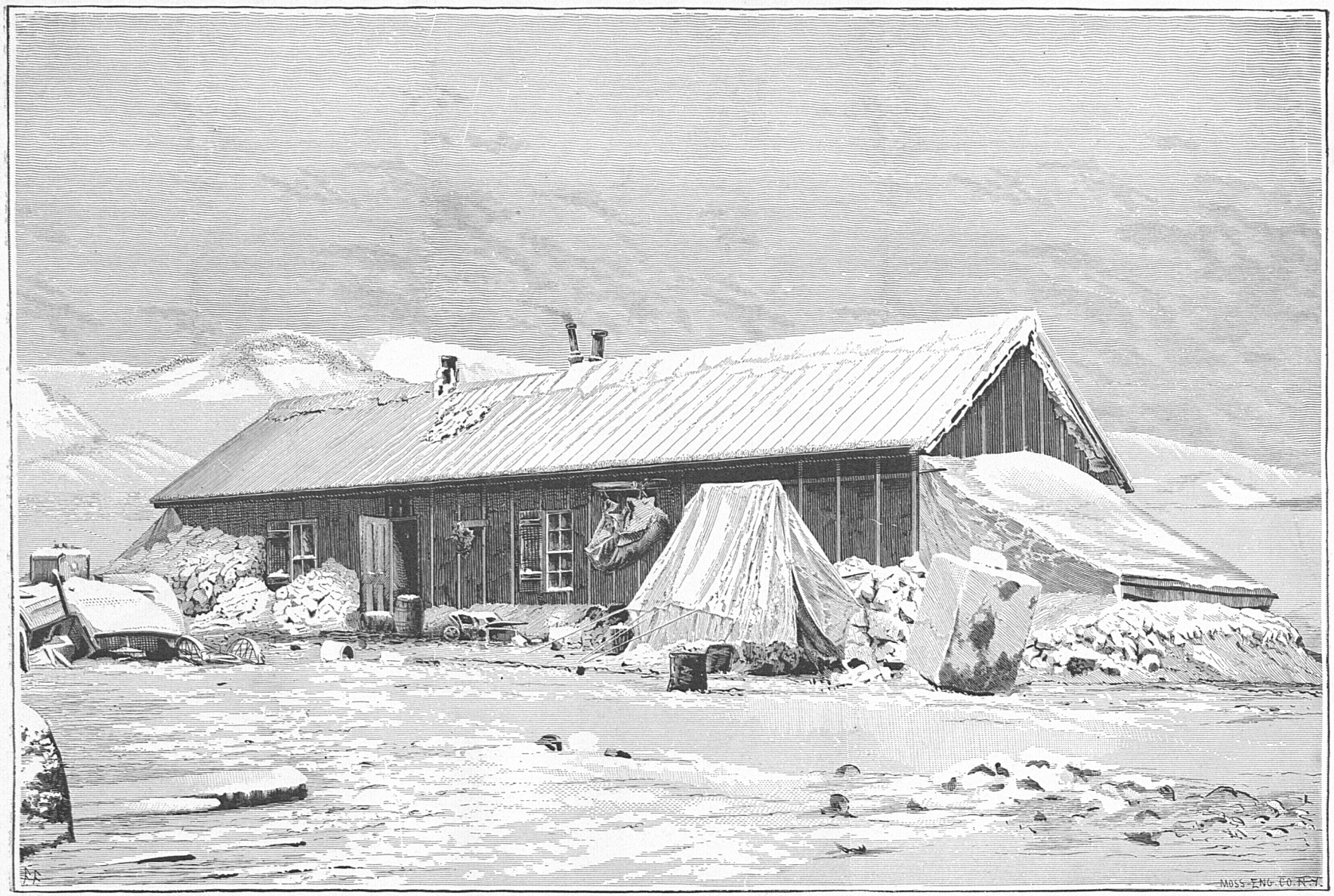


Our House at Conger (West Side), March, 1882.

(From a photograph.)

INTERNATIONAL POLAR EXPEDITION.

REPORT

ON THE

PROCEEDINGS OF THE UNITED STATES EXPEDITION

TO

LADY FRANKLIN BAY, GRINNELL LAND,

BY

ADOLPHUS W. GREELY,
FIRST LIEUTENANT, FIFTH CAVALRY, ACTING SIGNAL OFFICER AND ASSISTANT, COMMANDING THE EXPEDITION.

Q
115
.I6
U7
1888
v. 1

VOLUME I.

LIBRARY
rebound
JUL 25 1939
58348
WEATHER BUREAU

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1888.

National Oceanic and Atmospheric Administration

ERRATA NOTICE

One or more conditions of the original document may affect the quality of the image, such as:

Discolored pages
Faded or light ink
Binding intrudes into the text

This has been a co-operative project between the NOAA Central Library and the Climate Database Modernization Program, National Climate Data Center (NCDC). To view the original document, please contact the NOAA Central Library in Silver Spring, MD at (301) 713-2607 x124 or www.reference@nodc.noaa.gov.

LASON
Imaging Contractor
12200 Kiln Court
Beltsville, MD 20704-1387
March 21, 2005

IN THE HOUSE OF REPRESENTATIVES, *June* 17, 1886.

Resolved by the House of Representatives (*the Senate concurring*), That 4,500 copies, with the necessary illustrations, be printed of the Report on the Proceedings of the International Polar Expedition to Lady Franklin Bay, Grinnell Land, by First Lieutenant A. W. Greely, Fifth Cavalry, United States Army, Acting Signal Officer; 1,250 copies of which shall be for use of the Senate, 2,500 copies for use of House, and 750 copies for distribution by the Signal Office to foreign libraries and Arctic explorers.

C|K
I 61

CONTENTS.

(VOLUME I.)

Page.

Report of the commanding officer 1

APPENDICES.

1. War Department order assigning Lieutenant Greely to command 97
2. War Department order organizing the expedition 97
3. Instructions from the Signal Office regarding the expedition 98
4. List of commissary subsistence stores, with remarks thereon 108
5. Records left at and taken from Southeast Cary Island, August, 1881 109
6. Lieutenant Kislingbury's report of trip to Life Boat Cove 110
7. Records taken from and left at Washington Irving Island, August, 1881 110
8. Records obtained at Discovery Harbor, August 1, 1881 111
9. Lieutenant Lockwood's report on Water-course Bay, August, 1881 111
10. Lieutenant Kislingbury's request to be relieved, with Lieutenant Greely's indorsement 112
11. Orders No. 5, relieving Lieutenant Kislingbury and ordering him to report to the Chief Signal Officer 113
12. Orders No. 6 amending Orders No. 5 113
13. Lieutenant Kislingbury's request for modification of Orders No. 6 114
14. Orders No. 8 modifying Orders No. 6 114
15. Lieutenant Lockwood's report on exploration of St. Patrick Valley 114
16. Sergeant Brainard's report establishing Depot B near Cape Beechey 115
17. Sergeant Jewell's meteorological report in connection with trip establishing Depot B 117
18. Sergeant Gardiner's report of trip to Cape Murchison 119
19. Sergeant Linn's report on moving Depot A to Cape Murchison 119
20. Orders to Dr. Pavy for overland journey to Lincoln Bay 120
21. Report of Dr. Pavy on trip to Lincoln Bay 121
22. Report of Lieutenant Lockwood on journey to the Bellows 124
23. Orders to Dr. Pavy on exploring Archer Fiord 126
24. Report of Dr. Pavy on attempted trip down Archer Fiord 126
25. Report of Lieutenant Lockwood on sledge journey to Depot B near Cape Beechey 127
26. Report of Sergeant Rice on sledge journey to Depot B, near Cape Beechey 129
27. Orders to Dr. Pavy to proceed to Cape Joseph Henry 130
28. Report of Dr. Pavy on trip towards Cape Joseph Henry 131
29. Lieutenant Lockwood's report on St. Patrick Valley 133
30. Sergeant Rice's report on camp equipage 134
31. Lieutenant Lockwood's orders to attempt crossing of Robeson Channel 134
32. Lieutenant Lockwood's report on attempted crossing of Robeson Channel 135
33. Dr. Pavy's orders for journey to Wrangel Bay 138
34. Dr. Pavy's report on journey to Wrangel Bay 139
35. Dr. Pavy's supplementary report under Appendices 27 and 33 141
36. Lieutenant Lockwood's orders for preliminary journey to Cape Beechey 142
37. Lieutenant Lockwood's report on journey ordered in Appendix No. 36 143

Page.
38. Lieutenant Lockwood's orders for journey to Thank God Harbor ---- 144
39. Lieutenant Lockwood's report on journey ordered in Appendix No. 38 ---- 144
40. English records obtained at Thank God Harbor ---- 149
41. Dr. Pavy's orders to carry provisions to Greenland coast ---- 156
42. Dr. Pavy's report on journey ordered in Appendix No. 41 ---- 156
43. Sergeant Brainard's orders to move boat to Greenland coast ---- 158
44. Sergeant Brainard's report on trip ordered in Appendix No. 43 ---- 159
45. Sergeant Jewell's report on trip to Lincoln Bay while supporting Dr. Pavy ---- 163
46. Dr. Pavy's orders for journey northward over Polar Ocean ---- 165
47. Dr. Pavy's report on journey ordered in Appendix No. 46 ---- 166
48. Sergeant Rice's report on detached trip from Lincoln Bay to Fort Conger and return ---- 178
49. Private Long's report on trip into Archer Fiord ---- 179
50. Sergeant Israel's report on trip into the Bellows ---- 181
51. Lieutenant Lockwood's orders to explore north coast of Greenland ---- 182
52. Supplementary instructions for exploration of north coast of Greenland ---- 183
53. Lieutenant Lockwood's report on exploration of north coast of Greenland ---- 185
54. Report of Private Biederbick's trip into Black Rock Vale ---- 233
55. Sergeant Linn's report of trip into Black Rock Vale ---- 233
56. Lieutenant Lockwood's report of launch trip up Archer Fiord ---- 234
57. Lieutenant Lockwood's report of launch trip up Chandler Fiord ---- 236
58. Dr. Pavy's orders to proceed to Carl Ritter Bay ---- 237
59. Sergeant Elison's report of trip to Carl Ritter Bay ---- 237
60. Sergeant Brainard's report of trip to Carl Ritter Bay ---- 239
61. Orders establishing day of "Thanksgiving" ---- 242
62. Dr. Pavy's letter of March 8, 1883 ---- 242
63. Lieutenant Greely's answer to Dr. Pavy's letter of March 8, 1883 ---- 243
64. Lieutenant Lockwood's orders for preliminary journey northward, 1883 ---- 243
65. Lieutenant Lockwood's report on journey ordered in Appendix No. 64 ---- 244
66. Sergeant Jewell's report to Lieutenant Lockwood relative to journey ordered in Appendix No. 64 ---- 246
67. Orders to Lieutenant Lockwood for exploration of Greenland, 1883 ---- 247
68. Sergeant Rice's orders for journey to Thank God Harbor ---- 248
69. Dr. Pavy's orders for journey, as surgeon, to Thank God Harbor ---- 248
70. Lieutenant Lockwood's report on trip to North Greenland ---- 249
71. Sergeant Jewell's report on tidal and meteorological observations made on trip to North Greenland ---- 255
72. Sergeant Rice's report on trip to Thank God Harbor ---- 259
73. Dr. Pavy's medical report on trip to Thank God Harbor ---- 264
74. Orders for Sergeant Jewell for tidal observations at Cape Beechey ---- 264
75. Report of Sergeant Jewell on tidal observations at Cape Beechey ---- 264
76. Orders for Sergeant Gardiner for tidal observations at Cape Baird ---- 265
77. Orders for Sergeant Israel for astronomical observations at Cape Baird ---- 266
78. Report of Sergeant Israel on observations ordered in Appendix No. 77 ---- 266
79. Report of Sergeant Gardiner on tidal and ice observations at Cape Baird ---- 268
80. Report of Sergeant Jewell on paleocrystic ice ---- 268
81. Orders to Sergeant Jewell for tidal observations at Cape Beechey ---- 269
82. Report of Sergeant Jewell on tidal observations at Cape Beechey ---- 269
83. Sergeant Brainard's report on journey to Cape Cracroft ---- 270
84. Sergeant Gardiner's report on journey to Cape Cracroft ---- 272
85. Lieutenant Lockwood's orders to cross Grinnell Land ---- 274
86. Lieutenant Lockwood's report on the crossing of Grinnell Land ---- 274
87. Orders to Dr. Pavy relative to natural history data ---- 297
88. Orders to Dr. Pavy relative to botanical specimens ---- 297
89. Orders to Lieutenant Lockwood to relieve Dr. Pavy as naturalist ---- 298
90. Lieutenant Lockwood's report on natural history specimens received from Dr. Pavy ---- 298
91. Lieutenant Lockwood's letter and report on natural history specimens, June 30, 1883 ---- 300
92. Sergeant Brainard's report on Lieutenant Lockwood's trip towards the United States Mountain range ---- 317
93. Orders to Lieutenant Lockwood to receive medical stores from Dr. Pavy ---- 319
94. Letter of Dr. Pavy asking the detail of Steward Biederbick ---- 320
95. Reply of Lieutenant Greely to Dr. Pavy's request for detail of Steward Biederbick ---- 320
96. Letter of Dr. Pavy's, dated July 18, 1883 ---- 320
97. Answer to letter referred to in Appendix No. 96 ---- 321
98. Dr. Pavy's refusal to turn over his diary ---- 321

		Page.
99.	Letter transmitting charges to Dr. Pavy	321
100.	Letter limiting Dr. Pavy's bounds while in arrest	322
101.	Order for the abandonment of station at Fort Conger	322
102.	List of subsistence stores abandoned	323
103.	Medical reports	324
104.	Record left at Cape Baird	350
105.	Records left in abandoned boats	351
106.	Records found on Brevoort Island (deposited by Lieutenant Garlington and Private Beebe)	351
107.	Plan of winter quarters, Camp Clay	Face page 354
108.	Sergeant Frederick's report of November journey to Cape Isabella	354
109.	Lieutenant Kislingbury's letter, February 19, 1884	356
110.	Private Long's journey into Hayes Sound	357
111.	Sergeant Frederick's report of journey to Baird Inlet, April, 1884	358
112.	Lieutenant Kislingbury's letter, April 22, 1884	361
113.	Letter of Dr. Pavy's, April 25, 1884	361
114.	Letter of Dr. Pavy, April 27, 1884	362
115.	Lieutenant Greely's certificate to Dr. Pavy	362
116.	General certificate to Dr. Pavy	362
117.	Letter of Lieutenant Greely on Dr. Pavy	363
118.	Order for Private Henry's execution	363
119.	Report of Private Henry's execution	363
120.	Letter of Secretary of War approving Lieutenant Greely's course regarding execution of Private Henry	364
121.	List of deaths	365
122.	Order relative to Private Henry, dated June 5, 1884	365
123.	Lieutenant Lockwood's journal from August 3, 1883	366
124.	Sergeant Brainard's journal from besetment	441
125.	Portion of diary of Private Roderick R. Schneider, found on bank of Mississippi River, in Missouri, and correspondence relating thereto with Mr. J. A. Ockerson	529
126.	Description of drift-wood	534
127.	List of photographs and description of Eskimo relics in photographic plates	535
128.	List of maps and charts	536
	Index to Vol. I	537

LIBRARY
NOV 17 1888
SIGNAL OFFICE

Blank page retained for pagination

ILLUSTRATIONS.

(VOLUME I.)

FULL-PAGE ILLUSTRATIONS.

(Engraved by the Moss Engraving Company from photographs by Sergt. George W. Rice, photographer of the Expedition.)

	Face page.
Our house at Conger (west side), March, 1882	Frontispiece.
Godhavn, Greenland, July 19, 1881	2
Ritenbenk, Greënland, July 21, 1881	2
Proven, North Greenland, July, 1881	4
Danish Eskimo at Proven, North Greenland	4
Site of Polaris House, occupied in 1872, at Life Boat Cove, July, 1881	6
Proteus in ice, entrance to Discovery Harbor, August 12, 1881	6
Musk-cattle killed on Mt. Cartmel, near Conger, August 12, 1881	8
Head of musk-ox killed near Conger	8
Coal mine, Water-course Ravine, with reflected image	12
View of ice from Cape Murchison, looking towards Thank God Harbor, June, 1882	29
Musk calves, October, 1882. Captured near Conger, June, 1882. By Sergeant Frederick	30
Floeberg in St. Patrick Bay, June, 1882	44
Pressed-up Floeberg, Breakwater Point, Lady Franklin Bay, June, 1882	44
Chandler Fiord, looking westward; Ida Bay to extreme left	236
Paleocrystic ice in Robeson Channel	246
Tide-gauge at Cape Baird (from a sketch by Sergeant Gardiner)	268
Eskimo relics found in vicinity of Fort Conger. Pl. I	536
Eskimo relics found at junction of Lake Hazen and Ruggles River, June, 1882. Pl. II	536
Eskimo relics found at and in vicinity of Basil Norris and Sun Bays. Pl. III	536
Eskimo relics; greater number found south side of Lake Hazen, June, 1882. Pl. IV	536
Eskimo relics found at Cape Baird. Pl. V	536
Modern Greenland and ancient Eskimo sled. Pl. VI	536
Arctic Highlander from Cape York (from a photograph by Relief Expedition)	536
Arctic Highlanders from North Star Settlement, Saunders Island (from a photograph by Relief Expedition)	536

ILLUSTRATIONS GROUPED IN PLATES.

(Engraved by the Moss Engraving Company from sketches by Lieut. James B. Lockwood.)

PL. I.—Cape Britannia	188
Victoria Inlet, from near Cape Britannia	188
Beaumont Island, from near Cape Britannia	188
Stephenson Island, from Cape Britannia	188
Beaumont Island, from Cape Britannia	188
PL. II.—Elison Island	188
View looking into Chipp Inlet	188
Cape Alexander Ramsay	188
Shoe [Mary Murray] Island	188
Farthest Point beyond [to the east] Shoe [Mary Murray] Island	188

Face page.

PLATE I:
FIG. 1. Face of glacier above Emma Bay (from tent), April 30, 1883 ---- 278
FIG. 2. Flank view of same, from southeast corner, May 1, 1883 ---- 278
FIG. 3. Mer de Glace, "Chinese Wall," just west of "Divide," looking east (at Lake Harry), May 18, 1883 ---- 278
PLATE II:
FIG. 4. Mer de Glace, "Chinese Wall," where first approached, just east of Camp XI, May 10, 1883 ---- 278
FIG. 5. Glacier "Floeberg," head of Greely Fiord (Antoinette Bay), May 13, 1883 ---- 278
FIG. 6. Offshoot of the Mer de Glace (the same as Fig. 8), near head of lake between Camps XII and XIII, May 12, 1883 ---- 278
PLATE III:
FIG. 7. Glacier "Floeberg," at glacier at head of Greely Fiord, May 13, 1883 ---- 278
FIG. 8. *Glacier entering valley, May 12, 1883* ---- 278
FIG. 9. Lake, glacier, and mountains, from west end of lake, Camp XIII, May 12, 1883 ---- 278
FIG. 10. Glacier and cliffs, from east end of lake, May 12, 1883 ---- 278
PLATE IV:
FIG. 11. View to the west from head of fiord, May 13, 1883 ---- 278
FIG. 12. View to the west from "Farthest," May 14, 1883 ---- 278
FIG. 13. Farthest land on South Side, May 15, 1883 ---- 278
FIG. 14. Head of fiord from "Farthest", May 14, 1883 ---- 278

ILLUSTRATIONS IN THE TEXT.

(Engraved by the Moss Engraving Company from sketches.)

Page.

Coast of fiord east of Stephenson Island. (From a sketch by Lieutenant Lockwood) ---- 202
Coast ahead from camp beyond Britannia. (From a sketch by Lieutenant Lockwood) ---- 203
"Farthest," from the west. (From a sketch by Lieutenant Lockwood) ---- 207
Next Point beyond "Farthest." (From a sketch by Lieutenant Lockwood) ---- 208
Parhelia. (From a sketch by Lieutenant Lockwood) ---- 210
Floeberg, at Cape Baird, showing stratification. (From a sketch by Sergeant Gardiner) ---- 273
Section of face of glacier. (From a sketch by Lieutenant Lockwood) ---- 282
Plan of winter quarters at Camp Clay. (From a sketch by Lieutenant Greely) ---- Face page 354
Plan of winter quarters at Camp Clay. (From a sketch by Lieutenant Lockwood) ---- 394
Drift-wood; limb of a cedar. (From a sketch by Lieutenant Greely) ---- 534
Drift-wood; branch of a pine. (From a sketch by Lieutenant Greely) ---- 534

LIST OF MAPS AND CHARTS.

Face page.

Map of country immediately surrounding Fort Conger ---- 10
Map showing drift, travel, and exploration of the Lady Franklin Bay Expedition from besetment, August 26, 1883, until rescued, June 22, 1884; showing also discoveries in Buchanan Strait ---- 58
Chart of North Greenland coast, accompanying report by Lieutenant Lockwood of sledge journey, April 3 to June 1, 1882, showing discoveries and route from Fort Conger to Lockwood Island and return; also showing the route of preliminary journey in March ---- 186
Chart showing excursion of steam-launch *Lady Greely* during the summer of 1882 ---- 236
Chart showing route of sledge expedition, March 27 to April 12, 1883 ---- 252
Map of Grinnell Land ---- At end of volume.

THE LADY FRANKLIN BAY EXPEDITION.

REPORT OF THE COMMANDING OFFICER.

WASHINGTON, D. C., *June* 30, 1885.

The CHIEF SIGNAL OFFICER OF THE ARMY:

SIR: I have the honor to make the following report of the proceedings of the Lady Franklin Bay expedition, which I had the honor to command:

The station on the shore of Lady Franklin Bay was established for work of scientific observations and exploration, under the provisions of the acts of Congress approved May 1, 1880, and March 3, 1881. In its scientific work it formed one of the circumpolar international stations, which grew out of the exertions of Lieut. Charles Weyprecht, Austrian Navy, and which were finally determined upon by the International Polar Conferences of Hamburg, Berne, and St. Petersburg. Eleven nations participated in this great work, and fourteen stations were occupied, three of which were in the southern hemisphere.

I was assigned to the command of the Lady Franklin Bay expedition by the Honorable the Secretary of War, March 11, 1881, in accordance with the instructions of the President. (Appendix No. 1.) The formal order under which was organized the expedition to establish the station, was General Orders No. 35, War Department, A. G. O., April 12, 1881. (Appendix No. 2.) In accordance with that order the steam sealer *Proteus*, having been inspected and favorably reported on by Lieut. J. F. Merry, U. S. N., was hired for the transportation of the party from St. John's, Newfoundland, to Lady Franklin Bay. Second Lieut. Frederick F. Kislingbury, Eleventh Infantry, and Second Lieut. James B. Lockwood, Twenty-third Infantry, were detailed for duty with the expedition, and twenty-one enlisted men, who were either selected volunteers from the Army, or specially enlisted, were also ordered to report to me. The surgeon, Octave Pavy, M. D., who had been contracted with for a similar expedition in 1880, was to join the party in Greenland.

Lieutenant Kislingbury with two enlisted men sailed from New York about June 1, 1881, to superintend the proper stowing of the cargo, which was to be done in accordance with special instructions given him by me. Lieutenant Lockwood sailed from Baltimore June 14, 1881, in charge of the greater number of the party, taking with him the steam-launch which had been kindly furnished the expedition through the courtesy of the Honorable the Secretary of the Navy.

I sailed with the scientific observers on June 21 from New York, and the entire party assembled at St. John's, Newfoundland, June 27, except Sergeant Rice, the photographer, who, having been sent through Canada with the expectation of obtaining additional foot-gear for the expedition, was delayed until July 2. On July 4 the party took quarters on board the *Proteus*, which dropped her anchor in the harbor awaiting certain necessary stores.

The expedition at that time consisted of the officers and men named in Appendix No. 3, except Private Roderick R. Schneider, who replaced Corporal Grimm, a deserter. The general scientific and other instructions for the party are to be found in the same appendix (No. 3).

Ample field supplies and medical stores had been furnished by the Surgeon-General, and a stock of regulation clothing and camp equipage through the Quartermaster-General. A liberal and excellent supply of arms and ammunition, both service and special, was provided through the courtesy of the Chief of Ordnance. The Chief of Engineers furnished such scientific instruments as he could spare, and these were supplemented to a certain extent by loans from the Superintendent of the United States Coast and Geodetic Survey. Subsistence stores, well packed and of excellent quality, were furnished for sale by the Commissary-General of Subsistence. These commissary stores were furnished under the supervision of Maj. John P. Hawkins, in accordance with the special instructions of the Commissary-General of Subsistence, and I have deemed it my duty to submit in Appendix No. 4 a list of the articles, with comments on their quality and condition.

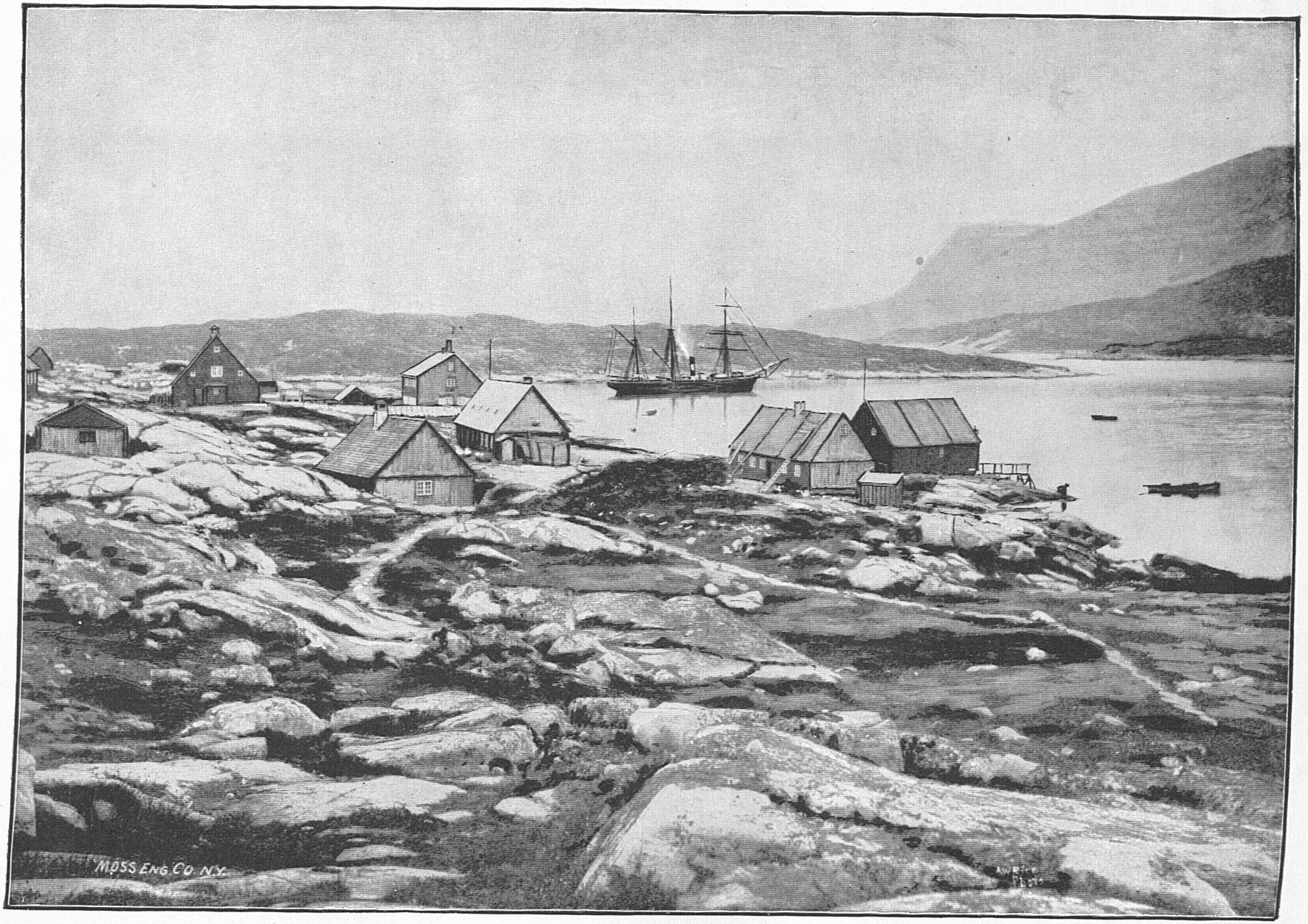
Less than $6,000 of the original appropriation remained after the charter of the vessel, with which to supplement the supplies of the expedition with articles indispensable for Arctic service, which were not within the province of the regular supply departments of the Army. While the sum was insufficient to provide the articles requisite for complete comfort and satisfaction, yet careful consideration and rigid economy enabled me to purchase everything absolutely essential to health and success. Boats, total supply of coal, spirits, and lime-juice formed no inconsiderable part of these indispensable purchases. The expeditionary supplies were in almost inextricable confusion on my arrival at St. John's, and to have re-stowed them would have entailed an expense of money and time which could not be spared. It was also ascertained beyond a doubt, that the boiler of the navy launch was entirely unsuited to use in salt water, and it became necessary to replace it at St. John's, at the expeditionary expense, by a boiler of another pattern.

During our enforced stay at St. John's, this expedition, like its predecessors, was indebted for valuable assistance and advice to Mr. Thomas N. Molloy, United States consul.

The last stores came on the morning of July 7, and at noon we passed the narrows of St. John's, to remain for three years without direct communication from the outside world.

The harbor of Godhavn, Greenland, was reached 9 p. m. July 16. The voyage was made in the face of continual adverse winds, with cloudy or foggy weather. Two strong northerly gales were experienced, during which the ship behaved admirably. No ice was seen south of Cape Farewell, except a few icebergs off the east coast of Newfoundland to the north of Funk Island. A thin pack of stream ice was fallen in with off the Greenland coast the evening of July 12, in 61° 30′ N., 53° 30′ W., and was passed through in about four hours. A second pack was met with the next day in 62° 30′ N., 53° 15′ W., and was passed through in an hour. Neither stream of ice offered any obstruction to free passage, or caused the slightest delay. Both packs consisted of ice-floes varying from one to eight feet above the water. These floes originally formed part of the Spitzbergen Ice Stream, a portion of which, after reaching Cape Farewell from the east coast of Greenland, is carried by the southerly current into Davis Strait. Along the lower Greenland coast only occasionally icebergs were seen, but in Disco Bay over a hundred were in sight at one time.

The expedition received at Godhavn official and personal courtesies from Herr Krarup Smith, royal inspector of North Greenland. He delayed for a day his departure on an official inspecting tour to Proven and Upernivik, in order to ascertain what he could do for the expedition. He promised all possible aid and assistance from the other Danish officials. I learned from him that the winter of 1880–'81, except a brief period of cold in March, had been one of marked and unusual mildness in Greenland.



GODHAVN, GREENLAND, JULY 19, 1881.

(From a photograph.)

RITENBENK, GREENLAND, JULY 21, 1881.

(From a photograph.)

The expedition procured at Godhavn twelve dogs and a large quantity of dog-food and some seal-skins. A quantity of mattak (the skin of the white whale, a valuable anti-scorbutic) and a few articles of fur-clothing were obtained by barter—the only possible manner. The wife of Inspector Smith and Mr. Fleischer, the chief trader at Godhavn, were of material assistance in this matter. The remains of the house purchased in 1880, which was stored at this point, were taken on board, as also some 3,000 pounds of Hudson Bay pemmican, which had been placed at my disposal by H. W. Howgate.

One set of time observations were obtained at the only hours during which the sun shone while the vessel was at Godhavn.

On July 20, Dr. Octave Pavy, having reported, was contracted with as acting assistant surgeon of the expedition.

The usual courtesies were shown the expedition at Godhavn and other Greenland ports.

The *Proteus* left Godhavn the morning of the 21st and reached Ritenbenk, Greenland, the same day. At this point nine dogs, dog-food, seal-skins, and other minor articles, which had been collected for the expedition through the energetic efforts of Dr. Pavy, were purchased. Here also Mr. Henry Clay joined the expedition, in the position of Signal Service employé.

A fog delaying our departure, Lieutenant Lockwood, with a party, was sent for birds to Aryeprins Island, near by, where he obtained sixty-five guillemot (*Alca arra*).

The spring of 1881 at Ritenbenk had been the most forward one for years.

The *Proteus* left Ritenbenk the afternoon of July 22, and, passing through Waigat Strait, anchored on the 24th at Upernivik, having been delayed by fog nearly ten hours just off the harbor.

To my disappointment, skin-clothing could not be obtained at Upernivik, except by a delay of ten days or two weeks. Fortunately, ten suits which had been made by order of the Danish Government for the use of the observers of the proposed international station at Upernivik, in 1882–'83, were on hand, and were purchased through the intervention of Inspector Smith. The two Eskimo who were recommended for service with the expedition were living at Proven, some fifty miles to the south, and in consequence it was necessary to put the steam-launch *Lady Greely* into the water for the trip. A severe storm prevented her immediate departure; but before it had entirely abated, Lieutenant Lockwood started southward on the 24th, taking a circuitous route next the mainland and inside the many islands, in consequence of the heavy weather. He was accompanied by Mr. Elberg, the chief trader of Upernivik, in whose district Proven was situated.

On the 24th and 25th, Lieutenant Kislingbury, with a party, was sent in the whale-boat to the loomery near Sanderson's Hope. They obtained four hundred and twenty guillemot which were dried for use at Discovery Harbor.

Lieutenant Lockwood returned on the 28th from Proven, bringing back, for service with the expedition, two Eskimo, Jens Edward and Frederik Thorlip Christiansen. They were formally contracted with the same day. He reported that the launch behaved admirably, both as a sea-boat and when under steam. He killed one hundred and twenty-seven guillemot during his trip. He also succeeded in securing a considerable quantity of skin-clothing, part of which, though second hand, was very serviceable. Sergeant Rice accompanied the party to Proven and made several negatives at that point.

Fortunately for the interests of the expedition, Inspector Smith was again met with at Upernivik, and it was through his marked interest and kindly influence that the service of the natives and so good a stock of all needed articles were secured. He informed me that the winter of 1880–'81 at Upernivik had been very mild, and the spring a very forward one; in fourteen years Upernivik had never been so green. Reports from Tasiusak were to the effect that the ice had broken up very early and had entirely disappeared.

Ten dogs, additional dog-food, sledge-fittings, dog-harness, and seal-skins were bought from Mr. Elberg, at Upernivik. The dogs so purchased proved to be diseased, and through contagion from them two-thirds of our draught animals eventually died.

At 7 p. m., July 29, the pilot was discharged about three miles west of Upernivik. After running northward a few hours, I decided to take the "Middle Passage" across Melville Bay, as there was no ice in sight except a few scattered bergs. Land was sighted at 4 a. m. of the 31st, and at 7 a. m. the engines were stopped, as the dead reckoning placed the vessel six miles south of Cape York. Dense fog prevented any land from being seen until an hour later, when, the fog lifting a few minutes, land was found to be about five miles distant. Nothing in the shape of a pack was encountered in Baffin Bay, but in about 75° N., 64° W., ice was seen a considerable distance to the westward, but whether it was a close or open pack was uncertain.

Of all favorable passages across Melville Bay, this is the most remarkable; but thirty-six hours from Upernivik to Cape York. The *Alert* ran across in seventy-two hours, the *Polaris* in forty hours (from Tasiusak), and the veteran whaler, Capt. William Adams, in 1873, as early as June 9, crossed in seventy-two hours. Though the Middle Pack is much feared by the most experienced navigators, yet its terrors have been much diminished since the use of steam. There seems to be but little doubt it can be passed without trouble almost any year late in July or August. The whalers passing Melville Bay in June necessarily follow the land ice.

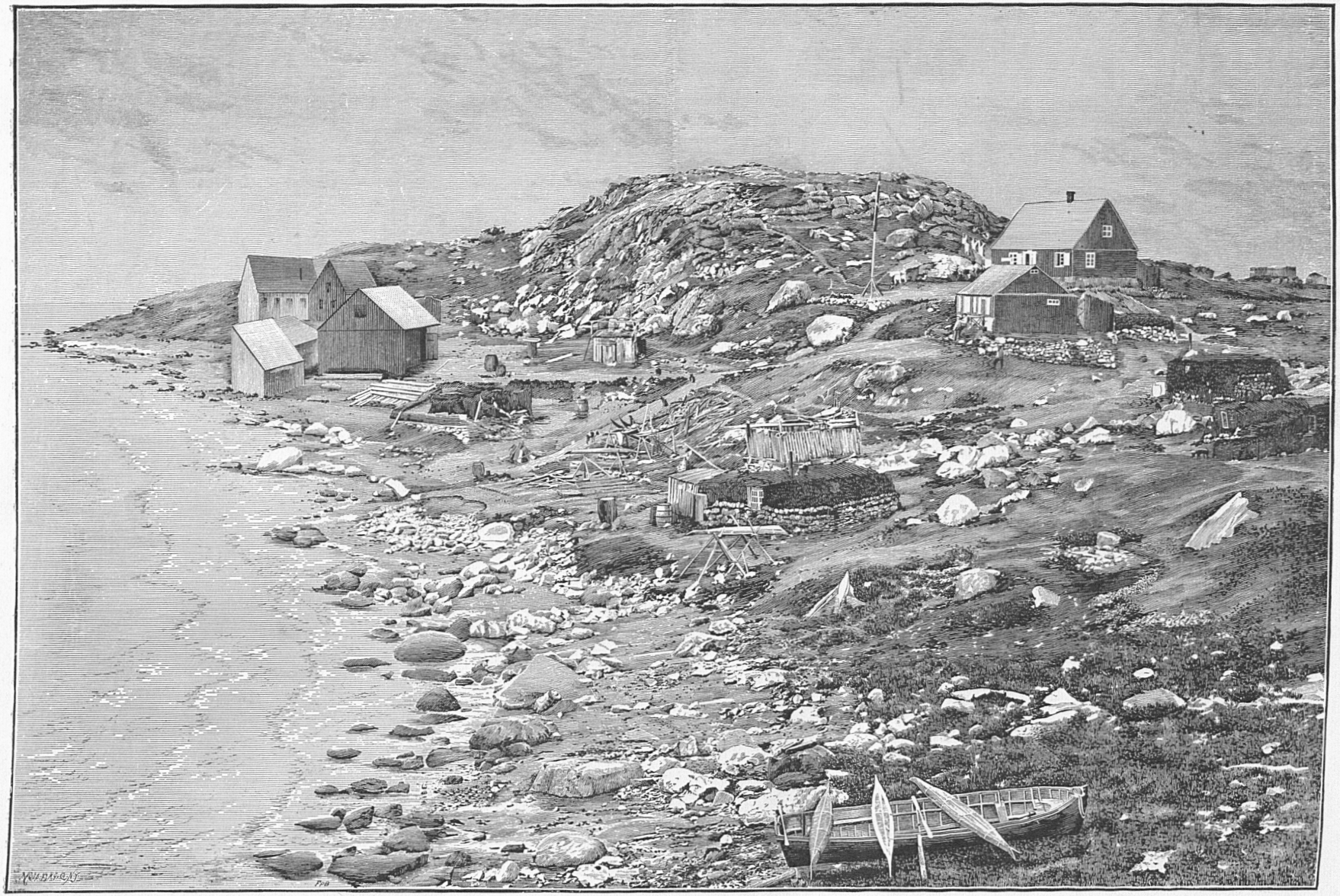
A polar bear (*Ursus maritimus*) and a seal (*Phoca barbata*) were killed on small detached floes in Baffin Bay. The vessel lay-to July 31 on account of foggy weather. Several soundings and serial temperature observations were made, which, together with others made during the journey north, form Appendix No. 104.

AUGUST, 1881.

The fog lifted the morning of August 1, at which time we were off Petowik Glacier, southeast of Cape Atholl. Along these shores were small patches of snow, of a dirty reddish color, which were without doubt the reddish snow of the "Crimson cliffs" of Sir John Ross. We took a course westward from Wolstenholme Island, and sighted the Cary group at 3.10 p. m. A party landed on the southeast island at 6 p. m. to examine the cache made by Sir George Nares in 1875. With Lieutenant Lockwood, I examined the provisions, and found them in generally good condition, except a certain portion of the bread, which was eatable, though somewhat moldy. The whale-boat was in serviceable condition. The cache evidently had not been disturbed since it was landed, six years before. At the same time, Dr. Pavy obtained from a cairn on the summit of the island a record left by Sir Allen Young in 1875–'76. A copy of the records obtained and left form Appendix No. 5. Sergeant Rice, with considerable difficulty, obtained a photograph of the cairn, which is at the very summit of the island, some five hundred feet above the sea.

On the island was found a worn oar and a number of other pieces of drift-wood, among which was a charred piece of ornamental work (possibly of the figure-head) of a ship which had been burned. The whaler *Xanthus* was burned about five miles north of Tasiusak in 1880. If, as is probable, this was from the *Xanthus*, it is interesting as showing a southeast surface current to extend occasionally that far to the north. Such a current from the southeast was experienced by us all day of July 31 off the coast, near Cape Dudley Digges. This fragment was of an old vessel, as the original red and yellow paint had been afterwards overlaid with a coat of white.

Cape Alexander was passed about 10 a. m. of the 2d, and at 1 p. m. we anchored south of Littleton Island. A careful and exhaustive search was made by me for seven hours, before



PROVEN, NORTH GREENLAND, JULY, 1881.

(From a photograph.)

DANISH ESKIMO AT PROVEN, NORTH GREENLAND.

(From a photograph.)

the Arctic mail on Littleton Island, landed by Sir Allen Young, in 1876, for the English expedition, was found. The seven packages of mail were later sent back by the *Proteus*, to be returned through the proper channels to the Admiralty in London. During the search a large number of cairns were found, all of which were empty, except two, which contained records from the steam-whaler *Eric*, Capt. J. B. Walker, dated June 20, 1876. The cairn erected by Sir George Nares was found open and empty, and had probably been plundered by the Eskimo, as part of the London *Standard*, of an unknown date in 1875, was found by me in the snow on the west side of the island.

While I was engaged in searching for the mail, Lieutenant Lockwood with a party landed over six tons of coal as a depot for fuel for possible future use. It was on low ground about twenty feet above the sea, on the extreme southwest side of Littleton Island, in sight of Cape Alexander.

Lieutenant Kislingbury, with Dr. Pavy and a party, visited Life Boat Cove to communicate with the Etah Eskimo, if any could be found, and to examine the *Polaris* winter quarters of 1872–'73. The transit instrument was found about twenty feet from the cairn in which it was originally deposited. Nothing remained of *Polaris* house, but the ground was covered with various articles of iron and other metals, which are well shown by the photographs taken by Sergeant Rice, who also made several other negatives in the neighborhood. Lieutenant Kislingbury's report forms Appendix No. 6.

None of the Eskimo had been seen in our northward journey, although a close watch had been kept on the coast from Cape Dudley Digges to Wolstenholme Island, and from Cape Chalon north. It was evident that none had lived at Life Boat Cove within the year, and probably not within three or four years.

The wheel of the *Proteus* needed some repairs and delayed us until 11 p. m. of August 2. The weather on leaving was fair with no ice in sight, and in consequence I did not dare to spend time for the examination of the two hundred and forty rations at Cape Sabine, but ordered the captain to make direct for Cape Hawks, which was reached 9 a. m. August 3.

The *Proteus* lay-to just north of Cape Hawks, while I with Lieutenant Kislingbury examined the English depot of 1875, and sent Lieutenant Lockwood and Dr. Pavy to Washington Irving Island. The jolly-boat was found in good condition, and was taken by me, as I was short of boats. It was named the *Valorous*, from H. M. ship to which it originally belonged. Two barrels of pickles, two barrels of stearine, a barrel of preserved potatoes, and two kegs partly full of rum were found in excellent condition. There was a large quantity of bread, some of which had evidently moulded owing to the casks being left in a depression of the rock where melting snow collected in summer. Three cans of potatoes and a keg of piccalilli, and the part of keg of rum were taken, and the remaining stores were placed in the best possible condition to resist the weather. Sergeant Rice made several photographs of the surrounding country during our brief stay.

Lieutenant Lockwood found on Washington Irving Island Sir George Nares' record of 1875–'76, which with his own notice forms Appendix No. 7.

Cape Hawks was left at 11 a. m., and at 3 p. m. Cape Frazer was passed. Washington Land was sighted at 4 p. m. through the fog, which had just set in. To this time no pack had been seen, and Kane Basin was evidently freer from ice than Baffin Bay. Only a few rotten floes of very limited extent were at any time visible. The only paleocrystic floe-bergs seen were four large ones near Cape Frazer.

The eightieth parallel was crossed at 5 p. m., and half an hour later the vessel was abreast of Cape Collinson; but increasing fogginess deterred me from examining the sledge rations there, for fear of serious delay in my northward progress. Scoresby Bay was filled with harbor ice, apparently unbroken that year, and already a fringe of new ice extended outward a mile or more into the sea. The dense fog retarded our progress considerably, and

about 10 p. m. it was necessary to lay-to until the morning of August 4. About 10 a. m. we obtained a sounding some eight miles southwest of Franklin Island, with no bottom at one hundred and thirty fathoms. Carl Ritter Bay was reached at 2 p. m., and a small depot of about two hundred and twenty-five rations of bread and meat were cached on the extreme northern shore of the bay. Cape Lieber was neared, and a heavy pack against the land was passed by a detour to the eastward.

At 9 p. m. August 4 the vessel was stopped for the first time by the ice in the extreme southeastern part of Lady Franklin Bay, only eight miles from our destination. The pack was a very heavy one, extending in a semicircle from Cape Baird to the Greenland coast, near the mouth of Petermann Fiord. It consisted of paleocrystic floes ranging from twenty to fifty feet in thickness, which were cemented together by harbor ice from two to five feet thick. The *Proteus* was made fast to the southern edge of the pack to await further movements of the ice.

On the 5th the cliffs of Cape Lieber were thoroughly examined by Lieutenant Lockwood, Dr. Pavy, and myself, and a cairn was erected on the highest peak. No signs of a previous cairn or any other indications of an earlier visit were noted. From the summit of Cape Lieber the ice to the northward, in Hall Basin and Robeson Channel, was seen to be heavy and almost continuous.

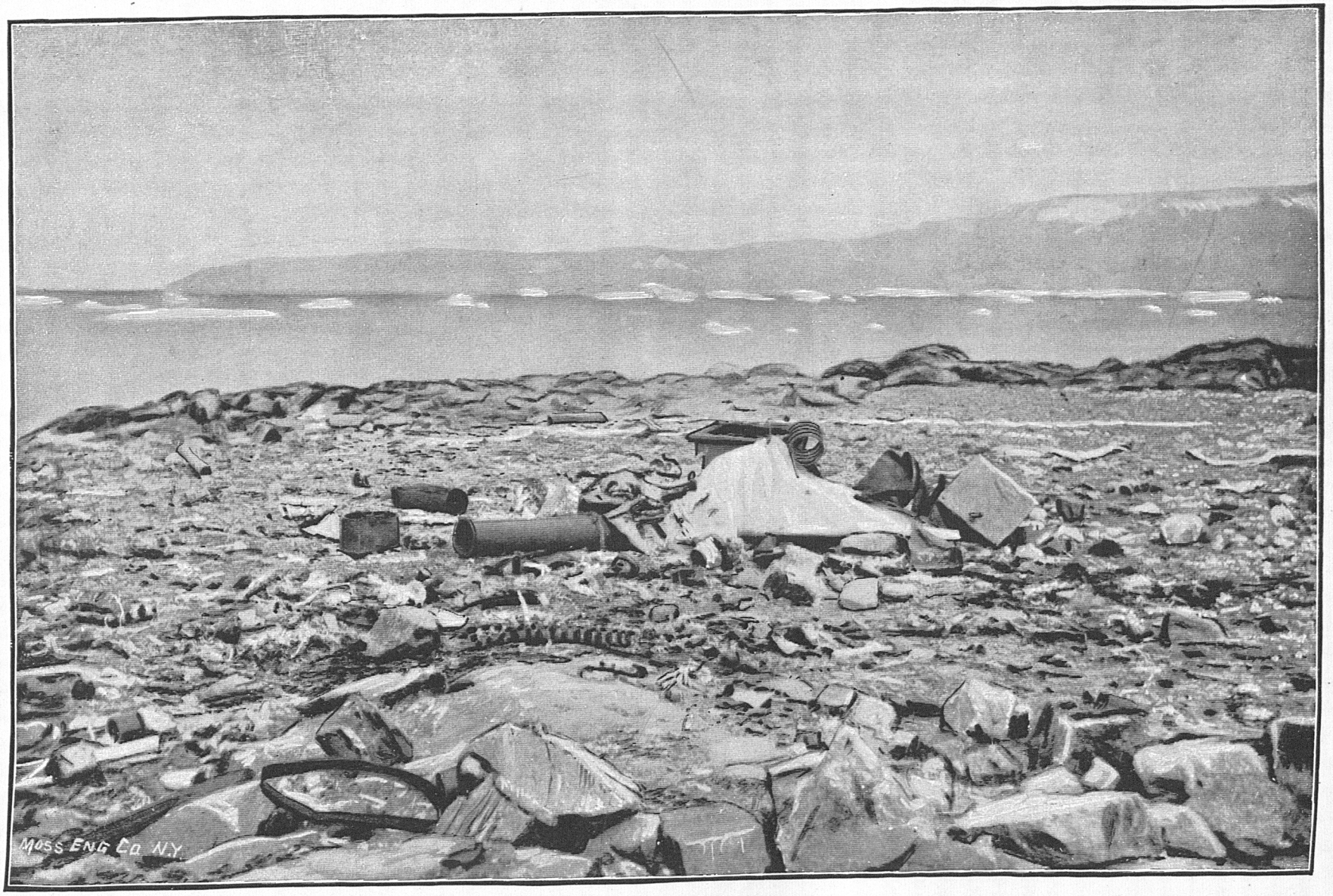
During the 6th, 7th, and 8th of August it was found necessary to frequently change the position of the vessel in order to avoid besetment, but every opportunity was improved to hold as much ground as possible. Immense fields of ice passed southward during this time.

On the 8th a nip appeared probable, as the fields driven to the south packed together and formed a wide barrier, which apparently caught between Hans Island and the Grinnell Land coast. A strong north wind at the same time was forcing immense quantities of ice southward from Hall Basin. Preparations were made for a nip and the screw and rudder made ready to be unshipped instantly. The condition of the ice improved, however, at the turn of the tide, but the vessel was forced slowly southward to within some five miles of Hans Island, having lost about forty-five miles of latitude.

A southwesterly gale with snow set in on the 10th, which continued during the 11th, starting the whole pack to the northward. When the snow cleared on the morning of the 11th, open water was visible along the west coast as far northward as the eye could reach. At 7.30 a. m. we ran to the northward, and by 2.30 p. m. had crossed Lady Franklin Bay without detention from the ice. Water-course Bay was entirely filled with pack-ice, jammed against the shore, which extended to the southward, but a narrow lane of water between Distant Cape and Bellot Island permitted the vessel to enter Discovery Harbor, where she was moored to the ice inside Dutch Island. Fast harbor-ice about eighteen inches thick covered Discovery Harbor, as well as the western half of Lady Franklin Bay.

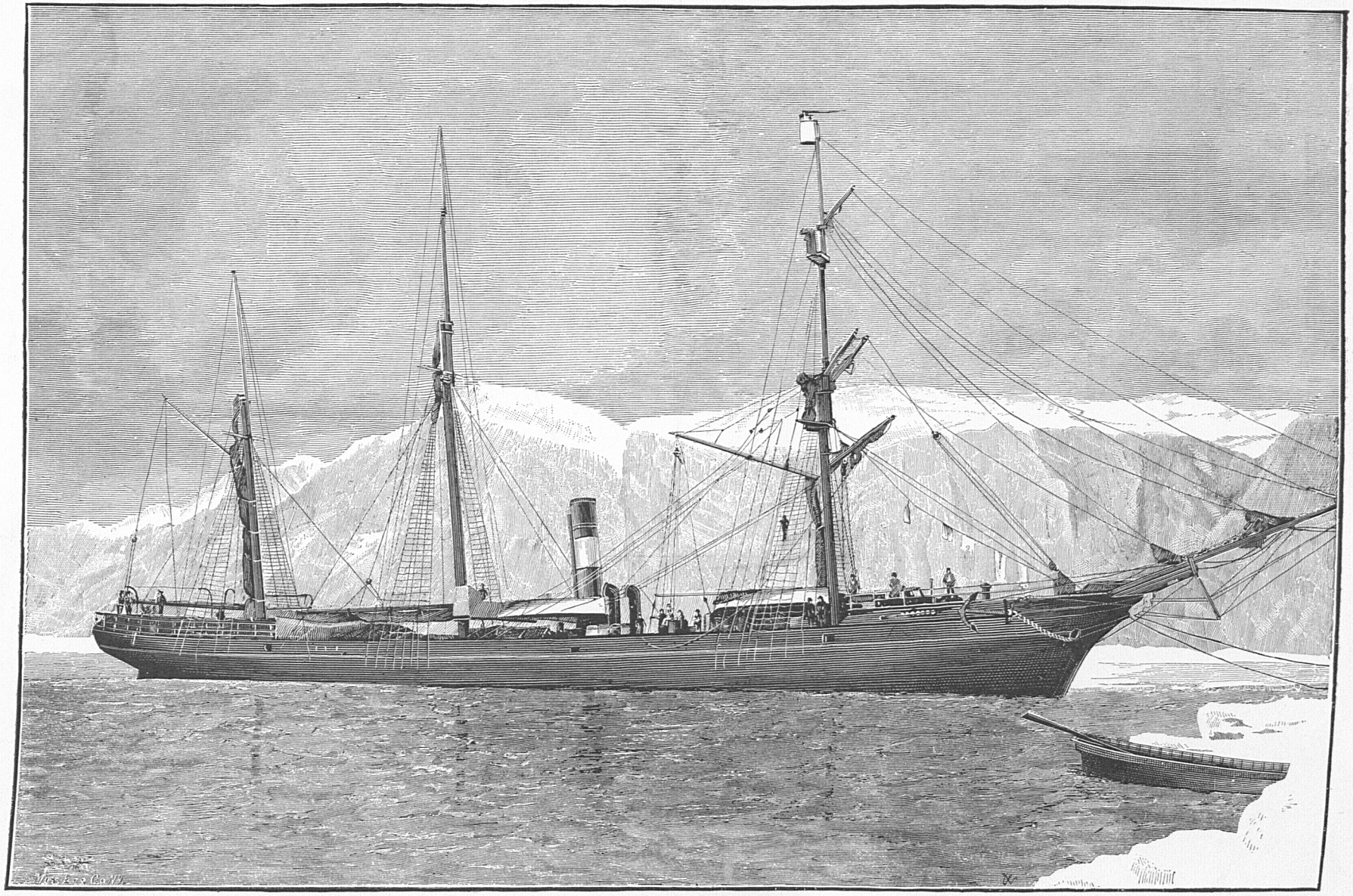
Lieutenant Lockwood was sent to examine Water-course Bay and the coal seam, while I visited the winter quarters of H. M. S. *Discovery*. The records found by me form Appendix No. 8. Lieutenant Lockwood's report on Water-course Bay forms Appendix No. 9. He considered the place an excellent one for the station, and reported that the bay, which was evidently a shallow one, was partly clear of ice, and that a vessel could probably approach within some two hundred yards of the shore. The situation of the bay was such that, while discharging, a vessel would necessarily be unprotected against the moving pack. In consequence I decided to establish the station at "Discovery" winter quarters. The decision was a wise one, for Dr. Pavy, from ground overlooking Water-course Bay, found it full of pack-ice on the 13th. Immediately on landing we succeeded in killing fourteen musk-cattle, which furnished an excellent and abundant supply of fresh meat for the first winter.

On the 12th the *Proteus* broke her way through nearly two miles of heavy ice, and anchored on the holding ground of H. M. S. *Discovery*, within one hundred yards of the post-



SITE OF POLARIS HOUSE, OCCUPIED IN 1872 AT LIFE-BOAT COVE, JULY, 1881.

(From a photograph)



PROTEUS IN ICE, ENTRANCE TO DISCOVERY HARBOR, AUGUST 12, 1881.

(From a photograph.)

office cairn of Captain Stephenson. The party was divided into gangs for unloading the stores. The general cargo was discharged in sixty hours by 4 a. m. of the 14th, and one hundred and forty tons of coal were landed by the evening of the 18th. The station was named Conger in honor of Senator Omar D. Conger, who had taken a deep interest in the expedition.

On August 14, my surgeon, first through an officer and later personally, expressed to me his intention of breaking his formal contract and leaving the expedition unless Mr. Henry Clay, with whom he had quarreled, should be ordered from duty with the party. The situation was trying in the extreme. If on one hand it seemed quite impossible to face without a regular doctor two years' isolated, Arctic service, it would on the other hand certainly be destructive to discipline and success if the commanding officer thus yielded to dictation from his subordinate. Dr. Pavy was immediately informed that such threat could receive neither consideration nor concession, but that he must submit to the judgment and decision of his commander. Dr. Pavy yielded. Mr. Clay, unaware of the question, later requested to be relieved in order to promote harmony; and I so ordered, having in my mind determined that such procedure was necessary, on the same grounds as actuated Mr. Clay's request.

The surgeon reporting Corporal Starr as unfitted for stay, owing to asthma, he was ordered to return in the *Proteus*.

To facilitate the departure of the vessel, and at the earnest request of her captain, she was formally discharged at 6 p. m., August 18, although our coal was ten tons short, which it was thought could be obtained from the adjacent mine. The expeditionary force landed at 7 p. m. and took up temporary quarters in tents.

The *Proteus* left her anchorage about 5 a. m., August 19, but being stopped by heavy ice, which late southerly winds had accumulated at the northern entrance of the harbor, returned to anchorage off Proteus Point. This name was given to a point off the east shore of Discovery Harbor, nearly midway between our station and Dutch Island. The steam-launch under Lieutenant Lockwood's command attempted to follow the *Proteus* when she left her anchorage on the morning of the 19th, but, owing to the heavy floes, found it not only dangerous but impossible to do so. The *Proteus* made several attempts to leave the harbor but was unsuccessful until the evening of the 26th. Private Ryan was sent on board the 22d, under orders to return to Washington, on account of an epileptic attack.

On August 26, Second Lieut. F. F. Kislingbury, dissatisfied with the expeditionary regulations, requested to be relieved. He was immediately relieved and ordered to report in person to the Chief Signal Officer. The *Proteus* got under way just as Lieutenant Kislingbury was leaving the station to board her, and he was consequently obliged to return. He was at first notified that he would be regarded as awaiting orders at the station, but subsequently, at his own request, the order was so modified as to consider him awaiting transportation in order to report to the Chief Signal Officer of the Army. He remained at Fort Conger performing no duty, and no further requirements were made of him than that he should conform to the police regulations of the station. At no time did he ever request to be returned to duty as an officer of the expedition, and his assignment to duty on April 9, 1884, at the time of Lieutenant Lockwood's death, was made on my own responsibility, as being required by propriety, if not by the exigencies of the service. It may here be said that Lieutenant Kislingbury at various times contributed by his skill and assiduity as a hunter to our stock of game, and thus to our comfort and health. The orders and correspondence in his case form Appendices Nos. 10, 11, 12, 13, and 14.

By almost incessant work the house was covered in so that the cook-room could be occupied on the 21st, and by August 31, although not comfortable, the house was habitable. The general stores having been secured and the house well advanced, attention was turned to field work. Lieutenant Lockwood started with two men on the 29th to ascertain the best route for inland travel to and around St. Patrick Bay. He returned on the following day

having killed a musk-ox during his absence, and also frozen (fortunately only superficially) his foot. St. Patrick Bay was found to be fringed on its southern shores with precipitous cliffs, at the head of and overlooking the bay, of about nine hundred feet elevation, which could be passed only with great difficulty. His report forms Appendix No. 15.

Acting Assistant Surgeon O. Pavy and Sergeant Rice, the photographer of the expedition, having volunteered their services for an overland trip, were sent northward August 29, with instructions to proceed as far as practicable towards Cape Joseph Henry, and search for traces of the *Jeannette*. Lack of snow forbidding sledges, and heavy running ice the use of boats, they were obliged to carry food, bedding, etc., on their persons. Sufficient provisions were taken to last as far as the English depot at Lincoln Bay, where they could be renewed. Sergeants Ralston and Linn accompanied them one day's journey, hauling supplies on a wheeled conveyance to form depot A at the most convenient place, which proved to be the top of the precipitous cliffs overlooking St. Patrick Bay.

Visiting Dutch Island the 30th and finding that Robeson Channel was clearing of ice, I decided to attempt the establishing by boat of a depot to the northward. Stores and a whale-boat were hauled over the ice to Dutch Island, and on the 31st Sergeant Brainard and five men left with stores for depot B. Instructions did not permit them to proceed farther north than Cape Beechey. If threatened seriously by ice, the boat was to be secured above tide-water and the party return on foot to the station. Sergeant Brainard was sent in command of this party owing to Lieutenant Lockwood's temporary disability from frost-bite.

During the month one ptarmigan, a hare, and sixteen musk-cattle were killed.

On the 23d a permanent bench-mark was established, in order that any subsequent expedition could determine any elevation or depression of the land which might meanwhile occur. The earth was excavated several inches below permanent frost, and a brick pier set in cement was erected. A bar of iron, half an inch square, projected two inches above the brick pier, into which it was firmly set. Its top is 24.5 feet [7.5^{m}] above mean sea-level; it has a mark (XX) on its south (true) side.

A temporary tide-gauge was erected on the 18th, and a permanent one on the 23d, from which latter date hourly readings were made. Hourly meteorological observations were discontinued on the *Proteus* at 12 p. m. August 18, and commenced on shore an hour later. These readings gave a mean pressure (8th to 31st) of 29.842, and a mean temperature (5th to 31st) of 33.30° [.7° C.]. Extremes of 45.9° [7.7° C.] and 15.6° [—9.1° C.] were noted; the latter being the lowest August temperature on record, until exceeded during our retreat in 1883.

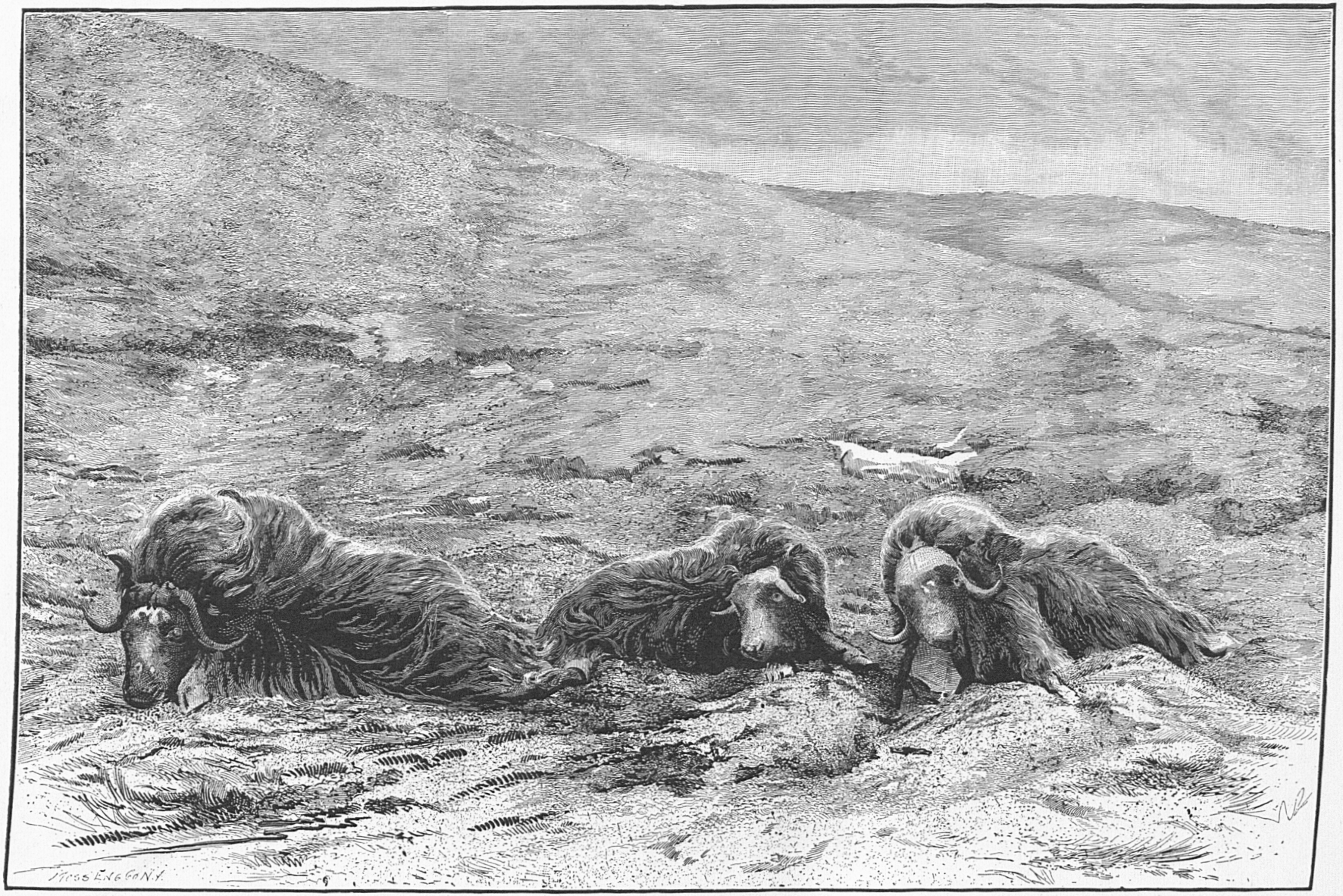
By the morning of September 1 the entire harbor was frozen over, and the young ice was 4⅜ inches thick.

The health of the command at the end of the month was excellent.

SEPTEMBER, 1881.

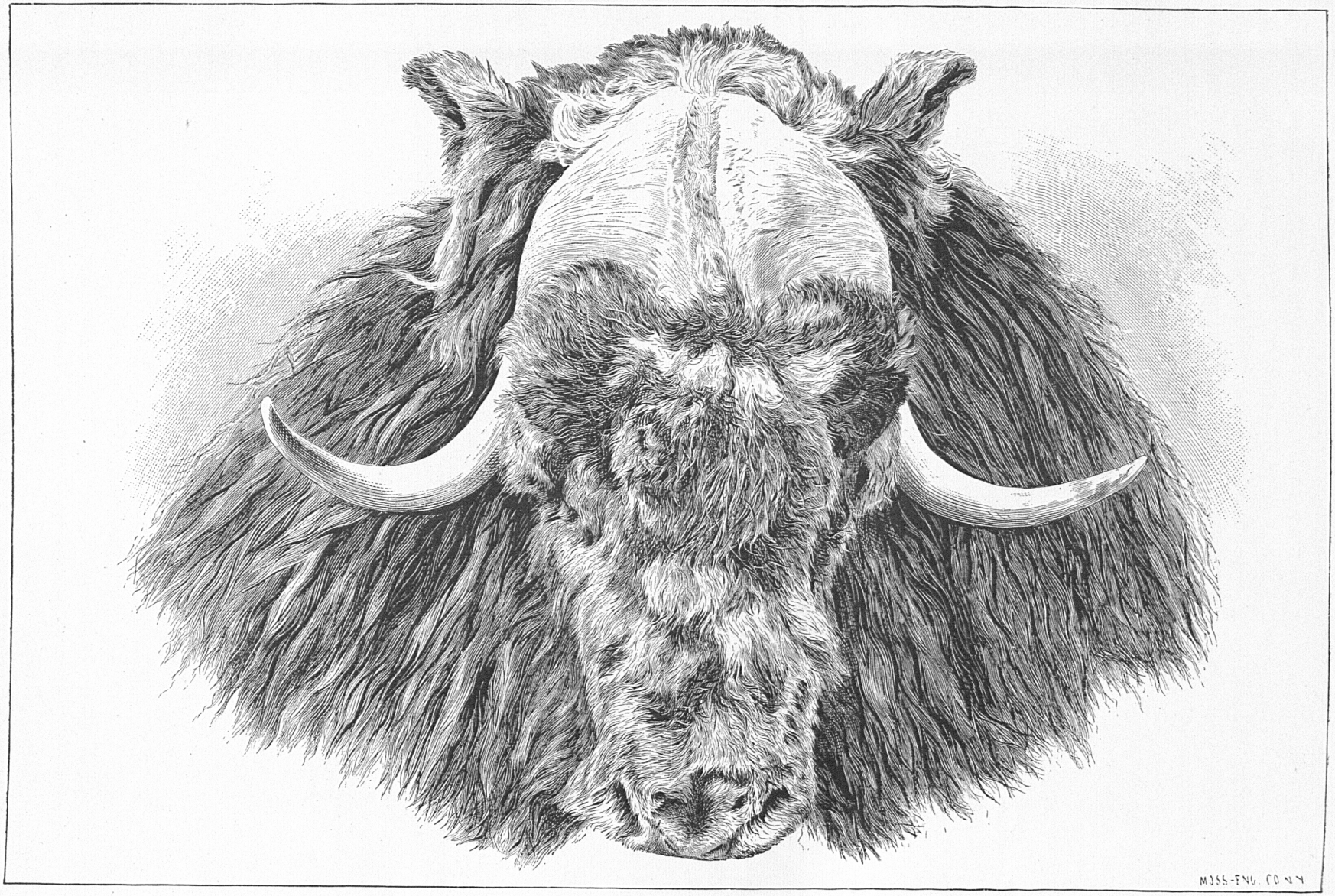
Sergeant Brainard returned with his party on the 3d, having walked overland from the foot of Mount Beaufort, near Cape Beechey, where depot B had been established. The incidents of his journey were as follows:

Leaving Dutch Island the forenoon of August 31, the boat had experienced much difficulty from young ice. After incurring imminent danger from large moving floes, they reached Cape Beechey, but were obliged by the difficult ice-foot to land four miles below the cape, where heavy ice came down as they were unloading. Drawing up the boat and pitching the tent, they waited thirty-six hours for an opportunity of returning by boat. Finding that the ice remained packed, they secured everything and returned to the station across a very rough country, passing St. Patrick Bay over the new ice. The detailed report of Sergeant Brainard, together with that of Sergeant Jewell, forms Appendices 16 and 17.



MUSK CATTLE KILLED ON MOUNT CARTMEL, NEAR CONGER, AUGUST 12, 1881.

(From a photograph.)



HEAD OF MUSK OX KILLED NEAR CONGER.

(From a photograph.)

Sergeant Gardiner and Corporal Salor were sent the 6th to examine how far westward from Cape Murchison the foot-hills of St. Patrick Bay were practicable for loaded sledges. They reported the route possible on land, only a mile beyond and northwest of Cape Murchison, where precipitous cliffs, at the mouth of and overlooking St. Patrick Bay, would necessarily cause any sledge party to take the ice-foot or main pack. They found an eight-man sledge, a pickax, a cooking-lamp, and a twelve-foot cedar boat, with paddles. Only slight repairs were needed to make the boat serviceable. Boat and sledges were evidently abandoned by sledging party from H. M. S. *Discovery*, in 1876. Sergeant Gardiner's detailed report of this journey forms Appendix No. 18.

September 7, Sergeant Linn was sent with a small party to remove depot A from the cliffs overlooking St. Patrick Bay to a point in the southeast corner of the bay, where a party traveling north would naturally pass it. It was located a mile northwest of Cape Murchison. Sergeant Linn found in Water-course Bay a cart left by the English expedition, 1875–'76. His report forms Appendix No. 19.

September 7, accompanied by three men and taking dog-sledge *Antoinette*, I started westward to ascertain the condition of the ice in Archer Fiord, to examine the depot which Lieutenant Conybeare, R. N., was believed to have left in Sun Bay, and to gather such information as would be valuable in case of a sledge trip inland toward the west coast of Grinnell Land. The western shore of the large bay forming the extreme southwestern parts of Discovery Harbor was reached that afternoon, and while the party were slaughtering a herd of musk-oxen, I visited alone Sun Bay and Stony Cape. The ice in Archer Fiord, of recent formation, was found in perfect condition for traveling. Searching two hours over rocky points for the depot, and seriously injuring my knee by a fall among sharp rocks, I was obliged to abandon the search. Two cans, one each of rum and alcohol, were the only articles found. Possibly the rations may have been left in bags and been eaten by animals, a wolf's lair being near. Eleven musk-cattle were killed, the remainder of the herd being spared by my orders, to guard against their extermination. Twelve eider ducks were killed in the southwest part of Discovery Harbor. A considerable quantity of drift-wood, apparently coniferous, as a rule, was gathered along the shores, some pieces being about three feet in circumference. The detailed description forms Appendix No. 126.

Dr. Pavy appeared at the station at 4 a. m. September 9, and reported that Sergeant Rice, suffering from an attack of inflammatory rheumatism, had been left that night in the ravine north of St. Patrick Bay, about ten miles from the station. Sergeant Brainard was at once sent to him with needful medicines and provisions, followed by four men with a sled and an improvised stretcher. Five men being unable to bring him up the high, steep cliffs bordering St. Patrick Bay, six others were added to the party, whose united efforts were required for nearly an hour and a half to get him up the cliffs. During their absence a northeasterly gale set in, and the temperature fell to +8° [—13.3° C.]. A number of frost-bites resulted, fortunately none severe.

Dr. Pavy had reached Cape Union September 3. He traveled from Fort Conger across the country, around St. Patrick Bay, striking the coast at Cape Beechey. Following thence the shore as far as Black Cliffs he was compelled by precipitous crags and open water to turn back, and reached Wrangel Bay by a detour inland. From Wrangel Bay to Cape Union the coast had been followed. The English depot at Lincoln Bay was carefully examined. The bread and many of the groceries were found to be spoiled. The preserved beef, rum, and stearine were good. Several boxes of meat and potatoes were missing, possibly blown into the channel by some violent storm. The serviceable groceries were packed in one cask. From Cape Union the Greenland coast was visible, Dr. Pavy said, as far as Cape Britannia. The Polar Ocean was covered with the ordinary pack; no paleocrystic floes, and but few water lanes were seen. In Robeson Channel a water lane, about two miles wide, extended northward

and southward along the Grinnell Land shore as far as the eye could reach. Save a few grounded bergs, no paleocrystic ice was seen at any time. No traces of the *Jeannette* were found.

The condition of Sergeant Rice precluded progress beyond Cape Union. Having broken through the young ice in Wrangel Bay, he had been troubled with rheumatic pains the 3d. On the 4th his joints were so swollen that he could not draw on his boots without difficulty. Although suffering with acute rheumatism, he traveled fifty-five out of seventy-one hours after leaving Lincoln Bay. When reached by the party he could move no limb except by great effort. The severity of his sufferings may be estimated from his losing twenty-four pounds of flesh during his journey. His pluck and endurance, as Dr. Pavy remarked, were wonderful. He recovered speedily, and on the 19th was again in the field.

Dr. Pavy found at the head of Lincoln Bay several small lumps of coal, but was unable to locate the vein. A fish about seven inches long was seen in Beechey Lake. A hare was shot, and nine musk-cattle seen during the trip. Dr. Pavy's orders and detailed report form Appendices Nos. 20 and 21.

On the 10th, reluctantly realizing that winter had come, advantage was taken of a very high tide, augmented by a northerly gale, to haul the launch *Lady Greely* up on the ice-foot, where, undisturbed, she could securely pass the winter.

September 11, Lieutenant Lockwood, with Sergeant Gardiner and Eskimo Christiansen, started with dog-sledge to explore the "Bellows," a valley leading northwestward from the southwest part of Discovery Harbor. Lieutenant Lockwood followed the valley for about twelve miles beyond the farthest of Lieutenant Archer, R. N. In the last dozen miles the valley narrowed rapidly, changed its direction to the northward, and apparently terminated in a narrow gorge a mile or two beyond Lieutenant Lockwood's farthest, through which a distant snow-covered mountain was seen.

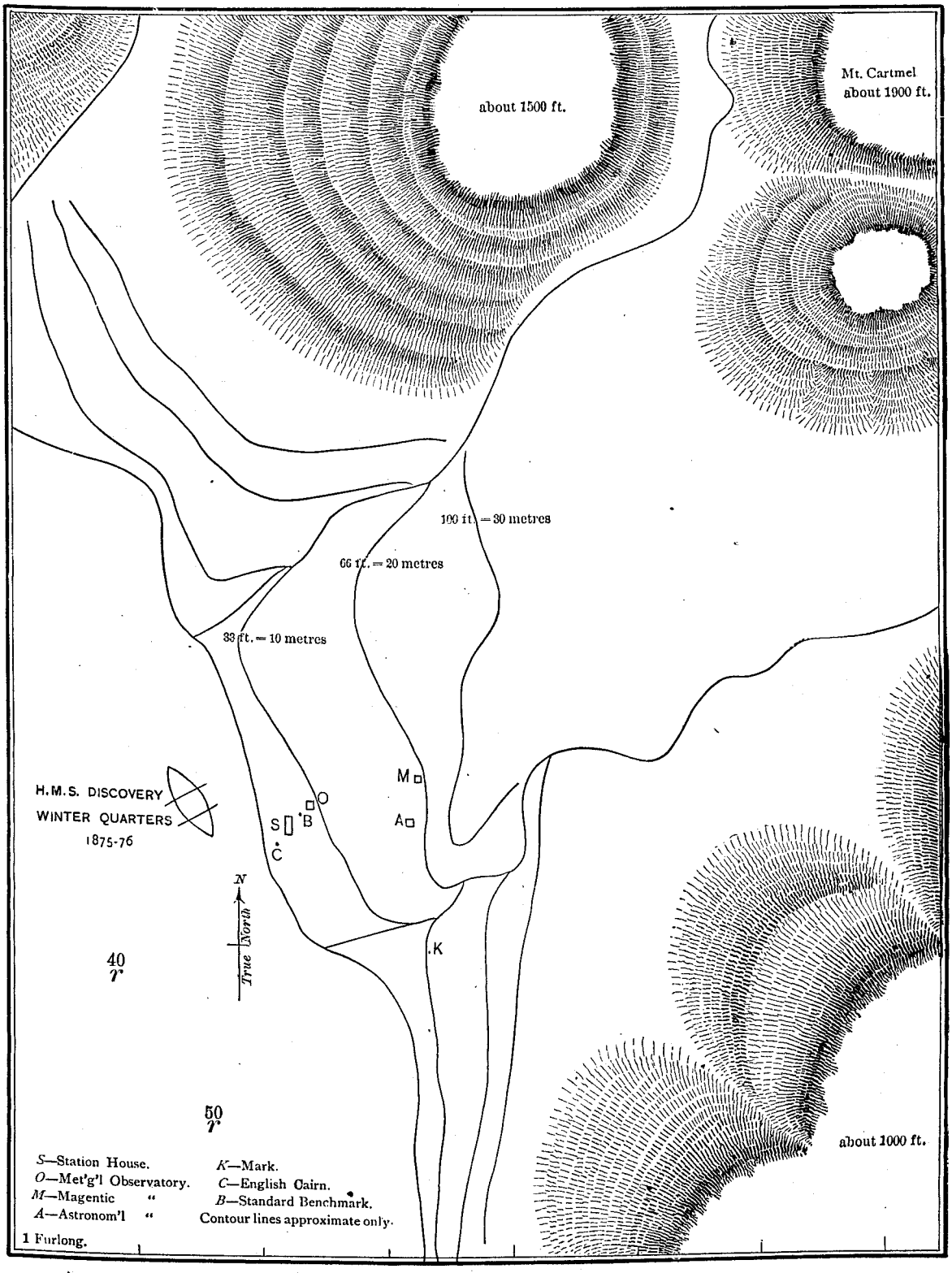
The latter part of his outward journey was on foot, he being compelled, as was Lieutenant Archer, to leave his sledge behind, it being nearly worn out by the sharp, flinty stones with which the bed of the valley was covered. A great deal of lignite coal in small pieces was seen between Black Cape and Devil's Back, but it could not be found *in situ*. This coal was evidently seen by Lieutenant Archer, R. N., who "found the bottom of the valley to consist of * * * shingle * * * mixed with some hard substance very much like charcoal." This coal resembled very much in appearance that of the vein near Water-course Bay.

About two and a half miles from Black Cape, at an elevation of nearly one hundred and fifty feet [46^{m}] above the sea, Lieutenant Lockwood found a piece of knotty pine, three feet long and eight inches in diameter, in the frozen earth. Breaking his hatchet handle in an attempt to cut it out, he was unable to obtain the stick. Two musk-oxen were seen, but in accordance with my orders were not killed. Lieutenant Lockwood's report forms Appendix No. 22.

Dr. Pavy, with two men and two dog-sledges, left September 15, with orders to proceed down Archer Fiord and travel overland westward from Mount Neville as far as his provisions would permit. He returned the following day, reporting that the late storm had broken up the new ice in Archer Fiord, and that progress beyond Sun Bay was impracticable. The written report rendered by Dr. Pavy and the orders for his journey form Appendices Nos. 23 and 24.

September 16 I started with two men for three days' inland journey towards the United States Mountains, but was myself compelled to return the same day, my knee not having sufficiently recovered from its injury the week previous. A man replacing me, the party continued onwards, but were driven in by a heavy storm the 18th. Sergeant Brainard verbally

Map of Country immediately Surrounding Ft. Conger.



reported that they had traveled twenty-five miles to the northwest, and had reached a high "divide," from which they believed water drained westward, although a thick snow-storm prevented any view.

Dr. Pavy started on the 21st with supplies for depot B, and was unable to round Distant Cape. Later in the day, with Sergeants Brainard and Rice, I got the sledge around the cape to the entrance of Water-course Bay, where, a runner breaking, the load was left until the next day, when Sergeant Brainard moved it to the north shore of St. Patrick Bay.

On the 24th Lieutenant Lockwood started with four men to haul supplies to depot B (near Cape Beechey). In returning he brought from near the head of St. Patrick's Bay a section of a large coniferous tree, probably pine. It was found just above the tide-water by Privates Connell and Christiansen, September 9, at which time the largest end was cut off for fire-wood for the relief party. The section from the center was of nine and a half inches diameter. When found, the tree was thirty feet in length. Lieutenant Lockwood's detailed report is appended, No. 25.

Sergeant Rice, on the 25th and 26th, with dog-sledge, added supplies to depot B. His report forms Appendix No. 26.

Sergeants Brainard and Jewell examined the ice towards Cape Lieber September 26. It was found to be quite rough and evidently liable as yet to open during the tides or strong winds.

During the month a hare, four wolves, twelve eider-ducks, and eleven musk-cattle were killed. The wolves were of a pack which, eighteen in number, crossed the harbor-ice near the station September 17. Two others of the pack were badly wounded.

Stars were first visible midnight of September 9 and 10. Sets of time, latitude, and azimuth observations were made during the month. From the 17th to the 19th, inclusive, hourly observations of magnetic declination were made, and observations for inclination and horizontal intensity. In addition to hourly tidal observations, the high and low waters were observed as to time and height. Hourly meteorological observations were made. (As the hourly observations mentioned above have been regularly made, they will not be referred to in detail each month.)

Mean pressure, 29.800 [756.9^{mm}]; temperature, +10.92° [—11.7° C.]. The mean temperature (4.7° [2.6° C.] below Nares, Floeberg Beach, 1875) has been surpassed as regards cold only by 9.74° [—12.4° C.] of Kane, Van Rensselaer Harbor, 1853.

Extremes of temperature, +30° [—1.1° C.] and —11.9° [—24.4° C.]. The minimum is the lowest on record for September. A minimum of —14.5° [—25.8° C.] was experienced by field parties the night of the 24th and 25th.

The new ice was fifteen inches thick at the end of the month. Snow fell on nine days; amount melted, 0.23 inch.

The issue of an ounce of lime-juice to each man, which had been made on alternate days, became daily from September 21. The health of the command continued excellent.

OCTOBER, 1881.

The state of the ice permitting sledge travel, Dr. Pavy left, October 2, with Private Whisler, Eskimo Jens, and two dog-sledges, under orders to proceed to Cape Joseph Henry, en route for drift-wood or other possible traces of the *Jeannette*. In addition to his search, he was to lay out northward such depots as would facilitate spring travel along the cost of Grinnell Land. He returned the 9th. He had been obliged to reach Wrangel Bay from Cape Beechey by an inland route, and was stopped by open water and failure of ice-foot, south of Lincoln Bay, at the cliffs of Cape Frederick VII. Very heavy ice was found from that point southward to Wrangel Bay. Two small depots (C, in Wrangel Bay, and D, at the foot of Mount Parry) were established. His orders and report are to be found in Appendices Nos. 27, 28, and 35.

Lieutenant Lockwood (3d to 5th) explored the valley north of St. Patrick Bay. About a mile and a half wide at the bay, it extends six miles to the northwest (true) and terminates in a narrow ravine, the bed of the river. His report, with a map of the valley, forms Appendix No. 29.

Lamps became necessary midday of the 8th. On the 5th, 11th, and 13th, parties were sent to the southwest part of Discovery Harbor to bring in the musk-cattle killed September 7; the eleven furnished twenty-six hundred pounds of dressed meat. The report of Sergeant Rice (Appendix No. 30) is of interest in connection with the equipment of the parties.

Lieutenant Lockwood, having ascertained on the 9th that the ice in that direction was practicable, on the 12th and 13th established a small depot of provisions at Cape Baird, for possible emergencies. Hudson Bay sledges were used for the work and proved satisfactory.

The sun was last visible from the station October 14, not to be seen again until February, one hundred and thirty-seven days. Stars were visible at noon (local time) October 22.

October 18 a party was sent to mine coal in Water-course ravine, and on the 19th, 20th, 24th, 26th, and 28th, parties were engaged in hauling it to depot A (Cape Murchison), where a ton and a half was accumulated to serve as fuel for sledge parties. A small quantity was hauled to the main station.

Lieutenant Lockwood, October 23, proceeded with a party to depot B, near Cape Beechey, and constructed a substantial snow house. A small stove and four hundred pounds of coal were hauled from depot A to depot B. He ascended Mount Beaufort October 26, and saw Robeson Channel open in all directions. The only ice to be seen appeared to be small. No floe-bergs, save a few grounded ones, could be discerned. He was of the opinion that an Arctic vessel could have steamed with but little if any trouble from Cape Lieber to Repulse Harbor.

October 9 an anemometer and self-registering thermometer were exposed on Mount Campbell, Bellot Island, at an elevation of about 2,100 feet [640^{m}]. Magnetical, meteorological, and tidal observations were continued as usual.

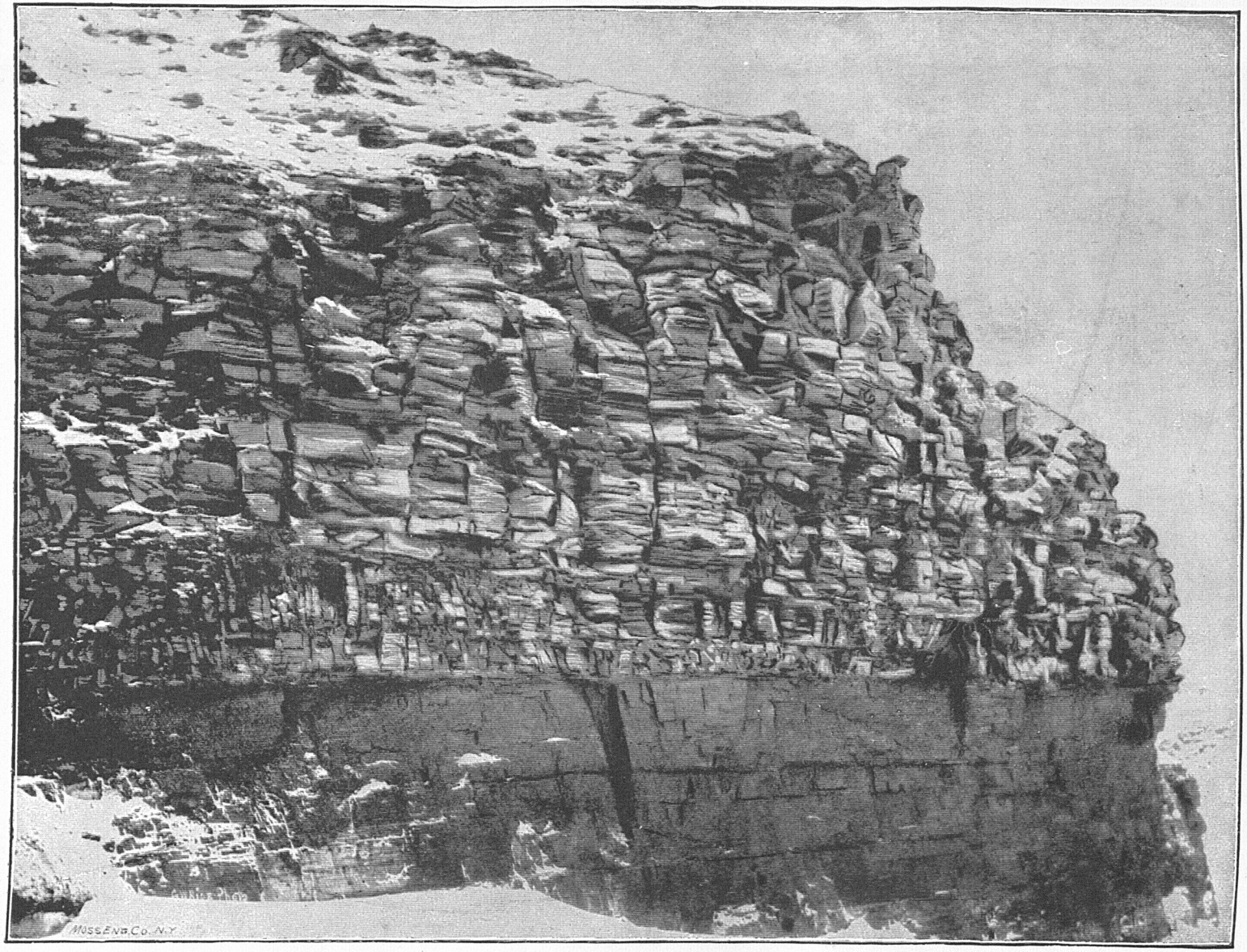
Mean pressure, 29.891 [759.2^{mm}]; temperature, −9.22° [—22.9° C.]. The mean temperature is the lowest recorded for October, except at this station (Stephenson), −9.79° [—23.2° C.], 1875. Extremes of temperature, +9.6° [—12.4° C.] and −34° [—36.7° C.]. The maximum is the lowest recorded by over 6° [3.3° C.]. A lower minimum has been recorded only by Kane, Van Rensselaer Harbor, 1854 —37.8° [—38.8° C.], and at this station, Stephenson, 1875 (—39.0°) [—39.4° C.].

Sea temperatures were observed and the new ice measured every fifth day. Ice, November 1, twenty-seven inches thick.

A case of anæmia, which yielded readily to treatment, put Private Long off of duty for a short time; otherwise the health of the command was excellent.

NOVEMBER, 1881.

Winter may be considered as having commenced when the sun left. The beginning of the long Arctic night found the expedition in excellent spirits and full of hope and confidence as to the spring work. The autumn work on the Grinnell Land coast was successful beyond anticipation. Four depots had been established to the northward; the condition of the stores at Lincoln Bay ascertained; points previously unknown reached toward the interior; and practical information gained as to the conditions governing field work in high latitudes. The only drawback was our inability to cross Robeson Channel in order to transport caches of provisions, and to ascertain the quantity and condition of the stores at Thank God Harbor. During September, young ice had prevented any attempt to cross the channel, and at the end of October, although the weather had been unprecedentedly cold, the straits could not be



COAL MINE, WATER-COURSE RAVINE, WITH REFLECTED IMAGE.

(From a photograph.)

considered as safe for sledges. Lieutenant Lockwood, however, proposed that a crossing be attempted near Cape Beechey, at the narrowest part of the channel. While sensible of the very hazardous nature of such an attempt, I consented, having full confidence in Lieutenant Lockwood's prudence, and feeling assured that his good judgment would cause him to abandon the effort at the proper time. Leaving the station November 2 with eight men, who had all volunteered for the duty, he returned the 8th, having made two unsuccessful efforts on the 4th and 5th. The channel was found covered with heavy ice, some of which was in motion, and several miles from the shore a channel of open water four or five hundred yards wide was found. Lieutenant Lockwood's orders and detailed report form Appendices Nos. 31 and 32.

Dr. Pavy, who had left with two dog-sledges, November 3, to add stores to depot C in Wrangel Bay, returned to the station the same day as Lieutenant Lockwood, November 8. Dr. Pavy's orders and reports form Appendices Nos. 33, 34, and 35.

These trips, ending twenty-three days after the sun had left us, terminated the autumn work at an unprecedentedly late date, the high latitude being considered. The expedition then settled down to winter quiet.

A tri-weekly school was commenced during the month and kept up through the winter, with benefit to the men attending. Of the educational qualifications of the expedition it may be said that every man of the party but one could write, and he acquired the attainment during the winter. A semi-monthly newspaper, *The Arctic Moon*, continued for four numbers, exciting interest and affording amusement.

The 24th was appointed as a day of thanksgiving and praise. Selections from the Psalms were read in the morning. Amusements of various kinds, races, rifle-shooting, etc., filled up the day pleasantly and added zest to the excellent dinner which followed.

November 24 the observer commenced taking daily samples of the air, in accordance with instructions furnished by Prof. Edward Morley. Other observations were continued as usual.

The thickness of the new ice December 1, was thirty-one inches.

Means: pressure, 29.760 [755.9^{mm}]; temperature, —24.53° [—31-4° C.]. Extremes of temperature, —3.0° [—19.4° C.] and —46.0° [—43.3° C.]. The mean temperature is the lowest on record of any expedition, being 2.15° [1.2° C.] lower than that of Kane, Van Rensselaer Harbor, 1853. Only one lower maximum is known: Kellett, H. M S. *Resolute*, near Melville Island, 1853 (by 5°) [2.8° C.]. There are two lower minima: Parry, Melville Island, 1819 (—47.0°) [—43.9° C.], and Kane, Van Rensselaer Harbor, 1853 (—47.9°) [—44.4° C.].

The health of the party remained excellent. No symptoms of scurvy appeared, and no other sickness occurred.

On the 30th Sergeant Gardiner broke his left leg while making a tidal observation. No complication followed in his case; his general health remained good, although the bone united slowly.

DECEMBER, 1881.

December passed slowly. About the 10th, if at any time, a few of the men gave indications of being affected by the continual darkness, but such signs soon disappeared, and cheerful spirits returned. The Eskimo appeared to be the most affected. On the 13th Jens Edward disappeared, leaving the station in early morning, without mittens and without breakfast. Sending two parties with lanterns to describe a half-mile circle around the station, his tracks were soon found, leading towards the straits. He was at once pursued, and was overtaken about ten miles from the station, near Cape Murchison. He returned to the station without objection, and in time recovered his spirits. No cause for his action in this respect could be ascertained.

Sergeant Rice, while assisting in the pursuit, fell on the ice-foot in the straits and seriously injured his shoulder. He was sent back in charge of Private Whisler. The latter had left the station in zeal, without orders, and was too thinly clad. Although the weather was moderately warm (—29°) [—33.9° C.] yet over exertion, followed by reaction, so affected him that he would have perished from cold had it not been for Sergeant Rice's judicious and persistent efforts. These efforts were the more creditable that Sergeant Rice's right arm was useless from his fall. This exposure affected somewhat Private Whisler's faculties, and it was several hours after his return before he was entirely in his right mind.

Eskimo Christiansen two days later gave decided signs of following Jens' example, saying that the men intended to kill him. In this connection it should be said that the men always treated the Eskimo in the kindest and most considerate manner, carefully avoiding any pleasantries with or allusions to them. This course had been enjoined on them by me as the result of Inspector Smith's advice regarding them, and from my knowledge of the experiences of previous expeditions. The affair gave me much uneasiness until the returning sun and commencement of spring work engaged their attention and rendered them more cheerful.

Christmas was celebrated as elaborately as our surroundings would permit. The kind thoughtfulness of friends of the expedition, some personally unknown to any member, had done not a little to contribute to our pleasure, by providing a gift for every member of the party. I am certain that the heart of more than one man was deeply touched by these contributions.

The usual observations were regularly made during the month. Means: pressure, 29.709 [754.6^{mm}]; temperature, —32.01° [—35.6° C.]. Maximum temperature, —10° [—23.3° C.]; minimum, —52.2° [—46.8° C.]. Lower means and extremes of temperatures have been observed but twice in December.

The health of the command remained good. No signs of scurvy were detected. A few cases of indigestion and anæmia, not interfering with duty, were reported.

JANUARY, 1882.

The event of January was a storm of great violence on the 16th. The barometer sank to 29.020 [737.1^{mm}] (0.86 inch in sixteen hours), while the temperature rose to —9.5° [—23.1° C.] (21.4° [11.9°. C.] in seven hours). The wind attained a registered velocity of northeast sixty-five miles per hour, when the anemometer spindle broke. Without a doubt a velocity between eighty and ninety miles per hour was reached. For nearly an hour I was fearful lest the house be torn in pieces, and I doubt not it would have been destroyed but for its double embankment of earth and snow.

Although six of the most active men devoted their energies to the observations, yet one tidal and three temperature observations were missed. The entire solid covering of ice moved perceptibly in the harbor, a swell of several inches appeared in the tidal hole (inside a snow-house), and the tidal rod was bent and displaced.

Pendulum observations were commenced on the 6th and ended on the 29th. Forty-eight separate swings were obtained, on sixteen days, with corresponding time observations. Sergeant Edward Israel, Signal Service, a graduate of Ann Arbor University, observed the transits and made the time observations. He is entitled to much credit for attention and devotion to his work, which, as every Arctic observer must know, was of a trying character. The mean temperature of the sixteen days on which he observed averaged more than 40° below zero [—40° C.], and the time observations were made with the temperature of the observatory 56° below zero [—49° C.]. It is, perhaps, superfluous to add that he suffered somewhat from frost-bites.

The detailed pendulum observations, with records of corresponding time observations, have been transmitted, for reduction and publication, to the Superintendent of the U. S. Coast

and Geodetic Survey, at whose initiative and expense the work was done. The instructions of Assistant Charles Peirce, of that service, were followed as closely as practicable, and fortunately no accident or mishap occurred in the course of the observations. The pendulum itself was brought back in good condition, so that further comparable observations may be made with that instrument.

Other observations were made as usual.

Means: Pressure, 29.717 [754.8^{mm}]; temperature, —38.27° [—39.0° C.]; maximum, —9.5° [—23.1° C.]; minimum, —58.2° [—50.1° C.]. Several expeditions have experienced lower extremes and means.

Slight symptoms of scurvy appeared in the case of Jens Edward, Eskimo, who had been in a very despondent mood, but by the beginning of February he had entirely recovered. Scurvy symptoms occurred in no other case. Marked anæmia in one case put a man off duty for a few days. From the 15th there was a general improvement in the spirits and health of the whole party.

FEBRUARY, 1882.

The beginning of the month was marked by very cold and unusually clear weather. At mid-day of the 2d the thermometer on the floe could be read without artificial light. The increasing evidences of the returning sun were closely noted by all, and naturally afforded universal gratification. The minimum temperature of the winter was observed on the 3d; the standard in instrument shelter (corrected from freezing mercury at —37.9°) [—38.8° C.], read —62.1° [—52.3° C.]; substandard on harbor floe (corrected), —63.1° [—52.8° C.]; uncorrected, —67° [—55° C.].

On the 16th terminated a period of cold probably unparalleled for its duration and intensity. Pure mercury remained frozen sixteen days and five hours, while the *corrected* mean temperature on the floe was —54.6° [—48.1° C.]. Kane's period of greatest cold for sixteen consecutive days gave a mean of but —43.3° [—41.8° C.]. At this station, Stephenson, 1876, the mean for fourteen days was (uncorrected) —49° [—45° C.].

Lieutenant Lockwood, with two men and a dog-sledge, was sent on the 19th to examine the ice from Cape Beechey towards the Greenland coast, and determine what route should be followed in crossing Robeson Channel as soon as the sun should reappear. They returned the 22d, having traveled several miles eastward from Cape Beechey and found good ice. Although mercury was frozen during their entire absence, and the temperature as low as —52.1° [—46.7° C.], the party experienced but slight frost-bites. Lieutenant Lockwood's orders and reports form Appendices Nos. 36 and 37.

Washington's birthday was duly celebrated. Out-of-door amusements with a mean temperature of —44° [—42.2° C.] were not much in favor. Races and target-shooting were participated in, however. Parties were occupied the 23d and 24th in mining coal, and in hauling it and other supplies to Cape Murchison.

On the 28th the sun, after an absence of one hundred and thirty-seven days, was seen for a few minutes.

Experiments to determine the velocity of sound were made at temperatures as low as —55° [—48.3° C.] and —61° [—51.7° C.]. More careful experiments were made the second winter, which, with deductions, form Appendix No. 137.

A hare was shot on the 15th, and later in the month two others.

The greater part of the month was employed in active preparations for spring traveling. Insufficiently equipped originally for sledging work many articles had to be improvised. The ingenuity of the party proved equal to all demands made upon it. Privates Bender and Frederick were entitled to especial credit for special devices and improvements; the former in cooking and the latter in foot and tentage gear. Sergeants Elison and Cross succeeded admirably in the construction of sledges after the Greenland and Hudson Bay models.

The new ice at the end of the month was fifty-three and a half inches thick.

Mean pressure, 29.765 [756.0^{mm}]; temperature, mean, —46.47° [—43.6° C.]; maximum, —10° [—23.3° C.]; minimum, —62.1° [—52.3° C.]

Lower minima have been reported only by the expeditions of Kane, Van Rensselaer Harbor, 1854 (—66.4°) [— 54.7° C.], and Nares, Floeberg Beach, 1876 (—66.5°) [—54.7° C.].

The mean temperature was unprecedentedly low, not only for February, but for every month. The nearest February mean, Nares, Floeberg Beach, 1876, was 8.5° [4.7° C.] higher.

The coldest month previously reported by an Arctic expedition was by McClure, Mercy Bay, January, 1853, mean (unofficial and uncorrected) —43.87° [—42.2° C.]. Against this may fairly be placed the mean of our floe thermometer, for February, —52.13° [—46.7° C.] uncorrected, —48.23° [—44.6° C.] corrected. Our floe thermometer was properly protected from radiation, and was a sub-standard, reading with the standard under similar conditions.

The health of the command was excellent throughout the month. This subject since the previous October had naturally engaged the most earnest and especial attention of Dr. Pavy and myself. Special stress was laid by me on the following points: Thorough and frequent airing of beds and bed-clothing to insure perfect dryness; regular bathing; change and variety in diet; and innocent amusements. A course of lectures was commenced in January and continued throughout the winter. Fresh bread of excellent quality, canned fruit, musk-meat or birds, and canned vegetables were all issued on alternate days. An ounce of lime-juice was taken daily by each man. The entire party was medically examined each week. This subject is treated more fully in the medical report, which forms Appendix No. 103.

MARCH, 1882.

The sun having returned, all thoughts and energies were turned towards spring traveling. Lieutenant Lockwood, with three men and dog-sledge, left March 1st for Thank God Harbor, on the Greenland coast, to ascertain what serviceable provisions could be drawn from that point for the North Greenland sledge party. A second sledge, under Private Long, accompanied him as far as depot B, near Cape Beechey, carrying additional supplies to that point.

Lieutenant Lockwood returned on the 11th, having found the traveling generally good, although in places very bad. His route outward was via Capes Beechey and Lupton; inward he traveled overland to Newman Bay and around Cape Sumner. Although the roof and a side were gone, the observatory building at Thank God Harbor was found yet standing, and the stores fairly protected from weather and animals. In quantity and variety the articles in no way agreed with the list in the *Polaris* narrative. The records of the English expedition and their store-book were brought to Fort Conger. They form, with Lieutenant Lockwood's orders and report, Appendices Nos. 38, 39, and 40. The graves of Hall, Hand, and Paul were visited and were found in good condition. The English twenty-foot ice-boat was apparently in good order. The whale-boat at Polaris Boat Camp was found, with materials at hand with which she could be made serviceable.

The experiences of this sledging party had been looked forward to by me with considerable anxiety. The journey, latitude and sun considered, was the earliest extended one on record, and was made in the worst month in the year. The party experienced a severe storm, and for ten days the temperature never rose higher than —30° [—34.4° C.]. They traveled once in —55.5° [—48.6° C.] with a light wind, and again in a storm at —40° [—40° C.]; experiencing in the latter case frequent, but not severe, frost-bites. The trip thoroughly tested foot-gear, cooking apparatus, sleeping-bags, and sledges which were, to a certain extent, experimental. While several slight defects were discovered, yet the general experience inspired

confidence and reliance during the main spring work which followed later. The exemption from severe frost-bites at such extreme temperatures were guarantees of the caution and helpfulness of the several members of the party.

It is but justice to Lieutenant Lockwood and his party to notice, in connection with this remarkably successful journey, that the distance from Thank God Harbor to Cape Sumner, was passed over in three marches. It is no disparagement to Captain Hall, that over the same road and distance from Thank God Harbor to Cape Brevoort six marches were necessary during his journey.

Sending on the 2d to Water-course Bay for the meat of two musk-cattle, which had been suspended on a tripod, it was found that drifting snow had enabled wolves and foxes to reach it. It was our only loss of meat during the winter, and was unimportant, our supply being ample.

Dr. Pavy, with Sergeant Linn, Jens, and dog-sledge, left, March 5, to establish depot E on the Greenland coast for Lieutenant Lockwood's spring traveling. His own supplies, except such as were to be drawn from the English depot at Lincoln Bay, had been cached the preceding autumn. The journey was made under trying circumstances. They traveled with the temperature as low as —54° [—47.8° C.], and crossed Robeson Channel during a northeast gale; temperature, —38° [—38.9° C.]. The only frost-bite was that of Eskimo Jens Edward, who, thinking Sergeant Linn sick, slept outside the bag rather than disturb him. Although the temperature sank that night to —44.7° [—42.6° C.] he had but one toe frozen, and that not severely. Dr. Pavy's orders and reports form Appendices Nos. 41 and 42.

March 14, Sergeant Brainard, with seven men, started with the boat *Discovery* (which had been hauled as far as Water-course Bay on the 7th) and additional sledging supplies, which were to be cached on the Greenland coast. They returned on the 20th, having left the boat and part of the supplies at depot E, in the Gap. Sergeant Brainard was unable to take all the supplies across Robeson Channel, or move depot E into Newman Bay, within the time fixed for his return, owing to his party being weakened by the loss of two men, one of whom, attacked with rheumatism, was necessarily sent back with a comrade to depot B to await the return of the party. In addition to stormy weather the party experienced extreme cold, traveling in a temperature of —50° [—45.6° C.], and having a minimum of —61° [—51.7° C.]. The successful issue of this journey under such trying conditions of the weather and temperature, bears strong testimony to the successful management of field details by Sergeant Brainard, and also evidences the hardy endurance of the members of the party. Sergeant Brainard's report forms Appendix No. 44, and his orders No. 43.

On March 19 Dr. Pavy, who had volunteered his services for that special geographical work, started for Cape Joseph Henry, whence he was to attempt the discovery of land to the northward, over the Polar Ocean. He was instructed to keep a sharp lookout for drift-wood in order that no chance for discovering the fate of the *Jeannette* should be lost. His party consisted of Sergeant Rice, Signal Service, the photographer of the expedition, and Jens Edward, driver of the dog-sledge *Lilla*.

The *Antoinette*, under Sergeant Jewell, Signal Service, was sent as a supporting sledge as far as Lincoln Bay. Sergeant Jewell returned to the station March 30. He had, after leaving Dr. Pavy at Lincoln Bay, transported two loads of supplies from depot B near Cape Beechey, to depot E in the Gap, on the Greenland coast. Private Ellis, who had left the station on the 23d to assist in this work, had unfortunately wet his feet from tidal overflow, while en route to Cape Beechey, from which somewhat severe, but superficial, frost-bites followed. Ellis, however, displayed great endurance in the affair, crossing Robeson Channel twice after his injury, and then returned on foot alone from Cape Beechey to the station. Sergeant Jewell was entitled to great credit for his energy and endurance. During the time he was in the field the mean temperature was —35.2° [—37.3° C.]; and, on five days, temperatures ranging from

—50° to —53° [—46° C. to —47° C.] were recorded. His field work was done without tentage except when he chanced to be at Cape Beechey. Sergeant Jewell's report forms Appendix No. 45.

March 19, continuous daylight practically commenced, Arcturus being the only star visible at midnight.

The jolly-boat *Valorous* was taken to Dutch Island on the 31st, and hauled up on the adjacent shore, convenient for use when the straits should open.

Four hares were the only game added to our larder during the month. A large quantity of musk-meat, and over seventy guillemots from Greenland, were yet on hand at the end of the month.

On the 7th an anemometer and on the 11th a minimum thermometer were exposed at Dutch Island for the purpose of comparison.

The usual observations were uninterrupted during the month.

Mean pressure, 29.738 [755.3^{mm}]. On the 29th the barometer touched 28.988 [736.3^{mm}].

Temperature: Mean, —29.94° [—34.4° C.]; maximum, —7° [—21.7° C.]; minimum, —46.8° [—43.8° C.]. The mean and minimum temperatures were very high for the latitude. This was the fifth consecutive month during which the thermometer remained constantly below zero [—17.8° C.].

The black-bulb solar thermometer, which was scaled only down to five degrees above zero [—15° C.], first registered on the 10th.

On the 19th the ice on Lake Alexander was found to be eighty inches thick, against fifty-four inches in the harbor a few days later. On April 1 the harbor-ice was fifty-five inches thick.

APRIL, 1882.

The early days of April were fully occupied with the final arrangements for the party selected to explore the north coast of Greenland. This work had lately been intrusted to Second Lieut. James B. Lockwood, with general instructions which empowered him to perfect the necessary field details. Sergeant Brainard and nine men, dragging the Hudson Bay sledges *Beaumont*, *Hall*, *Hayes*, and *Kane*, left April 3, followed the next day by Lieutenant Lockwood and two men with the *Antoinette*, dragged by eight dogs. In the interest of this journey of exploration, a large depot of provisions had already been established under my directions near Cape Beechey, and a second one on the Greenland coast near Cape Sumner.

The force employed consisted of thirteen; main party, Lieutenant Lockwood, Sergeant Brainard, and Eskimo Christiansen, with dog-sledge *Antoinette*; supporting parties, four sergeants, a corporal and five privates, hauling four Hudson Bay sledges.

By the 13th four men had returned to the station; two, Privates Henry and Whisler, though physically sound, had proved unfit for arduous field work at such low temperatures; Private Connell had been incapacitated by a superficial frost-bite (the party having had temperatures as low as —49° [—45° C.]) which temporarily lamed him, and Private Biederbick had been attacked by a bladder trouble which caused Lieutenant Lockwood to consider his return advisable. The latter two men returned reluctantly. Lieutenant Lockwood returned to the station on the 14th, and left again the same day. He came for a spare set of runners to the *Antoinette*, as the old set showed signs of weakness. His party and rations were then at Polaris Boat Camp, and he reported that, although delayed by violent storms, yet the progress of his work was not at all discouraging.

At 8 p. m. of the 3d, Sergeant Rice, Signal Service, the photographer of the expedition, appeared with Eskimo Jens Edward, bringing with them the iron shoe of one of the runners of Dr. Pavy's sledge, which had completely broken down on the morning of the 2d at Cape Union. This sledge had been brought from Greenland, and was hardly made of as choice material as

sledges of the same pattern which had been constructed at Conger. Sergeant Rice had immediately offered to return to the station for a runner, and half an hour after the accident was on the way to Conger with Eskimo Jens. They arrived at depot B, south of Cape Beechey, at 2.30 p. m. the same day, after journeyings which may be considered as among the most remarkable in Arctic annals. They had been thirty-six hours without sleep, and in nineteen hours had traveled at least forty miles, over a rough pack in which much rubble ice was interspersed. The temperature, which was —42° [—41° C.] at starting, fell during their march to —56° [—49° C.], and was —32° [—35.6° C.] on their arrival at Conger. Leaving Fort Conger April 4, Sergeant Rice reached Lincoln Bay the 6th, having with Jens carried the runner (which weighed twenty-five pounds) from Cape Beechey, to which point it had been taken on Lieutenant Lockwood's sledge.

Other than this accident, reports from Dr. Pavy were very encouraging. His team was in good condition, and, except the load on his broken sledge, all his supplies were at Black Cape. No heavy ice whatever could be seen from that cape, and traveling ahead appeared good. Previous to the accident he had expected to leave the coast at Cape Joseph Henry by the 11th of April.

Jupiter was last seen on the 2d, and continuous daylight commenced although the sun sank a few degrees below the horizon until the 11th.

On the 8th the temperature rose to 1.2° [—17.1° C.], after having remained continuously below zero [—17.8° C.] for one hundred and sixty-five days.

Sergeant Cross and Private Bender were sent on the 19th to Sun Bay with additional supplies for that depot. Their orders further required them to travel as far into the Conybeare Bay as could be done in half a day's march, in order to ascertain the condition of the ice, and to report on the general outlook of the country to the westward of that bay. This journey was ordered with the hopes of obtaining information as to whether that route afforded any chance of a successful journey to the westward. On their return (the 22d) they informed me that they had gone as far as opposite the west end of Miller Island. Travel was heavy, and thick weather prevented any view to the westward.

In view of our ignorance concerning the interior of Grinnell Land, I had long been impressed with the importance of penetrating it, and had not doubted the practicability of such a journey. Although imbued with the idea that an Arctic commander's place is at his ship or station, yet in default of an officer, and feeling secure as to the condition of the parties to the northward, I started on such a trip April 24, to be absent not exceeding twenty days.

The route determined on was from Archer Fiord via Conybeare Bay. Five men and two Hudson Bay sledges were taken, two of the men to be a supporting party for but two of the marches. Only indispensable articles of the lightest possible character were taken, from the knowledge that even moderate success must depend largely upon light equipment. A single rubber blanket, a dog-tent, and two double sleeping-bags provided shelter and bedding. Our cooking-lamp and table furniture weighed but six pounds.

April 29, a puppy team of eight, born at Fort Conger in November, and trained by Private Schneider, hauled their first load, 355 pounds. They were worked continuously and judiciously from that time, and, with others born later, contributed by their labors most materially to our geographical success. Without such recruits, the remnants of our original teams, which, spared by contagion, were necessarily overworked, would have surely failed us.

A hare, a fox, and a ptarmigan were obtained during the month. Two wolves were seen near Cape Beechey. A snow-bird was first seen on the 14th. To our surprise, an eagle was seen on the 4th, and again on the 11th.

The thickness of the ice remained nearly constant, being 50.5 inches at the beginning, and 1.5 less at the end of the month.

The usual observations were made throughout the month.

Mean pressure, 30.150 [765.8^{mm}]. The barometer at 2 p. m. April 9 reached 31.000 [787.4^{mm}], a rise of 2.012 inches [51.1^{mm}] (from 28.988 [736.3^{mm}], March 29) in eleven days—a change possibly unparalleled in Arctic or other observations.

Temperature: Mean, —8.58° [—22.5° C.]; maximum, 15° [—9.4° C.]; minimum, —42.1° [—41.2° C.].

Though one of the coldest Aprils on record, it has been three times exceeded: 1861, Hayes, Port Foulke, —11.01° [—23.9° C.]; 1855, Kane, Van Rensselaer Harbor, —14.0° [—25.6° C.]; 1876, Stephenson, this station, —17.27° [—27.4° C.]; and Nares, Floe-berg Beach, —17.96° [—27.8° C.], respectively. Lower minima, however, were observed only in 1876 at the two latter stations, —42.5° [—41.4° C.] and —46.5° [—43.6° C.], respectively.

MAY, 1882.

Dr. Pavy unexpectedly returned May 3 from his sledge trip to the northward. The following summary covers the important details of his journey:

He left March 19 to search for land north of Cape Joseph Henry, and had been particularly instructed to keep a careful lookout for drift-wood, and to bring to Conger all such, in view of possible tidings of the *Jeannette*, accompanied by Sergeant Rice, Signal Service (the photographer of the expedition, who had volunteered for the trip). The dog-sledge *Antoinette*, under Sergeant Jewell, Signal Service, was taken as a supporting sledge as far as Lincoln Bay, which point was reached in four days. Visiting that depot to take it up, it was found that the provisions cached at Mount Parry the previous autumn had been visited by a bear, which ate seventy pounds of the pemmican, evidently at a meal. Sergeant Jewell, supporting, left the party March 23 to return to Fort Conger, with the dog-sledge *Lilla* and Eskimo Jens Edward.

On April 1, while en route to Black Cape with their last load, a sledge-runner broke at Cape Union, which involved a delay of five days. Sergeant Rice and Eskimo Jens, making a remarkable journey (as mentioned in the April proceedings) to Fort Conger, returned on the 6th with a new runner. Starting on the same day, despite bad ice and loss of three days by stormy weather, all the supplies had been brought up to Cape Joseph Henry, and that point left by April 20. The ice to the northward appeared to be of the roughest possible character, and the course of the party was directed towards Cape Hecla, with the intention of making a depot there and of traveling thence directly north.

Early the morning of the 22d a violent southeast storm set in. It subsiding, the party moved towards Cape Hecla, and about 8 a. m. reached a channel of open water. The lane, as then seen, extended from Crozier Island around Cape Hecla, as far to the northwestward as could be seen from a high floe. Towards Cape Hecla the lane was a mile in width. A harbor seal (*Phoca hispida*), much to the excitement of the Eskimo, was seen in open water. By 11.35 a. m. the channel had increased to two miles in width, while the floe moving northward opened out the land to the west of Hecla, so that the three capes—the farthest presumably Cape Columbia—were seen.

As it seemed probable that open water did or would extend to Cape Joseph Henry, a retreat was then decided on. Returning immediately to that cape, Dr. Pavy found that his party was adrift on a pack in the Polar Ocean. Open water for nearly a mile intervened between them and the nearest land. Nothing was possible except to watch and wait. Fortunately, on the morning of the 23d a northwest gale set in, and the pack drifting eastward touched Cape Joseph Henry about 8 a. m. Abandoning their tent, and all but their most essential articles, they hastened to the land and started southward. Occasional lanes of water with moving pack were seen until Black Cape was reached; thence southward only solid ice was met with.

The party were in a state of health during their entire trip of forty-six days.

Temperatures of —30° [—34° C.], and below, were common in the first twenty days; the lowest being —52° [—46.7° C.] March 30, and —56.2° [—49° C.] March 24. On the former occasion a severe snow-storm followed, during which the temperature in a few hours rose from —52° [—46.7° C.] to —8.5° [—22.5° C.]. The temperature rose first above zero [—17.8° C.] the same day as at the station, April 8, 8 p. m. (+ 4.5°) [—15.3° C.]. Stormy weather was frequent, but, as the party traveled when it was in any way possible, only four days were lost from that cause.

Traveling was excellent from Fort Conger to Cape Beechey; thence hummocky ice, interspersed with rubble and occasionally covered with snow, was found, which near Wrangel Bay gave place to large floes and excellent level ice, affording good traveling until at the end of Lincoln Bay, where the worst kinds of hummocks were met with. From Lincoln Bay towards Black Cape there was an ice-foot fairly good as far as Cape Union, but beyond exceedingly rough in many places. From Cape Union to Black Cape no large paleocrystic floes could anywhere be seen, and at Floe-berg Beach, where H. M. S. *Alert* wintered, 1875–'76, no heavy ice nearer than one and a half miles in the offing. From Cape Sheridan to View Point continuous paleocrystic floes afforded, as a rule, fair traveling. From View Point to Cape Joseph Henry new level ice was found, which caused Dr. Pavy to travel directly northward instead of crossing Feilden Peninsula and James Ross Bay to Cape Hecla, as recommended by me. Dr. Pavy's detailed report, supplemented by Sergeant Rice's account of his detached trip, and by his own instructions, forms Appendices Nos. 46, 47, and 48.

May 5, Private Schneider left with puppy team to haul additional supplies to depot B, near Cape Beechey; he returned the next day.

On the 7th I returned from the interior of Grinnell Land, having in twelve days (fifteen marches) traveled two hundred and forty miles with a loaded sledge, besides seventy miles of separate journeys, making a daily average of twenty-one and a half miles. The route was via the southwest part of Discovery Harbor, Sun and Conybeare Bays.

The results may be briefly summarized as follows:

Conybeare Bay does not terminate ten miles inward, as supposed by Lieutenant Archer, R. N., but proves to be a fiord, which I have called Chandler Fiord. Extending from Stony Cape to the southwest, Chandler Fiord terminates in that direction, about thirty miles inland, by a bay (Ida Bay), about four by six miles in extent. Near Ida Bay the fiord proper turns sharply to the north-northwest and continues about twelve miles farther.

At the end of Chandler Fiord was found what at first sight appeared to be a glacier—an almost vertical wall of ice, fifteen feet high and about a mile wide. It proved to be the ice-dam of a river, from which fresh water oozed in small quantities. Following the river, its very tortuous course was in general first north and then west-northwest. It was found to have its source in a lake (Lake Hazen) of remarkable extent. The junction of Lake Hazen and the river was in latitude 81° 46.5′ N., longitude 70° 30′ W. Five miles before reaching Lake Hazen we were extremely astonished to find the river open. The appearance in April at this latitude of a clear running stream made a marked impression on us, which was not diminished by a bird (neither snow-bunting nor ptarmigan, but of an unknown kind) suddenly flying by. The open river was about forty yards wide and two feet deep, with ice-walls about ten feet thick, which, gradually decreasing in thickness, totally disappeared at the edge of the lake, into which open water extended about a quarter of a mile. It was evident that the stream flows the entire year, and that at its source it rarely, if ever, freezes. Thin ice, along the borders of the junction, shows that in extremely cold weather a thin coating of ice forms, which must very soon be destroyed by the current. Its rapid current (the average gradient of the river was about twenty feet per mile) and a water temperature of 32.6° [0.3° C.] account for the stream remaining open.

Lake Hazen was estimated to be nearly sixty miles long and six miles wide. Its general direction is from east-northeast to west-southwest (true). Its southern shores are bounded by ranges of low hills, not entirely snow-clad, which extend far to the southward, with no prominent peak visible. Parallel with the northern shore extends a range of mountains, partly snow-clad, which were called the Garfield Range. Through the valleys of this range could be seen occasional peaks of those mountains—covered with eternal snow—which I have called the United States Mountains, retaining the nomenclature, although their location has been radically changed from that originally given them.

In Lake Hazen several very small fish were seen, and along its shore ptarmigan and hare shot. About a dozen musk-cattle were seen, and evidences were found of extensive herds wintering in the adjacent valleys.

The thickness of the ice on Lake Hazen could not be ascertained, owing to the loss of our ax. The surface of the lake was covered with snow from one to two feet deep.

The *sastrugi* (*i. e.*, bands of drifted snow) on Lake Hazen indicated plainly that the prevailing winds of the past winter had been northeasterly.

Following the shore-line about eighteen miles to the southwest, I crossed the north side of the lake and visited a large glacier (Henrietta Nesmith Glacier). This glacier was found to discharge into a small bay, some four miles deep, and to have a convex-shaped front of three miles extent. The perpendicular front, which at first had appeared to be of insignificant size, towered up in an imposing manner on near approach, and proved to vary from about one hundred and twenty-five to one hundred and seventy-five feet in height. It was lowest where one of five surface-discharge brooks had worn it down, in the very center. Its extent inward could not then be determined, as no view reaching more than three or four miles distance could be obtained, although I ascended the side of an adjacent mountain, which bears north by east (true).

Knowing that our rations could not carry us farther than we had already explored to the westward, and fearing the entire breaking up of the river, I returned to Fort Conger, caching our surplus stores at the river, for the use of a future party. The general health of my party was excellent. I had the misfortune to badly bruise my left foot in rough ice while in the drag-belt the third day out, and Private Connell twisted his knee in sight of the station when returning; but neither injury was serious.

The ice traveled over was in many places remarkable. For some eight miles in Chandler Fiord and twenty on the river it was free from snow and so smooth that the sledge and load could have been drawn by a child. Not over forty miles of really bad ice were met with during the journey. The weather was perfect and no temperature below —14° [—25.6° C.] was experienced. Privates Bender, Connell, and Whisler endured most cheerfully the privations and hardships incident to the trip, and my success was due to the great endurance and energy shown by these men.

On May 19 Sergeant Jewell, Corporal Salor, and Private Frederick (one of Lieutenant Lockwood's supporting parties) returned. They had accompanied Lieutenant Lockwood as far as Cape Bryant, from which point he had sent them back, their Hudson Bay sledges being in such condition as to render them of no further assistance to him. Sergeants Linn, Ralston, and Elison had remained at Polaris Boat Camp to await Lieutenant Lockwood's return, in order to assist him in managing the whale-boat should Robeson Channel in the mean time break up. The entire party had been in excellent health during the whole trip.

Lieutenant Lockwood on April 29 was at Cape Bryant, across the Polar Ocean, about to start for Cape Britannia with Sergeant Brainard and Eskimo Christiansen, with the dog-sledge *Antoinette* and twenty-five days' rations.

Thinking it advisable that the party at Polaris Boat Camp should be visited, Dr. Pavy was sent by me to them on the 10th, taking with him a small supply of special provisions for occasional change of their diet. He returned on the 16th via Thank God Harbor, from which

place he brought one hundred and ten pounds of pemmican, a grindstone, and three books belonging to the English Arctic expedition. The books were abandoned at Fort Conger. No written report of this trip was made by Dr. Pavy.

May 15, Privates Long and Whisler started down Archer Fiord to examine the English depot cached there. They returned the 19th, having gone with the Hudson Bay sledge below Keppel Head, whence Private Long had reached, on snow-shoes, Hillock Depot, where eighty-four rations were found in good order except the bread. This short journey was made at the request of Private Long, who was desirous of field service, but was debarred from the longer journeys owing to the advice of the surgeon. Long's report is to be found as Appendix No. 49.

Two men were occupied the 21st, 24th to 26th in hauling coal from the mine to the ice-foot on Water-course Bay. May 24, a garden was dug and planted, which totally failed, owing probably to alkali or other salts in the earth at the selected spot.

Sergeant Edward Israel, Signal Service, the astronomer of the expedition, and Private Connell left on the 25th to follow up the Bellows and ascertain whether it afforded a practicable route to Lake Hazen. They returned on the 30th, having reached the end of the valley. Sergeant Israel determined the position of several points during his absence. About thirty-six musk-oxen were seen and three killed; no more being slaughtered for fear the meat would spoil. Sergeant Israel's report is to be found in Appendix No. 50.

The temperature at 9 a. m. of the 28th rose to 32.5° [0.3° C.], after having been continuously below the freezing-point of water two hundred and seventy-two days.

On the 29th I visited Lake Alexandra. May 31, "Decoration Day," was celebrated by decorating, as far as our means would permit, the head-stones of the dead of H. M. S. *Discovery*. The initiative in this matter was taken by the enlisted men of the expedition.

May 31, Sergeant Rice (photographer) was sent with the dog-teams to the Bellows to make some negatives and bring in the musk-meat. He was accompanied as far as Sun Bay by Private Biederbick, who was ordered to make half a day's march into Black Rock Vale to determine its extent and general direction, with reference to further exploration of the interior.

Game near the station was very scarce; one hare only was obtained. Two ptarmigan and two hares were shot on the shore of Lake Hazen. A snowy-owl (*Nyctea scandiaca*) was seen on the 8th, and a burgomaster-gull (*Larus glaucus*) on the 14th. Five square-flipper seals (*Phoca barbata*), weighing in the aggregate 2,717 pounds, were killed.

The harbor-ice attained on May 31 its maximum thickness, 59¾ inches, being 20½ inches thicker than observed by H. M. S. *Discovery* in the same harbor, 1876. On the 31st the ice in the straits (Robeson Channel, Hall Basin, and Kennedy Channel) appeared as firm and solid as ever; no water except from tidal cracks was anywhere visible.

The usual observations were uninterrupted during the month.

Mean pressure, 30.133 [765.4^{mm}]; temperature +17.41° [—8.1° C.]; extremes of temperature, +33.8° [1.0 C.] and +1.3° [—17.1° C.]. No expedition north of Smith's Sound has before experienced so warm a May, and none other even in that sound has recorded a May minimum above zero [—17.8° C.]. No temperature below zero [—17.8° C.] was recorded by either of Lieutenant Lockwood's parties, but on a single occasion it was noted by me inland on Lake Hazen.

The health of the command continued excellent.

JUNE, 1882.

On June 1 Lieutenant Lockwood returned from the exploration of North Greenland and the discovery of Hazen Coast. The general features and results of the trip are here given, but correct details are to be found in the very interesting and excellent report made by Lieutenant Lockwood, which forms, with his instructions, Appendices Nos. 51, 52, and 53.

Lake Hazen was estimated to be nearly sixty miles long and six miles wide. Its general direction is from east-northeast to west-southwest (true). Its southern shores are bounded by ranges of low hills, not entirely snow-clad, which extend far to the southward, with no prominent peak visible. Parallel with the northern shore extends a range of mountains, partly snow-clad, which were called the Garfield Range. Through the valleys of this range could be seen occasional peaks of those mountains—covered with eternal snow—which I have called the United States Mountains, retaining the nomenclature, although their location has been radically changed from that originally given them.

In Lake Hazen several very small fish were seen, and along its shore ptarmigan and hare shot. About a dozen musk-cattle were seen, and evidences were found of extensive herds wintering in the adjacent valleys.

The thickness of the ice on Lake Hazen could not be ascertained, owing to the loss of our ax. The surface of the lake was covered with snow from one to two feet deep.

The *sastrugi* (*i. e.*, bands of drifted snow) on Lake Hazen indicated plainly that the prevailing winds of the past winter had been northeasterly.

Following the shore-line about eighteen miles to the southwest, I crossed the north side of the lake and visited a large glacier (Henrietta Nesmith Glacier). This glacier was found to discharge into a small bay, some four miles deep, and to have a convex-shaped front of three miles extent. The perpendicular front, which at first had appeared to be of insignificant size, towered up in an imposing manner on near approach, and proved to vary from about one hundred and twenty-five to one hundred and seventy-five feet in height. It was lowest where one of five surface-discharge brooks had worn it down, in the very center. Its extent inward could not then be determined, as no view reaching more than three or four miles distance could be obtained, although I ascended the side of an adjacent mountain, which bears north by east (true).

Knowing that our rations could not carry us farther than we had already explored to the westward, and fearing the entire breaking up of the river, I returned to Fort Conger, caching our surplus stores at the river, for the use of a future party. The general health of my party was excellent. I had the misfortune to badly bruise my left foot in rough ice while in the drag-belt the third day out, and Private Connell twisted his knee in sight of the station when returning; but neither injury was serious.

The ice traveled over was in many places remarkable. For some eight miles in Chandler Fiord and twenty on the river it was free from snow and so smooth that the sledge and load could have been drawn by a child. Not over forty miles of really bad ice were met with during the journey. The weather was perfect and no temperature below —14° [—25.6° C.] was experienced. Privates Bender, Connell, and Whisler endured most cheerfully the privations and hardships incident to the trip, and my success was due to the great endurance and energy shown by these men.

On May 19 Sergeant Jewell, Corporal Salor, and Private Frederick (one of Lieutenant Lockwood's supporting parties) returned. They had accompanied Lieutenant Lockwood as far as Cape Bryant, from which point he had sent them back, their Hudson Bay sledges being in such condition as to render them of no further assistance to him. Sergeants Linn, Ralston, and Elison had remained at Polaris Boat Camp to await Lieutenant Lockwood's return, in order to assist him in managing the whale-boat should Robeson Channel in the mean time break up. The entire party had been in excellent health during the whole trip.

Lieutenant Lockwood on April 29 was at Cape Bryant, across the Polar Ocean, about to start for Cape Britannia with Sergeant Brainard and Eskimo Christiansen, with the dog-sledge *Antoinette* and twenty-five days' rations.

Thinking it advisable that the party at Polaris Boat Camp should be visited, Dr. Pavy was sent by me to them on the 10th, taking with him a small supply of special provisions for occasional change of their diet. He returned on the 16th via Thank God Harbor, from which

place he brought one hundred and ten pounds of pemmican, a grindstone, and three books belonging to the English Arctic expedition. The books were abandoned at Fort Conger. No written report of this trip was made by Dr. Pavy.

May 15, Privates Long and Whisler started down Archer Fiord to examine the English depot cached there. They returned the 19th, having gone with the Hudson Bay sledge below Keppel Head, whence Private Long had reached, on snow-shoes, Hillock Depot, where eighty-four rations were found in good order except the bread. This short journey was made at the request of Private Long, who was desirous of field service, but was debarred from the longer journeys owing to the advice of the surgeon. Long's report is to be found as Appendix No. 49.

Two men were occupied the 21st, 24th to 26th in hauling coal from the mine to the ice-foot on Water-course Bay. May 24, a garden was dug and planted, which totally failed, owing probably to alkali or other salts in the earth at the selected spot.

Sergeant Edward Israel, Signal Service, the astronomer of the expedition, and Private Connell left on the 25th to follow up the Bellows and ascertain whether it afforded a practicable route to Lake Hazen. They returned on the 30th, having reached the end of the valley. Sergeant Israel determined the position of several points during his absence. About thirty-six musk-oxen were seen and three killed; no more being slaughtered for fear the meat would spoil. Sergeant Israel's report is to be found in Appendix No. 50.

The temperature at 9 a. m. of the 28th rose to 32.5° [0.3° C.], after having been continuously below the freezing-point of water two hundred and seventy-two days.

On the 29th I visited Lake Alexandra. May 31, "Decoration Day," was celebrated by decorating, as far as our means would permit, the head-stones of the dead of H. M. S. *Discovery*. The initiative in this matter was taken by the enlisted men of the expedition.

May 31, Sergeant Rice (photographer) was sent with the dog-teams to the Bellows to make some negatives and bring in the musk-meat. He was accompanied as far as Sun Bay by Private Biederbick, who was ordered to make half a day's march into Black Rock Vale to determine its extent and general direction, with reference to further exploration of the interior.

Game near the station was very scarce; one hare only was obtained. Two ptarmigan and two hares were shot on the shore of Lake Hazen. A snowy-owl (*Nyctea scandiaca*) was seen on the 8th, and a burgomaster-gull (*Larus glaucus*) on the 14th. Five square-flipper seals (*Phoca barbata*), weighing in the aggregate 2,717 pounds, were killed.

The harbor-ice attained on May 31 its maximum thickness, 59¾ inches, being 20½ inches thicker than observed by H. M. S. *Discovery* in the same harbor, 1876. On the 31st the ice in the straits (Robeson Channel, Hall Basin, and Kennedy Channel) appeared as firm and solid as ever; no water except from tidal cracks was anywhere visible.

The usual observations were uninterrupted during the month.

Mean pressure, 30.133 [765.4^{mm}]; temperature +17.41° [—8.1° C.]; extremes of temperature, +33.8° [1.0 C.] and +1.3° [—17.1° C.]. No expedition north of Smith's Sound has before experienced so warm a May, and none other even in that sound has recorded a May minimum above zero [—17.8° C.]. No temperature below zero [—17.8° C.] was recorded by either of Lieutenant Lockwood's parties, but on a single occasion it was noted by me inland on Lake Hazen.

The health of the command continued excellent.

JUNE, 1882.

On June 1 Lieutenant Lockwood returned from the exploration of North Greenland and the discovery of Hazen Coast. The general features and results of the trip are here given, but correct details are to be found in the very interesting and excellent report made by Lieutenant Lockwood, which forms, with his instructions, Appendices Nos. 51, 52, and 53.

The parties, as before stated, left Fort Conger April 3 and 4. Their energies were first devoted to accumulating at Polaris Boat Camp, Newman Bay (which place had been fixed on as the base of operations), stores cached at various depots. Very low temperatures and a succession of violent gales not only delayed this work, but, entailing on the men severe physical sufferings, necessarily impaired their strength and energies. The temperature fell on two days below —40° [—40° C.]; and as low as —48.8° [—44.9° C.] was recorded. Four men suffered to such an extent from this work (one from frost-bite, fortunately superficial), that it was thought their further continuance with the party would not be conducive to ultimate success, and they were consequently ordered back to the station.

On April 16, however, the party started from Boat Camp for Cape Bryant with 300 rations for the men and about 350 for the dogs. Over 2,000 pounds were dragged—sledge *Antoinette*, hauled by eight dogs, 743 pounds; Hudson Bay sledges *Hall*, *Hayes*, and an extemporized sledge, *Nares*, dragged by seven men (Sergeants Brainard, Jewell, Ralston, Linn, and Elison; Corporal Salor and Private Frederick), 1,276 pounds. Average weights, 93 pounds per dog and 182 pounds per man. The route followed (via Gorge Creek and Lost River) left the Gap Valley of the English to the west, and brought the party out on the shores of the Polar Ocean somewhat to the eastward of Repulse Harbor. The journey from Boat Camp to Stanton Gorge was tedious and trying in the extreme, snow falling the greater part of the time, and the temperature falling as low as —40° [—40° C.]. Bad traveling made *doubling up* (*i. e.*, advancing only half the load at a time by the whole party) necessary; and a runner of the *Antoinette* breaking caused the abandonment of the *Nares*. Lieutenant Lockwood's perseverance and energy (he traveling often three times over the same road) continually inspired the men to renewed exertions, and on the 27th the party, with all its supplies, was at Cape Bryant. The coast line had been closely followed, the party being driven to the floe only at Black Horn Cliffs. Forty rations cached in 1876 at Stanton Gorge by Lieutenant Beaumont, R. N., were taken to Bryant; they proved barely eatable.

The rough ice encountered had so damaged the sledge *Hayes* that it was abandoned, and fearing that *Hall* would be totally disabled by further advance, Lieutenant Lockwood decided to send back all of his supporting party and continue onward with the dog-sledge *Antoinette*.

Lieutenant Lockwood spoke in the highest praise of the extraordinary pluck and energy displayed by his supporting party, and also of their expressed desire to continue to the northward of Cape Bryant. The trials and sufferings of a party traveling in the field under such conditions, with temperatures at times below that of freezing mercury, are such that only men who possess marked mental determination and fine physical powers can ever hope to endure them.

On April 29 Sergeant Linn and party started on their return to Polaris Boat Camp, while Lieutenant Lockwood left for Cape Britannia with Sergeant Brainard and Eskimo T. F. Christiansen. He took twenty-five days' rations, which, with other weights, made a total of 783½ pounds, or 98 pounds per dog.

Cape Britannia was reached May 4, in six marches, during four of which soft snow, sometimes to the knees, made traveling so bad as to necessitate *doubling up*. The cape proved to be in somewhat lower latitude than had been expected; its position is 82° 44′ N., 49° 41.5′ W. Lieutenant Lockwood ascended the headland, elevation about 1,930 feet [588^{m}], which commands an extensive view. He says:

"We were apparently on an island; its most northern limit ended in a bold headland, a half dozen miles distant. Away to the northeast (or a little to the south of it) was a bold headland, some fifteen or twenty miles off, the termination of a promontory or an island stretching to the north. Between it and me were the projecting capes of three similar bodies of land further to the right, all separated by great fiords stretching to the south, and overlapping one another so that little could be seen to the south of them but a confused mass of snow-covered peaks.

"Towards the north and west the eye rested on nothing but the ice pack, till Beaumont Island was reached; after that the mountains near Cape Bryant. Stephenson Island is evidently an island, for the opening of a fiord that separates it from Cape May can be seen, and on its east is an immense fiord running to the south. The two fiords are (to all appearances) connected. No land is visible at the head of the large one. To the east of this the coast trended off towards the southeast, forming, with the south side of the Britannia coast, an immense funnel ending in a fiord. All to the south is an indistinct mass of snow-covered mountains.

"A cairn was built and a record deposited."

At Cape Britannia were cached five days' provisions for their return, and also every other article which could be spared, as extra sledge-runner, snow shoes, etc. In starting, May 5, Lieutenant Lockwood was thus enabled to travel without doubling up. Following the coast, which trended first to the north-northwest, Cape Frederick was rounded in latitude 82° 51′ N. and the course then changed to northeast from headland to headland, across fiords and bays. Fair weather, which had prevailed since leaving Cape Bryant, gave place to wind and snow on the 7th and 8th, but the party continued marching, and on the latter day Low Point, temporarily named Cape Benét, 83° 07′ N., about 47° W., was reached. Thenceforward Lieutenant Lockwood had the gratification of traveling on land situated farther to the north than had ever before been known.

The northeast trend continued to Cape Alexander Ramsay (Cape Surprise), beyond which point it changed to the east as far as Cape Mohn, 83° 10′ N., 43° W. (nearly). In one march more beyond this point to the northeast, made under trying circumstances with high wind and drifting snow, Cape Hoffmeyer (Storm Cape) was passed, and Mary Murray Island (Shoe Island) reached—the latitude 83° 19′ N., longitude 42° 21′ W. Here the storm, which had already continued four days, attained such violence that further travel was impossible, and they camped there sixty-two hours. They could ill afford such a delay, and, to counteract its serious effects on the success of their journey, they decided to eat as rarely as possible, and permitted intervals of sixteen, twenty-four, and seventeen hours to pass between successive meals. As the Arctic sledging ration means just enough food to maintain life and vigor, this resolution on their part shows how strong was their determination for utmost success.

At 12.30 a. m., May 13, the northeast storm, though continuing with snow, had yet abated to such an extent that travel was possible, and Mary Murray Island was left to the southward. At noon of that day "The Farthest," an island, was reached.

This island, the most northerly that man's foot has ever trod, I have named Lockwood Island. It is in 83° 24′ N., 40° 46′ W. Of this point Lieutenant Lockwood's report says:

"Presently, the weather clearing, a large, wide inlet, with cliffs and mountains on its farther side, opened up to view, forming a grand panorama, the most remarkable yet observed. To the right oblique the line of cliffs ended in a cape, from which the coast turned abruptly to the south, and then ran in a curve toward the southeast, forming from the western shore of the inlet. Directly ahead was a pyramid-shaped island (Brainard Island) of considerable altitude, which seemed to touch the line of cliffs back of it. This line of cliffs ran almost north and south, ending in a cape to the northeast of our position (Cape Kane), and, on the other hand, gradually curving back to the southeast and forming the eastern side of the inlet (Weyprecht Inlet). A little to the south of the island referred to is another, apparently of a cone shape. The land to their rear towered up to an enormous height, and formed a mountain certainly not less than four thousand feet [1,219^{m}], completely dwarfing the islands and cliffs beneath."

Only sufficient food remained to cover the time required by instructions to be spent at "The Farthest," to determine accurately its latitude and longitude, and to obtain botanical

and geological specimens. Sets of circum-meridian, subpolar, and time observations were made. These observations, worked up by Gauss's method, give latitude 83° 23.8′ N., longitude 40° 46′ W.

Vegetation was somewhat scantier than to the southward. Quite a number of plants (saxifrages, grasses, and the poppy) were obtained. Numerous geological specimens were procured, principally schistose slate. Traces of hares and foxes, feathers of a ptarmigan, and tracks of a lemming were observed, and snow-birds seen. A lemming was caught near 83° 19′. Musk-oxen and bears are occasional visitors in this locality, traces having been seen on the coast just north of the eighty-third parallel.

May 14, Lieutenant Lockwood ascended the cliffs overshadowing his camp—elevation upwards of two thousand feet [616^{m}]. There the national ensign was given to the breeze in the highest latitude ever reached by man, and on land farther north than any which had ever before met his vision. For the first time in two hundred and seventy-five years another nation than England claimed the honors of the farthest north, and the Union Jack gave way to the Stars and Stripes.

Lieutenant Lockwood, in describing the prospect from the mountain, says:

"It commanded a very extended view in every direction. The route of our last journey laid very distinct. Beyond (Mary Murray Island) Shoe Island lay a dark cape (probably Cape Alexander Ramsay), but I could not exactly identify it. It bore northwest (mag.) by pocket compass. Between the cape this side and my position lay the broad fiord last crossed (Wild Fiord), extending in a curve to the southeast, its course shut out by the high mountains south of me. To the northeast (about) projected another rocky headland (Cape Kane); to the north and at its foot I could perceive a low shore projecting out and forming another cape (Cape Washington) some distance beyond, doubtless separated from the first by a fiord (W. B. Hunt Fiord) as the first was from the promontory on which we stood. The fiord (Conger Fiord) just to the east extended south until shut out by the mountains south of us, but it presented every appearance of connecting in that direction with the fiord last crossed. The horizon beyond, on the island side, was concealed by numberless snow-covered mountains, one profile overlapping another, and all so merged together, on account of their universal covering of snow, that it was impossible to detect the topography of the region. To the north lay an unbroken expanse of ice, interrupted only by the horizon. Could see no land anywhere between the two extreme capes referred to, although I looked long and carefully, as also did Sergeant Brainard. Delayed on top twenty minutes. Left a short record in a small tin box under a few small stones (there were no large ones)."

The most northerly land seen, Cape Washington, was estimated to be in 83° 33′ N., and the most easterly land in longitude 38°.

At the northeast point of Lockwood Island was erected a large cairn, about thirty feet (9^{m}) above the sea-level, in which were deposited a record of the journey and a minimum thermometer, which registers to —65° [—54° C.].

Starting May 15, on his return, Lieutenant Lockwood reached Cape Britannia in five marches and Cape Bryant in nine. Four of these marches were made in stormy weather. There being but eight days' rations, no delay was practicable. The return rations were exhausted at their last camp, before reaching Cape Bryant. At Cape Bryant one day was given to the tides, but unfortunately no reliable observations were obtained:

"One cause of want of success seemed to be a tide or current which inclined the rope to the right (east), and when the stone was raised and lowered several times in succession it seemed to take a different level on each occasion. The divisions on the rope were made with string tied around it. Several crustaceans were brought from the bottom with the stone.

"The depth of the sea in tidal crack about half a mile from shore was one hundred and three feet [31^{m}]."

About half a mile inland, and some distance east of Cape Bryant, Lieutenant Beaumont's cache was found, but no cairn. Quite a number of articles, Enfield rifle, etc., were visible on the mound, but no tent, pemmican, or spirits of wine, which, possibly left below the mound, may have been covered by snow which lay there several feet deep.

Caching all extra supplies at Cape Bryant, for the use of future parties, Lieutenant Lockwood left May 26, and passing Repulse Harbor on the 28th, discovered and opened Lieutenant Beaumont's cairn. The weather being very bad and documents long, he took shorthand copies and redeposited the originals.

Polaris Boat Camp was reached May 29, and Sergeants Linn, Ralston, and Elison found in good health. The supporting party had reached the camp, May 5, in six marches. Sergeant Jewell, Corporal Salor, and Private Frederick had left May 6 for the home station.

The party remaining had, during their monotonous stay of twenty-five days, experienced almost constantly violent wind-storms. Two bears had visited the encampment May 17, while the party were asleep. These animals came from Newman Bay and went south along the coast via Cape Sumner.

All extra stores were cached by Lieutenant Lockwood in the whale-boat for future use.

Leaving, May 30, Robeson Channel was crossed in one march; Cape Beechey, about thirty miles distant, being reached in thirteen hours' travel. Their course could be determined only by compass, as a violent northeast snow-storm prevailed. Snow-blindness attacked three of the party, from which they suffered during the two succeeding marches.

The work of this sledge party extends our knowledge of North Greenland eleven degrees of longitude to the east, and nearly a degree of latitude to the north.

The new coast—Hazen coast—trending to the northeast, is a succession of high, rocky, and precipitous promontories, probably the north projections of islands in many cases, with intervening inlets. Immense fiords extend inland long distances, while the interior of the country is a confused mass of snow-covered mountains.

A most remarkable feature along the coast was what is termed—in default of a better name—"The Tidal Crack." This "crack" extended from Cape May to Beaumont Island, thence to Cape Frederick; and from headland to headland, with gentle curves southward across the fiords, to Lockwood Island. Whenever the party was driven from a floe to the headland, it was necessary to cross it, and then a narrow practicable place was readily found, although the width of it was at times several hundred yards. Lieutenant Lockwood opines, in which I concur, that the crack results from the almost constant motion of the Polar pack.

At about 82° 40′ N., and 51° W., a sounding was made. Eight hundred and twenty feet (250^{m}) of line and thongs—everything that was available—were used, but no bottom was found. In 83° 20′ N., 63° W., Commander A. R. Markham, R. N., in 1876 found bottom at four hundred and thirty-two feet (130^{m}).

The ice-foot was slight and illy-defined north of Cape Bryant. The fiords and bays were immense expanses of level snow, their regular surface rarely broken by hummock or floeberg. This to me seems to indicate that Victoria Inlets are but entrances to a fiord, not to a strait, and that the interior country is the mainland of Greenland.

The most gratifying feature of this work has been its entire freedom from sickness. One trifling case of frost-bite and a few slight cases of snow-blindness comprised the list of ailments.

In accomplishing this work, Lieutenant Lockwood displayed remarkable energy, courage, and perseverance. His success, which I cannot judge as otherwise than as grateful to the country, was won only by great endurance and much physical suffering on the part of himself and his party. I cannot but especially invite the attention of the War Department to his work, and commend his memory to the favorable consideration of his superiors. His labors in extending northward the limits of Greenland, and later in determining the western outlines and the interior conditions of Grinnell Land, resulted in important additions to our knowledge

of the physical features of that part of the Arctic circle. His work reached from Cape Washington 38° W., to Arthur Land 83° W., thus covering above the eightieth parallel one-eighth of the circle of the globe. He worthily upheld the honor of the American for courage, energy, and perseverance. If his tragic fate awakened the sympathy of the world, none the less should his successful work receive recognition. He unfortunately did not return for merited promotion. Under similar circumstances it would have seemed grateful had my death and services been announced to the Army in General Orders, and such tribute I trust may yet seem proper to Lieutenant Lockwood's memory.

Sergeants Linn, Ralston, Jewell, Elison, Corporal Salor, and Private Biederbick were, separately and collectively, commended by Lieutenant Lockwood for their energy and the spirit of determination, alacrity, and willingness shown by them under all difficulties. Although Linn was troubled with snow-blindness at Cape Bryant, and Frederick had a sprained knee, both were anxious to go farther. I cannot forbear adding that their excellent conduct in the field was but in thorough keeping with the general characters of all these men. The Eskimo F. T. Christiansen showed himself attentive, willing, laborious, and very reliable.

No one who is without a practical experience of Arctic field service can fully appreciate the extraordinary energy and determination which these men must have put forth to accomplish so successfully the task put before them. The healthfulness and adaptability of the different members of the party is shown by their return in perfect health, though, of course, physically exhausted, despite the fact that the greater part of their marches and encampments were made without the supervision of an officer.

Of Sergeant Brainard Lieutenant Lockwood says :

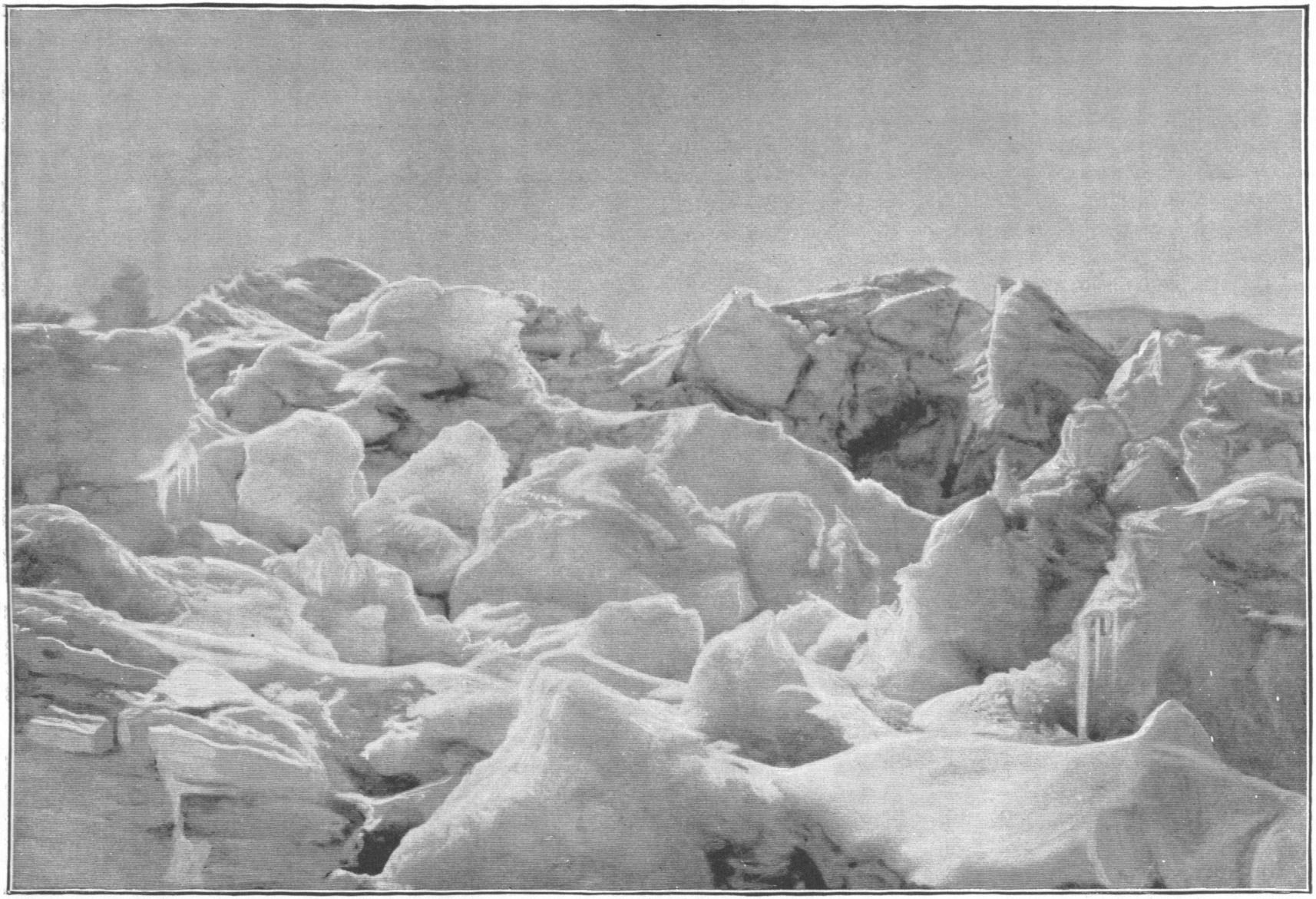
"Sergeant Brainard, both when commanding a supporting party and afterwards as one of the advance party, showed on all occasions such good judgment, energy, cheerfulness, and willingness to promote the expedition, that I cannot commend him too highly."

It is justice to add that Sergeant Brainard was, of necessity, repeatedly assigned by me, in connection with the work of the expedition, to an officer's command, and that his conduct was uniformly such as to win commendation. Apart from his valuable services in the field, I believe that he possesses qualities which merit reward, and which would render his promotion to the grade of second lieutenant in the Army most suitable. I most heartily and earnestly recommend such promotion.

On June 2 Sergeant Rice and party returned. Private Biederbick's trip had been successful and proved that inland travel was practicable. He went sixteen miles up Black Rock Valley, the general direction of which is west-northwest (true). A lake, five miles long and nearly a mile wide, was discovered, which I, at the time, called Lake Heintzelman. Private Biederbick's report forms Appendix No. 54.

Additional supplies were sent by dog-sledge, under charge of Private Frederick, to Sun Bay on the 3d. The same day Sergeant Jewell and Corporal Salor were sent to Cape Baird to examine the depot established the previous autumn. They returned after twenty hours' travel, being unable to find the tent, which must have been blown down—probably during the violent storm of January 16—and later covered with drifting snow.

On the 5th Private Connell discovered at Proteus Point, near the station, traces of previous Eskimo habitation. Search resulted in a number of relics: toggles for dog-traces, spear-heads, etc. Quite a number of other remains were found along the shore of Discovery Harbor and near Discovery Cape, which proved the possession by these natives of dogs, sledges, lamps (stone), wood (in small quantities), the porous bone of the whale, walrus, and narwhal ivory. One piece of bone-work was especially neat, ingenious, and delicate. Sergeant Brainard later found numerous traces of summer encampments on the shores of the southwest part of Discovery Harbor and Sun Bay (about sixteen to eighteen miles from Conger). Numerous remains of hunting implements, dog and sledge gear, etc., were found. While indications



View of Ice from Cape Murchison, Looking towards Thank God Harbor, June, 1882.

(From a photograph.)

were in general of summer encampments, one hut, about five feet square, of flat stones, seemed a habitation of more than transient character. It had sides about one and one-half feet [.457m] high; the roof had fallen in.

Sergeant Linn and Private Bender were sent, the 5th, to explore Black Rock Valley, and ascertain its practicability as a wagon or sledge route to Lake Hazen. They returned the 9th and reported that the lake could be reached with wagon, but only with great difficulty. They had reached a point where water drained inland, and whence what was thought to be the eastern end of Lake Hazen could be seen. A large glacier, which divided into four streams, could be seen, and two small lakes were discovered. Sergeant Linn's report is Appendix No. 55.

On the 8th samples of water were obtained from eight different strata of a paleocrystic floeberg, which was about thirty feet (9m) in thickness and above the ordinary ice. These samples were necessarily abandoned at Fort Conger.

June 9, Sergeant Gardiner and Private Schneider were sent with the dog-team to Cape Beechey to secure depot B against summer floods, while Sergeant Rice accompanied them to depot A, Cape Murchison, for photographic work. They all returned on the 11th and reported both depots to be in good condition.

June 10, Lieutenant Lockwood with Sergeant Brainard and Eskimo Christiansen—all of whom were but nine days returned from the Discovery of Hazen coast—left with the dog-sledge *Antoinette* on a tentative trip down Archer Fiord. As the snow was melting freely when they started—temperature during the day as high as 38° [3.3° C.]—it was not to be expected that much distance could be made. Lieutenant Lockwood reached Hillock depot in a march and a half, whence, as the water on the ice was from ankle to knee deep, he returned, bringing to Conger the pemmican, bacon, and compressed tea—articles useful for future work. During the trip three musk-oxen, two geese, and three hares were killed. He reached Conger the morning of the 15th. He found at Hillock depot only eighty-four rations in cases. There were no signs of the one hundred and twelve rations in bags, nor of the notice relative to them left by Lieutenant Archer, R. N.

Near the station two musk-cattle were killed on the 12th and seven on the 13th; the latter on the very summit of the Sugar Loaf, a very precipitous mountain, eighteen hundred feet [549m] high. Among this herd were four musk-calves—two bulls and two heifers. They were captured and brought to the station, and in a few days were tame, tractable, and thriving. These calves were successfully raised, largely from the efforts of Privates Long, Frederick, and Connell. It was my intention to send them to the United States by the relief vessel of 1882, but three of them dying late in October I found it necessary to kill the fourth.

The 13th was marked as being the first day on which the temperature had not fallen below freezing (0° C.) since August 17, ten months less four days. Taking advantage of the spring tides from the 17th to the 19th, the launch *Lady Greely* was moved into a tidal crack. She had remained safe and undisturbed on the inner ice-foot since September.

On June 24, leaving Lieutenant Lockwood in charge of the home station, I started on a trip inland into Grinnell Land, taking four men, two of them as a supporting party.

By the 18th all snow had disappeared from the ice in the harbor. From the 28th to the 30th the straits showed large lanes of water, and occasionally fields of ice were in motion. On the 30th a party—with difficulty, and for the last time during the season—reached Bellot Island over the ice.

On June 1 a purple saxifrage (*Saxifraga oppositifolia*), June 2 a willow (*Salix arctica*), June 5 a sorrel (*Oxyria reniformis*), June 11 a cochlearia (*Cochlearia officinalis*), were found in flowers. Other plants followed in rapid succession.

Game was more plentiful than in May. One seal (*Phoca barbata*), eight hares, two ptarmigan, two geese, twenty dovekies, twenty-two ducks (eider, king, and long-tailed), and four-

teen musk-cattle were killed during the month. Two dead wolves—evidently poisoned the previous winter—were found. Geese—the first sign of Arctic summer—were seen on the 3d, and on the 4th water ravines were running freely.

The regular magnetic, meteorological observations, and tidal readings were continued through the month.

Means from hourly observations: Barometer 29.930 [760.2^{mm}]; temperature, 33.12° [0.6° C.]; maximum temperature, 53° [11.7° C.]; minimum temperature, 13.2° [—10.4° C.]. The maximum is the highest ever observed in June by any Arctic expedition north of the seventieth parallel, while the minimum is the lowest of any known June in or north of Smith's Sound. The mean is not noticeable, but is 0.6° [.3° C.] higher than that noted by H. M. S. *Discovery* in 1876 at Discovery Harbor, Fort Conger.

The harbor-ice remained stationary at a thickness of fifty-two inches [1.321^{m}] from the 1st to the 21st, but afterwards, with astonishing rapidity, diminished to twenty-nine inches [.737^{m}] by July 1.

The health of the command was excellent during the month. Sergeant Rice sprained his ankle on the 25th, but recovered rapidly.

JULY, 1882.

At 00^{h} 00^{m}, Göttingen time, July 1, magnetical readings were commenced, conformable as far as one instrument would permit, to the programme drawn up by the Hamburg International Polar Conference. The readings made were as follows:

Daily observations each hour for declination, five readings at intervals of a minute being made as recommended by Weyprecht; on the 1st and 15th of the month five-minute readings of declination, with twenty-second readings for the selected hour; intensity observations were necessarily made on the 2d and 16th, there being no duplicate instrument.

The Kew dip-circle furnished, being unsuitable for use in that locality, prevented at first observations of that character, but later it was so arranged that one end of the needle could be read. To avoid any misapprehension in this matter it seems best to state that a dip-circle was made especially for work at the Lady Franklin Bay expedition, with transverse instead of upright standards. The late Superintendent of the United States Coast and Geodetic Survey, Carlile P. Patterson, directed that this instrument, which had accidentally been sent to the Coast Survey, should be sent me, but on opening the instruments at St. John's, Newfoundland, it was found that some error had been made and an unserviceable instrument forwarded in its place.

Hourly meteorological readings from July 1 included complete observations except as to humidity and rainfall, which were noted every fourth hour, six times daily. Hourly tidal readings were necessarily discontinued after the end of the first year, but the time and heights of high and low tides were regularly observed the second year.

The ice in the harbor showed signs of breaking up on the 1st, at which time it was but twenty-nine inches [.737^{m}] thick.

Corporal Salor and Private Whisler, supporting party to Lieutenant Greely, returned on the 3d. The same day Sergeants Elison and Private Long visited Lake Alexandra, where but little open water was found.

The 4th of July was celebrated as fully as circumstances permitted, by the display of flags, shooting matches, base-ball, races, etc.

On the 5th, owing to continued warm and wet weather, the musk-ox meat killed that summer commenced spoiling, and over fifteen hundred pounds had to be fed to our dogs.

On the 6th Private Biederbick returned, having been sent back from Very River by Lieutenant Greely. Privates Long and Ellis were sent to depot B for a pair of small oars on the 7th, but finding on the shore of St. Patrick Bay a pair, which had evidently been abandoned by the English expedition of 1875–'76, returned with those.

MUSK CALVES. OCTOBER, 1882; CAPTURED NEAR CONGER, JUNE, 1882; SERGEANT FREDERICK.

(From a photograph.)

On the morning of the 9th the ice in the harbor commenced breaking up. Steam was got up on the launch *Lady Greely*, and she was run a short distance in the harbor. On the 10th she was run twice to Dutch Island.

Lieutenant Greely and Sergeant Linn returned in the midst of a snow-storm from the trip into the interior of Grinnell Land the afternoon of the 10th.

The general outlines of my journey were as follows:

Left Fort Conger June 26 with four men, an improvised cart being our means of transportation. Traveling on ice to the southwest part of Discovery Harbor, I followed up the Black Rock Vale, and, striking across the country, made camp No. 3 on Lake Appleby, in sight of and about eight miles from Lake Hazen, latitude 81° 55′ N., longitude 68° 06′ W., magnetic variation (observed) 103° 30′. This, with Lake Rogers and others, forms a chain which drains a considerable section of the country inland to Lake Hazen. Lake Rogers has the greatest elevation, about eighteen hundred feet [549^{m}]. This lake although only about two miles distant from Lake Appleby, is about five hundred feet [153^{m}] above it. In one lake several fish, over an inch long, were caught, and on its shores a piece of lignite coal was found.

Striking Lake Hazen, the party traveled about fifteen miles westward to the junction of a river, by which the lake discharges into Hall Basin, via Chandler Fiord and Lady Franklin Bay. Over the frozen surface of this river Lake Hazen had been reached the previous spring.

At two points on the lake, east of the river, Eskimo relics were found, indicating at least summer encampments, but at the junction of the river and Lake Hazen, on both sides of the stream, were found the remains of habitations which evidently in previous ages had been permanently occupied. A wooden sledge (nearly complete) shod with bone, parts of hunting-gear, portions of dog-harness, skinning-knife with iron blade, combs (two ornamented) comprise the major part of the list of articles found. Narwhal and walrus ivory, porous bones of the whale, and wood were the principal substances. Bones of the musk-ox, wolf, fox, and hare in abundance, a piece of reindeer horn, and the bone of a fish were found.

Quite a collection of reindeer horns was made from various points along the shores of the lake and adjacent valleys. From this place my supporting party (Corporal Salor and Private Whisler) turned back, leaving me yet Sergeant Linn and Private Biederbick. About twenty miles farther the wagon, before frequently disabled, broke down completely. The tent, and everything not indispensable, were abandoned, and we started on; the men carrying on an average seventy pounds, and I thirty-one and occasionally seventy pounds.

Two marches brought us to camp No. 8, Very River, on July 1. Private Biederbick, who had overtaxed his strength in his zeal, here showed signs of sickness from overwork, and, though willing to proceed, I deemed it best for him to return to Fort Conger. It was a doubtful question whether I should send him back alone a distance of one hundred and twenty-five miles; but to have decided otherwise would have entailed the entire abandonment of the journey. On Biederbick's pressing representations that he could make the journey safely I finally decided to send him, directing him to stop at one of our caches in case he grew worse. He reached Fort Conger safely July 6. In consequence of Biederbick's return a portion of our provisions was necessarily cached. On leaving camp No. 8, Sergeant Linn carried sixty-four pounds and I forty-seven pounds besides my sextant.

Following the southeastern side of Very River, which stream was nowhere fordable, the eleventh camp was made in latitude 81° 21′ N., longitude 74° 04′ W., magnetic variation (observed) 114° W. Just before making this camp snow was met with for the first time. Starting the next day, July 4, but finding the country covered with from one to three feet of snow, underlain with water, a few hours convinced me that much farther progress was impracticable. Our boots, too, were nearly worn out by the rough traveling. To settle the question, I decided dropping everything but the glasses and compasses, and to climb a high mountain about four miles distant. We started at 9 a. m. for the mountain, and at 1 p. m.,

after most strenuous exertions, I reached the summit in a thoroughly exhausted condition. Sergeant Linn, owing to a lame knee, had been unable to proceed farther than the base of Mount Linn, an adjoining mountain of much less prominence. The elevation of the mountain ascended by me was forty-five hundred feet [1,372^{m}], seven hundred feet [213^{m}] higher than any other *known* peak in Grinnell Land. I have named it Mount C. A. Arthur. From its summit all Grinnell Land seemed stretched out before me. Fortunately, after four days of clouds and rain, the weather was clear and the atmosphere in a state of *visibility*. Except a narrow pencil of clouds to the southward, which veiled the immediate land in that direction, while disclosing the summits of certain snow-clad peaks, scarcely a cloud was visible. No mountain beyond Mount Augur, the most westerly of the Garfield range, had before been seen. To my surprise, a second range (Conger Mountains), partly snow-clad, extended westward about fifty miles, and appeared thence to gradually trend northward. These mountains were separated from the Garfield range by a valley of considerable width. Between Conger Mountains and the United States Mountains (I comprise under the latter name all mountains entirely snow-clad) there was a valley which apparently widened to the westward. This valley appeared to drain into Lake Hazen by the break between the two mountain ranges, some eight or ten miles west of Lake Hazen. No glacier could be seen in that direction.

North of the Garfield range there was a valley visible north of Mount Augur [Mount Biederbick], but it soon closed to the eastward, and the range appeared to crowd closely against the Snowy range. The United States Mountains covered the northern horizon from about northeast (true) to northwest, an immense area of mountains, entirely ice-clad, about sixty miles by twenty. Their northern limit as seen could not average much less than sixty miles, as beyond Henrietta Nesmith Glacier, which was over forty miles distant, the range could be seen for twenty miles at least. These mountains resemble rather snow-clad, gently rounded hills, there being no distinct range, but merely a confused mass of mountains beyond mountains. They must have been of lower elevation than Mount Arthur. From west-southwest (true) to southwest a slight depression of the intervening bare hills disclosed a range of mountains, partly snow-clad, which could not possibly have been nearer than seventy-five miles. I thought it probable they were farther distant, and that they were situated not in Grinnell Land but on an island or land westward. Lieutenant Lockwood's discoveries in the following year leaves no doubt that the mountains seen were those to the south and westward of Greely Fiord, possibly including the high land seen by him on Arthur Land.

From northwest to southwest, within a radius of seventy miles, could be seen nothing but low hills, entirely free from snow (except within ten or fifteen miles of Mount Arthur), which were intersected with numerous ravines. Their appearance was identical with that presented by the parts of country traveled over from Lake Hazen. Due south was a prominent mountain peak, and southeast a second mountain, probably a peak of the Victoria and Albert Mountains, and nearly east what I took to be Mount Neville, with a peak just north of it. Intermediate between Mount Arthur, Lake Hazen, Chandler and Archer Fiords, only low hills, *i. e.*, from fifteen hundred to twenty-five hundred or three thousand feet, 457 to 762 or 914 meters (which were all bare, a patch of snow being exceptional), were visible. The summit of Mount Arthur was an expanse of level snow, half a mile in diameter. Trying the compass on the snow to obtain bearings, I found every mountain disappear from view, and standing I was unable to obtain any satisfactory readings. All bearings were determined approximately from the sun.

My stay on the summit of Mount Arthur did not exceed twenty minutes, as I feared perishing, owing to my exhausted condition, the prevalence of a strong, cold north wind, and the absence of any sensation in my feet.

Rejoining Sergeant Linn, a small cairn was erected at the base of Mount Linn, in which a record was placed. Swollen ice-cold rivers to be forded and no sun to dry our clothing, was the story of the return. For five days we were without dry clothing, and were obliged to

get such rest as was possible from a blanket of single thickness, on moist ground, with ice frequently forming around us.

In crossing the deep river in Black Rock Vale Sergeant Linn was carried off his feet by the current and escaped only by swimming. I was soaked to my breast in crossing, and only saved note-book and chronometer by holding them above my head. We nearly perished with cold after this bath while traveling to the depot on the southwest shore of Discovery Harbor, three miles or more distant. The temperature was less than two degrees [1.1° C.] above the freezing-point [0° C.], and a high wind blowing, which rendered progress difficult and benumbed us with its cold.

Some difficulty was experienced the next day in crossing Discovery Harbor to Fort Conger, the ice having partly broken up. At times it was necessary to wade waist deep through channels and brooks which covered the surface of the floe.

The important result of the journey was the discovery of the main topographical features of Grinnell Land. The existence of an interior lake of such dimensions as Lake Hazen (which covers probably three hundred square miles), shows with what rapidity the numerous ravines must drain the country, and explains why the entire country is not ice-capped. Glaciers were seen only where the Garfield range pressed closely against the United States Mountains, evidently offshoots of the enormous ice-cap which covers the northern mountains.

The vegetation of Very Valley was remarkable for its amount. At least a hundred musk-oxen were seen in it, and on adjacent hills. That valley, for some miles up, was several miles wide and resembled many which I have seen in our territories. The valleys of the tributary rivers seemed to closely resemble the main valley. It was a matter of regret that none of them could be reached, Very River not being then fordable. This river in the lower valley was half a mile wide, with a moderate current; in the upper valley though rarely over one-eighth of a mile wide, it ran with great rapidity. Vegetation was also luxuriant on the hills and in the valleys bordering Lake Hazen, though occasionally barren hills were found. The vegetation at Discovery Harbor, though luxuriant, seemed somewhat scanty after my return, suffering from comparison with that of the inland country.

Near camp I, on Lake Heintzelman, were found, about thirty feet [9^{m}] above the lake, the trunks of two large coniferous (pine?) trees, partly embedded in the hill-side. One was with difficulty dug out, and proved to be ten feet [3.048^{m}] long and sixteen inches [.406^{m}] in diameter; there were yet attached the remains of two large branches. Although partly decomposed, it served fairly as fuel. The second was too deeply covered to permit its removal. The portion seen was six feet [1.829^{m}] long and twelve inches [.305^{m}] in diameter. These trees were more than two hundred feet [61^{m}] above and nearly seven miles distant from tide-water. The presence of trees and small shells, which to that point were common, shows conclusively that the interior valley had been at no distant day washed by the sea.

The energy and endurance of Private Henry Biederbick, and especially of Sergeant David Linn, insured the marked success of this inland journey. Sergeant Linn traveled for the last four marches outward with an injured knee, and when he reached the home station his ankles were so injured from rough travel that they were over a month healing. The exceedingly rough and trying conditions of this overland travel were such as to completely wear out all our boots although they were new at starting.

From the western part of Lake Hazen to Discovery Harbor, over fifty miles of very rough country, Sergeant Linn and I carried on our backs, in addition to our camp outfits, about fifty pounds of Eskimo bone implements. These relics, associated with the farthest wanderings in the past ages of the most northerly people of the world, were necessarily abandoned at Fort Conger, but photographs of them were saved and are herewith reproduced.

The farthest reached, the summit of Mount Arthur (elevation 4,500 feet) [1,372^{m}], was in latitude 81° 14′ N., longitude 74° W., and to reach that point at least 175 miles outward travel from Fort Conger was necessary.

The magnetic variation observed at the farthest camp, about seven miles north-northeast (true) of Mount Chester A. Arthur, was 114° W. At the mouth of Cobb River (a temporary name given to the small river directly south of Henrietta Nesmith Glacier) on the south side of Lake Hazen, the variation observed was 108° W.

On July 20, in accordance with his request, the renewed contract of Dr. Pavy, as acting assistant surgeon of the expedition, contained a clause giving him transportation, on final discharge, to Saint Louis, Mo. The new contract was for at least one year, and its terms were identical with the original contract. The oath of service was formally administered by me to Dr. Pavy on that day.

Thin ice formed on pools near the station early in the morning and late in the evening of the 12th. From the 13th to the 15th 0.76 inch [19^{mm}] rain fell.

Sergeants Brainard and Cross reached Bellot Island by boat on the 17th. On the 22d Private Ellis reported seeing a walrus off Distant Cape. If a walrus was seen, it must be considered as a certain indication that the straits below to Kane Sea were unusually free from ice, a condition which, without much doubt, existed.

Sergeant Brainard and party started on a hunting trip to Cape Beechey on the 23d, and returned on the 27th. They killed eight musk-cattle, twenty-two geese, and two goslings. Privates Henry and Whisler, absent at the same time at the entrance of Black Rock Vale for Eskimo relics cached there, killed a hare and two musk-cattle. Game near the station was found in fair quantities. One hare, nine ducks, twenty-four geese, and ten musk-cattle were killed. Not included as game, may be mentioned four ermines killed and thirteen young owls captured. Two foxes were wounded but none secured.

Additional Eskimo remains were found near the station on various dates.

The ice in the straits naturally varied with every tide. From July 16 there had been but a few days on which a vessel reaching the southern entrance of Kennedy Channel could not have rounded Cape Lieber and entered Discovery Harbor. On the 28th a heavy gale was experienced. During its continuance (but not at its height as indicated at the station) the wind on Cairn Hill blew at a velocity of forty-eight miles per hour [21.5^{m}] per second.

Magnetical, meteorological, and tidal observations were regularly made.

Means (from hourly observations): Barometer, 29.714 [754.7^{mm}]; temperature, 36.82° [2.7° C.]; maximum temperature, 53° [11.7° C.]; minimum, 29° [—1.7° C.]. While the mean temperature is 0.4° [.2° C.] lower than any recorded by any expedition in or north of Smith Sound, the extremes agree closely with others in that latitude.

The health of the command continued excellent. The garden, I regret to say, proved a total failure despite all care.

AUGUST, 1882.

Preparations were made in the first days of the month for the arrival of the expected relief steamer. Property returns were brought up to date, and copies made of all observations taken during the preceding year.

During the first few days the ice broke up rapidly, and on the 4th I was able to send Sergeant Brainard and a party with the whale-boat to the southwest point of Discovery Harbor, to bring in the musk-cattle which had been killed there.

By the 7th Hall Basin was so free from ice that I decided to visit Cape Cracroft in the launch, with the hopes of seeing a steamer to the south. That point was reached without difficulty, and from an elevation of over two hundred feet [61^{m}] a fine view was had to the southward. The eastern half of Franklin Island could be plainly seen, and no ice was visible to the southward except very rare floe-bergs of small dimensions. The sky to the southward of Franklin Island was carefully examined with glasses, and was free from any signs of an ice

blink. Kennedy Channel was in effect freer from ice than we had found it in 1881. While examining the ice to the southward, Sergeant Gardiner discovered fossils to be very abundant in the rocks and a fine collection was made.

No signs of a vessel appearing, on August 12 I ordered Lieutenant Lockwood to visit the head of Archer Fiord with the launch, and he left on the following day. His orders required him not to be absent exceeding seventy-two hours, and during that time he was to acquire such knowledge as would be valuable in connection with the proposed crossing of Grinnell Land. He left on the 13th and returned the 16th. His report of the trip forms Appendix No. 56. During his absence he killed twelve musk-oxen, three hares, and about sixty birds, which supply of fresh meat contributed materially to our health during the second winter. Twenty-eight other musk-cattle were seen on the south side of the fiord but the launch being short of coal Lieutenant Lockwood did not delay for them.

On the 19th, having but faint hopes of a vessel, Lieutenant Lockwood was ordered into Chandler Fiord to make a survey, and Dr. Pavy at the same time was ordered to examine Daly Peninsula for an overland route from Cape Baird southward to Cape Defosses or Carl Ritter Bay. Lieutenant Lockwood left on the 30th, but being unable to cross Archer Fiord to land Dr. Pavy at Cape Baird, was obliged to return, but left the following day, landing Dr. Pavy at Cape Baird and proceeding to Chandler Fiord, whence he returned on the 23d. He was unable to reach the extreme end of Chandler Fiord owing to the large amount of heavy ice yet in it. He succeeded, however, in surveying the eastern half of the fiord, and Sergeant Rice obtained two excellent photographs, showing the fiord to the eastward and to the westward. Lieutenant Lockwood's report forms Appendix No. 57.

Sergeant Brainard was ordered, with five men, on August 25, to bring the whale-boat from Cape Beechey, where she had been cached the preceding year. The party returned with the boat on the 27th, just after Lieutenant Lockwood had left in the steam launch for Cape Baird to bring back Dr. Pavy and Sergeant Ellison.

Dr. Pavy found that the valley near Cape Baird extends to the "divide" at a point about five miles from Cape Defosses, from which point another broad wide valley of easy grade descends to Kennedy Channel. The valley near Baird was filled with a river which I named Pavy River. The river at four points enlarges into lakes of moderate size. From an elevation of seven hundred feet [213^{m}] at Cape Defosses, no ice could be seen in Kennedy Channel, or as far south as the eye could reach, a distance of about thirty-five miles. The farthest point reached was our depot in Carl Ritter Bay. No written report of this trip was made by Dr. Pavy, but a report from Sergeant Ellison forms Appendix No. 59 and Dr. Pavy's orders, No. 58.

On August 28 I gave up all hopes of the ship, and ordered Lieutenant Lockwood to proceed with the launch to the head of Archer Fiord for exploration, and to leave the whale-boat with a depot at Cape Lieber, en route. A southerly gale with snow prevented his leaving on the 29th, and the large amount of ice which filled the straits on the succeeding day decided me to countermand his orders. On the 31st the harbor was filled with pack-ice, and as young ice had commenced forming slowly, I decided to lay up the launch at Dutch Island.

The party was very successful in obtaining game during August. Thirty-three musk-cattle were killed, twelve of which had been obtained by Lieutenant Lockwood in Archer Fiord, as already stated, and eight killed by Sergeant Long in St. Patrick Valley. Eleven hares, two fiord seals, thirty-seven ducks, thirty-two ptarmigan, thirteen dovekies, and about seventy-five smaller edible birds were also obtained.

The mean temperature, 35.3° [1.8° C.], was unusually high for an Arctic station, and remarkably so considering the latitude of Fort Conger. An unusually high maximum, 47.8° [8.8° C.], was recorded on the 21st, and a minimum of 22.8° [—5.1° C.] on the 31st. The temperature fell permanently below 32° [0° C.] on the morning of the 29th, one day earlier than the preceding year. Observations were continued during the month with the customary regularity.

SEPTEMBER, 1882.

On September 1 it became necessary, in view of the non-arrival of a relief ship, to arrange for a second winter in accordance with existing supplies. Vegetables, milk, sugar, and flour had been previously used at pleasure and without limit. To insure equitable distribution through the coming year the following weekly allowance was necessary : Vegetables, forty-two ounces ; milk, nine ounces ; sugar, twenty ounces ; flour, cornmeal, etc., forty-seven ounces. Bread, salt meats, molasses, apples, and other fruits in natural juice, butter, pickles, preserves, jellies, and many other articles remained in sufficient quantities to render their limitation for the second year unnecessary.

On September 1 we came near losing our launch owing to its having been anchored in an insecure position near Dutch Island. I fortunately visited her early that morning, to inspect her condition, and succeeded in obtaining assistance in time to save her; however, some small stores were spoiled through her partly filling with water.

On the 2d I commenced systematic work ; arranging my reports and observations in such a manner that complete records could be easily transported in case a boat journey in 1883 should be necessary. This work was continued unremittingly until August 5, 1883, and thereby the complete scientific observations were reduced to such condition that they were ultimately brought in safety to the United States.

On the 3d the sun set for the first time, and on the ensuing day preparations were made for winter by replacing the inside windows.

The launch was secured for the winter during the spring tide of the 17th. On this day Sergeant Israel while skating broke through the ice and came near drowning. He was rescued with some difficulty, suffering, however, no harm from his immersion.

Lieutenant Lockwood on the 24th was sent, at his own request, up Black Rock Vale with dog-sledge, to ascertain whether autumn travel was possible inland. He returned on the 27th, bringing a musk-ox killed by Christiansen some three miles above Lake Heintzelman. That lake was found covered with clear smooth ice already a foot [.305^{m}] thick. The trip showed the general impracticability of sledging to Lake Hazen overland.

During the month one musk-ox, two hares, three seals, and three ptarmigans were killed and two foxes captured. By the early part of the month all birds had departed, except our regular habitant, the ptarmigan, and an occasional owl or raven. The station was visited on September 30 by a bear, which was not seen, however.

The mean temperature was 18.1° [—7.7° C.], with a maximum of 27.4° [—2.6° C.] on the 5th, and a minimum of 0°.7 [—17.4° C.] on the 21st. The minimum occurred on the same day on which the temperature fell below zero [—17.8° C.] in 1881. The early part of the month was unusually warm, the first eight days being three degrees [1.7° C.] warmer than for the corresponding period in 1881.

A great deal of open water was seen in and around the harbor and in Robeson Channel until after the 20th.

OCTOBER, 1882.

On October 2 Sergeant Linn was reduced to the grade of private for disrespectful language. Save this indiscretion, Sergeant Linn's conduct was irreproachable during his entire service, and a year later I reappointed him sergeant.

On the 2d a bear was seen, which had several times visited the station, but escaped although pursued. In connection with his appearance, restrictions were for the first time placed on the men's movements, and for absences for greater distances than a third of a mile

verbal authority was required. No other bear appearing, the limits were increased to two miles late in January, the sergeant on duty, however, to be notified when going further than three-quarters of a mile.

The temperature was observed below zero [—17.8° C.] on the 4th, for the first time that autumn. Auroras were frequently noted during the month. The sun left us on the 16th and darkness increased so rapidly that Jupiter was visible at local noon of the 24th, and four first-magnitude stars on the 28th.

In view of the evident inclination on the part of many of the men to keep their beds excessive hours, an order was issued forbidding the use of the beds on week days between 8 a. m. and 3 p. m., except in special cases.

As soon as the ice around Distant Cape would bear, which was the 12th of October, parties visited Cape Beechey and St. Patrick Valley to bring in the musk-meat cached at those points. Unfortunately an entire ox had been eaten at Cape Beechey, probably by bears and foxes; and fully half of the meat in St. Patrick Bay had been devoured by foxes, which had effected an entrance into the stone huts which had been built to protect it.

The first occultation obtained was observed on the 24th. It was the occultation of *δ Piscium*. The immersion took place at $8^h\ 27^m\ 29.9^s$, by chronometer (Bond & Son's) No. 198, which was fast of local sidereal time $4^h\ 32^m\ 24.7^s$.

On the 26th systematic observations were commenced of the temperature of the surface sea-water, with a view to ascertaining whether the temperature of the flowing tide varied from that of the ebbing tide.

The health of the party continued excellent, and at the end of October but two men were taking medicine—one for a slight attack of indigestion, and the other, iron for his blood.

I inaugurated a series of lectures for the winter, and was assured co-operation from Dr. Pavy and Sergeant Israel, my astronomer.

On October 22 Dr. Pavy, at his expressed desire, was ordered to proceed as far southward as practicable along the Grinnell Land coast to look for caches or any signs of a visiting vessel. He was accompanied by Sergeant Brainard and Eskimo Jens.

The harbor-ice increased a foot [305mm] in thickness during the month and was 23½ inches [597mm] thick on November 1. The fresh-water ice on Lake Alexandra, however, had attained a thickness of thirty inches [762mm] by the 25th.

No game was killed during the month, though a ptarmigan and an owl were seen on the 12th. The bear on the 2d was the only one seen at Conger, although tracks were noted occasionally on the shores of Robeson Channel. Three of the musk-calves, kept with great trouble by us, died during the month, and a fourth one was killed. The cause of their death was attributed by me to lack of exercise, caused by their being necessarily penned up the greater part of the time to protect them from the dogs.

A series of observations on the velocity of sound at low temperatures was commenced during October, and continued during the entire winter. Observations and results form Appendix No. 137.

On October 15 observations of high and low waters were commenced on fixed tide-gauge No. 6, which was located for winter observations.

The mean temperature for the month was —7.8° [—22.1° C.], with a maximum of 14° [—10° C.] on the 1st, and a minimum of —23.5° [—30.8° C.] on the 19th. The temperature fell permanently below zero [—17.8° C.] on the 15th; sixteen days earlier than in the preceding year. The month was extremely cold, lower means having been noted only on two other expeditions; one of which was at the same station in 1875.

NOVEMBER, 1882.

On the 1st a meteor of a blue color was observed about 10.40 p. m. A heavy detonation was heard upon its disappearance. At 1 a. m. November 14 a remarkable meteor was noted, which must have been visible at least five minutes. A list of meteors observed during the two years at Fort Conger forms Appendix No. 138*a*.

On the 5th, Dr. Pavy and his party returned. They had gone as far as Carl Ritter Bay, traveling overland from Cape Baird to Cape Defosses, thence along the coast. Heavy ice was found in motion in Kennedy Channel; and south of Carl Ritter Bay water-clouds were visible for some distance, and to the south there was an ice blink. A musk-ox was killed by Sergeant Brainard on the 1st near Cape Defosses. This was the only game procured during the month except a fox, and harbor-seal of twenty-eight pounds (which was killed in the tide-hole), although a number of hares were seen. A detailed report of this trip by Sergeant Brainard forms Appendix No. 60. No written report was made by Dr. Pavy.

Auroras were frequently noted during the month. The most remarkable displays occurred from the 11th to the 18th, attended between these dates with heavy magnetic disturbances.

On the 24th the light of the full moon was determined at 9 p. m., by a grease-spot photometer, and found equal to the light of an adamantine star-candle at a distance of 49½ inches [1.257^{m}]. At 10 p. m. the thermometers in the inner instrument-shelter were read by moonlight, and diamond type was read with ease. My astronomer's opinion agreed with my own, that such clear light had never been noted by either of us in lower latitudes.

November 30 was designated by orders (Appendix No. 61) as Thanksgiving day, and was celebrated as elaborately as our means would permit.

During the magnetic storm of November 17 five-minute readings were continued until 9 p. m. (Washington mean time) November 18. The range of the needle during the 17th was considerably over nineteen degrees. At 8.35 a. m. (Göttingen mean time) November 17 the needle had moved 20° 28.2′ to the westward and stood at 113° 19.8′ W., the largest recorded magnetic variation within my limited knowledge.

The health of the party at the end of the month was excellent. Besides geese and hares, a pound and a half of fresh meat was issued on alternate days.

The harbor ice increased a foot [305^{mm}] in thickness during the month.

The mean temperature for November was —28° [—33.3° C.], with a maximum of —1.1° [—18.4° C.] on the 15th and a minimum of —46° [—43.3° C.] on the 29th. It was the coldest November experienced by any Arctic expedition. The mean temperature for the first nine days was —23.4° [—30.8° C.], or 11° [6.1° C.] below that for the same period the previous year, which was the coldest November on record. Frozen mercury was first noted on the 9th, as against the 14th in 1881. This is probably the earliest date in a winter on which frozen mercury has been noted.

DECEMBER, 1882.

The aurora was noted daily from the 1st to the 17th, inclusive, with exception of the 13th. During these displays the magnet was generally quiet, but a heavy disturbance occurred on the 19th, at which time the weather was overcast. It may here be noted as a general result of our observations, that our magnetic disturbances were generally co-existent with displays of aurora which showed prismatic colors and during which marked and sudden changes of form occurred. On the other hand the magnet remained quiet during the prevalence of colorless aurora which was slow-moving as regards change of position or unchanging in shape.

An electrical self-registering tidal-gauge was devised by me and put in operation during the month with excellent results, showing the possibility of such an apparatus for use in high latitudes. The records were too bulky for packing and were left at Fort Conger.

By the early part of the month the outer wall, built as a protection to the house, was completed. It consisted of an ice-wall about a foot thick [305^{mm}], running to the eaves, and the space between the ice-wall and house was later filled in with dry snow, so that the entire thickness of the protecting wall ranged from a base of seven feet [2.134^{m}] to an apex of two [610^{mm}].

On the 8th we experienced a touch of the Greenland foehn; the barometer rose a quarter of an inch [6^{mm}] during the day; from 10 a. m. to 2 p. m. strong southeast to southwest wind puffs were experienced; the temperature rose thirteen degrees [7.2° C.] in a single hour, and later in the day fell as much in two hours.

Christmas was celebrated in the usual manner, but was hardly as great a success as that of the previous year. The health of the party at the end of the month was good.

The mean temperature was −27.8° [−32.2° C.], with a maximum of +5.5° [−14.7° C.] on the 26th and a minimum of −43.9° [−42.2° C.] on the 31st. This month was one of the rare instances in Arctic observations when the mean temperature of December has been above that of November.

No game was killed during the month, but ermine and hare tracks were seen, and on two occasions the howling of a wolf was heard.

The sea ice increased eight inches [203^{mm}] in thickness against one foot [305^{mm}] in November, and was forty-five inches [1.143^{m}] thick on the 1st of January.

JANUARY, 1883.

Auroras occurred frequently during the month, unaccompanied, as a rule, by marked magnetic disturbances.

The temperature being very low, on the 1st and 2d many of the thermometers were tested in freezing mercury [−37.9° F.]. On January 4 the carelessness of the observer caused a slight fire in the officers' quarters, which fortunately did no damage, owing to the self-possession and prompt action of Lieutenant Lockwood.

On the 26th an order was issued for the exact guidance of the observers in meteorological and magnetical observations, the general substance of which had been the habitual practice of the observers.

During the early part of the month the launch was slightly injured by the movement of the ice during a storm, but the damage was such that it was easily repaired.

On the 18th light snow fell at a remarkably low temperature for precipitation, from −38° [−38.9° C.] to −39° [−39.4° C.].

During January no game was killed, but hare and ermine tracks were observed.

The health of the party was good during the month. A little over thirteen ounces of fresh meat was used per man daily. For a few days an extra allowance of fresh meat was given Private Biederbick for rheumatism, and to Eskimo Jens Edward on account of his small appetite, which was attributed by the doctor to home-sickness. This was the first special diet prescribed by the doctor during our service of nearly a year and a half at Fort Conger.

Several hourly magnetic readings were missed through breakages of the suspension-thread of the magnetometer.

The mean temperature of January was −35.8° [−37.7° C.], with a maximum of −18° [−27.8° C.] on the 5th, and a minimum of −50.6° [−45.9° C.] on the 16th. The barometer touched 29.122 [739.7^{mm}] on the 25th.

FEBRUARY, 1883.

I decided on the propriety and necessity of commencing the establishment of a depot of provisions at Cape Baird, for use during retreat in case the relief vessel should not reach Lady

Franklin Bay, and on the 1st of the month Sergeant Brainard with Eskimo Christiansen and dog-team commenced the work. The surgeon of the expedition officially and professionally objected to it, on the ground that any work in the field was exceedingly dangerous at such an early period of the year. The work, however, was carried on at various dates throughout the month, without injury from frost-bite or in any other manner, and the stores thus accumulated were of primary importance later in the year.

An observation of the movement of the harbor ice, on the 7th, showed that the floe had moved since the middle of October twelve and one-half feet [3.810^{m}] in a straight line to the south-southwest, which was offshore. During its irregular movement, however, the entire movement must have been about twenty feet [6.096^{m}].

But few stars could be seen on the 7th at local noon, and thermometers were read for three hours without artificial light on the 8th. The upper limb of the sun was, astronomically, above the horizon on the 25th, but was not seen at the station until the 27th, after an interval of one hundred and thirty-seven days since its last appearance. Auroras were occasionally observed during the month.

A hare was killed on the 9th, and another seen on the 10th.

Corporal Salor was discharged for expiration of term of service on the 22d and re-enlisted on the 23d. His warrant as corporal was continued.

The national holiday of the 22d was celebrated as fully as possible.

The verbal weekly reports of the surgeon during the month showed the health of the party to be excellent. A special allowance of fresh meat was issued for a short time to Private Long. To the general party nearly a pound of fresh meat was issued per man daily.

The mean temperature for the month was —38.9° [—39.4° C.], with a maximum of —5° [—20.6° C.] on the 21st, and a minimum of —56.5° [—49.2° C.] on the 27th. The coldest day was the 28th, with a mean temperature of —51.2° [—46.2° C.], the maximum being —45.6° [—43.1° C.]. The monthly mean is one of the lowest on record.

On the 14th unusually marked and sudden changes of the temperature took place, with light winds from easterly quarters. The temperature rose 12.3°[6.8° C.] degrees in one hour, and fell 8.7° [4.8° C.] in fifteen minutes. Although the temperature rose to —32.9° [—36.1° C.], the mercury thawed in none of the thermometers, even the most delicate. On the 19th the barometer touched 28.968 [735.8^{mm}], the lowest recorded at the station. On the 28th excellent sound experiments were made, with the temperature at —54° [—47.8° C.].

MARCH, 1883.

As was natural, the first days of spring brought a sense of relief that the second winter had ended, and the entire party was in strength and health. The knowledge that no expedition had ever before passed a second winter in such a high latitude, added to the forebodings repeatedly expressed by the surgeon of the expedition, had caused me great uneasiness, and been a serious mental trial through the late months.

The February report of that officer, received on the 3d, stated that the health of the men was good, with no signs of scurvy, and but two men, Long and Bender, on a special diet. During the early days of the month the depot at Cape Baird was supplemented by additional supplies of food as opportunity presented. The weather, however, was trying, as up to the 7th of March the sun had been visible but three hours.

Lieutenant Lockwood was ordered to prepare for the continuation of the exploration of the North Greenland coast, in which it was believed he would be able to reach, unless unfortunate, the eighty-fourth parallel. The trip to be made early in March was with a view to establishing special depots for the final journey.

On March 9 I received from the surgeon of the expedition what appeared to me as a remarkable letter (Appendix No. 62), which practically recommended the abandonment of

all work of exploration. My own views at the time are shown in my answer (Appendix No. 63), in which I declared that the abandonment of field work through a fear of possible contingencies seemed to me dishonorable and unmanly. Owing to the death of Dr. Pavy, I have no desire to add further to my letter of March 16, 1883, than to say that the spring journeys of that year were fruitful in geographical results of great importance and value, and that such work was done without accident or injury, and that it in no way interfered with our arrangements for subsequent retreat by boats.

Lieutenant Lockwood, with Sergeants Brainard, Jewell, and Private Long, with two dog-teams and drivers, left on the 10th of March and returned on the 17th. Lieutenant Lockwood's orders and report form Appendices Nos. 64 and 65. He succeeded in laying out a practical sledge route from Cape Beechey to Cape Sumner, and near the latter point a cache of about thirteen hundred pounds was established. Sergeant Jewell, who remained in the field one day longer than Lieutenant Lockwood to perform certain work, met with a misfortune at depot B, which delayed him several hours, and might under other circumstances have proved a very serious matter. His dogs during the night stole and ate all the harness and whip, which had been secured in an empty tent instead of their own. His report to Lieutenant Lockwood forms Appendix No. 66.

This preliminary field work was performed in the most satisfactory manner, and without any accident apart from the great discomforts arising from sledging in very low temperatures. Sergeant Elison, who started with Lieutenant Lockwood, was taken sick the first day out, but feeling better the next morning he continued on until the 13th, when Lieutenant Lockwood sent him back by a sledge to depot B, near Cape Beechey, whence, as he had recovered strength, he persuaded Sergeant Jewell to permit him to return to the station on foot. The pluck and courage shown by Sergeant Elison on this occasion was only in keeping with his entire field service in connection with the expedition.

Lieutenant Lockwood and party left on the 27th for their final journey on the north coast of Greenland. My letter of instructions forms Appendix No. 67. Sergeants Brainard and Jewell, Private Ellis, the two Eskimo, and two strong teams, of ten dogs each, accompanied him. Ellis was detailed on the doctor's recommendation, he insisting on the retention of Sergeant Linn, who was originally selected for this duty, at the station. Private Schneider accompanied them with the puppy team to Water-course Bay. The party was thoroughly and carefully fitted out, and they left more perfectly equipped than in the preceding spring. While in the field they had fresh musk-meat for half their meat ration and the cooking and sleeping gear were so arranged that one, two, or three men could travel together or be safely left alone. The plan contemplated the return of the supporting party with Jewell's sledge on the 23d of April, and that Lieutenant Lockwood himself should turn back from the north by the 19th of May, and reach the shore of Grinnell Land by the 1st of June. The dogs of Lieutenant Lockwood's team averaged 70 pounds in weight, and the members of the party in traveling dress about 175 pounds each. The *constant* weights of the advance sledge were estimated at 312 pounds, and the supporting sledge at 280 pounds. The estimate of the entire weights to be hauled by the teams when leaving Cape Sumner were based from my observations of the preceding spring that a good dog-team can haul a load amounting to 150 per cent. of its weight. In consequence, the party were to start from that point with about 2,100 pounds, including sledges.

On the 28th all meteorological and tidal observations were taken, for the first time that year, without artificial light.

From the 17th the puppy-team, driven by Private Schneider, had been employed as far as possible in hauling coal which had been mined the preceding autumn, and piled on the shore of Water-course Bay. Nearly five thousand pounds of this coal were hauled to the station during the month.

March was not a fortunate month for game, only three hares and a lemming being obtained. Two ptarmigan were seen on the 23d, and two wolves on the 27th. That the foxes remained in the country during the winter was strongly evidenced by reports, early in the month, that the pemmican cached at Wrangel Bay, and also that at Cape Beechey, had been eaten by them.

The weekly reports of the surgeon indicated the continued good health of the party. Only minor ailments developed, and but three of the men, Cross, Bender, and Long, were named as being unfit for field service.

On the 28th the surgeon was ordered to furnish, by April 30, a general report, treating in detail the health of the command to June 30, 1882; and by July 10, with a second report covering it to June 30, 1883. These reports were required so that the entire subject of health might be treated fully while the data were fresh in the doctor's mind, and that our experiences might be on record and so available, in case of any disaster, for the information of future expeditions. Indeed, one central thought the last year was to insure the rendition to our countrymen of the fruits of our two years' labors.

The mean temperature for March was —17.9° [—27.7° C.], with a maximum of +9.9° [—12.3° C.] on the 8th, and a minimum of —49.1° [—45.1° C.] on the 1st. The monthly mean temperature was the highest on record in connection with the various expeditions in Smith Sound.

On the 8th a storm of unusual violence prevailed. The wind attained a velocity of about sixty miles per hour (26.8^{m} per second), and the temperature rose to +3.3° [—15.9° C.] at 7 a. m., a change of 11.8° [6.4° C.] in an hour. It was the first time in seventy-one days that the temperature was observed above zero [—17.8° C.]. During the height of the storm a heavy swell of from four to six inches high [101.6 to 152.4^{mm}] was observed in the tide-hole, thus indicating that the gale must have been an exceedingly violent one on the open straits.

On the 15th the temperature was extraordinarily high for March; being above zero [—17.8° C.] for fourteen hours during the day.

The ice increased in thickness only an inch and a half [38.1^{mm}] during the month, being 56¼ inches [1.429^{m}] on the 1st of April.

On the 22d and 23d remarkable changes of the barometer took place, unaccompanied by high winds until the end of the fluctuations. The barometer rose .054 inch [1.4^{mm}] in one hour, .168 [4.3^{mm}] in four hours, .822 [20.9^{mm}] in twenty-six hours, 1.030 [26.2^{mm}] in thirty-one hours, and 1.123 [28.5^{mm}] in forty hours.

Experiments made during the month, over a measured course, showed that our Eskimo dogs with light sledge, could rarely travel more than five miles an hour, and with a loaded sledge about half that distance.

APRIL, 1883.

On April 5 Sergeant Rice was ordered to prepare for a sledge trip to Thank God Harbor for the purpose of bringing to the station the twenty-foot [6.096^{m}] ice-boat, left there by Lieutenant Beaumont, R. N., in 1876. His orders form Appendix No. 68. In connection with this trip, Sergeant Rice examined the ice from Distant Cape eastward into Hall Basin on April 6, and visited Cape Murchison on his return.

Sergeant Rice with his party of ten men left, April 10. Lieutenant Kislingbury accompanied the sledge party a few miles into the strait. Dr. Pavy was not assigned to the command of the party on account of his expressed unwillingness to assume any responsibility in connection with this work, claiming that his duties with the expedition were strictly those of a medical officer. He accompanied the party as a medical officer in accordance with his own wish and earnest recommendation. The instructions to Dr. Pavy form Appendix No. 69.

On April 12 I was surprised by the return of Lieutenant Lockwood and his party, all of whom were in excellent condition. They had been compelled, by open water and the disintegration of the polar pack near Black Horn Cliffs, to return to the station. In an attempt to round the cliffs Lieutenant Lockwood, Sergeant Brainard, and Eskimo Christiansen came very near being set off into the Polar Sea by the movement of the pack. Their trip to Black Horn Cliffs had been a remarkable one, having been made from the station in six days against twenty-two to the same point in 1881. The entire sledging outfit was found to be perfect, and only the unfortunate breaking up of the polar pack prevented the party from attaining a remarkably high latitude. The journey, however, could not be considered fruitless, as Sergeant Jewell obtained at BlackHorn Cliffs, Repulse Harbor, and Cape Sumner, sets of extended tidal observations which must be of marked value for determining the co-tidal lines of thePolar Ocean and Robeson Channel. The formal report of Lieutenant Lockwood forms Appendix No. 70, and that of Sergeant Jewell No. 71.

On the 14th Sergeant Brainard left with dog-team to assist Sergeant Rice in bringing in the English ice-boat, being accompanied by Lieutenant Kislingbury, who, desiring to be of use, volunteered for the trip. Sergeant Rice returned on the 15th, having made a most successful trip, and brought the ice-boat in perfect condition. His detailed report forms Appendix No. 72. The medical report of Dr. Pavy forms Appendix No. 73, and is different from what was expected after his strong verbal representations of the absolute necessity of a doctor accompanying the men to watch over their debilitated physical condition. The result of this journey shows the excellent physical condition of the party. The twelve men engaged therein were but an average of the party, and a round trip of nearly ninety miles in six days was made by them, subjected to a mean temperature of —21° [—29.4 C.], and with no higher temperature noted than —13° [—25° C.]. The ice-boat was later moved by Sergeants Gardiner and Cross, Private Schneider, and Eskimo Jens, with dogs, to Cape Baird, where she was secured for possible use during the coming autumn.

Lieutenant Lockwood was extremely anxious that I should permit him to attempt again the exploration of the North Greenland coast. After a thorough consideration of the subject, I decided against the advisability. A different course would have been followed if the party had intended wintering another year at Conger, or there had been any certainty of the arrival of a vessel. I, however, decided to send him southward into Archer Fiord to attempt the crossing of Grinnell Land to the western ocean, and issued the orders on the morning of the 24th. Lieutenant Lockwood, accompanied as usual by Sergeant Brainard and Eskimo Christiansen, left at 8 o'clock that evening with two teams of ten dogs each. The second team was under the charge of Sergeant Elison and driven by Eskimo Jens. Sergeant Elison returned on the 29th, accompanied by Privates Connell and Henry, who had visited in the mean time the Bellows and Black Rock Valley for game, of which no traces were seen except rabbit and wolf tracks. Sergeant Elison had accompanied Lieutenant Lockwood an hour's travel on the third day, turning back when about five miles from Depot Point.

Nine thousand five hundred pounds of coal were hauled from the mine in Water-course ravine during April, being within one-third of a ton of the amount consumed at the station.

On the 5th, owing to the limited amount of fuel, the fires were allowed to die down in the quarters of the officers and men between the hours of 9 p. m. and 6 a. m. The temperature, however, rarely sank below +30 [—1.1° C.]. This slight reduction of fuel caused no inconvenience or sickness, and is only alluded to by me as the surgeon of the expedition verbally protested against it, prophesied resulting sickness, and made it the subject-matter of official mention in his medical report of May 5.

The ice increased 1½ inches [38.1^{mm}] in thickness during the month, measuring nearly 58 inches [1.473^{m}] on May 1, at which time the ice on Lake Alexandra (fresh water lake) was found to be 79.8 inches [2.027^{m}] thick, at a point where a sounding gave 33 feet [10.058^{m}].

The mean temperature for the month was −14.8° [−26° C.], being nearly as cold as the preceding month of March. A maximum of 6.6° [−14.1° C.] was noted on the 29th, and a minimum of −37.3° [−38.5° C.] on the 3d. It was the coldest April on record except 1876, on the same coast. The severity of the weather is shown by the fact that the temperature did not rise above zero [−17.80° C.] until the 27th, except for a single observation on the 22d.

The month was an unfortunate one for game, only two hares and four ptarmigan being killed. A snow-bird was seen on the 25th, ten days later than in 1882. Nearly a pound of fresh meat, however, was available daily per man, and the health of the command continued good.

MAY, 1883.

On May 6 a party was sent to Cape Beechey under charge of Sergeant Jewell, and a second to Cape Baird under Sergeant Gardiner (Appendix No. 76), to make a series of simultaneous tidal-readings in connection with the readings made at Fort Conger.

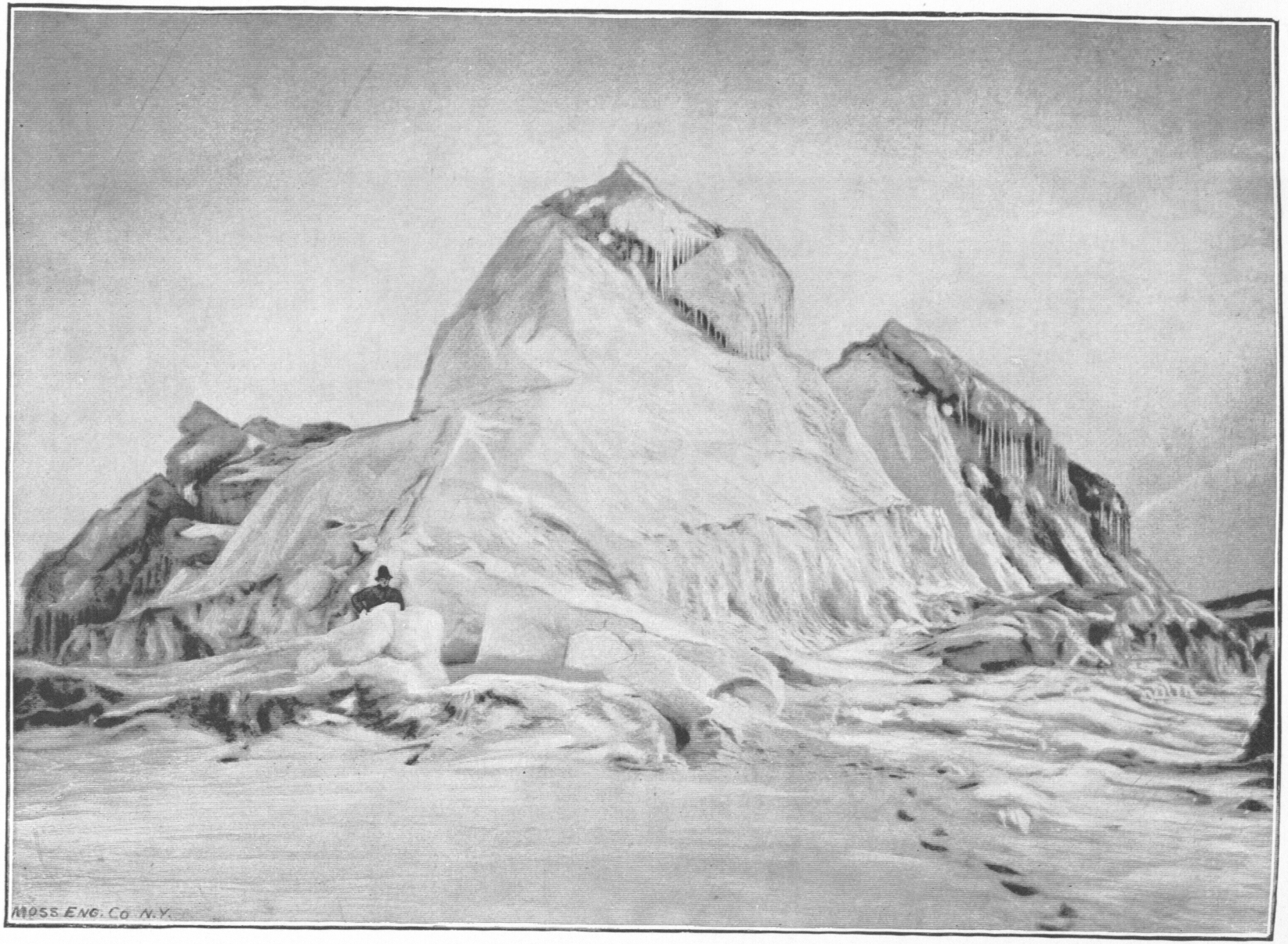
On May 23 Sergeant Jewell again visited Cape Beechey, and a second set of simultaneous readings were made at Cape Beechey, Distant Cape, Dutch Island, and Conger. These observations were deemed by me of special importance for determining the co-tidal lines of Robeson Channel and Hall Basin. Sergeant Jewell also made observations for latitude and longitude, which, reduced by my astronomer, Sergeant Israel, showed Cape Beechey to be in latitude 81° 52′ 29″ N., and longitude $00^h\ 07^m\ 22.3^s$ (in time) east of Fort Conger. Sergeant Jewell's orders and report form Appendices Nos. 74 and 75.

Sergeant Israel, the astronomer of the expedition, visited Cape Baird on the 9th, to determine carefully the latitude and longitude of that point. The latitude, determined from a set of circum-meridian observations, was 81° 32′ 27.7″ N., with a possible error of plus or minus 0.9″. The cape was $00^h\ 00^m\ 57.5^s$ east of Fort Conger (in time). This determination makes the latitude of Cape Lieber about 81° 28′ N. Sergeant Israel's orders and report are Appendices Nos. 77 and 78.

During his trip to Cape Baird Sergeant Gardiner, in accordance with his instructions, made careful and extended observation of the many floe-bergs grounded at that point, with a view to determining if their structure was a stratified one.

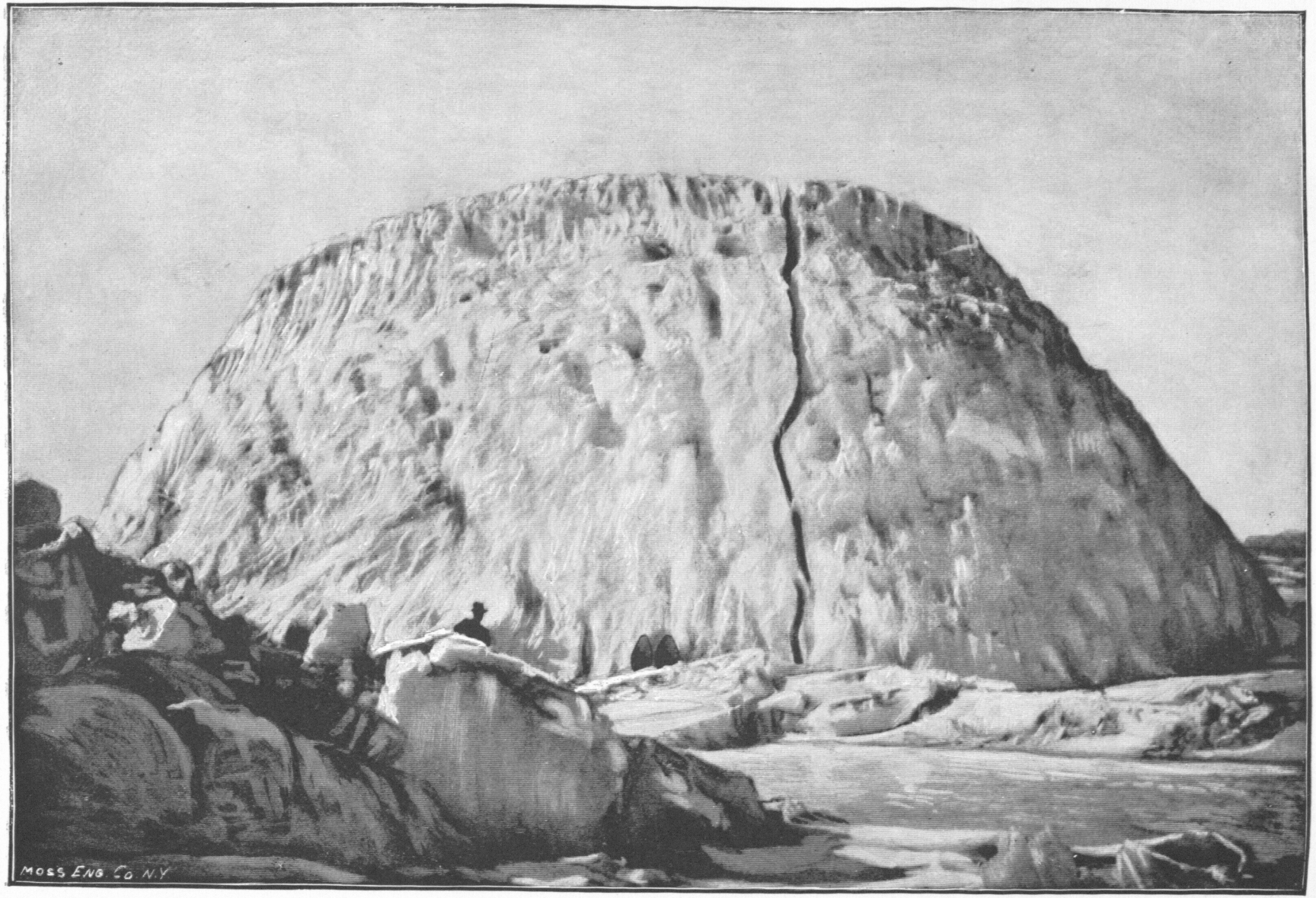
I had previously examined all floe-bergs easily accessible from the station, and especially those which had split since grounding. The angles of cleavage were almost invariably perpendicular and extremely regular. In examining the interior of recently split floe-bergs plainly defined strata were visible in every case. The upper part of the ice was somewhat more opaque and of a whiter color than that below. Many of these paleocrystic floe-bergs resembled very closely in color and structure the recently fallen ice from the Henrietta Nesmith Glacier, on the north side of Lake Hazen, which was examined by me in May, 1882. Sergeant Jewell reported seeing a very large floe-berg on the North Greenland coast in April, 1883, which had thirteen very marked and clearly-defined strata. He examined it very closely, in accordance with my general instructions on that point. Sergeant Gardiner's observations at Cape Baird showed stratification to be general and it is probably universal. His instructions and report form Appendices Nos. 76 and 79, and Sergeant Jewell's, bearing on the same subject, Appendix No. 80. Sergeant Jewell visited Cape Beechey May 21–24, for tidal and time observations (see Appendices Nos. 81 and 82).

Simultaneous tidal readings at Capes Beechey, Baird, Distant Cape, and Conger developed peculiarities which appeared to render further observations necessary, and on the 28th Sergeants Brainard and Gardiner, with dog-team, were sent to Cape Cracroft to make simultaneous observations in connection with Distant Cape and Fort Conger. These observations with preceding tidal readings have been transmitted to the Superintendent of the United States Coast and Geodetic Survey for reduction and discussion. During these trips Sergeant Gard-



FLOEBERG IN ST. PATRICK BAY, JUNE, 1882.

(From a photograph.)



PRESSED-UP FLOEBERG, BREAKWATER POINT, LADY FRANKLIN BAY, JUNE, 1882.

(From a photograph.)

iner made, under trying circumstances, a special examination and collection of the fossils at Cape Cracroft. The collection of fossils was very extensive and complete, but was necessarily abandoned at Conger, as well as the fossils at Cape Baird. Sergeant Gardiner's report on this subject forms Appendix No. 84; Sergeant Brainard's general report, Appendix No. 83.

Sergeant Brainard's report is particularly interesting from his account of fossil trees, over a foot [305^{mm}] in diameter, found by him, at an elevation of some eight hundred feet [244^{m}] on Judge Daly peninsula, several miles south of Cape Baird. Sergeants Gardiner and Brainard are entitled to much credit for the success of this trip. The trip was a dangerous one owing to the advanced season of the year and the decayed condition of the ice. Its execution would not have been directed but for my unwillingness to allow an apparently vexed scientific question, which could be determined by direct observation, to remain unsettled on the ground that the performance of such duty entailed danger.

On May 26 Lieutenant Lockwood returned from an exploration westward, after an absence of thirty-one days. The party was in perfect health and excellent spirits. His journey had been remarkably successful. He explored the valley at the head of Ella Bay, and finding no practical route in that direction proceeded to Beatrix Bay, and from that point succeeded in crossing Grinnell Land, reaching the salt water from the Polar Ocean at the head of a fiord named by him in the field Greely Fiord. He traveled down the fiord some twenty-five miles and reached a point in 80° 48′ N., 77° W. After waiting three days on less than half rations for fair weather, he noted on a clear day the apparent termination of Grinnell Land, on the north side of Greely Fiord, in Cape Brainard. To the southwest, at a distance of some sixty or seventy miles, a projecting point of high land could be seen, which apparently was separated by a wide fiord from the southern part of Grinnell Land. It seemed proper to me to name this point Cape Lockwood, in honor of its discoverer, and to designate the new land as Arthur Land, in honor of Chester A. Arthur, then President of the United States. In addition, Lieutenant Lockwood discovered that the southern half of Grinnell Land is covered by an immense ice-cap, which extends from the head of Ella Bay to the southern shores of Greely Fiord. A marked peculiarity of this ice-cap was its unbroken and perpendicular front which ranged from one hundred and twenty-five to two hundred feet [38 to 61^{m}] in height. Such was its abrupt character that but two places, in a fifty-mile journey along its front, were observed where it would have been possible to scale it.

During this journey Lieutenant Lockwood and Sergeant Brainard displayed energy, endurance, loyalty, and pluck, which were hardly second to their record of the previous year on the shores of the frozen Polar Sea. For nearly a week the entire party lived on less than half rations in order to render as complete as possible their work of exploration and discovery.

Lieutenant Lockwood's loyalty in connection with this journey impressed me with particular force. He deemed the crossing of Grinnell Land an impossibility, and in starting out had entreated me to permit him instead to examine the glacial system of Lake Hazen. His persistency, energy, and fidelity in attempting the route from Beatrix Bay after failing in Ella Bay, evidenced most strongly his determination that his commanding officer's idea of the practicability of the crossing of Grinnell Land should not fail through him. This trip, in common with all our extended journeys, entailed marked privations and serious hardships, to which, in the interest of their work, Lieutenant Lockwood and Sergeant Brainard voluntarily added a serious reduction of rations for several days.

Lieutenant Lockwood's full and very interesting report, with his instructions, forms Appendices Nos. 85 and 86. Sergeant Brainard's share of this work showed the same sterling qualities evinced by him the previous year, and in consequence he was recommended by me in 1882 for a commission in the Army.

On May 1 Dr. Pavy, who was serving as the naturalist of the expedition, was directed to furnish, by May 31, as complete a report concerning the natural history of the expedition as

was possible. A description of all specimens on hand was to be given, and such notes made as would facilitate the speedy rendering of a report on the return of the expedition, or as would secure similar results if their abandonment should be necessary. This order was deemed essential to prevent the entire loss of our labors in case of a contemplated retreat by boats. He was also ordered to furnish, by May 6, six complete sets of botanical specimens, so arranged that they could be securely transported and duplicates be intrusted to each officer of the expedition. Instructions on this subject form Appendices Nos. 87 and 88. The collection of plants was not delivered until May 22. The collection was an exceedingly poor one and was unsatisfactory in its condition and necessitated a new collection that summer. The lichens were not furnished until the 25th, and only after repeated applications for them. The provisions of my letter of May 2, requiring a report by letter regarding certain deficiencies in the specimens and their arrangement, were never complied with by Dr. Pavy. On June 1, my written orders of May 1 having been entirely disregarded, it became necessary for me to order Lieutenant Lockwood to relieve Dr. Pavy of his duties as naturalist. (See Appendix No. 89.) The small amount of work done by Dr. Pavy in nearly two years, and the unsatisfactory condition of the specimens when transferred to Lieutenant Lockwood, are shown by Appendix No. 90. In extenuation of my responsibility for such a condition of affairs, I should say that Dr. Pavy's repeated verbal reports to me led me to believe that the specimens obtained had been properly preserved and that full and complete notes had been made regarding them. Many of the gaps in the natural history notes were subsequently filled by extracts drawn almost entirely from my private journal and that of Sergeant Elison.

During this month we lost nearly three hundred pounds of fresh meat, which had become tainted in its interior though perfectly good externally. The month was hardly to be called a good one for game. Eleven ptarmigan, two seals, seven hares, and three musk-cattle were obtained. A musk-ox was killed by Lieutenant Lockwood during his western trip, and the two others on the 30th of May by Private Connell, who had been sent with Eskimo Jens and dog-sledge hunting to Black Rock Vale.

The health of the command during May was good, though probably a number of the men who disliked the seal meat suffered somewhat by their abstention from that part of our diet.

The thickness of the harbor-ice on June 1 was 54.4 inches [1.382^{m}]; a decrease of only about 2.5 inches [63.5^{mm}] during May.

The mean temperature for May was 14.8° [—9.6° C.], with a maximum of 32.3° [0.2°C.] on the 22d, and a minimum of —13° [—25° C.] on the 1st. The severity of the weather during the month may be imagined from the fact that but for one hour was the temperature above the melting-point of ice. The snow-storm of May 27 and 28 was noticeable as being the longest continued snow at the station; it lasted for sixty-two hours.

The 30th of May was considered as a holiday, and in honor of our "Decoration Day," and in fortunate default of any graves of our own, the head-boards of the Arctic dead of the English expedition of 1875–'76 were decorated. The initiative in this matter, as in the preceding year, was taken by Privates Frederick and Long. These marks of appreciation and honor for the foreign dead must be considered of greater value as coming from the rank and file of the expedition than if they had been suggested by the officers.

JUNE, 1883.

On June 8 Dr. Pavy, at his own request, was sent with the dog-sledge to Cape Baird to examine the petrifactions and fossils in that neighborhood. He returned on the 9th, having been unable to find them. No written report was made by him of the trip.

The dog-sledge under Sergeant Linn was sent to Cape Murchison on the 10th to bring in some supplies needed for the party.

Private Connell was sent with Eskimo Jens's sledge to the Bellows on a hunting trip on the 17th. He returned on the 20th with three hundred and eighty-five pounds of meat. He had found a herd of sixteen cattle at the head of the Bellows, eight of which he killed, very judiciously sparing the rest, owing to the slight chance of the meat being brought to the station. Privates Schneider and Ellis were sent later, each with a dog-sledge, and succeeded in bringing in over six hundred pounds of meat. These trips were made with great trouble, as the river in the Bellows Valley was very high and was forded with great difficulty; owing to rapidly melting snow the stream was rising with such rapidity at the time of the last crossing that it was useless to attempt another trip. This meat was a great benefit and satisfaction to the party, and was especially a boon to those who disliked seal-meat.

During the month other game was killed in considerable quantities. A seal, two hares, twelve brent-geese, forty-two ducks, twenty-one dovekies, fifteen ptarmigan, and many other smaller birds, were obtained.

The first flower, a purple saxifrage (*Saxifraga oppositifolia*), was found in blossom June 4, three days later than in the preceding year. The list of flowers found, with their dates of blossoming and other information, forms Appendix No. 130.

The first brent-geese appeared on the 5th of June and the ducks on the 6th. An authenticated egg of the knot (*Tringa canutus*) was procured on the 9th; the first authenticated specimen ever known. The longer axis of the egg was one and one-tenth inch, and the shorter about one inch. The ground color was a light pea-green, closely spotted with small brown specks about the size of the head of an ordinary pin.

Steep ravines, with southern exposure, commenced discharging freely on the 4th, while those of a lower gradient and other location were yet frozen.

Hunting near the station was followed almost daily, but the only distant trips, besides that of Private Connell, were made by Private Biederbick, who alone visited the Bellows and St. Patrick Valley. While hunting near Distant Cape, Private Ellis discovered on the 26th the remains of an old Eskimo sledge. It was about four feet long [1.219^{m}], of wood, apparently pine, shod with the bone of the whale, and was found about forty feet [12^{m}] above the sea.

Sergeant Brainard visited Cape Baird on the 16th to examine the ice to the southward, and to obtain game if possible. The only water visible on the 19th from the summit of Cape Lieber was a narrow lane to the northward of Joe Island and an open space near Distant Cape and Cape Murchison. Sergeant Brainard brought in a fine and large collection of fossils and petrifactions, gathered near Cape Baird on Daly Peninsula.

On June 30 Lieutenant Lockwood submitted, with Appendix No. 91, an inventory of collections in natural history, classified and arranged. It should here be stated, that, during his brief service as naturalist of the expedition, Lieutenant Lockwood carefully and systematically brought together in order the large collection of this and the previous summer, numbered and labeled all specimens, arranged and packed them in the best manner (except the plants, which were in my own charge), and had the cases so arranged that they could have been loaded in an hour on the relief steamer. The specimens as packed will remain many years uninjured by weather or animals. Sergeant Elison, by his habits of application and untiring zeal, added many fine specimens of birds ready for mounting, and Sergeants Brainard and Gardiner contributed remarkably fine collections of fossils, while I obtained very many marine specimens and a large number of fossils from the shale at the coal mine. To Sergeant Elison's interest and skillful handling was also due the excellent condition of the botanical specimens brought back, most of which were gathered by me, but all of which were beautifully pressed and dried by him.

The list of birds seen during the two years, and notes thereon, form Appendix No. 131. A similar list as to mammalia forms Appendix No. 129.

The party were in good health at the end of the month. Over a pound and a tenth of fresh meat daily per man had been used. Economy in fuel had been practiced during the month by the discontinuance of fires, except in one room, between 9 p. m. and 5 a. m.; so that six tons of coal remained on hand at the end of the month. The rotten condition of the sea-ice forbade hauling any more by sledge from the coal mine.

A heavy northeasterly gale occurred on the 24th, during which the wind rose to a velocity of forty-two miles per hour [18.8^{m} per second]. The first rain of the season occurred on the 26th, but the first month of summer ended with a touch of snow.

The harbor ice decreased 16.5 inches [418.39^{mm}] in thickness, measuring 38.9 [998.08^{mm}] on July 1.

The mean temperature of June was 32.4° [0.2° C.], with a maximum of 39.6° [4.2° C.] on the 17th, and a minimum of 22.7° [—5.2° C.] on the 2d. June 23 was the first day on which the temperature did not fall below 32° [0° C.].

JULY, 1883.

On July 1 Sergeant Brainard was sent, with Eskimo Christiansen and dog-sledge, to Cape Lieber to examine the channel southward. He returned on the 3d, and reported the ice to be solid both north and south of Cape Baird, except occasional water-lanes and an open space around Distant Cape and Cape Murchison. The new ice surrounding the heavy floes, however, had melted or broken away, and he was confident that the next heavy gale would break up the main floe in Hall Basin and Kennedy Channel.

Lieutenant Lockwood and Sergeant Brainard were sent into the interior on July 11 for a trip towards the northwest in order to acquire a knowledge of the physical conditions of the country, and to ascertain definitely the topography between the northeast end of Lake Hazen and Lincoln Bay. They returned on the 14th. Privates Biederbick and Henry accompanied them one day to assist in carrying their packs. Lieutenant Lockwood succeeded in penetrating about thirty miles to the northwest. From his farthest point a very large glacier could be seen about fifteen or twenty miles distant from them to the northwest. Exceedingly bad traveling caused them to return, as another day's journey would have added little or nothing to their information. Lieutenant Lockwood, by permission, delayed making his report until he could finish a map of the surroundings of Fort Conger in conjunction with this trip. Owing to his death the map and report were not made. In lieu thereof, Sergeant Brainard's report, the materials of which have been drawn from his own and Lieutenant Lockwood's journals, forms Appendix No. 92.

On July 9, having been informed by Acting Assistant Surgeon Octave Pavy of his determination not to renew his contract for the year, which he considered as ending on July 20, he was directed to turn over, before leaving the United States service, his property, official diary, and collections in natural history, to Lieut. James B. Lockwood. These articles were to be delivered packed, boxed, and addressed to the Chief Signal Officer. The orders to Dr. Pavy, and the correspondence had with him in this connection, form Appendices Nos. 93, 94, and 95.* On July 19 Dr. Pavy not only positively refused to transfer his diary, but, although his contract did not expire until the succeding day, declared that he was out of the service, that my orders were not binding upon him, and he refused to obey the formal order of arrest until a file of men was called to enforce my authority. Formal charges and specifications were furnished him on the 19th, previous to the expiration of his term of service, and he was held in service to await the action of the War Department in his case. The charge and correspondence of these dates form Appendices Nos. 96 to 100, inclusive.

*The directions for Dr. Pavy to turn over his diary was in accordance with the orders of the War Department organizing the expedition, which left me no discretion. These instructions read:

"Each member of the party will be furnished with a diary, in which he will record all such incidents as specially interest him. This diary will not be open to inspection until delivered to the Chief Signal Officer for his sole use in compiling the full record of the expedition."

Every consideration was shown Dr. Pavy in connection with his arrest; limits of a mile in any direction from the station being granted him. He broke his arrest, however, on the 26th of July, as well as on other occasions, but owing to our isolated condition I did not deem it advisable to place him in close arrest. It should be said to the credit of Dr. Pavy's humanity that he continued to give medical advice to such members of the party as requested it, although when placed in arrest he positively declared that he would not render such service in the future to any one of the expedition. I deem it my duty to call attention to the fact that, contrary to Dr. Pavy's written statement that his diary consisted of letters to his wife, a translation of his notes in the office of the Chief Signal Officer since my return shows this statement to be erroneous. No domestic or family matters were alluded to, and instead of letters only disjointed and disconnected data without sequence of dates or subjects were found, which were devoid of scientific or even medical comment.

On the 28th the launch was tried under steam from Dutch Island westward in the harbor, and everything was found to be in good working order. Stores and supplies were gradually carried to Dutch Island during the month for the purpose of facilitating the prospective retreat by boats.

On July 29 the abandonment of the station was announced in orders (Appendix No. 101) to take place on August 8, or as soon thereafter as practicable.

Sergeant Brainard was directed to make an inventory of the stores on hand which were to be abandoned, a list of which forms Appendix No. 102. Sergeant Brainard during the two years' service at Fort Conger has served as orderly-sergeant and as commissary-sergeant of the expedition. In filling these thankless and difficult positions he had shown as much tact, equable temper, and good judgment as he had energy and determination in the field.

It was with great reluctance that I decided on the abandonment alive of our dogs. In case we were unsuccessful in our boat journey, as had been Hayes, and Kane (in his first trip), and returned to Conger, these patient, willing laborers would be indispensable to obtain fuel and meat. Several barrels of pork were unheaded and all the barrels of oil opened, so that a couple of months' food could be reached with some difficulty.

The ice broke up gradually during the month; the upper part of Kennedy Channel broke on the 24th. The harbor-ice may be said to have broken up on July 30.

On July 8 Sergeant Cross discovered a coal seam above the old coal mine in the bed of the same water-course. It had long been evident that a seam of such kind must exist, as very large pieces of coal had been seen at many points a long distance above and at a much greater elevation than the old mine. The surface of coal exposed was reported to be about twenty feet [6m] high and twenty feet [6m] long.

The month was not a good one for game. Only three hares, two geese, thirteen ducks, and several small birds were procured. Our last musk-meat was eaten on the 24th, but sufficient bones remained for soup until August 1. The game being scarce, but one meal from game was had during the last week of the month.

Private Long was discharged for expiration of term of service on the 23d, and re-enlisted on the 24th.

The party remained in excellent health, with the exception of Steward Biederbick, who was troubled with rheumatism.

On the 30th Lieutenant Kislingbury turned over to me, as a personal contribution for the expedition, two large tea-cans full of lichens. He had devoted much of his leisure time during the two years in searching for lichens and mosses, and this collection must have been very complete and valuable. He took a strong interest in making it complete, and showed his goodwill by his tender of it. Unfortunately it was necessary to abandon this with other bulky and weighty collections.

The month ended in southerly gales, which did much to break up the harbor ice in Hall Basin and Robeson Channel. Unfortunately the ice in Archer Fiord remained fast, and no possible chance of crossing it appeared. Every preparation, however, had been made for the abandonment of the station at the earliest moment. With this view, five thousand pounds of carefully screened and selected coal had been bagged and cached on Dutch Island, for use in the launch during the retreat.

The mean pressure was 29.865 [758.6^{mm}] for July, and the mean temperature of the month was 37.2° [2.9° C.], with a very high maximum of 52.4° [11.3° C.] on the 12th, and a minimum of 28.8° [—1.8° C.] on the 6th.

The reduced magnetical observations for the first year form Appendix No. 139*a*. The other magnetical observations have been transmitted to the United States Coast and Geodetic Survey for reduction and publication. Meteorological observations for the two years form Appendix No. 138.

AUGUST, 1883.

By the 3d the records of the expedition had been packed and arranged for retreat. These records, weighing about fifty pounds, were packed in three tin boxes, which were soldered up and thus made water-tight. One box, to be in my charge, contained the originals of reports and field journals, which had been filed with me in connection with the various work of exploration, and also my completed journals. A second box contained the original sheets of magnetical and meteorological observations and other official papers. The third box, which was to be in Lieutenant Lockwood's especial care, contained letter-press copies of all magnetical and meteorological observations and records of the pendulum transits, the star-sheets, and the official collection of plants.

Of necessity, all property, papers, and records, not indispensable to the history of the expedition, were abandoned, as well as all private property. All the standard thermometers were boxed carefully for transportation, and the pendulum, carefully soldered up in its water-tight case, was also boxed, in order to render its carriage in an uninjured condition certain.

The condition of the party for the coming retreat was of general health and strength, despite their arduous labors for two years amid unequaled cold and darkness. Of the seven hundred and twenty-one days spent at Fort Conger, two hundred and sixty-eight had been marked by the total absence of the sun. On two hundred and sixty-two days one or more sledge parties had been absent in the field, on journeys entailing from two to sixty days' absence, and some three thousand miles had been traveled by such parties; an unequaled latitude to the north had been attained; to Greenland over a hundred miles of new coast had been added; and to the westward Grinnell Land had been crossed, its exterior surveyed, its physical geography determined, and the contours of its northern half fixed with considerable certainty.

This geographical work had been done without disaster, without physical injury to any one, and for its prosecution no part of the scientific work for which the expedition was formed had been neglected or abandoned. It seems proper to make these statements in view of the many assertions that all Arctic work is of necessity unduly dangerous or fatal. The programme of international observations had been carried out as fully as instruments and circumstances would permit, and during the two years there had, on an average, been made and recorded daily full five hundred observations.

A selected party was told off on the 1st, with orders to be in readiness for prompt departure for Cape Baird, as I intended sending to that point at the earliest practicable moment the launch, loaded with coal, provisions, and all the most important collections and records, leaving the main party to follow, when everything important had been transferred. The journals of the men were, as a rule, turned in, sealed, and addressed to the Chief Signal Officer. They were

packed with forty-eight photographic negatives in a small box, which weighed about seventy pounds. A supply of medicines, the list of which had been furnished by Dr. Pavy early in July, was carefully packed and boxed by Steward Biederbick.

A small fiord seal was killed by Lieutenant Kislingbury on the 4th, which gave us fresh meat for a couple of days.

The ice was watched closely from the 1st of the month, but up to the morning of the 9th no possible chance of crossing Archer Fiord presented itself. About 10 o'clock a. m. the ice in Archer Fiord, though not navigable, from its movements appeared to presage more favorable conditions, and, in order to avail myself of any possible changes, the station was ordered to be abandoned at 1 p. m. of that date. The launch left Dutch Island at 2.30 p. m. and ran to Proteus Point, meeting the small boat from the station, which brought our dinner partly cooked.

The eastern entrance being completely blocked with ice, we were compelled to attempt a western passage, and with great difficulty reached Sun Peninsula, at the western entrance, about 10 p. m. The passage across the strait appearing possible, we started into Archer Fiord about midnight, but the ice commencing to move towards the shore the launch was badly nipped, and was only saved from loss by strenuous exertions. On the morning of the 10th, at the turn of the tide, we were able to run southward into Archer Fiord and pass around the heavy ice which separated us from Cape Baird. A heavy gale prevailing made it impossible to proceed southward that evening, but everything was put in readiness for instant move. A cairn was erected at Cape Baird, in which was deposited a record (Appendix No. 104).

On leaving Cape Baird we had fifty-five hundred pounds of coal and about fifty days of provisions, with small caches at Carl Ritter Bay and Cape Collinson, which were relied on to carry us to Dobbin Bay, where I at least counted on a vessel. Our means of transportation were the steam-launch, the whale-boat *Narwhal*, the English ice-boat *Beaumont*, the English boat *Valorous*, with a small Whitehall boat for special use. The crews of the three boats were told off, so that each would know where he belonged in case of an accident to the launch.

We left Cape Baird at 11.15 p. m. of August 9, and were delayed between Capes Lieber and Cracroft nearly eight hours, by a huge paleocrystic floe, which, by estimate, was over fifteen miles long. Passing southward the morning of August 11, a depot of corn-beef at Cape Cracroft was taken up by the small boat, but one hundred and twenty pounds of bread were left for lack of room, the launch and boat being badly crowded. The weather was exceedingly foggy during the day, so that we moved southward slowly and with great difficulty. The fog was so dense in the afternoon that for a time we were uncertain of our position, and were obliged to run to the shore and follow it southward. Several shoal places were found which interfered with our progress, and near midnight we stopped, as I felt that the distance made was not commensurate with the coal consumed. The point where we stopped later proved to be some five miles north of Carl Ritter Bay.

On the morning of the 12th, while the party was preparing breakfast, the launch was allowed to touch the shore on a falling tide and was grounded. Careful instructions had been given to avoid this. Sergeant Cross, who was specially in charge of the launch, was evidently intoxicated, probably from the fuel alcohol. It was only by the most energetic and laborious exertions that the launch was finally released, after a loss of two hours' time.

The day's run was a slow and difficult one, owing to the large quantity of ice and the prevalence of foggy weather. Serious nips were frequently threatened, and at times we were obliged to draw the small boats up on the floe. In consequence of the unfavorable conditions we were obliged to wait some distance above Carl Ritter Bay until the weather cleared, when we ran south and picked up the cache of bread and meat at Carl Ritter Bay. To avoid a long detour along the shores of this bay I ran direct from the cache to Cape Von Buch, which was passed without difficulty.

The launch was stopped about 2 a. m. of the 13th, in latitude 80° 52′, by an apparently unbroken pack of very large floes. A good harbor was found for the boats, and we were obliged to camp until noon, owing to the very unfavorable reports of the reconnoitering parties. At noon the tide loosened up the ice a very little, but progress being possible I started south, despite the snow and foggy weather, and ran for three hours until forced by repeated nips to camp. Lieutenant Kislingbury, during the run, shot a small harbor-seal which was cooked for supper and relished by all.

During this run Sergeant Cross was insubordinate and disrespectful and everything went wrong with the launch. His services as engineer being thought indispensable, prevented any further action than cautious and well-considered reprimands.

Our position was then 80° 44′ N., about 68° W., some twelve or fifteen miles south of Carl Ritter Bay. A severe northeasterly gale packed the straits with ice, and the storm being followed by low temperatures new ice formed to such an extent as to delay us at that point until the evening of the 18th.

Lieutenant Kislingbury and Eskimo Christiansen went hunting inland, without success, during our stay. Lieutenant Kislingbury reported the existence at that point of a narrow, desolate valley, devoid of vegetation, which ran at right angles with the coast for a couple of miles, and then, turning at right angles, trended to the northeast parallel to the coast for a distance of seven or eight miles. Two small permanent lakes were passed, and a depression, indicating a third large lake, was seen. A small stream, probably springing from the inland ice-cap, fed and connected the lakes and then drained them into Kennedy Channel near our camp. I have attached Lieutenant Kislingbury's name to the valley. The shore had been closely followed since leaving Carl Ritter Bay, and at the beginning of the gale the launch was at the ice-foot. Owing to low temperatures, on the 15th, as a matter of precaution against being frozen in, I moved the launch and boats with great difficulty a mile or two from the shore, within some two hundred yards [183^{m}] of the moving pack, to a point, however, where they would be fully protected from the grounded bergs.

The unmilitary and insubordinate conduct of Sergeant Cross, the engineer of the launch, culminated at this time. When the launch was beset in the worst kind of ice possible, my orders to the engineer were so indefinitely carried out as to endanger the safety of the boat. At the most critical junction I learned that Sergeant Cross was intoxicated, probably from fuel-alcohol, a fact which escaped my notice as he was hidden from view by the covering of the launch. I instantly relieved him from duty, and substituted Private Frederick as engineer in his place. The critical and trying situation of the party made such conduct as Cross's extremely reprehensible, but the circumstances permitted none of the usual methods of discipline. This misbehavior was in keeping with Sergeant Cross's previous and subsequent propensity to appropriate rum or alcohol whenever possible.

Private Frederick on assuming charge reported that the boiler was in such condition that if it had been neglected a few minutes longer it would have become entirely useless, even if it had not exploded.

The next day the boats were moved as far as possible towards open water. The precaution of quitting the shore was a wise one, for when the northeasterly gale ceased young ice had formed to such an extent inshore that it would have been impossible ever to have extricated the launch.

During our stay at that point the temperature was observed above 32° [0° C.] but once, and sank as low as 23.2° [—4.9° C.], undoubtedly an unparalleled low temperature for the 17th of August.

On the 18th the condition of the party was critical. The low temperatures, heavy snows, and inactive condition had been exceedingly trying, physically and morally, to the party, who were sheltered only by the canvas of the boat. On that afternoon, the pressure of the moving

pack against the fast ice diminishing somewhat, I decided to try and reach the moving ice, preferring to take the chances of making our way along the moving pack to remaining ice-bound in that bay. Several hours' labor had no results, as the one hundred and fifty yards [137^{m}] of ice between the launch and the moving pack consisted of large floes cemented together by new ice, then two or three inches [50.8^{mm} or 76.2^{mm}] thick. Our efforts were renewed a few hours later, without much hope of success; but ultimately, by extraordinary exertions, the launch and the boats were at the outer edge of the fast ice before midnight.

We met much moving ice, but had a fine run until about 4 a. m. of the 19th, when, stopped by a dense, heavy pack, a secure harbor was found between two grounded bergs. At that point the tides were very heavy, evidently from twelve to fifteen feet [3.7^{m} to 4.6^{m}] in the springs. We were then about eleven miles northeast of Cape Lawrence, and, an opportunity offering at the turn of the tide, about three-quarters of an hour's run was made without much advantage; and to avoid wasting coal, there being much ice, we stopped seven miles north of Cape Lawrence to await more favorable conditions. About 9 p. m., being Sunday, the psalms of the day were read, and then Sergeant Brainard and Eskimo Christiansen were sent along the coast as far as Cape Lawrence in order to examine the pack southward, which from our position seemed dense and impracticable. They were accompanied by Dr. Pavy, at his own request.

At the turn of the tide on August 20, some open water showing up, and a heavy southwest wind prevailing, I immediately started south with the boats and took up Sergeant Brainard with his party three miles north of the cape. As he reported an impenetrable pack extending from the very point of Cape Lawrence eastward to Cape Jackson, with no water in sight, I thought it best to make a very secure harbor which Sergeant Brainard had observed a couple of miles north of the cape. While a meal was being prepared I visited Cape Lawrence, and from an elevation of about two or three hundred feet [61^{m} or 91^{m}] saw much water with broad lanes opening up in the midst of the heavy ice southeast and south, while to the southwest Rawlings Bay was evidently, though slowly, clearing under the influence of the southwest wind. The launch started immediately, but, after rounding Cape Lawrence and running a couple of miles into Rawlings Bay, I was obliged to make the shore, partly on account of the strong adverse wind and tide, but more especially owing to the dense fog over the surface of the bay. I walked up on the north side of Rawlings Bay to the point overlooking Radmore Harbor, and from a considerable elevation saw an immense paleocrystic floe of many miles extent moving out of the bay, leaving clear water behind it, between the northern shore and Cape Joseph Good. I hastened back to the launch to find her just grounded, although exact and stringent orders had been given to keep her clear, and two men had been detailed for that specific purpose. The strength of the entire party was inadequate to clear her, and we were delayed nearly six hours for the next tide. In extenuation of the failure of the watchmen, it should be noted that the range of this tide was between thirteen and fourteen feet [3.962^{m} and 4.267^{m}], and that at times the water must have fallen about an inch [25.4^{mm}] a minute. In 1876, in this same bay, and under similar circumstances, H. M. S. *Alert*, crowded near shore by a floe, was caught by a similarly falling tide.

At Rawlings Bay ivory gulls and several seals were seen, and traces of the fox and musk-ox, that of the latter being very old. Vegetation along the northern shore of the bay was very luxuriant for the latitude, and resembled very closely that in the vicinity of Fort Conger. Just north of Cape Lawrence two small glaciers were seen by Sergeant Brainard, when traveling along the shore, and a skeleton of a young reindeer was found, which Christiansen thought had been dead about two years. I hazard the opinion that a detailed examination would show the vicinity of Radmore Harbor to be the most northerly point frequented by the reindeer of Grinnell Land. The vegetation of the adjacent valleys is sufficiently luxuriant for reindeer and musk-oxen, and in 1876 Major Feilden, R. A., discovered near Radmore Harbor a recently picked skeleton of a reindeer.

The launch was afloat at 8.30 p. m., and the bay was crossed in two hours. Clear water was found by a long detour inward, which carried us nearly up to the point behind which Radmore Harbor is situated. A dense fog and a strong adverse tide drove us just south of Cape Joseph Good to an insecure harbor; but our situation was materially improved later, as opportunity offered, by moving our anchorage a short distance south. At the first harbor, we came near having a bad nip from an immense paleocrystic floe, which, moving northward, was set well in toward shore by the heavy tide and pressure of the dense pack which filled the straits. At the second harbor, despite our exertions and owing to the very heavy tide, the launch grounded a short time at extreme low water.

The Whitehall boat was here broken up and used for fuel. She had leaked badly, been a heavy drag, and was only of occasional use. She had been kept by me, contrary to advice, until we should have crossed Rawlings Bay. For the previous few days it had been necessary to bail her hourly. She was so easily handled by two men, however, that I had thought it important to keep her as long as possible. After the breaking up of the boat the kayak remained, with which either Eskimo would be able to perform services previously attended to by the use of the boat.

Sergeant Jewell was sent along shore to Cape Wilkes to examine the ice. On his return he reported open water to the south in Kane Sea, and also on the south side of Richardson Bay. Shortly after an opportunity of reaching Cape Wilkes presented itself. Water opened up to the next point of land, and the entire pack, under the influence of the southwest wind, moved slowly and steadily offshore. We had, however, gone scarcely half a mile when the main pack set violently in towards shore and nearly destroyed the launch and boats. There was scarcely any wind at the time, and the movement of the ice probably resulted from tidal currents, which doubtless are very marked in the season of spring tides in that vicinity of the junction of northern and southern tides. It being low tide the boats caught between the moving pack and the perpendicular ice-foot, some ten feet [3m] in height. There were no available breaks in the ice-foot where we could seek shelter, and, in consequence, the launch was jammed and we barely escaped losing her. The other boats were slightly injured, but to no material extent, as they leaked no more after the nip than before, though they had been necessarily much strained. One of the boats was pulled out on the moving pack, but the other two were finally secured along the ice-foot.

During this severe and unexpected nip the entire attention of Lieutenant Lockwood and myself was necessarily devoted to the launch, the most important boat, leaving the others to secure their own safety. Sergeants Brainard and Rice and Private Connell, who were in charge of the respective boats, justified the confidence placed in them by their excellent conduct. Lieutenant Lockwood was of material assistance to me in connection with the launch.

By watching closely and taking chances I managed, despite the heavy pack and great jam of ice, to get into the extreme northeast point of Richardson Bay just after noon (August 22), and with only a couple of hours' delay succeeded in crossing the bay, though with great difficulty. Very much to my disinclination I was obliged to make a long detour westward into the bay, as the passage through the moving pack to the southerly point of the bay would have been extremely hazardous if not impossible.

We found in crossing near the head of the bay that young ice had formed to such an extent as to cement together the small floes, and was thus sufficiently thick to prevent at times the progress of the launch, even when the boats were cast off. The difficulty of penetrating young ice was evidenced by our experience in passing through three hundred yards [274m] at one point, where it required an hour's efforts and entailed at times the necessity of dropping all the boats. It was a useful experience, and in that as in many other matters only experience is of value. On reaching the south side of Richardson Bay it was difficult to determine which point was Cape Collinson. In order to make certain of the English cache the nearest land

was made, and the coast was searched to the nearest point to the westward by Lieutenant Kislingbury and Private Henry, while others examined the first point east. No sign of the cache was found at either. Private Henry picked up to the northwest a small piece of pine wood, and found ancient traces of Eskimo.

While we were endeavoring to reach Cape Collinson, the flowing tide brought from the north such immense quantities of heavy ice that we were driven to harbor in a small bay near a wasted ice-foot twelve feet [3.7m] high, where we were sheltered by three large grounded floe-bergs. From that point Sergeants Brainard and Jewell, sent out to search the coast, succeeded in discovering the English cache, from which all the rum and a barrel of bread was missing, as well as the tobacco, sugar, and tea.

We were unable on account of heavy and jammed ice to move until the change of the tide, about 2 a. m. of August 22. The tide being in the springs rose some fourteen feet [4.3m], which enabled us to get the small boats inside the ice-foot, and thus protect them from heavy ice, but the launch, of necessity, remained outside. The three grounded floe-bergs which had been relied on for protection floated at high tide and came near destroying the launch. As soon as the falling tide grounded the bergs, and the pressure of the heavy pack was somewhat relieved, we ran eastward to Cape Collinson, and about 5 a. m. took up the cache. It consisted of two hundred and forty rations of meat, stearine, alcohol, salt, pepper, onion-powder, and one hundred and twenty rations of bread.

When rounding Cape Collinson a strong southwest wind was met, which with an adverse ebbing tide forced the launch to harbor. In making shore the collar of the feed-pipe, which had several times before been injured, was again broken. This necessitated a delay of two hours, which stay was improved by cooking a warm breakfast.

During our stay Lieutenant Kislingbury visited a point whence he was able to look into Joiner Bay, the chances of crossing which he reported to be unfavorable owing to the great amount of ice. Snow, fog, and wind in the mean time prevailed, but during a temporary clearing up I started south and determined to try the channel by the outside passage through the pack. This dangerous attempt proved successful, though fog set in during the run. About 11 a. m. we reached an excellent harbor just north of Cape McClintock where the boats were moored until the weather should clear and the ice conditions improve.

From the summit of the grounded bergs it was noticed that even during the rising tide the strong southwest wind was setting large quantities of ice out from Scoresby Bay, and as soon as the wind lulled slightly, I ran into Scoresby Bay a couple of miles and reconnoitered from an adjacent hill. I discovered that the bay was full of immense floes, but could be crossed by running inland. A long detour was necessary, but fortunately clear water was found the entire distance, and I succeeded about 6 p. m. August 22 in reaching a point just south of Cape Norton Shaw, where an immense quantity of pack slush-ice, with occasional pancakes, made such a tremendous jam as prevented further progress.

The water opened a little to the south once, but a paleocrystic floe moved in just ahead of us, and, jamming between some grounded floe-bergs and the shore, cut us off from the south. I later made about three-quarters of a mile, but poor shelter for the boats obliged me to give way several hundred yards to await further developments. My astronomer there got an observation which he thought the meridian, and which made our latitude 79° 51′, two miles south of my reckoning. It transpired later, however, that the sun was off the meridian, and that my reckoning was correct.

About noon the pack commenced moving slowly inshore, and I was obliged to scatter the boats for shelter. For a time we were jammed against the ice-foot by the pack, with prospects to the southward very unfavorable on account of the large quantity of densely packed rubble and small ice, which had no motion during the change of the tide. It seemed possible

to me then as we were near Cape Frazer, where the tides from the north and south meet, that this jam was caused by its location with reference to the tides.

My journal at that time shows my uneasiness that no ship had been sighted, and that I realized our unenviable position if none was found at Cape Hawks, with late season, but little fuel, and an uncertain supply of food.

Shortly after high water, at the first chance of progress, I started south and made an hour's run over a tortuous course, and was finally beset in a pack of sludge-ice, with an occasional small pan-cake, while making shore a half mile distant. During this ebbing tide we drifted at first northeastward a little as would be natural from a tide flowing from the Polar Sea; but a short time afterwards the drifting was changed to the south by an immense floe-berg which was carried south evidently by an under-current. It was probably the drift of this floe which packed the sludge-ice in which we were beset. We reached a small pancake floe, where the boats were entered, to be drawn up at a moment's notice. The floe-berg, which at first was nearly a mile north of us, was only some two hundred yards [182.9^{m}] distant at slackwater. On the morning of the 24th we succeeded in reaching the ice-foot, where a very poor shelter was found, affording protection for only two boats. About 9 a. m. a northeasterly gale set in, when we succeeded, by extraordinary exertions and with great difficulty, in moving the launch and one boat five hundred yards [457.2^{m}] to the south, where an excellent shelter was obtained, which had been inaccessible at the time of our first reaching the ice-foot. This movement of the boats was made in a dense pack, which, driven inward by the heavy wind, ground along the ice-foot, and which came near utterly destroying our boats. Two boats being in a somewhat sheltered position remained behind owing to the great danger attending any movement under such conditions. The boats which took the chances and moved fared better, however, than those left behind, which received some slight injuries that were easily repaired. The general opinion was that we had escaped easily in not losing some of the boats. Fog varied by occasional snow set in, wetting everything and making the condition of the party thoroughly uncomfortable.

Sergeant Jewell was sent along the coast to Cape Frazer, and on his return reported unfavorable conditions to the southward, the ice being heavily packed as far as he could see.

The tides were exceedingly heavy near Cape Frazer and caused me great anxiety during our enforced stay, which, owing to the unfavorable condition of the weather, was for the rest of the 24th.

The ice loosened somewhat just after the turn of the tide on the morning of the 25th, and permitted an hour's run over a very crooked route, as the heavy pack obliged me to closely follow the ice-foot. Stopped by ice for two hours, I succeeded about 9 a. m. in making a little southing, and moored to a flat-top floe-berg which was grounded a mile from the shore. In this run the collar of the feed-pipe was again broken, and was with great difficulty repaired by the engineer, Private Frederick. The boiler put in at St. John's was unfortunately insecurely fastened in the bottom of the boat, and, consequently, acted like a ram against the engine when any direct shock came.

Christiansen shot a seal that morning, which was a welcome addition to our supplies. Our noon observation placed us in 79° 45′, just north of Cape Frazer.

A strong southwest wind set a number of large floes against our grounded berg and on the rising tide it floated it off to the northeast, and compelled us to seek shelter behind some grounded bergs near shore. I waited for eight hours, under the cover of bergs, patiently watching for a large lane of open water, which, under the influence of strong southwesterly winds, made slowly to the north all that time. At 6 p. m., seeing that the shore ice was crowding in, and, owing to the increased fogginess, might finally cut us off from a run, I determined to force our way through a mile of moving pack to open water, though sensible of the danger of besetment. With great difficulty the launch succeeded in reaching clear water, and ran southward for

a short time till a dense fog drove us to shore at Hayes Point, north of several grounded floes. During the preparation of supper I ascertained from personal observations that open water prevailed a half mile south. The fog breaking very slightly an hour later I ventured out into the strait, around a number of grounded bergs, and reached good water. The fog remained thick, but during occasional breaks the tops of Cape Louis Napoleon and adjacent mountains presented themselves, and enabled me to run until 10 p. m. At that time I moored to an immense grounded iceberg, from the summit of which a good view to the southward was had during a break in the fog. The ice in that quarter consisted of very large floes and numerous lanes. It offered a perfect passage for an Arctic vessel, but with my small launch, the prevalence of the fog, and our proximity to Cape Hawks I did not think it advisable to take any chances. This grounded floe was about a mile from land, and running to the shore I found us cut off from open water, near Cape Napoleon, by a miserable corner of a grounded berg, which laid against the ice-foot. I set the party to work to try to cut away this barrier, which was only twelve feet [3.658^{m}] across and three feet [.914^{m}] thick, in the hopes that the rising tide would permit an inside passage. In the meantime Sergeant Jewell and two men were sent on to Cape Napoleon with orders to look into Dobbin Bay, where I hoped for a vessel.

At 3 a. m. on the 26th the watch-sergeant awakened me with the report that the changing tide had opened the ice, so that an outside route was practicable to Cape Napoleon. We got under way as soon as possible and reached Cape Louis Napoleon about 4.15 a. m., having picked up Sergeant Jewell and his party en route. He reported that owing to heavy fog Cape Hawks had not been seen, and that Dobbin Bay, to the southwest of Cape Napoleon, was filled with large floes separated by occasional lanes of water.

The dense fog compelled me to remain at Cape Napoleon until 10 a. m., when a large amount of open water, seen during breaks in the fog, induced me to attempt an outside passage to Cape Hawks. The fog was exceedingly thick and the run was made under difficult and dangerous circumstances, but we finally reached the English cache near Cape Hawks about 2.15 p. m., having run in from Kane Sea to the northward of Washington Irving Island. The route from Cape Napoleon had been a very tortuous one owing to the ice, and probably involved traveling twice the direct distance.

Sergeant Rice, with the whale-boat, was dropped as we passed Washington Irving Island, with directions to examine the cairn, bring in any records found, and leave a notice of our movements. He was also specially directed to note and report on the condition of the ice to the southward. On his return he reported that the cairn had not been touched since our visit in 1881. He left a brief record, which set forth our movements past and contemplated. He reported the ice to the southward, as far as the eye could reach from the summit of Washington Irving Island, to be in such a condition that any well-provided vessel could easily run through it.

While Sergeant Rice visited Washington Irving Island I found the English depot with some difficulty and took it up. A foot or more of newly fallen snow covered Washington Irving Island and the land around Cape Hawks, and rendered the discovery of the cache difficult. The depot consisted of three hundred and forty-two pounds of stearine, one hundred and sixty-eight pounds of preserved potatoes, about six gallons of rum, and some two hundred and fifty pounds of bread. Fully nine-tenths of the bread had spoiled since our previous visit, and owing to the grave uncertainty of the future the entire amount was carefully examined for such as was serviceable, and a considerable quantity of that taken was so moldy that it was barely eatable. In connection with subsequent events it may, perhaps, be properly stated that, not exceeding a hundred pounds of bread could possibly have been selected from the unserviceable amount left, and that all of this was permeated and covered by a slimy, green mold which rendered the bread unfit for any one, and eatable only by a starving

man. To supplement our small amount of coal, then reduced to about four hundred pounds, all the casks at Cape Hawks were broken up and taken on the launch, to be used for steaming purposes.

We left Cape Hawks at 4.25 p. m. and ran southwest nearly an hour, finding the old ice increasing in amount and in places cemented thickly together with young ice. My judgment at the time, of the situation, is best shown by a literal quotation from my journal of that date:

"I cannot but feel that we are now in a critical situation, not knowing what can be depended on. Since no vessel reached this point in 1882–'83 (to this time), we must all feel an uncertainty as to the party for our relief being at Life Boat Cove. The ice to the southward, as far as the eye could reach from the summit of Washington Irving Island, is now in such a state that any well provided vessel could easily run through it. If no party is at Life Boat Cove, our situation is exceedingly dangerous. We have, perhaps, sixty days' provisions, except sugar, and beyond that we must depend upon the resources of the country, which are of the most precarious character. However, we shall do as we have done, our utmost, and by some possible chance we may reach Cary Islands."*

We had, unaided, successfully made our way for over two hundred miles of latitude (involving over 400 miles of travel), despite a remarkably early autumn, and through ice of such character as must be seen for a just appreciation of the dangers and difficulties connected with its successful navigation. Scarcely fifty miles south of us were the cliffs of Cape Sabine, which looked southward to the open North Water, and though unconscious that five weeks before the *Proteus* had sunk in the sea before us, our minds were filled with apprehensions and forebodings as to the future. The condition of affairs seemed alarming; it was evident that no relief vessel could be depended upon; the temperature, which had been for some time below the freezing-point, then stood about 25° [−3.9° C.], and the appearance of the young ice foreboded trouble. We had reached a latitude where the sun now set, and the clear sky indicated a decided fall in temperature the coming night. The launch was off Allman Bay, the surface of which consisted of water substantially fresh, derived from John Evans Glacier. Only four days later in 1876, with a similar temperature, newly formed ice had been found in this bay by Sir George Nares, from one to three inches [25.4^{mm} to 76.2^{mm}] in thickness. Through this ice the *Discovery* had forced its way only with difficulty, and its passage by a small launch would be manifestly impossible. But four hundred pounds of coal remained for steaming purposes.

In consequence of these conditions, it seemed imperative for me to keep off the coast and endeavor to reach by a direct course Victoria Head, only about eighteen miles, or four hours' run, distant. Lieutenant Lockwood was consulted before deciding the question, and his views agreed with mine, that it was the best, indeed the only, course to follow. The responsibility of this decision, however, rests, as did that of all orders in this retreat, entirely upon me, as I never considered the counsel of any of my subordinates as in any manner

*It has been suggested that in the spring of 1883, orders or no orders, I should have withdrawn the command, or at least a part of it, to Littleton Island to facilitate relief. Strange as it may seem, there are those who do not realize what a disgrace it would have been for an American officer to abandon scientific work and assigned station which the honor of his Government was pledged to maintain until August 1, 1883. Such may yield, however, to cogent facts, which disprove the possibility and utility of such retreat. Had honor, orders, and sound judgment all permitted sending a party southward what would have occurred?

First. Such party (even of three men) would have stripped, for the subsistence of themselves and dogs, the depots between Capes Lieber and Hawks, and exhausted the provisions, which later gave twenty-five men a chance of life, and eventually saved seven.

Second. The party could not have reached Littleton Island. This is based on the fact that in the only *known* years, 1861 and 1872, the southern part of Kennedy Channel was impassable for sledges.

Third. Granted—an impossibility—that Littleton Island was reached. As the route is direct from Cape Hawks, any effect on Lieutenant Garlington was impossible, for that officer did not land at Littleton Island but passed by to Cape Sabine.

relieving me from the responsibility which, properly, devolves upon every commanding officer. In order to avail myself of the best nautical experience of the expedition, Sergeant Rice, who was in charge of the whale-boat, was called forward to steer and assist in running the launch. He was a man of excellent judgment, accustomed to boats from his boyhood, and had experience for over a year in the management of coasting vessels.

After leaving the coast the outside ice opened somewhat and considerable progress was made to the south and eastward. We were finally stopped by two small floes cemented together by young ice, through which, unfortunately, we could not force our way, and so moored our boats to await the next tide. It was the opinion of Sergeant Rice and the acute Eskimo Jens, that if we could have advanced a mile farther to a large floe-berg, we could have gone southward without difficulty.

The temperature fell that night to 18° [—7.8° C.], and young ice formed between the floes of sufficient thickness to bear a man in places. The morning of the 22d found us beset, beyond a doubt, in about longitude 73° 30′ W., and 79° 21.5′ N. I stated to the party that at the worst we could reasonably expect within the next thirty days to drift into Smith Sound, and in so doing must pass within eight or ten miles of the coast. A tripod, twelve feet [3.658^{m}] high, was erected on the floe on which to display a signal, and also for a lookout to the south.

On the 28th a proposition was made to put the party on reduced rations, which I thought unadvisable until such action was imperative, in view of the depressing effect it would naturally have upon the party.

The temperature sank to 12.5° [— 10.8° C.] on the night of the 28th and to 10° [— 12.20 C.] on the morning of the 30th, the lowest temperatures ever recorded in August. The temperature may be said to have gone permanently below the freezing-point on August 25, for during the remainder of the month a higher temperature was noted but a few scattered hours.

On the 31st we were in about latitude 79° 19′ N., our position indicating a slight movement of the pack to the southward.

An inventory of stores the preceding day showed that we had provisions for fifty days, except tea and coffee for forty days. The men at that time were generally well, although suffering much discomfort from their inactive condition and continued cold weather. An issue of three-eighths of a gill of rum was made that evening, and was continued on alternate days thereafter, when thought necessary.

Lieutenant Lockwood approached me that day (August 31) in regard to our future movements, and was informed by me that September 10 was the latest limit to which I was willing to wait the action of the spring tides and heavy winds to break up the floes. I moreover stated my intention of abandoning all boats but one, expecting to find a boat at Cape Sabine and believing that a second boat could not be hauled. Lieutenant Lockwood then concurred in the unadvisability of waiting longer than September 10, but urged a second boat being taken.

SEPTEMBER, 1883.

On September 1 the young ice was broken up by the strong tide during calm weather, and the movement of the floes, catching the launch, raised her entirely out of the water (fortunately without injury), where she remained for several hours. The ice showed a tendency that evening to separate, and considerable open water was seen as far as the fog would permit—some three hundred yards [274^{m}] —which unfortunately ran east and west. I was advised to attempt a movement, but considered it insanity to attempt to change the position of four boats in such a dense fog, with the heaviest tide of the month coming on. The prudence of my decision was shown a couple of hours afterwards, at the change of the tide, when the pack closed suddenly and violently and lifted the launch bodily out of the water three or four different times. When the morning came not a pool of water could be seen.

Two small seals were killed on the 2d and 3d, affording a welcome change of our diet.

On the 3d the meridian observation placed us in 79° 15.6′ N., near Victoria Head. The decreasing latitude much encouraged the party. Early that morning the ice loosened up sufficiently to allow our moving the launch and boats to a larger and more desirable floe, which was a little over a mile square. The tripod was kept up, from which the condition of the ice could be seen for about five miles, and an ensign was kept flying to attract the attention of any party or vessel at Cape Sabine.

On September 3 I was obliged to notice and reprimand an injudicious and ill-advised discussion of Lieutenant Kislingbury and Lance Sergeant Connell on our situation, and to forbid a recurrence to such a demoralizing course.

Deeming it a proper occasion, I concluded to ask the opinion of the officers and the two most experienced sergeants as to future movements.

Lieutenant Kislingbury first advised the immediate abandonment of the launch and to attempt to reach over the detached floes Bache Island with two boats and five hundred pounds of selected baggage, thence to pass around Buchanan Strait, which he believed to be a bay. He thought Cape Sabine could be reached by the time our rations would be exhausted, say, from fifty to sixty days. Dr. Pavy's opinion concurred with Lieutenant Kislingbury's, except he advised delaying a day, but he thought Cape Sabine could be reached in a month. Lieutenant Lockwood counseled inaction for the present, believing the drift would assist us, and that the pack could not be crossed at that time with all our baggage. Sergeants Brainard and Rice concurred substantially in Lieutenant Lockwood's opinion, with the addition from Rice that, under Lieutenant Kislingbury's plan, he felt but one boat could be got to Cape Sabine.

I then announced that my plan was to uniformly and persistently follow up with the boats any opening which would carry us either south or towards land. I stated my belief that Bache Island could only be reached by extraordinary exertions, and that the crossing of Buchanan Strait, some twenty miles wide, would be extremely difficult if not impossible. I further stated that if our drift carried us to the southwest the nearest land could be made by sledge, after young ice permitted traveling, or if to the southeast, I should attempt to reach the Greenland coast. Our ration of bread, meat, potatoes, and fuel was considered to be sufficient to last until November 1.

On the 4th, Private William Whisler, who had been discharged the day before for expiration of term of service, was re-enlisted.

A harbor-seal was killed on the 4th, and another on the 5th. Preparations were commenced on the latter day for the proposed abandonment of the launch on the 10th. A large paleocrystic floe was visited, but to my great disappointment no signs of a ship were visible from its summit, but only occasional narrow lanes of water, which seemed general to the north of us.

Late in the afternoon the ice loosened up somewhat, and it appeared possible to reach Cape Albert. The boats were immediately put in water and the launch taken in tow until she could get up steam; for during this time the small amount of fuel had rendered it necessary to permit the fires to die out. We succeeded only in making a mile to the southwest, and were driven by the closing pack to take refuge on a small paleocrystic floe, about one hundred and fifty yards [137.158^{m}] square and some fifty feet [15.240^{m}] thick.

A heavy northeast gale set in during the night of the 4th, and drove us rapidly at first to the south, but later our movement stopped, showing evidently that there was no water of any extent between us and the south side of Buchanan Strait. During the gale the launch received many nips from the dense, heavy ice, but fortunately escaped unharmed. On the 5th we were obliged to commence melting ice for cooking purpose, there being no floe in reach from which fresh water could be obtained.

Our noon observation of the 5th was an agreeable surprise to us, being 79° 0.6′; we were then equidistant from Capes Camperdown and Albert, being three miles from each. Cape Albert bore four degrees south of west, showing that the south coast of Bache Island was laid down wrong or else the magnetic declination had changed materially since 1875–'76. Victoria Head had agreed with our previous observations, but Cape Albert had been out all the time. It was very encouraging to know that we were only seventeen or eighteen miles from Cape Sabine, and eleven or twelve from Cocked-Hat Island.

Owing to these discrepancies I ordered special observations for magnetic declination, which were made by my astronomer, Sergeant Israel, on the 6th. The variation was found to be 105.9° W. This correction made our bearings more in accord with the English chart, although not entirely agreeing. Cape Camperdown was then due west, and so was in our latitude, 79° 0.6′, which is some two miles farther south than is shown by the British map. The trend of the south coast of Bache Island was apparently correct, as we could not then see the Weyprecht Islands.

In the early morning of September 8 the temperature sank to —0.8° [—18.2° C.], the lowest I have ever known so early in the season, zero [—17.8° C.] being reached twelve days earlier than at Conger in 1881, which was unprecedentedly early.

I visited on that day a large floe-berg, which was half a mile long and a quarter of a mile wide, with an average elevation of eighty feet [24.384^{m}]. An excellent view to the south showed only densely packed ice, except a narrow lane, probably about four hundred yards [366^{m}] wide, running south a few hundred yards from Cape Camperdown. The natives declared the ice to the west, in Buchanan Strait, to be that of the previous year, and that it had never broken up. With a glass I examined the ice carefully for sledging, and the best route seemed to coincide with the direction of the nearest land, Cocked-Hat Island.

On September 9, our latitude having been unchanged since the 6th, I called together the officers and Sergeants Rice and Brainard, and notified them that we would start with sledge the next day for Cocked-Hat Island. I stated that two boats, all the provisions, all records and scientific instruments would be taken. The second boat was taken in deference to the opinion of the officers who thought a movement with a single boat dangerous. I was unsettled as to abandoning some three hundred pounds of stearine and shot-gun ammunition, but finally decided to take them. I informed the party that including sledges we had sixty-five hundred pounds or more to haul, so from the first we must travel three times over the same ice. The officers and sergeants advised no further delay. Dr. Pavy recommended abandoning one keg of lime-juice, which was done. The best shot-gun, marine-glass, and telescope property were taken, the remaining ones being abandoned, as was all private and public which was not absolutely indispensable to us.

The pendulum being a heavy and cumbersome instrument, I informed the men that while the saving of it was much to be desired, from the value of subsequent comparative observations, yet it could not weigh against the chances of any man's life, and that whenever any one thought his life endangered by hauling it or any one insisted on its abandonment I would do so. To the credit of the party no man ever hinted at the abandonment, and most of them were outspoken for its retention to the last.

Prepared records were left in the launch *Lady Greely* and the jolly-boat *Valorous*, setting forth our condition and our intention of reaching Littleton Island, and possibly Cary Islands, if practicable, a copy of which record forms Appendix No. 105.

September 10 broke with a northeasterly snow-storm, which delayed our moving until afternoon. Sergeant Brainard suggested that one man should select the route in advance, which was carried out, on this as well as on other days, with excellent results. The party started with three sledges, the first, the twelve-man sledge, dragged by myself and thirteen others; Lieutenant Kislingbury with five men dragged the six-man sledge; Sergeant Jewell and three

others the four-man sledge. During this retreat I performed the same work in the drag-ropes as any private in the party and the officers all did the same. Both the small sledges broke down the first day, and the four-man sledge was abandoned. The six-man sledge was repaired and used subsequently.

At starting, the estimated distance of Cocked-Hat Island was eleven miles. On the first day we made good one mile of that distance, which involved nine hours traveling, or almost fourteen hours from breaking to completing camp. In camping, Lieutenant Lockwood and myself with ten men slept on the floe, sheltered by a tepee made of canvas, Indian fashion; and under Private Frederick's supervision Lieutenant Kislingbury and six others slept in the whale-boat, and Sergeant Brainard with six others in the ice-boat *Valorous*. The weaker and ailing of the party, Israel, Biederbick, Connell and Long, were assigned by me to the boats, which were more comfortable than the tepee.

On the 11th we made about a mile and a half good, leaving us about eight miles and a half from Cocked-Hat Island. Dr. Pavy and Sergeant Brainard visited a very large floe-berg about two miles distant and brought back very discouraging reports. Towards Cocked-Hat Island new thin ice a quarter of a mile in extent was seen, and then rubble, from young ice, towards the island, with no floes. I called the officers and sergeants together and informed them of the condition of the ice towards Cocked-Hat Island, and stated that the spring tides would come in about four days, and asked their opinions as to future movements, particularly as to our advisability of venturing on the new ice. Lieutenant Kislingbury advised moving to the berg (which would entail about two days' work owing to deep snow in that direction) and await there the spring tides; Dr. Pavy and Sergeants Brainard and Rice substantially agreed with Lieutenant Kislingbury's recommendations, though Sergeant Rice thought it possible, perhaps, to move to the westward; Lieutenant Lockwood advised moving ahead but to the east of the floe-berg, and thence examine practicable routes by parties.

I decided to examine the ice thoroughly in all directions before moving, in order to avoid exhausting the strength of the party by useless efforts, and so delayed five hours while the ice was being examined by a party under Dr. Pavy to the southeast, and by Lieutenant Kislingbury to the southwest. This short rest served a good purpose in allowing sleeping-bags and clothing to be partly dried. This was on the morning of September 12, at which date we were in latitude 78° 58.9′.

Lieutenant Kislingbury's reports were very discouraging as to the ice to the southwest. Dr. Pavy and Sergeant Rice reported the route to the southeast practicable and advisable, and I decided to move in that direction. As we were about moving off with the first load, the three officers and two sergeants came to me and strongly and unanimously recommended the abandonment of the whale-boat, fearing it would break down our sledge and compromise our ultimate safety. I at once concurred in their opinion, being satisfied of the necessity, and ordered the abandonment of the boat. It had been evident to me, as shown by Lieutenant Lockwood's journal of August 31, that a second boat could not be taken by us with any hopes of successful traveling, and it had been ordered retained by me in abandoning the launch, only in deference to the unanimous opinion of all the officers and most of the men.

We made good about two miles due south on the 12th. At noon of the 13th we were in latitude 78° 56. 9′ N., with extremely divergent opinions as to our distance from Cocked-Hat Island; it being variously estimated from four to ten miles by the party; the astronomer and I believed it to be about eight statute miles. By the map we were six miles of latitude to the north of the island and nine miles due north of Camp Clay.

On the 14th our latitude was estimated anywhere from 78° 54′ to 78° 56′. But to our dismay, after a hard day's work, a marked movement of the pack towards the northeast was discovered in the afternoon, caused by a southwest storm, which set us off to the northeast.

At noon of the 15th we were in 79° 1.8′ N., over a mile north of the latitude in which the launch was abandoned, and at a greater distance from land than we had ever been. The southwest gale had driven us into the middle of Kane Sea, to a point twelve to fifteen miles east of Cape Albert. On the evening of the 15th we were seventeen miles northeast of Cocked-Hat Island, on the Littleton Island meridian. On the 16th the gale abated and at noon we were in 79° 0.7′, with our meridian unchanged, having gained a mile due south in the day.

The ice was carefully examined to the southeast by Lieutenant Lockwood and party, and to the southwest by Sergeant Rice. My intentions then were to reach the Greenland coast, if any chance presented itself. We were at that time thirty miles from Cairn Point and nineteen from Cape Sabine, and appeared to be drifting to the southeast. To reach Cairn Point in our southerly drift but five or six miles easting was necessary, while to reach Sabine fully three times that amount would be required. An inventory that day showed forty days' remaining rations, and that evening two small harbor-seals, aggregating about three hundred pounds gross weight, were killed.

At noon of the 17th we were in 78° 56′, having drifted three miles to the west and four to the south. This marked change in the drift altered my intention of attempting to reach the Greenland coast, which would have been my route if the drift had been south or even south-southwest. During our enforced delay the two sledges, badly worn and injured by rough ice, were repaired.

We started at 1 p. m., and when the darkness came at 10 p. m., had made about three and a quarter miles to the southwest. Some of the party then estimated land as three or four miles distant, but it was nearer eight.

On the 18th the cooks were up at 5 a. m., and the party at 6. We worked steadily until 9 p. m., with a short delay for tea at 7 p. m. The day's work was exceedingly trying; several lanes of water had to be crossed where three loads were necessary, and consequent separations of the party entailed. On the moving pack such separations were dangerous, but absolutely essential to progress. When darkness came we were about four miles from shore, with an intervening open pack. The party were so exhausted that no shelter was erected that night.

September 19 was a critical day for the party. A southwest gale commenced shortly after midnight, and was so violent during the day that pemmican and water was served to the men in their bags for breakfast and supper, no cooking being possible. The wind was too violent for a latitude observation at noon. At 5 p. m., our bearings indicated that we were again in the middle of Kane Sea in 78° 52′ (or 53′), from twelve to fourteen miles east of Cape Sabine, and about seven miles west of Cairn Point, and on the meridian of Cape Alexander. The land which the night before had been in easy reach, was now between fifteen and twenty miles distant. A consultation of all the officers and two sergeants was had, at which they were asked to express their opinions as to future movements. They all believed that there was a chance of reaching the west coast, if we drifted by Cape Sabine.

I stated my opinion that the proper course would be to abandon two thousand pounds weight, and take our records, instruments, and twenty days' rations, start across the open pack for the Greenland shore, twenty-three or twenty-four miles distant. By such abandonment, I said, the party could haul everything at a load, transferring by boat in two loads, which would ensure our making nearly three times the distance as by our past method. I pointed out that the Greenland coast with the Etah Eskimo was the only quarter where positive relief could be expected, that Cape Sabine presented nothing certain, and that I considered it almost impossible to make twelve miles westing in nine miles southerly drift. Our previous experience had shown that in three days we had made but four miles westing in twelve miles southing, or one-third of a mile westing to each mile southing. Towards the Greenland coast we had to make but two miles easting to reach Littleton Island, thirty-one miles to the south.

Owing to the unanimous opinion of my officers I decided to delay until the 20th to ascertain the drift, announcing, however, my intention of moving towards the Greenland coast the next day, unless remarkable changes resulted from our drift in the mean time. During the next day the dense fog and occasional snow prevented movement in any direction. I should certainly have moved towards Greenland, had land been visible in any quarter so as to show our exact position.

During the 20th and 21st four seals were killed, which added materially to our food supply. Snow fell on the 21st and prevented any movement. On the 22d we were in latitude 78° 52.6′, on the meridian of Cairn Point, our latitude being slightly uncertain on account of the lowness of the sun. The abandoned whale-boat was seen two miles southwest of us, and an attempt was made to reach it, but it was unsuccessful owing to the packed slush-ice, which would not support a man or permit the passage of a boat.

On the night of the 22d and 23d snow prevailed, and a heavy gale, probably from the east, drove us again very near the Ellesmere Land coast. At noon we were about nine miles distant from Cape Sabine and the same from Cocked-Hat Island.

On the 24th the ice to the westward was examined and reports were made by Sergeant Brainard and Private Schneider, showing its impracticability. Later, I sent Lieutenant Lockwood, with several men with a boat, to visit the adjoining floes to the west and southwest in the direction of the whale-boat. The floes were found to be of last year's ice, and so rotten that traveling over them with a load was impossible. This party returned to us with serious difficulty, owing to rubble and slush-ice, and unfortunately lost in so doing our only shovel.

The cooks were called at day-break, 4.30 a. m., on the 25th, I being determined to move in some direction. A severe northeast gale with snow, however, prevented it. The violence of the gale and the pressure of heavy ice split up our paleocrystic floe. Its original size was about half a mile square and from thirty to forty feet [9^{m} to 12^{m}] thick. We were left upon a piece, the area of which amounted to about three acres. Our situation was then extremely critical, as the northwest gale was setting us slowly, but certainly, offshore towards the center of Smith Sound. At 6 p. m. we were crowded against a large paleocrystic floe to the west, from which huge masses of slush and rubble ice separated us for an eighth of a mile. Christiansen was sent across to test the ice in the hope that we might reach this floe. He reached it with great difficulty, but in returning nearly broke through in several places, showing its utter impracticability for a heavy load. The party doubtless could have reached Cape Sabine at this time on foot by abandoning all provisions, records, and supplies; and, indeed, shore could have frequently been reached at such expense.

At 8. a. m. of the 26th we were half a mile east of Stalknecht Island, with open water to that point. Sergeant Rice and Private Schneider, the most experienced sailors, examined the pool and reported it as utterly impracticable, owing to the heavy sea and the thick slush-ice, through which a well-manned boat could hardly move, even without a load. Possibly a portion of the party might have landed at that time, abandoning the rest to its fate. Such an attempt was strongly recommended by Dr. Pavy.

At 1 p. m. two large paleocrystic floes pressed us so badly that our own floe was cracked, and, despite the violent northerly gale and a drifting snow, we were obliged to seek refuge on a second floe where shelter was obtained with difficulty. Our old floe eventually broke in fragments.

From the afternoon of the 26th until the morning of the 28th the most violent northwesterly gale experienced by us during our retreat prevailed, accompanied by drifting snow. During this time it was impossible to cook but once, and a portion of the men for forty hours were unwilling to leave their sleeping-bags even for food.

On the morning of the 28th we discovered that Smith Sound was so densely packed with ice that we had scarcely moved a mile southward since the preceding day, and that to the west-

ward of us a second paleocrystic floe was caught fast. The water space to the westward was closely watched, and the moment the sea had decreased, so that it was passable with small loads, the crossing to the floe to the west commenced. We succeeded in reaching that night by extraordinary efforts a point where land seemed a certainty. During that day and the following one we were obliged to cross several lanes of water, which necessarily entailed repeated separations of the party, but at 5.20 p. m. the first boat, in charge of Lieutenant Lockwood, reached shore, followed by the last party under myself two hours later. The land appeared to be a point immediately south of Leffert Glacier, several miles above Wade Point. It received from me the name of Eskimo Point, owing to the discovery of permanent habitation in past years of this point by the Eskimo.

On the 30th I sent Corporal Salor and Eskimo Christiansen to visit the cape on the south side of Rosse Bay, which they were unable to reach, owing to a lane of water, half a mile wide, off the cape. They were once on the moving pack and escaped with difficulty. Anticipating, however, that Corporal Salor would reach the cape, orders were issued to Lieutenant Lockwood to prepare for a trip with the twelve-man sledge to Cape Sabine on October 1, but Corporal Salor's report, showing sledge travel to be impracticable, compelled me to countermand the order. Sergeant Rice then volunteered for an attempt to reach Cape Sabine on foot, taking Jens and a one-man sleeping-bag, into which the two could crowd. Records were prepared for the cairn at Brevoort Island, and detailed instructions were given to him for this trip. He crossed to Rosse Bay over Alfred Newton Glacier, which was discovered to be practicable by Lieutenant Kislingbury while hunting.

On October 2, a site having been selected just south of Alfred Newton Glacier for building, the party was moved over and the work of winter quarters commenced, it being too late in the season to delay longer, as the sun would quit us in about three weeks.

Every effort was made to obtain game, four of the party being detailed as hunters, but in the twelve days we were at that point only one seal was obtained.

On the 2d we had rations remaining for thirty-five days, based on an allowance of ten ounces of bread, sixteen ounces of meat, and two ounces of potatoes daily. After a general consultation, I decided to make these rations last fifty days. This measure was decided on contrary to the advice of my surgeon, who would not commit himself to the recommendation of any definite reduction. This course, while perhaps a wise one for a medical officer, on strict professional grounds, was exceedingly embarrassing to the commanding officer.

On October 3 the building of three winter huts commenced. The covering of one house was to consist of our boat and two lots of canvas. The boat was disposed of by choice and fell to the lot of Sergeant Brainard's party. Lieutenant Kislingbury's party was allowed to have first choice of the canvas, so that the remaining lot fell to the party which quartered with Lieutenant Lockwood and myself. By October 8 the huts were in habitable condition, the roofs having been covered with moss, and a considerable quantity collected for the beds.

On the 4th, in accordance with the doctor's advice, the ration was increased slightly, to four ounces of pemmican, eight ounces of bread, and one and a half ounces of potatoes, which was continued until the extreme hard work connected with the building of the stone huts was through with.

The general conduct of the party during the exhausting labor necessary in constructing stone huts, as well as during our dangerous drift on the ice-pack, was exceedingly creditable. It was but natural that great physical sufferings from lack of proper shelter, continued excessive work, and insufficient food should react on the mind and cause murmurs and discontent, which at times broke into indiscreet remarks and reflections. This impropriety was only on the part of few members, and as detailed in the attached journals of Lieutenant Lockwood (written in shorthand at the time) and Sergeant Brainard. Fortunately the party as a whole was never otherwise than subordinate and united. Such subordination and united action had

been our safety in five hundred miles travel, which had ended in our party of twenty-five landing in health and strength, with records and instruments safe, on the barren coast of Ellesmere Land. This courage, good behavior, and loyalty may seem theoretically a matter of course in the common interest, which could be subserved only by unity and harmony, but when death, starvation, and great continued suffering impend, the temptation for the strong to appropriate all and sacrifice the weak is certainly very great.

The 9th of October was an eventful day to the party; Sergeant Rice returned, bringing us news. He brought the record of Lieutenant Garlington, dated July 24 (Appendix No. 106), which informed us of the sinking of the *Proteus* on July 23, and that Lieutenant Garlington and her crew had gone to the east coast to communicate with the U. S. S. *Yantic* or a Swedish steamer. Rice discovered three caches—the English one of two hundred and forty rations, the Beebe cache of two hundred and forty rations (aggregating four hundred and eighty rations), and the wreck cache, which, from Lieutenant Garlington's report, contained five hundred rations of bread, sleeping-bags, tea, and a lot of canned goods. The record further said: "Cache on Littleton Island and boat at Cape Isabella." The words "two hundred and fifty rations" contained in Lieutenant Garlington's copy as furnished to the *Proteus* court of inquiry, were not in the original record.

The modification of Lieutenant Garlington's record is referred to, as the record left had an important bearing upon my subsequent action. The record informed me of the disaster to the *Proteus* and of Lieutenant Garlington's positive assurance that "*everything within the power of man to rescue*" my party "would" *be done*. His declaration that he left for the east coast to endeavor to open up communication, and pointed out that if the *Yantic* failed him a Swedish steamer was possible, were construed as conveying to me in the strongest terms his fixed determination to return to Cape Sabine if either steamer was fallen in with, and that I could look to him for relief. Two courses, only, were open to me; one to proceed to Cape Sabine, await possible assistance thus promised, and if it did not come to cross to Littleton Island by sledge as soon as the channel should close.

Those who are inexperienced in the varying phases of Arctic ice conditions cannot clearly understand why Smith Sound, crossed in whale-boats during July, should be impassable for similar boats in October. In July, with its ever present sun, Smith Sound is generally an open sea free from ice, but in October, 1883, it was filled with floes and ground-up ice, continually driven about by heavy tides and severe storms, while the scant six-hour sun of October 10th disappeared entirely for the winter only sixteen days later.

Our experience of the previous thirty days had shown the impossibility of then crossing the upper part of Smith Sound, owing not only to the large quantities of heavy ice moving southward, but particularly on account of the prevalence of rubble and slush ice, among which young ice was continually forming, which would neither permit the passage of a boat nor bear the weight of a man.

Our experiences had been somewhat similar to those of naval expeditions under like conditions. The drift party of the *Polaris* had been unable in that channel, and in sight of that very spot, to make land, but a few miles distant, failing, says the official narrative, "despite the most persistent efforts." On the east coast of Greenland the crew of the *Hansa*, in January, 1870, had been unable to reach shore, but two miles distant, although their lives appeared to depend on their success.*

*The following extracts from the report of celebrated and successful Arctic travelers, Sir John Richardson, Dr. John Rae, and Lieut. Sherard Osborn, R. N., are added, as illustrations of Arctic boat experiences under conditions by no means as desperate as the crossing of Smith Sound in October, 1883.

Richardson, in 1848, with Rae, was unable to cross Dolphin Strait, and thus comments (page 178, Arctic Searching Voyage):

"It (the young ice) did not exceed an inch in thickness, but * * * did not crack readily, while * * * it was hard enough to cut the planks of the boats through, rendering them scarcely seaworthy, though we had strengthened them on the water-line with sheets of tin beaten out of the pemmican cans. In dragging them over the floes they were much shattered.

Two months before, to a day, a powerful vessel of the navy had been forced out of the lower and less dangerous position of this sound, owing to the dangers of its navigation. By extraordinary exertions and fortunate circumstances we had been able to make land twelve miles off without sacrificing as did one of these parties their entire scientific collection.

In consequence of this condition of affairs, a movement to Cape Sabine meant a permanent camp until relief could come by vessel that autumn, or the straits freezing over permit crossing by sledge. The second course was to turn our faces homeward, and, taking the second boat at Cape Isabella, push southward to Clarence Head along the west coast, and from that point attempt the Cary Islands, where we would be safe, or, the ice conditions precluding that course, in desperate strait push still southward in the hopes of being able to cross Jones and Lancaster Sounds and reach Pond Inlet.

Smith Sound from Isabella southward opens like a fan, so that necessarily the ice spreading in early fall leaves large water spaces, which freeze over at a very late date, if at all. During our stay at Eskimo Point the ice had frequently opened up so that a voyage could have been made by boat to the southward, and by ship across Smith Sound to the eastern shore. As far north as Cape Isabella, Smith Sound was navigable for ships most of the time until after November 4. In short, the ice was a pack, changing with every wind and tide, which was fringed with young and slush ice, though in general not of a very heavy character.

The prevailing sentiment of the party plainly favored a movement to Cape Sabine, where all possible help was pledged, and I decided, on my own responsibility, to move to that point, reluctantly turning my back to the southern trip which might have involved the entire destruction of the party or have secured its ultimate safety. Had I been plainly told that harmony did not prevail in the *Proteus* party, that there were no rations for a winter at Littleton Island, and that the *Yantic* was a fair-weather ship, not equipped for an Arctic winter, I should certainly have cached my instruments and records and chosen the dangerous journey to the southward. Going to Cape Sabine necessarily rendered the four boats within our reach of no benefit to us, but in the southern trip they would have been invaluable. Sergeant Rice further reported that Cape Sabine was on an island separated from the mainland by a strait, which I have named Rice Strait.

"At noon" (after only half a day of such experience), continues Richardson, "finding that we could not advance farther in the present condition of the ice, without pulling the boats to pieces, we encamped."

Then, after consultation with Mr. Rae, Richardson abandoned his boats.

Elsewhere (page 178) he says: "It was on this cape (Krusenstern) that Mr. Rae spent a month of the following summer (1849), anxiously watching for an opening in the ice, by which he might cross to Douglas Island (ten miles distant) and Wollaston Land."

From Dr. Rae's report (pp. 312, 313), same volume, we learn that he (Rae) waited twenty days (from July 30 to August 19, 1849) at Cape Krusenstern (68° 25′ N.) for an opportunity of crossing Dolphin Strait to Wollaston Land. On August 19 he had water to within *three* miles of Douglas Island, "when," says Rae, "we came to a stream of ice, so close packed and so rough that we could neither pass over nor through it." Rae, after twenty-four days waiting, abandoned the attempt as impracticable.

This inability of two great Arctic travelers, in two successive years, in the month of August even, to cross a strait only half as wide as the narrowest part of Smith Sound, speaks for itself of the almost insuperable character of boat navigation after new ice begins to form.

Sir George Nares, R. N., in his testimony on Arctic matters, quoted, in no captious spirit, Rae's experience.

Lieut. (afterwards Admiral) Sherard Osborn, R. N., who commanded an Arctic searching ship (page 3, "Stray Leaves from an Arctic Journal), says: "On the 5th (October, 1850), Lieutenant Aldrich returned from his journey. He had not been able to go beyond Somerville Island, the sea between it and Lowther Island being covered with *broken, packed ice, half-frozen sludge, and young ice.*"

The italics are Osborn's, and evidence his opinion that boat navigation under such conditions (identical with those which existed in Smith Sound October, 1883) was impossible.

Capt. Sir John Ross, R. N., in 1832 abandoned, as hopeless, the crossing of Prince Regent Inlet on September 24, although the lives of his party apparently depended on it. This inlet, as difficult of crossing by boat as Smith Sound, is over two hundred and fifty miles to the south of Cape Sabine.

This note is added, not to appease that worthless criticism which every official must expect from persons unqualified by experience though always ready to pass judgment on any topic, but to satisfy the intelligent, thinking men, who naturally desire to learn what success men who are sailors by profession have met with under similar circumstances.

The whale-boat, abandoned September 12, had with its floe drifted down and caught between Cape Sabine and Brevoort Island, where it was safe and uninjured.

Fast-falling snow on the 10th prevented the party moving. Sergeant Rice volunteered to go with Eskimo Christiansen to Cape Isabella, to ascertain whether the *Yantic* had left supplies there for us. Most of the party believed that she must have done so, asserting that no Navy vessel would have returned to the United States without leaving something for the party on this coast. The record at Cape Sabine indicated that no other party had visited that point since Lieutenant Garlington left, and I was necessarily forced to the conclusion that the *Yantic* had never succeeded in reaching Littleton Island, and consequently I was reluctant to send two of the party on a dangerous and trying journey to verify my impression that one hundred and forty-four pounds of English meat only were cached at Cape Isabella. However, I finally decided to send them, and they started October 11, at the same time that Lieutenant Lockwood and party moved northward with a portion of our load to be hauled across the bay, over the new route discovered by Sergeant Rice on his return from Cape Sabine. Lieutenant Lockwood returned that evening, and preparations were made for the abandonment of the camp at Eskimo Point the next morning.

On the morning of the 12th the entire party started with all our supplies hauled on two sledges, the temperature being —8.5° [—22.5° C.]. The only things left behind were the English ice-boat and two paddles, in perfect condition so as to be available for further use if needful. After seven hours' road work we camped at the point reached by Lieutenant Lockwood the previous day. Our load was so heavy, and the party so weak, that all were thoroughly exhausted on reaching camp.

The surgeon and Lieutenant Kislingbury recommended, at that point, the abandonment of everything which could not be hauled at one load, predicting that the party in their enfeebled condition could not do the work and reach Cape Sabine at that time, and that the load could be brought up later in the season, and also advised urgently a very large increase in the rations to forty-two ounces solid food. I refused to abandon either records, instruments, or any part of our provisions until their ultimate safety was secured, by caching them on the island where the three provision depots were situated. I, however, slightly increased the ration, making it twenty-seven and a half ounces of food, of which sixteen were meat.

On the 13th, in ten hours' work, eight of which were on the road, we succeeded in crossing Rosse Bay, although two double trips were necessary. The day then was very short, and owing to darkness we could travel more than six hours only with difficulty. On the 14th, in eleven hours' time, we succeeded in moving our entire loads to the north end of Rice Strait, about five miles from our previous camp, and had the satisfaction of seeing all our supplies on the island. This day's work entailed more than fifteen miles traveling, and thoroughly exhausted the party. We had now (October 14) lost the sun for the winter, owing to the high land south, though it rose a few days longer above the horizon at noon.

On the morning of October 15, caching about twelve hundred pounds, we started for the wreck cache cove. I preceded the party with Sergeant Gardiner and Jens, to visit the cache and determine the point at which it would be best to establish our winter quarters. I reached the cache in about two hours' travel, and examined its contents as far as it was possible. I was exceedingly disappointed in the contents, there being scarcely a hundred rations of meat, instead of five hundred, as I hoped, from Lieutenant Garlington's record. The record was vague on that point, saying: "There were five hundred rations of bread, sleeping-bags, tea, and a lot of canned goods; no time to classify." The last clause caused me to think that there must be a considerable quantity. The record stated, however, that Lieutenant Garlington had been unable to reach these articles of food again after caching them.

I found the *Neptune* cache of 1882 undisturbed, and went within a mile of Cape Sabine, examining the coast for a good camp. A careful survey of the entire coast made it evident that no

better place for a camp existed than the neck of land near the wreck cache. The sledge party reached camp about 2 p. m., having been delayed over two hours by the breaking down of their sledge, which necessitated its repair and reloading.

Sergeant Rice and Christiansen surprised me, an hour after camping, by their return. Rice reported that he had visited Cape Isabella, that no whale-boat and only one hundred and forty-four pounds of English meat could be found. The spirits of the party were generally depressed by this announcement, as the greater number of the men had been confident that some stores must have been landed at Cape Isabella by the *Yantic*. I, however, had been determined since landing on the coast to base our future only on provisions actually within reach, considering that stores or game, which we might afterwards obtain, whether by our own exertions or from others, would be extra guarantees for our ultimate safety.

The rest of October was passed in collecting at our camp the different caches along the coast, and in hauling in the two whale-boats. The bacon mentioned in Lieutenant Garlington's record of August 12, and the barrel of beef stated in his record of July 26 to have been left at Cape Sabine, were never found by us. It is certain that the barrel of beef could not have been safely rolled above tide-water. Lieutenant Garlington's order, of which we found a copy, directed him "if possible to examine them (caches) and replace any damaged articles of food," and although his record said he had not visited the English cache, yet I hoped against hope that he had somehow assurances of its good condition and that it would prove to be entirely serviceable. On bringing it in, the rum and alcohol were found to have entirely leaked away or evaporated, the groceries spoiled, and the four hundred and fifty pounds of bread and dog-biscuit all moldy. Seventy-two pounds of the latter, only a mass of green mold, was entirely unserviceable. Dr. Pavy emphatically declared that these slimy biscuits were not only valueless as food, but that their use would be absolutely injurious to health, an opinion in which I fully concurred, and so ordered them thrown away. However, as I subsequently learned, the ravenous condition of some of the party was already such that, despite my positive order and earnest entreaties, they were all eaten. The canned meat brought in was good, but the bacon rancid, though all of it was eaten by us later.

A portion of the party were engaged during this period in erecting permanent quarters on the chosen site, about half a mile from our first camp. I built on the only possible place—a little neck of land between a fresh-water lake, fed by a glacier of the island, and a cove making up from Buchanan Strait about half-way from Cape Sabine to Cocked-Hat Island.

There were many loose rocks which could be cut out of the ice or pried up, and so were available for building purposes, while near by were large snow-drifts from which snow blocks were obtained. The house built by us was twenty-five by eighteen feet [7.6^{m} by 5.485^{m}] in the clear, and its ridge was formed by an inverted whale-boat, which rested at its ends on the walls. The party could just crowd into it while in their sleeping-bags, each man perforce touching his neighbor. One could stand erect only in the very center of the hut. The commissary stores were placed in a snow-house abutting against the main hut, and could be reached only by leaving our quarters. A plan and description of the hut is in Appendix No. 107.

This work of collecting the supplies and building the house was of the most trying character. The party, half-starved and indifferently clad, were subjected almost daily to temperatures at or below zero [—17.8° C.], from which frequent slight frost-bites resulted. The ration on which this hard work was done and severe exposure undergone consisted of a pound of meat, eight ounces of bread, and one and one-half ounces of evaporated potatoes. The detailed conditions of this work are briefly set forth in Lieutenant Lockwood's diary. During this time Private Long and the Eskimo, detailed as hunters, were in the field, at the north end of Rice Strait, covered only by canvas.

At the end of October I decided that our only chance of safety consisted in the adoption of the smallest living ration. An inventory showed that the following stores would be left November 1:

	Pounds.		Pounds.
Roast beef	125½	Onion pickles	80
English beef	212	Cloudberries (46 cans)	—
Corn beef	72	Milk	42
Seal	115	Coffee, extract	86
Pemmican	222 1/16	Chocolate, extract	61
Bacon	232	Chocolate, English (moldy)	15
Beef extract	50	Potatoes	764/8
Butter	93	Sugar	15
Lard	50	Tea	65 5/16
Soup (forty-eight 2½ pound cans)	120	Tea, English (moldy and wet)	7½
Bread (very moldy)	1,395	Salt	1⅞
Rice	30	Pepper	¾
Peas (27 cans)	42 3/16	Onion powder	1⅞
Corn (24 cans)	37½	Blubber (between 200 and 240 pounds)	—
Carrots (13 cans)	20 5/16	Seal skins (2)	—
Tomatoes (24 cans)	60	Stearine (fuel)	125
Raisins	40	Dog-biscuit (all moldy)	152

In consequence, I announced to the party that I had decided on the following ration, which would carry us to the 1st of March, 1884, and leave ten days' rations on a more liberal scale for the crossing to Littleton Island.

The ration per man, each day, consisted of the following:

	Ounces.		Ounces.
Meat	4	Butter	0.5
Extract of beef	0.26	Lard	0.26
Evaporated potatoes	0.4	Rice	0.1
Soup	0.6	Raisins	0.16
Tomatoes	0.3	Tea	0.3
Peas	0.2	Extract of coffee	0.44
Corn	0.2	Extract of chocolate	0.3
Carrots	0.1	Pickled onions	0.4
Bread	6	Milk	0.2
Dog-biscuit	0.8	Aggregating 14.48 ounces (omitting beverages).	

For occasional use as medicine or antiscorbutics the only allowance was: Mulberries, two-tenths ounce weekly; lime-juice, small quantity weekly; rum, one-half gill weekly; and one-fourth of a lemon weekly.

I requested that before I ordered this ration to be carried into effect, I might know the opinions of the various members of the party. Dr. Pavy objected very strongly to the ration fixed, stating that he would vouch his medical reputation that the party could not possibly live upon it until March. Most of the party, however, either concurred in my views regarding the matter, or expressed their willingness to be satisfied with my decision. The opinion of my medical officer, put in such strong terms, was exceedingly embarrassing; the more so as he declined to give a medical opinion as to the smallest amount on which the party could exist. I felt, however, that it was a case in which I must exercise my own judgment, as the responsibility rested solely upon me; and with this feeling I ordered the ration to be fixed at the figures given, from November 1, except in case of any sledge party, when a slightly increased allowance should be granted. The soundness of my judgment was best proved by the fact that no member of the party died of starvation until six weeks after the date fixed for rations to last, which was the time planned for our crossing Smith Sound, March 1, 1883.

Near the end of October, I reluctantly decided that it would be advisable to send to Cape Isabella for the hundred and forty-four pounds of English meat cached there. This meat, if

obtained, would add two-thirds of an ounce to our ration, which might mean life. Sergeant Elison endeavored to construct a Hudson Bay sledge from the whale-boat, but was unsuccessful, but later, cutting down the six-man sledge to a four-man, I sent Sergeant Rice and three others on the trip. They were equipped as thoroughly as our means would permit, the rest of the party contributing everything in their possession, in the way of clothing, foot and hand gear, which was needful to comfort. They left on November 2, the temperature at that time being nine degrees below zero [—22.8° C.].

The mean temperature for October was 0.96° [—17.2° C.] and of pressure 30.041 [763.03^{mm}]. These means are drawn from observations broken and irregular consequent on our situation, but they are substantially correct.

NOVEMBER, 1883.

On the 1st of November the party was necessarily divided into two messes—one under Lieutenant Kislingbury, and the other under the commanding officer. This arrangement continued during the entire winter, the commanding officer never interfering with the internal arrangements of the mess of the other party, except on a few special occasions, when authoritative intervention seemed necessary in the interest of the expedition.

Bread and meat were issued daily to each mess, and all other supplies weekly. The quantity of bread and meat to be eaten daily was determined by the commanding officer, but the arrangement in which other articles should be served out were left to the individual messes. Each "Issue day" came on Wednesday of each week. On Friday a slight increase in meat was made, and on Sundays the largest meals of the week were served. Sunday was further marked as a feast day by the issue of one-fourth of a lemon, a half gill of rum, and about two ounces of mulberries. These arrangements were planned by me with a view to breaking up the monotony of the situation, and to divert the men's attention from a routine which necessarily lasted for over four months. Beneficial results followed from such a scheme, and during our months of suffering no two days were exactly alike. The cooking, for the greater part of the winter, was done on a stove constructed by Private Bender from the sheet-iron sheathing of the launch.

During the early days of November Lieutenant Kislingbury suffered much from a rupture, received from a fall while engaged in helping to haul in our supplies by sledge. To make him more comfortable, Lieutenant Lockwood and Dr. Pavy loaned him the mattress which had fallen to them by lot. The second mattress, given me by common consent as commanding officer, had been loaned by me to Sergeant Gardiner who was ill, and later was given to Sergeant Elison, and so was never used by me.

On the 4th of November regular barometric observations were commenced, being made from a barometer abandoned by Lieutenant Garlington at Cape Sabine. These observations were made every four hours from 7 a. m. to 7 p. m., until the instrument was broken, about three weeks before the final rescue of the party. Gaps in the record necessarily occurred towards the latter part of the time, owing to the diminishing strength and deaths of the observers. During the winter months of total darkness the thermometer was rarely read, except at 11 a. m., as I was unwilling to subject any member of the party to unnecessary exposure, even in the scientific interests of the expedition.

The messes alternated in their order of cooking, the party which cooked first one day being the last the day following. The cooks of the messes necessarily worked together, and the most complete harmony between them was essential to economy of fuel. Privates Frederick and Long did the greater part of the cooking. Steward Biederbick and Private Schneider also served efficiently at times; the former never neglecting while cook his arduous and exhausting services as steward. The greatest credit is due Frederick and Long for the manly, effi-

cient, and thorough manner in which they performed this onerous and thankless task. Their skill and efforts not only contributed to the comfort and satisfaction of the party, but also eked out in a wonderful manner the scanty store of fuel. Private Long did not assume the duties of cook until after November 8, when he returned from Rice Strait; his equipage and meat being hauled in by Lieutenant Lockwood and eight others. Long had been in the field at Rice Strait with Christiansen and Jens for over two weeks, and they had succeeded in killing four seals, only two of which were secured, which weighed about two hundred and fifty pounds gross. The service of this hunting party was arduous in the extreme. Covered only by canvas, and without fire or sufficient rations, they had been subjected to temperatures as low as —30° [—34.4° C.]. On leaving Fort Conger Private Long had been under medical treatment, and was regarded by the surgeon as one of the weakest men. His services then and afterwards showed a remarkable physique as well as evidencing great patience, endurance, and determination.

On the evening of the return of Lieutenant Lockwood's party with Long's outfit, an extra allowance of rum was issued to the men who had been in the field. Private Schneider, charged with the duty of issuing, took a quantity without authority, which visibly affected him. He quit the hut while his supper was cooking, he being the cook, and, not returning, was sought for and detected coming out the storehouse. A number of articles had been previously taken, and the general sentiment implicated Schneider in the past thefts. Whether he entered the storehouse in a responsible mental condition or not, his taking the liquor without authority was equally reprehensible. Schneider was severely reprimanded, and imperative orders against any man entering the commissary storeroom were issued.

On November 9 Lieutenant Lockwood discovered, concealed in an old snow hut, a can of milk, opened but not disturbed. Marks on the can showed that it had been opened by a knife belonging to Schneider, but which was at that time in Private Henry's possession, having been loaned him shortly before. The impression prevailed that Henry was the guilty party.

I was awakened at midnight of November 9 and 10 by footsteps, which proved to be those of Sergeant Rice, who informed me that Sergeant Elison was dying. I gathered from his statement that three days' traveling had carried his party to the neighborhood of Cape Isabella, and that, leaving their bags and rations in camp, they visited Isabella and brought to camp the one hundred and forty-four pounds of English beef. On reaching their bags and rations it was found that Sergeant Elison was seriously frost-bitten, resulting from his continued eating of snow, in handling which his hands had become wet and frozen. After two days' efforts to bring both Elison and the meat in, Sergeant Rice perceived that it was impossible to do so, and, in consequence, the rifle and meat were abandoned in Baird Inlet, while Rice, Linn, and Frederick succeeded in getting Elison to our old camp at Eskimo Point. To save his life it became necessary to cut up a part of the English ice-boat for a fire. With great trouble Elison was thawed out, and as soon as he appeared able to travel they left Eskimo Point for Camp Clay. It was discovered, however, that Elison's powers of resistance to cold were gone, and he froze immediately on the slightest exposure. On reaching the ridge between Baird Inlet and Rosse Bay, they were unable to haul Elison over it. A violent storm prevented them from cooking. Rice and Frederick decided that the only chance of safety was in Rice returning to Camp Clay for assistance, while Frederick and Linn remained in the sleeping-bag to thaw out Elison by the heat of their bodies. Rice had come through from Eskimo Point to Camp Clay in one march and without food, except a bit of frozen meat eaten on the way. He was almost entirely exhausted on his arrival. A detailed report of this remarkable trip, made by Sergeant Frederick since our return, forms Appendix No. 108.

Sergeant Brainard and Christiansen started at 4.30 the morning of November 10, with medicines and stimulants for Elison's relief. They were followed at 6.30 by Lieutenant Lockwood, Dr. Pavy, Jens, Sergeant Jewell, Privates Ellis and Schneider, with the twelve-man

sledge. On the evening of the 11th Linn and Frederick arrived, reporting Elison yet alive. Linn was completely broken down, but Frederick, though greatly exhausted physically, was in a wonderful condition considering his privations. It may be said here that Sergeant Linn never recovered, mentally or physically, from the effects of this trip, and to his sufferings on this arduous journey I ascribe his early death.

Sergeant Brainard on reaching the bag found Frederick, Elison, and Linn frozen in. He was unable to extricate them from the bag, and fed them in it. On Lieutenant Lockwood's arrival, a few hours later, the men were frozen so solidly in the bag that it became necessary to cut it to pieces with a hatchet in order to release them from their imprisonment.

Lieutenant Lockwood and party arrived with Sergeant Elison about 10 a. m. of November 12, having made but one camp during their absence. Their march was a most extraordinary one, considering the previous condition of the men, the complete darkness, and the state of the ice. Lieutenant Lockwood's account will be found in his journal.

This half-starved party of eight men made a round trip of about forty miles, in total darkness and over rough and heavy ice, in forty-four hours, with temperatures ranging from —19° [—28.3° C.] to —34.5° [—36.9° C.]. The remarkable work done by this party appears the more astonishing, in that this was their third winter within the Arctic circle, that they had been on short rations for over two months, and had been utterly inactive for the previous ten days. In the most willing manner, without a murmur, these men ventured their lives on the mere possibility of rescuing a comrade whom they expected to find dead.

The return of the party completed all sledge work, and winter routine commenced.

The commissary storehouse had been finished about the 15th, and our stores of food were under lock and key, which was a great relief to me. While the stores were accessible to every one, it was not to be wondered at that some few of the men, suffering from terrible hunger, had been unable to resist the temptation to take a piece of bread or some other food.

On the 20th the meat and bread rations were reduced a fraction of an ounce, which was done in order to grant an extra allowance to Sergeant Elison. The recommendation of my surgeon to increase Elison's food very largely could not be complied with in justice to the rest of the men. I, however, set aside several cans of milk, and nearly all of our sugar, for the sick man's benefit, and gave him daily ten ounces extra of bread and two ounces of meat; counting on five pounds of extract of beef in the medical supplies to eke out this extra allowance. Although this extra allowance, granted by me as commanding officer, gave Elison twice the food that any other man received yet no demur or opposition was ever made to my action. The feeling seemed general that Elison's helpless condition, having been brought about in our interest, should of right claim certain sacrifices on our part.

Several foxes were shot during November, and others later during the winter. Twenty-four in all were killed at Camp Clay, which gave us about ninety pounds of extra meat during the five months, and just about counterbalanced the loss in subsistence supplies which resulted from the unfortunate issue of the expedition to Cape Isabella.

To break the monotony of our winter routine I commenced on November 17 daily lectures on the physical geography, the history, the resources, etc., of the United States in general and the States in detail. The natives of any State generally supplemented my own knowledge. This arrangement occupied about two hours daily, and was continued throughout the winter, being omitted only on days when some other means of diverting the mind were adopted for a change. Readings were given nearly every evening, which lasted from one to two hours. Although illy able to spare the small quantity of seal-oil needful for the miserable light used at such times, yet it is impossible to doubt that in no other way could so much benefit come from it to the party. Later in the winter Dr. Pavy gave many very interesting lectures on various subjects, physiology, etc.

November 29, the last Thursday in the month, was set apart as a day of Thanksgiving and Praise. It was celebrated by the addition to our scanty ration of certain stores reserved by me for the day. High spirits and general good feeling prevailed throughout the day, and Sergeant Elison, for the first time I think, took a new interest in life.

November ended with a storm and a temperature of +3° [—16.1° C.]; the first time above zero [—17.8° C.] in the month. The party at that time were in good health, though several had suffered much from constipation.

By the last of the month the party had a full realization of what an Arctic winter, of four sunless months, in a miserable stone hut, with inadequate food and clothing, meant. The disposition to bear their ills without discontent was particularly noticeable in the party. The ice had already covered the inside of our roof, frost several inches thick had formed on the interior of the walls, and our sleeping bags, without exception, were frozen to the ground. Consequently there was great and continued suffering from cold, which made sleep difficult and so intensified our miseries. Equitable distribution of the blankets and other coverings had been made, but several complained bitterly. I deemed it needful for example, to strip my own sleeping bag, and, later, that of Sergeant Brainard, for the benefit of others.

The mean temperature of the month was —21.8° [—29. 9° C.], with a maximum of +3° [—16.1° C.] on the 31st, and a minimum of —43.5° [—41.9° C.] on the 27th.

The mean pressure was 29.803 [756.99^{mm}].

DECEMBER, 1883.

December passed very much as did November. It was marked, however, by the prevalence of severe gales, which were extremely trying to us, not only physically but morally owing to the certainty that Smith Sound must necessarily remain open during the prevalence of such high winds.

The water-hole in the lake was kept open with extreme difficulty, and on two occasions I found it necessary to assist in opening it. In general, the manual labor of obtaining ice, removing slops, etc., was spared me, owing to mental work and trying responsibility.

Sergeant Elison's condition improved very much, and at one time the doctor believed that both feet would be saved and a part of his hands. On December 29 we commenced melting ice, over the blubber lamp, for the dressing of Elison's wounds.

After the 21st of December had passed, the spirits of the party seemed to improve, although they never could be called bad at any time.

Christmas was celebrated in the same manner as "Thanksgiving Day," by the addition of certain supplies specially reserved by me for that day. The day was marked by a feeling of kindly fellowship and an exhibition of Christian spirit which was wonderful.

The most unfortunate experience of the month for me was the detection, on December 3, of Dr. Pavy purloining the extra food of Sergeant Elison. The detection occurred when the party were asleep and in total darkness, and Dr. Pavy was ignorant that I knew of his action. That a physician should treat a helpless patient thus would be trying, but to feel that the surgeon of the expedition should so fail in his duty to the men and his commanding officer was exceedingly depressing, and gave me great mental anxiety. I communicated my knowledge of this fact only to Lieutenant Lockwood, as my successor in command, and to Sergeant Brainard, feeling that an open charge would only result in a denial and bitter discussion. The importance of the doctor's services to us at that time was manifest to the entire party. Nearly every one but myself had been treated medically since reaching Sabine, and the demand for medicine and medical treatment was continually increasing. Whether right or wrong, I felt the necessity of pursuing conciliatory methods entirely with a man from whose skill and knowledge was expected such alleviation of the party's miseries as our medicines permitted.

The mean temperature of the month was —21.2° [—29.6° C.], with a maximum of +5° [—15° C.] on the 5th, and a minimum of —39.5° [—39.7° C.] on the 27th.

The mean pressure was 29.903 [759.53^{mm}].

JANUARY, 1884.

January 1 was the earliest day on which any marked signs of weakness were evident to me. Lieutenant Lockwood and Sergeant Cross both showed to me on that day signs of failing. On the 2d Elison's right foot was cut off, or rather the shreds which held it to the ankle were separated, Sergeant Elison remaining in ignorance of the loss of his foot for several months.

On the 2d three pounds of seal-blubber was used for a much-debated experiment for cooking—the only blubber used for the purpose.

On the 3d Sergeant Brainard reported to me that the roof of the commissary had been cut and a small bit of bacon taken, and on the 7th the discovery was made that a hole had been made in a barrel of bread, on the outside, and a pound or more taken. About this time a small piece of bacon was taken from the general mess-stores of Lieutenant Kislingbury's party, and I learned that during the night somebody had been in the habit of scraping out the seal oil and eating it. All efforts to discover the man guilty of these practices were fruitless, but every one, without exception, deplored and condemned them. This state of feeling evidenced the general desire for equitable division, but also showed that starvation had such a hold as to render the resistance to the temptation to take a bit of food almost irresistible.

Elison's birthday was celebrated on the 12th by an allowance to him of an extra half gill of rum, which cheered him greatly.

The doctor that day reported the mouths of Cross, Schneider, Linn, and Ellis as indicating a possible touch of scurvy, and, in accordance with the surgeon's recommendations, I forbade the smoking of tea or other substances than tobacco.

Our first death was on the 18th when Sergeant Cross died; he was buried on the 19th. The burial service was read in the house to save long exposure to low temperature, the mercury being frozen, and later I accompanied the body to the grave. Lieutenant Kislingbury and six others dragged the body, covered by the American flag, to the summit of an adjoining hill, where the grave was prepared. No salute was fired, as it was thought advisable to save the ammunition for hunting. The cause of Cross's death, as announced to the party, was water around the heart. The fact that this was induced by insufficient food, and that he had very marked signs of scurvy, was known only to a few.

Lieutenant Lockwood's condition during the month gave me a great deal of anxiety, it being evident that he was in a very critical state. He was very feeble, quite frequently saw everything double, and was in an extremely weak condition of mind, which at times bordered very decidedly on childishness. In accordance with the doctor's instructions he was forbidden to smoke, on the ground that tobacco injured him.

On the 15th the water from the lake gave out. A hole cut with great difficulty to the bottom of the lake gave but a small quantity of sea-water. For some time we had tried to delude ourselves with the idea that the water obtained from the lake was fresh, but were finally forced to the conclusion that the lake was largely supplied from the sea, and that we were drinking sea-water slightly freshened from ice and snow. The necessity of melting ice obliged me to reduce the quantity of tea one-half. This deprivation was a great one for many of the party and depressed them somewhat. For the benefit of others who suffered, I occasionally melted ice in a rubber bag by the heat of my body, and urged others to do the same.

Sergeant Brainard's private reports as to how the estimated bags of bread were running enabled me on the 19th to increase the bread half an ounce daily. This announcement in a manner counterbalanced the depressing influence of Cross's death.

On the 22d Brainard discovered that twelve cans of milk had been stolen, undoubtedly in November, before the lock and key was put on the commissary. There was an intense feeling among the party over this news. To counteract the depression caused by the loss of the milk, I increased the issue of seal-blubber slightly, so that thereafter the weekly ration for each man was eleven ounces of blubber and fifty-seven of bread. This action had an exceedingly good effect upon the party, and produced almost incredible joy and pleasure.

On the 22d Privates Henry and Bender were insubordinate and insolent in their language, the first instance of such a spirit on the part of the enlisted men.

Gardiner's birthday on the 22d and Biederbick's on the 25th were celebrated by an allowance to each of a half gill of rum.

On the 22d the mattress which Lieutenant Lockwood had nearly three months before loaned to Lieutenant Kislingbury owing to illness, was returned to Lieutenant Lockwood on account of his weak condition.

On the 26th I forbade the party eating tea-leaves, as the doctor thought such habit injurious in our condition; but few of the party had persistently indulged in the practice.

Extra rations commenced on January 26th for Sergeant Rice and Eskimo Jens, to strengthen them for their proposed trip to Littleton Island to ascertain the condition of the ice and obtain assistance from the party supposed to have wintered there. They were given sixteen ounces daily of bread, sixteen of meat, and four ounces of seal-blubber. Private Frederick commenced on the 28th to enlarge a single-man sleeping-bag and put it in comfortable condition so it could be used by Rice and Jens in crossing. The last days in January were occupied by me in copying our meteorological records and in writing letters to Lieutenant Garlington, the Chief Signal Officer, and others, to be carried to Littleton Island.

An occasional extraordinary allowance of half an ounce of bread or meat was issued to the party towards the end of the month, always with marked benefit to each mentally, if not physically. The month ended with the party in excellent spirits. Lieutenant Lockwood was very weak, Ellis and Jewell very despondent, and Eskimo Jens complaining.

The mean temperature of the month was — 28.3° [— 33.5°], with a maximum of —6° [— 21.1° C.] on the 31st and a minimum of —42.0° [—41.1° C.] on the 19th and 20th.

The mean pressure was 29.831 [757.70^{mm}].

FEBRUARY, 1884.

On February 1, owing to Lieutenant Lockwood's weakness, I decided to issue him daily an ounce of bread extra and an ounce of meat, and also increased the allowance of the party generally, by a half ounce of bread daily.

Bender, on the 1st, evinced an insubordinate disposition and refused to obey my orders, when I interfered to stop an extremely violent and bitter discussion between him and another of the men. In consequence he was ordered out of the hut, with instructions not to return until he was willing to comply with my orders. An hour's exposure in the cold air of the outer passage was scarcely sufficient to conquer his unruly spirit.

On February 2 Sergeant Rice and Eskimo Jens left for Littleton Island. They had received for the previous week twenty-six ounces extra of solid food, and announced themselves to be in good condition on leaving. They had six days' rations, on the scale of one pound of pemmican, one-fourth pound of blubber, one three-fourths pound of bread, two ounces of rum, and six ounces of fuel alcohol. A small cooking-lamp had been made by Private Bender, and the outfit of the two men was remarkably complete, considering our circumstances. The thermometer was read by twilight at noon for the first time, and the increasing moonlight was

counted on as being of great assistance in the crossing. Sergeant Brainard and Eskimo Christiansen carried their packs about a mile and returned much exhausted. Sergeant Rice had about forty pounds to carry and Jens about thirty-five.

The party in general believed that Lieutenant Garlington was at Littleton Island with ample supplies from the *Yantic*, and consequently they counted on certain help. I, however, distinctly announced my belief that Lieutenant Garlington did not land on his way north, as his record of departure from Pandora Harbor and his arrival at Payer Harbor could not have given him time. There was much dispute regarding that point, as Lieutenant Garlington's record, while assuring us of a cache at Littleton Island, did not say that he examined it or whether it was large or small. The same notice assured us of a whale-boat at Cape Isabella, which, nevertheless, could not be found. After the Isabella affair I was more than ever unwilling to count on anything not immediately under my hand.

On February 3 the allowance of bread was increased about an ounce; and on the same day two ounces extra of lard was issued, it having been decided that it was not possible to use it all for dressing Sergeant Elison's wounds.

About this time I learned that some of the men had been eating scraps of cocoanut-stearine, remaining from making candles. As these bits were generally covered with verdigris, I forbade, positively, any such thing in the future.

On the 4th, by the doctor's advice, I ordered the men to keep their heads outside of the sleeping-bags during the day, and especially enjoined the party to obey strictly all instructions given by the surgeon regarding the methods of eating their food. The doctor assured me of Sergeant Elison's final recovery and safe transportation to Littleton Island, under ordinary circumstances.

On the 4th and 5th Brainard, who had nearly broken himself down with hard work, was reported by the doctor to be in a dangerous condition. His kidneys and chest were much troubled, and exposure to cold or severe work would endanger him.

On February 6 Sergeant Rice and Jens returned about 2 p. m., well, but thoroughly exhausted, especially the Eskimo. Sergeant Rice reported that open water extended from ten miles off of Wade Point, and a mile off of Brevoort Island, as far north into Kane Sea as the eye could reach. At no time was the Greenland shore visible. There was much moving ice with dense water-clouds along the edge of the fast ice. He thought he reached a point as far south as Littleton Island, and about ten miles distant. The two men suffered very much, as might be supposed; the temperature being from —18° to —36° [—27.8° to —37.8° C.], with one severe storm. The party, strange as it may seem, did not appear much depressed by the unfavorable report.

The ration was increased slightly on the 7th to counteract the effect of Rice's return; the increase coming from our scanty stock of lard and blubber. This increase was for mental influence, however, and a couple of days later I reduced the ration of bread slightly, and informed the party that on that scale we had enough to last us until the 6th of March, with a residue of fifteen days for crossing the straits, on a ration of twelve ounces of bread and ten of pemmican.

On the 11th a number of the men expressed a strong desire for water, as it was over a month since any of the party had had drinking water. I was able to furnish Lieutenant Lockwood a little from ice melted by the heat of my body, and encouraged others to obtain it in like way. On the same day the preparation of foot and hand gear for crossing the strait was commenced. I being determined to have everything in order for crossing in case of Smith Sound freezing over by the 10th of March. Private Frederick, though still the cook, took general charge of the work, assisted by Private Schneider and Jens. One of the men said he did not believe we would ever reach Littleton Island, the first remark of that kind that was ever heard.

The rum was found short the evening of the 11th; the calculation being based on the gauger's certificate. I was somewhat worried about the matter until, on Sergeant Israel's suggestion, I was satisfied that the deficit was caused by the rum being issued in an English measure, which is slightly larger than the American. In consequence of the shortage, rum was issued after that day only medically on prescription, instead of regularly on Sundays.

On the 16th Dr. Pavy requested two ounces extra meat on alternate days to Sergeant Elison, which I ordered with reluctance owing to previous circumstances.

February 17th the sun was above the horizon for the first time in one hundred and fifteen days. Several, including myself, had not seen it since October 13.

Sergeant Rice visited the summit of the island on the 18th and saw much open water with many large floes, which to the east appeared to touch and afford a possible passage. The straits were doubtless wide open, though we tried to delude ourselves with the idea that they were not. Private Long made his first trip for game on this day, but saw only fox tracks.

The 19th Privates Bender and Schneider quarreled in their sleeping-bags and came to blows—the first struck in the expedition ; Bender being the aggressor. I reproved both men, however, and forbade such a condition of affairs again.

On the 20th Privates Long and Frederick went hunting, but saw nothing except a raven; our first bird—possibly our neighbor who left us in November.

Sergeant Ralston was troubled at this time with a felon; Sergeant Jewell and Steward Biederbick had been similarly affected. Sergeant Gardiner's finger, which had been disabled from a felon nearly all winter, was well.

Sergeant Rice on the 21st visited the summit, and reported that the ice had apparently formed a bridge some five or eight miles wide from Cape Sabine to the Greenland coast. To the north some water spaces were seen but to the south nothing but open water. A horse-shoe curve near Cape Napoleon indicated solid ice near that point. The spirits of the party were visibly improved by the gratifying report. The English sledge was got out that day and put in order for crossing.

On the 19th Lieutenant Kislingbury transmitted to me (Appendix No. 109) a communication recommending the abandonment of my plan of crossing with the entire party, and that he with the strongest be allowed to cross to Littleton Island for game or assistance, leaving the weak behind. This proposal struck me as an abandonment to their fate of the weakest of the party. I brought it to the attention of the men and informed them that the party could not be divided with my consent, and, as long as my authority remained, no one should be deserted or abandoned until we had thoroughly exhausted all efforts. A careful estimate of the outfit showed that we would have a ton and a half weight to haul in crossing the straits, without counting Lieutenant Lockwood who was unable to travel. Heavy gales continued for several days immediately after, which tried me very much mentally, as I realized the utter futility of hoping for the straits to freeze over during such storms.

The barometer rose 1.50 inch [38.10^{mm}] in twelve hours on the 26th, and water in large quantities, indeed a veritable sea, was to be seen to the north of us. Conflicting opinions were offered as to the prospect towards Greenland; some thinking that a bridge had formed by the ice catching and others not.

Private Henry's twenty-eighth birthday was celebrated by giving him a half-gill of rum.

On the 29th the small four-man sledge was brought into the house and lashed for crossing. We were trying very hard to delude ourselves with the idea that we should have an opportunity for using the sledge and foot and hand gear, which had been put in order for crossing Smith Sound to Littleton Island.

The mean temperature of the month was —21.2° [—29.6° C.], with a maximum of +12° [—11.1° C.] on the 19th, and a minimum of —42° [—41.1° C.] on the 12th.

The mean pressure was 29.712 [754.67^{mm}].

MARCH, 1884.

The 1st day of March brought the date fixed the previous autumn for crossing Smith Sound. We had lived to that time on a ration declared to be impossible for the sustenance of life, only to encounter other misfortunes. Smith Sound was open for miles from Brevoort Island to the eastward and northward, and the party were in such diminished strength from five months' fasting, that the boat could not be moved from the roof of the building by our united efforts. My purpose still held to attempt the crossing by sledges if an ice-bridge only formed, but my hopes in that direction weakened, and later in the month I publicly abandoned all hope of the Sound freezing over.

Spring opened with twenty-four living, of whom twenty-two were yet in health, though very materially reduced in physical strength from the small ration. Sergeant Elison's wounds had healed much, and suppuration was substantially arrested. Lieutenant Lockwood was very weak, and, according to the surgeon's report, his mind was yet affected.

Two ounces extra meat were issued to Elison on the 1st, and a similar amount on occasional dates during the month.

On the 2d the last milk was used for Sergeant Elison, and our variety of food was very materially reduced by the exhaustion of the various articles, which had been arranged so as to last until March 1.

The 3d I informed the party that we could live on present supplies until the early days of April, and that up to the 16th we would still have sufficient food to effect a crossing.

Steward Biederbick was sick on the 4th, the illness resulting from his extremely arduous labors in caring for Sergeant Elison and the other sick men during the few weeks previous. The care of Sergeant Elison's wounds had fallen almost entirely on Steward Biederbeck, who, throughout the entire experiences of the expedition, was most unremitting in his attention and devotion to the sick and dying of the party. No work was too arduous or nursing too exacting to lessen his zeal or attention.

From the 6th our ration consisted of only four ounces of meat and eight of bread. That day Private Henry complained of chest troubles.

Private Long, though still cook, went hunting on the 7th as far as Brevoort Island, but saw only two fox and bear tracks. Sergeant Rice saw two ptarmigan that day, but unfortunately was without a gun. Lieutenant Kislingbury, while hunting on the stranded floe, being about three-quarters of a mile distant, unluckily broke through the ice and wet his feet. He saw some bear tracks only.

On the 9th Sergeant Rice and Private Frederick volunteered their services to attempt the recovery of one hundred pounds of English meat, abandoned in order to save Sergeant Elison's life the previous November in Baird Inlet. I was then unwilling and declined to allow such a dangerous trip to be undertaken.

Sergeants Brainard and Rice hunted ptarmigan on the 10th, but saw none. Brainard had a fine view of the straits from the summit of the island, and reported immense quantities of ice to the eastward, which increased the chances of crossing, though my opinion held that it would more probably be changed by the first heavy tide or high wind.

March 9, I judged the chances of crossing to Littleton Island substantially gone, and so decided to send Private Long and Eskimo Christiansen to Alexandra Harbor in search of game, which should be found in that quarter, according to the observations of Sir George Nares in 1875, which showed the undoubted presence of occasional game. Sergeants Brainard, Long, and Frederick prepared Long's outfit on the 10th, and they started on the 11th, a clear, calm morning, the temperature —19.1° [—28.4° C.]. Rice and Ellis hauled Long's sledge to Cocked-Hat Island, and returned much exhausted by their exertions. Long and Christiansen were fitted out as thoroughly as was possible. They were allowed as a field ration eight

ounces of meat, eight of bread, and six of fuel alcohol, and a small quantity of rum and ammonia for medical purposes. They were given three ounces extra food for their breakfast before starting. I was sanguine of some success from this trip, owing to the many signs of game seen by Nares in 1875, and felt that if the valley was of sufficient size to afford winter pasturage for musk-ox and reindeer, our party would be saved, as I well knew Long was certain of securing game if he ever saw any.

The variability of spirits and the indomitable courage of the party were evidenced by Sergeants Israel, Jewell, and Brainard volunteering to go into Hayes Sound for geographical exploration in May, in case Long succeeded in obtaining game, and later the doctor added his name. I talked much of sending a party into that Sound in May for the purpose of exploration, more to encourage the men than for any other purpose, and such discourse and planning appeared to have borne good fruit.

On the 12th the sun struck our hut for the first time. It was the first day in five months that the entire party could have seen it. During the day, Sergeant Brainard hunted as far as Cape Sabine, but saw only a fox track. Dense water-clouds prevented any extended view of the straits. Sergeant Rice saw ptarmigan tracks on the 13th, and Lieutenant Kislingbury followed them up without result.

Private Long returned unexpectedly at 7.15 p. m. of the 13th from Alexandra Harbor, both he and Christiansen being very much exhausted. They saw no game except a raven, and no tracks save of a fox. They examined thoroughly the valleys of Alexandra Harbor, and Long visited the western side of Mount Carey, and, with his field-glasses, looked farther westward into Hayes Sound than had ever been the good fortune of any previous explorer. He discovered three new capes on the north side of the Sound, the most westerly of which I named "Cape Francis Long," in his honor. Apparently the Sound was closed some twenty miles to the westward by land, on which I have since placed the name of Commodore Schley. On the south side I have placed the name of Sergeant Israel, as a slight testimony to the courage, fidelity, and ability of my late astronomer.

Long reported that Bache Island terminated some distance to the southeast of Cape Baker, and that a high, rocky island, similar in appearance to Cocked-Hat Island, was situated just to the westward of Bache Island. Several small, unimportant, rocky islands were discovered along the shore between Rice Strait and Alexandra Harbor. Long examined carefully the whole of Alexandra Harbor, passing over the edge of the Twin Glacier, and was positive that no game was to be found in that section. From Mount Carey no signs of game could be seen to the westward, but he thought it possible that in the vicinity of Cape Long or Cape Baker game might be procured. Their sleeping-bag froze up so badly that they were unable to get into it, except up to their breast, and Private Long, taken ill with cramps, suffered greatly, and was only able to travel after being revived by a mixture of ammonia and rum. The account of his trip, as abridged and entered in my journal from his account at the time, forms Appendix No. 110.

On March 14 I announced to the party that we could live at our present camp four weeks longer on substantially the same ration we were then eating, and while such an arrangement would leave nothing for crossing Smith Sound, it would insure our safety if a party at Littleton Island should reach us. The same day Sergeant Brainard succeeded in killing a ptarmigan, the first game obtained since a fox early in February. Sergeant Rice, hunting, crossed the island into Rosse Bay in three hours, and visited the grounded bergs in that bay, hoping to find seals, but saw no traces of them. He returned via Payer Harbor much exhausted, having seen no game but a raven. He reported considerable ice to the northward in Kane Sea, but there was much open water to the south of Cape Sabine.

On the 15th the doctor reported Gardiner's finger, which had troubled him since the 29th of September, as entirely well, and Ralston's finger better.

Sergeant Brainard killed three ptarmigan that day; Jens hunting saw no game. Lieutenant Kislingbury visited the grounded berg and saw five dovekies in winter plumage, and tracks of a bear, followed by a fox.

The 16th, at a temperature of —35° [—37.2° C.], Long and Christiansen went with the kayak to the water pool for dovekies, and succeeded in killing four. They weighed a pound each, and were yet in winter plumage. A seal of several hundred pounds weight was seen in the pool, but was unfortunately missed at short range by Christiansen.

Saint Patrick's Day was marked by a reduction of bread to five ounces weekly. Lieutenant Kislingbury, hunting, saw a seal and got no shot, but Jens killed a ptarmigan.

Sergeant Brainard on the 17th found ten ounces of English chocolate, which, covered by the snow, had been overlooked in the storehouse. The party were very much pleased at this discovery, but I thought it best to set aside the chocolate as a luxury for Sergeant Elison, very much to the poor fellow's gratification, and without objection from any one as far as I could then infer. I regret to state that later in the month the chocolate was stolen; all circumstances pointed to Private Henry as the offender.

On the 18th the surgeon reported that Christiansen was affected by dropsical effusion, similar to Sergeant Brainard's late attack, and considered it advisable for the native to refrain from hunting and exposure. His trip with Private Long nearly broke him down physically, as did that of Jens with Sergeant Rice.

Private Long hunted on the 20th but saw only two dovekies. Private Henry saw three owls or falcons flying northward, and Sergeant Rice saw a raven while hunting shrimps; an occupation just commenced by him. The idea was advanced by me the previous autumn, but at that time was impracticable; he succeeded in getting only a couple of ounces the first day.

Our wood was gone on the 20th, leaving only stearine and alcohol for fuel unless we should touch our whale-boat, which remained to that time intact.

On the 21st Lieutenant Kislingbury was sick, and fainted of pain from a carbuncle. Jens was troubled with dropsical effusion, but on account of the exigency I was obliged to send him and Christiansen to hunt on alternate days. On the same day Sergeants Rice, Gardiner, and Frederick succeeded in devising nets and rakes for catching shrimps and dredging sea-weed, and over a hundred pounds of shrimps were caught by the end of the month. These shrimps were what are known as sea-fleas, and were so small that over thirteen hundred were required to fill a *gill* measure.

On the 23d, as Lieutenant Lockwood enters in his diary: "Lieutenant Greely announced this morning that we could run along on the present ration until April 6, and then by cutting down to three ounces of meat per day, without bread, we could exist to May 1. This is most encouraging."

The entire party nearly perished on the 24th from asphyxiation from alcohol fumes resulting from cooking without opening the chimney, which was closed nights. Several of the party became unconscious; and those that were able went into the open air. The cause of our trouble was discovered by Sergeant Gardiner. Sergeants Brainard and Israel and Steward Biederbick were for a time apparently dead. Sergeant Brainard and one or two others were slightly frozen by exposure to the outer air, and my own hands were frosted above the second joints to such an extent that for several days they were utterly useless, and it was nearly two weeks before I could use them without great suffering. The temperature at that time was about twenty-five degrees below zero [—31.7° C.].

Private Henry improved the confusion resulting from the helpless condition of his comrades to steal a piece of bacon from one of the messes. The evidence against Henry was positive, and after a thorough investigation every man without exception voted him guilty. Proposals to use violence were promptly overruled by me, but Private Henry was relieved

from duty and put under surveillance, until the diminished strength of the party rendered it absolutely necessary to release him and permit him to do his part of the work.

Sergeant Brainard killed a fox on the 25th, but other daily hunting had no results until the 27th, on which day Private Long killed thirty-eight dovekies; thirty-three of which Jens secured by means of his kayak. These birds were killed in open water, which was about two miles distant from our hut. On the 28th Christiansen shot a ptarmigan, and Long killed fourteen more dovekies, to which Sergeant Rice added another ptarmigan on the 29th. Although a small seal and some other dovekies were seen during the month, no opportunity of shooting them presented itself. This early game apparently insured our safety.

From the 20th to the 31st a slight increase of food was given to Long and Jens daily, for lunch while hunting. Christiansen was worse at the end of the month, and Lieutenant Lockwood in a very weak condition. Frederick, for a wonder, was sick on the 31st, and Biederbick was relieved from cooking on the 26th owing to his suffering from anæmia. Contrary to the doctor's advice he had insisted on doing the cooking for a considerable time, in addition to his nursing and other trying services as steward in caring for Elison's wounds, and in administering medicines to Lieutenant Lockwood and others.

The mean temperature of the month was —16.6° [—27.0° C.], with a maximum of +3.0° [—16.1° C.] on the 31st, and a minimum of —35.2° [—37.3° C.] on the 1st.

The mean pressure was 29,823 [757.49^{mm}].

APRIL, 1884.

Private Long and Jens hunted indefatigably from the 1st to the 5th, during which time Long killed eleven dovekies and two ptarmigan and saw several seals. Sergeant Rice and Corporal Salor continued catching shrimps by nets, bringing in from twelve to thirty pounds daily, until the 7th, when Corporal Salor broke down and Sergeant Brainard was obliged to temporarily take his place.

Christiansen was given daily four ounces extra food from the 1st, but the increase proved of no avail and he died on the 5th of starvation; his body showing, however, a few signs of scurvy. The industry, loyalty, and fidelity of this Eskimo were undoubted. His death, the first one from starvation, naturally had a depressing effect. It determined me to send Sergeant Rice and Private Frederick after the English meat in Baird Inlet; a course I had hesitated over, despite their tender of services and their declared certainty of success. They were fitted out as thoroughly as possible, and, contrary to their wishes, they were given an extra allowance of food, amounting in all to six ounces of pemmican and six ounces of bread, daily, while in the field. This slight increase was deprecated by them as they wished to attempt their work on the regular ration, which was plainly impossible. They left on April 6, the day on which Sergeant Linn died.

Linn's early death resulted, without much doubt, from the severe mental and physical shock arising from his privations in November, 1883. He was a faithful, hardworking man, an excellent and subordinate soldier, whom, in nearly three years' services, I had never but once found reason to complain of.

I commenced issuing four ounces extra meat to Lieutenant Lockwood on the 6th of April, which continued until his death, which occurred on the 9th. I have elsewhere in various ways alluded to the success and importance of Lieutenant Lockwood's geographical work, and as to the qualities displayed therein. As to his personal qualities they were such as invariably commanded respect, though his quiet, retiring disposition did not tend to make friends quickly. Slow in forming an opinion, his judgment was excellent when matured. He was loyal, brave, true, and his whole character was based on virtues of which gentleness and Christian charity were essential parts.

Burial services were read over Lieutenant Lockwood, Sergeant Linn, and Eskimo Christiansen, and as much formality and care were exercised in their burial as the weak state of the party would permit.

In consequence of Lieutenant Lockwood's death I felt constrained to formally order Lieutenant Kislingbury to duty with the expedition, although he was at the time mentally and physically disqualified for duty of any character. In assigning Lieutenant Kislingbury to duty I publicly complimented him for the marked energy and efficient manner in which he had labored toward collecting stores and building the house the preceding autumn, whereby he had injured himself by overwork and straining.

Steward Biederbick had informed me on the 9th of Dr. Pavy taking Elison's bread, and that four entire cans of extract of beef, entrusted to the surgeon as medical stores, had been consumed by the doctor. Though Dr. Pavy denied ever having the cans, yet later Steward Biederbick found three of them empty under the head of the doctor's sleeping-bag. On the 10th I felt obliged to officially inform Lieutenant Kislingbury of Dr. Pavy's improper actions relative to Sergeant Elison, so that in case of my death he might know what to expect.

On the 11th Sergeant Brainard, who, owing to Corporal Salor's sickness, had taken upon himself the duties of shrimping in addition to the issuing of supplies, came in utterly exhausted, and reported that a bear was coming up the ice-foot. Private Long and Eskimo Jens went out and following him nearly two miles, succeeded in killing him within thirty feet of the open water. Lieutenant Kislingbury started out but was unable to go more than a hundred yards. The bear was hauled in by the strongest of the party and appeared to promise our future safety, as it was believed game could be readily obtained after the 1st of May. Private Long's success in killing this bear (for Long's shot killed him after Jens had simply struck his leg) showed the same nerve and skill which had made him the acknowledged hunter of the expedition. To Long's great patience, iron endurance, and reliable marksmanship were due part of the seals of the previous autumn, the birds of the early spring, and this great addition to our food, which undoubtedly saved the remnant of the party. As some reward I ordered his promotion to be sergeant, and transferred him to the Signal Corps, vice Sergeant Jewell, who died at that time. It seemed to me then imperative to ultimate safety to insure some definite reward for such extraordinary services. In this as other similar cases my action could not be confirmed, as it was decided to be beyond my authority to so transfer, except by application to the War Department.

Sergeant Jewell died of starvation on the 12th. Burial services were read in the hut as usual, and he was buried on the hill. Sergeant Jewell proved himself a most efficient and conscientious observer, and, despite his apparently weak physique, performed for the expedition very effective services in the field. He crossed Robeson Channel on sledge trips more frequently than had any of his comrades or predecessors.

Private Frederick returned at 2 p. m. of the 13th, reporting Rice's death from exhaustion the previous Wednesday in Baird Inlet, some six miles from our old camp at Eskimo Point. The remarkable energy and excellent judgment displayed by Private Frederick in his trying trip, is modestly but incompletely shown by his report, which forms Appendix No. 111. Private Frederick distinguished himself during this disastrous journey, and brought in the entire load hauled out by the two; and, remarkable to say, did his work on the scanty ration of six ounces of meat and six of bread, not availing himself of additional increase authorized by me in case of extraodinary circumstances. His extremely valuable services, as one of the supporting party to the "Farthest North," as engineer at the critical point of our retreat, as cook during the terrible winter, and as hunter and general worker in the more disastrous spring, all showed the stamp of no ordinary man. As some reward an order was issued promoting him to be sergeant, and transferring him to the Signal Corps, as of date of Sergeant Rice's death. These orders were not confirmed by the War Department, as being beyond my power. Private Frederick's report merits careful reading.

Sergeant Rice was a young man of decided promise. A skillful and enthusiastic photographer, he had also fitted himself for law and had been admitted to the bar. Clever, cultivated, and amiable, he endeared himself to his comrades at Fort Conger. In addition to his excellent work as photographer, his manly strength and aptitude for field work had also been exercised in valuable services for the expedition, particularly during our retreat. He was ever ready to venture his life for his comrades, as shown by his extraordinary trips to Cape Sabine, to Cape Isabella (twice), and towards Littleton Island. He volunteered for the fatal journey, conscious of the dangers, but was impelled to do so owing to our desperate straits, and in hopes of saving his starving comrades.

The bear killed by Long and Jens on April 11 added so materially to our supplies, that I commenced on the 14th issuing to each man a pound of meat daily. In addition to this pound, eight ounces extra were given to Sergeant Elison and to the hunters and shrimpers—Private Long, Eskimo Jens, and Sergeant Brainard.

The doctor informed me that my heart was in a very bad condition and death might result at any time. Lieutenant Kislingbury was then suffering from mental weakness, and, owing to the condition of affairs, I felt constrained to order the issue of four ounces extra pemmican and two ounces of bread for that day to myself. This measure had been urged on me by Sergeants Brainard, Israel, Ralston, Private Frederick, and others, but although I had freely ordered extra supplies for other urgent cases, I felt a natural delicacy to do so for myself. The few days on which these issues were made should be found noted in Sergeant Brainard's diary. Extra rations of eight ounces of meat daily were issued from the 12th to Sergeant Israel, owing to his failing.

Sergeant Gardiner was very poorly on the 15th, and the doctor stated he would die next. Owing to his depressed condition, I gave him half a gill extra of rum.

On the 16th I relieved Ralston as cook in our mess; some of the party asserting that he did not fairly divide our scanty food. This was the first time in five and a half months of extreme suffering, that, despite the constantly morbid and distrustful conditions of our minds, such complaint had been made in our mess. One or two similar complaints had been made in Lieutenant Kislingbury's mess, but after investigation by that officer they were considered by him and the majority of the party to be not well founded.

In connection with this division of food it may be proper to evidence the general good behavior of our cooks, and the general spirit of confidence and fair dealing by the rest of the party, by contrasting our conditions with those experienced by McClure's party in Mercy Bay. McClure's force of men was for months on reduced rations, which aggregated, however, nearly three times as much solid food, with infinitely superior shelter, than our own; and yet Dr. (now Sir) Alexander Armstrong states that in the officers' mess they alternated as carvers, and to insure fairness each selected his piece of meat, leaving the last to the carver. This same plan of division, at the solicitation of the cooks, was offered by me to my own and to Lieutenant Kislingbury's mess. My own mess persistently refused to adopt it, but Lieutenant Kislingbury's mess, for a week or so, alternated in distributing portions, but regretted doing so, and ultimately returned to our method of trusting the cook.

The doctor, on the 18th, made a detailed report of the party, stating that Lieutenant Kislingbury, Biederbick, Israel, Gardiner, Connell, and Whisler were quite weak. He stated I was improving very slowly: and in consequence no extra food was issued to me.

On April 19 Long detected Dr. Pavy drinking part of Schneider's rum. On the 21st Israel's allowance of eight ounces extra meat, which had been issued since the 12th, was discontinued. The doctor said if it was continued he would be obliged to recommend it equally for Lieutenant Kislingbury, Biederbick, Gardiner, and Ellis.

In consequence of no game being obtained the meat allowance was reduced from sixteen to ten ounces, depressing naturally the spirits of the party. The day following, Dr. Pavy and

Lieutenant Kislingbury (Appendix No. 112) recommended an increase of meat to one pound, which would have entirely exhausted our provisions by the 1st of May at the latest. I could not consent to their recommendation, but finally conceded some change, and ordered an increase of twelve ounces from the 24th.

On the 22d the great trouble with my heart, doubtless augmented by my mental anxiety over the arguments about the daily rations, seemed to indicate the near approach of my own death. In consequence detailed instructions were given to Sergeant Brainard as to the course to be pursued in case of my sudden death, and he was informed that a letter written some time before would be found on my person, which ordered him to assume command in case of my death; as Lieutenant Kislingbury was unfit either mentally or physically to do so.

Private Schneider, the cook, refused to prepare supper that evening on the plea of inability, although reported by the surgeon to be physically able, and, in consequence, I insisted on replacing him by myself as cook, hoping to overcome his disinclination by personal example. It having no effect, however, I informed him the following morning that if he did not cook he could not eat; which had the desired effect. The man's mental condition was pitiable, but necessity demanded he should do the work he was able to.

On April 23, as fuel failed, Privates Bender and Henry commenced tearing out the inside of the boat, which had a depressing effect upon the party, as its destruction seemed to foretell the fate of the entire party. It was necessary, however, as the last stearine was used for cooking on that day, and the seven gallons of alcohol remaining would serve a better purpose as food, and of eking out our meat, bread, and other supplies, of which we had about three hundred and fifty pounds including shrimps.

Dr. Pavy that morning requested to be relieved from feeding Sergeant Elison, and Sergeant Ralston assumed the duties by my orders. Dr. Pavy alleged the effect of smoke upon his eyes as the reason, but Sergeant Elison later reported that he had detected Dr. Pavy appropriating his bacon while feeding him the night before, and Elison requested that I should note the fact in my journal. The opening of the boat admitted light so that one could see for the first time in six months what was being done. It is evident that Elison's food had all these months paid regular toll to Dr. Pavy.

To show the general spirit of unselfishness, it may be stated that Sergeant Ralston spilled his stew and Private Schneider his tea the same morning, but others contributed from their meager portions to replace that lost. In previous cases of loss of food or drink by accident, some of the party invariably contributed or offered their mite to replace it. Four ounces extra meat each was given to Sergeants Israel and Gardiner.

On the 24th I put in practice Dr. Pavy's recommendation to withhold the eight ounces meat to Brainard for shrimp hunting, and do the work by detail from the strongest of the party. Dr. Pavy, Sergeant Brainard, and Private Schneider alternated in the work for three days, with the result that the doctor got nothing and Schneider about ten pounds or so. As a result, a pound of meat was saved and from thirty to forty pounds of shrimps lost, and Private Schneider injured by a bad fall. In consequence I returned to the former plan and issued eight ounces extra meat to Sergeant Brainard. While shrimping on the 25th Brainard shot two ptarmigan, which made up his extra allowance of meat for four days.

Sergeant Israel's and Gardiner's daily allowance of four ounces extra meat continued until April 29, except that on the latter day four ounces went to Steward Biederbick instead of to Sergeant Gardiner.

In deference to Dr. Pavy's expressed and reiterated medical opinion, I commenced, the 25th, to issue half a gill of diluted alcohol to the hunters. Fearing the influence of alcohol on the nerves of a half-starved man, I had opposed issuing it before they went out, believing it should be taken by the hunters on their return. April 26, the first day's hunting after the issue

of alcohol, Jens, from behind a screen at his own selected point, fired at an Ugsuk seal and missed him inside of a distance of forty yards [37^{m}].

About that time Dr. Pavy submitted two written reports (Appendices Nos. 113 and 114), the suggestions of which I could only adopt in part.

On the 27th Private Henry took advantage of my illness, and of others being in their sleeping-bags, to prepare the diluted alcohol, and took extra liquor to such an extent as to intoxicate himself. His condition was first discovered by Lieutenant Kislingbury, who lay next him. The disgust of every one at such baseness was excessive, but he was spared again.

On the 29th Jens and Long went hunting, as they had done every suitable day during the month. At 2.30 p. m. Private Long returned and reported that Jens was drowned about noon, by the cutting of his kayak by young ice. The kayak and our only reliable rifle, the Army Springfield, were lost. Long, at a very great risk, endeavored to reach the body and the kayak during the time it remained near. The death of Eskimo Jens caused great sorrow, not only on account of our critical condition, but for the strong affection all had for his great heartedness, unvarying truthfulness, and strict integrity.

On the 30th Lieutenant Kislingbury was in a very depressed condition and showed such signs of mental derangement that I wrote out a second letter ordering Sergeant Brainard to assume command in case anything went wrong with me, having destroyed the first at a time when Lieutenant Kislingbury's mental condition had temporarily improved.

Sergeant Brainard caught during April (from the 7th) four hundred and sixty pounds of shrimps and two pounds of sea-weed.

The mean temperature of the month was —0.95° [—18.3°C.], with a maximum of +19.8° [—6.8° C.] on the 16th and a minimum of —24.0° [—31.1° C.] on the 12th.

The mean pressure was 30.136 [765.44^{mm}].

MAY, 1884.

The first days of May I was dangerously ill from excessive constipation and incipient inflammation of the bowels, which yielded but gradually to Dr. Pavy's skillful treatment.

On the 3d Private Long made an exhausting trip of fourteen hours to Rice Strait and killed a seal, which sank after it had drifted within a few yards of him—a sad loss for us.

On the same day Private Whisler was detected taking about a pound of bacon from the storehouse, the door of which had been forced. Privates Henry, Bender, and Whisler were outside the hut, having left in the order named. Whisler claimed that the door must have been forced by Bender or Henry, as he saw it open on passing out, and, looking in, his terrible hunger overcame his principles. About two pounds of bacon and a half pound of pemmican, besides what Whisler was detected with, were missing, which, with other circumstances, pointed to the truthfulness of Whisler's confession, which he continually asserted to his dying moments. Private Whisler moreover expressed his willingness to be killed or meet any other fate the party might award, but deplored his mental weakness which caused his sinning. I believed the man's confession and in his deep repentance, which he manifested to his dying day.

On the 5th Dr. Pavy urged a largely increased issue of shrimps, of which some sixty pounds over the current issue had been accumulated by Sergeant Brainard's indefatigable exertions. As we had but a week's meat I refused.

On the same day after this refusal Dr. Pavy made trouble by uttering publicly false statements on three different points, regarding his medical reports made to me daily in French. An acrid discussion followed, and, to avoid demoralizing influences, I ordered him four times to stop the discussion, and finally told him that were he not the doctor I should kill him for his present and past behavior. Private Bender then joined in the matter, and, despite repeated

orders, would not be quiet until I attempted to get Private Long's gun to shoot him. It is appropriate to state here that this was the only occasion during our eight months at Cape Sabine that I was obliged to resort to violent threats to insure the execution of my orders. The only other occasion on which direct orders were not obeyed has been referred to in case of Private Bender, who was put out of the hut for an hour, and Private Schneider, who pleaded inability to perform his work. When reiterated orders given to a party in such extremities are not obeyed, it is evident that unless they are enforced at all hazards all bonds of discipline are at an end, and threats of force to insure obedience are fully justifiable.

Privates Long and Frederick hunted long and diligently through the month without practical success, though Frederick saw white whales and many seals, and succeeded on the 11th in killing in a water pool an Ugsuk seal, which unfortunately sank before reaching the edge of the ice. Long saw many seals, but had no possible chance of killing one. Sergeant Brainard continued regularly obtaining shrimps and dredging sea-weed.

Sergeant Israel's extra allowance of four ounces of meat stopped on the 10th. On the same date my journal notes the entire freedom of the channel from ice, as it had been for a few days previous; and also my positive opinion that there could be no party at Littleton Island, or we would ere this have seen them at Cape Sabine by boat.

On the 12th, after consultation with Sergeant Brainard, I ordered the issue of our last meat and tallow, which included rations for the 15th of May. After the experience of May 3 it appeared barely possible that one of the worst men of the party might break into the storehouse and appropriate the small quantity of remaining food, hoping thus to save himself at the expense of the others.

The issue of our last regular food leads me to speak of Sergeant Brainard's services in that connection. Faithfully and fairly for all our service he issued food and all other supplies. In his equity and even justice all had full faith. Personally he made all issues, kept all accounts, and reported to me weekly or otherwise as ordered. His safe and careful estimates of unknown weights of bread and meat were of incalculable benefit in the spring. The scores of pounds which these estimated supplies overran were sure testimony as to what I firmly believe, that in all that terrible winter no ounce of unauthorized food passed his lips. In less loyal and more unscrupulous hands these gains would never have been reported. That a starving man for months could handle daily such amounts of food and not take for himself speaks volumes for his moral courage.

On May 12 Dr. Pavy urged that I give him, for his wife's satisfaction, a certificate of general good standing. I declined to do so; but later, after persistent urging, and to insure continued medical attendance for the dying men, I gave him as full a certificate as I could conscientiously, confining it most rigidly to strictly professional duties. Later, on May 21, I learned from Sergeant Israel that, under stress from Dr. Pavy, he had copied for him and signed a certificate of good behavior. I append both the certificates, and my letter on learning of this remarkable action (see Appendices Nos. 115, 116, 117). These men were slowly dying, and looked for medical assistance and relief to the man who penned this certificate.

Lieutenant Kislingbury, on learning Dr. Pavy's request, insisted on a complimentary certificate in writing, which I refused, saying he had no right to demand such. An acrimonious discussion followed, in which I used improper and ungentlemanly language towards him, for which I afterwards openly and publicly apologized, both to him and the party. I look back on that personal episode in the three years' experience as the only one for which I have an abiding regret. Though my statements were strictly accurate, I should have remembered Lieutenant Kislingbury's weak mental state and enfeebled physical condition. I can only plead in extenuation great physical pain, and resultant mental condition from my severe illness of a few days previous. Lieutenant Kislingbury and I were fully reconciled prior to his death.

On the 13th, during the night, about five ounces of Sergeant Elison's bacon was taken by some unknown person, and a couple of days previously an ounce of pemmican was stolen from the hunter's lunch. The bacon entrusted to me had been placed for safe-keeping between the sleeping-bags next to Sergeant Israel's head. I have full faith that it was not touched by Israel.

On the 17th the last alcohol, except a small quantity for medical purposes, was issued. I also ordered Steward Biederbick to issue the lard remaining for medical purposes, which gave each one about three ounces. Dr. Pavy objected, however, both to the issue and division.

On the morning of the 18th I heard a raven, and called Long, who killed him.

The 18th, one of the very weak men was brutally reviled by one of the party, and on the 23d a similar case occurred. All the parties concerned are dead, and this mention of a lack of kindly feeling is made, as it was the only evidence of it in all our months of suffering and privations. It is touched on, not to bring reproach to the guilty men, but to show how very free the party was from unkindly and inhuman feeling, despite continued and agonizing suffering, which had been endured for months.

May 19, Frederick, going in early morning for ice, discovered a bear near the house. He and Long immediately started after him, but returned after six hours' chase, entirely exhausted. Their weakened condition was such that the bear easily out-traveled them, and they were unable to get a shot at him.

Private Ellis died during the bear hunt and was buried on the 20th, services being read as usual. His death was very depressing, as it was the first one from starvation in nearly six weeks. On the 20th, to give Sergeant Israel a last chance for life, and on the doctor's urgent recommendation four ounces of raven were issued, our only meat.

On the 21st a purple saxifrage (*Saxifraga oppositifolia*) was seen in blossom in a very sheltered place. We commenced that day mixing saxifrage with our shrimps and sea-weed, with doubtful advantage, as in general that plant was but faintly tinged with green.

On the 20th I was obliged to commence feeding Sergeant Ralston, who slept with me, and on the 22d he became unconscious in my arms and died early the following morning. He had proved himself an excellent observer and an efficient man in the field.

The doctor expressed the opinion that we would all die in a few days unless we succeeded in moving from the hut, where melting snow saturated our clothing and kept us continually cold and wretched. The strength of the party was consequently devoted, on the 22d, to pitching the wall-tent, about three hundred yards [274^{m}] southeast of the winter hut, on a level, gravelly spot, where we could have the benefit of the ever-present sun's rays. The tent was able to hold but a portion of the party, and the strongest were directed to sleep for a time in the hut; but the whole party messed together at the tent. The weakest moved to the tent the afternoon of the 23d. Private Whisler managed to walk to the tent alone but became unconscious that evening. Sergeant Israel walked half-way, and was hauled the rest of the distance. I succeeded in reaching the tent with great difficulty, carrying my Afghan sleeping-bag.

The barometer was broken removing it to the hill, a great misfortune, as I had hoped to continue observations until the last man died. The rapidly diminishing strength of the party at that time compelled the discontinuance of certain observations, which had been made regularly till May, but other observations were kept up.

Private Long saw a skua (robber gull) on the 23d, and Brainard got only ten pounds of shrimps—less than our daily ration.

Private Whisler died on the 24th, and burial services were read over him. A man of strong physique, he had always worked hard to advance the objects of the expedition.

On the 24th it was surmised that Schneider was not dividing our shrimp stew fairly, by giving out much soup and retaining a disproportionate quantity of solid shrimps in his own portion. Observations on the 25th confirming this suspicion, Private Frederick was ordered to relieve Schneider as cook. That day, to supplement our wretched diet of shrimps, sea-

weed, and saxifrage, we commenced stewing the seal-skin thongs, of which we arranged to have one stew daily.

Sergeant Israel weakened gradually, and on the 26th I was obliged to feed him. On the 27th he died very easily. A young man of some fortune, a graduate of Michigan University, a promising astronomer, with a bright future before him, his death was particularly sad. He had been a most valuable man to the expedition in its scientific work, and had earnestly desired field service despite his slender and weak physique. He endeared himself to the entire expedition by his kindness, consideration, and unvarying equanimity.

On the 26th and 27th Long killed four dovekies, which fell in the water beyond reach.

On the 27th, in consequence of their extraordinary services in our behalf, and to encourage the party, Frederick and Long were assigned to the Signal Service, vice Ralston and Israel lately died. This action, made subject to confirmation, was not approved by the Secretary of War, on the ground, I understand, that, even under such extraordinary circumstances, I exceeded my authority. It would seem to me that the danger of a precedent in authorizing such action would be less dangerous to the service than to put forth the idea that even in extraordinary circumstances an officer cannot safely step out of the well-beaten path of routine.

On the 27th Dr. Pavy took all the remaining iron from the medicine chest during my temporary absence. He was also accused by Steward Biederbick, Sergeant Elison, and others of previously taking, medicinally, nearly all of our Dover's powders. He had lately failed to issue iron to the party as promised, and I immediately ordered him to return it to the chest.

On the 28th Private Long saw two dovekies and secured one. I divided it between him and Sergeant Brainard, who were feeding the party at that time.

A violent gale occurred on the 29th and 30th, and we were without food or drink for twenty-eight hours, and on the 31st another violent gale kept everybody in the bags for twenty-four hours.

Sergeant Brainard, by systematic and indefatigable exertions, obtained during May no less than four hundred and seventy-five pounds of shrimps and eighty-one pounds of sea-weed.

The mean temperature for the month was +17.0° [—8.3°C.], with a maximum of +36.0° [+2.2°C.] on the 21st, and a minimum of —4.0° [—20.0°C.] on the 11th.

The mean pressure (1st to 23d, inclusive) was 30.123 [765.11^{mm}].

JUNE, 1884.

Lieutenant Kislingbury died on the 1st, and the usual burial service was read over his remains. He was an earnest, hard-working officer, and had attained an excellent reputation, particularly for detached service in the field in connection with Indian scouts. The qualities which insured success there, perhaps caused him to chafe under restraint incident to service where his work and actions were strictly limited. He was a successful hunter, a man of very fine physique, and never spared himself any personal exertion which would add to the personal comfort or pleasure of others. He worked hard and manfully during our retreat and subsequent life at Cape Sabine.

On the 1st Long killed a dovekie, which I ordered divided between him and Brainard. Similar disposition was made of one on the 2d, except that the intestines were put in the shrimp stew for the general party.

Corporal Salor became slightly delirious on the 2d and died on June 3. He was always a patient, reliable, and hard-working soldier, and, as a member of the supporting party to Lieutenant Lockwood in 1882, he contributed in no small degree to our geographical success.

Dr. Pavy was very weak on the 3d, and evidently slightly delirious. He appeared in better mental condition on the 4th, and that afternoon, while I was outside the tent, took from the medicine chest the bottle of ergot and probably drank all of its contents, some three ounces. Steward Biederbick examined the chest after Dr. Pavy left it, but did not notice the

absence of the ergot bottle, as it was a medicine which was not used. The doctor died at 6 p. m. of the 6th, his death possibly hastened by his taking ergot, probably by mistake.

Dr. Pavy was a man of fine education, polished manners, and great Arctic ambition. To his credit I have to record the restless energy which marked his physical exertions in behalf of the party during the last month of his life at Cape Sabine. His medical skill, in my opinion, was great, and contributed much to the general welfare of the party the last winter. It must be added that his changeable moods and previous Bohemian life unfitted him for duty when his actions were subjected to restriction or limitation from others.

On the 4th Long succeeded in obtaining one dovekie out of seven killed. I ordered the dovekie to be issued to the hunters, who could barely walk. Bender begged, with tears, for his twelfth, which I finally gave him, though some of the party urged strongly that he should not have it. There was some feeling over this point after Bender's allowance was given him. I informed Bender that the hunters must be kept on their feet, and unless they were kept in such condition as to obtain shrimps and game the party must inevitably perish. I also informed Sergeant Long that in case he feared trouble over the division of any bird brought in he had best retain and eat his share of the game, as his strength must be maintained.

Private Bender became weaker on the 5th and died on the 6th. He was an ingenious, hard-working man, who had done good service in various ways during the two years at Conger, and in improvising articles at Cape Sabine.

On the 4th Henry was detected taking shrimps, and Schneider and Bender were also suspected.

June 5th I had a conversation with Private Henry, in which he admitted his many offenses and promised to deal fairly in future. In default of moral feeling I appealed to his sense, pointing out the certainty that the few remaining could survive only by unity and fair dealing, and that otherwise everybody would perish ; and I cautioned him of his coming to grief if he did not act properly. I felt doubtful of his sincerity, however, and consequently gave written orders (Appendix No. 122) to watch him, and, if found stealing, shoot him. On the 6th Frederick, while cooking, detected Henry taking shrimps from the general mess-pot when his back was turned, which Frederick reported to me. Not being armed at that time he could not comply with my orders. Later Henry made two trips to our winter hut, and, after the second, passed me, and on being questioned admitted that he had in a bundle on his shoulder some seal-skin thongs, and had elsewhere concealed seal-skin. An order (Appendix No. 118) was issued, directing his execution. Owing to Henry's strength, which was greater than that of any other two men, the necessity of caution to prevent general disaster was obvious, and arrangements were made accordingly. Shots were heard about 2 o'clock, and later the order was read to the general party. Every one, without exception, acknowledged that his fate was merited. Considerable quantities of seal-skin were found in his clothes-bag, and also a pair of my seal-skin boots, loaned to the hunter and stolen from him a few nights before, though Long thought they had blown away. On Henry's person was also found a silver chronograph, which had been packed and left by me at Conger and stolen by him on leaving the station.

Private Long brought in a dovekie on the 6th, which was divided between the hunters and the cook, although some remarks were made concerning it.

On the 6th we commenced eating a great deal of *tripe de roche* (a large black lichen), which the doctor had said was injurious ; and on the 7th Biederbick, Connell, Frederick, and I commenced collecting, systematically, reindeer moss, *tripe de roche*, and saxifrage, while Long hunted and Brainard caught shrimps. These lichens proved very palatable and nutritious, and were regularly gathered thereafter. Gardiner, Schneider, and Elison were then helpless. I could only drag myself fifty yards (46^{m}) from the tent to rocks where I could hunt these lichens. Biederbick and Connell could go farther, though very weak and feeble.

On the morning of the 7th all the shrimps on hand were eaten for breakfast, the first time we were without a supply of them, and we commenced that evening on seal-skin stews, from boot-soles.

On the 8th a bunch of purple saxifrage was found in full bloom, the first specimen since May 21. Long was sick on the 9th—his thirty-second birthday—and could not hunt. A spoonful of our last gill of brandy was given him for his birthday.

On the 10th a dovekie was brought in, which went to the hunters, although there were some unpleasant remarks about it. I urged that the end should be met decently.

About that time in Sergeant Gardiner's case inflammation of the bowels set in, owing to excessive constipation, and on the 12th he died. A young man of excellent habits and disposition, with ambition and application, he had been a valuable man to the expedition and had endeared himself to his comrades. His strong will, and intense affectionate desire to return to his wife and mother, doubtless did much to prolong his life.

On the 12th of June a distress-signal was erected by Sergeant Brainard on the adjacent cliffs, it being, as my memory then served me, the average date of the whalers reaching North water. The 13th Steward Biederbick was formally discharged, for expiration of term of service, and re-enlisted on the 14th. The 9th he had promised to fulfil his contract to the Government.

On the 13th my seal-skin jumper, reserved for shrimp-bait, was divided between the party and eaten roasted; and the oil-tanned covering on my sleeping-bag was cut off and divided between the party on that and the following day.

On the 15th the hunters, who had been eating such lichens as they could gather while out, owing to comments, decided to put in the general mess all they collected. The same day Private Schneider piteously begged for opium pills to end his life; but Steward Biederbick concealed them, to avert any possible consequences.

On the 16th Sergeant Brainard found minimum thermometer No. 590, which had been blown away by the gale of December 2. The day following Sergeant Brainard collected his last shrimps, his nets being carried away by the ice breaking up. The amount collected in June had only been forty-four pounds.

On the 18th Schneider, who had gradually become weaker and been helpless for sometime, died. He had done good service at Conger not only as a clerk but also in raising and breaking the puppies, without which our geographical work would have been limited.

It is not in the province of this report to dwell on the remarkable energy and daring displayed by Captain Schley and Lieutenant Emory in pushing their vessel through the dangers of Melville Bay, and thus snatching the remnant of the party from death. When found, we had experienced the violence of a heavy gale for two and a half days, and for one and a half had been without food or water, save an ounce or so of half-boiled or roasted oil-tanned seal-skin, which each man had by him. Our tent had blown down and the heavy canvas pinned Sergeants Brainard, Long, and myself to the ground. Connell was but half-conscious, and a day later would have seen the death of several. Steward Biederbick's first action was in keeping with his previous conduct, showing his thoughtfulness and unselfishness. The two table-spoonfuls of rum which remained in his charge were poured out immediately. One was given to Connell, and the last offered me, but, on my refusal, went with its fellow.

It seemed then to me impossible that the relief ship should venture on that coast in such a gale, which was yet so violent that although under the lee of and protected by the high cliffs we were transported to the ships with difficulty. It evidenced most strongly Captain Schley's appreciation of the exigency of the situation. From the officers of the relief squadron we received the most careful and considerate kindnesses, not such as come in the mere line of their official duty, but such as spring from men's hearts when moved by pity and compassion.

In mentioning Captain Schley, Lieutenant Emory, and Chief Engineer Melville in this respect, I must add that none were second in good offices to those named. The watchful skill and unceasing attentions of Doctors Green and Ames insured the building up of the faint

spark of vitality which remained in us. Less firmness and attention might easily have proved fatal.

Sergeant Elison died July 8, 1884, at Godhavn, consequent on secondary amputation, which was absolutely necessary, though with a faint chance of success. For over seven and a half months his indomitable will-power and naturally fine physique had kept this man alive, although he lost both hands and both feet by natural amputation. That during this time he was fed, nursed, and cared for by starving men, his comrades, speaks for itself as to the humanity of the Lady Franklin Bay Expedition. Sergeant Elison was an honest, faithful man, who never spared himself pain or trouble when he could advance the interests of the expedition. He was equally serviceable in the workshop, in the field, as botanist and natural history collector, or as carpenter or sledgeman.

As to our return home and subsequent receptions, the public press have heralded those. The grateful words of thanks from the President, in behalf of himself and the nation, the eloquent message at St. John's from the honorable the Secretary of the Navy, together with public receptions and invitations which have come to me, are most highly valued, not personally, but for the recognition, through their chief, of the living and the dead of the Lady Franklin Bay Expedition, and of that which their hands wrought, their labors accomplished.

I have felt it necessary in the preparation of this report to enter more fully into details connected with the retreat and our subsequent experiences at Cape Sabine than perhaps seems called for in a general report. I have touched on many disagreeable points, and ignored none of importance, solely because if they were neglected it might seem as though the many exaggerated and erroneous statements, put forth in general terms as to the misconduct of certain members of the expedition, were correct and justified.

The attached journals of Lieutenant Lockwood and Sergeant Brainard speak for themselves (Appendices Nos. 123 and 124).

Lieutenant Lockwood was a man of unvarying truthfulness, good judgment, and Christian charity. His journal was written in shorthand, in a method but little known, and its complete translation (from leaving Conger to his death), without omission, is found herewith. Though Lieutenant Lockwood's mental powers were necessarily affected for several months prior to his death by his extremely enfeebled physical condition, yet such weakness never revealed itself in the shape of severe and unkind comments, even in matters disagreeably affecting himself. The tone of this journal indicates the character of the officer who penned it.

Sergeant Brainard's journal covers the period from our besetment in the pack until our rescue. Its contents, in a like manner, speak the man. His journal is used because he is the only one of the survivors who kept a regular diary. Thus the story is told by a dead and by a living witness.

In regard to the general conduct of the expedition during the year after leaving Conger, any impartial critic must speak of it in terms of commendation. Courage, patience, and fortitude characterized all, both living and dead. If, in a few cases, impatient spirits gave expression to indiscreet and insubordinate utterances, yet such feelings vented themselves in words, without demoralizing the party or weakening the bonds of discipline which united us as a whole. To say we were always a command, never a mob, epitomizes the record.

As to cases where men were guilty of appropriation of the food of others to themselves, I bear in mind, now as then, the great temptation which slowly starving men must necessarily experience when food is within their reach. The spirit of conciliation and forbearance which I so long exercised, while such a policy seemed possible without fatal results, was followed by the execution of Private Henry, which the exigency of the case demanded. I attach herewith, as appropriate appendices, the orders in the case, as well as the previous report to the honorable the Secretary of War, and his reply, approving of my course in the matter. (See Appendices Nos. 118, 122, 119, 120.) It was only after repeated thefts that this terrible retribution fell upon Henry. The execution was regarded by me simply in the light of a self-defense for the

remnant of my party and myself. While deeming the punishment merited, I appreciated fully the tremendous temptation it was to a man like Henry (who was, as he acknowledged himself, devoid of moral principles) to take that which was before him, and which would, in a measure, satisfy him physically.

As to other matters which have engaged an undue share of public attention, while having no official knowledge of the facts in the case, yet the responsibility of all action in connection with such an expedition rightfully and properly rests upon the commanding officer. In assuming the entire responsibility in that connection, I know of no law, either human or divine, which was broken at Cape Sabine, and so do not feel called on as an officer or man to dwell longer on such a painful topic.

In Appendix No. 121 will be found the dates and causes of death of the various members of the expedition.

I should be unjust to the dead did I not call attention to their arduous labors, heroic endurance, and unflinching determination which advanced the national ensign to an unparalleled latitude, carried out the programme of international scientific observations, increased perhaps in an unequaled degree in this century our knowledge of the physical characteristics and configurations of polar lands, and who, more than all, in perhaps the most successful Arctic boat journey of the age, brought safely, at the price of great bodily suffering and diminished chances of life, through a dense polar pack, their records to a point whence they would eventually reach the world. They died for that end, and should not be forgotten.

It would be equally unjust not to mention the services of the living. The lack of precedent forbade the War Department from confirming appointments and promotions made by me in the exigencies of my position. The necessity of maintaining the dignity of the service likewise interfered to their detriment when public interest was in a way of rewarding them with moderate fortunes.

Two of these men, Hospital Steward Henry Biederbick and Sergeant J. R. Frederick, have been discharged from the service, on surgeon's certificate of disability, and, in a maimed condition, are adventuring the gain of their livelihood. The three remaining are now members of the Signal Service, on application of the Chief Signal Officer. As a reward in some way commensurate with the successful work done by them, and the extraordinary suffering entailed through no fault of their own, I respectfully recommend that their Arctic services may be considered as rendering all these men eligible for appointment for the retired-list of the Army, as of the grades of signal-sergeants and hospital-steward.

I am conscious of the many defects in this report, which could have been remedied if longer time and better health had been mine. It has been rare that Arctic commanders, returning in health, have been able to make a formal report of their experiences in a shorter time than that occupied in the prosecution of the work itself. The great public interest shown in the fortunes of the Lady Franklin Bay Expedition seems to me a valid reason why no longer delay should be had in this matter.

Until authority can be obtained from Congress for the publication of this report, with its complete appendices, I shall, with your permission, occupy my time in perfecting and arranging the scientific observations, and in deducing such results as may be possible in that limited period.*

I attach hereto, as convenient for use and reference, a list showing the number of appendices and the title of the subject-matter on which they dwell.

Very respectfully, your obedient servant,

A. W. GREELY,

First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding Lady Franklin Bay Expedition.

* This work has been carried out and the observations have been as fully discussed as means and opportunity have permitted.

Blank page retained for pagination

LIST OF APPENDICES FILED WITH THE FOREGOING REPORT.

1. War Department order assigning Lieutenant Greely to command.
2. War Department order organizing the expedition.
3. Instructions from the Signal Office regarding the expedition.
4. List of commissary subsistence stores, with remarks thereon.
5. Records left at and taken from Southeast Cary Island, August, 1881.
6. Lieutenant Kislingbury's report of trip to Life Boat Cove.
7. Records taken from and left at Washington Irving Island, August, 1881.
8. Records obtained at Discovery Harbor, August, 1881.
9. Lieutenant Lockwood's report on Water-course Bay, August, 1881.
10. Lieutenant Kislingbury's request to be relieved, with Lieutenant Greely's statement.
11. Orders No. 5, relieving Lieutenant Kislingbury and ordering him to report to the Chief Signal Officer.
12. Orders No. 6 amending orders No. 5.
13. Lieutenant Kislingbury's request for modification of orders No. 6.
14. Orders No. 8 modifying orders No. 6.
15. Lieutenant Lockwood's report on exploration of St. Patrick Valley.
16. Sergeant Brainard's report establishing depot B near Cape Beechey.
17. Sergeant Jewell's meteorological report in connection with trip establishing depot B.
18. Sergeant Gardiner's report of trip to Cape Murchison.
19. Sergeant Linn's report on moving depot A to Cape Murchison.
20. Orders to Dr. Pavy for overland journey to Lincoln Bay.
21. Report of Dr. Pavy on trip to Lincoln Bay.
22. Report of Lieut. Lockwood on journey to the Bellows.
23. Orders to Dr. Pavy on exploring Archer Fiord.
24. Report of Dr. Pavy on attempted trip down Archer Fiord.
25. Report of Lieutenant Lockwood on sledge journey to depot B near Cape Beechey.
26. Report of Sergeant Rice on sledge journey to depot B near Cape Beechey.
27. Orders to Dr. Pavy to proceed to Cape Joseph Henry.
28. Report of Dr. Pavy on trip towards Cape Joseph Henry.
29. Lieutenant Lockwood's report on St. Patrick Valley.
30. Sergeant Rice's report on camp equipage.
31. Lieutenant Lockwood's orders to attempt crossing of Robeson Channel.
32. Lieutenant Lockwood's report on attempted crossing of Robeson Channel.
33. Dr. Pavy's orders for journey to Wrangel Bay.
34. Dr. Pavy's report on journey to Wrangel Bay.
35. Dr. Pavy's supplementary report under Appendices 27 and 33.
36. Lieutenant Lockwood's orders for preliminary journey to Cape Beechey.
37. Lieutenant Lockwood's report on journey ordered in Appendix No. 36.
38. Lieutenant Lockwood's orders for journey to Thank God Harbor.
39. Lieutenant Lockwood's report on journey ordered in Appendix No. 38.
40. English records obtained at Thank God Harbor.
41. Dr. Pavy's orders to carry provisions to Greenland coast.
42. Dr. Pavy's report on journey ordered in Appendix No. 41.
43. Sergeant Brainard's orders to move boat to Greenland coast.
44. Sergeant Brainard's report on trip ordered in Appendix No. 43.
45. Sergeant Jewell's report on trip to Lincoln Bay while supporting Dr. Pavy.
46. Dr. Pavy's orders for journey northward over Polar ocean.
47. Dr. Pavy's report on journey ordered in Appendix 46.
48. Sergeant Rice's report on detached trip from Lincoln Bay to Fort Conger and return.
49. Private Long's report on trip into Archer Fiord.
50. Sergeant Israel's report on trip into the Bellows.
51. Lieutenant Lockwood's orders to explore north coast of Greenland.
52. Supplementary instructions for exploration of north coast of Greenland.
53. Lieutenant Lockwood's report on exploration of north coast of Greenland.
54. Report of Private Biederbick's trip into Black Rock Vale.
55. Sergeant Linn's report of trip into Black Rock Vale.
56. Lieutenant Lockwood's report of launch trip up Archer Fiord.
57. Lieutenant Lockwood's report of launch trip up Chandler Fiord.
58. Dr. Pavy's orders to proceed to Carl Ritter Bay.
59. Sergeant Elison's report of trip to Carl Ritter Bay.
60. Sergeant Brainard's report of trip to Carl Ritter Bay.
61. Orders establishing day of "Thanksgiving."
62. Dr. Pavy's letter of March 8, 1883.
63. Lieutenant Greely's answer to Dr. Pavy's letter of March 8, 1883.
64. Lieutenant Lockwood's orders for preliminary journey northward, 1883.
65. Lieutenant Lockwood's report on journey ordered in Appendix No. 64.

66. Sergeant Jewell's report to Lieutenant Lockwood relative to journey ordered in Appendix No. 64.
67. Orders to Lieutenant Lockwood for exploration of Greenland, 1883.
68. Sergeant Rice's orders for journey to Thank God Harbor.
69. Dr. Pavy's orders for journey, as surgeon, to Thank God Harbor.
70. Lieut. Lockwood's report on trip to North Greenland.
71. Sergeant Jewell's report on tidal observations made on trip to North Greenland.
72. Sergeant Rice's report on trip to Thank God Harbor.
73. Dr. Pavy's medical report on trip to Thank God Harbor.
74. Orders for Sergeant Jewell for tidal observations at Cape Beechey.
75. Report of Sergeant Jewell on tidal observations at Cape Beechey.
76. Orders for Sergeant Gardiner for tidal observations at Cape Baird.
77. Orders for Sergeant Israel for astronomical observations at Cape Baird.
78. Report of Sergeant Israel on observations ordered in Appendix No. 77,
79. Report of Sergeant Gardiner on tidal and ice observations at Cape Baird.
80. Report of Sergeant Jewell on paleocrystic ice.
81. Orders to Sergeant Jewell for tidal observations at Cape Beechey.
82. Report of Sergeant Jewell on tidal observations at Cape Beechey.
83. Sergeant Brainard's report on journey to Cape Cracroft.
84. Sergeant Gardiner's report on journey to Cape Cracroft.
85. Lieutenant Lockwood's orders to cross Grinnell Land.
86. Lieutenant Lockwood's report on the crossing of Grinnell Land.
87. Orders to Dr. Pavy relative to natural history data.
88. Orders to Dr. Pavy relative to botanical specimens.
89. Orders to Lieutenant Lockwood to relieve Dr. Pavy as naturalist.
90. Lieutenant Lockwood's report on natural history specimens received from Dr. Pavy.
91. Lieutenant Lockwood's letter and report on natural history specimens, June 30, 1883.
92. Sergeant Brainard's report on Lieutenant Lockwood's trip towards the United States mountain range.
93. Orders to Lieutenant Lockwood to receive medical stores from Dr. Pavy.
94. Letter of Dr. Pavy asking the detail of Steward Biederbick.
95. Reply of Lieutenant Greely to Dr. Pavy's request for detail of Steward Biederbick.
96. Letter of Dr. Pavy's dated July 18, 1883.
97. Answer to letter referred to in Appendix No. 96.
98. Dr. Pavy's refusal to turn over his diary.
99. Letter transmitting charges to Dr. Pavy.
100. Letter limiting Dr. Pavy's bounds while in arrest.
101. Order for the abandonment of station at Fort Conger.
102. List of subsistence stores abandoned.
103. Medical reports.
104. Record left at Cape Baird.
105. Records left in abandoned boats.
106. Records found on Brevoort Island (deposited by Lieutenant Garlington and Beebe).
107. Plan of winter quarters, Camp Clay.
108. Sergeant Frederick's report of November journey to Cape Isabella.
109. Lieutenant Kislingbury's letter, February 19, 1884.
110. Private Long's journey into Hayes Sound.
111. Sergeant Frederick's report of journey to Baird Inlet, April, 1884.
112. Lieutenant Kislingbury's letter, April 22, 1884.
113. Letter of Dr. Pavy, April 25, 1884.
114. Letter of Dr. Pavy, April 27, 1884.
115. Lieutenant Greely's certificate to Dr. Pavy.
116. General certificate to Dr. Pavy.
117. Letter of Lieutenant Greely on Dr. Pavy.
118. Order for Private Henry's execution.
119. Report of Private Henry's execution.
120. Letter of Secretary of War approving Lieutenant Greely's course regarding execution of Private Henry.
121. List of deaths.
122. Order relative to Private Henry dated June 5, 1884.
123. Lieutenant Lockwood's journal from August 3, 1883.
124. Sergeant Brainard's journal from besetment.
125. Portion of diary of Private Roderick R. Schneider, found on bank of Mississippi River in Missouri, and correspondence relating thereto with Mr. J. A. Ockerson.
126. Description of drift-wood.
127. List of photographs and description of Eskimo relics in photographs.
128. List of maps.
129. Natural history (Mammalia).
130. Botany.
131. Ornithology.
132. Medusæ.
133. Echinodermata, Vermes, Crustacea, and Pteropod Mollusca.
134. Mollusca.
135. Astronomical observations.
136. Hydrography.
137. Sound experiments.
138. Meteorology.
138*a*. Meteors.
139. Magnetical reductions by U. S. Coast and Geodetic Survey.
139*a*. Magnetical reductions 1881–'82.
140. Tidal observations.
141. Pendulum observations.

APPENDICES.

APPENDIX No. 1.—*War Department order assigning Lieutenant Greely to command.*

Special Orders No. 57.

HEADQUARTERS OF THE ARMY, ADJUTANT-GENERAL'S OFFICE,
Washington, March 11, 1881.

[Extract.]

* * * * * * * * *

2. By direction of the President, First Lieut. A. W. Greely, Fifth Cavalry, acting signal officer, is hereby assigned to the command of the expeditionary force now organizing under the provisions of the acts of Congress approved May 1, 1880, and March 3, 1881, to establish a station north of the eighty-first degree of north latitude, at or near Lady Franklin Bay, for the purpose of scientific observation, &c., as set forth in said acts.

During his absence on this duty, Lieutenant Greely will retain station at Washington, District of Columbia.

* * * * * * * * *

By command of General Sherman.

R. C. DRUM,
Adjutant-General.

Official:

H. C. CORBIN,
Assistant Adjutant-General.

APPENDIX No. 2.—*War Department order organizing the expedition.*

General Orders No. 35.

HEADQUARTERS OF THE ARMY, ADJUTANT-GENERAL'S OFFICE,
Washington, April 12, 1881.

The following order, received from the War Department, is published for the information of the Army:

In order to carry into execution the act approved May 1, 1880, and so much of the act approved March 3, 1881, entitled "An act making appropriations for sundry civil expenses of the Government for the fiscal year ending June 30, 1882, and for other purposes," as provides for "observation and exploration in the Arctic seas, for continuing the work of scientific observation and exploration on or near the shores of Lady Franklin Bay, and for transportation of men and supplies to said location and return, twenty-five thousand dollars," it is ordered:

I. First Lieut. A. W. Greely, Fifth United States Cavalry, acting signal officer, having volunteered for the expedition, shall take command of the expeditionary force, now organizing under said act, to establish a station north of the eighty-first degree of north latitude, at or near Lady Franklin Bay, for the purpose of scientific observation.

II. Lieutenant Greely shall have authority to contract for and purchase within the limits of the appropriation the supplies and transportation deemed needful for the expedition; and the appropriation for this purpose, made by the act approved March 3, 1881, shall be drawn from the Treasury and disbursed, upon proper vouchers, by the regular disbursing officer of the Signal Service, under the direction of the Chief Signal Officer.

III. The force to be employed in the expedition shall consist of two other officers, who may volunteer their services; twenty-one enlisted men, who may volunteer from the Army or be specially enlisted for the purpose; and one contract surgeon. The latter to be contracted with at such time as he may be able to join the party.

IV. The commander of the expedition is authorized to hire a steam sealer or whaler to transport the party from St. John's to Lady Franklin Bay, for a fixed sum per month, under a formal contract that shall release the United States from any and all responsibility or claim for damages, in case the steamer is injured, lost, or destroyed. The said contract shall include the services and subsistence of the crew of the vessel, and shall require that the said crew shall consist of one captain, two mates, one steward, two engineers, two firemen, and seven seamen—not less than fifteen in all. Such steam sealer or whaler shall not be hired until it has been inspected by an officer to be detailed by the Secretary of the Navy for that purpose, and found by him fit for the intended service.

V. The expeditionary force shall be assembled at Washington, District of Columbia, not later than May 15, and at St. John's not later than June 15, 1881.

VI. During their absence on this duty Lieutenant Greely and the other officers of the Army accompanying the expedition will retain station at Washington, District of Columbia. The enlisted men who may volunteer or be specially enlisted for this duty shall receive the pay and commutation allowances (except commutation for quarters and fuel) that accrue to men detached for duty in Washington, District of Columbia.

VII. The several Bureaus of the War Department will furnish, on requisitions approved by the Secretary of War, the necessary subsistence, clothing, camp and garrison equipage, transportation to St. John's, Newfoundland, and return, medicines, books, instruments, hospital stores, arms, and ammunition. The subsistence stores to be furnished as above directed are for sale, not for issue, to the officers and men of the expeditionary force.

By command of General Sherman.

R. C. DRUM,
Adjutant-General.

APPENDIX No. 3.—*Instructions from the Signal Office regarding the expedition.*

Special Orders No. 97.

WAR DEPARTMENT, OFFICE OF THE CHIEF SIGNAL OFFICER,
Washington, D. C., June 17, 1881.

I. By direction of the Secretary of War, the following-named officers and enlisted men are assigned to duty as the expeditionary force to Lady Franklin Bay:

First Lieut. A. W. Greely, Fifth Cavalry, acting signal officer and assistant;
Second Lieut. Frederick F. Kislingbury, Eleventh Infantry, acting signal officer;
Second Lieut. James B. Lockwood, Twenty-third Infantry, acting signal officer;
Sergeant Edward Israel, Signal Corps, U. S. Army;
Sergeant Winfield S. Jewell, Signal Corps, U. S. Army;
Sergeant George W. Rice, Signal Corps, U. S. Army;
Sergeant David C. Ralston, Signal Corps, U. S. Army;
Sergeant Hampden S. Gardiner, Signal Corps, U. S. Army;
Sergeant William H. Cross, General Service, U. S. Army;
Sergeant David L. Brainard, Company L, Second Cavalry;
*Sergeant David Linn, Company C, Second Cavalry;
Corporal Daniel C. Starr, Company F, Second Cavalry;
†Corporal Paul Grimm, Company H, Eleventh Infantry;
Corporal Nicholas Salor, Company H, Second Cavalry;
Corporal Joseph Elison, Company E, Tenth Infantry;
Private Charles B. Henry, Company E, Fifth Cavalry;
Private Maurice Connell, Company B, Third Cavalry;

*Re-enlisted at Fort Conger under a name slightly different in spelling, viz, David Lynn, which accounts for the want of uniformity in the spelling of his name in this report.

† Deserted and replaced by Private Roderick R. Schneider, Company A, First Artillery.

Private Jacob Bender, Company F, Ninth Infantry;
Private Francis Long, Company F, Ninth Infantry;
* Private William Whisler, Company F, Ninth Infantry;
* Private Henry Bierderbick, Company G, Seventeenth Infantry;
* Private Julius Fredericks, Company L, Second Cavalry;
Private James Ryan, Company H, Second Cavalry;
Private William A. Ellis, Company C, Second Cavalry.

II. In accordance with special instructions from the Secretary of War, Lieutenant Greely will contract at Disco, Greenland, with Octave Pavy, M. D., who will thereafter remain on duty as acting assistant surgeon, U. S. Army, with the expeditionary force.

III. First Lieut. A. W. Greely, Fifth Cavalry, acting signal officer and assistant to the Chief Signal Officer, is hereby assigned to the command of the expedition, and is charged with the execution of the orders and instructions given below. He will forward all reports and observations to the Chief Signal Officer, who is charged with the control and supervision of the expedition.

W. B. HAZEN,
Brig. and Bvt. Maj. Gen., Chief Signal Officer, U. S. A.

Instructions No. 72.

WAR DEPARTMENT, OFFICE OF THE CHIEF SIGNAL OFFICER,
Washington, D. C., June 17, 1881.

The following general instructions will govern in the establishment and management of the expedition, organized under Special Orders No. 97, War Department, office of the Chief Signal Officer, Washington, D. C., dated June 17, 1881.

The permanent station will be established at the most suitable point north of the eighty-first parallel and contiguous to the coal seam discovered near Lady Franklin Bay by the English expedition of 1875.

After leaving St. John's, Newfoundland, except to obtain Esquimaux hunters, dogs, clothing, &c., at Disco or Upernivik, only such stops will be made as the condition of the ice necessitates, or as are essential in order to determine the exact location and condition of the stores cached on the east coast of Grinnell Land by the English expedition of 1875. During any enforced delays along that coast it would be well to supplement the English depots by such small caches from the steamer's stores of provisions as would be valuable to a party retreating southward by boats from Robeson Channel. At each point, where an old depot is examined or a new one established, three brief notices will be left of the visit—one to be deposited in the cairn built or found standing, one to be placed on the north side of it, and one to be buried 20 feet [6^m] north (magnetic) of the cairn. Notices discovered in cairns will be brought away, replacing them, however, by copies.

The steamer should, on arrival at the permanent station, discharge her cargo with the utmost dispatch, and be ordered to return to St. John's, Newfoundland, after a careful examination of the seam of coal at that point has been made by the party to determine whether an ample supply is easily procurable. A report, in writing, on this subject will be sent by the returning vessel. In case of doubt, an ample supply must be retained from the steamer's stores.

By the returning steamer will be sent a brief report of proceedings and as full a transcript as possible of all meteorological and other observations made during the voyage.

After the departure of the vessel, the energies of the party should first be devoted to the erection of the dwelling-house and observatories, after which a sledge party will be sent, according to the proposal made to the Navy Department, to the high land near Cape Joseph Henry.

The sledging parties will generally work in the interests of exploration and discovery. The work to be done by them should be marked by all possible care and fidelity. The outlines of coasts entered on charts will be such only as have actually been seen by the party. Every favorable opportunity will be improved by the sledging parties to determine accurately the geographical positions of all their camps, and to obtain the bearing therefrom of all distant cliffs, mountains, islands, &c.

Careful attention will be given to the collection of specimens of the animal, mineral, and vegetable kingdoms. Such collections will be made as complete as possible, will be considered the property of the Government of the United States, and are to be at its disposal.

* These men reenlisted at Fort Conger under names slightly different in spelling, viz, William Whistler, Henry Biederbick, Julius Frederick, which accounts for the want of uniformity in the spelling of their names in this report.

Special instructions regarding the meteorological, magnetic, tidal, pendulum, and other observations, as recommended by the Hamburg International Polar Conference, are transmitted herewith.

It is contemplated that the permanent station shall be visited, in 1882 and in 1883, by a steam sealer or other vessel, by which supplies for and such additions to the present party as are deemed needful will be sent.

In case such vessel is unable to reach Lady Franklin Bay in 1882 she will cache a portion of her supplies and all of her letters and dispatches at the most northerly point she attains on the east coast of Grinnell Land, and establish a small depot of supplies at Littleton Island. Notices of the locality of such depots will be left at one or all of the following places, viz, Cape Hawks, Cape Sabine, and Cape Isabella.

In case no vessel reaches the permanent station in 1882, the vessel sent in 1883 will remain in Smith's Sound until there is danger of its closing by ice, and, on leaving, will land all her supplies and a party at Littleton Island, which party will be prepared for a winter's stay, and will be instructed to send sledge parties up the east side of Grinnell Land to meet this party. If not visited in 1882, Lieutenant Greely will abandon his station not later than September 1, 1883, and will retreat southward by boat, following closely the east coast of Grinnell Land until the relieving vessel is met or Littleton Island is reached.

A special copy of all reports will be made each day, which will be sent home each year by the returning vessel.

The full narrative of the several branches will be prepared with accuracy, leaving the least possible amount of work afterwards, to prepare them for publication.

The greatest caution will be taken at the station against fire, and daily inspections made of every spot where fire can communicate.

In case of any fatal accident or permanent disability happening to Lieutenant Greely the command will devolve on the officer next in seniority, who will be governed by these instructions.

W. B. HAZEN,
Brig. and Bvt. Maj. Gen., Chief Signal Officer, U. S. A.

INSTRUCTIONS FOR THE COMMANDING OFFICERS OF THE INTERNATIONAL POLAR STATIONS OCCUPIED BY THE SIGNAL SERVICE.

I. GENERAL.

1. Regular meteorological and other observations will be maintained uninterruptedly, both at sea and at the permanent station, in accordance with instructions issued to Signal Service observers and those contained in the accompanying extract from the proceedings of the Hamburg Conference, to which special notes are appended where needed.

2. The original record of these observations will be kept in the blank books supplied for this purpose, and a fair copy of the corrected and reduced results will be made upon Signal Service and special forms, as supplied in bound volumes.

3. At sea a daily record will be kept, by dead-reckoning and astronomical observations, of the latitude and longitude of the vessel, by which the positions at the times of meteorological observations will be deduced, and on arriving at the permanent station the local time and longitude will be immediately determined, whence the Washington and Göttingen times will be found by applying the correction for longitude.

4. All meteorological and tidal observations will be made at exact hours of Washington civil time (the longitude of Washington Observatory is $5^h\ 8^m\ 12.09^s$ west of Greenwich). The regular magnetic observations will be made at even hours and minutes of Göttingen mean time (Göttingen is $0^h\ 39^m\ 46.24^s$ east of Greenwich, or $5^h\ 47^m\ 58.33^s$ east of Washington; whence 12 noon, Washington time, is simultaneous with $5^h\ 47^m\ 58.33^s$ p. m. Göttingen time, or $6^h\ 12^m\ 1.67^s$ a. m. Washington time is simultaneous with 12 noon at Göttingen).

If hourly meteorological observations of all these phenomena cannot be taken, then if possible, take bihourly observations at the hours 1, 3, 5, 7, 9, 11 a. m. and p. m., or at least six observations at 3, 7, and 11 a. m. and p. m. On no account will the meteorological observation at 7 a. m., Washington time, be omitted.

5. Upon arrival at the permanent station the local time and longitude will be determined at once, without waiting for the erection of permanent shelters, which will be built for the meteorological, magnetic, and astronomical instruments according to the plans and material as specified.

The meteorological and astronomical observatories will be located conveniently near to the dwelling of the observers, but that of the magnetic observatory will be determined by the consideration that these instruments must be removed from all danger of being affected by the presence of steel or iron, including galvanized and tinned iron. If needed to keep off intruders, a guard or fence should surround the magnetic observatory.

6. The observation of tides will be made as complete as possible in summer by a gauge on the shore, and in winter through an opening in the ice, according to the instructions furnished by the Superintendent of the U. S. Coast and Geodetic Survey. The necessity for observing the tides will suggest that the dwelling-house should be located as near the sea as is safe and convenient.

7. In addition to the ship's log and the official journal of the party, to be kept by the commanding officer, and the official record of observations, to be kept by the meteorological, magnetic, tidal, and astronomical observers, each member of the party will be furnished with a diary, in which he will record all such incidents as specially interest him. This diary will not be open to inspection until delivered to the Chief Signal Officer for his sole use in compiling the full record of the expedition.

8. Accurate representations, either by the photographic process or sketching, will be made of all phenomena of an unusual character, or of whatever is characteristic of the country.

9. Carefully prepared topographical maps will be made of as much of the surrounding country as is practicable.

II. Detailed Instructions concerning Observations, Instruments, and Time, by the International Polar Conference, Hamburg, October 1 to 5, 1879.

[Translated at the office of the Chief Signal Officer, with added notes in italics.]

1. OBLIGATORY OBSERVATIONS IN THE DOMAIN OF METEOROLOGY.

No. 17. *Temperature of the Air.*—The mercurial thermometers should be graduated to two-tenths degrees centigrade, and the alcohol thermometers to whole degrees, and both verified at a central meteorological station to within one-tenth degree centigrade.

The thermometers furnished are graduated to Fahrenheit; they have been compared with the Signal Service standard, and are provided with correction cards.

No. 18. The instruments should be placed at an altitude of between 1.5 and 2.0 meters (5 to 6 feet), and it is recommended that they be exposed in a double shelter of lattice work, according to Wild's method. The outer shelter to be of wood, the inner of metal. The observations of minimum thermometers can be made under various conditions.

The shelters furnished consist of an outer wooden louver work and an inner galvanized iron shelter, both framed so as to be easily set up. The minimum temperatures at various altitudes above ground will be observed, and under such various conditions as circumstances suggest.

No. 19. The *alcohol thermometers* ought to be compared at the station of observation with the standard mercurial thermometer at the lowest possible temperatures.*

No. 20. Sea temperatures should be observed, whenever possible, at the surface and at each 10 meters (about 33 feet) of depth; as instruments, proper for this observation, the following may be specified: Deep-sea thermometers, as manufactured or invented by Ekmann; Negretti & Zambra; Miller–Casella; Jansen.

While at sea the temperature of the surface-water will be observed hourly, with the Signal Service water thermometer, by the ordinary methods, and the temperature at each 33 feet of depth, whenever practicable; for greater depths, one of the above deep-sea instruments will be used.

No. 21. The point 0° centigrade [32° Fahrenheit], for all the thermometers, should be determined from time to time.

The testing of thermometers will be made quarterly, according to the usual Signal Service rules.

No. 22. *Pressure of the Air.*—At each station there must be at least two well-compared mercurial barometers, a reserve barometer and an aneroid.

No. 23. The standard barometer ought to be compared or read once each day.

* For notes on special thermometers, prepared for the Signal Service stations, see Section III of these instructions.

Several mercurial and aneroid barometers are furnished, and all regular observations will be made from a mercurial barometer, selected from among them, which will be compared, once each day, with the standard barometer. All barometers will be fully compared with the standard once each month; such comparative readings will be entered on the regular Signal Service forms for this purpose.

No. 24. *Humidity.*—The psychrometers (*i. e.*, dry and wet bulb) and hair hygrometer will be used with Regnault's dew-point apparatus as a check, according to Wild's instructions.

Comparative readings, with these instruments, will be frequently made and carefully preserved for future study.

No. 25. *The Wind.*—The wind-vane and Robinson's anemometer are to be read from within the house (see the method of construction of the apparatus of the Swedish station at Spitzbergen), at the same time; the force of the wind will be estimated according to the Beaufort scale and the wind-direction to 16 compass points, referred to the true meridian.

The points of the compass on the wind-dial will be adjusted to the true meridian as is ordered for all Signal Service stations; self-registering instruments, of the Signal Service pattern, for the velocity and direction of the wind to 8 points will be used. A record of wind-force on the Beaufort scale (0 to 12), and wind-direction to 16 points will also be kept and will be entered in the special column.

No. 26. To aid in deciding the question whether the Robinson's anemometer, with large or with small cups, should be used for determining the force of storms in the Polar zone, it is recommended that both such be subjected to preliminary experiments.

Anemometers of the Signal Service pattern, having small cups and short arms, are the only ones that it is convenient to furnish. For comparative purposes keep two of these in permanent daily use, exposing them in different but good localities. The extra anemometers should be compared with these during 24 hours on the first Monday of each month, and a full record be kept of such comparisons.

No. 27. *The Clouds.*—The amount of cloudiness and the direction of the movement of all clouds should be observed to 16 compass points.

In addition, the kinds of clouds will be noted, and the record kept in the usual Signal Service form.

No. 28. *Precipitation.*—The commencement and duration of rain, snow, hail, &c., and, when possible, the amount of precipitation is to be observed. As to the amount, however, this is not obligatory in winter.

There will be recorded regularly, and if practicable hourly, the amount of precipitation, measured if possible, otherwise estimated.

No. 29. *The Weather.*—Storms, thunder-storms, hail, fog, frost, dew, &c., and the optical phenomena of the atmosphere ought to be recorded.

2. OBLIGATORY OBSERVATIONS IN THE DOMAIN OF TERRESTRIAL MAGNETISM.*

No. 30. *Absolute Determinations.*—For declination and inclination it is necessary to attain an accuracy of 1.0 minute, for horizontal intensity of 0.001. The proper instruments are, for example, the portable theodolite of Lamont and the ordinary dip-needles.

No. 31. The absolute observations must be executed in close connection and synchronous with the readings of the variations instruments, in order to be able to reduce the data given by the latter to an absolute normal value, and to determine the zero point of the scales. The determinations must be made so frequently that the changes in the absolute value of the zero point of the scales of the variations apparatus can be accurately checked thereby.

No. 32. *Observations of Variations.*—These ought to include the three elements and be made by means of instruments, with small needles, in contrast to the apparatus of Gauss. In order to obtain an uninterrupted reciprocal control, two complete sets of variations instruments are desirable, and recommended, in order to avoid any interruption of the observations, by reason of breakage, derangement, &c.

One set of these instruments is now provided, but a second set may be sent in 1882.

No. 33. The horizontal intensity in one, at least, of these systems should be observed with the unifilar apparatus. Because of the magnitude of the perturbations to be observed, the scales of the variations instruments must have at least a range of 10 degrees, and the arrangements are to be so made that the greatest possible simultaneity of the readings may be achieved.

* For special instructions in magnetic work, furnished by the Superintendent of the U. S. Coast and Geodetic Survey, see Section IV of these instructions.

No. 34. During the entire period of occupancy of the station the variations instruments will be read hourly. It is desirable that two readings be made; for instance, just before and after the full hour, with an interval of a few minutes between.

No. 35. Weyprecht presented the following separate note on this point:

"Since it appears to me that in these regions of almost perpetual disturbances, hourly readings, made at moments not well defined, are insufficient to establish mean values accurately expressing the local perturbations for a given epoch (which data ought to serve as a means of comparison with other localities), and in consideration of the slight increase of labor which will be caused by taking readings at precise moments, I cannot agree with the views of the majority of the Conference.

"I state that at least the expedition conducted by myself will take readings hourly of all three variations instruments at $58^{min}\ 0^{sec}$; $59^{min}\ 0^{sec}$; $60^{min}\ 0^{sec}$; $61^{min}\ 0^{sec}$; $62^{min}\ 0^{sec}$; Göttingen mean time.

"WEYPRECHT."

Observations will be taken as specified by Weyprecht.

No. 36. As term days, the 1st and 15th day of each month will be observed from midnight to midnight, Göttingen time. The readings will be taken at intervals of 5 minutes, always on the full minutes, and the three elements are to be read with all possible rapidity, one after the other, in the following order: 1. Horizontal intensity; 2. Declination; 3. Vertical intensity.

No. 37. For these term days, the plan of magnetic work should comprehend continuous readings; for instance, readings every 20 seconds, throughout one whole hour, even though only one magnetic element be observed. It is the opinion of the Conference that the observations should begin so that one of the hours of observation shall agree with the first hour of the 1st of January, and that during the entire period of magnetic work the hours devoted to this continuous observation should be changed on each successive semi-monthly term day.

No. 38. The accuracy of the magnetic observations should be such as to give the declination to the nearest minute, and the horizontal and vertical intensity in units of the fourth decimal place.

No. 39. On the term days, observations of auroras are also to be made continuously. Moreover, auroras are also to be observed from hour to hour throughout the period of magnetic observations, and especially in reference to their form and momentary position in altitude and true azimuth. The intensity of the light is to be estimated on a scale of 1, 2, 3, 4.

No. 40. Isolated auroral phenomena must be made the subject of thorough observation, in connection with which the various phases are to be noted simultaneously with readings of the magnetic variations instruments.

Those of the party not engaged at the magnetic instruments will observe and record auroral phenomena.

No. 41. Since the greatest possible simultaneity in the readings is a point of the highest importance, the determinations of the location and of the time are to be made with instruments having firm foundations (such as the universal instruments or astronomical theodolite, the vertical circle, zenith telescope, astronomical transit, &c.); this, however, does not exclude the use of reflecting instruments of a superior class. By all means, therefore, must efforts be made to determine the geographical position and especially the longitude of the station as soon as possible after it has been occupied.

The first approximate longitude of the station, as determined by chronometers, will be checked as frequently as possible by lunar distances, occultations, &c., and the value adopted in the daily work of the station will be revised as often as necessary, preferably at the end of each quarter. The details of the magnetic observations will be regulated according to the instructions published by the Superintendent of the U. S. Coast and Geodetic Survey.

3. ELECTIVE OBSERVATIONS.

No. 42. The Conference recommends the following observations and investigations most earnestly to the consideration of all those to whom is intrusted the preparation of instructions for an expedition or who themselves are assigned to such work.

No. 43. *Meteorological.*—The diminution of temperature with altitude, the temperature of the earth, of the snow, and of the ice at the different depths should be determined.

The forms of the snow-crystals should be recorded by careful drawings; the amount of hoar-frost accumulated on some well-exposed object should be measured by the use of the scales furnished by the medical department. Apparatus is ordered to be provided for the preservation of air and of air-dust for future analysis.

No. 44. Observations of insolation (or solar radiation) are to be made, as well as observations on spontaneous evaporation, which latter can be made during the winter by weighing cubes of ice, and during the summer by the evaporometers.

A shallow, circular vessel of water, whether fluid or frozen, exposed to the open air and sunshine, should have its loss of weight determined, daily or oftener, by delicate scales.

No. 45. *Magnetical.*—From time to time absolute simultaneous readings of all three elements of terrestrial magnetism must be made in order to accurately determine the ratio between the simultaneous changes of the horizontal and those of vertical intensity.

No. 46. *Galvanic Earth Currents.*—Observations are desired of earth currents in intimate connection with magnetic observations and the auroral phenomena.

Telegraph lines of well insulated wire extending a short distance N. and S., and also E. and W., and furnished with resistance coils and deflection needles are supplied, and every effort should be made to carry out these observations.

No. 47. *Hydrographic Investigations.*—Observations of the direction and strength of the ocean currents and the movements of the ice.

No. 48. *Deep sea soundings* and observations upon the physical properties of the sea water; for instance, determination of the temperature, specific density, gaseous contents, &c., and these objects should be especially kept in view in the selection of a vessel for the expedition. Observations on tides, when possible, should be made with the self-registering apparatus.

With regard to tidal observations, the instructions published by the United States Coast and Geodetic Survey are to be followed. Glass-stoppered bottles are provided for preserving specimens of sea water to be brought back for examination.

No. 49. *Parallax of the Aurora.*—Determination should be made of the altitude of the aurora by means of measurements, made, for example, with the meteorograph, which must be made by small detached parties of observation, having also, if possible, one party observing simultaneously the variations of magnetic declination.

Particular attention will be paid to determining the apparent position in altitude and azimuth of bright meteors and shooting stars and of definite portions of the aurora borealis and to drawings of the appurtenances presented by the phenomena as seen by observers situated as far apart (say one-half to five miles) as possible; in these drawings the auroral phenomena should appear in their proper positions relatively to the horizon, meridian, fixed stars, &c., and to that end each member of the party, without exception, will learn the names and configurations of the stars shown upon the map of stars furnished you. A supply of these maps is furnished, sufficient to allow of using them as base charts upon which to enter the observed phenomena in special cases. Attention is called to the points of inquiry suggested in the Annual Report of the Chief Signal Officer, 1876, pp. 301–335.

No. 50. Observations of: 1, atmospheric electricity; 2, astronomical and terrestrial refractions; 3, length of the simple second's pendulum; 4, observations on the formation and growth of floating ice and glaciers.

Attention is called to the observations on the formation of ice made by Nares and other explorers. The pendulum observations will be made in accordance with special Coast Survey instructions.

No. 51. Observations and collections in the realms of zoology, botany, geology, &c.

The instructions given by Prof. Spencer F. Baird to the naturalist will be followed by him.

No. 52. There will also be made special observations relating to the whole Polar problem, such as the flight of birds, presence of drift-wood, and from what direction it came, and other matters as may suggest themselves from time to time and be found practicable.

III. Special Instructions relative to Care and Use of Special Thermometers.

(See paragraph 19.)

The construction of the minimum standard designed for the Arctic stations, having been intrusted to the Thermometric Bureau of the Winchester Observatory of Yale College, the astronomer in charge of that institution furnishes the following special instructions, which will be carefully followed:

"GENERAL REMARKS AND DIRECTIONS CONCERNING THE SIGNAL SERVICE MINIMUM STANDARDS, NOS. 1 TO 12 INCLUSIVE, CONSTRUCTED BY THE WINCHESTER OBSERVATORY OF YALE COLLEGE, J. AND H. J. GREEN, MECHANICIANS.

"New Haven, *May* 30, 1881.

"*Materials.*—The alcohol, carbon disulphide, and ethyl oxide used, are as pure as the chemical processes will admit. For thermometrical purposes they may be assumed chemically pure. There is no more air

above the liquid columns than is accidentally admitted in the process of sealing the tubes. In this respect these standards are different from the ordinary spirit thermometers. It is probable that the great purity of the alcohol will render it nearly as valuable for temperatures below −80° F. as the carbon and ether thermometers.

"*Directions for carriage.*—It is highly desirable that these thermometers should be kept, as nearly as possible, in the same condition as on leaving the observatory. For this purpose they have been carefully packed in a vertical position, and care must be taken to see that they are so repacked, with the *bulb* down. Owing to the low boiling-points of the ether and carbon disulphide they are not (probably) accurate at temperatures above +60° F., but they will remain clear and limpid at temperatures below zero, at which the alcohol thermometers may (but hardly probably) show viscidity. It is desirable, therefore, that preference be given to these standards over any other standards for extremely low temperatures, and in establishing the meteorological observatory at which the greatest cold is expected, special attention should be given to the ether and carbon disulphide thermometers.

"*Suggestions in their use.*—Before mounting these thermometers in their stations, they should be carefully swung or jarred so that no spirit can be detected (with a magnifying glass) adhering to their upper ends. They should be inclined (with the bulb end nearest the ground) as far as it is safe, and have the index stand in its place by its own friction against the side of the tube, so that the drainage may be as perfect as possible.*

"*All readings should be recorded in millimeters*, and it should be remembered that the accompanying tabular corrections (see the correction cards) are meant to give only approximate temperatures. A careful comparison of all the thermometers from 1 to 12 has been made between 0 and 90° and Nos. 1, 5, and 9 have been kept by the observatory for experiments at temperatures below 0° F.

"These are probably the best thermometers ever sent into the Arctic regions, and special care should be taken to insure the safe return of the records and, though less important, the instruments."

IV. Special Instructions prepared by the United States Coast and Geodetic Survey for Observations in Terrestrial Magnetism at Point Barrow and Lady Franklin Bay.

These instructions will be applied, when suitable, to the observations ordered in preceding pages, but they will also furnish a guide to the minimum number of observations to be taken in case of accidents occurring to prevent full compliance with the plan proposed by the International Polar Commission.

As soon as the quarters of the expedition have been fixed upon, a magnetic house will be erected, in which the regular magnetic observations, as described below, will be made; other observations will be made when on boat or sledge trips.

Instruments.—For use at the magnetic observatory, there will be provided a magnetometer, for absolute and differential declination and for horizontal magnetic intensity, to be permanently mounted on a stone pier. In connection with this instrument a meridian or azimuth mark will be established, a short distance off the observatory and visible from it through an opening in the wall. The astronomical bearing of this mark will be carefully determined by means of an alt-azimuth instrument and solar or stellar observations.

In the same house, but on a separate pier, will be mounted a Kew dip circle, and, in the case of Point Barrow, a third instrument, a bifilar magnetometer, will also be permanently mounted on its pier. At Point Barrow the magnetometer (or unifilar) and the bifilar instruments will be mounted in the magnetic meridian and at a distance of not less than 12 feet [3.6^{m}], and the dip circle will be mounted equidistant from these instruments, forming an equilateral triangle. At Lady Franklin Bay the two instruments will be mounted in the plane of the magnetic prime vertical, and not less than 12 feet [3.6^{m}] apart. No iron is to be used in the construction of these buildings, and they should not be nearer than 50 yards [45.7^{m}] to any other building, or double that distance to any large mass of iron. Special reading-lamps (of copper) must be provided for use with the instruments, and they must be tested to make sure that they do not affect the position of the magnets. The use of candles stuck into wooden blocks is preferable to using lamps.

When on boat or sledge journeys the party will carry a chronometer, a small alt-azimuth instrument, with circles of about 3 inches diameter (as constructed by Fauth & Co., of Washington, or by Casella, of London), provided with a magnetic needle or compass, mounted over its vertical axis, and a dip circle.

*This method conforms to that followed at all signal stations with minimum thermometers, except as to degree of inclination, wherein these suggestions should be most carefully followed.

Observations at the permanent station.—Hourly observations will be made, for declination and diurnal variation, with the magnetometer, on three consecutive days about the middle of each month. Besides these observations, extending over seventy-two hours, there will be made at any convenient intermediate time *each* day (of the three) one set of deflections, followed immediately by a set of oscillations for the determination of the horizontal intensity. At Point Barrow the bifilar will be read immediately after the unifilar. There will also be made at any intermediate time *each* day (of the three) a set of dip observations. In connection with the declination the mark will be read once each day (unless the instrument should accidentally be disturbed), but it suffices to determine the magnetic axis of the declination magnet on one of the three days. The instrumental constants of the magnetometer will be determined before leaving Washington, and the observers will use the Coast and Geodetic Survey magnetic blank forms for their records, or, in case no special forms are provided, they will use small octavo note-books. They will also compute, as soon as the observations are completed each month, the magnetic mean declination, diurnal range, and turning hours; also, the horizontal force in absolute measure (English units) and the dip, tabulating the results for each day.

Extra observations on other than the three days, about the middle of each month, will be made during all occurrences of auroral displays; but, as they are likely to be very numerous at Point Barrow, observers there may confine their extra observations to the more conspicuous displays only. On these occasions the declinometer (and the bifilar at Point Barrow) will be read, say, every ten minutes, or at shorter or longer intervals, as the state of the needle may appear to demand, the object being to establish a connection between the appearances of the aurora and the motion of the magnetic needle.

When landing on a boat journey or during a sledge journey, at suitable stations (not less than ten or fifteen miles apart), the time, latitude, and azimuth will be determined by the alt-azimuth instrument, and the declination by the same instrument (the hour and minute of the observation is to be noted, in order that the diurnal variation may be allowed for). The dip will also be observed, and, in case time is pressing, reversal of circle, reversal of face of needle, and reversal of polarity may be dispensed with, but the needed correction to the result, from the single position of the instrument, must be ascertained at the permanent station. Observations of deflections (with magnetic needle and with weights) will be made with the dip circle, as arranged for relative and absolute total force, the data for the latter to be supplied at the permanent station.

It is highly desirable, especially in the case of the Lady Franklin Bay party, that all stations within reach and formerly occupied by other parties for magnetic purposes be revisited, in order to furnish material from which to deduce the secular change during the interval; besides, all opportunities should be taken when landing, on the way up, to secure observations for declination, dip, and intensity, the latter best by oscillations of the intensity magnet. The winter quarters of the late English expedition should be connected magnetically with the present quarters.

All magnetic observations will be made on Göttingen time, as provided for by the Hamburg conference.

All magnetic records will be kept strictly in conformity with Notes on Measurements of Terrestrial Magnetism, United States Coast Survey, Washington, 1877, and other records in connection therewith should be equally clear and complete, and all computations should be made by the observer in separate books. Duplicates of all records will be made, compared with the original, and the latter returned, annually, if practicable, to the Chief Signal Officer, for the Superintendent of the Coast and Geodetic Survey, Washington, D. C. The observers should also provide themselves with copies of the Admiralty Manual of Scientific Enquiry, the Arctic Manual and Instructions, 1875, and Auroræ, their characters and spectra, by J. R. Capron, 1880; also with Terrestrial and Cosmical Magnetism, by E. Walker, 1866, and any other work they may require for their information

V. Additional Special Instructions.

The rules prescribed in Instructions for the Expedition toward the North Pole, as published (in pamphlet) by authority of the Hon. George M. Robeson, Secretary of the Navy, and those contained in Suggestions Relative to Objects of Scientific Investigation in Russian America, both of which are furnished, will be followed as closely as circumstances permit.

VI. Memorandum of Outfit.

LIST OF APPARATUS TO BE FURNISHED TO POINT BARROW AND, WITH SOME EXCEPTIONS AND ADDITIONS, TO LADY FRANKLIN BAY.

Geographical and astronomical apparatus.—One surveyor's compass and tripod; one 100-feet [30.5^{m}] chain or steel tape; one prismatic compass; one set of pins; one meridian transit, about 2 or 3 inches [51 to 76^{mm}] aperture; three sextants; three artificial horizons; eight marine chronometers—mean time; one marine chronometer—sidereal; two pocket chronometers—mean time. (If practicable these will be rated at various temperatures at the Horological Bureau of the Observatory of Yale College.)

Magnetic apparatus.—One complete magnetometer—Fauth & Co.—unifilar declinometer—catalogue No. 70, price $400, extra light needles and mirror for auroral disturbances; one Kew dip circle, larger size.

Pendulum apparatus.—Pendulum apparatus will be carried and used by a special temporary party from the United States Coast and Geodetic Survey.

Deep-sea sounding.—(Will be left to the United States Coast Survey.)

Meteorological apparatus.—One instrument shelter of open wooden louver work, made in sections, (*see* plan); one inner thermometer shelter of open galvanized iron louver work, made in sections (*see* plan); twelve mercurial thermometers, ordinary stem divided; twelve spirit thermometers, ordinary stem divided; six mercurial thermometers, maximum stem divided; six spirit thermometers, minimum stem divided; six special minimum thermometers, from Yale College; four psychrometers, mercurial, wet bulb; one dew-point apparatus, Regnault's; six water thermometers and three cases, Signal Service pattern, for surface temperatures; two mercurial marine barometers; four mercurial cistern barometers (Green, Signal Service pattern), large bore, reading to thousandths; three aneroid barometers (Casella's make); two hair hygrometers; two self-registers, one double and one single, for anemometers and anemoscopes (Signal Service pattern, Gibbon or Eccard); six extra attached thermometers for barometers; six extra barometer tubes for barometers; four rain-gauges, two copper and two galvanized iron; six divided sticks for measuring rain and snow; ten pounds pure mercury; four anemometers (Robinson's); four arms and cups and four spindles, for Robinson's anemometer, for repairs; two vanes, small; one large vane, complete; one Eccard contact (interior); 10 battery cells (Eagle) and supplies for same for three years; two thousand yards [1,828^{m}] insulated wire; four telephones and two call bells; one galvanometer for observations of ground currents; one hundred feet [30.5^{m}] cable, for the double self-register; four box sounders.

Signal apparatus.—Two Grugan's heliographs; four sets signal kits complete; six signal code cards.

Blank books and forms.—Twelve diaries for 1881, 1882, and 1883, respectively, one to be kept by each man; two hundred and fifty books for original record of meteorological observations; fifty blank books for daily journal, for miscellaneous observations; fifty volumes Form 4, for copy of original record; three hundred star charts, for auroras, &c.; one hundred forms for comparison of barometers; eight hundred forms for anemometer register.

Books.—Instructions to Observers, Signal Service, U. S. A.; Annual Reports of the Chief Signal Officer, from 1873 to 1880, inclusive; Loomis's Treatise on Meteorology; Buchan's Handy Book of Meteorology; Smithsonian Miscellaneous Collections, Vol. I.; Guyot's Meteorological and Physical Tables; Loomis's Practical Astronomy; Church's Trigonometry; Chauvenet's Practical Astronomy; Bowditch's Navigator; Bowditch's Useful Tables; Lee's Collection of Tables and Formula; American Nautical Almanac for 1881, 1882, and 1883; Admiralty Manual of Scientific Inquiry, 4th ed.; Admiralty Manual and Instructions for Arctic Expedition, 1875; Nares's, &c., Reports of English Arctic Expedition; Nares's Narrative of Voyage to Polar Sea, London, 1878; Charts, United States Hydrographic Office, No. 68, and British Admiralty, Nos. 593, 2164, 2435; Bremiker's edition of Vega's Logarithmic Tables; Barlow's Tables; Coast Survey Papers on Time, Latitude, Longitude, Magnetics, and Tidal Observations; Everett's Translation of Deschanel; Sigsbee on Deep Sea Sounding, &c. (U. S. Coast Survey Report); Markham's Collection of Papers Relating to Arctic Geography, London, 1877; Schott's Reduction of Observations of Hayes and Sontag, of Dr. Kane, and of McClintock; Manual of Military Telegraphy; Myer's Manual of Signals; J. R. Capron, Auroræ: their characters and spectra; Pope's Modern Practice of the Electric Telegraph; Instructions for the Expedition toward the North Pole, from Hon. George M. Robeson, Secretary of the Navy; stationery, as ordinarily supplied; drawing paper and instruments.

All officers and observers of the expedition are charged to at once familiarize themselves in detail with these instructions, and in the practice of the duties they prescribe, together with a thorough knowledge of the instruments and their use; and commanding officers are specially charged to see that these requirements are observed.

Official memorandum to accompany instructions No. 72.

W. B. Hazen,

Brig. and Bvt. Maj. Gen., Chief Signal Officer, U. S. A.

APPENDIX No. 4.—*List of commissary subsistence stores taken with the Lady Franklin Bay Expedition.*

Packages.	Articles and quantities.	Remarks.
42 barrels	42 barrels pork	Fair.
6 boxes	3,000 pounds bacon	Excellent.
23 barrels	23 barrels salt beef	Poor; very lean.
36 boxes	120 2-pound cans corned beef	Good.
5 boxes	120 2-pound cans roast beef	Excellent; much larger quantity needed.
147 barrels	17,899 pounds hard bread	Excellent; less proportion required, as fresh bread is preferable.
7 boxes	980 pounds cornmeal (tins)	Very good.
5 barrels	1,264 pounds white beans	Very good; should have been two-thirds white and one-third black.
5 barrels	1,395 pounds black beans	
24 boxes	576 3-pound cans baked beans	Very good; excellent for short field journeys.
2 barrels	420 pounds split peas	Excellent; much larger quantity needed.
2 barrels	595 pounds rice	Very good.
8 boxes	1,120 pounds hominy (10-pound cans)	Excellent.
10 boxes	522 pounds cheese	Very good.
19 boxes	1,900 pounds Rio coffee, roasted and ground	Excellent.
2 packages	200 pounds green gunpowder tea	Excellent; but cheaper grades liked better.
1 package	48 pounds black Oolong tea	Excellent.
	56 pounds English breakfast tea	Good.
25 half-barrels	3,060 pounds sugar, "A"	Very good.
6 barrels	269 gallons vinegar	Do.
17 boxes	510 pounds candles	Do.
4 boxes	240 pounds soap	Do.
7 sacks	1,568 pounds salt	Good.
3 boxes	75 pounds pepper, black	Do.
9 boxes	108 pounds yeast-powder	Excellent.
1 box	5 pounds allspice	Very good.
19 boxes	456 3-pound cans apples	Excellent.
5 boxes	60 1-gallon cans apples	Do.
2 boxes	100 pounds evaporated apples	Do.
4 boxes	96 cans asparagus	Excellent; other vegetables more valuable.
3 half-barrels	242 pounds breakfast bacon	Excellent.
42 boxes	3,024 pounds Top O can butter	Do.
2 packages	204 pounds McCobb's chocolate	Fair; powdered, cake better.
8 boxes	200 pounds Baker's chocolate	Excellent.
	5 pounds cinnamon	Excellent; too much by half.
1 box	24 2-pound cans clams	Excellent; very much larger quantity needed.
	5 pounds cloves	Excellent; too much by half.
4 boxes	196 pounds Java coffee, roasted and ground	Excellent.
6 boxes	144 cans green corn	Excellent; larger supply needed.
	24 4-ounce bottles lemon extract	Do. Do.
	24 4-ounce bottles vanilla extract	Do. Do.
30 casks	6,450 pounds family flour	Do. Do.
	50 packets Swinburn's gelatine	Excellent.
	50 packets Nelson's gelatine	Do.
	10 pounds ginger	Do.
4 barrels	729 pounds sugar-cured ham	Excellent at first but deteriorated.
10 boxes	100 pounds hops	Excellent; too many by three-fourths.
2 boxes	48 2-pound cans blackberry jam	Excellent; larger supply needed.
6 boxes	144 cans currant jelly	Fair; better replace by other sweets.
13 boxes	780 pounds lard (5-pound tins)	Excellent.
2 boxes	48 cans lobster (2-pound cans)	Do.
5 packages	500 pounds macaroni	Do.
2 boxes	288 boxes safety matches	Not suited for Arctic service.
40 boxes	1,920 cans milk	Excellent.
11 boxes	198 pounds mustard	Excellent; too much by three-fourths.
	5 pounds nutmegs	Do.
13 boxes	1,720 pounds oatmeal (tins)	Do.
1 box	12 bottles olive oil (Lucca)	Fair.
40 boxes	960 cans onions (2½-lb. cans)	Excellent.
4 boxes	96 cans oysters (2-lb. cans)	Fair; replace by clams or other shellfish.
6 boxes	144 cans peaches (3-lb. cans)	Excellent; much larger supply needed.
5 boxes	250 pounds evaporated peaches	Do.
2 boxes	48 cans pears (2-lb. cans)	Do.
4 boxes	96 cans green peas, American	Do.
	10 pounds Chili Colorado pepper	Do.
8 boxes	96 bottles chow-chow pickles (qt. bottles)	Do.
10 kegs	100 gallons onion pickles	Excellent; very much superior to cucumber.
25 kegs	250 gallons cucumber pickles	Fair; should have been onion or chow-chow.
2 boxes	48 cans pine-apples (2-lb. cans)	Excellent.

List of commissary subsistence stores taken with the Lady Franklin Bay Expedition—Continued.

Packages.	Articles and quantities.	Remarks.
1 box	48 pipes briarwood, No. 2	Excellent.
1 box	48 pipes briarwood, No 3	Do.
1 box	120 pipe-stems, cherry	Do.
1 box	120 pipe-stems, weichsel	Do.
52 boxes	1,248 cans potatoes (2½-lb. cans)	Excellent; for field service an additional supply of evaporated needed.
6 boxes	144 cans preserved damsons	Excellent.
5 boxes	244 pounds prunes	Excellent; much larger supply needed.
1 package	15 ¼-boxes raisins, L. L	Do.
1 package	50½ pounds raisins, Sultana	Excellent.
4 packages	96 cans salmon (2-lb. cans)	Do.
1 barrel	95 bags table salt	Do.
42 boxes	1,008 cans sauce, cranberry	Do.
1 box	12 bottles Tobin's Chili sauce	Excellent; more needed.
1 box	12 bottles Worcestershire sauce	Do.
1 box	72 cakes Castile toilet soap	Poor.
2 boxes	96 cakes glycerine toilet soap	Excellent.
	24 cakes lettuce toilet soap	Do.
	48 cakes No. 90 toilet soap	Do.
	48 cakes Guimauve toilet soap	Do.
10 boxes	240 cans oxtail soup	Do.
11 boxes	264 cans mock turtle soup	Do.
10 boxes	240 packets vegetable soup	Do.
2 boxes	40 pounds corn-starch	Excellent; much more needed.
10 half-barrels	1,063 pounds granulated sugar	Excellent.
3 half-barrels	96 gallons sirup	Excellent; more needed.
2 boxes	12 gallons maple sirup	Do.
1 box	25 pounds tapioca	Do.
25 boxes	1,000 pounds plug tobacco	Excellent; could well have replaced 100 pounds by Durham and other varieties.
12 boxes	300 pounds Durham tobacco	Excellent.
1 box	25 pounds Lone Jack tobacco	Do.
40 boxes	960 cans tomatoes (3-lb. cans)	Excellent; much more needed.
1 box	140 pounds cracked wheat	Poor.
5 boxes	120 cans Lima beans (2-lb. cans)	Good.
6 boxes	144 2-lb. cans beef extract	Poor; standard quality needed.
1 box	24 4-oz. bottles celery extract	Good.
1 box	24 2-lb. cans mutton extract	Poor; standard quality needed.
2 boxes	48 2-lb. cans crab meat	Excellent; more needed.
21 boxes	504 cans condensed eggs	Fair; many cans poor, but others excellent.
2 boxes	280 pounds farina (tins)	Good; finer quality preferred.
3 boxes	180 pounds figs	Good.
8 boxes	192 cans gooseberries (2-lb. cans)	Do.
6 half-barrels	192½ gallons New Orleans molasses	Excellent; men prefer sirup.
8 boxes	96 jars preserved peaches	Excellent; prefer canned, with light sirup.
	12 bottles Tobasco pepper	Excellent.
18 half-barrels	18 ½-bbls. pickles, sauerkraut	Good at first; soon spoiled.
42 boxes	1,008 cans rhubarb	Excellent; should prefer three-fourths other fruits.
2 boxes	48 3-lb. cans quinces	Excellent.
1 box	48 cans shrimps	Excellent; much more needed.
5 boxes	200 pounds salt-water soap	Excellent.

APPENDIX No. 5.—*Records left at and taken from Southeast Cary Island, August, 1881.*

International Polar Expedition to Lady Franklin Bay, fitted out by the War Department under the supervision of General W. B. Hazen, Chief Signal Officer, United States Army, and commanded by First Lieut. A. W. Greely, Fifth Cavalry, Acting Signal Officer and Assistant.

Left, in the steamship *Proteus*, island off Upernivik, 7 p. m., July 29th, 1881, and at 7 a m. July 31st, stopped by fog about 6 miles south of land supposed to be Cape York. Middle passage taken and found to be entirely unobstructed by ice. Landed at southeast island of Cary Group at 5.45 p. m., Aug. 1. British provision depot and boat of 1875 found in good condition. Old records taken and new records left at depot and cairn. All well. This notice deposited August 1st, 1881.

[NOTE.—The English records referred to are not printed, having been returned, through the War Department, to the English Admiralty.]

APPENDIX No. 6.—*Lieutenant Kislingbury's report of trip to Life Boat Cove.*

ON STEAMER PROTEUS, OFF LITTLETON ISLAND, *August 2*, 1881.

SIR: I have the honor respectfully to report, as directed, that in obedience to your verbal directions of this date, accompanied by Dr. Pavy, Mr. Clay, Photographer Rice, and the two Eskimo, I proceeded in the whaleboat to Life Boat Cove and to place in that vicinity occupied by the crew of the *Polaris* after the wreck of the same. The place has been visited by some persons, probably Eskimo, since Captain Nares was there, as nearly everything mentioned by him as being there at the time has been taken away.

Also visited the cairn built by the people of the *Polaris*, and, with the exception of some scattered fragments of books, nothing was found. The stones of which the cairn was built were scattered. Some distance from the cairn, behind some rocks, I found the different parts of a transit instrument with the frame-work complete but damaged. The glasses and micrometer had been taken and, evidently with care, unscrewed. I brought everything pertaining to the transit on board, together with many other articles, thinking you might desire them as relics. Have turned them over to Dr. Pavy, who will keep them together and can give list if required.

The boxes, carpenter's tools, files, needles, and skin boats, mentioned by Captain Nares, had all been taken away. Not a piece of wood of which the house had been built was left. A broken cooking-stove, several pieces of rusty stove-pipe, ship-pulleys, broken parts of instruments, broken compass-frame, broken tools, broken part of steam-engine, hose-pipe, broken hinges, several iron hooks with broken pulleys attached; in fact, all sorts of odds and ends were strewn about the place where the house had been built. But everything showed evidence of having been overhauled. No Eskimo were seen, and no signs of any having recently been in the neighborhood were noticed.

Mr. Rice took negatives of the place and of Life Boat Cove.

I shot one snow-gull, four eider-duck, and one small auk. Saw eleven walrus in the vicinity of Life Boat Cove, sporting in the water, and had a somewhat exciting time with one, a female. Mr. Clay and myself put two shots into her, one in the head and one through the neck, and hit her three times afterwards, when she started towards the boat with her head raised, mouth open, and a determined, wicked look. We waited until she was within about 20 feet [6^{m}] of us, when we put two shots into her head. She went down immediately, which was the last seen of her. A young one that climbed over her after the poor creature was wounded, was shot by Mr. Clay, and sank at once. I am convinced from this experience that it will be almost impossible to get a walrus after killing it in the water, because they sink soon as dead. With a harpoon, however, lodged in the walrus after he is wounded, the trouble of dispatching and keeping him from sinking would be lessened. An ax or strong hatchet would also be a useful thing to have at hand. The best manner of killing and securing them I think would be to catch them on the land or ice, some distance from the water, and creep up close enough to send a ball with force into his head, and from an examination of the skull I believe the only place a ball could effect an entrance would be in the eye.

Coming back we were able to use our sail, but in going we had hard rowing as the wind was brisk and dead against us.

I am, sir, very respectfully, your obedient servant,

FRED. F. KISLINGBURY,
Second Lieutenant, Eleventh Infantry, A. S. O.

First Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant,
Commanding Lady Franklin Bay Expedition.

APPENDIX No. 7.—*Records taken from and left at Washington Irving Island, August, 1881.*

International Polar Expedition to Lady Franklin Bay, fitted out by the War Department, under the supervision of General W. B. Hazen, Chief Signal Officer, United States Army, and commanded by First Lieut. A. W. Greely, Fifth Cavalry, Acting Signal Officer and Assistant.

Left, in steamship *Proteus*, island off Upernivik 7 p. m., July 29, 1881, and at 7 a. m. July 31, stopped by fog about 6 miles south of land supposed to be Cape York. Middle passage taken and found to be

entirely unobstructed by ice. Landed at southeast island of Cary Group at 5.45 p. m., August 1. British provision depot and boat of 1875 found in good condition. Old records taken and new records left at depot and cairn. Reached Littleton Island 11.30 a. m., August 2d. Found and brought on board mail for H. M. S. *Alert* and *Discovery*, left by Sir Allen Young. Left Littleton Island 10.45 p. m., August 2d, and reached Cape Hawkes 8.45 a. m., August 3, 1881, running at full speed from Littleton Island and encountering no pack or, indeed, other ice of slightest importance.

[NOTE.—The English records referred to are not printed, having been returned, through the War Department, to the English Admiralty.]

APPENDIX No. 8.—*Records obtained at Discovery Harbor, August 1, 1881.*

The original records were forwarded to the British Government, through the War and State Departments, December 5, 1881.

No copies were retained.

APPENDIX No. 9.—*Lieutenant Lockwood's report on Water-course Bay, August, 1881.*

FORT CONGER, LADY FRANKLIN BAY, GRINNELL LAND, *August* 15, 1881.

SIR: Pursuant to your verbal instructions I have the honor to report, that on the 11th instant I proceeded ashore from the steamship *Proteus*, and after a walk of some hours over the intervening high land separating our present position, Discovery Harbor, from Cape Murchison, found with some difficulty the coal seam referred to in the report of the British expedition of 1875–'76.

The coal is soft and lies *apparently* in two deposits, which are probably connected and form one seam. The largest is exposed for about a hundred yards [91^{m}] along the bed of the stream, its front vertical and about 20 or 25 feet [6 or 7^{m}] high by perhaps 4 [1^{m}] deep, covered on top by a mass of slate. The second seam is much smaller and probably 100 yards [91^{m}] farther down-stream; the coal lies in thin strata, some of which I readily pulled down by hand. The banks of the stream at this point, and for a mile or more above, are quite or so nearly vertical as to be impassable; the stream also runs in places through natural tunnels of snow. Below and near the straits, which are about three quarters of a mile distant, the banks become much lower, offering places where a sledge or other vehicle could attain the river bed though with more or less difficulty. The bed of the stream itself has a very slight grade to the sea, and when frozen and covered with snow, but only then, furnishes an excellent outlet for the coal.

Water-course Bay is a mere indentation of the coast and is wholly exposed to all winds from the northeast to the south. The shore is very shallow, where observed, small floe pieces being aground 50 yards [45.7^{m}] from the beach. At the time I visited the place the straits were filled with ice moving rapidly north before a southwest wind; but there was quite an extent of open water between the two capes forming "the bay" and extending out a hundred yards [91^{m}] or more from shore. The coast slopes gradually down to the bay in a terrace-like formation from the divide a mile to the rear; all points are exposed to the same winds as the bay. This slope offers a very good route for wagon or sledge; crossing the intervening ridge the short descent to the creek becomes somewhat steep, but thence to our present location the grade is exceedingly slight, being up one wide level valley and down another; in short, the route across is quite practicable and very good indeed.

Very respectfully, your obedient servant,

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, A. S. O.

First Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant, Commanding Expedition.

APPENDIX No. 10.—*Lieutenant Kislingbury's request to be relieved, with Lieutenant Greely's statement.*

FORT CONGER, LADY FRANKLIN BAY, *August* 26, 1881.

SIR: In conversation at breakfast this morning you said, in effect, that if I could not agree to certain ideas of yours I "had better go." This I take that my services are no longer desirable to you as a member of this expedition.

After receiving such a suggestion or invitation to go, from my commanding officer, because, possibly, I expressed myself too freely, the only thing I feel left for me to do is to ask to be relieved from duty as a member of the expedition and ordered to report to the Chief Signal Officer of the Army. On other occasions you have seen fit to find fault with me over matters in which I may have been lacking, or which might have been annoying to you but of no practical importance, and from your final request of this morning, already stated, it will doubtless be better that I go.

You and I disagreed this morning because I differed from you in the matter of early breakfasting. I objected to being compelled or required to breakfast so early. You would have me breakfast when the men do, at 7 a. m. I would not agree that the officers should be required to rise at the same time and breakfast at the same time with the men. You then said that I "had better go" unless I saw fit to do as you required in such matters. If I had been accused of anything of a serious nature, warranting you in telling me this or anything tending to a necessity for a severance of my connection with the expedition, I would act differently in this matter—would, doubtless, resist being relieved; but if such a trivial matter as this morning causes you to express such a wish as you did—*so readily*—I cannot but feel that the comfort, peace, and harmony, and even success, of the expedition may be jeopardized if I remain. It is possible that I am at fault, but, if so, it can be only because I have been too candid.

The sacrifices I make in parting from the expedition will be in every way of a serious nature. Pecuniarily, I place myself in a very embarrassing position. The year's pay and allowances, paid me in advance by the Government, has been nearly all absorbed in the liquidation of my liabilities, which would have been settled from month to month had I not come on this expedition, but which were paid by me before I left, knowing, of course, that there would be no opportunity to negotiate money matters during my absence.

But the many personal sacrifices I make are too numerous to particularize. I have also been put to no inconsiderate expense in the matter of personal outfit for clothing suitable for this climate, and incidentals occasioned by changing station such a distance, which were not by any means covered by allowances received from the Government. I shall therefore expect the Government to be at least lenient to me, or thoughtful, considering my pecuniary matters, in some manner that may suggest itself during the ensuing nine months, until I have reimbursed my advance pay and allowances and can commence again to draw my regular monthly pay.

It is hardly necessary to say anything further, *yet I shall leave the expedition in sorrow.* I am become fond of Arctic life. I see many bright hopes ahead. Physically I feel myself competent to endure the privations, hardships, and depressing influences incidental to life here, and contemplated working hard for the success of the expedition.

But I must be in the way or you could not have told me what you did this morning, and rather than be the slightest bar to the present or future success of the expedition, I abandon all my bright expectations, and feel that it would be better that I go before it becomes too late for me to do so.

The *Proteus* is still within reaching distance. With the assistance of enough men to help me take my things off to ship I can reach her over the ice. As there is a probability of the vessel being obliged to winter in the Arctic, I would ask that enough subsistence and antiscorbutics sufficient to last me until next season be furnished me.

I would also ask that you furnish me a letter to hand to the Chief Signal Officer of the Army explaining this matter and the state of my pecuniary affairs.

I am, sir, very respectfully, your obedient servant,

FRED. F. KISLINGBURY,
Second Lieutenant, Eleventh Infantry, Acting Signal Officer.

First Lieut. A. W. GREELY,
Fifth Cavalry, Acting Signal Officer and Assistant,
Commanding International Polar Expedition.

FORT CONGER, LADY FRANKLIN BAY, GRINNELL LAND, *August* 26, 1881.

Respectfully forwarded to the Chief Signal Officer of the Army.

Lieutenant Kislingbury has been relieved, in accordance with this request. In connection with my finding fault with him on previous occasions he doubtless alludes to a reprimand given because for several days after landing, while the men were working 16 hours daily, Lieutenant Kislingbury rose only at hours ranging from 10 a. m. to 1 p. m., and when sent for at 1 p. m. was in bed. This reproof was received with bad grace. This morning breakfast was delayed half an hour, and I deemed it necessary to say that the officers must rise for breakfast when the men did. Lieutenant Kislingbury said that he would not rise, but would first go without his breakfast. I said that he must conform to the rules and rise whether he ate or not. He said he would do so, only if it was *insisted* on. I said that when an officer required orders to be insisted on, his usefulness as a member of the expedition was destroyed. I declined further argument.

Previous to issuing this order Lieutenant Kislingbury was informed, in the presence of Lieutenant Lockwood and Dr. Pavy, that he could not base his request on any wish of mine to lose him, but that it must rest entirely on the question of cheerful subordination to expeditionary regulations, and that his status was not such he should so state. He so acknowledged, reiterating his unwillingness to conform to post regulations which he deemed obnoxious. Such an assertion shows his unfitness to remain here longer. While admitting his peculiar fitness for field work, and regretting his loss on that account, I cannot retain him.

As regards the reasonableness of the regulation as to breakfast, it should be borne in mind that the meal is at 7 a. m., Washington mean time (7.50 mean time), and that one man, necessarily unaided, cooks for four officers and twenty-one men. Lieutenant Kislingbury has been furnished with subsistence stores asked for. As to his pecuniary matters I have no recommendations.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding International Polar Expedition.

APPENDIX No. 11.—*Orders No. 5, relieving Lieutenant Kislingbury, and ordering him to report to the Chief Signal Officer.*

[Orders No. 5.]

FORT CONGER, GRINNELL LAND, *August* 26, 1881.

Second Lieut. F. F. Kislingbury, Eleventh Infantry, Acting Signal Officer, is at his own request relieved from duty as a member of this expedition, and, returning by the steamer *Proteus* to St. John's, Newfoundland, will report in person without delay to the Chief Signal Officer of the Army at Washington, D. C.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding the Lady Franklin Bay Expedition.

APPENDIX No. 12.—*Orders No. 6, amending Orders No. 5.*

[Orders No. 6.]

FORT CONGER, GRINNELL LAND, *August* 27, 1881.

The execution of Orders No. 5, current series, from these headquarters, being rendered impracticable by the departure of the steamship *Proteus*, its provisions are so far modified as to direct Second Lieut. F. F. Kislingbury, Eleventh Infantry, Acting Signal Officer, to proceed from this place to St. John's, Newfoundland, by the first visiting steamship. In the mean time Lieutenant Kislingbury will be considered as on waiting orders at this place.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding the Expedition.

Second Lieut. F. F. KISLINGBURY,
Eleventh Infantry, Acting Signal Officer.

APPENDIX No. 13.—*Lieutenant Kislingbury's request for modification of Orders No. 6.*

FORT CONGER, GRINNELL LAND, *October* 24, 1881.

SIR: It has occurred to me for the first time within the past week that my status, "waiting orders," may, by some possible construction of law, affect my pay.

My fears may be groundless, but in order that there may be no doubt in the matter I would respectfully ask that the clause following the word "steamship" be stricken from Orders No. 6, which I enclose.

The orders would still have the same effect without this clause, because Orders No. 5 relieved me from duty with the expedition; and if the words "waiting orders" are omitted from the orders any question regarding my pay could not then be raised. In any event I shall feel easier in mind if this is done.

I am, sir, very respectfully, your obedient servant,

FRED. F. KISLINGBURY,
Second Lieutenant, Eleventh Infantry.

First Lieut. A. W. GREELY,
Acting Signal Officer and Assistant, Commanding United States Expedition.

APPENDIX No. 14.—*Orders No. 8, modifying Orders No. 6.*

[Orders No. 8.]

FORT CONGER, GRINNELL LAND, *October* 24, 1881.

The final paragraph of Orders No. 6, current series, from this station, reading, "In the mean time Lieutenant Kislingbury will be considered as on waiting orders at this place," is amended so as to read: "In the mean time Lieutenant Kislingbury will not be considered as a member of this expeditionary force but as temporarily at the station waiting transportation."

A. W. GREELY,
First Lieut., Fifth Cavalry, A. S. O. and Assistant, Commanding Expedition.

Second Lieut. F. F. KISLINGBURY,
Eleventh Infantry, Acting Signal Officer.

APPENDIX No. 15.—*Lieutenant Lockwood's report on exploration of St. Patrick Valley.*

LADY FRANKLIN BAY, GRINNELL LAND, *August* 31, 1881.

SIR: I have the honor to render the following report of my journey to St. Patrick Bay, made in obedience to your written instructions of the 29th instant:

With Sergeants Brainard and Cross the party started on foot at 9 a. m. of that date and took its course along the valley or low land to the northeast of our present position, lying between the "hogback," as called on the English map, and the range of high hills or mountains running parallel and to the south of it. The only grade of any importance, as regards steepness, lies between our station and the gap to the west of Mount Cartmel. Even this *may be* obviated by starting hence directly north, instead of northeast through the gap, though by so doing the route would be sensibly lengthened. By following our trail, however, the route selected is not difficult, and on attaining the elevation of the gap, which is quite considerable, the course taken, when covered with snow, as it was at the time of my trip though not very deep, is direct and quite easy all the way to St. Patrick Bay. The grade is hardly more than perceptible for the greater part of the distance, except as interrupted by slight undulations in the ground caused by the few water-courses like "prairie-draws," which take their courses from the mountain ranges on either side. The route will be much better after a while when the snow has entirely covered up the sharp little hills, a foot or so in height and very close together, which the frost or some other action of the elements has created. This character of the ground, however, exists only in places. Pursuing our course between and generally parallel to the ranges referred to, we came to the bay about 1 o'clock. One hour was occupied en route in skinning and cutting up a musk-ox which I killed, making the time in crossing three hours.

Feeling not quite assured of the identity of the bay, on account of various discrepancies in the map, I proceeded with party in a northerly direction along what forms the eastern slope of the "hogback," very steep and rocky but affording a good view of the country to the north and east intersected with numerous deep cañons. We proceeded in this direction about a mile, and then turning eastward and climbing down a very steep descent crossed the wide deep bed of a very insignificant river coming from the northwest—insignificant and yet larger than any hitherto seen in these regions. We followed up its bed, which is at least half a mile broad, for perhaps a mile, and then taking advantage of a break in the wall on the further side, climbed our ascent to the eastward for almost three hours, when we gained an altitude from which could be seen the straits and the coast beyond. We were opposite, I think, Newman Bay. It was now 6 o'clock in the evening, and feeling well satisfied that the little arm of the straits first met with (though seemingly entirely too small and otherwise "out") must be St. Patrick Bay, I retraced my course to the river-bed and followed it down to the bay. We found it necessary to climb the continuation of the steep, rugged ascent, already referred to, between the river and the "hogback," which took an hour, and it being then too late to proceed to the south, as I had originally intended, we returned to the station, which we reached about 12.30 a. m. The site selected for the depot is a good one, excepting more or less difficulty which will have to be encountered in reaching the level of the bay; the feet of the whole party being very cold and wet I left this for more complete examination on some other occasion.

I shot one musk-ox, as already stated, and saw another in the distance, up the river; we saw a good many tracks of foxes and hare, but these were all the animals and signs of animal life observed.

Better to illustrate the subject, I have the honor to append a small map* or plan showing the route taken. The country to the west of St. Patrick Bay is a copy of the English map; that from the north is from my recollection of it, and, of course, only represents it in a very general way.

Very respectfully, your obedient servant,

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, A. S. O.

Lieut. A. W. GREELY,
Fifth Cavalry, Acting Signal Officer and Assistant,
Commanding United States International Polar Expedition.

APPENDIX No. 16.—*Sergeant Brainard's report on establishing Depot B, near Cape Beechey.*

FORT CONGER, GRINNELL LAND, *September* 4, 1881.

SIR: I have the honor to submit the following report of a boat journey to Cape Beechey for the purpose of establishing a depot of supplies for the use of northern exploring parties during the coming spring:

In conformity with your instructions of August 30, 1881, the whale-boat was hauled to the open water near Dutch Island and placed in a secure position for the night. The following morning the boat was launched and loaded with the stores brought from the station by the party, under your charge, the same morning. Owing to the unsafe condition of the newly formed ice, considerable difficulty was experienced in transferring the supplies from the ice to the boat. It was accomplished, however, without accident, and the start made at 10.15 a. m. My crew consisted of Sergeants Jewell and Cross, Corporal Salor, and Private Connell. We rounded Dutch Island in comparatively clear water, but the moving ice in the distance warned us that caution was necessary.

Soon after leaving Dutch Island we encountered stream ice, and as we approached Distant Cape the ice became more compact, the lanes less frequent and narrower, necessitating extreme caution in pushing our boat through them. The floes were moving about in the eddy at this cape with such velocity that we almost despaired of effecting a passage. We were prepared at all times to unload the boat and haul her on a floe if essential to safety.

On several separate occasions, notwithstanding our watchfulness, we narrowly escaped being crushed between floes moving in opposite directions. Had not the crew retained possession of their presence of mind, keeping constantly on the alert, and using their strength to the best advantage when a new danger menaced them, our boat must have been crushed to atoms. Our situation was deplorable in the extreme.

*Not reproduced.

A new danger arose in the shape of young ice which formed quickly between the floes, but was no particular hindrance to their movements. Its dangers to us were twofold—the difficulty experienced in pushing our boat through the new ice while endeavoring to elude whirling floes which threatened us with destruction, and the danger of having our boat cut through at the water-line by this razorlike formation of ice. In many places this ice was found to have attained a thickness of over an inch [25^{mm}] and our channel was necessarily made by breaking the way with axes. Underneath this covering débris, or sludge-ice, was found to have accumulated to the depth of six inches [152^{mm}] and through which it was with the greatest difficulty that our boat could be moved. At 4.30 p. m. we cleared the pack and rounded Distant Cape, keeping well out, in order to take advantage of the lanes which appeared larger and more numerous as we receded from the shore. In crossing the entrance to Water-course Bay, at 6 p. m., the ice appeared to have scattered somewhat in the direction of its northern termination. Steering towards shore, we found that not only did this condition exist, but the new ice was much less troublesome than before.

Between this point and the north shore of St. Patrick's Bay very little ice of a formidable character was met with. At 7 p. m., just north of this cape, our further progress was checked by new ice which had closed all lanes. Not wishing to venture too far into the channel with the heavily laden boat, I tied to the ice-foot to await the result of a change in the tide. During the time we remained inactive, coffee was made and a light lunch partaken of. The evident curiosity of a young seal having prompted it to approach quite near our boat, it was killed by Connell and taken on board. A large fragment of the ice-foot, becoming detached from underneath, struck the keel of our boat with great force on rising to the surface, and raised the stern far out of the water. No damage, however, was done, except that a box containing articles of importance to our equipment was thrown into the water and everything contained in it lost. Appendix A forms a list of the articles thus lost.

A brisk northerly wind springing up at about 8 o'clock, the floes were once more set in motion, and the young ice disappeared as if by magic. At 9 o'clock we again resumed our course and arrived opposite Mount Beaufort at 12.30 a. m., September 1. Owing to the fringe of floe-bergs which lined the shore in the form of a huge wall as far northward as the cliffs of Cape Beechey, no landing could be made at this point. Turning the boat southward we moved slowly down the coast, examining carefully every place at which we thought a landing could be effected. At 1 a. m., about 1 mile south of Mount Beaufort, we found a small gap in the ice-wall, through which we had very little difficulty in transporting our supplies.

We had barely time to haul the boat to a place of safety after unloading before an ice pack from the north, driven by a high wind, passed down the channel. The pack was supplemented at intervals during the day by other detached masses from the Polar basin, all of which appeared to choke the channel not far to the southward.

I detailed a man for the purpose, and at all times a strict watch was kept of the movements of the ice, in order that the first favorable opening which occurred might be taken advantage of. I frequently visited the high ground in the vicinity of the tent, but could discover no lane of water by which we could escape.

A suitable site for the tent was found on the low bench land, about 20 feet [6^{m}] above high tide and 100 yards [91^{m}] from the water. The stores were carefully packed inside and securely covered with a rubber blanket to protect them from dampness and the drifting snow.

Low and dense fogs prevented any accurate bearings being taken during the day with the prismatic compass.

On the morning of September 2 Sergeant Jewell and Private Connell went to the summit of Mount Beaufort with instructions to take bearings of all prominent points and headlands, and to erect a cairn in which a record would be placed, stating the locality of the cache, and the date of deposit. They were also instructed to inspect and report on the condition of the channel to the southward. On returning to camp they reported the ice firmly massed between Cape Murchison and our position, and that the existing circumstances extended no possibility of escape by boat.

In view of the damage already sustained by the whale-boat in pushing through the new ice, I considered it highly injudicious to again venture into the pack without having a suitable sheathing placed on her sides as a protection from the ice.

At 3 p. m. we beached her at the base of the bench land contiguous to the depot, and deposited all her gear in a place of safety. Immediately after this we turned our faces towards Fort Conger, each man carrying a bundle on his shoulders, consisting of overcoat, shoes, &c., weighing from twenty-five to thirty-five pounds.

Not deeming it necessary or advisable to follow the tortuous course of the coast line, we took an overland route towards the head of St. Patrick Bay. Arriving at 7.40 p. m. on the shores of this bay, we crossed on the new ice to its southern side and ascended the abrupt bluff through a deep ravine with steep rocky sides to the hills above.

Fort Conger was reached at 1.15 a. m. on September 3, the party very tired, lame, and foot-sore.

Relative to the feasibility of a sledge route across the head of St. Patrick Bay, I would state for your information that the bluffs on either side are too high and rugged to admit of their being used as a crossing place for sledges. However, a lightly laden sledge could possibly be lowered down the abrupt sides with ropes and hauled up the other in the same manner, but this mode of traveling would not only cause great labor and loss of time but the probable destruction of the sledge. A list of the property and commissary stores left at the depot, being in addition to the regular depot, forms Appendix B.

I cannot commend too highly the excellent behavior of the men under my charge, who, under trying circumstances, exhibited nerve, coolness, and a strict observance of discipline which could scarcely have been expected of those who were unaccustomed to the lurking dangers of the Polar pack.

I am, very respectfully, your obedient servant,

D. L. BRAINARD,
Sergeant, Company L, Second Cavalry.

Lieut. A. W. GREELY,
Fifth Cavalry, U. S. A., Acting Signal Officer and Assistant,
Commanding Lady Franklin Bay Expedition.

APPENDIX A.—*Articles intended for the depot, which were accidentally lost from the boat.*

2 can openers.	1 gimlet.	100 rounds of ammunition.
1 minimum thermometer.	1 tablespoon.	1 can condensed milk.
2 papers carpet tacks.	2 table forks.	

APPENDIX B.—*List of the property and commissary stores left at the depot, being in addition to the regular depot.*

1 whale-boat and rudder.	1 tin cup.	1 recruiting flag.
4 oars.	2 bread bags (Navy).	2 pounds chocolate.
1 mast and sail.	1 water-breaker	15 pounds bread.
1 water-bucket (paper).	1 coffee-pot.	2½ pounds sugar.
2 rubber water-bottles.	1 tablespoon.	1½ pounds coffee.
2 knapsacks.	1 monkey-wrench.	½ pound butter.
1 axe.	1 signal flag and staff.	1 can corned beef.

APPENDIX No. 17.—*Sergeant Jewell's meteorological report in connection with trip establishing Depot B.*

FORT CONGER, GRINNELL LAND, *September* 3, 1881.

SIR: In compliance with your instructions for me to join the boat party under Sergeant D. L. Brainard (sent out for the purpose of caching provisions, at or as near Cape Beechey as possible, and to take and record meteorological observations, nature and extent of the ice, and any other physical phenomena worthy of note) I have the honor to make the following report:

Owing to the new ice, formed during the past few days in Discovery Harbor, it was necessary to convey the boat and provisions over the ice by means of sledges to the open water, which extended but a short distance inside of Dutch Island. We got under way about 10.15 a. m., August 31, following the most favorable water-leads for reaching Distant Cape.

We found no difficulty in making a nearly direct course for about a mile, as the ice was in small packs, and with no apparent movement. This apathy of the ice did not long continue, as an inward movement was discovered about 11 a. m., the pack bearing down upon the boat from the eastward.

Having cleared ourselves from this danger with great difficulty, we took advantage of a large lead that opened to the eastward. But this was soon closed by the ice coming from the shore. From this time until 4.30 p. m., when we rounded Distant Cape, there was a continual movement from all directions, and we were driven over a mile from the shore by the moving ice.

The currents between Dutch Island and Distant Cape appear to be entirely under local influences, and apparently governed by no fixed laws, except that at the time of high water, which occurred between 3 and 4 p. m., they were much stronger than at any other time.

The cause of this diversity is probably on account of the prominent headlands in the vicinity, consisting of Cape Lieber, south; Distant Cape, north, and those projecting from Bellot Island, at the entrance of Discovery Harbor.

After passing Distant Cape we found an open lead that extended a long distance to the north. With the exception of new ice, that greatly retarded our progress, the lead remained open until 8 p. m. At this time the ice began to move again, and it was deemed advisable to make a landing on the ice-foot, where we remained until 9.20 p. m., at which time we again got under way.

The ice-foot began to increase rapidly after we passed St. Patrick Bay, extending, in places, at least one-fourth of a mile from the shore. The currents run from northeast and southwest, parallel with the coast. From the former with the flood, and the latter with the ebb tide.

In order to make any progress toward the north it was necessary to follow the leads that inclined toward the eastern coast, and at 11 p. m. we were at least four miles from the shore. In the mean time the temperature began to fall, and the new ice to form rapidly, and it became a serious matter as to whether we could reach the shore through it. We, in consequence, made no more northerly, but bent our entire energies upon reaching the open water near the western shore, opposite Mount Beaufort.

We arrived at this point at 12.30 a. m., and found it impossible to land on account of the ice-foot. Seeing that there was no hope of landing any farther north, and realizing that, as the northwest wind had increased to brisk (force 5 to 6 [about 2.5^{m} per second]), it would be expedient to land as soon as possible, we accordingly made a landing about one mile south of Mount Beaufort at 1 a. m. In less than half an hour after we had landed everything on shore, and beached our boat, the ice began to come down in heavy packs, completely filling the channel with moving ice.

The wind diminished during the early morning, but as the day advanced increased to a gale, with occasional snow and dense cumulo-stratus clouds covering the coast line, so that your instructions relating to the angular measurements of the adjacent points could not be carried out. As the ice showed no sign of breaking up it was decided on the morning of the 2d to leave the boat and return to Fort Conger by land. At 11 a. m. I, accompanied by Private Connell, made the ascension of Mount Beaufort, on the summit of which mountain we erected a cairn. I was enabled to measure the following angles, viz: Depot B of Lady Franklin Bay Expedition, N. 220° E.; Cape Lieber, N. 191° E.; and Cape Sumner, N. 88° E. The elevation, as shown approximately by an aneroid barometer, was 675 feet [206^{m}] above the sea.

We arrived at the cache at 2.30 p. m., and at 3 p. m. started on our return, arriving at St. Patrick Bay at 7.30 p. m. Here we found the ice strong enough to allow our crossing on it, and arrived at Fort Conger at 1 a. m. The route taken on our return would be an excellent one for sledging, were it not for the precipitous cliffs on each side of St. Patrick Bay. These I consider insurmountable for a sledge, and would recommend the shore-line instead.

You will find inclosed herewith the meteorological observations, which are incomplete owing to the loss of my thermometers; the minimum having been lost overboard while we were moored to the ice-foot, and water thermometer broken while taking an observation.

W. S. JEWELL,
Sergeant, Signal Corps.

Lieut. A. W. GREELY,
Commanding Lady Franklin Bay Expedition.

NOTE.—The regular meteorological observations are omitted here, as they are incorporated in the detailed field observations elsewhere (Appendix No. 138).—A. W. GREELY, *Lieutenant.*

APPENDIX No. 18.—*Sergeant Gardiner's report of trip to Cape Murchison.*

FORT CONGER, GRINNELL LAND, *September* 6, 1881.

SIR: I have the honor to make the following report in obedience to instructions, dated Fort Conger, September 4, 1881, directing me to proceed, accompanied by Corporal N. Salor, to the south shore of St. Patrick Bay and examine the "cliffs," also the country between that bay and this "post," and report as to the practicability of a route for loaded sledge and party.

Leaving this post at 7.40 a. m., September 5, 1881, accompanied by Corporal Salor, I proceeded to the northward along the valley between the "hogback" and the mountains nearer the coast. After reaching the "lakes" I took a northeast course and ascended the mountain close to the shore of St. Patrick Bay. The route to the foot of this mountain would be good traveling for a sledge. But it is impracticable any farther on account of the cliffs bordering the bay being very high and steep. Descending the mountain we found that we were on the south shore of the bay and opposite Cape Beaufort.

Up to this time, 1 p. m., a dense fog had obscured everything from view, and at times so dense that objects ten yards [9^{m}] away could not be seen distinctly. The fog now rising allowed us to see objects around us more clearly, and I examined carefully, with the glass, all the north shore of the bay for three-quarters of a mile from the mouth, but failed to find any point that would be accessible for a sledge party to land after crossing the bay on the ice.

On the south shore, and opposite Cape Beaufort, I found a small boat containing two oars and two paddles; boat was twelve feet [4^{m}] in length and in fair condition. It was marked with the word "Discovery" on the stern-post. I searched in the immediate neighborhood for records but did not find any. About half a mile to the southeast of the boat and about ten feet [3^{m}] above high water I found a large sledge about ten or twelve feet [3 or 4^{m}] in length and three or four feet [914 or 1,219^{mm}] wide; also one large spirit-lamp, one pickax, and one small smelting ladle; and small piece of lead about one pound in weight. Everything was in good condition with the exception of being a little weather-stained. Here we also searched for records but found none. The sledge was marked "H. M. Sledge *Discovery*."

Resuming our route around Cape Murchison, we found good traveling on the ice-foot and lower parts of the shore. We followed the shore of Robeson Channel to Water-course Bay, thence through the valley from the coal mine to this post, arriving at 5.30 p. m. after an absence of ten hours, and having traveled about twenty-five miles.

I would respectfully state, as the result of my observations during the trip, that the only practicable route for a party and sledge traveling from this post to cross St. Patrick Bay, is by way of the valley leading to the coal mine and Water-course Bay, and thence to follow the coast around Cape Murchison, crossing the bay to the outermost point of Cape Beaufort, which is low and much the same in character as Cape Murchison, and is the only point accessible on the northern shore.

I would respectfully refer you to inclosed map* of the country, and the route by which we traveled.

Very respectfully, your obedient servant,

H. S. GARDINER,
Sergeant, Signal Corps, U. S. A.

Lieut. A. W. GREELY,
First Lieutenant, Fifth Cavalry, U. S. A.,
Commanding International Polar Expedition.

APPENDIX No. 19.—*Sergeant Linn's report on moving Depot A to Cape Murchison.*

FORT CONGER, GRINNELL LAND, *September* 10, 1881.

Leaving Fort Conger at 8 a. m., September 7, 1881, we arrived at the end of the ravine, A (see inclosed map),* at 10.25 a. m.

The arm of the axle was bent going over the rough ground and the wagon worked badly. Took the 11 o'clock observation: Barometer, 29.63 [752.59^{mm}]; thermometer, 21 [−6.1° C.]; clouds, $\frac{3}{10}$ cumulus; wind, NW., moderate. B, here we found that spokes in the hub had broken, and we strapped the wheel. Started

*Map not reproduced; see map of Fort Conger and vicinity.

again and made next stoppage on small lake, near Musk-ox Meat on Triangle, C; time, 11.45 a. m. Arrived on beach at Water-course Bay, 1 p. m., D, odometer registering 3,289 revolutions (6.02 miles). Followed the beach in hopes to get ice-foot, and in doing so discovered wagon, E, near high-water mark. Took off forward wheels of newly found wagon and put on our load. Looked at odometer of old wagon; 3,409 revolutions (6.26 miles). Started again but had to abandon wheels, F, on account of steep hill. Time, 2.30 p. m. Divided load and proceeded to destination, only stopping to take 3 p. m. observation. Result: Barometer, 29.45 [748.02^{mm}]; thermometer, 19.5° [−6.9° C.]; wind, NW., blowing fresh; foggy and snowing light. Found sledge, G, at 4.45 p. m.; dropped our loads and searched for the boat, H, which we found at 5.15 p. m. Turned over boat and discovered several cracks in her bottom; two men can handle her easily. Followed shore on southern side of St. Patrick Bay up to T, where we climbed cliff; arrived on top of cliff, 7 p. m. Took observation: Barometer, 28.76 [731.00^{mm}]; thermometer, 21.5 [−5.8° C.]; thick fog, but no wind. Kept near edge of mountain in sight of bay and reached tent, K, at 10.25 p. m. Rested here awhile and took 11 o'clock p. m. observation: Barometer, 28.36 [720.33^{mm}]; thermometer, 19 [−7.2° C.]; dense fog; wind, NW., moderate.

Made cairn, containing a box, letter, and 12 hardbreads, and then started to a ravine which we followed down toward the creek at the head of St. Patrick Bay, L; it brought us within 1,000 yards [914^{m}] of the head of bay. Took the ice from there to almost the place where we climbed the cliff, T, before mentioned. The ice here growing too thin we followed our old track as near as possible. Took 3 o'clock observation: Barometer, 29.86 [758.43^{mm}]; thermometer, 20 [−6.7° C.]; wind, NW.; fog lifted some. Reached sledge at 5 a. m., September 8, 1881, and erected tent, G. Rested and cooked coffee, and at 9 a. m. started again with the sledge. Arrived at Water-course Bay at 12 m., having only stopped on our way to take 11 o'clock a. m. observation; result: Barometer, 29.83 [757.67^{mm}]; thermometer, 16 [−8.9° C.]; wind, N., quite fresh. Here we stopped long enough to get forward wheels of newly found wagon and abandoned the day before, F, and brought the same back to its old place, E. We now tried to bring wagon and sledge both to Fort Conger, but it proved too much for us, and we started with the sledge and the old wagon on top of it. Took 3 o'clock observation on lake, C; result: Barometer, 29.82 [757.41^{mm}]; thermometer, 19 [−7.2° C.]; wind, N. moderate; clouds, cumulus. We here tried to get water, but without success; after having dug three holes in different places, and striking dirt every time, we gave it up. At the head of cañon, near coal mine, we saw what we supposed to be water, and on going there found it to be true. We drank some, this being our first water that we had since we left camp, and then proceeded on our journey.

Arrived at Fort Conger 6 p. m. Sledge pulled heavily and cut through light snow all the way.

Respectfully submitted.

DAVID LINN,
Sergeant in charge.

APPENDIX No. 20.—*Orders to Dr. Pavy for overland journey to Lincoln Bay.*

FORT CONGER, GRINNELL LAND, *August* 29, 1881.

SIR: Accompanied by Sergeant George W. Rice, you will proceed northward along Robeson Channel as far as you deem prudent, with the view of ascertaining whether any traces of *Jeannette* are to be found to the northward. While absent you will also note the best route for sledge travel during the coming autumn and spring, and will ascertain the condition of the depot of 1,000 rations established by Sir George Nares, on the north side of Lincoln Bay. You will examine carefully all cairns and will bring back with you such original records as are found, leaving in their stead copies thereof, and also such records of the present expedition as are furnished you, as well as a statement of your own trip. Copies of such records will be retained for my information. At the most northern point reached, you will, from the highest practicable ground, examine most carefully with your telescope all land and routes to the northward, that nothing may escape your notice.

You will be accompanied during one day's march by Sergeants D. C. Ralston and D. Linn, who will transport one common tent and other equipage and supplies, which will be left at your first camping place for the convenience of further parties traveling along the coast. In going north to St. Patrick Bay you will take the route to the westward of Mount Cartmel, and on your return will, if your party is in fit condi-

tion, and the weather good, endeavor to ascertain whether Wrangel Bay can be reached from Lincoln Bay by an interior route. Meteorological observations will be made when practicable at 7 a. m., 3 p. m., and 11 p. m., Washington mean time. Your experience in travel within the Arctic circle, as well as your long study of the proposed work, cause me to trust wholly to your judgment and discretion, as to the details of the journey.

I am, very respectfully yours,

A. W. GREELY,
First Lieutenant, Fifth Cavalry,
Acting Signal Officer and Assistant, Commanding.

Acting Assistant Surgeon O. PAVY, *U. S. Army.*

[Inclosures, two; record and list of provisions carried by supporting party. Record a duplicate of that deposited on Washington Irving Island (see Appendix No. 7).]

APPENDIX No. 21.—*Report of Dr. Pavy* on trip to Lincoln Bay.*

FORT CONGER, GRINNELL LAND, *September* 14, 1881.

SIR: I have the honor to inclose the report of my overland journey between the dates of the 29th August and the 8th September.

The 29th August, at 7 p. m., accompanied by Sergeant Rice, we left Fort Conger, Discovery Harbor. Our baggage and provision including two haversacks, two blankets, and a shelter tent, was strapped on our shoulders. At 8 p. m. we caught up with the party send [*sic*] ahead. Following then a northwest direction (true), at 1.30 a. m. we camped on the top of the cliffs that form the south side of St. Patrick Bay. During the march, at 10.30 p. m., we met with the party of Lieutenant Lockwood.

At 11.30 a. m., August 30, we cooked breakfast. Sending back Sergeants Ralston and Linn with the empty wagon at 1 p. m., accompanied by Sergeant Rice, I followed until 4 p. m., at the height of 1,500 feet, [457^{m}] in a western direction, the high cliffs of St. Patrick Bay. The walk was very tiresome; at 4 p. m. we saw a ——— † to the north. From 4 p. m. to 5.30 p. m. we descended precipetious [*sic*] cliffs. From 5.30 p. m. we followed the valley towards the north, finding numerous fresh tracks of musk-oxen on the snow. From 7 p. m. to 11.30 p. m. we ascended a mountain, over 2,000 feet [610^{m}] high, bearing southwest (true) from Mount Buford [Beaufort]. From its summit the view extended to the south [?] over the snowy peaks of the United States range; at our feet to the north over a extensive valley.

To the northeast we could see the summits only of the mountains of Polaris Promentory [*sic*], the sea in that direction being covered by fog. Until 12 p. m. we descended, when we camped, in the expectation that the fog would raise [*sic*] in the morning.

August 31, awoke at 8 a. m. The fog was still very thick, but at 11 a. m. it raised [*sic*]. At 11.30 a. m. started. Descend [*sic*] very steep. At 1 p. m. reached the valley leading north, but southwest of Cape Beechey. Walked until 3 p. m.; saw numerous traces of musk-oxen and foxes. Weather beautyful [*sic*]. At 3 p. m. ascended a small hill and halted. Left there the first cache for the returning journey. When building a small cairn for provisions saw nine musk-oxen. Rice went in persuit [*sic*]; fired two shots with the revolver without success. From this point ascended several hills and walking over several hills in a northeast direction (true).

Arrived at the lake, 11.30 p. m., when, breaking the ice for water, Rice saw a small fish six or eight inches [about 178^{mm}] long. From the lake we reached the coast and followed it on the ice-foot to a point south of the black cliffs. Finding it impossible to pass, on account of the absence of ice-foot and the almost perpendicular cliffs, we returned to a point south, where, at 1.30 a. m., September 1, we struck camp. September 1, at 11.30, broke camp; climbed by a very steep ravine on the plateau of a mountain, 1,500 feet [457^{m}]; followed its ascending grade in a northward direction. Wind blowing a strong gale, with drifting snow.

* All the reports of Dr. Pavy, for obvious reasons, have been reproduced literatim. Bracketed parts are interpolations.—A. W. G. † Omission in original.—A. W. G.

This days walk very disagreeable. Reached Wrangell Bay 12 p. m. Struck camp close to water-course, 200 feet [61m] above the level the sea. Many traces of musk-oxen and seal. September 2, broke camp at 11 a. m.; weather very fine; followed the west and north shore of the bay on the ice-foot. Took the coast northward from the ice-foot, which in places is formed by very heavy ice. Here and there pools of fresh water prove that this ice has not melted this year. Have seen very few pieces that I would call paleochristique [paleocrystic]; none at all in the straits. The ice was in motion under the influence of the tide.

Reached Cape Frederick at 9 p. m. Here the pressure of the ice upon the coast is great. At the head of the bay found traces of coal. Here crossed on the ice to the northeast shore; ascended its very steep grade. Saw a lake about a mile and a half in extend [*sic*]; mistook it for a bay, but was obliged to ascend the hill once more. Walked then towards a bold cape, that I take to be Cape Constitution. Then returning to the southwest, were we had left our sacks, followed the coast, and found, at 10 a. m., August 3, the depot of 1,000 rations left by Sir George Nares in 1875. August 3, at 1 p. m., put up tent. We have walked 22 hours, on a few bisquits [*sic*] and a cup of chocolade [*sic*]. Rice complained of his feet paining him considerable. At our fartherst north I have seen no traces of the *Jeanette* expedition.

From where I write now, 1,000 feet [303m] above the level of the sea, with an horizon as clear as it can be possible to find, I can follow the line of the Greenland coast to the northeast from Cape Brevoort to Cape Bryant; then in indentation, and another point that I take to be the land of Cape May. Further north two other spots of land, seperated [*sic*] by two lines of horizon and of different shade, can be clearly seen. The fartherst of these I believe to be Beumont [Beaumont] Island, the other, more to the east, Cape Brittania [Britannia], or Stevenson [Stephenson] Island.

To the south, on the Grinnell Land coast, Cape Frederick the Seventh barr [*sic*] all view of land. On the Greenland coast I can see as far as Kennedy Channel. To the east the ice is closely packed on the coast. To the north the sea is, as far as the view extends, as a white sheet, dark only in few places by pools of water. On the Grinnell Land side, from south of Cape Frederick the Seventh as far north as I can see, there is a broad channel of open water extending at my feet, about 2 miles from the coast. September 4, at 8 a. m., called Rice. He suffers extremely of his swollen feet; can scarcely put on his boots. We descend from the summit of the hill to the depot of provisions, placed about 75 feet [23m] above the level of the sea. The weather is beautifull [*sic*].

Worked all day in opening and closing barrels. Difficult work for men that are not coopers. Of the provisions, as I have before stated to you, 1,200 pounds of canned meat are still good. All the bread is spoiled; the chocolade [*sic*], stearine, and rum are good; part of the tea, potatoes, and tobacco is spoiled.

At 6 p. m. broke camp. One mile from camp, Rice, with a revolver, killed a white hare. I added its weight to my own. The skin and skeleton is [*sic*] worth its carring [*sic*]. We crossed the bay on the ice, 2 miles from its head. Followed the same route as the day before, and after 16 hours of walk struck Wrangel Bay at 10 a. m., September 5. Rice is exceedingly tired. Broke camp at 6 p. m., and following again our old track in the fog, on top of the plateau, we reached the most northeasterly lake of Beechey Valley, 3 p. m., September 6. Rice is exhausted; cannot eat. Left knee considerable swollen as well as both wrists. The pulse beat 112. He told me that several times he has been affected with accute rheumatism. I admire his endurence [*sic*] and pluck. It would be difficult to find a better man to travel with. At 7 p. m. woke up Rice. Started, 9 p. m.; he can scarcely walk.

At 9 a. m., September 7, arrived at our first depot on the journey. Put up tent. Ate roast-beef and chocolade [*sic*]; but Rice having no appetite. His articulation [*sic*] seems to be swollen. The situation is critical. He wants me to leave him there and return to Fort Conger for a relief party, but before I leave him we must reach the other side of St. Patrick Bay. It is impossible of thinking of leaving him here.

At 8 o'clock, September 8, broke camp; follow slowly the valley to the west of Mount Buford [Beaufort]. Ascend the mountain, on top of which we had camped 30th August. Partly lost our way in the fog, and came down in St. Patrick Bay Valley, following a cliff formed by rock slide, which I think I would be afraid now to climb. The energy and endurence [*sic*] of Rice is [*sic*] wonderful. At 9 p. m. we arrived in the valley of the end of St. Patrick Bay. Put up the tent. Left Rice at 10 p. m., and reached Fort Conger at 4 a. m.

Very respectfully, your obedient servant,

OCTAVE PAVY,
Acting Assistant Surgeon, U. S. Army.

Lists brought from Lincoln Bay.

(No. 5.)

This cask contains:

Chocolate: 2 parcels; cakes marked in ¼-pound squares; 5 squares = 1 man for 20 days.

Sugar for chocolate: 12 parcels; each parcel = 1 man for 20 days.

Tea and sugar (mixed): 12 parcels; each parcel = 1 man for 20 days.

Tobacco: 4 parcels; each parcel contains ¼-pound packets; 1 packet = 1 man 8 days.

Salt: 12 parcels; each parcel = 1 man for 20 days.

Pepper: 12 parcels; each parcel = 1 man for 20 days.

Potatoes: 12 parcels; each parcel = 1 man for 20 days.

Onion powder: 4 bottles of ½ pound each; ½ ounce = 1 man for 20 days.

Matches: 4 boxes, each box containing about 75 matches.

Spare wick: 10 feet.

Stearine: 4 parcels, each cake divided into ¼-pound squares.

12 men, 2¼ pounds = allowance for 1 day.

8 men, 1½ pounds = allowance for 1 day.

2 men, 1 pound = allowance for 1 day.

Tin opener.

In the kilderkin will be found 22½ pounds of stearine in 1½-pound packets.

G. S. N. [GEORGE S. NARES], *July* 28, 1875.

1,000 RATIONS DEPOT.

Preserved meat, 1,375 pounds:

375 pounds, in lieu of bacon.

37 cases and 4 tins in No. 5 cask.

Biscuit, 875 pounds:

375 pounds in No. 12 cask; not divided.

35 pounds in No. 7 cask.
87½ pounds in No. 4 cask.
87½ pounds in No. 10 cask.
87½ pounds in No. 11 cask.
87½ pounds in No. 8 cask.
(A layer of bread-bag between every 17½ pounds, or 1 man for 20 days.)

60 pounds in No. 3 cask; not divided.

35 pounds in No. 1 cask; divided.

20 pounds in No. 13 cask; not divided.

Preserved potatoes, 125 pounds:

30 pounds in No. 6 cask.
30 pounds in No. 5 cask.
In packets of 2½ pounds each, or one man for 20 days.

50 pounds in metal cases; 15 pounds in metal case.

Rum, 23⅝ gallons, in cask:

8 gallons, in lieu of spirits of wine and stearine.

Chocolate, 62½ pounds:

15 pounds in No. 6 cask, 15 pounds in No. 5 cask, 32½ pounds in No. 3 cask; divided into ¼ pound squares, 5 squares being 1 man for 20 days.

Sugar for chocolate, 31¼ pounds:

7½ pounds in No. 6 cask; 7½ pounds in No. 5 cask; 16¼ pounds in No. 2 cask.

Tea, 15$\frac{9}{16}$ pounds; *Sugar*, 47 pounds; mixed:

15 pounds in No. 5 cask; 15 pounds in No. 6 cask; 32 pounds 5 ounces in No. 2 cask.

Stearine, 165 pounds:

60 pounds in No. 5 cask, 60 pounds in No. 6 cask; divided into ¼-pound squares.

22½ pounds in No. 7 cask, 22½ pounds in No. 1 cask; in packets of 1½ pounds each, or 8 men for 1 day.

12 men, allowance for 1 day = 2¼ pounds.

8 men, allowance for 1 day = 1½ pounds.

2 men, allowance for 1 day = 1 pound.

Tobacco, 31¼ pounds:

7½ in No. 5 cask, 7½ in No. 6 cask, 16¼ in No. 2 cask; in packets of ¼-pound each.

¼ pound = 8 men for 1 day.

Salts, 7$\frac{3}{16}$:

1 pound 14 ounces in No. 5 cask, 1 pound 14 ounces in No. 6 cask; in packets, 1 man 20 days; remainder in No. 2 cask.

Pepper, 3$\frac{2}{16}$:

¾ pound in No. 5 cask, ¾ pound in No. 6 cask; in packets, 1 man for 20 days; remainder in No. 2 cask.

Onion powder, 16 bottles:

4 bottles in No. 5 cask, 4 bottles in No. 6 cask, 8 bottles in No. 2 cask; each bottle ½ pound, 2½ ounces = 1 man 20 days.

Curry paste, 1 jar of 4½ pounds:

1¼ ounces = 1 man for 20 days.

Matches, 10 boxes:

4 boxes in No. 5 cask; 4 boxes in No. 6 cask; 2 boxes in No. 2 cask.

Spare wick, 30 feet:

10 feet in No. 5 cask; 10 feet in No. 6 cask; 10 feet in No. 2 cask.

Tin opener in No. 2 cask.

G. S. N. [GEORGE S. NARES], *August* 30.

APPENDIX No. 22.—*Report of Lieutenant Lockwood on journey to the Bellows.*

FORT CONGER, LADY FRANKLIN BAY, GRINNELL LAND, *September* 19, 1881.

SIR: I have the honor to render the following report of my expedition to "The Bellows," made in pursuance to your instructions of the 9th instant.

Accompanied by Sergeant Gardiner and the Eskimo Frederick, I left here at 10 o'clock a. m., September 11, with a dog sledge and eight dogs.

Weight of load as follows:

	Pounds.
Provisions (four days for three men)	51
Dog food	31
Two sleeping-bags (sheepskin, 34, and dogskin, 16)	50
Shotgun, pistol, and ammunition, &c., spirits wine, hatchet, and rubber blanket	50
Total	182

The ice of Discovery Harbor afforded a good straight route, the snow being light and the hummocks few. We reached French Cape at 12.30 and the west side of the harbor at 1.40. Here, however, we were stopped by a sheet of water extending along the shore for several hundred yards, which seemed to cover a sheet of ice a few feet below the surface, doubtless due to the action of the tides. After some reconnoitering we got started again at ———* and turning to the north reached shore, which we traveled along over a very poor route till we reached Bleak Cape at 2.50. Near the shore I noticed two pieces of drift-wood which I placed on a rock till my return.

Bleak Cape is a long, low point stretching out into the valley known as "The Bellows," and seems to be formed from the débris from a very high, rocky, and steep cliff, which rises abruptly and forms with the "Knife edge," on the west side, the termination of the valley and also the two principal landmarks of this section of country. At Bleak Cape one sees—looking north or rather to the west of it—a wide valley, probably two or three miles wide and quite level, walled in by high and steep cliffs and mountains; its apparent termination is probably seventeen miles distant and bears north 34° west (true), according to the reading I took with a prismatic compass.

I started up the east side, following the bed of a small water-course. The traveling was difficult on account of the number of small stones and the want of snow. Along this water-course, and about one hour's travel, or 2½ miles from the cape, I found a piece of drift-wood, apparently a knotty species of pine, firmly frozen in the sand; it was about 8 inches [203^{mm}] in diameter and 3 feet [914^{mm}] long.

After several ineffectual efforts to get it up by means of a knife and hatchet I left it till my return, not wishing to add to the weight of the sledge. Here one of the dogs became sick and unable to travel and was left behind. Shortly after this I crossed a low, narrow ridge and found myself in the bed of another creek, one that runs the whole length of the valley. After following it up some distance we camped, at 6 p. m., just below a mass of jutting rocks known on the English map as the "Devil's Head."

Monday, September 12.—We got up at 7 a. m. and started at 9; traveling still difficult. In fact, except on the ice of the bay, we walked during the entire trip, frequently having to help the dogs. At 11 o'clock I stopped, intending to leave the sledge and push on without it; but finding some good snow ahead, about the same time, we continued on till 12.30, after a half hour's rest, and there turned to the right and went to the creek a little way off. We cut through the ice, about 8 inches [203^{mm}] thick, and got water, in so doing breaking the hatchet handle. After a slight lunch, thinking I could now walk to the end of the valley and back without the sledge, Sergeant Gardiner and I started at 2.30 p. m. We reached the "apparent end," before referred to, at 3.45, and took a compass sight back to Bleak Cape, which was quite distinct. Ahead another point shut in the valley some distance off; its bearing was north 2½° west (true). At 4 we started and reached the point referred to at 5. Here the trend of the valley is still more to the west, the next "cape" bearing North 57½° west. Reaching this, the most distant point bore north 30° west, which we reached about 6 o'clock, and at 6.25 were about a mile distant from a point where the valley assumes the dimensions of a narrow gorge or cañon. The valley becomes rapidly narrower from the point referred to as the "apparent end." At our farthest it was but a few hundred yards wide, though just below it widened out into a plain a mile or more across. At other places I judged it to be from ¼ to ½ mile across. Sergeant Gardiner

* Omission in original.—A. W. G.

had difficulty in keeping up with me on account of his knee, and I judged it best to return. Accordingly we started back and reached camp at 10 p. m. Through the gap at the end of the valley I could see just one high peak covered with snow from our farthest up the stream.

September 13.—We arose at 7.30 and were off at 9, on our return. We took a more direct course than when coming up by following the main creek to a great extent; this creek keeps rather to the west side of the valley. Between Devil's Head and Bleak Cape I noticed a good deal of what seemed to be a very soft bituminous coal, a specimen of which I brought back with me. This coal had evidently been washed down the creek, but from where I could not ascertain. We reached Bleak Cape at 2 p. m. Though the sledge was badly worn, and the road ahead would make it worse, still I determined to go over to the cañon to the southwest to get some of the musk-ox meat left there by yourself. We were not successful in finding it, and Sergeant Gardiner being unable to keep up with the sledge, and on other accounts, I left this part of my orders, and the bringing back of the drift-wood, till another day, and turned towards home, starting from the shore-ice at 3.45 and reaching the station without event at 8.15 p. m.

The only game seen during the trip was two musk-oxen in the opening near the head of the valley. I approached them quite close but did not attempt to kill them. The only tracks noticed were those made by these animals and some wolf or fox tracks farther up.

In the accompanying itinerary I have used the English map as far as it goes. Having no means of measuring distances traveled I have allowed a certain rate per hour, based on the time occupied in returning, in estimating the length of the valley.

Hours of Travel, Stops, &c.

September 11.—10 a. m., started; 11 a. m., opposite Musk-ox Bay. 12.30 p. m., passed French Cape. 1 p. m., stopped 10 minutes to make sketch. 1.40 p. m., met with water; stopped. 2.10 p. m., fairly started on land again. 2.50 p. m., Bleak Cape; stopped 10 minutes. 4 p. m., met with drift-wood; dog sick; stopped 10 minutes. 6 p. m., arrived at camp.
$8^h - 1^h = 7^h$.

September 12.—7.10 a. m., got up. 9 a. m., started. 11 a. m., stopped for lunch, &c., 55 minutes. 12.30 p. m., stopped at creek.
$3^h\ 30^m - 55^m = 2^h\ 35^m$.
2.25 p. m., started on without sledge. 3 p. m., stopped 8 minutes. 3.45 p. m., reached "apparent end" of Bellows; stopped 12 minutes. 5.05 p. m., stopped 5 minutes. 6.10 p. m., stopped 3 minutes. 6.25 p. m., stopped at farthest till 6.30 p. m. 3½ hours, 10 p. m., reached camp; no stops.

September 13.—7.30 a. m., got up. 9 a. m., started on return. 2 p. m., reached Bleak Cape; stopped 5 minutes. 3 p. m., near Bellot Harbor; stopped 15 minutes. 3.45 p. m., on ice some little way from land. 8.15 p. m., reached station.
$11^h\ 15^m - 20^m = 10^h\ 55^m$.
Going out, $13^h\ 7^m$; coming back, $14^h\ 25^m$.

Readings of Thermometer and Barometer.

Date.	Hour of day.	Thermometer.		Barometer.	
		Fahr.	*C.*	*Inches.*	*mm.*
Sept. 11	3.00 p. m.	16.2	— 8.8	29.39	746.49
	7.00 p. m.	13.5	— 10.3	29.36	745.73
	12.00 p. m.	17.0	— 8.3	29.40	746.75
Sept. 12	7.10 a. m.	20.0	— 6.7	29.47	748.52
	11.00 a. m.	22.0	— 5.6	29.38	746.24
	1.20 p. m.	19.8	— 6.8	29.36	745.73
	3.00 p. m.	21.0	— 6.1	29.32	744.71
	6.25 p. m.	9.0	—12.8	29.11	739.38
	10.30 p. m.	4.0	—15.6	29.44	747.76
Sept. 13*	7.30 a. m.	3.5	—15.8	29.55	750.56
	11.15 a. m.	8.5	—13.1	29.52	749.79
	3.45 p. m.	11.0	—11.7	29.80	756.91

* Minimum thermometer during the night, +1° [−17.2° C.].

Very respectfully, your obedient servant,

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, A. S. O.

Lieut. A. W. GREELY,
Fifth Cavalry, Acting Signal Officer, and Assistant to the Chief Signal Officer, Commanding.

APPENDIX No. 23.—*Orders to Dr. Pavy on exploring Archer Fiord.*

FORT CONGER, GRINNELL LAND, *September* 14, 1881.

SIR: You will leave September 15, weather permitting, for a sledge journey southward through Archer Fiord to Beatrix Bay, thence overland to the westward as far as practicable. You will take with you Private W. Whisler, Eskimo Jens Edward, two dog sledges and sixteen dogs, with six days' rations. The object of your journey is to determine, if possible, the existence or non-existence of the sea or other water to the westward or southward of Mount Neville. It seems to me quite probable that such water exists at no great distance. Lieutenant Archer, who, viewing the country from an elevation of 3,800 feet [1158m], writing on this point, says that "no single hill or mountain was visible at any great distance to the westward, while mountain ranges extended northward from bearings 70° N. and southward from 72° S." Sir Edward Belcher found islands about 300 miles to the south-southwestward of that point. Lieutenant Aldrich, in 85° 33′ W., found that the coast of Grinnell Land trended south as far as could be seen. These facts, in connection with Sir J. D. Hooker's discovery that "the vegetation of this meridian of the polar area is entirely Greenlandic, showing no more relation than does Greenland itself to the floras of the American Polar islands to the westward of it," argue a land, and to the westward especially, of limited extent.

During the journey you will keep as complete a sledge journal as practicable, and will make a detailed report within a reasonable time after your return. I inclose a chart of the country, traced from Lieutenant Archer's map, and such notes in connection with his journey as may be useful to you. You will carefully examine Hillock and Simmonds Bay depots on your westward trip, as on their contents may perhaps depend the safety of your party. A correct list will be made of all articles found in good condition and of all used by you. At your farthest a cairn should be erected, in which will be placed a record to be furnished you, with such additions as you may deem proper. Similar records will be left at the cairn at Record Point, with a copy of Lieutenant Archer's record, the original being brought back with you.

As far as Beatrix Bay, travel will not be sacrificed to observations, as journeys thus far made show the correctness of Lieutenant Archer's map. Beyond this point as many observations will be taken as possible of bearings of prominent points, of courses traveled, &c. Observations will be made when possible at 7, 11, and 3 a. m. and p. m., Washington mean time, of barometer, thermometer, wind and weather. Near your farthest you will, if the weather is fair, ascend the most prominent hill in order to examine carefully all points beyond, the bearings of which should be most carefully determined. All points of prominence should be given temporary names only.

I am, most respectfully yours,

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant.

Acting Assistant Surgeon O. PAVY, *U. S. Army.*

(Two inclosures.)

APPENDIX No. 24.—*Report of Dr. Pavy on attempted trips down Archer Fiord.*

FORT CONGER, GRINNELL LAND, LADY FRANKLIN BAY, *September* 29, 1881.

SIR: Having received orders to proceed to the southeast extremity of Archer's Fiord, the 15th of September, at 9.35 a. m., I combine by Private William Whisler and the Greenlander Jens Edward, with two sledges and sixteen dogs, I left Fort Conger.

The ice being very good and the snow hard, at 11.15 a. m. we passed Musk-ox Bay, arriving at 1.30 p. m. at the southwest extremity of Bellot Harbor, where you had previously left a small depot. After lunching I took the provision and travelled overland for an hour, reaching the ice of Archer Fiord at 3 p. m. The land that we crossed is low, not rising above an altitude from 30 to 35 feet [9m to 11m]. Traces of wolfs [*sic*] were seen. The travelling would have been good but for the ground being barely covered with snow in many places. As soon as we reached the ice, open water could be seen in the middle of the fiord.

I then followed the coast as far as the last point north of Stone Cape; but the ice being to [*sic*] thin for the weight of the sledges, at the suggestion of the Eskimo Jens, we halted (3.30 p. m.), and advanced about

200 yards [183m] to sound. In places, at the first tocke, the tocke went through. This ice, that could scarcely bear the weight of a man, and certainly not to be sledged, extended about 400 or 500 yards [366m or 457m], getting thinner until it ended in open water, extending from the middle of the fiord to the foot of Stony Cape. During the time that we were examining the state of the ice I had sent Private Whisler to the shore to hunt for the provisions left there by the English expedition, 1875-'76.

Leaving then the two sledges on the edge of the old ice, we proceeded towards Stony Cape, over a very broken and rough ice-foot, being, in places, obliged to take the side of the hill. From the Cape, at the elevation of about 400 feet [122m], I could see open water extending northeast as far as the view could reach. To the east the water in the fiord was entirely free of ice. On the west coast, where I was standing, the ice in the bay between Cape Clear and Stony Cape was solid. From the top of Stony Cape I could see that from its base to Kepples Head the ice described an arc of circle, having about the middle of Miller Island for centre. It being impossible to pass the cape we returned to the sledges, and at one-fourth of a mile from the unsafe ice I struck camp at 6.15 p. m.; the thermometer adjusted 20° [−6.7° C.] above. After cooking supper and feeding the dogs their allowance of walrus meat, we retired for the night in our dog-skin sleeping-bags (9 p m.).

September 16, we awoke at 6 a. m., having passed a very comfortable night. The minimum temperature had been 10° [−12.2° C.]; and at the time (6 a. m.) was 12° [−11.1° C.] outside, and 40° [+4.4° C.] inside of the tent. After breakfast I made two caches among the rocks of the coast, above the ice foot, one at the place where we had found the depot of the English expedition and another about one-fourth of mile north.

At 9 a. m. our sledges were running homeward, reaching at 11 a. m. the place where the previous day we had taken lunch.

Following your instructions, I then proceeded with one sledge, overland, to the spot where musk-oxen had been killed. Loaded four hind quarters, and at 1.40 p. m. reached the ice again, stopping twenty minutes to cook and eat dinner; then resuming our travel, we reached Fort Conger at 5 p. m.

OCTAVE PAVY,
Acting Assistant Surgeon, U. S. Army.

First Lieut. A. W. GREELY,
Fifth Cavalry, U. S. A., A. S. O. and Assistant,
Commanding Lady Franklin Bay Expedition.

APPENDIX No. 25.—*Report of Lieutenant Lockwood on sledge journey to Depot B near Cape Beechey.*

FORT CONGER, GRINNELL LAND, *September* 28, 1881.

SIR: I have the honor to render the following report of operations, in pursuance to your instructions of the 24th instant, setting forth marches, &c., as recorded in my journal, for the sake of greater brevity and clearness.

September 24.—At 9.18 a. m., left station with English 8-man sledge, drawn by Sergeant Ralston and Privates Biederbick, Ellis, Frederick, and myself. Weight of sledge, 126 pounds; weight of load, 201½ pounds; consisting of four days' rations (51½ pounds); Sergeant Rice's photographic apparatus (40 pounds), &c. At 10 a. m. passed Dutch Cape. At 11.15 reached ice foot about middle of bluff.

At 11.47 reached cache of provisions near Distant Cape, consisting of four bags hard bread, one can pemmican, one can alcohol, one ax, and one ice-chisel, weighing 386 pounds total. Stopped eight minutes and started again, stopping again shortly afterwards about fifteen minutes to rearrange load, the ice-foot along here being very narrow and the way difficult, necessitating the cutting down of some masses of ice and carrying the sledge bodily over others and over masses of rock which obstructed the route.

At 1.55 p. m. carried first sledge and then load over a mass of rocks, about one hundred yards [91m], in view of Water-course Bay. Stopped forty-two minutes for lunch.

At 4 p. m. stopped fifteen minutes by English wagon at Water-course Bay. The route since lunch was much easier, though being constantly on and off the ice-foot made a good deal of hard work.

At 5 p. m. reached Point of Rocks, from which considerable stretch of coast to the north can be seen; should call it the first cape beyond Water-course Bay.

At 5.55 p. m. reached tent at Cape Murchison, depot A, and stopped for the night. I found a sleeping-bag here (though with a hole in the foot) and five blankets. Spent a tolerably comfortable night, though the lamp was unsatisfactory, catching fire below as soon as the metal became heated, rendering the boiling of chocolate difficult, and also the thawing out of beans and drying anything in the way of clothes almost impossible. The weather during the day was fine; the farther side of the straits quite distinct. I saw great quantities of ice moving south all along the coast, and got two or three glimpses of open water.

September 25.—At 5.20 a. m., got up; thermometer, —9.5° [—23.1° C.]; minimum during night, —14.5° [—25.8° C.].

At 7.35 a. m. resumed journey along coast to the northeast. Traveling good. At 8.45 a. m. left saw near farther side of St. Patrick Bay. Stopped three minutes.

At 9.25 a. m. reached cache of provisions beyond St. Patrick Bay. Exchanged a bag of hard bread for a sleeping-bag found there; stopped eleven minutes.

At 10.45 a. m. stopped fifteen minutes to catch some shrimps in the water about middle of bold range of hills forming a kind of cape.

At 12.35 p. m. stopped thirteen minutes in a bay south of two promontories, the north one of which is Cape Beechey.

At 1 p. m. crossed head of bay; stopped about ten minutes before doing so while I hunted a crossing; this bay is much encumbered with great numbers of floe-bergs and ridges of snow and ice, making traveling very difficult and the route anything but direct.

At 2.55 p. m., at depot B, an A tent pitched on a slight rise, about 100 yards [91^{m}] from tide-water. Here we deposited the provisions, ax, &c. The whale-boat is about 30 yards [27^{m}] from the tent—as far as could be seen, in good order and condition, turned bottom up. The seal lies underneath, buried in a snow-drift. The coast traveled along to-day was lined with great numbers of floe-bergs, some of them 30 feet [9^{m}] or more high and as many wide. They had evidently been forced ashore by the immense pressure of the ice-pack in the straits. The ice and snow along the shore furnished a good route, except as interfered with to some extent by the rise and fall of the tide. We kept the coast except when crossing St. Patrick Bay, and a slight indentation, this on the north side of the last cache of provisions and the bay alluded to, which the men named Sunday Bay. I got a glimpse of open water once during the day—about the neighborhood of St. Patrick Bay—but the land on the farther side of the straits was hid from view by masses of clouds or mist extending upward 10 or 15 degrees, and which I took to indicate the presence of open water in that direction. The sun was particularly beautiful, exhibiting almost all the phenomena peculiar to his appearance in these regions. As this was equally seen by yourself from the station, I shall not further allude to it. Spent the night at Depot B; having a good sleeping-bag and six blankets beside a rubber blanket and spare tent, which we laid on the ground, the party slept more comfortably.

September 26.—At 8.05 a. m. started back to last cache for provisions there, taking only empty sledge. At 9.57 a. m. stopped to rest eleven minutes. At 11.17 a. m. reached cache. Stopped thirty-one minutes, and started on return, with load weighing 483 pounds. At 1.25 p. m. rested fifteen minutes.

At 4.17 p. m. reached depot. Found it pretty hard work even pulling the empty sledge—comparatively speaking. At about 5 p. m. Sergeant Rice joined us at the depot, having brought some bags of pemmican from the station. There not being room in the tent he and the Eskimo Jens slept in their sleeping-bags by the boat.

September 27.—Sergeant Rice left on return about 6 a. m.; his dogs disturbed the seal under the whale-boat during the night, but only slightly.

At 7.50 a. m. started back on return to station. At 10.20 a. m. rested fifteen minutes at old cache. At 11 a. m. reached place where saw was left. Rested five minutes; then, leaving Private Biederbick to continue on to depot A, between two and three miles, with the sledge and prepare some lunch, I started up St. Patrick Bay with the rest of the party to get a specimen of the drift-wood at its head, walking very fast.

At 11.53 a. m. passed inner cape on west side of the bay.

At 12.15 p. m. reached tide water. The tree lies at the present tide level, a short distance to the west of this point and about fifty yards [46^{m}] from foot of hill. I was misled by one of the party, who had been to the place, and taken some distance beyond it, so that it was not till 12.43 p. m. that we reached the tree. The

tree, a section of which I have brought back with me, is about thirty feet [9m] long, and in appearance does not vary materially from the specimen now before you. Its smaller end measured 66½ centimeters in circumference. The men there before me had cut off a portion of the larger end. The section was taken off just above the marks of the ax. The tree lay half embedded in ice and snow. It was carried, beyond all doubt, to its present position by the currents and tides. There were no branches.

At 1.38 p. m. started back with the log. At 3.20 p. m. reached the sledge at depot A. Here we rested and took something to eat.

At 4 p. m. left depot A with sledge and party. At 6.37 p. m. left ice-foot at Distant Cape. At 7.50 p. m. reached Dutch Island. At 8.34 p. m. reached the station and end of journey.

I found the passage round Distant Cape much more difficult than on the 24th, our outward tracks being carried away by the water in many places. It was necessary to raise, lower, and carry the sledge in many places. The day was overcast—snowing slightly at the start.

The articles taken to depot B, besides those enumerated already (which were found at Distant Cape), are three cans pemmican, one can potatoes, one can alcohol, one box chocolate, one bag pemmican, and one sleeping-bag; also an ax and ice-chisel.

I sent back to station, by Sergeant Rice, from depot B, two haversacks and one small iron alcohol stove and left there remains of rations of party, *i. e.*, about 10 pounds hard bread and about 10 pounds of lime-juice pemmican. We consumed two quarts alcohol out of one of the cans, and about quarter-pound butter, half-pound coffee, and half-pound chocolate—remains of rations of Sergeant Brainard's party.

At depot A we used about 1½ pints alcohol, one can chocolate, one pound hard bread, and opened one can corned beef but did not use it.

Very respectfully, your obedient servant,

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, A. S. O., in command of Party.

Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant, Commanding.

APPENDIX No. 26.—*Report of Sergeant Rice on sledge journey to Depot B, near Cape Beechey.*

FORT CONGER, LADY FRANKLIN BAY, GRINNELL LAND, *September* 27, 1881.

SIR: I have the honor to report that, in accordance with your instructions, I left the station at 8 a. m., September 26, to convey 345 pounds pemmican and 20 cans extract of beef to depot B, near Cape Beechey. I was accompanied by the Eskimo Jens, with team of ten dogs and sledge; Private C. B. Henry assisted as far as Water-course Bay. Reached Cape Murchison at 12.30 p. m., and were compelled to remain until 1.15 p. m. for tide, which had overflowed ice-foot, to subside and allow us to pass. After leaving Cape Murchison we traveled without interruption until 5 p. m., when we arrived at our destination.

Found Lieutenant Lockwood and party in camp at the depot, and learned that they had just arrived with the load of provisions that had been cached at St. Patrick Bay by Sergeant Brainard and party. Jens and I were compelled to spend the night in sleeping-bags without the tent, owing to its crowded state.

Depositing the pemmican and extract of beef, we started at 5.30 a. m., September 27, to return. Reached depot A, Cape Murchison, at 8.30 a. m., to breakfast. Resumed our journey, and arrived home at station at 1 p. m.

GEO. W. RICE,
Sergeant, Signal Corps, U. S. A.

Lieut. A. W. GREELY,
Commanding International Polar Expedition.

P. S.—The following articles were, at request of Lieutenant Lockwood, brought back from depot B: 1 boat-stove, 1 monkey-wrench, 2 knapsacks.

Date.	Hour.	Barometer.		Thermometer.		Remarks.
1881.		*Inches.*	*mm.*	*Fahr.*	*C.*	
Sept. 24	3 p. m.	29.62	752.33	—5.5	—20.8	
	7 p. m.	29.62	752.33	—8	—22.2	
Sept. 25	7 a. m.	29.70	754.37	—6	—21.1	Minimum temperature during night of 24th, —14.5 [—25.8° *C.*].
	11 a. m.	29.63	752.59	1	—17.2	
	3 p. m.	29.62	752.33	—3	—19.4	
Sept. 26	7 a. m.	29.62	752.33	—4	—20.0	Minimum temperature during night of 25th, —11 [—23.9° *C.*].
	11 a. m.	29.68	753.86			Thermometer left at Mount Beaufort.
	3 p. m.	29.63	752.59			
	7 p. m.	29.60	751.83	—3	—19.4	Lowest temperature during day, —9 [—22.8° *C.*]
Sept. 27	7 a. m.	29.55	750.56	0	—17.8	Minimum temperature during night of 26th, —5 [—20.6° *C.*].
	11 a. m.	29.50	749.29			
	3 p. m.	29.48	748.78			

APPENDIX No. 27.—*Orders to Dr. Pavy to proceed to Cape Joseph Henry.*

FORT CONGER, GRINNELL LAND, *September* 29, 1881.

SIR: You will prepare for a sledge journey to Cape Joseph Henry, leaving, weather permitting, at 8 a. m. September 30. You will be accompanied by Private Whisler and Jens Edward, and will take two sledges and all the serviceable dogs. Rations for fourteen days will be taken from this place, and such other depot stores as practicable. Depots A and B, and that of the English expedition at Lincoln Bay, will be drawn on as you may require. Although your recent trip to Cape Union precludes the hopes of any tidings from the *Jeannette*, you will make particular search for drift-wood, which possibly would have come in this direction if the vessel had been lost. During your absence you will lay out for your spring journeys such depots as the state of the ice, and the condition of your party permit. The *Alert* winter quarters, Depot Point, and Wrangel Bay are indicated as suitable points, but you are at liberty to use your judgment in the selection.

Inclosed you will find for your information charts showing the coast-line from Cape Beechey to Cape Joseph Henry, with the tracks of the English expedition along the coast. On these charts will be entered your track and camps daily. This will accompany your sledge report to me. A careful sledge journal will be kept, showing all details of the trip. The condition of the ice in Robeson Channel and the Polar Sea will be closely observed, and carefully noted. All bearings taken, and astronomical observations made, will be reported in full. From the *Alert* winter quarters will be brought any records found, substituting therefor copies and the inclosed documents, to which will be added such notes as you may deem proper. A copy of any addition will be retained and furnished me.

Meteorological observations will be made, when practicable, at 3, 7, and 11 a. m. and p. m., Washington mean time, as well as on all suitable and important occasions. The minimum thermometer at Cape Beechey (depot B) will be read and reset, both on your outward and return journey.

On your return trip you will bring as much preserved meat southward from Lincoln Bay as may be practicable, part of which will be left at Wrangel Bay and the remainder at depot B. A list of all articles taken, with their respective weights, will be furnished me prior to your departure, and a similar list will be made of all articles brought back to this station, within a reasonable time after your return. Your sledge journal will be submitted to me, and later a detailed report.

I am, very respectfully yours,

A. W. GREELY,

First Lieutenant, Fifth Cavalry, Acting Signal Officer and Assistant, Commanding.

Acting Assistant Surgeon O. PAVY, *U. S. Army.*

APPENDIX No. 28.—*Report of Dr. Pavy on trip towards Cape Joseph Henry.*

FORT CONGER, GRINNELL LAND, *February* 17, 1882.

SIR: According to your orders, the 2d of October, at 9 a. m., I left Fort Conger, accompanied by William Whistler and the Eskimo Jens, with the two dog sledges, *Antoinette* and *Lilla*.

Arriving at Cape Murchison at 11.30 a. m., we crossed St. Patrick Bay. Following the ice-foot we reached the tent at Mount Beauford [Beaufort] by 4.30 p. m., pitched our own [tent], cooked supper, fed the dogs, and at 7 p. m. went into our sleeping-bags.

The 3d of October, rising at 6 a. m., we broke camp, added to our stores the supplement of provisions necessary for the journey, and started at 9 a. m., traveling on the ice-foot towards Cape Beechey, that we reached at 1 a. m.

So far the ice formed on the level beach of Shift Rudder Bay, where the hummocks and paleocrystic floes cannot ground, was excellent. North of Cape Beechey we fell in with an ice-foot, narrow, broken, and obstructed in many places by heavy pieces of floe-bergs, thrown evidently ashore by the last storms; for since I had passed here with G. W. Rice the state of the foot has partially changed.

For an hour and a half we travelled through the winding paths of piled up masses, and at a very good rate, considering the condition of the ice. But by 12.30 p. m., the foot coming suddenly to an end, our progress was stopped at the formidable Black Cliffs, where, in my previous journey, I had been forced by open water to ascend the cliffs and to travel over table land.

Before me stood steep, precipitous cliffs, dark and ragged at their summit; at their feet, nearly perpendicular. There lay catatique [chaotic] masses of ruble [rubble], not in motion at the time, but seperated [*sic*] by small streaks of water, and resembling, in their pointed forms, to so many enormous stalagmites. This ice lined the coast as far north as I could see; to the east it formed a band, stretching about two miles in the straits. Farther still to the east and southeast the pack, or rather floes, small and large, of all shapes, and of all dimensions, from the rounded bowlder to the tall, paleocrystic floe-berg, were majestically floating to the south.

To embrace a larger field of observation we climbed from the ice-foot to the top of one of the highest agglomerated masses lining the coast. The scene was magnificent in its desolation; but we were in the impossibility to advance a step.

I then retraced my course towards Beechey Valley to hunt for the overland route, of which Capt. Sir George Nares have [*sic*] foreseen the existence. At 3 p. m. we entered the dry bed of a stream, half a mile from the tent. Its direction being northwest towards a lake where I had camped in September, I followed its course, in the belief that if any valley existed the lake was certainly the receptacle for its spring waters. The bottom of this creek, full of pepples [pebbles] and rocks, scarcely covered by snow, was so bad for travelling that we reached the lake, a mile and a half distant, at 5 p. m., with only half of our load. At 7 p. m. we camped. I spent the morning of October 4 in carring provisions at the top of a steep hill overhanging the lake, and about 1,000 feet [305^{m}] high. On the other side, to the north, stretches a valley 8 miles long by one-half mile wide, turning in the distance to the northeast. The tent remained pitched on the lake. The travelling was so hard over ground, bare of snow, that at 6 p. m. only we reached camp again, very tired, and having only advanced part of our load three miles in the valley.

October 5, the tent and the rest of our baggage was packed on the sledges, and for the last time we ascended a steep hill. By small advance I reached the extremity of the valley at 5 p. m., being then at an altitude of 1,750 feet [533^{m}].

The 6th of October, at 7 a. m., with half of our entire load we descended by a very steep ravine in a lower valley running nearly at the level of the sea, and opening by a narrow gulch into Wrangell Bay. There we saw two ptarmigan (for me the last of the season), of which Jens killed one with a revolver. Then for four hours we travelled at a rapid gait over a frozen stream, and reached the sea-coast on the northeast side of Wrangell Bay. There the ice was solid, but extended only a short distance from the north and south capes. After caching our load of provision behind a large eratique [erratic] block we returned to the tent that had remained pitched in the upper valley, reaching there at 4.30 p. m.

The night 6th to the 7th of October having been very stormy, with light but steady fall of snow, I waited until 9 a. m. before venturing to start. At 3 p. m., the wind still blowing hard, I passed around the north cape of Wrangell Bay and followed the ice-foot, on which in places we were all three obliged to hitch

to the sledge and pull between enormous blocks of paleocrystic ice, or haul with arms strength over hum mocks and ruble [rubble] ice. Here Whistler was of excellent assistance. At 5 p. m., being scarcely able to pick out any more our way, on account of the dimness of the light thrown by the moon, I halted to camp. The place was certainly not good; ten yards [9^{m}] of ice-foot, squeezed to the right by the piled up and overhanging blocks of paleocrystic ice, and to the left by the high cliffs, from the ragged summits of which we were at every instant threatened by the fall of rocks. Numerous débris around us proved of the unsafety of the spot.

But here was the best, even the only camping spot. To raise the tent in the teeth of a northwest wind, blowing, I should think, at the rate of 20 miles an hour [8.9^{m} per second], was a difficult work. Nevertheless, at 7 p. m. supper was cooked; then, trusting to fortune, we got into the bags.

Like symphonie [symphony] of nature in such a far away place I shall never forget; and for a long time the noise of the howling winds and the grinding of the floes, twenty feet [6^{m}] from my head, will remain impressed upon my memory.

I was sleeping, when, at 1 p. m. [1 a. m.], Whistler woke me by rushing out of his bag towards the door with the announcement that the ice under the tent was moving. Happily the alarm was false. The concert of nature had confounded his thoughts and misled his judgement. The case was realy a pardonable one. Nevertheless, we kept awake; at 2 p. m. [2 a. m.] cooked a hasty breakfast and waited until 4 p. m. [4 a.m.]. The light of the moon then shining more brightly, we packed the sledges and proceeded north. But an hours drive through heavy paleocrystic ice brought us again to a stop. It was a repetition of the scene of the Black Cliffs, but on a larger scale.

About half of a mile north of Mount Parry the narrow foot formed by the heavy ice, piled up by tremendous pressure against steep cliffs, had been broken and washed away. We stood there looking, but once more powerless to act.

The wind still blowing had nevertheless abated. In the straits all the ice was in motion, not as a pack, but in broken floes, small and large, covered or bordered by gigantic floe-bergs. When two of such pieces came in contact it seemed as if a fight of titants [Titans], rendered more terrible by prolonged crashing and roaring sounds, and that from every direction of the strait.

Pushing further was out of the question until a new piled-up ice-foot would be formed, and that by pressure, against the steep cliffs that were now grinded by floating floe-bergs. It must have been a similar scene that Commander Markham witnessed in his fall journey of 1875.

With reluctance I decided to return home, convinced now that it must be very rarily possible to reach the *Alert* winter quarters in the autumn by travelling with sledges and along the coast. Nearly at the foot of Mount Parry I cached my provisions. Then, at the great satisfaction of Jens, who seemed anxiously watching the repeated assault of the floe-bergs against a narrow strip of ice-foot that we had to cross, I gave the order of retreat.

With our nearly empty sledges we hastened towards Wrangell Bay, reaching there at 9 a. m., with driving snow and cutting wind. At 9 p. m. we once more slept on the lake of Beechey Valley.

The 8th of October camp was broke at 7 a. m.; at 9 a. m. we passed the tent in Shift Rudder Bay and arrived at 12 m. at Cape Murchison. At 4 p. m. we entered Discovery Harbor, unsuccessful in our attempt to reach Cape Joseph Henry.

This journey has taught me the fact that if for spring journeys provisions are to be carried at Cape Henry in October, it must be by travelling overland in valleys similar to the two lately discovered. Captain Nares advised to look for this inland route that, says he, "must exist, and would put in communication Lincoln with Wrangell Bay."

I am, very respectfully, your obedient servant,

OCTAVE PAVY,
Acting Assistant Surgeon, U. S. A.

[Address omitted.]

FORT CONGER, GRINNELL LAND, *February* 20, 1882.

SLEDGE JOURNAL TO WRANGELL BAY.

October 2, 1881.—Left Fort Conger, accompanied by Whisler and Jens, with the two dog sledges. Arrived at Cape Murchison at 11.30 a. m. Reached Mt. Beauford [Beaufort] by 4.30. Went into sleeping-bags at 7. p. m.

October 3, 1881.—Rising at 6 a. m. we started at 7 a. m.; we reached Cape Beechey at 1 a. m. North of Cape Beechey fell in with broken ice-foot, obstructed by heavy pieces of floe-bergs. The foot has partially changed. We travelled for an hour and a half; at 12.30 p. m. our progress is stopped at the Black Cliffs. Cahotique [chaotic] masses of ruble [rubble] and ice, &c. We climbed from the ice-foot to the top of agglomerated ice. Magnificent scene. Impossibility to advance. Retraced towards Beechey Valley. Reached lake at 5 p. m., with half of the load.

October 4, 1881.—Spent in caching provisions in a valley, 8 miles long by ½ mile wide. Tent remains pitched on the lake. Travelling hard. Advanced part of the load 3 miles in the valley.

October 5, 1881.—Packed tent and baggage, and by small advances I reached the extremity of the valley at 5 p. m., altitude 1,750 feet [533^{m}].

October 6, 1881.—Started at 7 a. m. Reached Wrangell Bay at 12 m. Ice solid, but extends but short distance from the capes; we returned to the tent that had remained pitched in the upper valley, reaching there at 4.30 p. m.

October 7, 1881.—Night very stormy, with light but steady fall of snow. Started at 9 a. m.; at 3 p. m. (wind blowing hard) I passed the west cape of Wrangell Bay. Followed the ice-foot. We were all three obliged to pull the sledge in places. Enorma [ous] blocks of paleocrystic ice. At 5 p. m. we halted to camp in a bad place; wind, 20 miles an hour [8.9^{m} per second]. At 7 cooked supper. October 7 cooked breakfast at 2 p. m. [a.m.]. Packed at 4 p. m. [a. m.]. Brought to a stop at 5 p. m. [a. m.]. Repetition of the Black Cliffs. All the ice in motion. I repeat reaching Wrangell Bay at 9 a. m., and the lake of Beechey Valley at 9 p. m.

October 8, 1881.—Broke camp at 7 a. m., arrived at 12 m. at Cape Murchison, and at 4 p. m. entered Discovery Harbor.

Respectfully submitted.

OCTAVE PAVY,
Acting Assistant Surgeon, U. S. A.

First Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant, Commanding.

APPENDIX No. 29.—*Lieutenant Lockwood's report on St. Patrick Valley.*

FORT CONGER, GRINNELL LAND, *October* 6, 1881.

SIR: I have the honor to make the following report of a short excursion to the valley to the north of St. Patrick Bay in the immediate vicinity of this station.

I left here in the forenoon of the 3d instant, at 10.40 a. m, with the iron sledge drawn by the party, consisting of Sergeant Linn, Corporal Salor, Private Henry, and myself. We took the overland route and found it very difficult for the lack of snow, especially the ascent from here to the "gap," which occupied over an hour. The steep and rocky bluffs bordering St. Patrick Bay were reached at 3.30 p. m. The work of descent was very arduous and occupied two hours when, on reaching the level of the bay, the tent was pitched and I went into camp.

I broke camp and got off in the morning at 8 o'clock and reached the dry bed of the stream in the valley referred to half an hour afterwards, but found on reaching it so many stones and so little snow that I gave up the idea of dragging the sledge up the valley, more especially as the unironed sledge-runners were already very badly worn. So I started with the party up the valley leaving the sledge and load behind. The valley, properly speaking, is, I should judge, from a mile to a mile and a half wide, measured between the steep, precipitous bluffs or mountains hemming it in. It has two levels, so to speak, that of the stream above mentioned and that of level mesa lands, from fifty [15^{m}] to a hundred feet [30^{m}] high, above the general level. These seem to be washings from the valley's lofty sides, and project out first on one side, then

from the other, like the mud flats of a river. I continued on with the party for three hours; that is, till 11.30 a. m., and there found myself, at the northern extremity of the lower level referred to, probably 6 miles from the bay. Ascending a rocky ridge, about midway between the sides of the valley, I took a compass reading to St. Patrick Bay, which gave the trend of the valley thence to this point 139° from south, or not quite northwest. This agreed within 9° of a reading up the valley as far as could be seen; that is, to this locality, taken at 9 a. m. A sight up-stream gave the continuation of the valley as north, within 2 degrees. I could see no *valley* to the north from my elevation—nothing but a narrow ravine inclosing the stream-bed, and the whole party suffering very much from a cold north wind, I retraced my course southward, down-stream. In following the dry bed we passed through a narrow gorge about 30 feet [9m] wide by 50 to 100 [15m to 30m] high, its sides vertical in many places. It illustrates glacier action at some past period, the rocky sides being deeply worn and furrowed. A narrow stream from the west comes in just above this place. Much fatigued by our walk over rocks covered with snow, we reached the sledge at 2 p. m., and continuing with it down the bay reached depot A at 5.15 p. m.

The following day we got off at 9 a. m., leaving spare provisions, &c. at the depot, and on reaching the English wagon dragged it to the south side of Water-course Bay, leaving it on the shore convenient to the ordinary route to the coal mine. The party reached the station at 2.05 p. m.

Very respectfully, your obedient servant,

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, Acting Signal Officer.

First Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant to Chief Signal Officer, Commanding.

APPENDIX No. 30.—*Sergeant Rice's report on camp equipage.*

FORT CONGER, GRINNELL LAND, *October* 8, 1881.

SIR: I herewith respectfully submit transcript of readings of thermometer, Beck's Minimum, at the "Bellows," made October 5, 6, and 7.

We arrived at Bellows 3.40 p. m., Wednesday, October 5; thermometer was set. At 7 p. m. it registered −18 [−27.8° C.]. Thursday, October 6, at 7 a. m., −24 [−31.1° C.]; at 4 p. m., −18 [−27.8° C.]; at 4.20 p. m., −20 [−28.9° C.]; at 7 p. m., −25 [−31.7° C.]. Friday, October 7, at 7 a. m., −25 [−31.7° C.].

A high northerly wind prevailed during the whole time, which, in conjunction with the low temperature, affected us very unpleasantly when exposed to it. The faces of Sergeant Brainard and myself were partly frozen, Sergeant Brainard's several times.

The buffalo sleeping-bag was hardly given a fair trial. Being disappointed in our expectations of finding rubber blankets at the "Bellows," we were compelled to place the sleeping-bag on the bare ground, with nothing intervening between it and the snow. We were, therefore, affected by the cold from the ground. Under other circumstances, we think the bag would give satisfaction in every respect. It might, perhaps, be improved by covering the outside with canvas or sealskin dressed.

The new Hudson Bay sledge, used in transporting the musk-ox meat to the ice, gave perfect satisfaction. It became considerably worn by being dragged over bare ground and rocks, but we do not know of any other sledge that would have suffered less under the same circumstances.

Very respectfully,

GEO. W. RICE,
Sergeant, Signal Corps, U. S. A.

Lieut. A. W. GREELY,
Commanding Polar Expedition.

APPENDIX No. 31.—*Lieutenant Lockwood's orders to attempt crossing of Robeson Channel.*

FORT CONGER, GRINNELL LAND, *November* 1, 1881.

SIR: You will proceed, weather permitting, on Wednesday, November 2, to depot B, near Cape Beechey, and attempt crossing Robeson Channel at an early day. Seven men, hauling the eight-man sledge, will

constitute your main party, while Sergeant Rice, with Jens Edward and a dog sledge, will accompany you to Cape Beechey, and will be at your disposal until you can spare them, when they will report to Dr. Pavy at that place. Ten days' rations will be taken (except certain articles largely in excess at depot B), from this point; and on leaving the coast twenty full days' supplies will be carried. The food to be used will be left to your discretion, except that enough lime-juice must be taken, either frozen or in pemmican, to allow an ounce daily to each man. However, the ration to be consumed after leaving this coast will not exceed the following, or its equivalent: 14 ounces pemmican, 2 ounces bacon, 12 ounces bread, 2 ounces milk, 2 ounces cranberry preserves, 3 ounces potatoes, 2 ounces butter, 2 ounces sugar, 1 ounce chocolate, ¼ ounce tea, $\frac{1}{16}$ ounce pepper, ¼ ounce salt. If stores are found at Thank God Harbor this amount can be increased from such stores at your discretion.

In crossing you will take, if open water is visible, the whale-boat now cached at depot B. The boat on your return must be brought to this coast and safely cached.

On reaching the Greenland coast your permanent camp will be made at the most convenient spot. A party will be sent by you to examine the boat, tent, and stores about 1½ miles east of Cape Sumner, while you, with a second party, will visit the observatory at Thank God Harbor.

A list of the stores left by the *Polaris* in 1871 is herewith inclosed. You will please verify its correctness, add to it any other articles found, and note their condition as well as that of the whale-boat left by the English expedition of 1875–'76. In case time permits, the condition of the shore ice around Cape Sumner and towards Gap Valley should be noted, but for this special purpose no favorable opportunity of recrossing the straits should be lost.

A set of signal equipments will be taken, and from November 5 a party will daily attempt to communicate with you from Distant Cape, between 2 and 3 p. m., during which hours you are to keep, if possible, a watch on that point.

As you fully understand, a journey across Robeson Channel is at all times full of dangers, which are greatly increased at this period of the year, when the sun has long been absent and new ice daily forming. Although this is a later date than any party has ever traveled, even by land, in such high latitudes, I feel confident that your sound judgment and prompt action will bring about all possible success, while knowing that no reasonable chance of crossing will be lost. I count, too, on your discretion, which will constrain you to take no unusual or unnecessary risks, but rather to return here. I am quite aware of the possibility of such return without success, and should not be surprised at such result.

If you succeed in crossing you will on your return leave all articles of food and equipments, not deemed by you indispensable, properly cached on the Greenland shore for your spring work.

Meteorological observations will be taken, when practicable, at 3, 7, and 11 a. m. and p. m., Washington mean time. The maximum and minimum thermometers, properly set, will be left by you on the Greenland shore. I inclose an approximate list of the times of high and low water and ranges thereof, from the 2d to the 15th, inclusive.

Wishing you and your party good health and success, I trust your speedy return will allay any uneasiness on my part.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant, Commanding Expedition.

Second Lieut. JAMES B. LOCKWOOD,
Twenty-third Infantry, A. S. O.

(Two inclosures.)

APPENDIX No. 32.—*Lieutenant Lockwood's report on attempted crossing of Robeson Channel.*

FORT CONGER, GRINNELL LAND, *November* 10, 1881.

SIR: In pursuance of your letter of instructions of the 1st instant, I have the honor to render the following report relative to an attempt to cross Robeson Channel, or rather a reconnaissance with that object in view.

The party consisted of Sergeants Brainard and Linn, Corporal Salor, and Privates Connell, Bierderbick, Fredericks, and Ellis. The English sledge used was loaded with about fifteen days' rations, tents, sleeping-bags, and the usual equipment and a variety of miscellaneous articles required to provide against contin-

gencies in getting across, or to make the snow-house at depot B more habitable—an itemized list of all of which, with weights, I have already furnished you. The total weight (sledge and load) was 1,050 pounds, a trifle more or less, perhaps, 131¼ pounds per man.

November 1.—At 1 o'clock p. m., the party left the station and pulled the loaded sledge to a point very near Distant Cape, where, leaving it, at 3.15 p. m., we started back and reached here at 4.30 p. m., where we passed the night.

November 2.—We got off at 8.45 a. m., and, picking up the sledge where left, proceeded rapidly on the way; everything satisfactory except the light, the gloom being greater on account of the thick overcast state of the sky.

At 2 p. m. we reached Cape Murchison, or rather depot A, near by. This place I consider ten miles from here or half-way to the snow-house.

Sergeant Rice, with the Eskimo Jens and the dog team, overtook me a half hour before, and here we all made a halt of ten minutes, drinking some chocolate, brought along for the purpose, and filling up two bags of coal. This coal, about 440 pounds, I put on the sledge, but the additional weight being very burdensome I threw it off again in a few minutes. The hauling across St. Patrick Bay was tedious and laborious as usual on account of the snow which, by concealing the trail, made it necessary to "break out" a new one or rather follow the one made by Sergeant Rice who preceded us. We were two hours, less ten minutes, in crossing. At 6.30 p. m. we reached a point on the south side of Shift Rudder Bay, about three miles from our destination, and, the men seeming much fatigued, I took the Hudson Bay sledge and about 200 pounds (what was needed for the night) and continued thus to depot B, very much to the disappointment of most of the men who were ambitious to pull through with the entire load. But the indentation of the coast here is very similar to St. Patrick Bay, as regards hauling, and I judged it more prudent to send back for the rest of the load in the morning. We reached the snow-house at 8 p. m., and found that Sergeant Rice had preceded us by about one-half or three-fourths of an hour.

Private Ellis complained of his foot hurting him a good deal and of his being "played out" thereby. He tells me he injured his foot by a fall some years ago.

November 3.—At 10.40 a. m., I left with Jens and the dog team (seven dogs), and at 1 p. m. reached the coal thrown off yesterday—about 100 yards [91^{m}] from the tent. While Jens loaded the two bags and started on return, I walked along the ice-foot, up the bay, about a mile, to examine the small boat left by the English. I overtook Jens crossing the bay. Finding the load very heavy for the dogs, and having decided it impracticable to take two bags of coal across the straits, I left one of the two at the old cache on the north side of St. Patrick Bay, and continuing on to the snow-house reached it at 4 p. m. While I was absent, Sergeant Brainard and the party had brought up the English sledge and load left yesterday and placed the whale-boat thereon, and I made some other preparations for the next day.

November 4.—About noon, having everything in readiness, the whole party, except Ellis, whose foot disabled him, left the snow-house, with whale-boat, equipped and rationed for upwards of twenty days, and "headed" towards Polaris Promontory. I could distinguish nothing in the gloomy twilight but a long stretch of hummocky ice, and so left the small stove and coal and other things behind that I had intended taking along had there been more water. The boat being 28 feet [8.5^{m}] long and the sledge 11 [3.4^{m}], the bow and stern projected far beyond the ends of the latter and made a very unwieldy load as well as a very heavy one. Our progress on the smooth, level floe next the shore was correspondingly slow and unsatisfactory. Every little unevenness in the ice brought us to a halt. A small piece of "rubble ice," about 2 feet [0.6^{m}] high, over which we did not succeed in pulling our load by united and repeated exertions, convinced me that it was impracticable to go farther, except by making a broad, level road all the way across as we went. An undertaking of this nature, in the daily increasing darkness and cold, was not to be thought of without urgent necessity. Accordingly we returned to the snow-house after an absence of two or three hours. Shortly afterwards Sergeant Rice, with the dog-team, returned from Cape Murchison with the small boat which I had sent him for in the morning. About 6 o'clock Dr. Pavy, accompanied by Lieutenant Kislingbury, came along. There were twelve in the snow-house at supper and eight slept inside. This structure is now quite comfortable. I occupied some time after returning from the ice in adding to the height of the roof and the thickness of the sides, and making some other improvements—putting slats under the canvas roof, &c. The sides are nearly vertical and about 6½ feet [2^{m}] high; the diameter of the floor is about 12 feet [3.6^{m}].

November 5.—The forenoon was occupied in preparing for another attempt in the small 12-foot [3.6m] boat brought up. Oakum and white-lead were stuffed in all visible cracks and openings. Doubtless we passed over others concealed by ice and frost. My plan was to have the whole party—excepting Ellis, sick—draw the loaded boat on the sledge to open water, if such there was, or at least as far as those to be left behind could prudently go, and, having found the craft seaworthy, to make an attempt with three of the men. Everything was prepared accordingly, baggage and rations being cut down to the lowest limit; the latter weighed 114 pounds. We started a few minutes after noon and made satisfactory progress (seven men dragging) till we reached the hummocky ice. The sky was overcast and everything indistinct and gloomy. Floundering through the snow and over the ice-cakes we got many falls. Soon we heard very distinctly the grinding of moving ice like a distant roar or the monotonous drone of a fly-wheel. Some of the men said they could see distant floe-bergs moving. In the distance, towards Polaris Promontory, perhaps two miles off, we all saw a dark, indistinct line, which evidently was open water. I left the rest straining at the load, and proceeding ahead over some very rough places, crossed some wet "sludge-ice," about fifteen or twenty yards [14m or 18m] wide, and found myself on a comparatively level floe. I had not proceeded more than a few minutes on this towards the dark line referred to when I became aware that the ice I was on was in motion. I imagined the "sludge-ice" crossed over to be water, and, thinking my retreat cut off, made all haste back, but found the "sludge-ice" still intact and the moving floe pressed close against its edge. It seemed to be the boundary line of the fast shore-ice. I found on further examination that water appeared in this "sludge," somewhat of the consistency of melted snow, and I could readily thrust my boat-hook down into the water beneath almost anywhere. I brought the party and their load to this place. The capacity of the boat and the equipment admitted of but four men. It would have been a laborious task for the seven to get her over this place. It was evidently dangerous for a man alone to walk over this sludge, and I did not know that the boat was seaworthy, but the chief consideration which made me forego any further attempt to proceed was the increasing gloom which made near objects indistinct in the extreme. The men seemed heartily glad when I told them we should give it up.

At 2 o'clock I displayed the two signal torches from the top of an adjacent floe-berg, 15 or 20 feet [4.5 or 6m] high; they continued burning for thirty-five minutes. I could see no lights at Distant Cape, and doubted ours being seen. The snow-clouds obscured everything. In returning, the darkness offered a greater obstacle than ever, though we followed our outward trail. Ellis had built a fire on shore, by my order, which was quite an aid when any difficulty in following the trail occurred.

November 6.—Accompanied by Sergeant Brainard, I walked out to the moving floe of the previous day; it occupied just twenty-five minutes, walking briskly. Instead of the floe we found open water stretching from the direction of Cape Beechey obliquely down the straits, varying in width from 50 to perhaps 400 yards [46 to 366m], these distances constantly changing according to the contour of the moving pack on the farther side. The "sludge" still adhered to the fast ice, though there was not so much of it. To-day, as well as yesterday, the ice was moving north when we observed it. The few hours of light were occupied in this walk and by the party generally in extending the tunnel of the snow-house and moving the tent and stores alongside. I also constructed a snow pedestal on the little bluff adjoining, near the former position of the tent, and fitted the telescope on top, thus making observation with it up and down and across the straits more satisfactorily.

In the evening I made arrangements to travel north next morning, along the ice-foot, with a view to gaining something by inspecting the straits and the land in this direction. Ellis was to be left behind, as his foot still pained him. All this in the event of the weather proving favorable.

November 7.—The wind blowing and the air filled with snow-clouds, I decided to return to the station. Ellis determined to do his share, notwithstanding his painful foot, and stuck manfully to the drag-rope till we reached home.

At 10.35 a. m. we got off, dragging the small boat on the English sledge, and, leaving behind rations and other things, I thought better to keep at the depot. Our day's work was a hard one. The south wind, aided by a high tide, had flooded the ice-foot to the very edge of the steep, rocky slope that marks the coast line. The new ice-foot had not yet frozen hard enough to bear, and we constantly broke in, often at every step and sometimes to the knee. It was but seldom possible to avoid this by traveling on the slope to our right, on account of the alternate deep snow-drifts and exposed rocks. I cautioned the men against frost-bite, and we kept on, our progress slow, though our load could not have much exceeded 650 pounds. At 3

p. m. we reached the north side of St. Patrick Bay and lighted the signal-torch to find a way off the ice-foot. It was not of much use afterwards except when in among the hummocks, for our old trail was obliterated and the driving snow made very indistinct even the nearest of the high bluffs along here. It was impossible to see across the bay till probably half-way over. Some of the men complaining of their wet feet, I halted, and most of them changed their foot gear. At 4.50 p. m. we reached depot A. I pitched the tent adjoining the one there, and, with the little stove brought along, we soon had a good fire from the supply of coal here. Private Bierderbick had changed his socks early in the journey and afterwards I believe, and had kept on land, generally where the ice-foot was weak, and yet on arrival at camp his big toe was found severely frozen, giving him a good deal of pain; everything was done that suggested itself, and he was put in a sleeping-bag. Sergeants Brainard and Linn and Private Connell, and perhaps some of the rest, suffered from frost-bitten toes, but none seriously.

November 8.—We had breakfast at 5 a. m. and were off at 6.30. It was found necessary to carry Bierderbick in the boat. Here, wrapped in a sleeping-bag, he remained till we reached the station. The ice-foot was extremely good, and we got along very well, except when we left it, on two occasions, at Water-course Bay, and floundered around in the hummocky ice, unable to see our way. We also encountered a like difficulty in the long stretch of snow between Distant Cape and Dutch Island. The bare rock, which marks the eastern extremity of the vertical cliffs forming this cape and over which the sledge route lies, we reached at 8.55 a. m. At 9.50 we were on the ice opposite the cape and at 11.50 at Dutch Island. Here we were happily joined by Private Whisler, by whose ready help we got to the station and ended the journey at 12.30 p. m.

I regret to say that I recorded but few meteorological observations. Being out so much, and finding much difficulty in getting accurate readings, principally on account of the darkness, I gave it up. At 9.15 p. m., of the 2d instant, the thermometer stood at — 12 [— 24.4° C.]. The lowest registered since my visit in October was — 28 [— 33.3° C.]. During my stay at depot B the thermometer ranged, without an exception that I recall, from — 11 to — 20 [— 23.9° C. to — 28.9° C.].

The sledge route between here and depot B is very good. The high tide referred to has improved it very much, though it ruined it at the time. High, rocky, precipitous bluffs follow the general contour of the coast line or ice-foot with but few exceptions. These exceptions are changes from bluff or cliff to the gradual sloping mountain sides. The latter topography exists only at Water-course Bay and in the neighborhood of Shift Rudder Bay. Sledge parties always cross these bays and St. Patrick Bay through the hummocks, in order to avoid long detours. The floe ice is also taken between here and Distant Cape. It may be said that sledging or transportation of any kind is impracticable along this route at any time, except on the ice-foot or the surface ice outside. The débris from the cliffs forms an inclined plane, extending from above to the edge of the sea. Though the slope of this plane is occasionally such as to allow traveling thereon, the alternate surfaces of bare, uneven rocks and snow-drifts make this traveling laborious in the extreme, even where it is possible at all

Very respectfully, your obedient servant,

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, A. S. O.

First Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant, Commanding.

APPENDIX No. 33.—*Dr. Pavy's orders for journey to Wrangel Bay.*

FORT CONGER, GRINNELL LAND, *November* 3, 1881.

SIR: You will proceed, on November 4, to depot B, Cape Beechey, taking the dog-sledge *Antoinette*. At depot B, Sergeant Rice, with the dog-sledge *Lilla*, will report to you, as soon as he can be spared by Lieutenant Lockwood. You will then proceed to lay out a depot for the work of exploration northward beyond Cape Henry in the coming spring, for which you have tendered your services. This depot will consist of pemmican, hard bread, milk, and butter. Such quantities of these articles as are needed to insure full loads from Cape Beechey northward will be taken from depot B. The new depot, to be known as C, will be at the most northerly point you can attain without endangering your safe and speedy return. You will also leave

at depot C any articles of your equipments which, not indispensable for your return, may be useful the coming spring. Meteorological observations will be taken, when practicable, at 3, 7, and 11 a. m. and p. m., Washington mean time. The minimum thermometer at depot B must be read and reset, both in going and returning. While at depot B no alcohol will be used, but all cooking must be done with coal. A list, with the weights of all articles taken, will be furnished before starting. A copy of your sledge journal will be transmitted to me within a *week* after your return.

I am, very respectfully yours,

A. W. GREELY,

First Lieutenant, Fifth Cavalry, A. S. O. and Assistant, Commanding.

Acting Assistant Surgeon O. PAVY, *U. S. Army.*

APPENDIX No. 34.—*Dr. Pavy's report on journey to Wrangel Bay.*

FORT CONGER, GRINNELL LAND, *February 17th*, 1881 [2].

SIR: According to your orders, Friday, Nov. 4th, at 7.30 a. m. I left Fort Conger, accompanied by Lieut. Kislingbury and driving myself the dog sledge *Lilla*. Without any difficulty we turned Distant Cape, and following the ice-foot, reached Cape Murchison at 11.30 a. m. Since my last journey, the general appearance of the floes in Water course Bay is not changed. On the north side of St. Patrick's Bay, after having passed over excellent travelling ice, we fell in here and there with hummocks; but alltogether the road could be considered as very good. At 6 p. m. the snow-house (in Shift Rudder Bay, at the foot of Mt. Beauford [Beaufort]) was reached, and we found assembled the party of Lieut. Lockwood, who had returned the previous day from an unsuccessful attempt to cross the straits. During the night that I passed very comfortably under the tent the wind blew hard, and the grinding of the ice could be heard in the distance.

This confirmed my belief that Robeson Channel closes, but very late in the fall or at the best in the beginning of winter.

Saturday, 5th November, I started at 9.30 a. m., leaving Lieut. Lockwood's party busy at work preparing a boat that they expected to use in a second attempt to cross the straits.

Following your instructions, I took with me G. W. Rice and the Eskimo Jens to drive the dog sledge *Antoinette*. When travelling in the bed of the water course that empties from the lakes of Beechey Valley, the little fox-dog Gypsy, of the sledge *Antoinette*, began showing symptoms of maternity. Being then but a mile and a half from the snow-house, I tried to drive her back, but without success. Neither coaxing or whipping being of any effect, I was obliged to let her run with the team, but unhitched.

Now the steep hill, north of the lake, that gave me so much trouble to climb in October, was ascended without unloading.

The snow being comparatively hard we succeeded by double manning each sled. But before reaching the bottom of the valley on the other side, men and beast had gone through hard pulling over places where the ground was swept bare of its snow. Nevertheless travelling was better than in October.

From two p. m., hour at which we entered the valley, to seven fifteen p, m., when we pitched the tent (about half-way between Wrangell Bay and Mt. Beauford [Beaufort]), the weather became cloudy and cold.

At nine p. m. the supper was eaten and every one had turned in his bag.

November 6th, at 8 a. m. we woke up with the news that Gypsy had increased our canine stock with three heads. Rice having implored mercy for the innocents, we dug a hole in a bank of hard snow and left the family well supplied with pemmican.

At 9.30 a. m. we were travelling; and at 12 m., after passing one of my encampments of last month, we entered the lower valley in a vertiginous descent down a steep ravine.

At 4 p. m. we reached Wrangell Bay and encamped, in a snow-storm, the wind drifting in our face.

Monday 7th November, the gale that was blowing all night had scarcely abated, and the moon was yet too cloudy to travel by.

We remained in the bag until 12.30 p. m.; when, hitching up one team, I started with Jens to carry the provisions across the bay, to the northeast side, where I had before started a depot. From this spot close to the northeast entrance of the bay, I could see, at a very short distance ahead, the line of demarkation between the ice and the open water, extending as far as the misty weather could allow the view to reach.

The sea, at the time, must have been washing the feet of the two foremost capes.

I may therefore venture to say, that, where I had found last October a solid sheet of ice, the waves were now rolling. I think, moreover, that if my purpose in this trip had been to reach Lincoln Bay, it would have been frustrated once more.

This storm, the winds of the past month, or the floating massing of ice, that have been tossed through and fro in the channel, must have undoubtedly broke the ice-foot in many places between Wrangell Bay and Lincoln Bay.

The provisions, well secured behind a large erratique [erratic] block, I at once returned to the tent, having been absent for about an hour. At 1.30 p. m. we began our homeward journey, reaching the snow-house of Shift Rudder Bay at 10 p. m.

On the way, we stopped at our camping place in the upper valley, to take the dogs on the sledge.

November 8th, by a dark and disagreeable day, at 12 m. we left the snow-house and sighted Fort Conger at 5.50 p. m., having accomplished the object of the journey.

I have but to express my satiesfaction [*sic*] for the manner in which G. W. Rice has done his duty.

I am, very respectfully, your obt. servant,

OCTAVE PAVY,
Act. Assist. Surgeon, U. S. A.

This report was received by me, February 17, 1882, after five formal requests for it and as many as a dozen personal ones.

It comes in an incomplete and discreditable shape. Dr. Pavy has been informed by me that his reports could be made in French if he so wished. I have not deemed it proper to correct the errors of English therein.

Being defective otherwise, I have (February 21) written officially for a supplementary report. I deem this indorsement necessary to show that I have in no way countenanced such gross neglect.

A. W. GREELY,
First Lieut., 5th Cav., A. S. O. and Asst., Comdg. Expdn.

Feby. 21, 1882, *Fort Conger, Grinnell Land.*

FORT CONGER, GR. LAND, *Feby.* 20, '82.

1st Lieut. A. W. GREELY,
A. S. O. and Asst., Commanding:

SLEDGE JOURNEY TO WRANGELL BAY.

November 4th, '81.—Left Ft. Conger at 7.30 a. m., accompanied by Lieut. Kislingbury. Reached Cape Murchison at 11.30 a. m. At 6 p. m. reached the snow-house.

November 5th, '81.—During the night the wind blew hard; the grinding of the ice could be heard. Took with me Sergt. Rice and Jens—Gypsy symptoms of maternity—ascended without unloading the hill north of the lake. Pitched tent about half way between Wrangell Bay and Mt. Beauford [Beaufort]; weather cloudy and cold.

November 6th, '81.—At 8 a. m. news of Gypsy; dug a hole in a bank for the innocents; at 12 m. we entered the lower valley. At 4 p. m. reached Wrangell Bay and encamped; snow storm.

November 7th, '81.—Gale abated. Remained in bags until 12.30 p. m. Left depot. Open water extending as far as the view could reach. At 1.30 p. m. we began our homeward journey, reaching the snow-house of Shift Rudder Bay at 10 p. m.

November 8th, '81.—Left snow-house at 12 m. and sighted Fort Conger at 5.50 p. m.

Respectfully submitted.

OCTAVE PAVY,
Actg. Asst. Surg., U. S. A.

*Provisions left by Dr. Pavy at Mt. Parry.**—150 lb. pemmican; 50 lb. bread.
*Provisions left at Wrangel Bay.**—100 lb. pemmican; 50 lb. bread; 7 cans milk; 3 cans butter; 4 cans extract beef.

* As per list handed me by Dr. Pavy a few days after his return from Mount Parry.—A. W. GREELY, *Lt.*

APPENDIX No. 35.—*Dr. Pavy's supplementary report under Appendices 27 and 33.*

FORT CONGER, GRINNELL LAND, *February 28th*, 1882.

SIR: I have the honor to submit to you the supplementary information bearing on my journey of the 3d of October and 4th of November.

JOURNEY OF THE 3D OF OCTOBER.

In this journey I have established two depots. The farthest one north (yet unnamed) is nearly at the foot of Mt. Parry.

The coast being in this neighborhood of very uniform appearance, I could only, to my previous indication, add that the provisions were cached behind a very prominent erratique [erratic] block that can certainly not escape the observation of any party travelling along the shore.

This depot contains bread, 100 [50] lbs.; pemmican, over 100 [150] lbs.; snowshoes, 1 pair.

At Wrangell Bay, the other depot (depot C) is again established behind a large block of stone on the northeast side towards the entrance of the bay.

I can again add that no travelling party can mistake the location. The bay is comparatively small, and the rock that marks the spot is the largest, and really the only prominent one. The depot consists of pemmican, 120 [100] lbs.; [bread, 50 lbs., A. W. G.]; butter, 3 cans; milk, 7 cans; extract of beef, 4 cans; snowshoes, 2 pair.

The list of provisions that *were to be* taken from depot B was made before leaving Fort Conger, and is in your possession.

On my return at Shift Rudder Bay I left at depot B three quarters of a gallon of spirit of wine, ten to twelve pounds of lime-juice pemmican, and a 15 lbs. can of English potatoes, from which a very small quantity had been taken.

At depot B the minimum self registring thermometer, set by the previous party (registered minimum) read minus 15° [—26.1° C.] the 3rd of October.

I will add that during this journey at no time and at no place I have seen Robeson's Channel in any favorable state of navigation.

Meteorological observations, October.

Date.	Hour of day.	Temperature.		Wind.
		Fahr.	C.	
3	7 p. m.	—10°	—23. 3°	NE.
4	7 a. m.	—10. 8	—23.8	NE.
4	7 p. m.	—15	—26.1	Calm.
5	7 a. m.	—12. 4	—24.7	Calm.
5	6 p. m.	—11. 0	—23.9	N.
6	8 a. m.	—13. 5	—25. 0	NE. blowing.
6	7 p. m.	—10. 2	—23.4	NE. blowing.
7	6 a. m.	— 3. 5	—19.7	NE. blowing.
7	8 p. m.	+ 1. 9	—16.7	NE. blowing.

Magnetical bearings correspond with the stations marked on the map.*

At station A, B reads 289°; at station B, station A reads 108°, station C reads 295°; at station C, station B reads 117°, station D reads 343°; at station D, station C reads 162°.

JOURNEY OF NOVEMBER 4TH.

List of articles left at depot C: Pemmican, 100 lbs.; bread, 60 lbs.; butter, 8 cans; milk, 8 cans.

The 7th of November the minimum thermometer read at the snowhouse, in Shift Rudder Bay, — 35° [—37.2° C.]. [At that time *so reading*.—A. W. G.]

*Map omitted as being unimportant, being traced copy of English map furnished by me to Dr. Pavy.—A. W. G., *Lt.*

In this trip at no time the straits were navigatable.

Having not aquired yet enough practical experience to write about the contested question of the formation of paleocrystic ice, I thought judicious, for the present, to dismiss the subject from my report.

I am, very respectfully, your obt. servant,

OCTAVE PAVY,
Act. Asst. Surgeon, U. S. A.

List of provisions at depot B, Nov. 7th, 1881.

1 box potatoes.
2 cans potatoes.
1 box baked beans.
18 cans baked beans.
1 box corned beef.
36 cans corned beef.
*1 sack for Greenland coast.
*1 bag, contents as follows: Coffee, 7 lbs.; chocolate, 7 lbs.; salt, 6 lbs.; pepper, 1 can; wicking, 3 lbs.; corned beef, 10 can; roast beef, 4 cans; condensed milk, †16 can; baked beans, 16 can; potatoes, 12 can; cranberry, 10 can; butter, 5 can; soup, 5 can; sausage, 3 can; sugar, 48 lbs.; tea, 2 lbs.; con. eggs, 3 cans; damsons, 3 cans.
Box containing tea, ¾ full.
4 boxes cartridges, cal. 45.
2 boxes pepper (9)? paper package [leather.—A. W. G.]
1 bag containing extract beef and chocolate (packages *chocolate*, broken for Lt. Lockwood.)
1 can coffee.
1 box alcohol (used from).
1 box (can-coffee).
1 box alcohol.
1 brl. pilot bread.
7 barrel bread [said to be one barrel.—A. W. G.].
5 bags bread.
1 box alcohol.
1 box onions.
1 sack plain pemmican.
4 cans lime-juice pemmican.
1 bag small, loose pemmican, estimated 15 lbs.
1 barrel sugar, partly full.
12 cans butter.
1 coil rope.
1 piece leather.
1 sack hard bread.

APPENDIX No. 36.—*Lieutenant Lockwood's orders for preliminary journey to Cape Beechey.*

FORT CONGER, GRINNELL LAND, *February* 18, 1882.

SIR: You will proceed at 8 a. m., February 19 (unless the temperature sinks below −50° [−45.6° C.] or the weather is threatening), to depot B, near Cape Beechey, to ascertain if the condition of the ice in Robeson Channel will permit of a speedy and satisfactory crossing to the Greenland coast. You will take the dog sledge *Antoinette*, with its team, and will be accompanied by Sergeant Brainard and the Eskimo Frederick. Food for the dogs for five days will be carried, and such extra supplies for the depot as can be taken without seriously impeding your progress. Any portion of supplies so taken can be cached *en route* at your discretion.

In case of fresh wind being experienced this side of depot A, you will return at once to the station, as such exposure, with the present low temperature −43° [−41.7° C.], with the sun yet absent, is deemed too dangerous to be encountered except in an emergency. The details of the trip, otherwise than as above mentioned, are left to your discretion.

A brief sledge journal will be kept, and a copy thereof submitted on your return, with such other reports as you find necessary.

The minimum thermometer at depot B is to be read on your arrival, and both the actual and registered temperature noted. The thermometers will be read at even hours at such times as are convenient, and will be set on your leaving the station.

Care will be taken to avoid over exertion, and to remedy any frost-bites in their incipiency. The footgear must be changed nightly, especially if circumstances oblige you to camp at depot A.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant, Commanding Expedition.

Second Lieut. JAMES B. LOCKWOOD,
Twenty-third Infantry, A. S. O.

---

*[Lt. Lockwood states that the contents of the above sacks comprise the same articles, *i. e.*, are duplicates.—A. W. G.]

†[15 in original memorandum.—A. W. G.]

APPENDIX No. 37.—*Lieutenant Lockwood's report on journey ordered in Appendix No. 36.*

FORT CONGER, GRINNELL LAND, *February* 24, 1882.

SIR: I have the honor, in compliance with your letter of instructions of February 18, to render the following transcript of journal during my recent trip to depot B, made for the purpose of inspecting the ice of the straits in that vicinity, with a view of finding a satisfactory crossing to Greenland. The party consisted of Sergeant D. L. Brainard, the Eskimo Frederick, and myself, a dog sledge and eight dogs, rations, dog food, &c., for five days, as per memoranda already submitted. No tent or sleeping-bags were taken, as each night was to be spent at depot B.

February 19.—Party left station at 8.30 a. m. Reached depot A, near Cape Murchison, at 11.30 a. m., and depot B, near Cape Beechey, at 2.40 p. m. Weather during the day clear and cold, very little wind, or none at all. The ice-foot from station to depot B, and the traveling generally is excellent. The snow this side of Distant Cape, at Water-course, St. Patrick, and Shift Rudder Bays, where the route is on the ice-floe instead of the ice-foot, is packed hard and has few inequalities. The low temperature just now causes a good deal of friction, making the sledge drag with difficulty; it was quite noticeable to-day. The tent at depot A is down; otherwise everything there seems *in statu quo*. The snow at depot B has formed a drift, reaching from the top of the little bluff just north of the snow house to some distance to the south of it—perhaps fifteen or twenty yards [14 or 18^{m}]; consequently the snow house and boat were completely concealed; the tent the same, excepting the ridge and a foot below it. There is at least 2 feet [.6^{m}] of snow on the roof of the snow house. In digging for the entrance of the tunnel through this snow, packed like slate, the thermometer was unfortunately broken before it was discovered. Some snow found inside of the snow house, having drifted through the small orifice adjoining the stovepipe. No tracks of wild animals noticed, and none evidently had visited the place.

February 20.—We all slept late this morning. I myself passed a cold night, owing partly to the bedding and partly to the hole in the roof adjoining the stovepipe. This last has been remedied now. Breakfast at 11, after which Frederick was sent back with sledge to vicinity of St. Patrick Bay after bag of coal left there since last fall. At 12.30 Sergeant Brainard and I started out on the ice of the straits and walked in a general direction towards Polaris Promontory till 2.20, when we retraced our steps and reached the snow house a little after 4. The ice hummocks and rubble-ice, covered with snow, extends from the shore some distance through; beyond it level floes exist as far as can be seen. I did not feel satisfied with it as a route for sledge.

February 21.—Breakfast at 8 o'clock. At 9.30 Sergeant Brainard and I started again on the straits, taking a direction from the snow house more to the north. We encountered the level floe-ice sooner, but from appearances a better crossing seemed to be offered from Cape Beechey; so, on my return, taking Frederick and his team, we proceeded to that place, reaching it in an hour and ten minutes, *i. e.*, at 12.10. We got a good view from the sloping side of the cape, and then started out on the straits. After traversing a distance hardly more than 200 yards [about 180^{m}] in a straight line the level floe-ice was encountered. On its hard covering of snow we traveled along quite rapidly till we were an hour's ride from the land (directly across). From the top of a hummock a good view ahead showed the same character of ice as far as could be seen, and assured me that the best crossing of the straits is from Cape Beechey. On our return we found it very cold. We reached the snow house again at 3.30 p. m.

February 22.—Left the snow house at 10 a. m., and reached the station, without event, at 2.45.

Very respectfully, your obedient servant,

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, A. S. O.

First Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant, Commanding.

APPENDIX No. 38.—*Lieutenant Lockwood's orders for journey to Thank God Harbor.*

FORT CONGER, GRINNELL LAND, *February* 28, 1882.

SIR: Weather permitting, you will leave this station at 8 a. m., March 1, for a trip to the Greenland coast. You will take the dog-sledge *Antoinette* and will be accompanied by Sergeants Brainard and Jewell, and the Eskimo, Frederick T. Christiansen. Private Long, with dog-sledge *Lilla* and Eskimo Jens Edwards, will leave at the same time with supplies for depot B, near Cape Beechey, and will be under your orders until directed by you to return. Ten days' allowance of provisions, fuel, and dog food for your party will be taken from here, which will be supplemented by such addition from depot B as can be carried without materially impeding your progress across Robeson Channel.

Your first duty on the Greenland coast will be to visit the observatory at Thank God Harbor, in order to ascertain exactly what supplies are available for sledge parties. A list of articles left by the *Polaris* expedition has already been furnished you. It is important that the boat camp, in ravine about one mile east of Cape Sumner, be visited, and the condition of the whale-boat be noted.

While it is very desirable that the condition of the ice from the boat camp across Newman Bay to Gap Valley should be examined, and that you should return to Cape Beechey and direct from Cape Brevoort, it is left to your judgment to abandon this part of the trip should adverse circumstances arise, or should you think time could be gained for your spring work by so doing.

Points should be selected with reference to the establishment of depots during the coming month.

On your return you will leave on the Greenland coast all supplies not indispensable to your comfortable and safe return to Cape Beechey.

As Sergeant Jewell will probably be charged with the support of your party during the spring, you should communicate to him freely your views as to the best route and methods to be followed in such work.

Meteorological observations will be made on even hours, Washington mean time, when practicable. In all cases the minimum temperature must be noted.

A brief sledge journal must be kept, which must show the hours of travel and rest, the hour of winding the chronometer, daily comparisons of watches, and any matter of importance.

I am, sir, respectfully yours,

A. W. GREELY,
First Lieutenant Fifth Cavalry, A. S. O. and Assistant,
Commanding Expedition.

Second Lieut. J. B. LOCKWOOD,
Twenty-third Infantry, Acting Signal Officer.

APPENDIX No. 39.—*Lieutenant Lockwood's report on journey ordered in Appendix No. 38.*

FORT CONGER, GRINNELL LAND, *March* 13, 1882.

SIR: I have the honor to render the following report on my late trip to the Greenland coast, made pursuant to your letter of instructions of the 28th of February.

The party consisted of myself, Sergeants Brainard and Jewell, the Eskimo Frederick, and his dog team (eight dogs) and sledge. Private Long, with the Eskimo Jens and his dog team, accompanied me as far as Cape Beechey. A tent, one 4-man sleeping-bag, ten days' rations, &c., all weighing three hundred and fifty pounds, constituted the equipment, a list of which, with weights, I have already furnished you.

For the sake of convenience I embrace pretty much everything under the several dates of my sledge journal.

March 1.—At 8.10 a. m. left the station with Long, Jens, and the latter's team. The rest of the party with the other sledge got off at 8 o'clock. Caught up with them near Distant Cape.

At 10.30 a. m. reached depot A. Here I put on Jens's sledge a bag of coal, about one hundred and fifty or two hundred pounds, and on the other the "signal can" of alcohol, about seventy-five pounds. Just north of St. Patrick Bay I found the bag of pemmican and a box of alcohol and added them to the loads of the two sledges.

At 1.30 p. m. reached snow house, depot B. Frederick's sledge got in about one-quarter hour before Jens's. Here I stopped for the night.

March 2.—At 6 a. m. Long got up and cooked breakfast. At 8.13 a. m. party got off. Yesterday's load was diminished by the bags of coal and pemmican picked up en route. They were left at the snow house. Packed on Jens's one of the bags of rations made up for Greenland, the contents of which you have.

At 9.30 a. m. arrived at Cape Beechey. Assured myself of the identity of Promontory Point as the point as laid down on the map as being the nearest. It bears S. 60 E. (true).

At 10.15 a. m. both sledges were through the rough ice (extending something less than one-quarter mile from shore), and, everything being transferred to Frederick's sledge, Long and Jens with sledge started back while the rest of the party proceeded. The load on one sledge must now have been about seven hundred pounds.

At 11.28 a. m. reached a hummock of the ancient ice-floe (the farthest of my trip with Sergeant Brainard in February), between four and five miles from the shore. Being fearful of the sledge breaking down, and knowing little of the route ahead, I here left the bag of provisions, placing it conspicuously on the top of the hummock. It is on or quite near a line from Beechey to Promontory Point, by which I designate the bold headland first below the gap on the opposite coast. Delayed here ten minutes. This delay, with fifteen minutes added, includes all the stops made in crossing. The character of the ice to this point is very good indeed, the route being over a paleocrystic floe which is quite level. The same may be said, with some few exceptions, of the route for the next two hours, when it changes to an undulating surface with deeper snow underlying a weak crust. However, the route is quite practicable and, on the whole, good.

At 3.05 p. m reached rubble ice but got through and along quite readily; at 3.55 reached Greenland shore at Promontory Point and pitched tent on an ice-foot extending along shore a few hundred yards.

March 3.—At 6.30 a. m. got up and cooked breakfast; Sergeants Brainard, Jewell, and I do the cooking in turn.

At 8.45 a. m. started south. Inspection yesterday afternoon and this morning before starting convinced me that no ice-foot exists along this coast. Later in the day I left the sledge on several occasions for the same purpose but always with the same result. A snow slope exists here and there, but is often interrupted by the floe-bergs, &c. We availed ourselves of level floes to a great extent, which sometimes approach close to the shore, and made fair progress though not without the occasional use of the ax. The traveling was found easier by keeping well out from the coast. Passed by three points, each of which we took for Cape Lupton as we approached it. On passing the last a wide plain came in view, extending back from the coast a long way. We discovered a black object in the distance, and at 2.17 p. m. reached the observatory and the wintering place of the *Polaris*. Passed the night in a hole dug in a snow-bank on the beach, which made a warm, comfortable sleeping place.

March 4.—The forenoon was occupied in taking an inventory of everything found. The list will be found appended. Hall's grave is in good condition, the original wooden headboard and the British headboard being in position, and everything apparently as when left. From a cairn near by I took a record left by the English. The grave of Hand, of the English expedition, was seen, and is in good condition. The range of hills which sweep in a circle from Cape Lupton to Lookout Mountain, and the range of mountains to the south which extend from the strait to Newman Bay, were easily identified. The plain is quite level but covered by such a thin layer of snow in most places that the rocky, stony surface of the ground is much exposed. Everything considered I thought it would be best to proceed from here to the mouth of Newman Bay via the plain and the head of the bay.

At 12.25 p. m. went south down the coast with Frederick and team and empty sledge, in order to find the best place to strike in to the eastward. The want of snow threatened to prove a serious difficulty. I had in mind also Lieutenant Beaumont's route across. After proceeding an hour and a half I found a small ravine which promised to furnish a route, for some distance at least, off the coast.

At 2.50 p. m. got back to observatory. At 6 p. m. went to bed.

March 5.—At 6.15 a. m. called cook. At 10.10 a. m. got off. Left the telescope behind in the snow-house constructed. I followed my tracks of yesterday, and at 11.30 got away from the beach and took an easterly course. Had little difficulty on account of the want of snow, to my surprise; though thin it seemed packed hard on the ground, and with a little care we avoided the bare ground. I soon found another ravine which enters the straits lower down. This became deeper and the country more broken until we emerged

on what is probably the water shed, an extensive plain stretching to the east as far as could be seen. We found this little broken by any deep water-courses, though the absence of snow was surprising. The thermometer registered −55.5 [−48.6° C.] and there was quite a perceptible breeze blowing in our faces.

At 3.55 p. m. reached some deep snow in a shallow ravine west of an apparently isolated mountain, towards which we had been traveling for one or two hours. Here we dug a hole through in 3½ or 4 feet [1 0m or 1.2m]. The ground was uncovered, the tent and poles were placed over it and snow over them, and here we passed a warm night, though very much cramped for room.

March 6.—At 4.45 a. m. called cook; at 9 a. m. got off, after digging out of our lodgings through the snow. A heavy snow-storm had prevailed during the night. It was still snowing, and the nearest land-marks were so obscure that traveling was by no means easy. The character of the country remained pretty much the same, the water-courses, like prairie drains, running to the east.

At 11.15 a. m. reached what I took to be Newman Bay, a perfectly level expanse, covered with snow, extending to the east, with nothing to break the surface but a group of rocks, which I thought might be an island. But the driving snow did not allow us to see very far. The isolated mountain of yesterday seemed to be the west extreme of a range of hills, the eastern end of which was to the north of us, and which I thought must mark the west shore of the bay. This point I made for, but soon discovered it was earth under my feet instead of ice, and on reaching it found mountains to the northeast of us and the undulations of land to the east.

Took from here a northeast direction.

At 1.05 p. m. strong wind and snow, making frost-bites frequent and traveling in its teeth very severe work. I determined to burrow into a good snow-bank near by. It took two hours and ten minutes to build our abode.

March 7.—The temperature being very low, and much wind, we remained in snow-burrow all day.

March 8.—Weather still very bad, but started out at 8 a. m., notwithstanding, to make an attempt. Frost-bites became so frequent that I returned in the course of an hour. Observation of temperature of snow house, opening (door) uncovered, no lamp, outside, −33° [−36.1° C.]; on floor, 6 feet [1.8m] from door, +3° [−16.1° C.]; 2½ feet [.76m] above floor, +31° [−0.6° C.]; roof, between five and six feet [1.5 and 1.8m] high, temperature, when lamp was burning, +36° [+2.2° C.] only. Just previous to this, however, a hole was cut in the roof and a piece of canvas placed over it to serve as a window, candles having been forgotten, and none brought on trip. The temperature, doubtless, afterwards got much higher than this. These experiments were performed just after return of the party.

March 9.—At 3.35 a. m. cook arose; at 5.15 a. m. breakfast; at 6.45 a. m. got off, and followed a slight surface drain, which gradually became a wide and deep ravine, leading us in a generally northeast direction (very winding). In this ravine, not far from the bay, four ptarmigan were seen. Here also I shot a hare.

At 9.20 a. m. on shore of Newman Bay; Reynold's Island not to be distinguished. I think we must have been some distance up the west coast. The whole bay is smooth and level. The snow on its surface hard. We traveled along very satisfactorily, though all had to walk. Yet the load consisted of little else than tent and sleeping-bag. The low temperature seemed to cause great friction. On little patches of ice met with, the sledge moved along very smoothly indeed. We walked almost continuously during the entire trip. There is no ice-foot along this coast.

At 3 p. m. reached Boat Camp. Found readily the whale-boat and the canvas boat. The former has one-half dozen oars by her side. Did not turn her over for want of time, and not regarding it as necessary. These boats are substantially as described in the English reports. The hole in the bottom of the whale-boat is hardly larger than one's hand; otherwise the boat seemed in good order and condition. Examined the bottom carefully.

At 4.15 p. m. reached a point at or quite near Cape Sumner, when we pitched the tent. The route from the Boat Camp here lies on a snow slope behind a row of heavy floe-bergs. The route could be made practicable for loaded sledges, only with several hours' work. I exercised my discretion and did not go to Gap Valley or Cape Brevoort. I think the depot should be either at the former or at the Boat Camp and both are inside the rough ice which crowds into the mouth of the bay from the straits. All inside of this line the ice is smooth and level. There seems to be a good route over some level floes which extended from the straits into the bay about midway between the two capes. Between the Boat Camp and Cape Sumner, extending some hundred yards from the shore, the ice is of the roughest description.

March 10.—Last night was cold and uncomfortable in the extreme. The sleeping-bag was unrolled with difficulty, and with as much labor we wedged our way in between the frozen folds.

At 3 a. m. cook arose. I deposited the tent and poles, sleeping-bag, one spade, one shovel, one snow knife, and a piece of cooked musk meat (about ten pounds) on the side of a small ravine or break in the cliffs, about 100 yards [91^{m}] west of Cape Sumner, or at least west of my camping place, and in a conspicuous position.

At 6.55 a. m. left camp and took a direct route for Cape Beechey. For some hours we traveled over level floes; then we encountered the undulating surface of paleocrystic floes, and afterwards made slow and laborious progress through rubble ice; then for an hour or two we traveled over a perfectly smooth, level floe. It coming on to blow and snow, so as to shut out even the nearest land, I inclined more to the right, and, after about an hour through bad rubble ice, at 3.15 a. m., reached the Grinnell Land shore, about a mile above Cape Beechey, traveling principally over a snow slope.

At 3.45 a. m. passed our outward tracks at old crossing.

At 5.20 a. m. reached snow house (depot B). The level floes which I speak of as encountering in the morning, seemed to extend south in a course nearly parallel to the coast, and probably as low as the Gap. I think that the best route to Cape Sumner lies in my original tracks across the straits till, perhaps, two hours from Promontory Point and the Gap, and then in taking advantage of the level floes which I have mentioned as extending south from Cape Sumner. My trail from Cape Sumner to Cape Beechey is not practicable for loaded sledges without much work with the ax.

March 11.—At 8.30 a. m. called cook; at 11.10 a. m. got off; at 2.05 p. m. passed depot A; at 5.15 p. m. arrived at station.

Appended will be found the meteorological report of Sergeant Jewell, as also the list of stores at Thank God Harbor.

Very respectfully,

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, A. S. O.

First Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant,
Commanding International Polar Expedition.

List of stores at Thank God Harbor and their condition.

½ barrel wheat, apparently good.
2 Enfield rifles (1862), apparently good.
⅓ canister gunpowder, small grain, in 100-pound canister, serviceable.
900 rounds Springfield cartridges, metal, cal. 50, apparently good.
1,000 cartridges, center primed, Navy pistol, cal. 50, apparently good.
1,000 cartridges, center primed, Navy pistol, cal. 50, apparently good.
1,000 cartridges, center primed, Navy pistol, cal. 50, apparently good.
8 brass hinges, 4 brass rowlocks, 6 brass castings, 8 brass castings, 2 brass hooks, good.
1 steel fox-trap, good.
1 pickax, without handle, good.
2 saws, carpenter's, good.
3 hatchets, good.
1 shovel, good.
2 shovels, bad.
1 box farina (about 30 or 40 pounds), *Polaris*, apparently good.
1 barrel cornmeal (of yellow color), good. (?)
6 cans pemmican (45-pound cans) for *men* to eat, good.
1 hammer, machinist's, good.
1 mattress (single), much worn.
1 5-man tent. (?)
½ barrel lime juice, good.
½ barrel pork (mess), bad.
2 water-breakers (boats), good.
1 grindstone (between 12 and 20 inches diameter), good.
1 bag tea (in barrel), spoiled.
3 shovels, bad.
2 dozen lead in straps, good.
1 12-man sledge, good.
1 5-man sledge, good.
10 barrels hard bread. (?)
1 small box minie-ball cartridges and caps, apparently good.
3 coverlets, felt, good.
1 waterproof floor cloth (for 5-man tent), serviceable.
3 25-pound bags No. 2 shot, good.
1 25-pound bag No. 2 buckshot, good.
2 volumes "Punch," bound, good.
1 book (———), good.

List of stores at Thank God Harbor and their condition—Continued.

1 book (Eulalie) good.
1 book (Foul Play), good.
1 book (Albert Nyanza) by Baker, good.
About 3 dozen panes glass, about 8 x 10, 8 x 12, &c., good.
2 snow knives, good.
1 tent brush, good.
1 box shotgun cartridges (center primed), apparently good.
1 20-foot ice-boat (complete), apparently, as well as could be ascertained without turning her over (she lays bottom up), excellent.
1 stove (cog-wheels and spindle), apparently good.
1 coil insulated wire on large iron cylinder. 1 can rum (English can about size of signal can and has about 3 inches in bottom), excellent.
1 sledge trough, serviceable.
11 crowbars (iron), good.
3 blue scarps, good.
2 cooking-lamps, good.

It should be added that as thorough an inspection as desirable of everything was not obtained, a cold wind with snow making such work very severe.

The observatory has three sides standing; the floor is also all right; the roof is gone. There are several planks and other débris scattered around, which probably once formed part of the observatory. Enough of these remain, I think, to complete the building once more. All stuff in the observatory was moved out and afterwards replaced and covered as well as practicable. Covered the barrels of hard bread with old canvas; their heads are all out.

Meteorological report of sledge party to Cape Sumner.

Date.	Time.	Barometer No. —.		Thermometer No. 1.		Wind.		State of weather.	Minimum thermometer.		Remarks.
						Direction.	Velocity.				
		In.	*mm.*	*Fahr.*	*C.*				*Fahr.*	*C.*	
Mar. 1	3 p. m.	29.65	753.10	—18.0	—27.8	SE.	Brisk	Lt. snow	------	------	At depot B.
Mar. 2	7 a. m.	29.36	745.73	—36.0	—37.8	NE.	Light	Clearing	—38	—38.9	Do.
Mar. 2	11 a. m.	29.04	737.60	—35.0	—37.2	NE.	Light	Fair	------	------	On the straits.
Mar. 2	1.13 p. m.	28.96	735.57	—37.0	—38.3	NE.	Light	Fair	------	------	Do.
Mar. 3	7 a. m.	29.03	737.35	—36.0	—37.8	NE.	Light	Cloudy	—45	—42.8	On Greenland coast, north of C. Lupton.
Mar. 3	7 p. m.	29.54	750.30	—25.0	—31.7	NE.	Brisk	------	------	------	Thank God Harbor.
Mar. 4	7 a. m.	29.65	753.10	—37.0	—38.3	NE.	Fresh	Fair	—37	—38.6	Thank God Harbor. Early of the morning of the 4th a heavy gale prevailed at Thank God Harbor, and also during the night of the 5th.
Mar. 5	7 a. m.	------	------	—50.5	—45.8	NE.	Light	Fair	—51	—46.1	East of Hall's Rest.
Mar. 5	11 a. m.	29.68	753.86	—55.5	—48.6	S.	Light	Fair	------	------	Do.
Mar. 5	2 p. m.	29.50	749.29	—52.0	—46.7	NE.	Light	Fair	------	------	Do.
Mar. 5	4 p. m.	29.42	747.25	—51.0	—46.1	NE.	Light	Cloudy	------	------	Do.
Mar. 6	6 p. m.	29.50	749.29	—36.5	—38.1	NE.	Fresh	Cloudy	—52	—46.7	Do.
Mar. 7	8 a. m.	29.57	751.06	—49.5	—45.3	NE.	Fresh	Cloudy	—52	—46.7	Do.
Mar. 7	11 a. m.	29.52	749.79	—44.0	—42.2	NE.	Brisk	Cloudy	------	------	Do.
Mar. 7	5 p. m.	29.50	749.29	—42.0	—41.1	NE.	Brisk	Cloudy	------	------	Do.
Mar. 8	8 a. m.	29.42	747.25	—35.0	—37.2	NE.	Brisk	Cloudy	—43	—41.7	Do.
Mar. 8	12 m.	29.28	743.70	—30.0	—34.4	NE.	Brisk	Lt. snow	------	------	Do.
Mar. 8	4 p. m.	29.29	743.95	—33.5	—36.4	NE.	Brisk	Foggy	------	------	Do.
Mar. 9	6 a. m.	29.41	747.00	—34.0	—36.7	NE.	Light	Cloudy	—35	—37.2	
Mar. 9	11 a. m.	29.69	754.11	—39.0	—39.4	NE.	Light	Cloudy	------	------	Newman Bay.
Mar. 9	4.15 p. m.	------	------	—40.0	—40.0						

APPENDIX No. 40.—*English records obtained at Thank God Harbor.*

[Arctic Expedition. H. M. S. *Discovery* at Bellot Harbour. Lat. 81° 44′ north, long. 65° 3′ west. 31 March, 1876.]

This paper is deposited by a sledge party, under Lieut. R. Archer of the *Discovery*, who came over to see the state of the provisions in depot here. The things seem to be good and serviceable. The following things were found here:

1,125 pounds pemmican (two-thirds sweet).
1,152 pounds preserved meat.
24 barrels of bread.
3 casks of pork.
2 casks of hams.
2 bags of bread.
2 cases farina.
2 casks of lime juice.
1 cask of molasses.
An observatory rather dilapidated, some few articles of clothing, two stoves, and a few other sundries.

We crossed straight over from Bellot Harbour to Cape Lupton and found the ice better in the middle but difficult travelling at the sides.

ROBERT H. ARCHER, *Lieut.*

Start, on our return to the ship, to-day, Ap. 2d. We leave in the observatory 10 rations of bread and 45 rations of stearine.

R. H. A.

PRINTED RECORD.

[H. M. S. *Discovery*, winter quarters, Bellot Harbor. Lat. 81 44 N., long. 65 3 14 W.]

On the 15th July, 1875, H. M. S. *Alert* and *Discovery* left Disco for Rittenbenk, arriving there on the 16th. Left on the 17th for Proven, passing through the Waigatt Channel. Anchored at Proven on the 19th. Embarked Hans Christian; left on the 21st, steaming inside the islands of Upernivik on the 22d, left again the same evening by the northern entrance, experienced dense fogs until discharging the native pilot off Kingatok on the 23d. Then shaped course to the northward of Brown Island, which was abeam at 4.30 p. m.; weather fine, clear, and calm. At 3.10 a. m. of the 24th ran into the middle pack ice of Melville Bay, lat. 73° 30′ N., long. 60° W., approx., patent log showing 63 miles from Brown Island. Ice from 2 to 6 feet [.6 to 1.8^{m}] thick, but much decayed. Steamed through the bay in 36 hours without difficulty, *Alert* proceeding to the Carey Islands and *Discovery* to Cape York; the two ships joined off the Carey group at midnight of the 26th. By 6 a. m. of the 27th, both vessels were on their way to Port Foulke, passing between Hakluyt and Northumberland Islands. Anchored in Hartstene Bay on the 28th. Captain Nares visited Littleton Island. Left Hartstene Bay on the 29th for Cape Isabella, *Alert* erecting a cairn south of that cape, and *Discovery* proceeding to Cape Sabine, where we were detained till the 4th of August (Smith Sound being completely blocked up with ice); rounded Cape Sabine and proceeded up Hayes Sound, intending if possible to pass to the westward of Henry Island; finding no passage we retraced our steps on the 6th, and secured to the ice in Franklin Pierce Bay on the 8th. Left again on the 9th, and made fast to floe under Cape Prescott till the 11th. Cut into dock in Dobbin Bay on the 13th.

Rounded Cape Napoleon on the 15th, and experienced great difficulty in getting to Cape McClintock, which was not reached till the 20th, lat. 80° 3′ N., long. 70° 37′ W. On the 21st observed open water in midchannel; we took advantage of it until reaching Joe Island, when a barrier of ice extending from Cape Moreton to Grinnell Land stopped further progress. Anchored in Bessell's Bay on the 23d. Left again on the 24th, unable to get to the northward of Newman Bay. We closed the SE. corner of Grant's Land, entering a large and deep bay on the north side of Lady Franklin's Strait named Bellot Harbour, the winter quarters of H. M. S. *Discovery*. The *Alert* left on the 26th, having embarked Lieut. Rawson, with 7 men and sledge complete, from this ship. The *Discovery* was frozen in on the 5th of September; no autumn sledging to the northward in Robeson Channel, or Lady Franklin's Strait to the westward, in consequence of water along the shore, as well as the sludgy state of the ice, which rendered it impracticable for either boat or sledge to make any progress.

We lost the sun on the 16th Oct., 1875, until the 29th Feb., 1876, making 135 days absent.

The winter was passed pleasantly and cheerfully, with very little sickness. The country abounds in musk-oxen, hares, ptarmigan, snow-bunting and lemmings, with two sorts of seals in the bay, so that we have had a liberal supply of fresh meat. The weather has been very cold but fine and calm. Our position is so well sheltered that we have only experienced two heavy gales. We have heard nothing of the *Alert* since August, 1875. Expect news before the 1st of April (1876). Intend visiting Hall's Rest when practicable.

All well up to this date.

[H. F. STEPHENSON], *Captain.*

25th March, 1876, received news. *Alert* wintered in lat. 82 27 N., long. 61 22 W. All well. Parties from *Alert* exploring north coast of Grinnell Land, and due north over Polar pack. Parties from *Discovery* exploring North Greenland and Peterman Fiord. Lady Franklin Straits is a deep sound bearing S. W., 60 miles, terminating in two small bays. All well to this date.

H. F. STEPHENSON, *Captain.*

10 MAY, 1875.

Lieut. Fulford and Sub-Lieut. Conybeare, with 18 men and 2 ice-boats, arrived here at 2 a. m. of the 12th May, 1876, having left H. M. S. *Discovery* at 8 p. m. of the 7th inst.

Capt. Stephenson, Mr. Hart (naturalist), Henry Petty, and Hans Christian (Esquimaux), with dog-sledge, arrived at 2 a. m. of the 12th May, having left *Discovery* at 8 p. m. of the 10th inst.

Dr. Coppinger, with Geo. Emmerson and 8 men in two sledges arrived here from "Refuge Harbour" at 7.30 p. m. of the 15th May, 1876. Dr. Coppinger parted company with Lieuts. Beaumont and Rawson on the 5th May, at Cape Stanton, their party being all well. Geo. W. Emmerson left H. M. S. *Alert* at Floe-berg Beach on the 2d inst., in lat. 82° 27′, long. 61° 22′ W.

Capt. Stephenson, Sub-Lt. Conybeare, Mr. Hart, and party of 27 men, left this harbor at 8.10 a. m., of the 17th May, 1876, for H. M. S. *Discovery*, Discovery Bay. All well.

Lieut. Fulford, accompanied by Dr. Coppinger, 2 men, and dog-sledge, leave at 10 a. m., this day, the 17th May, for Newman Bay, with depot for Lieut. Beaumont.

R. B. FULFORD, *Lieut., R. N.*

POLARIS BAY, *May* 17, 1876.

June 3rd—Lieut. Rawson arrived, with party of 4 men, having left Lieut. Beaumont about 40 miles along the coast, N. E. from Repulse Harbor. Lieut. Rawson was sent back from the advance party with J. J. Hand, A. B., suffering from scurvy, who died the night of his arrival here.

June 7th.—Lieut Fulford, Dr. Coppinger, and party returned from Peterman Fiord; they advanced to a distance of 30 miles, but were eventually stopped by glacier ice.

June 22d.—Lieut. Rawson and Dr. Coppinger, with dog-sledge, proceeded in search of Lieut. Beaumont and party (due at Hall's Rest, Polaris Bay, June 15th); Lieut. Rawson met the party in Newman Bay June 25th, the whole of them being sick with scurvy, 4 having to be carried on the sledge.

June 29th.—Dr. Coppinger, with Wm. Jenkins, Car Ute, and Chas. W. Paul, A. B., on dog-sledge, arrived at Hall's Rest at 12.30 a. m.; Chas. W. Paul, A. B., died that afternoon at 5.15 p. m.

July 1st.—Lieuts. Beaumont and Rawson, with remainder of party (two carried), arrived safely at Hall's Rest, Polaris Bay.

July 12th.—Lieut. Fulford, with dog-sledge, proceeded to H. M. S. *Discovery*, Discovery Bay (Bellot Harbor).

July 19th.—Captain Stephenson, with party of 6, arrived from the ship.

July 29th.—Intend leaving, with Lieut. Rawson and 7 men, for *Discovery* to-day. All invalids doing well. Lieutenant Beaumont, with remainder of party, hope to follow in a week.

H. F. STEPHENSON, *Captain.*

JULY 29th, 1876.

Augt. 7th.—Start to-day for Discovery Bay, accompanied by Dr. Coppinger and remainder of party (7); have waited since Friday (4th) on account of the very bad weather. Great quantity of ice has gone down the strait during this last gale.

L. A. BEAUMONT, *R. N., Lt.*

[H. M. S. *Discovery*. Winter quarters, Bellot Harbour. Lat. 81 44 N., Long. 65 3 14 W.]

H. F. STEPHENSON, *Captain*.

Duplicate of *printed record* on page 149:

March 28, 1876.

Received news of *Alert* on 25th March, '76. She wintered in the pack off the west coast of Robeson Channel, lat. 82° 27′ N., long. 61° 18′ 15″ W., close to the shore. "All well." Three sledges will follow the north coast of Grant's Land, now trending to the N. W., and this party endeavours to proceed to the northward over the ice. Parties from the *Discovery* will explore the north coast of Greenland and Lady Franklin's Straits.

H. F. S.

[Arctic Expedition, H. M. S. *Alert*, Floe-berg Beach, 82° 27′ N., 61° 22′ W., 30th April, 1876.]

MEMORANDUM.

The supplies of stores and provisions left in depot at Polaris Bay by the late American Arctic Expedition may be used if requisite by any travelling party arriving there from the *Alert* or *Discovery*. The commander of each party is held responsible that no waste or damage of either the provisions or fuel occurs during his stay. He is to separate from the stores such supplies as may be required to place his crew on the regulated scale of rations, and secure the remainder in the best manner possible. A book will be left at the store in which the commanding officer is to note the date of his arrival at and departure from the depot and the quantity of supplies he has used. He should also note any information in his possession, relating to the stores or the neighborhood, which might prove of value to future visitors. A copy of each entry in the store book is to be given to his commander on the return of the party to their ship.

G. S. NARES, *Capt. R. N., Comdg. Arctic Expdn.*

To Captain Stephenson, H. M. S. *Discovery*, and all in command of sledge parties arriving at the Polaris Bay depot.

Provisions in depot, 12th May, 1876: Preserved meat (?),* 926; American, 1,035; biscuits (all good) 1,990; tea, 356; hams, 570; stearine, 182; cask Indian meal, 1; cask wheat, 1; cask of pork, 1; cask of molasses, ¾; casks of lime-juice, 2; cask of pickles, 1.

R. B. FULFORD, *Lt.*

Depot left in boats, for Lt. Beaumont, consisting of 7 days for 17 men, or 119 rations, with the exception of pemmican, biscuit, tea, and bacon.

R. B. FULFORD, *Lt.*

POLARIS BAY, 11 *May*, '76, 2 *a. m.*

Lieut. R. B. Fulford and Sub-Lieut. Conybeare, with 18 men and 2 ice-boats, arrived from H. M. S. *Discovery*, Discovery Bay, lat. 81° 44′ N., long. 65° 03′ (?) W. Capt. Stephenson arrived same time with dog-sledge and 3 men. Issued, by his order, the following provisions to the party: Preserved (?) meat, 19; biscuits, 108 (?); tea, 2; stearine, 28; hams (?), 48; molasses (?), 4; pemmican (?), 85.

R. B. FULFORD, *Lieut.*

15th May, 7.30 *p. m.*—Dr. Coppinger, Geo. Emmerson, and C. Bell arrived from Repulse Harbour.

Issued, by Capt. Stephenson's order, depot for (?) Lieut. Beaufort: Biscuit, 42; tea, —; ham (in lieu bacon) 12; pemmican, 48; stearine, 9.

Additional provisions, issued by Capt. Stephenson's order: Preserved meat, 25; biscuit, 16; tea, —; pemmican, 12; ham (in lieu bacon), 6.

CRAWFORD CONYBEARE, *Sub-Lieut.*

Issued by order of Capt. Stephenson to Lieut. Fulford laying out depot 15th May, '76: Pemmican, 20; biscuit, 17½; stearine —; preserved (?) meat (?), 6.

R. B. FULFORD, *Lt.*

* Only letter-press copies of these records brought back, which, having been wet, are in places illegible. A. W. G.

Provisions, depot, —th May, '76: Preserved meat, 367; pemmican, 955; biscuit, 1,925 (?); tea, 30 10½; ham, 258; stearine, 160 (?); cask wheat, 1; cask molasses (?), 1; cask Indian meal, 1; kegs lime-juice, 2; pickles, 1.

17th May, 1876.—Issued by order of Capt. Stephenson: Preserved meat, 28; ham (in lieu bacon), 12; tea, 23 oz; stearine, 84.

CRAWFORD CONYBEARE, *Sub-Lt.*

Lt. Fulford, Sub-Lt. Conybeare, with 18 men and 2 ice-boats (20 ft. and 15 ft.), arrived here 2 a. m. of the 12th May, 1876, from H. M. S. *Discovery*, having left the ship 8 p. m., 7th inst. Captain Stephenson, Mr. Hart (naturalist), Henry Petty, and Hans Christian (Esk.), with dog-sledge, arrived at 2 a. m. on the 12th May, 1876, having left *Discovery* 8 p. m., 10th.

Dr. Coppinger, with Geo. Emmerson with 8 men and 2 dog-sledges, arrived from Repulse Harbour at 7.30 p. m. on the 15th May, 1876, the former having left Lts. Beaumont and Rawson at Cape Stanton on the 5th of May. All well. The latter from H. M. S. *Alert* at 11 p. m., on the 2d inst., Floeberg Beach, lat. 82° 27′ N., long. 61° 22′ W.

May 17th, 1876.—Capt. Stephenson, Mr. Hart (naturalist) Sub-Lt. Conybeare, and 27 men left at 8 a. m. this day for H. M. S. *Discovery*, Discovery Bay. All well. Placed, by captain's orders, record 20 ft. magnetic N. of Hall's grave.

Lt. Fulford, accompanied by Dr. Coppinger, 2 men, and dog-sledge, leave at 10 a. m. this day for Newman Bay with depot for Lt. Beaumont.

May 21st, 1876.—At 2 a. m. I returned with Dr. Coppinger and 2 men with dog-sledge from Newman Bay, having laid depot of 48 rations on the south side of that bay, about 40 yards from the ice-foot and marked by a flag. This on the west side of a small gully. Dr. Coppinger and his sledge came up.

May 22nd, 1876.—Took from depot: Pemmican, 220 lbs.; stearine, 15 (?) lbs.; hams, 32 lbs.; preserved meat, 6 lbs.; molasses, 1; lime-juice, 2.

I intend leaving at 9 p. m., the 22d of May, 1876, with 16 days' provisions, to explore Petermann's Fiord.

REGINALD B. FULFORD, *Lt. R. N., H. M. Sledge Faith.*

June 2nd, 1876, 9 *a. m.*—I arrived here with O'Regan and Rayner walking, having come in to fetch provisions, only being . . . and Hand and Bryant about 2 miles to the south. Have carried Hand on sledge (with scurvy) since May 19. Bryant has not been able to pull from on May 10. All well. Have taken pemmican, 4 lbs.; preserved meat and vegetables, 4 lbs.; biscuit, 4 lbs.; rum, 2 gills; ham (1). About one-half lb. lime-juice, frozen.

Am going back at once to sledge, which I hope to bring up to-morrow, but snow is very heavy, and my men are (?) at (?) her (?) done (?), so I may not be here till the 4th. I left Repulse Harbor May 20th.

WYATT RAWSON, *Lieut. R. N., H. M. Sledge.*

June 5 (?), 187–, 4 *p. m.*—Arrived here with sledge *Discovery* Ham'l (?), Bryant, and Regan.

WYATT RAWSON.

June, 187–.—Took from depot: Biscuit, 29 lbs. (?); stearine, 9 lbs.; teas (?), 1½ lbs.; ———, 16 lbs. lime-juice, — lbs.; preserved meat, 14 tins, or 32 (?) lbs.

WYATT RAWSON, *Lt.*

June 7, 6.30 *a. m.*—Lieut. R. B. Fulford, accompanied by Dr. Coppinger, L., and 8 dogs, arrived with H. M. sledge *Faith* from exploring Peterman Fiord.

WYATT RAWSON.

June 14, 1876.—Provisions drawn: Preserved meat, 84 lbs.; ham, 2; biscuit, 14 lbs.; stearine, 11 lbs.; molasses, 12 lbs.

WYATT RAWSON.

June 21, 1876.—Provisions drawn up to this date from depot: Preserved meat, 76 lbs.; biscuits, 56 lbs.; stearine, 6½; hams, 2; molasses, 4 gallons; tea (?), 2 (?) lbs.

WYATT RAWSON.

June 22nd, 1876.—I intend leaving, in company with Dr. Coppinger, for Newman Bay, to meet Lieut. Beaumont and party, who are only provisioned for the 27th of June. I am taking Hans and 8 dogs and 16 days' provisions.

Have drawn from depot: Pemmican (sweet), 180 lbs.; pemmican (plain), 45 lbs.; biscuit, 42 lbs.; stearine, 20 lbs.; molasses, 16 lbs.; tea, 3¼ lbs.; lime-juice, 4½ pt. (?); rum (for medicinal use), 3½ galls.

WYATT RAWSON.

Provisions remaining in depot 3rd July, 1876: Preserved meat, 529 lbs.; pemmican, 466 lbs; stearine 82 lbs. 4 *oz.*; tea, 20 lbs. 10 *oz.*; lime-juice, 1¼ carbs (?); molasses, (nearly) ½ cask (?).

June 28, *at* 11.45 p. m.: Dr. Coppinger arrived with an 8-man sledge and dogs, accompanied by Hans, carrying two of Lieut. Beaumont's sledge crew, with scurvy, C. Paul, A. B., L. Jenkins, carpenter mate.

REGINALD B. FULFORD, *Lt.*

1*st July*, 7 *a. m.*—Arrived at Hall's Rest. Lieut. Beaumont, Alexander Grey and —— —— —— 9 30, arrived, Lieut. Rawson, accompanied by Hans. They brought in the 8-man sledge drawn by the dog , on which were —— —— —— Peter Craig.

Expended besides (?) used (?) 3 July and 12: Preserved meat, 2 lbs; stearine, 2 lbs.; biscuit, 100 lbs.; tea, 1 lb. 1 oz.; pemmican, 93 lbs.; lime-juice,

Between 21 June and 3 July, 1876: Preserved meat (?), 98 lbs.; American meat (?), 40 lbs.; stearine, 8 lbs.; biscuit, 53 lbs.; tea, 1 lb. 1½ oz.; ham, 1 lb.; lime-juice, 3½ galls.; molasses (?),

R. B. FULFORD, *Lt.*

Expended between July 12 and July 19—1, from depot (?): Preserved meat, 120 lbs. (4 lbs. bad); biscuit, 70 lbs.; tea, 2 lbs.; ham (2), 24 lbs.

In depot, July 20: Preserved meat, 316 lbs.; pemmican, 371 lbs.; biscuit, 165 lbs.; tea, 17 lbs.; ham, 9 (108 lbs.); preserved meat and vegetables, 4 lbs.; molasses, 4 doz. (?) casks (?).

Provisions drawn, up to July 27, 1876 (?): Pemmican, 30 (?) lbs.; preserved meat, 106 lbs.; biscuit 106 lbs.; stearine, 20 lbs.; tea, 4 lbs.; ham, 4 (hams), 48 lbs.

Provisions, in depot, July 28: Pemmican, 340 lbs.; preserved meat, 218 lbs.; biscuit, 1,545 lbs.; tea, 13 lbs.; hams, 5 (60 lbs.); molasses, very little.

L. A. BEAUMONT, *Lt.*

Stowed in the house, August 4, 1876: 14½ casks (?) of bread, American; ¾ cask (?) of meat, American; ¾ cask (?) of meal, Indian corn (?), American; 1 case and 6 packets (?) (1 lb.) farina, American (?), (56 lbs.); 9 tins preserved meat, 68 lbs; 6 cans (?) pemmican (35 lbs. (?), American, + 10 lbs.), 28 (?); 10 lbs. tea; 2 6-men tents, with gage (?); 2 —— (?) cooking-stoves, complete, but ——— (?): 2 lamps, 1 stearine and 1 spirit (?); 3 pemmican-choppers; 6 water-bottles (?) (out of repair); 1 saw; 5 (?) snow-knives;

2 shovels; ——— and 1 spoon; 1 ladle; 1 pickax (no (?) handle); 1 hammer (American); 1 pair of shoes (?) and 1 old (?) boot (?), (American) (?); 1 case of pistol ammunition (?), American; 1 Sharps rifle; 1 magazine; — bags of shot (American); 7 oilskin coats; 1 8-man triangle; 1 8-man bottom (?).

Provisions from *Discovery:* 1¾ galls. rum (in 3-gall. tins (?)); 5 lbs. of sugar; 12 lbs. of stearine; 3 boxes matches (right-hand corner window).

Tent furniture: 2 Lower robes (5-man); 1 coverlet (5-man); 1 waterproof (5-man); 1 canvas floor-cloth.

Miscellaneous articles: 2 Punches (vols.); 3 books, Foul Play, Eulales (?), Albert Nyanza; 1 box English ammunition, 45 Snider and 24 gun; 1 box ——— soap, with ———, &c.; 2 8-man-tent guys; 2 8-man-tent spreaders; 1 box glass flasks (American); empty spirit can; 2 (?) galls; 2 (?) galls; 1 No. 9 flag; 1 old drawing-block, few leaves; 1 g. (?) trap, good working order; 1 extrang (?) old pair Aa. (?) boots; 2 Snider rifles.

Outside house, west side: 1 cask lime-juice (American); 1 barrel of pork; 2 provisions breakers (American); 3 cork cushions; old iron, assorted; 3 rolls bar lead; 1 roll insulator wire; 4 dredges; crowbars *ad libitum*.

South side: 12-man sledge (with boat bottom); 5-man sledge (trough and bottom); 4 8-man (?) cushion bottoms; 2 12-foot oars (15-foot ice-boat); 2 paddles; 2 sail, (12-man and 8-man, new); 5 8-man bottom; 2 hatchets.

North side: 1 20-foot ice-boat, complete.

L. A. BEAUMONT, *Lt., R. N.*

[Her Majesty's sledges *Stephenson* and *Alert*, 12 May, '76, at Boat Camp, south shore, Newman Bay.]

The above-named sledges, with party numbering ten, arrived here at 10 a. m., Wednesday, the 10th May, 1876, having crossed the Brevoort Peninsula from Repulse Bay via the Gap Valley, having visited and removed record from Hall's cairn.

Newman Bay on the way. Bound for Polaris (?) Bay via Newman (?) Bay and the south overland route. Been (?) snow (?) bound up to the present time. We have examined the boats and tents left here by the U. S. North Polar Expedition, and are about transporting with us to Polaris Bay such instruments and documents as we can carry. We can find only 7 lbs. oatmeal, 1 in the tent by the mouth of the ravine, 20 lbs. of biscuit in the lockers of the whale-boat which lies on the shingle. We find that the whaler can easily be repaired so as to be a good, serviceable boat, and we leave attached to the cylinder a box of copper tacks, with the aid of which and a piece of canvas or oilcloth or hide (all available), the damaged part in the bluff of her starboard bow can be made good. We cannot discover more than one seat. From this cairn the tent bears S. by W. about 400 yards [366^{m}], the whale-boat SW. by S. about 100 yards [91^{m}], the canvas boat SW. by W. 20 yards [18^{m}]. We find the 6 oars of the canvas boat. We removed the oars and placed them on the SW. larboard side of the whale-boat, not being able to find any oars belonging to whale-boat. We hope to start to-day for Polaris Bay. H. M. S. *Alert* has been wintering at Floe-berg Beach, lat. 82° 27′ N., and H. M. S. *Discovery* at Bellott Harbor, in lat. 81° 43′.

R. W. COPPINGER, M. D., *Surgeon.*

[31 Mch., 1876. H. M. S. *Discovery* at Bellot Harbor. Lat. 81° 44′ north, long. 65° 03′ W.]

This paper is deposited by a sledge party under Lieut. R. Archer, of the *Discovery* who came over to see the state of the provisions in depot here. The things seem to be good and serviceable.

The following things were found here: 1,125 lbs. pemmican (⅔ sweet); 1,152 lbs. preserved meat; 24 bbls. bread; 3 casks pork; 2 casks hams; 2 bags bread; 2 cases farina; 2 casks lime-juice; 1 cask molasses.

An observatory rather dilapidated. Some few articles of clothing. Two stoves and a few other sundries. We crossed straight over from Bellott Harbor to Cape Lupton and found the ice better in the middle but difficult travelling at the sides.

ROBT. H. ARCHER, *Lt.*

Start on our return to the ship to-day, April 2nd. We leave in the observatory 10 rations of bread and 45 rations of stearine.

R. H. A.

July, 1876.—[Letter-press copy illegible.]

March, 1876.—[Letter-press copy illegible.]

Lieut. Fulford and Sub-Lieut. Conybeare, with 18 men and two ice-boats, arrived here at 2 a. m. of the 12th May, 1876, having left H. M. S. *Discovery* at 8 p. m. of the 7th inst. Captain Stephenson, Mr. Hart (naturalist), Henry Betty, and Hans Christian, Esquimaux, with dog-sledge, arrived at 2 a. m. of the 12th of May, having left *Discovery* at 8 p. m. of the 10th inst.

Dr. Coppinger, with Geo. Emmerson and 8 men, in two sledges, arrived here from Refuge Harbor at 7.30 p. m. of the 15th of May, 1876. Dr. Coppinger parted company with Lieuts. Beaumont and Rawson on the 5 May at Cape Stanton, their party being all well. Geo. W. Emmerson left H. M. S. *Alert* at Floeberg Beach on the 2nd inst., in lat. 80° 27′ N., long. 61° 22′ W.

Captain Stephenson, Sub-Lieut. Conybeare, Mr. Hart, and party of 27 men left this harbor at 8.10 a. m. of the 17th May, 1876, for H. M. S. *Discovery*, Discovery Bay. All well.

Lieut. Fulford, accompanied by Dr. Coppinger, 2 men, and dog-sledge, leave at 10 a. m. this day, the 17th May, for Newman Bay, with depot for Lieut. Beaumont.

R. B. Fulford, *Lieut., R. N.*

Polaris Bay, *May* 17, 1876.

June 3d.—Lieut. Rawson arrived, with party of 4 men, having left Lieut. Beaumont about forty miles along the coast, NE. from Repulse Harbor. Lieut. Rawson was sent back from the advance party with J. J. Hand, A. B., suffering from scurvy, who died the night of his arrival here.

June 7, '76, Lieut. Fulford, Dr. Coppinger, and party returned from Peterman Fiord; they advanced to a distance of 30 miles, but were eventually stopped by glacial ice.

June 22.—Lieut. Rawson and Dr. Coppinger, with dog-sledge, proceeded in search of Lieut. Beaumont and party (due at Hall's Rest, Polaris Bay, June 15th). Lieut. Rawson met the party in Newman Bay June 25th, the whole of them being sick with scurvy, 4 having to be carried on the sledge.

June 29th.—Dr. Coppinger, with Wm. Jenkins, Car Ute, and Chas. W. Paul, A. B., on dog-sledge, arrived at Hall's Rest at 12.30 a. m. Charles W. Paul, A. B., died that afternoon at 6.15 p. m.

July 1st.—Lieuts. Beaumont and Rawson, with remainder of party (two carried), arrived safely at Hall's Rest, Polaris Bay.

July 12th.—Lieut. Fulford, with dog-sledge, proceeded to H. M. S. *Discovery*, Discovery Bay (Bellot Harbour).

July 19th.—Captain Stephenson, with party of 6, arrived from the ship.

July 29th.—Intend leaving with Lieut. Rawson and 7 men for *Discovery* to-day. All invalids doing well. Lieut. Beaumont, with remainder of party, hope to follow in a week.

H. F. Stephenson.

Aug. 7th.—Start to-day for Discovery Bay, accompanied by Dr. Coppinger and remainder of party (7); have waited since Friday (4th) on account of the ice and bad weather. Great quantity of ice has gone down the strait during the last gale.

L. A. Beaumont, *R. N., Lt.*

March 28*th*, 1876.—[Letter-press copy illegible.]

H. F. Stephenson.

March 28th, 1876.—Received news of *Alert* on 25th March, 1876. She wintered in the pack off west coast of Robeson Channel, lat. 82° 27′ N., long. 61° 18′ 15″ W., close to the shore. All well. Three sledges will follow the north coast of Grant's Land, now trending to the NW., and this party endeavours to proceed to the northward over the ice. Parties from the *Discovery* will explore the north coast of Greenland and Lady Franklin's Straits.

H. F. S.

APPENDIX No. 41.—*Dr. Pavy's orders to carry provisions to the Greenland coast.*

FORT CONGER, GRINNELL LAND, *March* 4, 1882.

SIR: You will leave this station March 5, at 8 a. m., or as soon thereafter as the weather will permit, to lay out a depot (E) on the Greenland coast.

Sergeant David Linn will accompany you, and you will use for this purpose the dog-sledge *Lilla*, with Eskimo Jens Edward for driver. The details for the trip will be arranged by you, but a list of all dead weights must be furnished prior to your starting.

There will be taken, from this station, one case cranberry sauce, one case milk, two sacks hard bread (126 pounds), one box containing butter, pepper, roast and corned beef, and, if your dead weights allow, a sack of pemmican. At depot B the sack of pemmican will be left and as much bread taken in its place as you judge can be carried.

The depot will be established on the Greenland coast as far north towards Cape Sumner as can be reached in one day's march from depot B. The depot will be left on land at such place as can be seen readily by a party traveling along the coast, and a red flag will be planted on a prominent point near it.

In returning, you will leave at depot E all dog-food and rations which shall not be indispensable to your safe and comfortable return to depot B.

The dogs may be fed, going and coming, from depot B. Hard bread, baked beans, and tea can be used therefrom, but no other articles except in case of necessity.

I inclose a map, which will be returned, with your route from Cape Beechey and the locality noted thereon.

The sledge journal, with a brief report covering all essential points, will be transmitted to me within forty-eight hours after your return.

I am, sir, respectfully yours,

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding Expedition.

Acting Assistant Surgeon O. PAVY, U. S. A.

APPENDIX No. 42.—*Dr. Pavy's report on journey ordered in Appendix No. 41.*

FORT CONGER, GRINNELL LAND, *March 11th*, 1882.

SIR: In accordance with your orders, the 5th of March, at 7.45 a. m., I left Fort Conger. Sergt. D. Linn and the Greenlander, Jens Edward, accompanied me; the last named driving the dog-sledge *Lilla*.

At 11.45 a. m. we reached Cape Murchison. (Temperature at the time, −49.4° [−45.2° C.], the minimum marked, since the last setting, −52.2° [−46.8° C.], and at 12.30 before leaving the Cape, −54° [−47.8° C.])

At 4.45 p. m. we were at the snow-house of Shift Rudder Bay. Temperature at 7.35 p. m., −35° [−37.2° C.]. Wind SSE.; stormy, with snow.

The next day, the 6th of March, being stormy, I did not deem it prudent to travel, and, therefore, remained in the house. During a part of the time, to save coal, I used my Eskimo lamps, and obtained a temperature of +26° [−3.3° C.], when the glass outside marked −34° [−36.7° C.]. At 3.20 p. m. my chronometer had stopped. I then set it by the watch of Sergt. Linn.

Temperature of the 6th of March: Minimum during the night, −36° [−37.8° C.]. At 7 a. m., −28.6° [−33.7° C.]; wind NNE., blowing a gale. At 12 m., −34° [−36.7° C.]; wind NNE., blowing a gale. At 7 p. m., −36.3 [−37.9° C.]; wind NNE., blowing a gale.

The 7th of March I woke up at 4 a. m. At 7 a. m. we started, and at 10 a. m. we left the ice-foot off Cape Beechey. From the shore, to about ¾ of a mile in the straits, the ice is of a very heavy kind, composed of boulders, hummocks, or rubble debris superposed or raised on their edges. Since last fall the ice of this locality has changed. At 10.35 a. m. we were clear of these difficulties, having reached an extensive floe of paleocrystic ice over which the travel was excellent. When about 2 miles from the shore left track of the sledge *Antoinette* and took an easterly course towards Cape Sumner. At 12 m. (travelling still excellent) we stopped for the purpose of melting ice, but. to my great annoyance, I discovered that the gallon tin

can containing alcohol had leaked, and that the reserved one had slipped from between the lashings of the sled at some point of the journey, that we were in the impossibility to precise. Jens walked back for about a mile, but was unsuccessful in finding the lost spirit of wine.

Shortly after 1 p. m. we resumed our march, travelling over small paleocrystic floes and hummocky ice of this year's formation. Until 3 p. m. the travelling may be said to have been fair. After 3 p. m., when about 6 miles from the Greenland coast, the floes became smaller and the hummocks heavier; in a word, the travelling more difficult. Two hours more of working and hard pushing behind the sledge brought us to about 2 miles from the coast, where we raised the tent and camped at 5 p. m. I was then just in view of a large gap in the cliffs at the point marked on my map.

This locality will easily be found, being distinctly visible even from Cape Beechey. During the day at no time I could see (on the Grinnell Land coast) further north than half way between Wrangell Bay and Lincoln, and that at times only through a misty atmosphere. To the south we could see the coast as far as Cape Lieber.

On the Greenland side the view could only embrace Polaris Promentory [*sic*], with Cape Sumner to the north.

Temperature of the day: Minimum during the night, −40.7 [−40.4° C.]. 7 a. m., −35.3 [−37.4° C.]; wind, NE. 12 m., −28.0° [−33.3° C.]; wind, NE. 5 p. m., −38.5 [−39.2° C.]; wind, NE. Wind blowing a gale all day.

March 8th.—In wakening up in the morning I found that my chronometer and the watch of Sergt. Linn had stopped. The weather was thick, with a sharp breeze. Assuming the time to be six o'clock I cooked breakfast, and at 8 a. m., leaving the tent pitched, we started with a load of provisions to be deposited on the Greenland shore.

At 9 a. m. the strength of the wind had increased to fifteen to twenty miles per hour [6.7 to 8.9^{m} per second]. We were in a storm of drifting snow from the ENE.

At 12 m., after having travelled over very heavy ice, we reached the coast at the gap above mentioned, deposited the provision, except the sack of pemmican (with the addition of 2 cans of beef, 2 cans of beans, and 2 of milk from my own stores), behind a large eratic [*sic*] block about midways between the sides of the gap. This block, elevated about thirty or forty feet [9 or 12^{m}] above the ice foot, is of a bright yellow color, forming a striking contrast with the slaty, devonic limestone of the neighborhood.

Over the depot I planted the signal flag, and with the empty sledge returned to the locality where the tent had remained pitched.

The weather was so thick that when on the coast we could scarcely see further than about a quarter of a mile.

The storm at 3 p. m. had abated some. We then packed our sledge, and, following the tracks made the preceding day, we arrived at 7 p. m. at about three miles from Cape Beechey.

My intention was to reach the snow-house that evening, but Sergt. Linn being too tired to proceed further, I camped.

Temperature of the day: Minimum during the night, −42.0 [−41.1° C.]. 7 a. m., −33.4 [−36.3° C.]; wind NE. 2 p. m., −28.2 [−33.4° C.]; wind NE. 7 p. m., −37.0 [−38.3° C.]; wind NE.

March 9th.—The grey dawn was just breaking, and I had slept very comfortably all night, when a sensation of heat against my back woke me up. At first I thought that one of the dogs had crawled in the tent; but I soon found out that the heat proceeded from the body of our driver Jens, who, by kindness, thinking that Sergeant Linn was sick, had preferred to sleep out of the bag without any covering than to discomfort him. The good man escaped with only one toe frost-bitten, and that by a temperature −41.7 [−40.9° C.].

Not being able to cook breakfast we started at 6 a. m., and at seven reached the ice-foot of Cape Beechey. At 9 a. m. we entered the snow-house after feeding the dogs and cooking breakfast; at 12 m. we resumed our homeward journey, reaching Fort Conger at 6.40 p. m.

Temperature: Minimum during the night, −41.7 [−40.9° C.]. At 12 m., −31.0 [−35.0° C.]. At Cape Murchison the minimum had been −35.0 [−37.2° C.]. At the time we passed, 3.30 p. m., −31.0 [−35.0° C.].

The assistance rendered by Sergt. Linn during this journey has been of great help to the accomplishment of the undertaking. The services of Jens are invaluable.

I am, very respectfully, your obt. servant,

OCTAVE PAVY,
Act. Asst. Surgeon, U. S. A.

Journal of a sledge journey to carry provisions to the Greenland coast.

March 5th.—Left Ft. Conger 7.45 a. m. Reached Cape Murchison at 11.45 a. m., and the snow-house at Shift Rudder Bay 4.45 p. m.

March 6.—Wind blowing. Remain all day in the house. Chronometer stopped. When burning Eskimo lamps temperature raised to +26° [−3.3° C.]; glass outside —34° [−36.7° C.].

March 7.—Woke up 4 a. m. Started at 7 a. m. At 10 a. m. left ice-foot off Cape Beechey. Ice changed since the fall. At 10.35 clear of the difficulty and travelling on a good paleocrystic floe. At 12 m. stopped; found one can of alcohol leaking and the reserved one lost. At 3 p. m., at about 6 miles from the Greenland shore, floes bad. Raise the tent at 5 p. m., about two miles from the coast. To-day wind blowing hard.

March 8.—Chronometer and watch stopped. Weather thick; wind blowing. At 6 a. m. cooked breakfast. At 8 a. m. left the tent pitched and started with provisions. Ice exceedingly rough; very heavy storm all day. After 9 a. m. storm very heavy, 15 to 20 miles per hour [6.7 to 8.9^{m} per second], from E. N. E. At 12 m. reached the coast and left depot; returned to the tent at 2.30 p. m. At 3 p. m. were travelling homeward. At 7 p. m., about three miles from Cape Beechey, camped on the ice.

March 9th.—Jens has slept out of the bag. At six a. m. we started without cooking breakfast. At 7 reached the ice-foot at Cape Beechey. At 9 arrived at snow-house, fed dogs, and cooked breakfast. Started at 12 m. Arrived at Fort Conger at 6.40 p. m.

OCTAVE PAVY,
Act. Asst. Surgeon, U. S. A.

APPENDIX No. 43.—*Sergeant Brainard's orders to move boat to Greenland coast.*

FORT CONGER, GRINNELL LAND, *March* 13, 1882,

SERGEANT: Weather permitting, you will leave this station at 7 a. m., March 14, to establish depot E in Newman Bay. Sergeants Linn; Ralston, and Elison, Privates Biederbick, Connell, Schneider, and Whisler will form your party. The English eight-man sledge, with the boat *Discovery* and its contents, will be hauled from its present location near Distant Cape, together with such stores for depot E from this station as may be furnished you.

At depot B two sacks of pemmican will be left, and in its place will be taken the bag of supplies cached about three miles east of Cape Beechey. You will travel directly east across Robeson Channel until near the Greenland coast; then, inclining to the northeast, you will deposit the boat in the "gap" where depot E is now established. The supplies, forming old depot E, will be taken, and will be deposited with all others in hand at a place to be selected by you in Newman Bay. In case you enter Newman Bay near the center it will be best to proceed to the land near Gap Valley.

At the point where the depot is established a snow house will be built or excavated from a snow-bank, and a flag left flying over near the depot. Six days' rations will be taken on leaving depot B. Bread, coffee, butter, beans, and corned beef can be used from depot B.

Meteorological observations, as usual, will be made by Sergeant Ralston.

You are cautioned particularly against traveling in stormy or windy weather. You must frequently question your party as to their condition, and avoid overwork. A four-man sleeping-bag will be taken from here, one two-man bag from depot A, and also one from depot B; these bags must be returned to their respective stations. A careful sledge journal will be kept, which, with a detailed report, must be submitted to me, in writing, two days after your return. The time of all halts and starts will be noted as well as the character of the ice passed over in the interval. All watches will be compared daily, and the result noted. The men will serve in turn as cooks, and but sixteen ounces (one pint) of alcohol will be allowed for each meal. All articles of food which you can spare on your return will be left at depot E, and the wall-tent will be left carefully cached at Cape Beechey. I trust your speedy and safe return may be soon noted. You must bear in mind that you start in a temperature of about −40° [−40° C.], and at an almost unparalleled early season of the year.

A. W. GREELY,
First Lieut., Fifth Cavalry, Acting Signal Officer and Assistant,
Commanding Expedition.

Sergeant D. L. BRAINARD,
U. S. Army.

List of stores for depot E.

6 cans extract of beef (to be obtained at depot B).
1 can of desiccated potatoes (to be obtained at depot B).
5 pairs large snow-shoes (three to be obtained at depot B).
2 45-lb. cans lime-juice, pemmican (one to be obtained at depot B).
6 cans extract of mutton.
24 cans milk.
10 3-lb. cans butter.
50 lbs. bacon.
1 bag Lt. Lockwood rations (to be obtained 3 miles east of Cape Beechey).
24 cranberry sauce.
4 ¼-boxes black pepper.
12 2-pound cans corned beef.
2 bags bread (126 lbs).
4 2-pound cans roast beef.
12 3 pound cans of butter.
} To be obtained at depot E, in gap 4 miles SW. of Cape Sumner.
2 oars for boat (to be obtained at Cape Beechey).

APPENDIX No. 44.—*Sergeant Brainard's report on trip ordered in Appendix No. 43.*

FORT CONGER, GRINNELL LAND, *March* 21, 1882.

SIR: I have the honor to submit to you the following report of a sledge journey, performed under my direction, for the purpose of placing the boat *Discovery*, together with a few supplies, on the Greenland coast in the vicinity of Newman Bay.

In compliance with your instructions, dated March 13, 1882, I left the station at 6.25 a. m. the following day, accompanied by Sergeants Linn, Ralston, and Elison, Privates Biederbick, Connell, Schneider, and Whisler.

We reached the large English sledge containing the *Discovery* at Distant Cape, where it had previously been placed, at 8.07 a. m., and loading the supplies brought us by Sergeant Rice with the dog-team, were again on our course at 8.15 a. m.

Although our load scarcely exceeded one hundred and twenty-five pounds to each man, yet so great was the friction of the broad runners on the crisp snow, that it was advanced only with the greatest difficulty, with frequent and repeated halts for rest. Our progress became so slow and unsatisfactory that I decided to cache the two sacks of pemmican at a point on the coast about one-half mile north of Water-course Bay. The sacks were carefully covered with snow and a small cairn left to indicate the spot. We reached depot A at Cape Murchison at 11.15 a. m., and halted for a few moments to secure the sleeping-bag and to partake of a light lunch. Soon after crossing St. Patrick Bay some of the men began to show signs of the excessive strain to which they were being subjected, and to which they were unaccustomed, but to stop was impossible, as we had sleeping accommodations for only six men; the other bag for the party being at Cape Beechey.

The snow-house (depot B) was reached at 6.05 p. m. The party was nearly exhausted from the severe toil of the day, and all complained of lameness in their lower limbs. The snow was quite deep and just strong enough to break under our weight when we thought it was going to sustain us. On the whole, however, I considered the traveling fair. Minimum temperature, −53.5 [−47.5° C.].

The following morning (March 15) found us again in the traces by 7 o'clock. We continued up the coast to Cape Beechey, where we entered on the floe at 12.30 p. m. In the belt of rubble-ice near the shore we were detained for a few minutes in relashing our boat to the sledge from which it had become loosened.

The traveling was wretched, the cold intense, and our load dragged heavily. The men became so tired that whenever a halt was called they would at once quit the drag-ropes and prostrate themselves on the snow, notwithstanding the low temperature. Halted at 4.15 p. m., and pitched our tent under the lee of a large floe-berg, which extended promises of protection from the winds which were liable to spring up during the night.

Schneider complained bitterly of soreness in his joints, together with rheumatic pains, which caused me no little anxiety during the night. Minimum temperature, −61.0 [−51.7° C.]. The next morning (March 16) his condition was greatly aggravated. He could scarcely walk, and his gums were badly inflamed and swollen. Fearing that these were scorbutic symptoms, I directed Biederbick to accompany him back to the snow house at depot B, and to there await our return from the Greenland coast, meanwhile using such stores as were, in his judgment, necessary to improve Schneider's condition.

As only six members remained to the party it was necessary to relieve ourselves of a portion of our weight. So cacheing 90 pounds of pemmican, 48 pounds of milk, and 14 pounds of desiccated potatoes, we were again on the road by 9 o'clock. The sufferings of the men from the effects of thirst became so great that I ordered a halt at 12.30 p. m., for the purpose of melting ice. This consumed forty minutes, but the party felt so greatly refreshed, and worked so cheerfully and vigorously, that I believe the halt was economy rather than waste of time. Snow began falling at 2.15 p. m., and the Greenland coast was obscured in consequence. From this time we shaped our course by the compass attached to the small aneroid barometer. The storm increasing in density and force I decided to camp at 3.40 p. m. We had traveled over new ice the greater part of the day, but had also encountered a few paleocrystic floes. The latter were a great improvement over the former in point of traveling. The snow at all times was deep and soft, and our utmost strength was required to move the sledge forward. Frequently a tangle of rubble was met with, which would be so rough and uneven that a road or canal had to be cut before the sledge could pass. Minimum temperature, $-44°$ [$-42.2°$ C.].

On the morning of the 17th March the snow had ceased falling and the abrupt cliffs of Polaris Promontory were again visible, and apparently not more than five miles away. I was in a dilemma. Your verbal instructions, limiting my time on the floe to five days, were explicit and imperative. If I went to Newman Bay, in accordance with your written instructions, I know, from former experiences in sledging, that four days more at least would be required to complete the journey. If I left my tent pitched where we were then in camp and made the journey to the Gap, depositing the provisions and boat, and returning to the tent the same night, I could probably reach depot B with my party within the time specified. After a careful consideration, I decided to adopt the latter course, and adhere strictly to your instructions. Leaving the tent standing, with all our baggage inside, we started at 7 a. m. The party, although lame and sore from the effects of their severe labors, were in excellent spirits. It being St. Patrick Day, the only Irishman in Grinnell Land (Connell), assisted by two or three others, warbled joyously the Irish melodies which are popular and appropriate on such occasions.

During the night some of the men thought an animal could be heard walking stealthily about the tent outside, and in the morning it was unanimously agreed upon that our only weapon, the revolver, then on the sledge, should in the future be kept in the tent as a protection against wild beasts. A careful examination of this weapon, however, revealed the fact that it had not been loaded for weeks, and that the ammunition intended for its use had been left snugly stowed away in the snow house at Cape Beechey.

We plodded slowly along through the deep snow, finally reaching the Gap at 11.20 a. m., where the supplies comprising depot E were readily found. We placed the boat above the ice-foot and piled boxes about it in such a manner as to secure it from harm. On making an examination of the condition of the boat before leaving, it was found that the strain to which she had been subjected had made several large cracks along her keel. These are unimportant, however, and may be repaired easily.

We began an excavation in a snow-bank, but fearing that our tracks would be obliterated by the northeast wind, which had risen suddenly, we immediately started back, reaching the tent at about 3 p. m. Several received frost-bites about the face during the homeward march. In a short time the wind rose to a velocity estimated at twenty-two miles per hour [9.8^{m} per second], and the air was so densely filled with drifting snow that it was impossible to distinguish objects more than one hundred yards [91^{m}] distant. Minimum temperature, $-43°$ [$-41.7°$ C.].

March 18.—The men suffered greatly during the night from the intense cold. Sleep was out of the question, and the cook was only too glad for an excuse to get up at 4 o'clock. The trials of this functionary can only be appreciated by those who had performed the same duties under similar circumstances. Without patience and fortitude none can hope to succeed in cooking a breakfast when the temperature is below minus forty. We were ready to start at 6 o'clock, but were delayed by a brisk wind until nearly 8. No event worthy of note occurred during the march. We camped at 1 p. m., four miles from Cape Beechey.

The bag of provisions which Lieutenant Lockwood and party had left near this place, was hauled to the tent, which I decided to leave standing, rather than cache at Cape Beechey. The stores which we had abandoned on our outward trip were also hauled and deposited there. Towards evening the wind died away and the sun shone brightly. Minimum temperature, $-43.2°$ [$-41.8°$ C.].

The next morning (March 19) the cook got up soon after 1 o'clock, to avoid the tortures which our wretched sleeping-bags inflicted. The large buffalo bag was frozen so hard that it resembled sheet-iron in point of pliability. Not a man of the four who occupied it slept for a moment during the long dreary night.

They were not able to get into it at once, but were, from necessity, compelled to thaw their way in gradually by first inserting their feet. A northeast wind, which had prevailed during the night, delayed our start until 5 a. m. We left the tent pitched in the shelter of a large floe-berg and placed the provisions inside. It was then carefully closed, and a small, red flag planted on the summit of a floe-berg, about 15 feet [4.5^{m}] above the main floe, which serves well to mark the spot. It is due east from Cape Beechey, and distant about four miles. Cape Beechey was reached at 7 o'clock and the snow house at 10 a. m. We were greatly rejoiced to find that Schneider had greatly improved in health under the skillful treatment of Biederbick. The latter informed me that he had experienced considerable difficulty in getting him to the shelter of the hut, and that his care of the sick man until our arrival had been unremitting.

The remainder of the day was spent in clearing away the snow which had formed in great drifts about the hut, and under which lay many of the tools left here last autumn. All the instruments thus covered, with the exception of one shovel, were found. The Hudson Bay sledge, which we left here last autumn, could not be found.

Dr. Pavy, Sergeants Rice and Jewell, and the two Eskimo drivers arrived from Fort Conger at 3.30 p. m., en route to Cape Joseph Henry.

We left depot B at 3.45 a. m., March 28, and reached depot A at 9 o'clock, where we halted for a short time for lunch. Schneider had walked along ahead of the sledge during the morning, but at his earnest appeal I allowed him to take his place in the drag-ropes, with the understanding that I was to be informed if the old symptoms returned.

Arrived at Fort Conger at 3.30 p. m. The party, as might be expected, were very tired, but all returned in good health. A few superficial frost-bites of the fingers and about the face are the only accidents which I can record. Considering the unprecedented low temperatures in which we traveled, from the first to the last day, it is certainly marvelous that more serious cases of freezing did not occur.

Sergeant D. C. Ralston was indefatigable in his efforts to secure meteorological data. His report of the same will be found appended.

One of our two watches stopped some time during the first night, and, in consequence, no comparisons were made. I found the allowance of four ounces of alcohol to each man per day, for cooking purposes, to be insufficient during extremely cold weather. At all times one-third more was required; once double the allowance was used.

I cannot speak too highly of the admirable behavior of the party under my charge during our absence from Fort Conger. The courage, zeal, and fidelity which they displayed in the performance of their duties is highly commendable.

Trusting that the course which I adopted—although not in strict accord with your instructions—will meet with your full approval,

I am, very respectfully, your obedient servant,

D. L. BRAINARD,
Sergeant, General Service, U. S. A.

Lieut. A. W. GREELY,
Fifth Cavalry, U. S. A., Acting Signal Officer and Assistant,
Commanding Lady Franklin Bay Expedition.

Report of observations made on sledge journey to the Greenland coast under charge of Sergeant D. L. Brainard, leaving this station March 14, 1882, and returning March 20, 1882.

Date.	Time.	Barometer.		Observed temperature.		Minimum temperature.		Weather, direction of wind, &c.	Remarks.
		Inches.	*mm.*	*Fahr.*	*C.*	*Fahr.*	*C.*		
Mar. 14	11.15 a. m.	-------	-------	—44.0*	—42.2*	—49.8*	—45.4	----------	* Min. ther. No. 560 exposed at Cape Murchison. Partially exposed to sun.
	1.00 p. m.	29.62	752.33	—44.0	—42.2	-------	-------	Calm and clear	
	3.00 p. m.	29.63	752.59	—46.0	—43.3	-------	-------	Calm and fair	
	7.00 p. m.	29.63	752.59	—53.5	—47.5	-------	-------	Calm and fair	Min. ther. set at 7 p. m.
Mar. 15	7.00 a. m.	29.95	760.72	—50.0	—45.6	—61.0*	—51.1*	Calm and fair	* Index point in bulb and below scale reading, viz, —60 [—51.1° C.]. Estimated one degree below [—51.7° C.].
	9.00 a. m.	29.72	754.87	—39.0	—39.4	-------	-------	Calm and fair	
	11.00 a. m.	29.69	754.11	—40.5	—40.3	-------	-------	Calm and fair	
	3.00 p. m.	29.72	754.87	—41.0	—40.6	-------	-------	NE., light, clear	
	5.00 p. m.	29.70	754.37	—43.5	—41.9	-------	-------	----------	Min. ther. set 4.45 p.m.
Mar. 16	8.00 a. m.	30.02	762.49	—39.0	—39.4	—44.0	—42.2	NE., brisk, cloudy	
	11.00 a. m.	29.95	760.72	—35.0	—37.2	-------	-------	NE., brisk, cloudy	
	1.00 p. m.	29.96	760.97	—35.5	—37.5	-------	-------	NE., light and fair	
	3.00 p. m.	29.98	761.48	—33.5	—36.4	-------	-------	SE., light snow	Lt. snow began 2.15 p. m.
	4.00 p. m.	30.02	762.49	—33.0	—36.1	-------	-------	Calm, light snow	Lt. snow ended 4.30 p. m.
Mar. 17	7.00 a. m.	30.31	769.86	—35.0	—37.2	—43.0	—41.7	Calm and fair	
	9.00 a. m.	30.27	768.84	—33.0	—36.1	-------	-------	NE., fresh and cloudy.	
	3.00 p. m.	30.27	768.84	—35.5	—37.5	-------	-------	NE., brisk, cloudy	Min. ther. set 3 p. m.
	5.00 p. m.	30.38	771.64	-------	-------	-------	-------	NE., brisk,* cloudy	* Estimated 22 miles per hour [9.8m per second.]
	Air filled with drifting snow, and impossible to distinguish objects 100 yards [91m] distant.								
Mar. 18	8.00 a. m.	30.35	770.88	—41.0	—40.6	—43.2	—41.8	NE., fresh	
	12.00 noon	30.23	767.83	—34.5	—36.9	-------	-------	NE., fresh	
	2.00 p. m.	30.22	767.57	—31.2	—35.1	-------	-------	NE., light and fair	Min. ther. set at 2.30 p. m.
Mar. 19	5.00 a. m.	30.25	768.34	—28.5	—33.6	—36.0	—37.8	SE., light and cloudy.	
	6.00 a. m.	30.22	767.57	—28.0	—33.3	-------	-------	SE., light, cloudy	
	7.00 a. m.	30.23	767.83	—27.0	—32.8	-------	-------	SE., fresh, light snow.	Lt. snow began 6.30 a. m.; snow ended 9.20 a. m., wind subsiding same time.
	10.00 a. m.	30.23	767.83	—26.8	—32.7	-------	-------	Calm and fair	
	11.38 a. m.	-------	-------	—37.5*	—38.6*	—57.0*	—49.4*	----------	* Min. ther. No. 560 at Cape Murchison, as read by Sergeant Jewell.
	1.00 p. m.	30.45*	773.42*	—33.0	—36.1	-------	-------	N., fresh and fair	* Inside ice-house. Outside of ice-house, after 5 mins. exposure to open air, 30.33 [770.37mm]. At 1 p. m. temp. of ice-house, farther side from stove, party of 8 men inside and coal fire burning, + 39.3 [+4.1° C.].
	7.00 p. m.	30.43	772.91	—37.0	—38.3	-------	-------	N., light and fair	Min. ther. set 7 p. m.
Mar. 20	3.00 a. m.	30.38	771.64	—37.0	—38.3	—38.8	—39.3	----------	
Mar. 20	9.05 a. m.	-------	-------	—28.0	—33.3	—43.8	—42.1	----------	Min. ther. No. 560 at Cape Murchison.

Instruments used during trip: Aneroid barometer No. 6, minimum thermometer No. 1.

D. C. RALSTON,

FORT CONGER, GRINNELL LAND, *March 21, 1882.* *Sgt., Signal Corps, U. S. A.*

APPENDIX No. 45.—*Sergeant Jewell's report on trip to Lincoln Bay, while supporting Dr. Pavy.*

FORT CONGER, GRINNELL LAND, *March* 30, 1882.

SIR: I have the honor to make the following report of my sledge journey to Lincoln Bay, made in compliance with your orders of March 15, to support Dr. Pavy and party on their expedition of discovery, to the north of Cape Joseph Henry.

The party, consisting of Dr. Octave Pavy, Sergeant George W. Rice, Signal Corps, U. S. A., Jens Edward, driver of dog-sledge *Lilla*, and Sergeant W. S. Jewell, Signal Corps, U. S. A., with Frederick Christiansen, driver of dog-sledge *Antoinette*, left Fort Conger, March 19, at 9.40 a. m., arriving at Cape Murchison at 12.38 p. m. Upon our arrival in the straits the wind increased to a fresh breeze from the NE.

The temperature at depot A was — 30.5 [−34.7° C.], which made the traveling particularly disagreeable, although the fog, which had all the morning been hanging over the channel, began to clear away, and when we reached depot B the Greenland coast was plainly visible. We here found the party under Sergeant Brainard, who had been sent across the strait on the 14th instant with a boat and supplies to be used in connection with the Greenland exploring party under Lieutenant Lockwood. The accommodations at this place being too limited for so large a party, Sergeant Rice and myself built a snow house of sufficient size to accommodate our whole party, in which we spent a very comfortable night. I awoke at 1 a. m. and found the temperature to be one degree below zero [−18.3° C.]. The minimum temperature for the night (open-air exposure) being −41° [−40.6° C.].

After completing our loads from the supplies at this depot we started at 10 a. m. (20th), finding the traveling good until we reached Cape Beechey at 11.45 a. m., where huge masses of ice had been thrown across the ice-foot, completely blocking our passage. Here our trouble began, for, owing to the unusually high tides prevailing, it was with considerable trouble that we succeeded in getting on the firm ice. This was of that character known as "rubble-ice," with an intermixture of floe-bergs, and so rough that an ax had to be in constant use making roads, in order to make any progress at all, and even then requiring the united strength of the whole party to get the heavily loaded sledges over some of the rough places.

This tiresome monotony was only relieved once, when, about three miles from Cape Beechey, we found an ice-foot which we were able to use for about a mile, after which we were again obliged to take to the ice. When first crossing the ice-foot the exclamation of "Nanook," from Jens, the Eskimo, drew our attention to the tracks of a polar bear. They were very plain, and showed him traveling to the south. At 7 p. m. we crossed to the ice-foot, found a snow-bank, made a dug-out, and retired for the night. Distance made good during day, 10 miles. Minimum temperature, from 7 p. m. (20th) to 9 a. m. (21st), was −22° [−30.0° C.].

We started from the snow house at 11.15 a. m., and found no improvement in the traveling, being a continual fight with the ice until we reached Wrangel Bay, at 5 p. m., where we were obliged to halt for the purpose of relashing the sledge *Lilla*, which had become weakened by the rough ice. At 5.30 p. m. we began crossing the bay, getting about half-way, where we camped at 7 p. m. The tent being too small to accommodate the whole party, I found a snow-bank in which I made a dug-out just large enough for Rice and myself to crawl into.

During the day I observed several fine specimens of paleocrystic floe-bergs; on some of them the strata were very plain and well defined, apparently from eighteen to twenty-four inches [457 to 610^{mm}] in thickness, and in numbers varying from five to twelve, according to the size of the berg. The difference in the formation of the strata was well marked, some being purely crystal, and others of a whitish or milk color, indicating the presence of snow in its construction. Distance made good, six miles. Minimum thermometer, from 7.30 p. m. (21st) to 7 a. m. (22d),−24° [−31.1° C.].

At 9.30 a. m. we began the day's march, and found a great improvement in the ice; for as soon as we got clear of Wrangel Bay we reached a floe of new ice which extended above Mount Parry. At this point a cache was made last year by Dr. Pavy, consisting of hard bread and pemmican. As we crossed the ice-foot we again discovered the tracks of a bear, the farthest north that evidences of a living one have ever been seen. Upon investigating the cache we found that he also had discovered it as there was but a small amount of the pemmican left, while the bread bags were torn in shreds. But we were able to save most of the bread as he did not appear to relish this article as a diet. As the snow then covering the cache was

undisturbed, it appears that the visit must have been made some time ago. After leaving the new ice we found some large floes on which the traveling was good. These extended to Lincoln Bay, and good time was made until within about two miles of our destination where some rubble-ice was encountered, which, however, caused but little delay. We reached the end of our journey at 5.20 p. m., and selecting a suitable bank built a snow house. Number of miles traveled, 12. Minimum temperature from 5.20 p. m. (22d) to 8 a. m. (23d), —40 [—40.0° C.].

After visiting the English depot at this place and receiving from Dr. Pavy 164 pounds of canned beef 4 pounds tobacco, 5 bottles onion powder, and 1 can curry paste, I left the party at 12.30 p. m., accompanied only by Christiansen with the sledge *Antoinette.* We made good progress, arriving at Wrangel Bay at 4.30 p. m., and at the same house occupied by us on the night of the 20th, at 8.30 p. m. Distance traveled, 18 miles. Minimum thermometer from 8.30 p. m. (23d) to 7 a. m. (24th)—53° [—47.2° C.].

Started at 7.30 a. m. for depot B. We left the ice at 11 a. m. about one mile north of Cape Beechey and reached our destination [depot B] at 1 p. m., where your order of March 21, assigning me to duty under Lieutenant Lockwood, was received from Corporal Salor. Meteorological observations were taken and recorded, the report of which you will find on accompanying form.

Very respectfully, your obedient servant,

W. S. JEWELL,
Sergeant, Signal Corps, U. S. A.

Lieut. A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding Expedition.

Meteorological report of sledge trip, from March 19 to March 30, 1882.

Date, 1882.	Time.	Barometer, aneroid, No. 10.		Thermometer No. 1.		Wind.		Minimum thermometer.			State of weather.	Locality.
						Direction.	Force.	Reading.		Time.		
		Inches.	*mm.*	*Fahr.*	*C.*			*Fahr.*	*C.*			
Mar. 20	7 a. m.	30.20	767.07	—31	—35.0	E.	Light.	—41	—40.6	7 p. m. to 7 a. m.	Lt. snow.	Depot B.
	10 a. m.	30.04	763.00	—27	—32.8	E.	Light.	------	------	----------	Lt. snow.	Do.
	5 p. m.	29.87	758.68	—20	—28.9	SE.	Brisk.	------	------	----------	Cloudy.	Between Cape Beechey and Wrangel Bay.
21	9 a. m.	29.71	754.62	—10	—23.3	SE.	Light.	—22	—30.0	7 p. m. to 9 a. m.	Cloudy.	Do.
	11 a. m.	29.67	753.60	—10	—23.3	SE.	Fresh.	------	------	----------	Cloudy.	Do.
	7 p. m.	29.51	749.54	—20	—28.9	SE.	Light.	------	------	----------	Fair.	Wrangel Bay.
22	7 a. m.	29.33	744.97	—20	—28.9	E.	Light.	—24	—31.1	7 p. m. to 7 a. m.	Fair.	Do.
	1 p. m.	29.22	742.17	—36	—37.8	Calm.	----	------	------	----------	Fair.	3 miles south of Cape Frederick.
	7 p. m.	29.15	740.40	—35	—37.2	E.	Gentle.	------	------	----------	Fair.	Lincoln Bay.
23	8 a. m.	29.21	741.92	—23	—30.6	E.	Light.	—40	—40.0	7 p. m. to 8 a. m.	Fair.	Do.
	8 p. m.	29.32	744.71	—37	—38.3	Calm.	------	------	------	----------	Cloudy.	Between Cape Beechey and Wrangel Bay.
24	7 a. m.	29.43	747.51	—45	—42.8	Calm.	------	—53	—47.2	8 p. m. to 7 a. m.	Clear.	Do.
	7 p. m.	29.58	751.32	—49	—45.0	SE.	Fresh.	------	------	----------	Clear.	Depot B.
25	5 a. m.	29.65	753.10	—48	—44.4	Calm.	------	—51	—46.1	7 p. m. to 5 a. m.	Fair.	Do.
	7 a. m.	29.61	752.08	—46	—43.3	Calm.	------	------	------	----------	Foggy on straits.	Do.
	11 a. m.	29.56	750.81	—40	—40.0	S.	Light.	------	------	----------	Clear.	Cape Beechey.
26	11 a. m.	29.60	751.83	—36	—37.8	Calm.	------	—51	—46.1	11 p. m. to 11 a. m.	Clear.	Depot E.
	11 p. m.	29.61	752.08	—32	—35.6	SW.	Light.	------	------	----------	Cloudy.	Depot B.

Meteorological report of sledge trip, from March 19 to March 30, 1882—Continued.

Date, 1882.	Time.	Barometer, aneroid, No. 10.		Thermometer No. 1.		Wind.		Minimum thermometer.			State of weather.	Locality.
						Direction.	Force.	Reading.		Time.		
		Inches.	*mm.*	*Fahr.*	*C.*			*Fahr.*	*C.*			
Mar. 27	11 a. m.	29.57	751.06	—29	—33.9	SW.	Fresh.	—40	—40.0	11 p. m. to 11 a. m.	Fair.	Depot B.
	3 p. m.	29.56	750.81	—27	—32.8	SW.	Fresh.	------	-------	----------	Fair.	Do.
	7 p. m.	29.57	751.06	—31	—35.0	SW.	Fresh.	------	-------	----------	Fair.	Do.
28	5 a. m.	29.56	750.81	—43	—41.7	Calm.	-------	—45	—42.8	7 p. m. to 5 a. m.	Clear.	Do.
	11 a. m.	29.47	748.52	—32	—35.6	S.	Fresh.	------	-------	----------	Clear.	Cape Beechey.
	7 p. m.	29.44	747.76	—46	—43.3	SW.	Gentle.	------	-------	----------	Clear.	Floe five miles from Cape Beechey.
29	7 a. m.	29.21	741.92	—28	—33.3	NE.	Fresh.	—50	—45.6	6 p. m. to 7 a. m.	Cloudy.	Do.
	3 p. m.	29.01	736.84	—33	—36.1	NE.	Fresh.	------	-------	----------	Fair.	Depot E.
	7 p. m.	28.91	734.30	—50	—45.6	SE.	Fresh.	------	-------	----------	Fair.	Floe five miles from Cape Beechey.
30	1 p. m.	29.38	746.24	—21	—29.4	SW.	Fresh.	—50	—45.6	1 a. m. to 1 p. m.	Cloudy.	Depot B.

W. S. JEWELL,
Sergeant, S. C., U. S. A.

APPENDIX No. 46.—*Dr. Pavy's orders for journey northward over Polar Ocean.*

FORT CONGER, GRINNELL LAND, *March* 14, 1882.

SIR: Having tendered your services in the field to command a party for the purpose of discovering whether land exists to the northward of Cape Joseph Henry, I have the honor to advise you that you are assigned to that duty, provided that the prospective health of the command will, in your opinion, permit of such absence, and to direct that you leave this station for your trip (weather permitting) on March 18, 1882.

Sergeant George W. Rice, Signal Service, and Jens Edward are assigned to duty with you, and the dog-sledge *Lilla*, with team of nine Eskimo dogs, will be taken.

Sergeant W. S. Jewell, Signal Service, and Frederik T. Christiansen, with the sledge *Antoinette* and its team of seven dogs, will be at your disposal from this point to the English depot at Lincoln Bay, beyond which point they must not be allowed to proceed.

On reaching that place, Sergeant Jewell will be furnished with 200 pounds preserved meat, six cans onion powder, a few pounds of tobacco, and will be directed to return with dog-sledge *Antoinette* to depot B.

The details of your journey, and the route to be followed northward from Lincoln Bay, are left to your own judgment and management. I deem it, however, important to invite your special attention to the route over Fielden Peninsula and across James Ross Bay to Cape Hecla.

While travel overland is usually objectionable, the experience of the English expedition of 1875–'76, as well as that of our own, indicates that traveling is thus facilitated when the party can avoid any considerable distance of the polar pack. Such route would probably give you the not inconsiderable advantage of leaving the coast at Hecla in less time than Cape Joseph Henry could be reached through the rough ice-pack on its eastward side.

Should you follow this route the cairn on Crozier Island will be visited, the record there found taken by you, and copy thereof be left, together with one of the record blanks furnished you. Similar action will be taken regarding the records in cairn at the *Alert's* winter-quarters.

You are to bear in mind that in no instance must your party be separated, that the exact location of depots must be made known to each member of the party, that no advance must be made beyond such time as on full allowance one-half of your provisions have been consumed, and that in case of any consider-

able movement of the ice, or on the appearance of any lanes of open water, you must at once seek the mainland. You are quite as well aware as myself of the hazardous nature of a journey without boats into the central expanse of a frozen ocean.

In case land is seen to the northward your efforts will be devoted to reaching its shores, and in following that coast which trends most to the northward. In case no land is reached, one day must be devoted at your most northerly point to determining, with the greatest care, your position, and in obtaining detailed information as to the depth of the sea, the temperature of the water, the tidal currents, the thickness of the new ice, and any other available data.

Whenever you are obliged to rest your team a day, similar observations should be made. In case new land is reached you will erect a cairn at a prominent place and deposit therein the expeditionary record furnished you, with such additions briefly detailing your discoveries.

A copy of your sledge journal, which must be as full as possible, will be submitted within *two weeks* after your return and a full report within one *month*.

Data regarding the depot at View Point, and the sketch of the coast to Cape Joseph Henry, are already in your possession.

A careful lookout will be kept for drift-wood, and if any fragment that could possibly have belonged to a ship be noted, it must be brought to the station unless of great size, when the piece best calculated for identification will be secured. It is possible that thus some tidings of the *Jeannette* may be obtained.

In accordance with your wishes no special anxiety will be felt for the safety of your party until June 1.

Trusting that your earnest enthusiasm for polar exploration, united to your practical experience, covering two winters of dog-sledging, will insure your party all possible success, and wishing, beyond all, your safe return—

I am, respectfully yours,

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding Expedition.

Acting Assistant Surgeon O. PAVY, *U. S. Army.*

APPENDIX No. 47.—*Dr. Pavy's report on journey ordered in Appendix No. 46.*

FORT CONGER, GRINNELL LAND, ——— —,* 1882.

To the Commanding Officer, L. F. B. Expedition:

SIR: In compliance with your orders, I have the honor to submit to you the report of my sledge journey, from the 19th of March to the 2d of May.

The 19th of March, accompanied by G. W. Rice and the Eskimo, Jens Edwards, I left Fort Conger. My team consisted of nine excellent dogs, and the constant weight on the sledge amounted to † lbs. To the provisions that I carried were to be added the rations cached last fall at Wrangel Bay, and part of the depot left by Capt. Nares at Lincoln Bay. Moreover, you had, as an auxilliary [*sic*] sledge, put at my disposal the *Autoinette* to support me as far as Lincoln Bay. This was accompanied by Sergt. Jewell (the Eskimo Frederick Christiansen acting as dog driver), and pulled by eight dogs.

At 3.40 p. m. we entered the snowhouse in Shift Rudder Bay, temp. —34° [—36.7° C.], where was assembled the party under command of Sergt. Brainard. The very temperature to which the men had been exposed in the straits had somewhat chilled their enthusiasm and slightly frost-bitten fingers and noses.

The house being already crowded, a deep hole, large enough for our party, was soon dug in a snow-bank; the bags were spread out, and at 10 p. m. all of us had turned in. During the night the thermometer inside registered —1° [—18.0° C.], while outside the alcohol was falling to —39.0 [—39.4° C]. Distance travelled in the day in straight line, 16 miles. Hours travelled, from 9.40 a. m. to 3.40 p. m.

March 20.—Temp. min.—39.° [—39.4° C.]; obs. †.

We started at 10 a. m., the weather not being very cold, but rather gloomy and disagreeable. At 12 m. we passed Cape Beechey, and followed the coast for about two or three miles; but the icefoot becoming

*Original undated. Received July 23, 1882.—A. W. G., *Lieut.*

†Omission in original.—A. W. G.

much encumbered with large paleocrystic bergs, we were compelled to take to the ice, notwithstanding its bad and hummocky character. At the place where we had left the shore, we had found encrusted in the snow the footprints of a fully grown bear, evidently on his perigrination towards the south. These tracks were not of very recent origin.

The travelling was exceedingly tiresome and the headway made very small. At no time could we find a quarter of a mile of good ice. It consisted of an aglommeration [*sic*] of small hummocks, amalgamated with rubble ice, and separated by holes, covered in many places with soft snow.

Despairing of making Wrangel Bay that night (being half-way between Cape Beechey and the bay), at 6.30 p. m. we stopped, and again Rice and Jewell dug a house in a snowdrift of the icefoot. With Jens and Frederick [Christiansen] I fed the dogs and afterwards cooked supper.

Distance travelled, 9¼ miles.

Hours travelled, from 10 a. m. to 6 p. m.

The 21st of March.—The weather was comparatively mild and the travelling, although bad, was, nevertheless, better. For several hours we toiled over large floes and less rubble and hummocky ice, and at 7.30 p. m. went into camp on the ice, at the entrance to Wrangel Bay, having marched since 12 m. With Jens and Frederick [Christiansen] I slept in the tent. Rice and Jewell burrowed a hole in a snowdrift, under the lee of a berg, where I am satisfied they passed a wretched night, half exposed to the cold wind and without a door to their igloo.

Distance travelled, 5¼ miles.

Hours travelled, from 12 m. to 7.30 p. m.

March 22nd. Temp., min., — 24.0 [— 31.1° C.]; obs., 9.30 a. m., — 20.0 [— 28.9° C.]; obs., 1 p. m., — 36.0 [— 37.8° C.]; obs., 5 p. m., — 30.0 [— 34.4° C.].

We started at 9.30 a. m., proceeding towards the small depot at the foot of Mount Parry, and without disturbing the cache made in the fall at Wrangel Bay. With the loads already on the sledges it was not possible to carry at once the provisions of both caches. After an hour's march, when out of the bay, we travelled over excellent level ice. It consisted of a band extending from the shore to two miles out in the strait, and to the north about four or five miles. On the coast the foot was the same as I had found it in the fall. More to the east the straits were hummocky; this band of young ice proved, evidently, that the floes must have been in motion until late in the season, cementing together by calm weather.

At the foot of Mt. Parry, when crossing from the ice to take up the depot, to my astonishment we again found the tracks of our bear. The cache had been plundered, a sack of bread torn open and untouched, but the pemmican two-thirds eaten up. The snowy bruin had made a lunch of 70 lbs!

We loaded on the *Antoinette* the bread, and about 30 lbs. of pemmican left, and resumed our course. The absence of icefoot north of the point where I had been stopped during the fall, and the accumulation of gigantic floebergs in other places, satisfy my mind, that this coast could not have been travelled at all. I am rather inclined to think with Capt. Nares, that, unless an internal road exists between Wrangel and Lincoln Bay, no autumnal travelling in this neighborhood can generally be successfully undertaken by sledges.

In the uncertainty in which I now stood about the state of our cache at Wrangell Bay, and unwilling to detain Jewell longer than we had expected, I decided for the present not to return to the bay, but to proceed north.

At one p. m., for the first time, we drove over paleocrystic floes; these afforded good travelling and were identically of the same nature as those over which I had passed early in the spring. Undulating surfaces that can be compared to rolling prairies, they are if at all large and not fortified at their edges by walls of rubble and bastions of bergs incomparably superior for sledging to the ordinarily hummocky ice formed by the disintegration of the pack in the conflict of autumnal storms. At 3 p. m. we were again stumbling over the worst kind of hummocks, and had to wind our way towards the north shore of Lincoln Bay, where we landed about a mile north of the British cache at 5 p. m. Again the tent was at once pitched; our builders, Rice and Jewell, dug in a snowbank for a house; the Eskimos fed the dogs, and I prepared supper; after which we all moved under our dome of snow. Distance made, 8½ miles.

Hours travelled, from 9.30 a. m. to 5 p. m.

March 23rd.—Temp., min., during night, — 40.0 [— 40.0° C.]. Obs., 12 m., — 23 [— 30.9° C.]; 7 p. m., — 39.5 [— 39.7° C.].

The 23rd, in the morning, we overhauled the provisions of the English depot that we found to be in the same state as we had left them last September. In the afternoon Jewell departed, carrying with him 150 [164, Jewell.] pounds of preserved meat. We passed the remainder of the day busily arranging our stores, and making more comfortable the house that was to become our headquarters, until the last load could be transported around Black Cape.

March 24th.—Temp., min., during night, — 56.2 [—49.0° C.]; obs., 6 a. m., —45.0 [—42.8° C.]; 8 a. m., —43.0 [—41.7° C.]; 11 a. m., —39.0 [—39.4° C.]; 6 p. m., —36.5 [—38.1° C.].

On the 24th we advanced as far as Cape Union, where we were compelled to go into camp by a south-east breeze blowing since noon, but at the time (5 p. m.) increasing to a velocity of about 15 miles per hour [about 7^{m} per second]. The tent was pitched on the ice under the lee of a berg, and, about 100 yards [91^{m}] from the foot, in this place, a perfect chaos of hummocks, bergs, and rubble. From Cape Union northward the coast stretches for a long distance as a wall of high and black cliffs, inclining to the sea at a very sharp angle, really in places too perpendicular for dogs to travel, and in others impassable for men sledges.

Here again I do not think the coast to be generally a practicable route for fall travelling. Three times in the day we had to leave the foot; and once we were compelled to unhitch the dogs, and with main strength to lower the sledge over a perpendicular wall of the foot.

Fortunately between these places the ice, when it could be travelled on at all, was level, but not absolutely good, as the very thin crust of snow, mixed with hardened, salty effloresences, over which a fierce wind must have raved in the early part of the winter, rendered the traction exceedingly laborious.

Between the northern end of Lincoln Bay and Cape Union, at the entrance of several deep ravines, can be seen large circular and oblong hills formed by glacial drifts, that at a certain period of the earth's history must have been the moraines of small glaciers.

Distance travelled, 11 miles.

Hours travelled, from 8 a. m to 5.30 p. m.

March 25th.—Temp., min., during night, —38.0 [—38.9° C.]. Observed, 3 p.m., — 27.0 [—32.8° C.], 12 a. m., —32.0 [—35.6° C.].

The storm has blown all night and was increasing so much at our usual starting hour that I delayed our departure until 3 p. m. Now the band of young ice, free from hummocks, that had at times offered us comparatively good travelling, and which did not extend in width more than a quarter or half a mile from the coast, ended a couple of hundred yards above our camp. Then again a chaos of rubble and large hummock hug the high and perpendicular wall of the foot (in places over 15 yards [about 14^{m}]), burinating with the tide its polished surface in thousand grooves, that under the rays of the sun glistened like engravings on Persian shields.

The foot was of a terribly broken up and for a long distance double, as if last season, or for many summers, the oldest ice had not been disagregated. Over the slippery and uneven surface, about 100 yards [91^{m}] wide, we had to carry to the snow slope of the cliffs our load—article by article—dragging the heaviest that could not be shouldered. The sledge and the dogs were taken across the last and separately.

Then for four hours came a difficult and tiresome walk. To the mind, I will say the most perplexing and arduous struggle. Whoever, once, has cast his chances of success on the solidity of a thin plank, will understand the anxiety of an Arctic traveller when the least false step or a too precipitous descent can, in an instant, reduce his highest expectations to a most regretted failure. Happily our sledge upset but once.

It is useless to state that Rice, as he has always done, showed himself in every way the man for such emergencies. As to Jens, his services cannot be too much praised.

I will further say that, to my belief, the Eskimos are indispensable for extended sledge journeys. Their experience in managing dogs, and the apparent facility with which they can drive at once over difficulties where the best of their inexperienced Caucasian pupils will fail, or labor for long hours, put the usefulness of their services out of the question. Moreover, their endurance to cold will allow them to perform the many duties of a driver with bare hands and in half of the time that it would freeze ours.

The history of the Arctic work, from Wrangel to this day, will bear witness to the fact that all dog sledging expeditions that have used natives as drivers, or perhaps their best substitutes, (I mean men trained for years to the work) have succeeded with comparative ease. I think that Sir George Nares, on his homeward bound journey, must have reflected more fully on the usefulness of dogs and their drivers.

Three miles north of our camp the road became better, being still in places rough and dangerous. We were at last, for the present, out of the labyrinth of bergs and hummocks. At 8.20 p. m. we reached Black

Cape, where, instead of building a snowhouse and proceeding a day or two forward, as it had been planned in the morning, we made a cache and returned to our tent on the ice, where we arrived at 11.30 p. m. with a gale blowing in our faces. Between Cape Union Peak and Black Cape the coast, still falling at steep angle, is formed of black slate and cut in many place by deep ravines, some of which must lead to interior valleys.

The ice, as far as the view could reach, presented the aspect of a frozen-up sea of hummocks, with very few patches of young ice. To our astonishment, since we had turned Cape Union we could not detect in Robeson Channel a paleocrystic floe of any considerable dimension.

From Black Cape, by a beautiful and cloudless evening, on an horizon tinted with the tender colors of the soft, Arctic light, we saw, far in the north, what appeared to us as the faint but extensive outline of the coast. Had we been, as the members of the "Polaris" expedition, the first to cast eyes over this apparition, we would have certainly pronounced it land. The too beautiful illusion was but a bank of fog—one of the thousand fancies and alluring deceits of mirage. Distance travelled, 8 miles. Hours travelled, from 3 p. m. to 11.30 p. m.

March 26th.—Min., during night, −37.5 [−38.6° C.]. Observed, 10.30 a. m., −33.0 [−36.1° C.]; 5 p. m., −34.5 [−36.9° C.].

The 26th of March, leaving again our tent pitched, we returned to Lincoln Bay and slept. The wind on the 24th was blowing from the southeast, with but little intermission, temp. being as low as −39.0 [−39.4° C.]. During the night of the 23rd to 24th, the thermometer had registered −56.2 [−49.0° C.] Distance travelled, 11 miles. Hours travelled, from 10.30 a. m. to 4.30 p. m.

March 27th.—Temp., min., dur'g night, −44.0 [−42.2° C.]. Observed, 10 a. m., −23.0 [−30.6° C.]; 3 p. m., −20.0 [−28.9° C.]; 4 p. m., −21.5 [−29.7° C.]; 6 p. m., −11.5 [−24.2° C.].

We started for the tent by fair and calm morning, the thermometer gradually rising, 10 a. m., −23° [−30.6° C.]. The barometer showed an extraordinary fall.

The sledge being heavily loaded our progress was slow and tedious, without any more charms of novelty. At noon a fresh breeze sprung from the northeast, and when we entered the tent its velocity had reached about 30 miles per hour [about 13^{m} per second].

Temp. at 6 p. m., −11.5 [−24.2° C]. Distance travelled, 11 miles. Hours travelled, from 10 a. m. to 3.30 p. m.

March 28th.—Temp., min., during night, −25.0 [−31.7° C.]. Observed, 6 a. m., −15.0 [−26.1° C.]; 7 a. m., −20.0 [−28.9° C.]; 11 a. m. in sun, −5.0 [−20.6° C.]; 11 a. m., in shade, −18.0 [−27.8° C.]; 8 p. m., −25.0 [−31.7° C.].

During the night, the wind having abated in the morning of the 28th, we took a second load of provisions to Black Cape and returned to the tent. Our mythical northern line had disappeared.

Distance travelled, 8 miles. Hours travelled, from 8.30 a. m. to 8 p. m.

March 29th.—Temp., min., during night, −43.0 [−41.7° C.]. Observed, 10 a. m., −33.0 [−36.1 C.]; 3 p. m., −29.0 [−33.9° C.]; 7 p. m., −36.5 [−38.1° C.].

We proceeded again to Lincoln Bay, with empty sledge, and, in places, riding in turn. The wind had ceased blowing and the atmosphere was remarkably clear. For the first time the influence of the sun upon the snow, glazing its surface, while the temperature stood as low as −36.0 [−37.8° C.], was observed. When on the march the weather seemed too warm to wear sealskin jumpers; we discarded them and travelled in guernseys. From the foot of Cape Union I could, for the second and last time, see to the northeast the coast of Cape Brittania [Britannia], Beaumont Island, and some of the adjoining land. To the south the faint outline of Cape Constitution evoked reminences [reminiscenses] of "The good Christian knight, Elijah Kent Kane," and set my mind pondering over the now old and nearly forgotten fable of an *Open Polar Sea.* I was standing on the extreme point reached by the poetical vision of Hayes, at the threshold of a once great mystery, that in younger days had so profoundly moved my imagination. Instead of a promised sea I could view nothing but the stern and cold reality of a impenetrable ice pack.

Distance travelled, 11 miles. Hours travelled, from *——

March 30th.—Temp., min., during night, −52.0 [−46.7° C.]. Observed, 12 m., −15.0 [−26.1° C.]; 3 p. m., −8.5 [−22.5° C.]; 7 p. m., −10.5 [−23.6° C.].

I decided that the day would be one of rest for the dogs, with an extra allowance of food. Our decision proved wise as the day turned out stormy. The snow drifted with such abundance in the vestibule of our igloo that Jens and Rice were several times obliged to use the shovel. The double ration had been a God-

*Omission in original. A. W. G.

send to our poor animals, curled up and covered with snow. I would willingly add the word chilly, if after our experience of last winter it was not still doubtful in my mind if an Eskimo dog really ever suffers of cold.

The temperature from −52° [−46.7° C.] during the night had raised to −8.5 [−22.5° C.]. We overhauled our baggage, and Jens dried and mended our boots and gloves. At 6 p. m. the storm was still raging with fury over our snow-bank, where inside, cosily muffled up in my sleeping-bag at the light of an Eskimo lamp, I wandered with an interesting traveller through the deserted halls of the ruined palaces of the once imperial Delhi, under the warm and blessed sun of old India. Rice read, lying on the top of his bag, until midnight. Jens, or the little man as he is generally designated with us, is perhaps dreaming of a rich land of seals and blubber.

March 31st.—Temp., min., during night, −15.0 [−26.1° C.]. Observed, 6 a. m., −12.5 [−24.7° C.]; 8 a. m., −14.0 [−25.6° C.]; 1 p. m., −17.0 [−27.2° C.]; 4 p. m., −27.0 [−32.8° C.].

In the morning the Eskimo was obliged to dig his way out of the house; the weather was clear, the atmosphere calm, and the temperature mild. At 8.30 a. m. we started, reached the tent at 1 p. m., and at 3.30 p. m. were back at Lincoln Bay.

Distance travelled, 12½ miles. Hours travelled, from 5.30 p. m. [8.30 a. m.] to 12 a. m. [3.30 p. m.].

April 1st.—Temp., min., during night, −35 [−37.2° C.]. Observed, 12 m., −30.0 [−34.4° C.]; 4 p. m., −38.8 [−39.3° C.].

I decided now to begin night travelling, on account of the snow being in places so soft during the day as to render the pulling of the sledge very laborious. The work had lately been so trying on the dogs, that last night, notwithstanding another extra ration of food, some of our brutes had entirely devoured their harness. Since this date the lashings of the sledge were at night carefully covered with snow, the traces taken in the tent, and the dogs unharnessed so the noses of the worst delinquents firmly secured with a thong of sealskin. At 5.30 p. m., after a last visit to the English cache, we started. The weather was calm, clear, and cold −38.8 [−39.3° C.]. The snow had hardened and, notwithstanding a very heavy load, our dogs were walking at a brisk pace.

Everything seemed to be complying with the best of our wishes, when at a quarter of a mile south of Cape Union, at a place where to double the cape we had been obliged to leave the foot, and where we passed so many times without considering any extra care to be necessary, the right runner of the sledge broke longitudinally through the line of holes bored for the lashings. I will certainly not try to describe my feelings, but will briefly state that Rice on the spot offered gallantly to start for home after a new runner. I at first objected, but it being impossible to mend the sledge we afterwards agreed that he would take Jens and make his way to Ft. Conger the same night.

April 2nd.—Temp., min., dur. night, −56.0 [−48.9° C.]. Observed, 1 a. m., −42.0 [−41.1° C.].

The sledge being lightened of nearly all the provisions, and the broken runner temporarily fastened with a rope, we returned to the snow-house. At 1 p. m., after eating, but without taking any rests, my brave traveller started. The thermometer registered *——, and fell during the night to −56.0 [−48.9° C.]. They were to be absent four or five days. Left alone and without a watch (my chronometer, affected by cold, had stopped since the 21st of March), it needed the greatest vigilance on my part to keep record of time. In the emergency the bold Cape of Frederick VII became a rough sort of sun-dial.

April 3rd.—I climbed the high hills and mountains that overlook the surrounding country and marched for 20 hours. My object was to see if an inland route could not be found allowing a party to travel in the fall from Wrangel Bay to the *Alert* winter quarters. At the highest point reached, that I estimate to be 2,000 feet [610m], I had a magnificent view especially overland. From the end of Lincoln Bay several valleys could be seen, which, succeeding to each other, appeared to lead towards Wrangel Bay. In another direction (NE.) I could distinctly see a succession of sloping hills, cut with ravines and valleys, by which I think it is possible to reach the coast at the entrance of some of the numerous openings near Floeberg Beach.

The weather was magnificent, and for the first time this year I could see the sun disappear but a moment behind the long and snowclad line of the United States Range. Between these and a lower chain of hills, closer to the coast, the distribution of light and shade showed plainly that a large and extensive valley must exist, running from NE. to SW.

On my return clouds had gathered in the east and south, and masked to the view the Greenland coast. I had foreseen the approach of the storm, and making haste I reached my burrow just as the snow was drifting so thick as to hide any object 100 feet [30m] ahead.

*Omission in original. A. W. G.

April 6th.—Temperature observed 9.30 p. m., −30.0° [−34.4° C.]. In the morning of the 6th Jens and Rice returned, carrying a new sledge-runner. They had a remarkable but tiresome march of *—— hours going and of *—— hours returning, by a temperature of, at one time, −56.0 [−48.9°], making at least *—— geographical miles.

Among the thousand and one items of news brought from home was a letter, in which you instructed me to look for a depot of 99 lbs. of pemmican left by Commander Markham near View Point, and to supply my party with the amount that I would judge necessary.

This unexpected help decided me to leave behind the cache of Wrangel Bay that, on his return, Rice had visited and found in good order. At 9 p. m., my two travellers having rested all day, we left Lincoln Bay and made the tent at 4.30 a. m. Distance travelled, 11 miles.

April 7th.—Temp., min., during day, −26.5 [−32.5° C.]. Obs., 5 a. m., −26.0 [−32.2° C.]; 8 p. m., −26.0 [−32.2° C.].

(We now generally travel during the night.) To guard the sledge against any accident we divided our heavy cargo into three small loads, and with two crossed over the roughest part of the ice-foot to Cape Union, but the strength of the wind, at times 25 to 30 miles per hour [11 to 13^{m} per second], compelled us to return into camp at 3 a. m.

Distance travelled, 8 miles. Hours travelled, from *——

April 8th.—Min., dur. rest, −13.0 [−25.0° C.]. Obs., 12.30 a. m., −12.0 [−24.4° C.]; 4 a. m., −14.0 [−25.6° C.]; 7 p. m., −4.0 [−20.0° C.]; 8 p. m. +4.8 [−15.1° C.].

It was only at 7 p. m., of the 8th, that (the wind having abated some) we could start. The part of the load that was intended for a third trip, the preceding evening was transported at Cape Union Peak. We returned again at 10 p. m., took the tent, sleeping gear, etc., and started for the last time from Cape Union. The fact that we had, in places, to carry all the articles, to unhitch the dogs and drag the sledge, will show what must have been our labor and the difficulties that encumbered the road. The previous day the sledge had upset but once. At Cape Union Peak, having passed the worst part of the ice-foot, we increased our weights considerably, leaving behind about 400 lbs. of English beef, reserved for dog food. The wind, that since the morning of the 7th had not ceased, was then blowing such a gale, perhaps 36 to 40 miles [16 to 18^{m} per second] that in places, over good ice glased [*sic*] by the sun, it pushed the sledge faster than the dogs could run, and, at times, threatened to break it against the hummocks of the road. Two of us only could keep behind and steer; the other followed, being often compelled to stop and sit down to save himself from falls or slides. We alternated with Rice, and reached Black Cape April 9th, at 3 a. m., having managed to escape with only half a dozen falls.

Distance travelled, 5 miles. Hours travelled, from 8 p. m. to 3 a. m.

April 9th.—Temp., 7 a. m., +6.5 [−14.2° C.].

The temperature was about zero [−17.8° C.], but the strength of the wind made us fully appreciate the advantage of a colder weather with a calmer atmosphere. It was with difficulty that we could pitch the tent. As I was cooking supper—or breakfast—(we now could never agree on the order of our meals), Rice commenced digging for a house. The wind blew all night with fury, shaking so much our tent that we scarcely slept. Up early, I prepared breakfast in haste. Rice and Jens finished the house, and when in the very act of moving in our new quarters a last gust of the gale blew the tent partly down, scattered many of our goods, and, as an immense arrow, lifted the sledge and buried the front part of its runners in a snowbank fully 500 yards [457^{m}] distant. It was then 3 a. m. of April 10th.

April 10th.—Temp. 5 a. m., 0.0 [−17.8° C.].

At 5 a. m. we started, the wind still blowing a strong gale. As we could but with difficulty pass around Black Cape, for the accumulated pieces of berg, we took to the ice, notwithstanding its hummocky appearance. At 8 a. m. we were again on the foot, and at 10 a. m. at Cape Rawson, were [where] we found ourselves detained for *—— hours by the violence of the storm, blowing now at least at the rate of 45 miles an hour [20^{m} per second]. It was not only dangerous, but nearly impossible, to proceed further. Just at the Cape, 40 feet [12^{m}] above the sea level, and badly sheltered behind blocks of paleocrystic bergs, we entered the sleeping-bags, and, drawing the flaps over our heads, stood very comfortably the assaults and drifts of a most terrific gale. Velocity of the wind, 45 to 50 miles [20 to 22^{m} per second].

Distance made, 5¼ miles. Hours travelled, from 5 a. m. to 10 a. m.

April 11th.—Temp. 3 a. m., +10.0 [−12.2° C.]; 1 p. m., +12.0 [−11.1°C.]; 2 p. m., +17.0° [−8.3 C.].

*Omission in original. A. W. G.

At 3 a. m., having been with Jens to look at the state of the ice, and finding it really worse than the foot, we carried our load, piece by piece, for a distance of over 1,000 yards [914^{m}]. After taking a cold lunch (made out of some English pemmican, found the preceding day at the cape), we started. The sky was cloudy, the drifting still heavy, and the wind blowing with a velocity of 30 to 35 miles [13 to 16^{m} per second]. From Cape Rawson the coast slopes more gently to seawards, and from Floeberg Beach to Cape Sheridan, and perhaps to Harley's Spit, can always be travelled by the bays in the fall. At six p. m., we turned around a small point of the coast and descended from a snowy slope on the shore of Floeberg Beach. The storm had ceased since an hour, leaving in its stead the weather uncomfortably warm. A heavy lead-colored sky, contrasting fearfully with the whiteness of the freshly drifted snow, lent to the surrounding landscape a gloomy appearance. From a distance we could see a large cairn on the top of the *Alert's* lookout, and lower, on the brow of a smaller hill, some dark object that at first we took for a cache, but was soon found to be the tomb of Petersen. Beneath the large stone that covers the remains of the Danish interpreter a hare had taken up his residence, strangely associating the fact of his presence with the words of the epitaph engraved on a copper plate at the head of the tomb: "He shall wash me and I shall be as white as snow." From this hill our hopes of finding a sea free from paleocrystic floes, had vanished. About a mile and a half from the coast, against which was pressed the thickest agglomeration of hummocks that we had yet seen, and as far as the view could extend (by somewhat thick weather), perhaps ten or twelve miles, the ice was nearly of the same character as the pack described by the officers of the *Alert*. Few days later we were unfortunately destined to make a closer acquaintance with these unmerciful floes. The comparatively narrow band of heavy and tightly pressed hummocks, of which I have just spoken, bordered the shore from Cape Rawson to Cape Sheridan.

Certainly, in this neighborhood the floes had been broken up and the coast perhaps navigable at some time in the summer or fall, but at what risk, and with how much danger, it is difficult to say. A ship tossed by a northeast storm on this exposed shore, without a harbor, and pressed between such piles of ice, will run great risks.

Captain Nares, somewhere, speaks of a line of grounded bergs that served as a harbor and shielded their ship from the pressure of the pack and perhaps from total-destruction. This spring no floe-bergs could be seen around the place where the *Alert* must have dropped her anchor in 1875. No signs of paleocrystic ice [were observed] closer than about a mile and a half from the coast. After taking a good survey of the neighborhood we resumed our march. The weather seemed so warm that when travelling, even in shirt sleeves, our foreheads were wet with perspiration. Along the coast we found many indices of the British stay—here an empty barrel, there a piece of wood stuck in the ground, and, near Cape Sheridan, the hoops forming the binding of a flower corbeille showed the spot where their garden had grown. We were struck by the abundance of snow that covered the surrounding country.

At Cape Sheridan three barrels superposed, and a small boat-mast, to which was still attached a halyard, marked the place of the highest flagstaff from which had ever floated a Union Jack. Here we left the shore and travelled towards Harley's Spit over apparently continuous paleocrystic ice.

Distance travelled, 10¾ miles. Hours travelled, from 3 a. m. to 1 p. m.

April 12th.—Temp., min., during rest, —2.0 [—18.9° C.]; 1 a. m., + 3.5 [—15.8° C.]; 6. a. m., 0.0 [— 17.8° C.]; 9 a. m., + 4.0 [—15.6° C.].

The 12th of April, the weather having been clear in the morning, we had a good, but distant, view of Cape Henry, Rawlins Bay, Marco Polo Bay, and Depot Point. At 2.45 a. m., leaving the tent pitched, we started for Black Cape after another load of provisions. The *Alert* quarters were passed at 6 a. m. and the snowhouse of Black Cape reached at 9 a. m.

During our absence, the storm that at Cape Rawson had drove [driven] us to our bags, must have raged here, blockading the entrance of the house and scattering our effects and provisions nearly 500 yards [457^{m}] from behind the rock where they had been cached. The icefoot was covered with large and small stones falling from the cliffs. At the very same place where our tent stood laid several heavy blocks of slate. From Cape Union to Floeberg Beach parties travelling by windy days are continually exposed to the fall of projectiles from these ragged and desingragated [disintegrated] tops. The weather was now really so mild and so pleasant that Rice and Jens slept outdoors in their bag; I still remained faithful to the snowhouse.

Apl. 13th.—Temp., 11 a. m., + 6.5 [—14.2° C.].

At 10 p. m., April 12th, [13th] we left Black Cape for Harley's Spit with a lighter load than the one we had previously carried. When at Floeberg Beach, we ascended the *Alert's* lookout to take copy of the

British record and to deposit our own. This cairn, a solid mass of piled up stones, ten feet [3m] high by eight [2.4m] wide—that will stand the storm of many winters—is of an imposing aspect.

About five feet [1.5m] from the ground a large, iron cylinder, sealed probably by the engineers of the ship, and in which are secured the documents of the British expedition, is so firmly held by an enormous weight of stones that it would be necessary to tear down half of the monument to get at its contents. Being wanting in tools to cut through thick iron, and scared at its probable weight, we contented ourselves with leaving our record in an air-tight rubber match-box well secured by heavy rocks on the side of the English document.

Distance travelled, 16 miles. Hours travelled, from 2 45 a.m. to 9 a.m.* ——,

April 14th.—Temp., 3 a. m., 0.0 [−17.8° C.]; 2 p. m.,−5.0 [−20.6° C.]; 3 p. m.,−10.0 [−23.3° C.]; 7 p. m.,−13.5 [−25.3° C.].

Our hours of travelling had been lately so much interverted by bad weather, few long marches, and some oversleeping, that the 13th of April we were again travelling during the day. The weather was beautiful, the temperature high, and not a breath of wind was stirring. From Cape Sheridian to View Point, the ice was a real paleocrystic pack, extending as far as the view could reach. Until 10 a. m. the travelling was fair, but afterwards it became so tiresome, through deep and recently fallen snow, already softened by the sun, that at 1 p. m. we stopped, and, without pitching the tent, waited until 9.05 p. m. to start again. At 12 a. m. the hauling of the sledge being still too hard on the dogs and the progress made very small, we unloaded half of our cargo, and then, making better time, at 3 a. m., April 15th, we camped on the ice at View Point, half a mile from the coast, where Lt. Aldrich, on his return journey, with a scurvy-stricken party, in June, 1876, had abandoned a depot of provisions.

Distance travelled, 16 m.

April 15th.—Temp., 1 a. m.,+10.0 [−12.2° C.].

From Harley's Spit we had travelled nearly in a straight line to View Point. Rice and Jens returned for the complement of our stores. I marched to the foot of Conical Hill and hunted over the whole neighborhood for the cache of pemmican left by Commander Markham. It was in vain! The depot must have been removed, as it could not possibly have escaped my careful search. The cache of Lt. Aldrich consisted of 174 lbs. bacon and pemmican. In the uncertainty in which I had stood concerning the state of these provisions, I was now, even without the help of Commander Markham, more fully supplied than I had expected to be when leaving Ft. Conger.

Distance made, 16 miles. Hours travelled, from† ——.

April 16th.—Temp., 6 a. m., 0.0 [−17.8° C.]; in the tent,+29.0 [−1.7° C.].

I sent Rice and Jens to Harley's Spit to bring a load of alcohol and preserved meat that we had been unable to transport on the 14th, and that I expected to leave behind had I found the cache of Commander Markham. During the absence of the sledge I explored again the neighborhood, returned to Conical Hill where I observed numerous traces of muskoxen and on the snow abundant fresh tracks of lemmings, ptarmigan, hares, and foxes.

From a high hill of Feilden Peninsula I could see into James Ross Bay. The ice there did not appear to be very rough, but from where I stood the view was faint. The bareness of the ground in many places, overland, and the softness and depth of the snow in others, decided me to travel around Cape Henry. In the country over which I passed near View Point, I had found numerous signs of animal life and also proof of more abundant vegetation than at any other place north of Discovery Harbor. Except the foot-prints of our bear at Wrangel Bay and few tracks of foxes, hares, and lemming, we had seen since March no indices of animal life. Rice travelled 32 miles.

April 17th.—Temp., 12 m., + 8.5 [−13.1° C.]; 7 p. m., + 1.0 [−17.2° C.].

Starting the same day, at 7.05 p. m., we carried our provisions in two loads to about the northern extremity of Conical Hill, from where, traveling over a good and continuous sheet of level new ice, we reached to about a mile south of Cape Joseph Henry. The ice of this floe was paleocrystic, but to us of a yet unknown nature, differing in character from what we had travelled over between Harley's Spit and the south side of Conical Hill. Between the two last-named places the pack was composed of floes, circular and nearly level but not of great dimension, the largest being perhaps a mile and a half in extent.

At the edges of these was a fringe of bergs and hummocks. Between them were ditches or crevices, from five to twenty [about 4 to 18m] or even fifty yards [46m] wide, and which must have been at some time

*Perhaps belongs under April 12th; see that date.—A. W. G. †Omission in original.—A. W. G.

filled by young ice. These hollows, originally from three to seven feet [.9^{m} to 2^{m}] deep, were now shallow and, in places, nearly filled by a mixture of fresh-water ice and frozen snow. The breastwork of hummocks that once must have made their access difficult, had lost of its height, and like the edge of the ice itself was considerably smoothed. Under the powerful influence of the sun of several summers the union of the pack presented a more even and a better route for travelling. In every place where the recently fallen snow had blown off the ice was fresh and good for cooking.

From Cape Sheridan to View Point there is a complete absence of last year's ice, and also of tide marks. In presence of these facts I think it logic to conclude that these floes have been leveled by the thaw and rain of at least a summer.

The sea was then closed to navigation last fall or perhaps for several years. The fields of young ice, on which we camped at about ten or fifteen feet [3 or 5^{m}] from the tidal line of the foot, extended in width to about two miles from the coast. At a very short distance north it united with the paleocrystic pack and as a very narrow strip ran along the coast to the west.

The young ice, inchased [*sic*] to the northeast and south by century floes, proove [*sic*] again, that, during fall, the and under the same atmospheric influences than the coast below, perhaps at the same time the sea must have been open.

Time travelled, 9.40 p. m. to 7.40 a. m. Distance travelled, 8 miles.

April 18th and 19th.—Temp., 18th, 10 a. m., —5.5 [—20.8° C.]; 11 p. m., —10.0 [—23.3° C.]. *April 19th*, all day occillating between —10 and—12 [—23.3 C. and —24.4° C.].

We passed the 18th and 19th in our tent, being unable to travel on account of a storm. The 19th one of our dogs died. To the last cheerful and warm days had succeeded a cold and stormy weather. Again condensation of moisture was deposited on the walls of the tent, and when the dogs, to shelter themselves, laid against the canvas, we were deluged by cold showers of snow.

April 20th.—The 20th the wind was still blowing with force, but leaving the tent at 3 a. m. we advanced a load of provisions about four miles from our camp and two miles on the pack north of the cape. We returned to the tent at 11.30 a. m.

Time travelled, 3 a. m. to 11 a. m. Distance travelled, 8 miles.

April 21st.—The day of April 21st opened bright and with a clear sky. The wind was blowing from the south only at a velocity of 3 or 4 miles per hour [1.3 or 1.8^{m} per second]. We started at 1.15 a. m.; on the way took our load of provision and stopped at 7.30 a. m., camping on the pack four miles from the coast and about five from Cape Henry. As I prepared supper Rice and Jens started for a part of our load that had been again left behind. At 11 a. m. they returned, having been caught in a violent storm from the SE. The previous day when north of Cape Henry, at the spot where we deposited part of our load, and from the top of some high floebergs, we had an excellent but discouraging look at the pack.

West of the line of young ice, that bordered the mass Cape Henry, the Polar Sea was of such rough appearance that no sledge, even lightly loaded, could have made any progress over its discorded surface. It was nothing but an inextricable maze of huge bergs and of enormous hummocks piled up in a similar manner as when travelled over by Commander Markham, who, I am glad to say, has certainly not exaggerated his hardships or cloaked his description with romantic colors. If such was the ice over which the British dragged heavy loads and cumbersome boats, instead of being astonished at the small distance daily travelled, I, on the contrary, sympathize with them in their sufferings, admire their perseverance, and applaud heartily their pluck and gallantry.

Directly north of Cape Henry, and at a certain distance from us, perhaps three or four miles, the confusion of the ice was the same; discouraging in its compactness. To the northeast this line of thick-ribbed ice lowered, and due north of Cape Hecla seemed to be of a less ponderous character. It was there that the 21st of April we had decided to take a northward course; stumbling over a less dense pack we could add the advantage of establishing a depot for our return, and of getting a good view from the summit of the high cliffs of Hecla.

The ice over which we travelled since we had left the young floe at Cape Henry, for not being so bad as the floes in the offing, was nevertheless in many places of a very difficult access. It differed from what we had found between Harley's Spit and Conical Hill, in the fact that here the edges of the floes were cut at sharp angles, and that the hollows, some of which measured a depth of seven feet [2^{m}] and a width of from 50 to 100 yards [46 to 91^{m}], had not yet been partly filled with the melted snow of previous seasons.

Some were fortified with fringes of high hummocks, between or over which we passed with difficulty. Others, like immense pieces of flat and broken crystal, offered a perpendicular ascent and descent from and in deep snow.

Smaller and treacherously concealed cracks, in which dogs often disappeared and men sank to the waist, were numerous.

Time travelled, from 1 a. m. to 7.30 a. m. Distance travelled, 10 miles.

April 22d, '82.—The 22d of April we were up at 3 a. m., the night having been exceedingly stormy. Wind from SE., about 40 miles per hour [about 18^{m} per second]. At 5 a. m., the tent remaining pitched, we started for "Cape Hecla." To the stormy atmosphere of the night had succeeded a calm and warm day, streaming with light, but without shadows, and enveloping everything in a tiresome uniformity. The pack, covered in places with deep snow and rough ice, appeared to us as an even float over which the tops of the highest bergs alone would project. A few yards ahead of our sledge we could scarcely detect the unevenness of the ice, and occasionally, at our feet, we were obliged to look or to feel if to raise or to lower the step. Our sense of vision was disagreeably confused. The horizon appeared clear, and everything showed distinctly except in our immediate neighborhood. To the left the high mountains of James Ross Bay detached vividly their ice-clad peaks from the cloudless background of a pale blue sky, as to the west Crozier Island its summit, bald of snow, over the fringes of bergs and hummocks that bordered our horizon.

We were advancing since two hours, and the deceptions of the nearing had ceased. Some black spots in the unfractuosity of the cliffs of Cape Hecla were showing with enough distinctness to already attract our attention, when suddenly Jens exclaimed, "Water"! After a careful search over the horizon, failing to perceive anything, and thinking that perhaps he meant a tidal crack, we proceeded; but half an hour's march told the tale. The unmistakable signs of water had struck the keen vision of the Eskimo.

We stopped the sledge in the center of the paleocrystique [paleocrystic] float on which we stood and at once advancing about a quarter of a mile we climbed to the top of a high marginal wall of rubble and bergs. At our feet a band of hummocky ice, of a more recent formation, extended for two or three hundred yards [183 or 274^{m}]; then to the coast, Cape Hecla, a channel was open a mile wide, in which floated to the SE., and at a velocity of about two miles per hour [.9^{m} per second], small and rare pieces of ice. For three or four miles, as far as the perspective allowed, the eye could follow them. Here, on account of the convexity of the floes, the line of water seemed to close at the entrance of James Ross's Bay against a margin of ice and about by the meridian of Crosier Island. To the west this opening, increasing in width, passed Cape Hecla, extending as far as we could see from hummocks thirty feet [9^{m}] high. From the side of the pack where we stood, following the edges of our floes and several larger ones above, it took a more northerly direction. Here again, as to the SE., a convex curve of the pack, the deception of perspective, and in the offing high fringes of hummocks closed to the view its northern extension. When at first ascending to our place of observation, the heart of Jens was tenderly moved by the appearance of a fiord seal. Smacking his lips and winking, our Eskimo, in an extraordinary quick oration, interrupted by sighs and mixed with expressions of the deepest epicurian love, paternally addressed the amphibious animal. Thinking that perhaps with a change of tide the pack would move towards the coast, we decided to return to our camp and bring the rest of our baggage.

When starting it certainly appeared to us that the ice had pivoted more to the north, taking Feilden Peninsula as base of evolution. The compass having been left in the tent we drove in the snow an extra cross-piece of the sledge and took sight at Cape Hecla. When we returned, at 11.35 a. m., the pack still moving in the same direction had considerably shifted to the north, opening to our view new lines of coast and three capes, of which I took the farthest to be Cape Columbia. The channel had now widened at least one mile between us and Cape Hecla. An opening, large enough for a dozen ships to steam, extended in the direction of the farthest promontory from which raised dense clouds, indicating, perhaps, the presence of more extensive water. Far to the north, behind the convex band of our floats, and still at a greater distance to the E. and NE. of Cape Henry, the experienced eye of Jens detected again in the sky faint but unmistakable signs of water. Still the current or tide was setting to the SE. As the channel of water seemed there not to extend at the most farther than the coast of Feilden Peninsula, we supposed that the pack must still bear on Cape Joseph Henry. But this conclusion was drawn, with the protest of Jens, who affirmed seeing water along the coast of James Ross's Bay and Feilden Peninsula. To proceed north was now out of the question.

Dark water-clouds, thick to the west and to the north and northeast, distinctly seen by our Eskimo, showed that water, of an extent that certainly it had been difficult to determine, must be open on the pass laid before us. The whole pack, or at least extensive floats, disaggregated, probably, by the numerous and violent storms of April, and perhaps set in motion during the gale of the previous night, had broken from the margin of young ice that must have bounded the coast from Conical Hill to an unknown distance. As it was impossible to successfully perform the task for which we had perseverently labored, we decided at once to reach Cape Henry.

Dividing in haste our load, and taking of our effects what was indispensable, with enough provisions to sustain ourselves and the dogs for several days, we at once started over the road previously followed. In the evening, at 4.30 p. m., we arrived opposite Cape Henry, where we found a large channel of water extending from the edge of the pack to the ice-foot of the cape, about ¾ to a mile in extent. Once more the correctness of Jens' observation had not been at fault.

As our retreat was now entirely cut off—and as for the present, out of a hundred means of escape no good one could be planned—we decided to remain here, six or seven hundred yards [549 or 640^{m}] from the water, on a large and heavy paleocrystique [paleocrystic] floe, surrounded and protected by thick armor or compact ice. As we would soon have to keep a continued watch, Rice turned in his bag to rest, and I started with Jens and the team after the load left near Cape Hecla.

At 8 p. m. we were once more at our place of observation, where again we saw the seal. The water-clouds had expanded into black vapors, and the channel from the edge of the float to the cape [Hecla] was at least three miles wide. To the N. and NE. the clouds first detected by Jens were now very distinct. Still the current or tide was floating pieces of ice towards Cape Henry. The sledge once packed, I waved the "Stars and Stripes" and started east, being at a latitude of 82° 56′ N.

My design was now, if possible, to transport my provisions on the ice-foot of Cape Henry, and to follow the coast as far as fifteen days of full rations would allow us, preserving 10 days for the return.

April 23d, '82.—I reached the camping-floe at 3 a. m., April 23d, having experienced a heavy northeast snow-storm, blown, evidently, from the open water. During our march the floe had shifted to the east. Tired and sleepy, and for the present condemned to inaction, we entered our bags, leaving Rice on observation at the top of a berg nearly 30 feet [9^{m}] high. At 7 p. m., having slept only few hours, the watch called me. The pack was shifting to the east, opening now to the view the south coast of Feilden Peninsula as far as Conical Hill. To seaward, for about 3 or 4 miles south and 6 or 7 east, floats were broken and in motion. The wind had again changed its direction and was blowing from the SE. To the west deep and prolonged roaring proved that the pack must be now grinding against the coast.

Without discussing on what could have happened if we had stayed on the float, I will say that we decided to load at once with our most indispensable effects, and with food enough to reach Harley's Pit [Spit]. Leaving behind all our provisions, and the tent still pitched, we drove to the foot of Cape Henry. The pack was here grinding against the perpendiculer wall of a high ice-foot about 40 feet [12^{m}], and in places pressing up large pieces of rubble from the fringes of the paleocrystique [paleocrystic] floes. Large blocks of ice, of great solidity, and which had been wedged between the foot and the pack, were split under such pressure and raised in succession to fall again over the tidal line.

Rice, in whose judgment and decision I would implicitly trust, advised to cross here, but, knowing the peevish disposition of the Eskimo dogs, and their obstinacy when crossing over loose ice, I hunted for a better place. Being unable to find any we returned to the cape, and after clearing the traces we pushed the dogs where Rice had first suggested to pass. As by magic, at the very instant in which we advanced the pack stopped. It had reached the moment when the contrary impulse lately given by the south wind contra-acting the impulse from the preceding NW. gale, produced immobility. The dogs began to fight, and Jens, quite stunned, busied himself with details ordinarily very appropriate in driving, but for the present out of season. I pushed to the sledge as hard as ever I have pushed, while Rice, unhitching a dog, led the way. At the wall of the foot we unloaded, and, having hoisted our brutes with a sealskin lash, we pulled up our articles and afterwards the sledge.

Once out of the lion's jaws, we felt that it would be unwise to return on the pack. The deep groans of the ice proved that the motion had not entirely stopped, and that at any moment the floes could be set again in motion, and perhaps seperate [*sic*] us from parts of our provisions. Moreover, the ice, as far as we could

see to the east and south, through an atmosphere overcast with water-clouds, was broken up and still drifting south. To us it was probable that Robeson Channel was open, and the greatest haste was necessary.

If the ice had broken between Cape Henry and Cape Sheridan, we would have been obliged to follow the indentation of the coast around numerous bays, depending for our subsistence on three or four day's rations. After melting ice and eating a handful of pemmican we started, followed by the grinding noise of the pack, similar to the spasmodic breathing of gigantic tugboats.

At the foot of Conical Hill, where we had previously taken to the young ice, the paleocrystic pack, that I thought had withstood the decay of last summer, was still firmly fastened to the shore.

April 24th, '82.—At 12 m., April 24th, '82, we camped at View Point. From this day we were obliged to sleep in our bags without the shelter of a tent. Distance made, 5 miles.

April 25, '82.—At 8 a. m., April 25, '82, we deposited a record in the old English cairn, and travelled all day in the worst and the thickest snow-storm that I have ever encountered.

We reached Harley's Pit [Spit] at 6 p. m. Distance travelled, 16 miles.

April 26, '82.—9 a. m., −3.0 [−19.4° C.]; 9 p. m., −10.0 [−23.3° C.]. At 9 a. m., April 26, we were again on the road and following our outward tracks which, in many places, could yet be found; at 7 p. m. we reached the snow house of Black Cape. From Cape Sheridan, south of the paleocrystic pack, the ice was broken, in motion, and in places separated by large lanes of water. To the north and northeast the sky was dark. Distance travelled, 16 miles.

April 27.—10 a. m., −5.5 [−20.8° C.]; 8 p. m., −4.0 [−20.0° C.]. The 27th of April the wind blew from the south and opened between the solid ice of Robeson Channel and the loose floes above, a space of about a mile wide, and of which the transversal end disappeared two or three miles from the coast in brown vapors of open water. This day we travelled over solid ice to Lincoln Bay. Distance travelled, 15 miles. Time travelled, from 8.30 p. m. to 5 a. m.

April 28 and 29.—28th, 7 a. m., −5.0 [−20.6° C.]; 7 p. m., −6.5 [−21.4° C.] 29th, 3 a. m., −7.0 [−21.7° C.]; 9 p. m., −10.0 [−23.3° C.].

The 28th and 29th of April we searched for an inland route between Lincoln and Wrangell Bay, but being led to [*sic*] far to the west and north we returned to the coast, having travelled about 30 miles.

April 30, '82.—At 4 a. m., April 30, we camped at Wrangell Bay. Hours travelled, from 9 a. m. to 4 p. m. Distance travelled, 8½ miles.

May 1, '82.—9 a. m. +1.0 [−17.2° C.]; 9 p. m., +13.0 [−10.6° C.].

The first of May, at 6 a. m., we were once more at the fastly decaying snow house at Shift Rudder Bay. Distance travelled, 14¼ miles.

May 2d, '82.—The 2d of May we entered Ft. Conger, having been unsuccessful in the main object of our journey, but having determined the important fact that last fall open water could have been found as far as Cape Sheridan, and from Conical Hill, perhaps, to Cape Columbia. Moreover, our experience confirm, to a certain extent, that of the *Polaris*, and prove that even in so high a latitude the pack may be in motion at any early period of the year, perhaps at any time. I am firmly convinced that, but for the misfortune of finding open water, we could have, without yet distancing much Commander Markham, reached, perhaps, the latitude of 84° N. Although I had been stopped by water, where I expected to travel over ice, I, nevertheless, disbelieve the existence of an open polar sea. "A myth to the ignorant and a wonder to the wise." Notwithstanding a careful lookout kept by our party, no signs of the presence of the *Jeanette* could be found. We returned in excellent health. Daily rations of lime-juice had been issued during the outward march. Rice has showed himself to be of the greatest assistance. His natural intelligence, accompanied with his education, his sound judgment, and his great perseverance, recommend him as the best of companions and as a man fit in any way to command a party.

I add here the list of Government stores taken from caches, and those left on the polar pack north of Cape Joseph Henry:

Stores taken from Wrangell Bay: 14 lbs. of pemmican; 1 can of butter; 1 can of milk; 1 can of extract of beef.

Stores from Mt. Parry: 30 lbs. of dog pemmican (70 lbs. were eaten by a bear); about 75 lbs. of bread; 4 cans of butter.

Provisions left on the float:*

* This list of provisions was not given in the original, in which half a page was left blank evidently for the purpose of entering them. A. W. GREELY, *Lt.*

Respectfully submitted to 1st Lieut. A. W. Greely, 5th Cavalry, A. S. O. and Asst., commanding the Lady Franklin Bay Expedition.

OCTAVE PAVY,
Acting Assistant Surgeon, U. S. Army.

This report, incomplete in many respects, has been received only at this late day (July 23) after repeated orders and requests for its prompt rendition.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant, Commanding Expedition.

FORT CONGER, GRINNELL LAND, *July* 23, 1882.

APPENDIX No. 48.—*Sergeant Rice's report on detached trip from Lincoln Bay to Fort Conger and return.*

FORT CONGER, GRINNELL LAND, *July* 24, 1882.

SIR: In accordance with your wish, I hereby submit a short statement of the main features of my uneventful tramp to the home station (to procure sledge-runner) while a member of your northern sledge party in March and April of this year.

As you will remember, we left Lincoln Bay for the North at 6.30 p. m., April 1; and the false start resulting in our misfortune at Cape Union, and return to the snow house, occupied five and a half hours. Another hour was passed in waiting for the pannikin of tea for you and us, and in making our preparations, after which, at 1 a. m., April 2, I started, accompanied by Jens. We took with us the shoe of the broken runner, as you thought it would expedite the work on a new one at Fort Conger.

Our outfit was extremely simple, consisting of a small spirit lamp, a little spirits, and sufficient preserved meat and chocolate for a lunch. We also carried large knives with which to dig for ourselves a burrow in the hard snow should we be overtaken by storm or accident before reaching our first possible resting place, the snow hut at Shift Rudder Bay. The thermometer stood —42° [—41·1° C.] when we started; the sun was just appearing above the icy horizon to the north, pouring a flood of light down the straits, coruscating and glistening on the hummocks and ice-points in our rough path in a manner that caused us to lose sight of the beauty of the scene in the discomfort of the effect upon our eyes. It was difficult to wear our goggles as the condensing moisture obscured them and rendered our steps uncertain.

Thinking we could effect a shorter route by foot over the bay than that necessarily taken by the loaded sledges, we struck directly across for the bold point of Cape Frederick VII. We soon found ourselves completely beset by hummocks and snow-drifts; and were glad to find the original path indicated by the marks of the sledges. We traveled rapidly, checking our pace only when we alternated in carrying the shoe; and examined our faces, which sometimes required the application of a warm hand to efface the white seal set upon us by the slight breeze that was storming. Considerable elation was felt when our tenting place in Wrangell Bay, representing one day's march while outward bound, was passed. We experienced much difficulty in progressing through the great confusion of hummocks and rubble ice at the entrance of the bay. We soon after fell in with our bear tracks; and, inadvertently following them for a short distance, found the traveling so much improved that we unhesitatingly followed them through the intricacies along the ice-foot, and had no cause to regret our choice. Bruin's admirable ice pilotage partly condoned his offense in eating our pemmican.

We began to weary about the time Cape Beechey was doubled; and the remaining four miles around the long curve of Shift Rudder Bay was not made with ease. My companion, who before had always a reassuring smile and shake of the head to my "Tired, Jens?" now began to reply less confidently, and soon answered with a strong affirmative; though he still cheerfully reminded me that it was his turn to carry the iron. The walking from Cape Beechey to depot B was very tiresome, though smooth, as the frosty, sandy snow, resting on the ice, furnished a very unstable foothold, our polished moccasins slipping back half the stride which was already short enough.

Despite our strong desire to move on, progress without occasional rests was not easy to make, and a line of small, decayed hummocks skirting our course furnished us with resting places. As soon as we would touch the icy seat I would find myself dozing, and would discover Jens with his head nodding to his breast, or stretched at full length on the snow fast asleep. When near depot B Jens wished to stop and rest awhile,

but I induced him to proceed to within a few hundred yards of my destination. I then left him and went on to the hut, intending to look to him so soon as a fire was started. He joined me in about fifteen minutes. Doubtless Jens's exhaustion was due to the greater exertions he made and worry he had undergone in getting the dogs, with broken sledge, back to Lincoln Bay, for I am sure that his powers of endurance are greater than my own.

We reached the snow house at 2.30 p. m., altogether nineteen hours, and covering at least forty miles. It is difficult to state exactly the distance traveled, as our path through the rough ice was very tortuous, and a long detour had to be made in getting out of Lincoln Bay. We turned in the sleeping-bag, after a hasty meal of baked beans, which we gave hardly time to thaw. I intended resuming the march in a few hours—as soon as we had been rested—but did not succeed in waking until 8 o'clock the next morning, April 3. We had trusted our foot-gear to the influence of the stove, but after rising were compelled to return to the warm bag and nurse it (our foot-gear) into flexibility. We started for the home station at 11 a. m., and arrived there eight hours later. We attempted several short cuts, but, with the exception of the one across Brenta Bay, fared worse than if we had followed the old track. The weather was very pleasant, compelling us to doff our *temiaks* [hooded seal-skin jackets] and suspend them to our belts.

Our sudden and unexpected reappearance at Fort Conger caused considerable excitement and apprehension for the safety of our party. On reporting to the commander, he at once ordered the carpenter to begin making a new runner, and he worked on it until midnight. We learned that the large Greenland party had just departed, and had missed meeting us by proceeding around Distant Cape while we were cutting across land from Water-course Bay.

On Tuesday, April 4, after another good meal, surrounded by the comparatively luxurious appointments of Fort Conger, Jens and I started back to join you again. The sledge-runner was completed, and Lieutenant Greely made the arrangement so advantageous to us that he would follow us to depot B with Lieutenant Lockwood, who was to start in a few hours with Jewell, Frederick, and dog-sledge, to join the main party. We reached depot B at 11.30 p. m., finding the Greenland party just arrived from depot A. Lieutenant Lockwood, with dog-sledge, came in at 3 a. m., next morning.

Wednesday, April 5, at 3.30 p. m., we bid "good-by" to the Greenlanders, who had entertained us so kindly, and moved on northward. We carried the runner by supporting part of its weight, only allowing one end to drag. We assumed the burden alternately and made very good time. The temperature when starting was only —22 [—30.0° C.], but the cold increased perceptibly, although we had no means of measuring its intensity. We entered Wrangell Bay at midnight, and, keeping inside the line of our hummocks at its entrance, visited the cache on the north side, finding everything in good condition—nothing disturbed by the bear. After stopping long enough to melt a little ice we continued on around Mount Parry.

The morning of Thursday, April 6, was bright and clear, and we entered Lincoln Bay in a dazzling blaze of light. On nearing the snow house, Jens was received by more than three cheers from his dogs, and a few moments later I was giving you the latest news from Fort Conger. It was 6 a. m. We had traveled the distance from depot B, including the stops at Wrangell Bay, in about fifteen hours.

Yours, respectfully,

GEO. W. RICE,
Sergeant, Signal Service, U. S. Army.

Dr. OCTAVE PAVY,
Acting Assistant Surgeon, U. S. A.

APPENDIX No. 49.—*Private Long's report on trip into Archer Fiord.*

FORT CONGER, GRINNELL LAND, *May* 20, 1882.

SIR: In compliance with your order of May 14, directing me, with Private William Whisler, to proceed to Depot Point, in Archer Fiord, and examine the provisions at that point, I have the honor to make the following report:

We left Fort Conger at 12.05 a. m., May 15, with Hudson Bay sledge *Polly*, arriving at tent in Basil Norris Bay at 9.30 a. m. At this point I left Private Whisler at 7 p. m., and proceeded ahead on snow-shoes, directing him to follow with the sledge and await my return at Keppel Head.

I arrived at the latter point at 2 a. m., 16th. From here proceeded to Depot Point, where I arrived at 11.30 p. m., and found the depot in good condition, except a portion of the hard bread, which had become mouldy from exposure.

The depot contained the following provisions:

Articles.	Amount.	Condition.
Pemmican	84 lbs	Good.
Bacon	21 lbs	Do.
Hard bread	73 lbs	Moldy.
Chocolate	5¼ lbs	Good.
Sugar	10½ lbs	Do.
Potatoes	10½ lbs	Do.
Tea	2⅝ lbs	Do.
Salt	10½ oz	Do.
Pepper	4½ oz	Do.
Onion powder	10½ oz	Do.
Rum	1 gall. and 10 gills	Do.
Spirits of wine	2 galls. (?)	
Tobacco	2 lbs. 5 oz	Do.

A considerable quantity of stearine was found, which had melted and run over the hard bread.

I left at 12.45 a. m., 17th, meeting Private Whisler at Hare Point. He had left the sledge at Keppel Head. We arrived at the latter point on our return at 1 p. m., and made camp. I had been on the march for thirty hours with no refreshment except at Depot Point. We left Keppel Head at 9 p. m., reaching the tent at 7 a. m., 18th. We broke camp at 8 p. m., and arrived at Fort Conger at 2.15 a. m.

Very respectfully, your obedient servant,

FRANCIS LONG,
Private, Company F, Ninth Infantry.

Lieut. A. W. GREELY,
First Lieut., Fifth Cavalry, A. S. O. and Assistant,
Commanding Expedition,

APPENDIX.

I was unable to find the depot of 192 rations—as given on the map of the English expedition—at Hillock's Depot. I made a thorough search, but concluded that the cache was covered with snow, which was very deep at this point.

NOTE.—Depot visited by Private Long proved to be Hillock's Depot. The 112 rations left in bags could not be found, nor notice left by Lieutenant Archer, R. N., regarding them. As Depot Point had 84 rations, the error was natural to Private Long, who found (as did Lieutenant Lockwood subsequently) 84 rations, and 84 only, at Hillock's Depot.—A. W. G.

Depot for 12-man sledge for 7 days = 84 rations.

Pemmican (one 56; one 28 lb. tin)	84 lbs.	0	oz.
Bacon (one 20 lb. tin; 1 lb. bacon in potato tin)	21 lbs.	0	oz.
Biscuit (50 lbs. in India-rubber case; 23 lbs. 8 oz. in potato can)	73 lbs.	8	oz.
Chocolate	5 lbs.	4	oz.
Sugar	2 lbs.	10	oz.
Tea	2 lbs.	10	oz.
Sugar	7 lbs.	14	oz.
Potatoes	10 lbs.	8	oz.
Salt	0 lbs.	10½	oz.
Pepper	0 lbs.	4½	oz.
Onion powder	0 lbs.	10½	oz.
Rum	1 gall.	10	gills.
Methylated spirits	1 gall.	10	gills.
Stearine	15 lbs.	12	oz.
Tobacco	2 lbs.	10	oz.

ROBERT W. ARCHER.

APPENDIX No. 50.—*Sergeant Israel's report on trip into the Bellows.*

FORT CONGER, GRINNELL LAND, *June* 16, 1882.

SIR: I have the honor to make the following report on my trip to the Bellows Valley. I left the station on May 25, at 11.25 p. m., with Private Connell. We took with us the light Hudson Bay sledge *Polly*, five days' provision, spirit lamp, snow-shoes, pocket sextant, artificial horizon, prismatic compass, an aneroid barometer, maximum and minimum thermometers (Beck's), a rifle and ammunition. We reached Musk-ox Bay at 1 a. m. of the 26th. From this point we kept the ice-foot as far as French Cape, finding pretty fair traveling; reached the tent at head of Basil Norris Bay at 6.20 a. m. At 7 a. m. the exposed thermometer read +7.5 [−13.6° C.]; aneroid barometer, 30.23 [767.83^{mm}]; attached thermometer, 30 [−1.1° C.]. Wind, calm. Clouds, upper, cirro-stratus, $\frac{4}{10}$, moving from the north slowly.

During our march we saw numerous wolf, fox, hare, lemming, and musk-ox tracks; also saw several musk-oxen on Sun Peninsula moving eastward. Breakfasted at 7.10, and then retired and slept until 6 p. m. The meteorological instruments read as follows: Thermometer, exposed, +14.0 [−10.0° C.]; min., +7 [−13.90° C.]; max., +20 [−6.7° C.]; bar., 30.16 [766.05^{mm}]; att. ther., 31 [−0.6° C.]. Wind, NW., light. Clouds; cirrus, $\frac{2}{10}$, calm; no lower. Weather clear.

Left the tent at 7.25 p. m., and after an hour and a quarter's hard pulling, over partially bare ground, we reached Bleak Head. As seen from this point the Bellows was entirely bare of snow for a distance of about six miles. I therefore thought it best to leave the sledge at this point to devote the night to an exploration of the Black Rock Vale, and after a rest to go up the Bellows as far as possible without sledge. At 8.45, bar., 30.16 [766.05^{mm}]; att., 39 [+3.3° C.]. Compass bearing of entrance of vale, 203° 30′. To reduce compass bearing to true bearing E. of N., add 77° 50′, the magnetic variation being 102° 10′.

After half an hour's walk we came to a creek bed filled with snow; this induced me to change my purpose and go back for the sledge, which we reached at 9.40 p. m. Temperature of air, +23.° [−5.0° C.]. After about an hour's hard pull over bare ground we reached the creek bed and followed this up the Bellows. The snow soon got so deep that we put on our snow-shoes at 11.20. Made camp at 12.20 a. m., of the 27th, on the east side of the valley about 1½ miles below Devil's Head. At this camp we found a considerable quantity of coal and some pieces of wood among the sand; also numerous pieces of substances resembling resin. The valley in the vicinity had been recently crossed by a herd of musk-cattle, there being numerous tracks crossing the valley diagonally NE. to SW. Bar., 30.05 [763.26^{mm}]; att. ther., 36 [+2.2° C.]; exp. ther., 34 [+1.1° C.]. Wind N., light. Clouds, upper, cirro-cumulus, $\frac{7}{10}$, calm, no lower. After supper Connell found the skull of a musk-ox, of apparently great age. Retired at 1.30 a. m. At 11.30 a. m., bar., 30.05 [763.26^{mm}]; att. ther., 40 [+4.4° C.]; exp. ther., 35.0 [+1.7° C.]; min., 30.0 [−1.1° C.]; max., 45.0 [+7.2° C.]. Wind S., moderate. Upper clouds hidden; lower, stratus, 10, calm.

Left Camp II at 12.20 p. m. At Devil's Head, 1.15 p. m., bar. read 30.00 [761.99^{mm}]; att. ther., 38 [+3.3° C.]; exp., 34.5 [+1.4° C.]. Made camp at 3.50 p. m., about four or five miles below what seemed to be the end of the valley, or a sharp turn in it. At 5 p. m., bar., 29.95 [760.72^{mm}]; att. ther., 36 [+2.2° C.]; exp., 32.9 [+0.5° C.]. Wind S., strong. Upper clouds hidden; lower, stratus, 10, calm.

We made our camp in a ravine on the west side of valley, about three-eighths of a mile above a point of low land extending over half-way across the valley from the west.

May 28.—Got up at 12.00 midnight. At 12.02 a. m., bar., 29.96 [760.97^{mm}]; att. ther., 32 [0.0° C.]; exp., 29.5 [−1.4° C]; min., 29.0 [−1.7° C.]; max., 42 [+5.6° C.]. Wind S, light. Upper clouds hidden; lower, stratus, 10, NE. (r). Started to climb a mountain on the west side of valley, but after ascending about 100 feet [30^{m}] we saw a herd of fourteen musk-oxen asleep just above our camp. We then returned, and Connell shot two cows and a yearling. After driving off the rest of the herd we skinned these. Had breakfast at 3 a. m.

The sun having in the mean time broken through the clouds I took six sights for longitude and six for magnetic variation. Deduced longitude west of Fort Conger 6^{m} 10.4^{s} [in time]; φ 81° 47.7′. Magnetic variation, 102° 10′ W.

While taking these observations Connell saw a wolf or fox on the mountain to our west. Placing our instruments on the sledge, we started for the end of the valley at 4.50 a. m. and arrived at the turn at 6.50. The valley here turns to the north and narrows rapidly, the mountain on the west being high, while on the east the land slopes up very gradually. At 6.55, bar. 29.85 [758.18^{mm}]; att. ther., 37 [+2.8° C.]; exp., 31.5 [−0.3° C.]. I sent Connell up the mountain on the west while I proceeded up the valley for about three

miles. The valley at this point is about 30 rods [about 150m] wide and splits into two narrow ravines, one extending up a mountain side for about a mile, and the other terminating in the same manner after extending to the north about three miles. As there is no turn in either of these passes, there can be no doubt that the valley ends here instead of communicating with another running in from the east, as I first thought. I returned to the sledge at 8.50, and Connell arrived about ten minutes later. He reported that the land was a high plateau as far as he could see; his view was partially obscured by low clouds. He identified several peaks, the bearings of which he took. At 9.05, aneroid, 29.86 [758.43mm]; att. ther., 42 [+5.6° C.]; exp. ther., 33.1 [+0.6° C.]. The barometer at top of mountain read 28.30 [720.84mm]. Took a set of circum-meridian altitudes, twelve sights. Deduced latitude 81° 53.9′. Longitude, by dead-reckoning from Camp III, 7m 44.4s [in time] W. of Fort Conger.

Compass bearings: Center of valley, N. 295° 00′ SE. 70 30°′. Camp III, 75° 55′.

Arrived at Camp III at 2.15 p. m.

May 29.—Breakfast at 3 a. m. At 3.30 a. m., bar., 29.78 [756.40mm]; att. ther., 36° [+2.2° C.]; exp. ther., 31.9° [−0.1° C.]. Two sun-dogs 22° from sun. Left Camp III at 4.15 a. m.

Compass bearings: From Camp III, place where observation was taken, 265° 45′; point of lowland, distant ⅜ of mile, 69° 30′; from point of lowland cairn erected near the meat (256° 00′); Camp III, 256° 00′; along center of valley SE., 80° 15′; along center of valley NW., 257° 30′; point at the turn of Bellows on east side, 262° 30′.

Stopped at 5.20 a. m., about three miles above Devil's Head, to take measurements of width of valley and height of cliffs. Width, 4,280 ft. [1,304m]; height of cliffs, west, 1,999 ft. [609m]; east (1,325 ft. [404m]) [?]. Arrived at Devil's Head at 7 a. m. Aneroid, 29 94 [760.46mm] ; att. ther., 34° [+1.1° C.]. Arrived at Camp II at 8.35 a. m. At 8.50 a. m., bar., 29.91 [759.70mm]; att. ther., 46° [7.8° C.] exp., 40.8° [+4.9° C.]. Upper clouds, cir. strat., $\frac{4}{10}$, calm, no lower.

Compass bearings: From Devil's Head, center of valley, 259°; north entrance of Black Rock Vale, 92° 5′. From Camp II, Devil's Head, 287° 5′; south entrance of Black Rock Vale, 97° 5′.

Took set of circum-meridian sights for latitude of Camp II. Sun obscured after 5th sight. Approximate latitude, 81° 45′.6. Left Camp II at 11.36 a. m.; came to low ground about one mile and a half NE. of Bleak Head. We found it impossible to pull the sledge, and had to carry the greater part of our load on our backs, and come back for the sledge. We finally found some snow when within a mile of the tent, which we reached at 4 p. m. At 4.30 p. m , bar., 29.95 [760.72mm]; att. ther., 42 [+5.6° C.]; exp. ther., 36° [+2.2° C.].

May 30.—Got up at 6 a. m., but turned in again as it was stormy; it had snowed all night. Got up again at 9 a. m. As the weather was not improving I determined to delay no longer, although it had been my desire to determine the position of the tent. Before leaving took an inventory of the provision, &c., at the tent. At 9.50, bar., 30.10 [764.53mm]; att. ther., 44 [+6.7° C.]; exp., 27 [−2.8° C.] Wind, E., strong. Upper clouds hidden, lower, nimbus, 10, calm. Snow.

Left tent at 10.15 a. m. Arrived at Fort Conger at 5.15 p. m.

I remain, very respectfully, your obedient servant,

EDWARD ISRAEL,
Sergeant, Signal Corps, U. S. A.

Lieut. A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding Lady Franklin Bay Expedition.

APPENDIX No. 51.—*Lieutenant Lockwood's orders to explore north coast of Greenland.*

FORT CONGER, GRINNELL LAND, *March* 21, 1882.

SIR: You are hereby charged with the full control and arrangement of the most important sledging and geographical work of this expedition, the exploration of the northeastern coast of Greenland.

In assigning you to this duty I am not unaware of the difficult, if not embarrassing, position in which you are necessarily placed, from our inability to lay out suitable depots to the northeast during the past autumn, from the limited number of your supporting parties, and from your working with a wide strait, covered with the roughest ice, between your base of supplies and field of operations.

The enterprise, energy, and discretion displayed during your attempt in November last to cross Robeson Channel in furtherance of this work, united to your endurance and experience (shown by nearly 200 miles field work this season, with temperature lower than ninety degrees below the freezing point [—50° C.]), give me strong assurances that lack of success will be through no fault of yours.

There will be at your disposal for this work: Sergeants Brainard, Linn, Ralston, Jewell, Elison, and Corporal Salor; Privates Biederbick, Connell, Frederick, Whisler, and one other to be selected. Dog-sledge *Antoinette*, with its team of eight dogs, and its driver, Frederick T. Christensen, are placed at your disposal, with such Hudson Bay sledges as you wish. These men dragging the supporting sledges will be used in such manner, and for such length of time, as you deem best. The details for the trip will be arranged by you. Memoranda showing the location of all supplies to the northward of depot A, and the sledging ration, will be at once furnished you.

The object of your work will be to explore the coast of Greenland near Cape Britannia. Should you be fortunate enough to pass beyond that point you will proceed in such direction as you think will best carry out the object of this expedition—the extension of knowledge regarding lands in the polar circle.

At your farthest, whether by land or sea, at least one day will be spent in determining accurately your position, in ascertaining the thickness of the ice, the depth and temperature of the water, and such other observations as are practicable. It is particularly to be desired that the period and character of the tides be noted, if any way possible. From the farthest land, specimens of the various rocks, vegetation, &c., should be obtained. During any day spent in rest similar observations and collections should be made. A careful watch should be kept for drift-wood, and if any fragments be seen that could have possibly formed part of a ship, they are to be brought to this station, unless of too great size, when such piece as is best calculated for identification will be selected. It is possible that in such manner some clue to the *Jeannette* may be obtained.

While it is desirable that Lieutenant Beaumont's cairns be visited, you are to make no considerable detour for such purpose. Map and data showing his route and work are already in your possession. In case such cairns are visited the usual instructions will be followed.

In establishing your farthest cairn you should add to the customary record as full and concise an account of your journey and, if possible, a skeleton map of your route and discoveries, if any. Depots should be carefully noted and secured; each member of the party should be shown the exact location, and attention invited to neighboring landmarks.

Your attention is invited to the danger of pursuing your journey beyond such point as your provisions are half consumed, and to remaining or venturing to any distance from the main land after lanes of water have once shown themselves.

Instructions to any returning party must be in writing, to avoid any possible error, and their tenor and importance should be fully understood by the non-commissioned officer to whom given.

The date of your departure from this station should not be later than April 4.

Wishing you the fullest success, and, above all, desiring the safe return of your party,

I am, sir, respectfully yours,

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding Expedition.

Second Lieut. J. B. LOCKWOOD,
Twenty-third Infantry, A. S. O.

APPENDIX No. 52.—*Supplementary instructions for exploration of north coast of Greenland.*

FORT CONGER, GRINNELL LAND, *March* 22, 1882.

SIR: I have the honor to herewith transmit, for your information, list of stores cached north of depot A, all of which are at your disposal for the trip toward Cape Britannia. You can rely on depot B being replenished during your absence. I also inclose memorandum fixing sledge ration. The proportion of pemmican and mixed meats may be changed by you until such time as the first supporting party leaves you, after which it is deemed necessary, in the interest of the men's health, that it should be carefully adhered to:

18 ounces pemmican (every other day); 18 ounces bacon, (once in 10 days); 22 ounces raw beef (one day in six); 18 ounces corned beef (one day in twelve); 22 ounces preserved meat (one day in ten); 18

ounces sausage (one day in twenty); 12 ounces hard bread, 2 ounces chocolate (one day in three); ½ ounce tea (2 days in three); 2 ounces sugar, 1 ounce cranberries, 4 ounces dried beans, 1 ounce desiccated potatoes, 1 ounce lime-juice (on days when lime-juice pemmican is not eaten); ¼ ounce salt; ½ ounce pepper; ⅛ ounce onion powder; 5 and 4 ounces (5 ounces to include April 30; after that date, 4 ounces) fuel alcohol.

I am, sir, respectfully yours,

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Asssitant,
Commanding Expedition.

Second Lieut. J. B. LOCKWOOD,
Twenty-third Infantry, A. S. O.

REPORTS ON EXPLORATION OF NORTH COAST OF GREENLAND.

APPENDIX No. 53.

Lieutenant Lockwood's letter of transmittal.

FORT CONGER, GRINNELL LAND, *July* 31, 1882.

SIR: I have the honor to submit sledge journal of my late expedition on the north coast of Greenland and a chart of same, showing route, &c. To this I have added an abstract, and appended various data necessary to make the record more complete.

The journal contains many details, which make it voluminous, and which are, perhaps, superfluous. I inserted them mainly because they exist in the original. I regret that, notwithstanding its size, the journal, and the map also, are incomplete in many respects. This must be ascribed mainly to the loss of my compass, the continuous bad weather, &c.

The men did well, and, on the straits particularly, endured many severe trials. It is easier to state than to appreciate what it is to drag a Hudson Bay sledge, with the bottom all splintered and broken, as ours soon became; the friction is enormous. Sergeant Brainard, both when commanding the supporting party, and afterwards while serving as one of the advance party, showed on all occasions such good judgment, energy, willingness, and cheerfulness to promote the object of the expedition that I cannot mention him too highly. Of Sergeants Linn, Ralston, Jewell, and Elison, Corporal Salor, and Private Frederick, who composed the supporting party, after leaving the Boat Camp, it is difficult to speak individually. I believe that each one did his best, and certainly they all showed a spirit of determination and alacrity, under difficulties, which, despite the breaking down of the sledges, got a large amount of rations to Cape Bryant, and would have enabled the dog-sledge to start from a more distant base had their desire to go farther been the only requisite, though at this time Sergeant Linn was suffering from snow-blindness and Private Frederick from a sprained knee. Sergeant Jewell, whenever he camped with me, voluntarily took on himself the whole labor of cooking, and also assisted Christiansen and myself in pitching the tent, &c., which, after a long march at the drag-rope, must have been very severe. Sergeants Linn, Ralston, and Elison elected to remain at the Boat Camp, and there endured twenty-five days, awaiting my return, which, in such a place, was worse, in many respects, than actual traveling. Of Privates Connell, Henry, Biederbick, and Whisler, I can only say that they did very well as far as they went, and were unfortunate in being able to go no farther. Private Connell showed great determination in going on after he had become actually disabled.

Frederick Christiansen, the Eskimo, I mention last, but he should be among the first. He did his work well, and performed everything required of him with alacrity and the stoicism of a philosopher. He proved himself very reliable.

I am, very respectfully, your obedient servant,

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, A. S. O.

Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant, Commanding.

Lieutenant Lockwood's abstract of sledge journey on the north coast of Greenland, with general remarks on the same.

FORT CONGER, GRINNELL LAND.

The expedition consisted of thirteen men, including myself and the driver of the dog sledge (Frederick, Eskimo), with one dog-sledge and four Hudson Bay sledges. It was originally contemplated that two of the small sledges and five of the men, with myself, should constitute an advance or main party, the others forming two supporting parties, but, owing to circumstances, this arrangement was never carried out. The route selected was via Cape Beechey and a point near the Gap opposite to Cape Sumner and thence along shore, about 1½ miles, to the *Polaris* Boat Camp, which was to be made a depot or base of supplies, and all rations collected there before proceeding farther. Nearly all the necessary rations had previously been accumulated at the two depots this side of Cape Beechey, at the Gap opposite, and on the ice of the straits intermediate. Beyond the Boat Camp the expedition was to cross Newman Bay and the Brevoort Peninsula, and, arriving at the northern coast, follow it along to Cape Bryant, whence the route to Cape Britannia and beyond, was left to circumstances.

Sergeant Brainard, with nine of the party and the four small sledges, left the station on the evening of April 3. I followed on the evening following with the dog-team and Sergeant Jewell. As a general rule, we traveled by night and rested during the day. In crossing the straits [Robeson Channel] two of the men broke down and had to be sent back. We encountered a severe storm but were not much delayed thereby, Sergeant Brainard and party reaching the Boat Camp, 50 miles from the station, on the 10th, and I, with the dog-sledge, on the 8th. The time from now to the 16th was occupied in accumulating here the rations at the Gap and on the straits [Robeson Channel]. Shortly after arriving two more of the men broke down and had to be sent back. We were prevented from doing anything for a day or two by a continuation of the storm referred to. After this a runner of the dog-sledge being broken and the other sledges almost worn out, I returned with dog-team to the station for new runners, &c., leaving on the 13th and getting back on the 15th. On the evening of the 16th we left the *Polaris* Boat Camp with the following organization and equipment.

I. One dog-sledge, *Antoinette*, and team of eight dogs, Christiansen and myself. "Constant weights," 253 pounds (including weight of sledge), with load of five sacks of dog pemmican; total, 753 pounds.

II. One large sledge called the *Nares* (improvised at Boat Camp from old sledge-runners repaired and pieces of plank), drawn by Sergeants Brainard, Ralston, and Corporal Salor; estimated amount dragged by each, 217 pounds.

III. One Hudson Bay sledge, *Hall*, drawn by Sergeant Jewell and Private Frederick; 150 pounds dragged by each.

IV. One Hudson Bay sledge, *Hayes*, drawn by Sergeants Linn and Elison; amount hauled by each, 150 pounds.

The other two Hudson Bay sledges, the *Beaumont* and *Kane*, were abandoned as unserviceable. The dog-sledge was now to be the advance sledge and the others to act in its support. The rations taken (all, at the start, on the man-sledges) were estimated at 300, and weighed about 900 pounds.

The route taken across the Brevoort Peninsula was up a narrow ravine, leading us in a northeast direction, then north across a "divide" or plateau, and thence through another ravine running northwest, which brought us out at Repulse Harbor, a little east of which, on the coast, we all camped together, April 22. Previous to this I generally camped independent of the supporting party, which was under Sergeant Brainard. Afterwards, till Cape Bryant was reached, we camped together. From Repulse Harbor to this cape we followed the coast line, only leaving it to travel on the floe for a few miles opposite the Black Horn Cliffs. From the Boat Camp to Stanton Gorge the supporting party found it necessary to "double up" (*i. e.*, divide the sledge loads and draw forward half at a time), the entire distance. I found it necessary all the way to Cape Bryant, sometimes going five times over the same road. Near Repulse Harbor a runner of the dog-sledge broke, and having to take one of the two belonging to the *Nares*, it was necessary to abandon that sledge, which was done after getting along with a patched runner as far as Drift Point. At Stanton Gorge I found the forty rations of Lieutenant Beaumont, and took them on as far as Cape Bryant, which we reached April 27. It is about 75 miles from the Boat Camp by the route traveled; the dog-sledge made eight intermediate camps, and the supporting party ten.

At Cape Bryant a careful inspection of the two remaining man-sledges satisfied me that they could proceed no farther. However, one was mended sufficiently to return. Having left in cache, *en route*, but four days' rations, a considerable quantity still remained surplus. Of these I took twenty-five days, or

seventy-five rations, for my further advance, and left most of the remainder in a cairn near by. The equipment of the dog-sledge now consisted of, rations, 230 pounds; dog-food, 300 pounds; "constant weights," 176 pounds, which, with weight of sledge, 80 pounds, made 786 pounds, or 98¼ pounds per dog.

On the afternoon of April 29 Sergeant Linn, with the supporting party, started on return, and shortly afterwards, with Sergeants Brainard, Frederick, and the dog-team, I started forward. The first journey I traveled towards Cape May, but after that proceeded as direct as possible for Cape Britannia, over the ice of the Polar Sea. Cape Britannia was reached May 5, after six journeys, the last a very short one. The first day's (or rather night's) journey was towards Cape May, but after that I proceeded as direct as possible towards Cape Britannia, passing the former cape about five miles from shore. It was only the first day or night that we got along without "doubling up," excepting a very few miles. *En route* when opposite and when on a line with Beaumont Island and Cape May, we crossed a remarkable tide-crack (?) and let down the deep-sea lead 840 feet [256^{m}] without finding bottom. In drawing it up the line parted and the lead, &c., was lost.

From the top of the mountain, 2,050 feet [625^{m}], which forms Cape Britannia, I got a good view all around. Towards the northeast lay a succession of headlands and inlets as far as I could see—some 15 or 20 miles—and this was the character of the coast beyond as far as I got. The tide-crack extended from Beaumont Island from one cape to another the whole distance. I estimate Cape Britannia as 60 miles from Cape Bryant. We left Britannia after only the usual delay in camp and proceeded, without any more doubling up, in a general northeast direction till May 13, when, the rations being exhausted, I reached my farthest at the sixth camp 95 miles beyond Cape Britannia. *En route* we remained sixty-two hours at Shoe [Mary Murray] Island, detained by a storm.

From the top of the height [Lockwood Island], just back of the headland [Cape Christiansen] (the farthest reached), I could see to the northeast two more projecting points [Capes Kane and Washington], with intervening fiords [Conger Inlet and Hunt Fiord], the farthest [Cape Washington] perhaps 15 miles distant. No land could be seen to the north—nothing but the vast expanse of the Polar Sea. To the south and east lay a maze of snow-covered mountain peaks.

After a delay till the 15th [May, 1882] in taking observations, collecting specimens of rocks and vegetation, &c., we started back. Cape Britannia was reached (May 20) in five marches and Cape Bryant (May 24) in four more, without particular event. At the latter place I attempted to get some observations on the tide, but without success. On reaching Repulse Harbor I continued along the coast till I reached the Gap Valley of the English by which I crossed the Brevoort Peninsula and reached the *Polaris* Boat Camp on the 29th instant, the fourth camp from Cape Bryant on return. Here Sergeants Linn, Ralston and Elison were awaiting my return, having arrived on the 5th May. The others, by my direction, had returned to Fort Conger after a day's rest. The party which remained had (while asleep) been visited by two bears and experienced several storms, but otherwise the time had been uneventful. We started the same day for the station, which we reached (June 1) in three marches.

The weather after leaving the station was often stormy and bad until about the middle of the month; during this time the coldest was experienced (April 6) —48.8 [—44.9° C.]. After leaving the *Polaris* Boat Camp it was alternately good and bad until Cape Stanton was reached, after which until beyond Cape Britannia we had fine weather. But then it commenced to blow and snow, and so continued, with few exceptions, until Britannia was reached on return. Thence to Bryant it was mild and foggy, and thence to Boat Camp generally calm and clear. In crossing the straits [Robeson Channel] again it was very bad.

1882.	Thermometer.			Barometer.		
	Number of observations.	Mean temperature.		Number of observations.	Mean height.	
		Fahr.	*C.*		*Inches.*	*mm.*
Fort Conger to Boat Camp, April 3 to 16	32	—15.77	—26.6	21	29.74	755.38
Boat Camp to Cape Bryant, April 16 to 29	39	— 7.36	—21.9	25	29.09	738.87
Cape Bryant to Cape Britannia, April 29 to May 5	18	+ 9.91	—12.3	19	29.43	747.51
Cape Britannia to Farthest, May 5 to 15	32	+12.34	—10.9	23	29.39	746.49

These means are given for what they are worth. The observations were taken every day but at very irregular hours, most of them when in camp. No observations were taken on return, the thermometer being left in cairn at Farthest and the barometer having been broken.

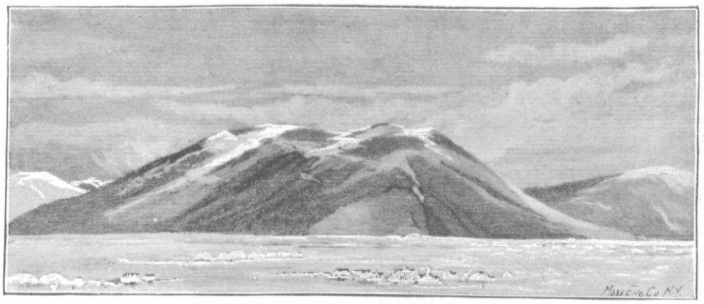
The coast line near the Boat Camp, both on the straits and the shores of Newman Bay, consists of a series of high, precipitous cliffs. Between Cape Sumner and Boat Camp was a steep snow-slope which I found necessary to follow on account of the very rough ice outside. On the north side of the bay the shore slopes at a varying angle to the plateau or water-shed above, the highest elevation of which is much nearer the bay than it is to the coast to the north, thus making the streams on the north side much longer than those on the south. On the seacoast a line of cliffs extends from Gap Valley to Repulse Harbor, but beyond they lie well back from the coast or rather merge into a range of hills, leaving a low, sloping shore which extends to the snow-slopes near Drift Point and the Black Horn Cliffs beyond. From the last-named cliffs the coast line extends along the base of a series of hills and mountains which at Frankfield Bay again run off inland and leave, thence to Cape Bryant, another low, shelving shore. Beyond Cape Bryant to Cape Britannia and beyond, as far as I traveled, the coast line, if such it may be termed, presents a great similarity of appearance, a series of high, rocky, and precipitous promontories, probably the north projections of islands in many cases with intervening inlets. It was not till near my farthest that I met any shore lying in the general direction of the line of travel, our route almost invariably being from one point to another across the openings of these inlets. It was very seldom that I could say whether these inlets were bays or channels connecting with larger bodies of water to the south. There was no visible land at the heads of several of them. They were very much like immense canals, and gave the whole coast the appearance of the Greenland coast between Upernivik and Proven, and Disco. From the top of Cape Britannia I saw one that extended off towards the east and seemed to make islands of all the projecting promontories to its north.

There was every appearance of a fiord on the south side of Britannia, thus making that land an island; this was noticeable from either side of Britannia. "Stephenson Island," also, is undoubtedly an island, and the fiords on each side of my farthest [Lockwood Island] seemed to connect a few miles to the south, thus making that land an island also. Owing to continual bad weather my view of the interior was mainly confined to what I saw from the two elevations ascended; and, owing to their comparative lowness, the maze of mountain peaks with their universal covering of snow merging and overlapping one another made it very difficult to distinguish the topography at all. The interior land seemed very high, and on this account the farthest that I could see could not have been very many miles removed. I could see [from Britannia and Lockwood Island] no glaciers that I recognized as such, though from the floe while traveling I saw a very large one, and one or two quite small. From my farthest I saw mountains to the east, perhaps twenty or thirty miles distant, and a high, mountainous country doubtless exists all along this coast for some distance to the south, the shore lines of the fiords invariably being at the base of steep cliffs and mountains. No land was ever seen to the north. There was a very noticeable abundance of snow everywhere.

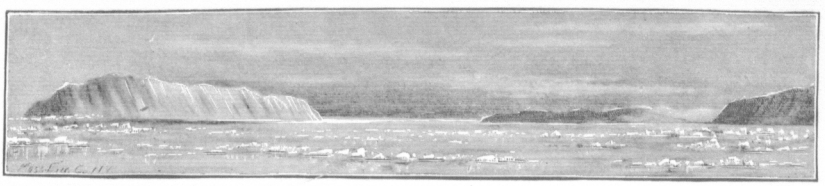
The most singular phenomenon along this coast was the tide-crack, extending from headland to headland as far as I got. I could only understand it on the supposition that the outside polar pack had constantly more or less motion. At North Cape [Cape Frederick] and beyond we heard a low, grinding sound, as of moving ice, which tended to confirm that impression. This "crack"—that is, the space between the solid floes on each side—was sometimes upwards of a hundred yards [91^{m}] wide, the intervening space being composed of young ice and lanes and pools of water. It generally inclined in a curve to the south between the different promontories, and its whole course was marked by a wall of hummocky ice, pressed up in the utmost confusion, sometimes on one side, sometimes on both. At the several capes this pressure was especially noticeable, and along short extents of coast line which lay parallel to the general direction of the crack.

As with one exception we traveled *inside* of the crack, little was seen of the main polar pack beyond, except at long intervals. It seemed a vast expanse of floes, crossed at many angles with many ridges of hummocks, with masses of rubble-ice here and there. When we crossed the crack we traveled on ice but lately formed apparently, and made good progress, except when masses of rubble-ice were encountered; but outside, whenever noticed, the main pack looked very rough. Traveling over it would no doubt be slow and difficult.

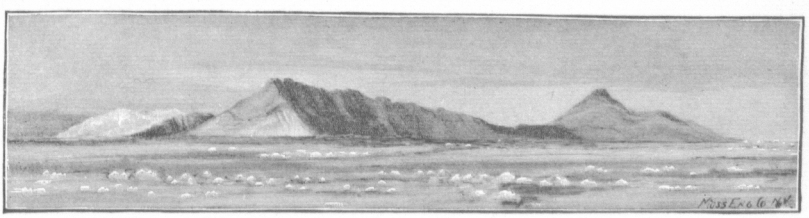
To the south of the crack, from shore to shore and up the fiords, as far as could be seen, the ice was covered with a smooth, level expanse of snow, seldom broken by even a solitary hummock. In the neighborhood of the tide-crack, however, the surface was often more or less undulating, but still presented the appearance of great age, excepting across some of the inlets beyond Distant Cape, where we traveled over more or less blue-top floes. At North Cape [Frederick], extending out some distance from shore, was a good deal of smooth, level ice, with very little or no snow on it—last year's ice. This was also met with just beyond Hummock Cape and near the coast west of Shoe [Mary Murray] Island. My



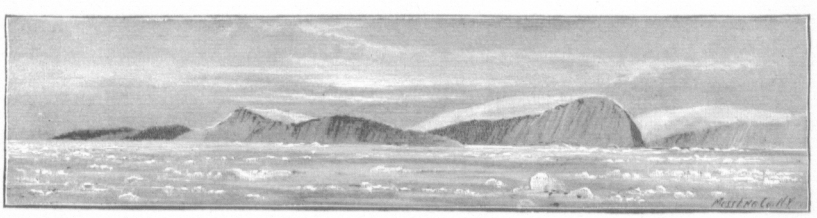
CAPE BRITANNIA.



VICTORIA INLET FROM NEAR CAPE BRITANNIA.
[Nares Land to left and Stephenson Island to right.]



BEAUMONT ISLAND FROM NEAR CAPE BRITANNIA.



STEPHENSON ISLAND FROM CAPE BRITANNIA.

BEAUMONT ISLAND FROM CAPE BRITANNIA.

course when not on the ice of the inlets was on the steep snow-slopes and ice-foot round the capes. These "ice-foots" were almost always covered with snow, more or less deep. Between Dome Cape [Cape Wijkander] and Shoe [Mary Murray] Island, however, were often many hundred yards of clear ice between the foot of the cliffs and the wall of hummocky ice lining the coast. The reason of this difference was not apparent. The ice-foot of the Grinnell shore below Cape Beechey, which remained clear late in the fall, and was so found early in the spring, had considerable snow on it in April. The snow on these fiords was quite frequently soft and deep, on some particularly so. It was of this character from Cape Bryant nearly to Britannia, and generally so beyond as far as Distant Cape. Afterwards, till I had nearly reached my farthest, it was moderately firm, but in the fiord beyond Hummock Cape it was extremely soft and deep. It was thus on almost all the snow-slopes.

My tidal observations at Cape Bryant were not successful, but a deflection of the line to the east, very frequently noticed during the twelve hours of my observations, seemed to indicate a current (perhaps a tide) in that direction. No such deflection was noticed at the crack south of Beaumont Island, but this crack was hardly more than two feet [.6^{m}] wide at this particular point. On the shores of Cape Britannia Island, and the whole distance beyond, the appearance of the ice seemed to indicate a very small vertical motion (rise and fall) of the tide. The chasm between the fast ice on shore and the floating ice adjoining and the débris formed by the two edges working against each other, so noticeable in the straits [Robeson Channel], was generally entirely wanting. Sometimes we passed from the floe to the ice-foot or snow-slope without any change whatever of the surface; sometimes a few small cracks were seen, as though the ice worked on a hinge, as it were. A bear track at Black Cape, and a great many fox, hare, and lemming tracks were noticed. Traces of musk-ox were found at Cape Britannia, and a ptarmigan shot. Beyond this the only birds or animals seen or obtained were a hare and some ptarmigan at Rabbit Point [Cape Benèt], a lemming at Shoe [Mary Murray] Island, and another just beyond, and some snow-birds at the Farthest [Lockwood Island].

The only drift-wood found was near Repulse Harbor. But little vegetation was seen, on account of the snow, &c. The rocks were quite the same in general appearance and formation as what is observed in the neighborhood of the station. The cliff forming the farthest headland [Cape Christiansen] reached consisted of a very friable slate, of several colors or shades, and also what I took for "indurated clay," a very pretty rock, of various shades of brown, red, and yellow. Specimens of the rocks and vegetation from here [Lockwood Island] and elsewhere have been submitted.

The health of the party remained good. A few cases of frost-bite and snow-blindness (not serious) were the only exceptions after leaving the Boat Camp.

Very respectfully, your obedient servant,

J. B. Lockwood,
Second Lieutenant, Twenty-third Infantry, A. S. O.

Lieutenant Lockwood's Journal of Sledge Expedition on north coast of Greenland (April 3 to June 1, 1882).

First march, Station to Snow House, Depot B.

April 4.—At 8.45 p. m. left Fort Conger with Sergeant Jewell, Christiansen (Eskimo), dog-sledge *Antoinette*, and eight dogs, equipped, and load weighing about 500 pounds. At 10.13 p. m. reached depot A; took on two sacks of dog pemmican; three other sacks added to load at a cache about one-half mile west. Took also from depot eight cans corned beef and one of beans, making quite a heavy load, which I found it necessary to transfer by hand over a crack on reaching St. Patrick Bay.

April 5.—At 2.40 a. m. reached snow house (depot B), where I found Sergeant Brainard and the main party, also Sergeant Rice and Jens (the Eskimo), on their way to rejoin Doctor Pavy. Just before reaching there, I saw on the south side of the first bay or indentation of the coast to the south, seated on a floe-berg, what I took for an eagle or owl—a large, white bird; it flew away to the south before we could get within range. At depot B all were asleep. They filled up the snow house and snow-burrow; so Sergeant Jewell and I slept in the store tent and Christiansen in the tunnel or entrance to snow-house.

Time *en route*, 5 hours 55 minutes; time actually traveling forward the first time, all delays deducted, 5 hours 30 minutes; distance traveled, 18 miles; distance made good, 18 miles.

SECOND MARCH, SNOW-HOUSE TO TENT ON STRAITS [ROBESON CHANNEL].

Some hours before starting were occupied in cooking breakfast on the little stove for the whole party and in getting ready rations, &c. (enumerated elsewhere), which were added to load from this place—the loads of the several sledges being rearranged before starting. At 8.50 p. m. Sergeant Jewell, Christiansen, and I got off. Sergeant Brainard, with the Hudson Bay sledges, left about ten minutes earlier. The dog-sledge, *Antoinette*, very heavily loaded; weight dragged, about 800 pounds. Each man with the Hudson Bay sledges dragged about 116 pounds. The ice-foot had more or less snow on it, and hence the traveling along here not so good as heretofore. I overtook the other sledges soon after starting and passed ahead. At 10.52 p. m. reached Cape Beechey; the other sledges some distance back. Here it was necessary to double up (take in two loads) through the rubble-ice extending out about one-quarter mile from shore. After this we traveled over old floe-ice, *i. e.*, ice with an undulating surface covered with deep snow.

April 6.—At 2.25 a. m. arrived at tent on Robeson Channel (about 4½ miles from shore). Delayed a few minutes and then went back part of the way to shore and assisted the last of the Hudson Bay sledges to the tent, having decided to camp there. This occupied a little more than an hour; it was rendered necessary by Whisler's breaking down and Connell and Bierderbick being unable to drag the sledge without help. It was very cold on reaching camp, the thermometer registering 45° below zero [−42.8° C.]. Sergeant Jewell, Christiansen, and I took possession of the wall-tent already pitched here. The others pitched their own tents two in number.

Time *en route* (dog-sledge), 6 hours and 45 minutes; actual time traveling forward, less delays, 5 hours; distance traveled, 13 miles; distance made good, 9½ miles.

THIRD MARCH, TENT ON STRAITS TO FLOE SOUTHWEST OF THE GAP.

While Sergeant Jewell was trying to cook breakfast on our little 2-man lamp I went to the tents of the others. I found that Private Connell had his foot badly frost-bitten on the last march and that Private Henry was suffering from rheumatism; the latter thought he would have to be hauled back if he went any farther, so I directed him to return to the station, and he left shortly before the others proceeded forward. Private Connell thought he was able to go on—was willing and anxious to try, at any rate.

At 10.10 p. m. started with dog-sledge, about 1½ hours after the others; this was occasioned by the lamp being unable to bring the water to a boil. It was very cold at this camp, the minimum reaching −47.5° [−44.2° C.]. About 1½ miles from camp I overtook Private Frederick dragging a sledge alone, and a little farther on, the others, who had halted for a rest. Connell had fallen out of the drag-rope, he being hardly able to get along at all. He reluctantly agreed to going back. I detached Sergeant Jewell from service with the dog-sledge, and from here on he worked with the others. Leaving the main party to proceed I left my load and took Private Connell to Cape Beechey, going along myself as far as the tent on the straits, where I awaited the return of the sledge. Connell thought he could get by himself from Cape Beechey. On the dog-sledge rejoining me I proceeded after the others, and picking up the load where left, continued on. Progress with such a load, however, involved so many delays and so much work, on account, of the heavy snow, that some time after this I threw off about half.

April 7.—At 5.30 a. m. arrived at a spot just southwest of the Gap, where I found the main party already in camp. Pitched tent, &c., while Christiansen went back for the rest of the load. He returned in the course of an hour. We got supper in the 6-man tent.

Advanced 8 miles; corresponding time, about 5 hours; total traveled, 24 miles; corresponding time, 8 hours and 30 minutes. See note to tabulated statement appended.

FOURTH MARCH, FLOE SOUTHWEST OF GAP TO [*Polaris*] BOAT CAMP, NEARLY.

At 8.45 p. m. left camp with dog-sledge and half-load, the main party preparing to move. Traveled for some time over level floes crossed by ranges of hummocky ice—taking a direction for Cape Sumner, but after some hours' traveling, a storm of wind and snow, which had set in some time before, made everything so obscure that I suddenly found the sledge "stalled" in a mass of rubble-ice and deep snow. It blew a gale from the southwest. After several ineffectual efforts things looked so discouraging that I began to think of taking refuge in a snow-burrow—unable to pick out a route on account of the driving snow. However, some time after this I succeeded in finding a floe and getting the sledge to it, with Christiansen's willing aid.

April 8.—At 2.10 a. m. arrived at Cape Sumner, and, getting through the rough ice near shore, gained the snow-slope between the foot of the cliffs and the line of immense bergs and hummocks which line the coast. Here, instead of the protection I had anticipated from the bluffs, we encountered a series of blasts and whirlwinds of snow, disagreeable in the extreme, and making it difficult to keep the sledge from sliding sideways into the pits, formed by the snow, adjoining every mass of ice.

At 3.50 a. m. reached an immense snow-drift, about one-half mile from Boat Camp, which extends at a steep angle from the top to the bottom of the cliff; it was not an easy place to pass. Christiansen and I left sledge and went ahead to reconnoiter. We could hardly keep our feet. We returned, and I thought it best to camp here; so in the course of two hours we had dug a small hole in the snow-bank and crawled inside, and, having got everything necessary in, stopped up the entrance. 8.10 a. m., supper finished. Quite dark in here, having no candles. We had no light except from some cracks which closed and opened continuously, through some unknown agency, occasionally new cracks forming. This movement was accompanied by a noise which was rather alarming until I found that our abode did not decrease in size thereby.

Advanced 12½ miles; time, less delays, 6 hours; traveled, 12½ miles; time, including delays, 7 hours and 5 minutes.

ARRIVED AT [*Polaris*] BOAT CAMP.

April 9.—How long, exactly, we remained at this place I don't know; I was glad to leave even before the storm had ceased. The entrance had become entirely snowed up. Cutting our way out, we found it still snowing and blowing, but not so hard. The dogs were almost concealed from view by the snow which had drifted on them.

At about 1 p. m. arrived at Boat Camp, and, it seeming impossible for a tent long to stand, we set to work and dug another snow-burrow at the conjunction of the coast-line of cliffs and the ravine. It was impracticable to do anything more.

At 8.10 p. m. left snow-burrow to proceed down the straits [Robeson Channel] for remainder of load, and also to see what had become of the main party, for whom I began to feel some uneasiness. A cold wind was blowing from the southwest.

At 11.10 p. m. met the main party *en route* to Boat Camp; all well. They had encountered so much difficulty in their march, shortly after my departure, that they had taken refuge behind a large floe-berg on the straits.

April 10.—At 12.10 a. m. reached remainder of load (400 pounds pemmican, dog-food), and started back; at 9.10 a. m. arrived again at Boat Camp, where I found the main party at supper. Their two tents were pitched at the foot of the snow-drift, but the violent gusts of wind threatened every few minutes to blow them down. The wind here blows in sudden gusts, first from one direction, then from another, sweeping the stony ground completely bare, except at the snow-drift at the foot of the cliffs.

Traveled 26 miles; time, 13 hours.

April 11.—At 1.10 a. m. got up, to find ourselves snowed in and the air so close that a match was lighted with difficulty. After getting something to eat we cut a hole through the top or roof of our abode, and got out; found the two tents had disappeared, and their inmates buried in two small snow-burrows. Spent the greater part of the forenoon in closing up the top of my abode, enlarging it, and constructing a tunnel.

At 1 p. m. went to bed again, the weather preventing us from doing anything else.

At 9 p. m. got up. Found that the main party had had an extremely uncomfortable rest, and were all suffering from bad air, &c., owing to the drifting snow. Private Bierderbick was suffering from continence of urine, and Whisler from a pain in the lungs attended with the spitting of blood. I thought it best to send them back, and they started about midnight direct for Cape Beechey.

[*Polaris*] BOAT CAMP TO GAP, ETC., AND BACK.

At 11.55 p. m. Sergeant Brainard, and those remaining, started, with three Hudson Bay sledges, for the Gap, to help bring up rations at that place.

April 12.—At 2 a. m. I left with Christiansen and dog-team for same place and purpose. The traveling between Cape Sumner and the Gap, about 7 miles below, is the best met with on the straits. A smooth, level floe of clear ice extends all along except at a place about 1½ miles below the cape, where it is interrupted by several hundred yards of rough rubble-ice, difficult to get through. This route was not fully discovered

till this occasion. I overtook the main party about two miles from the Gap at 4.10 a. m., about; their sledges had become much split and worn in the rough ice of the straits, and they found it fatiguing even pulling them empty. I put their sledges on the dog-sledge and went on in advance.

At 4.45 a. m. reached the Gap. Found the little English boat on the ice-foot and very badly broken up, as reported. Took the boat to land and hung her on the bowlder which marks the place where the provisions were left. A good meal was then cooked for every one in the snow-burrow adjoining, the lamps having been brought along for this purpose. In the mean time I sent Sergeant Jewell with dog-team, accompanied by Christiansen, of course, out on the straits [Robeson Channel] to get a few articles that had been left by the former about a mile from shore. At 7.45 a. m., leaving the rest to take to Boat Camp all they could haul, enumerated elsewhere, I started with dog-team for cache made by Sergeant Jewell (about 325 pounds) in March, 1882, five miles or more from shore, towards Cape Beechey.

At 9.32 a. m. reached cache. At 12 noon got back again to the Gap, and was delayed thirty minutes in adding to load everything that had been left. Found it an enormous load, and after proceeding, on return to Boat Camp, about a mile, I dropped off the Greenland bag and a large box of canned meats, &c.

At 6.10 p. m. reached Boat Camp; dogs very much exhausted. Found that the others had got back about 1½ hours before me.

At 10.10 p. m. went to bed. The lamp is very small, and being without the funnel arrangement the meat and tea have to be cooked separately; hence, the long time occupied on this occasion, as well as before and afterwards, until I used one of the larger lamps.

Traveled 25 miles; time, 16 hours and 10 minutes.

April 13.—At 8.30 a. m., about, was up and out. Jewell slept in the snow-burrow with Christiansen and myself last night and ate with us, turning over again to Christiansen his single dog-skin bag, and occupying the two-man buffalo-bag with me. This he continued to do thereafter, whenever we camped together, till Cape Bryant was reached. I found that the Hudson Bay sledges were very much worn and split; one almost entirely useless and another almost as bad. One runner of the dog-sledge became split across the horn some days previous, and, though lately mended by Sergeant Elison, as well as possible, I regarded it best, everything considered, to return to station for a new runner, &c. The forenoon was occupied in mending sledges, digging out whale-boat* (which was embanked in snow) and placing her on her keel, properly secured with stones. I left directions to have all extra rations placed therein and the articles left on the ice near the boat to be brought up. Everything being prepared Sergeant Brainard was also directed to leave with party, on the 16th, for Gap Valley, if I were not back on the 15th.

BOAT CAMP TO FORT CONGER

At 12.25 p. m. (13th) started for station with Christiansen and dog-team; sledge empty, excepting an ax and spade on it. We were half an hour in reaching Cape Sumner, whence I followed first-made tracks, which took me well out from shore. At 4.50 p. m. reached cross-roads, one fork running to Gap, the other to Cape Sumner. From here to station and back Christiansen and I took turns in riding. The dogs kept up a trot all the way. At 5.45 p. m. reached tent on straits. At 6.35 p. m. reached Cape Beechey. At 7.50 p. m. reached snow house (depot B). Cooked something to eat here and gave the dogs a rest; was afraid of overworking them. At 11.55 p. m. left snow house for station.

April 14.—At 2.03 a. m. reached depot A. At 4.15 a. m. reached Fort Conger. Weather beautiful during the journey; some wind on straits, as usual. At station I got new slats for sledge and a pair of runners off another sledge, retaining the old ones, however. The dogs were well fed on walrus meat.

Traveled 48 miles.

RETURN FROM FORT CONGER TO BOAT CAMP.

At 9.55 p. m. left station; at Dutch Island in twenty minutes, following the ice-foot newly formed close along shore.

April 15.—At 12.12 a. m. reached depot A; thermometer there,† 116 [—13.2° Fahr.; —25.1° C.]. At 2.30 a. m. arrived at depot B. Cooked a meal for ourselves and fed the dogs with meat brought from the station. Made an attempt to discover location of the Hudson Bay sledge buried in the drift here, both by digging from the tunnel laterally and also from the surface of the snow, but without success. We were too

* This was a whale-boat abandoned and cached by H. C. Chester, of the *Polaris*, in July, 1872. This boat gave the name to the camp.—A. W. G.

† Yale thermometer, arbitrary scale.

tired to attempt much. Christiansen got a short nap; I remained up. At 8.45 a. m., having given the dogs a good rest, we left depot, taking a few articles of food. Having already several articles on the sledge we now had a little load, a very small one. At 1.55 p m. reached smooth floe just below the Gap, and in half an hour got through a mass of rubble-ice with the usual amount of work and annoyance and were opposite Gap. At 5.30 p. m. arrived at Boat Camp. Weather during the day very fine indeed.

Traveled 48 miles.

During the remainder of this day (the 15th), and that following, two of the Hudson Bay sledges were made serviceable by means of tin which I had brought over for the purpose, and other means at hand. The sledges were so worn and broken that frequent relashings of their loads had become necessary, and the friction was great even on smooth, hard snow. It was thought best to abandon two of the Hudson Bay sledges (they seeming almost beyond repair), and to substitute a sledge made from the old dog-sledge runners, with cross-slats contributed partly from the dog-sledge but mostly improvised from old pieces of plank.

The various accidents to men and sledges had rendered a new organization necessary from that originally contemplated, so that we left the Boat Camp (the depot of supplies), with sledges and equipment as follows:

I. One dog-sledge, *Antoinette*, hauled by team of eight dogs, accompanied by Christiansen (Eskimo) and myself, with load and weights as follows:

	Pounds.
One dog-sledge, *Antoinette*	80½
One A tent, 20 lbs.; poles, 12 lbs.; and pins, 2 lbs	34
One two-man sleeping-bag (buffalo)	82¼
One single sleeping bag (dog-skin)	14
One rubber blanket	6½
One "funnel" lamp (complete)	5½
One ax, 6¾ lbs.; shovel, 5 lbs.; snow-knife, 1½ lbs	13¼
One pistol, 3⅝ lbs.; sextant, &c., 6¼ lbs.; telescope and compass, 4⅛ lbs	14
Three clothing-bags, about	24
One "catch-all" (stove, and cook's bag)	7¼
One shelter tent and poles, 10 lbs.; one two-man lamp, 1½ lbs	11½
Seal thong, rope dog-shoes, &c	10
Five sacks dog pemmican	500
Total	742¾

In addition to this there was generally on the dog-sledge two or three days' rations.

II. One large sledge, *Nares*, drawn by Sergeants Brainard and Ralston and Corporal Salor; estimated amount drawn by each man, 217 pounds (on starting).

III. One Hudson Bay sledge, *Hall*, drawn by Sergeant Jewell and Private Frederick; estimated amount dragged by each, 150 pounds.

IV. One Hudson Bay sledge, *Hayes*, dragged by Sergeants Linn and Elison; estimated amount dragged by each man 150 pounds.

The loads of the sledges drawn by the men comprised the following "constant" weights and rations:

	Pounds.
One six-man tent, 27 lbs.; poles, 15 lbs.; pins, 3 lbs	45
Two three-man sleeping-bags (buffalo)	67
One rubber blanket	10¼
One funnel lamp (complete)	6½
One ax, one spade, one snow-knife	13
One shotgun, one pistol	11
Five pair snow-shoes	17½
Six clothing-bags, about	30
Store-bag, cook's bag, and medicine, about	25
Total	225¼

About 300 rations.

	Pounds.
Pemmican (lime-juice)	169
Bacon	20
Beef:	
corned	28
English	88
musk-ox (raw)	68½
Sausage	28
Bread	225
Chocolate	12
Tea	6
Onion powder	2¼
Cranberry sauce	19
Sugar	38
Beans:	
Boston baked	45
dried, roasted, and ground	35
Potatoes	14
Lime-juice (frozen in small cakes)	9
Alcohol (in 11-pound square tins)	94
Total	900¾
Weight of large sledge, about 70 pounds; two Hudson Bay sledges, 80	150
Aggregate (amount drawn by seven men)	1,276
Average drawn by each	182

All tins were removed from the several articles of food (excepting the cranberry sauce), and they were sewed up in light bags. The dogs got at the meat packed on the Hudson Bay sledges at the Boat Camp and ate up about thirty pounds of bacon and corned beef. For this reason and others I didn't adhere strictly to the proportion of the several kinds of meat, as originally contemplated. Nor while at the Boat Camp did we strictly adhere to the sledge ration. For want of time, &c., I didn't compare amount of stores actually accumulated here with the estimated inventories; there was one can of lime-juice pemmican missing if nothing else.

Fifth march forward,* [*Polaris*] Boat Camp to Rocky Gorge Creek.

April 16.—At 10.24 p. m. left Boat Camp with whole party and took a course for what I supposed to be Gap Valley, a ravine across Newman Bay, almost directly east and on the north side of the extension of the bay to the south. It is also at the end of a line of cliffs, and is the only water-course, excepting some insignificant gullies, hardly noticeable on that side of the bay. For some distance from shore we traveled over a smooth surface of ice mostly. This was succeeded by snow, very hard and level, and uninterrupted by the smallest eminence until perhaps half-way across, when the surface became somewhat soft. Notwithstanding the very heavy load the dogs made good time, and soon left the other sledges far to the rear. We stopped twice to relash sledge-runner, involving about forty minutes' delay.

Aprit 17.—At 3.10 a. m. arrived at ravine, at upper end of Little Delta, some one-half mile inside of ice-foot. Leaving the sledge and Christiansen here, I walked up the bed of the stream about a mile and found the grade easy and the traveling good, except in two or three places where the stones were exposed; mounted a side hill some hundred feet, and saw that the narrow valley debouched from a rocky gorge a little farther up.

At 4.30 a. m. returned, and, detaching the dogs, sent Christiansen back with them to bring up *Nares*, following after myself. Sergeant Brainard had found it necessary to concentrate the whole party on two sledges at a time. The dogs continued on the track and were divided between *Hall* and *Hayes*, which were a long way behind. I assisted in bringing in *Nares*. At 6.30 a. m. the whole party together in camp where dog-sledge stopped. The dragging over the last half of the route was not found easy. Weather very fine.

Advanced 10 miles in 4 hours; traveled 14 miles in 8 hours 4 minutes.

Sixth march, from Mouth to Head of Rocky Gorge Creek.

At 10.35 p. m. main party started, leaving behind *Nares* and concentrating on the other two sledges. At 10.50 p. m. left with the dog-sledge; dropped one-half of the load after proceeding a few hundred yards. We soon passed the others, and a little beyond my farthest of yesterday came to the narrow gorge referred to. Its vertical sides were but a few feet apart; underfoot the stones were exposed. Passing this the stream-bed widened and ran between sloping hills, but we encountered at the same time deep, soft snow. This was the general character of the traveling—ravines with soft snow, varied by gorges, at intervals, with exposed stones and fragments of rocks. The stream is very tortuous, but the grade very slight its entire length, except when interrupted here and there by low banks of drifted snow. Its general course, as near as I could judge, is southwest.

April 18.—At 2.20 a. m. reached a sudden widening of the ravine, when, from the low elevation of the adjoining hills, I was satisfied we were near its head; the traveling for the last two hours or more through deep, soft snow. At 2.45 a. m. sent Christiansen back after rest of the load, and continued ahead by myself to reconnoiter. After half an hour's walk I ascended a hill to my left, but saw nothing of note except Newman Bay, &c. In another hour I was back again, and, after some delay, continued on down-stream, hoping to meet the main party, but only met the dog-team slowly returning. (Camped.) At 7 a. m. reached open place again, and 8.30 lighted lamp for supper; 10 a. m. supper finished.

Advanced 6 miles; time, forward, less delays, 3 hours and 30 minutes. Traveled 17 miles; time, *en route*, 8 hours, 10 minutes.

Seventh march, Gorge Creek to lower part of Lost River.

At 5.40 p. m. got up; at 6.55 p. m. lighted lamp; at 7 p. m. breakfast of sausage, bread, and tea. No beans, potatoes, or sugar; used a little more than the allowance of meat, on this account. At 10.12 p. m. started with half-load, the traveling somewhat better. In an hour we came to a fork of the ravine coming

*The journeys back and forth on the straits [Robeson Channel], after crossing the first time, are not counted.—J. B. L.

in from the north, the first branch of the main stream which seemed to offer a practicable route to tne north. One or two had been passed, but they were so narrow and steep, mere gullies, as to forbid the assumption that they formed part of Lieutenant Beaumont's route. It was the route of this officer, as laid down on his map, that I was endeavoring to follow. However, I continued on, but when a few hundred yards, seeing the stream bearing decidedly to the east, I left the sledge, and, ascending a low slope to the left, soon found myself on a "divide," very similar to the divides on the Western prairies. To the north the "breaks" of water-courses, running in that direction, could be seen. On the slope alluded to I saw what Christiansen gives the Eskimo names for eagle [Nektoralik and Tertersoak]; was unable to get a shot.

April 19.—At 12.12 a. m. back again at the prominent ravine referred to above. Built a cairn as a guide for the others and then followed it up with the sledge. After proceeding forty minutes the ravine dwindled down to the proportions of a shallow "prairie draw," one miniature valley running north, another—the main one—bearing off to the east. Dropped my load here and went back to last camp for what was left. 3.30 a. m. back again with entire load thus far. Left half of load and, proceeding north, soon found myself on level plain, its broad expanse stretching out for miles all around. The weather was overcast, threatening snow, but I could see the "breaks" to the north and, an hour's traveling, reached them—the snow affording very good traveling—and found myself in a water-course, quite broad and offering a very good route; the snow was generally hard and few stones exposed. The general course of the stream seems northwest; it is very picturesque.

About 7.15 a. m. I came to what looks like a gateway, opening into the street, a cañon running east and west and so level that it was with many doubts I concluded *to the left* was down-stream. At 7.30 a. m., seeing no signs of the expected sea, I pitched tent, and, leaving everything in it, after forty minutes' delay started back for rest of load. 10.15 arrived on plain, and at 11 a. m. loaded up and *en route* back to tent. At 2.45 p. m. reached tent, very tired. At 6 p. m. supper finished and Christiansen and I in sleeping-bag. Felt a good deal of uneasiness at not finding the sea (or some signs of it) which I expected to reach long before this. Felt no assurance that I was going *down* stream and not *up*. Could only convey my ideas to Christiansen by signs, and he was equally willing to agree to either proposition.

Proceeded 10 miles; time, 5 hours, 15 minutes. Traveled 30 miles; time, 16 hours, 33 minutes.

April 20.—To Repulse Harbor and back with empty sledge.

At 6.30 a. m. got up and proceeded to prepare breakfast; morning fine. At 10.30 a. m. started down-stream with empty sledge, resolved to find out something definite. After proceeding half a mile the cañon changed into a wide valley bordered by sloping hills which, at a little distance back, assumed the proportions of mountains. Passing the point of a hill, which hid the view ahead like a cape, the valley was seen to continue on in a direction a little north of west until closed up entirely, apparently, by a low range of hills. At 11.45 a. m. we reached this place and found a narrow gap. I here delayed thirty minutes and ascended a hill, but could see little but another valley-like expanse ahead, which seemed to turn to the north. In half an hour more we were opposite this opening to the north, and saw the floe-bergs lining the long-looked-for coast. On our right and left were low, sloping points about half a mile distant from each other; behind us was a semi-circle of hills and mountains, a good way off, and before us a level delta of bare stones. A few feet more in the elevation of the Polar Basin would make a bay of this place; it was doubtless the bed of one sometime in the past. 1.15 p. m. reached the sea after a walk of about a mile over the "delta" referred to, having left the sledge back. About one-half mile from the coast I found an old piece of drift-wood about 6 feet [1.8^{m}] long, 6 inches [152^{mm}] wide, and 4 inches [102^{mm}] thick, pine or fir, apparently split from the body or branch of a tree. It was partially buried. A sample preserved. While on the coast I perceived, several miles to the west and quite near the coast, a dark spot that looked like a cairn, but having been often deceived in cairn-like rocks, and not wishing to delay, I didn't visit it. At 2 p. m. started back with sledge, and in 1¾ hours of rapid traveling reached camp. Fox tracks noticed *en route*. 6.35 p. m., after a lunch, Christiansen and I started up-stream.

At 6.35 p. m., after a lunch, Christiansen and I started up-stream again with empty sledge to find main party and help them along. At 8.15 p. m. arrived near head of stream and found main party in camp just about to eat breakfast, in which we joined them, and also replenished our own store of rations which had run out entirely. At 10.40 p. m. started down-stream again with a load from the man-sledges.

April 21.—At 12.40 a. m. reached camp and went to bed. Weather cold but clear and bright. At Sergeant Brainard's camp it was −39.0° [−39.4° C.].

Traveled about 25 miles; time *en route*, 14 hours, 10 minutes.

EIGHTH MARCH FORWARD, LOST RIVER TO SEACOAST.

At 6.55 p. m. started from camp, taking half of the impedimenta now on hand, which made a very heavy load. At 8.34 p. m. we reached the camp of main party, who had passed my camp and continued on down, till just above the Gap. The upper part of this wide valley had some soft snow and the lower part a good many bare places where the stones were exposed, so the traveling was bad. When I reached here a strong wind down the valley had become a very disagreeable snow-storm. After relashing sledge Christiansen went back after rest of load; I turned over to the main party that part of theirs which I had brought thus far. I found the men all asleep. All were well, though a good deal worn by the hard work. At 11.35 p. m. left with the main party to assist them till the *Antoinette* (the dog-sledge) overtook me. We left one of the small sledges back and advanced *Nares* some distance below the gap or gorge. In passing this place on return for other sledge I met Christiansen and joined him again.

April 22.—The storm made traveling exceedingly uncomfortable, especially on return for second half of load. One could hardly open his eyes or see anything when they were open. In course of time, however, we got the first half-load to the east side of the entrance to the valley and reached it again with the other half at 4 a. m. We were now near the coast, and the traveling seeming very good, I put on everything and started ahead. We followed the tracks of the main party, who, in the mean time, had passed by me, and, with the storm at our backs, were getting along very well, when, all of a sudden, the sledge-runner broke down. It had cracked from end to end. We were able, however, to get along with a few articles, having now a clear ice-foot. At 6.30 a. m. reached a floe-berg ahead, in the lee of which the main party were endeavoring to pitch their tent, by means of guy-ropes, a heavy banking of snow, &c. Despairing of making the A tent stand, Christiansen and I pitched the little shelter tent and then got supper with the men. At 11.30 a. m. in sleeping-bag with Christiansen, the little tent made smaller yet by the snow piled all around it, almost to the top. While at supper some of the dogs thought it a good place to rest, and we returned to find the bag covered with snow. Remained in the sleeping-bag the remainder of the day, missing supper prepared in the large tent. The storm continued to rage till early in the morning of the 23d, when the wind ceased.

Proceeded 10 miles; time, about 6 hours. Traveled about 25 miles; time, 11 hours and 35 minutes.

NINTH MARCH, ALONG COAST TO SNOW-SLOPES.

April 23.—At 2.30 a. m. got up and crawled out. Woke those in the large tent. The dogs ate up all the bacon left, about 20 pounds, and about half as much English beef during our sleep; it was packed on the *Nares* and out of their reach, it was thought. I then sent Christiansen back for what was left behind yesterday. During his absence we built a cairn and left in it two days' rations for the entire party and one day's dog-food (a list appended).

At 7.15 a. m., Christiansen having returned, I started with the dog-sledge. The main party left at 7 o'clock. The broken runner had been patched up before starting, but I felt sure it had seen its last day. However, we got along for an hour when it gave way again. Leaving almost everything I proceeded ahead and overtook the *Nares*, *Hall*, and *Hayes*. I exchanged runners with the first-named sledge (its load was lighter than mine) and left it to the ingenuity of Sergeant Elison to again patch up the broken runner, if possible. All this occupied some time and then the men started ahead while Christiansen started back for load and I awaited his return. On his return, everything was put on the dog-sledge and we proceeded *en route*. At and beyond Drift Point the snow-slopes and soft snow were met with, and it became necessary to "double up," *i. e.*, advance by half-loads. Some distance beyond the Point I overtook the men, brought to a stand-still by the mended runner giving way completely, beyond all redemption. I considered several expedients, and finally, as the only alternative, lashed the two Hudson Bay sledges together and packed on them the load of the *Nares* in addition to their own, the seven men combining on this one vehicle. I added to the dog-sledge the old runner thus made.

At 2.45 p. m. reached a place where it was impracticable to go farther except on the floe. As this involved some work in the rubble-ice adjoining, I sent Christiansen back for rest of load, while I went back to help the men. They only got along with great effort; the two sledges, lashed together and so loaded, dragged like a harrow. We reached the place just referred to and went into camp, about the same time cutting a route through the rubble-ice near by. Our position was about a mile west of Black Horn Cliffs. The traveling this march was as already described, except that between Camp and Drift Point the route lay over an ice-foot covered lightly with hard snow.

Advanced 5 miles; time, about 4 hours. Traveled 15 miles; time, 8 hours, 30 minutes.

TENTH MARCH, SNOW-SLOPES TO BLACK HORN CLIFFS.

April 24.—Breakfast, 6 a. m. At 8 a. m. all started, each sledge leaving behind half its load—the two Hudson Bay sledges separated from each other. Shortly after starting we encountered rubble-ice which required more or less road-making for half a mile. Opposite Black Horn Cliffs, and extending a short distance this side, was a clear, smooth floe of ice (formed last year I suppose), over which, with a heavy wind on our backs, we made rapid progress. When opposite the farther end of the cliffs, and some distance from shore, further advance was stopped by a considerable mass of rubble-ice. Unloading in the lee of a hummock I sent men and sledges back for what remained at last camp, and went forward alone to find a route to the shore and also examine a ravine some distance ahead which I thought might be Stanton Gorge. I found a route, somewhat circuitous, to the shore without much difficulty, and continued on over a smooth, level floe (last year's), which extended half way to Gorge. The other half of the distance a good route was found on a hard, gently sloping snow-slope inside the line of bergs and hummocks which here commenced to fringe the shore. I saw two ptarmigan in winter plumage along here. I found no cairn or provisions, though I went half a mile beyond the Gorge. The violent wind made my return slow and very uncomfortable. At 3.30 p. m., got back to the hummock, and found Sergeant Brainard, Christiansen, and dog-sledge. The others had not yet returned. At 6 p. m. got everything to shore, the two Hudson Bay sledges coming up with our last load. The men had encountered a good deal of difficulty in walking back against the head-wind, though I sent their sledges back on the dog-sledge. Pitched tents close to cliff and got to bed about 9 or 10 p. m.

Advanced 6 miles; time, about 5 hours. Traveled 18 miles; time, about 10 hours.

ELEVENTH MARCH, BLACK HORN CLIFFS TO REST GORGE.

At 4.40 a. m. Sergeant Jewell got up to cook breakfast. Christiansen (Eskimo) complained of being sick, and ate no breakfast; he certainly looked so. I understood by his signs, in a vague way, that something was the matter with his stomach. I delayed somewhat on his account, but then concluded to move on to the gorge and there go into camp, delay twenty-four hours, and then send him back if still sick. At 9 a. m. started off; snowing. Christiansen managed to handle the whip, but had to ride on the sledge whenever it was possible. We had some trouble in getting through some rough ice before reaching the snow-slope, but reached the Gorge in about an hour, about 2½ miles. Pitched my tent and put Christiansen in sleeping-bag; a drink of whisky was the only medicine I gave him. Taking Sergeant Brainard I returned with dog-sledge to our last camp and brought up the pemmican and after that another load, which, with what the Hudson Bay sledges brought up, left nothing more. The two sledges, *Hayes* and *Hall*, were now almost worn out and very hard to drag. Shortly after starting this morning the sun came out bright and warm and so continued; we took advantage of it to dry our clothes, &c. In the afternoon I sent Sergeants Ralston and Jewell ahead to try and find the English cache at Stanton Gorge. They were fortunate enough to find it; the cairn stands on a hill of some elevation some distance back, and doesn't "show up" from the western approach.

Advanced 2½ miles; time, 1 hour. Traveled 7½ miles; time, 3 hours.

TWELFTH MARCH, REST GORGE TO FRANKFIELD BAY.

April 26.—At 2.30 a. m. woke Jewell. Before starting we built a cairn here and left one day's rations for entire party and one for the dogs, also everything in the way of clothing, foot-gear, &c., that could be spared. This was cache No. 2. Christiansen expressed himself as well and able to travel, though he didn't eat much. At 6.45 a. m. entire party left camp. At 8 a. m. I reached Stanton Gorge with dog-sledge in advance of the others. Sent Christiansen back for rest of load, and the others soon coming along Sergeant Ralston showed me the cache upon a hill or shoulder of the mountains, about a hundred feet [30^{m}] high. This cache consisted of 40 rations, 56 pounds sweet pemmican, 10 pounds bacon, and a metal box containing the hard bread, potatoes, &c., also a can of rum which Sergeant Ralston had brought down to Rest Gorge the previous day. I built up the cairn again and left a record of my movements to date, and took the rations to the ice-foot convenient to the dog-sledge on its return, for I thought it desirable to take them on to Cape Bryant. I then sent the main party on. At 10.40 a. m., Christiansen coming up, we continued on with all the dogs could haul, reached Cape Stanton, crossed Hand Bay, and at 2.15 p. m. overtook the

other sledges. I told the sergeant to continue on a certain distance, and, then camping, to return here for my load, which I there took off, and went back to Stanton Gorge for what was left there, taking Sergeant Ralston along in place of Christiansen who complained of his head. At 8.15 p. m. got back to camp of main party, which was near Frankfield Bay opposite Mount Lowe. A beautiful day, calm and bright. The route from last camp led us as far as Cape Stanton, inside a line of floe-bergs, on a snow-slope quite steep in places but generally hard on the surface, and offering fair traveling. As an exception, however, it should be stated that there is an ice-foot for some little distance at Stanton Gorge. The traveling over Hand Bay was also quite good.

Advanced 9 miles; time, 5½ hours. Traveled 27 miles; time, 13 hours, 30 minutes

THIRTEENTH MARCH, MOUNT LOWE TO CAPE BRYANT.

April 27.—At 7 a. m., about, breakfast. Before starting I left one day's rations for entire party in cache. At 8.25 a. m. started with dog-sledge, leaving half-load behind. Main party started at same time. Traveling rather heavy (over snow-covered ice-foot). At 9.25 a. m. reached east shore of Frankfield Bay. On the bay the snow was generally hard and good. From here the only route, or at least the best route, forward was over the foot of a hill, the ascent rather steep and the slope quite so the snow on it had packed hard and smooth. Continued forward till 9.45 a. m., when reaching the ice-foot, Christiansen and I threw off load and started back for remainder met the men a few minutes after reaching the bay, and at 10.45 were at last camp, getting back again to first half of load at noon. At 1.42 p. m. I reached farther side of an indentation of the coast, which really deserves to be named. Here I sent Christiansen back again for first half of load, and the men coming along one-fourth hour afterwards, I joined them and helped to pull; continued with them about two hours, and then went back to where load was thrown off to await Christiansen's arrival, in order to haul tent, &c., brought on, for I knew that when we reached Cape Bryant it would be too late to go back without rest. I had told Sergeant Brainard to keep on till he reached the cape. I walked back in just about one-third the time occupied in moving the sledges forward. I waited an hour before the dog-sledge arrived. At 5.40 p. m. started *en route* again. Some hours after this I saw four ptarmigan and killed three with the shotgun. Christiansen had some time before when by himself killed two with the pistol. (This pistol had a wooden stock, similar to a gun's, fixed to it, and we habitually carried it on the sledge.)

At 8.30 p. m. reached Cape Bryant. The others had not been in long. Sergeants Brainard and Ralston had been suffering from snow-blindness, and Private Frederick from a hurt knee. At 10.30 supper, and an hour afterwards in sleeping-bag.

The traveling since leaving Frankfield Bay has been along a low fore shore, excepting two or three indentations of the coast, where we crossed old floes. Along the shore we traveled over a snow-covered ice-foot, or what is generally called an ice-foot, sometimes *good* and sometimes *bad*; never *very* bad. Over the floes referred to, it was generally quite fair. Weather very fine,

Advanced 15 miles; time, 6 hours, 2 minutes. Traveled about 36 miles; time, 12 hours, 5 minutes.

AT CAPE BRYANT.

At 10.40 a. m. got up. After breakfast Sergeant Jewell and I ascended the hill or ridge just to the south and got a good view of the country. Cape Britannia was dimly visible; later in the day it was quite distinct even from near by the tents. The view is so well represented in Lieutenant Beaumont's journal that I will not attempt to describe it. Sergeants Brainard, Ralston, and Elison went along the coast to the south to look for Lieutenant Beaumont's cache or cairn, but were unsuccessful. They ascended a high cliff, some five miles distant, and got a good view of the floes, and reported that the route ahead looked very good. I made no further efforts to find the cache, principally for want of time. I had kept a good look out *en route* here, and felt pretty sure that no cairn could be found readily. After my return from the hill the rest of the day was spent in making preparations, &c., for further advance. Late in the day I sent Christiansen back for what was left behind yesterday

April 29.—Personally inspected the two Hudson Bay sledges, and was confirmed in the declaration of all the men that they were entirely unserviceable for further use. One I cut up and made slats of for the dog-sledge, the other was repaired sufficiently to carry the constant weights of Sergeant Linn's party on their return to Boat Camp. After this I built a cairn on the slope of a hill, perhaps a quarter mile from the shore, and deposited inside the forty English rations, all our own that were surplus, the gun, &c., and every-

thing I thought we could do without. I also left a record. Sergeant Brainard suffered severely from snow-blindness during the day, and had to remain in the tent. During my stay at Cape Bryant a strict adherence to the ration was not observed. I gave Sergeant Linn a dozen pounds of the English beef and some sugar, tea, &c., fearing the rations left in cache (four days) might not be sufficient. Moreover, the meat left in cache consisted entirely of lime-juice pemmican (very much disliked by all). The dog-sledge being now the only means of advance, I selected Sergeant Brainard to accompany Christiansen and myself, and made up a list of seventy-five rations, sufficient for twenty-five days' absence from Cape Bryant, viz:

	Pounds.
Pemmican (lime-juice), 35 rations	40
Musk-meat (frozen in tins), 25 rations	34
Canned meats (sausage and English beef), 15 rations	17
Beans, Boston, baked	19
Potatoes, evaporated	5
Cranberry sauce (3 cans)	4½
Tea, 30 rations	2
Chocolate, 25 rations	3
Sugar	10
Lime-juice (frozen in cakes)	2⅓
Hard bread	60
Milk	1½
Alcohol	29
Total	227⅓

The constant weights, &c., consisted of 1 A tent, poles and pins, 2 sleeping-bags (1 buffalo and 1 dog-skin), 1 cooking lamp, 1 rubber blanket, 1 ax, 1 spade, 1 hatchet, 1 pistol, 1 sextant, 1 sledge-runner (extra), 1 shelter tent, 1 small cooking lamp (extra), 2 pair snow-shoes, 1 catch-all bag, containing ammunition, cups, plates, spoons, sounding line and lead, brush, record cases, tin funnel, measure-cup, chopping-board, &c.; 3 clothes bags (individual weights given elsewhere):

	Pounds.
Total constant weights	176
Dog-pemmican (3 sacks), 300 pounds; weight of sledge *Antoinette*, 80 pounds	380
Total amount drawn by 8 dogs	783⅓

FOURTEENTH MARCH, LEFT CAPE BRYANT, OPPOSITE TO ST. GEORGE'S FIORD.

At 4.18 p. m. (29th) Sergeant Linn and party left on return to Boat Camp. I gave him written orders to return there, and thence send three of his party to Fort Conger to report my progress while he awaited further instructions. At 4.47 p. m. I left with dog-sledge, Sergeant Brainard and Christiansen (Eskimo) taking a course towards Cape May. The weather continued delightful. Found the floes quite hard and level, interrupted only by occasional low, detached hummocks over which the drifted snow made our progress very satisfactory. When nearly opposite Dragon Point, however, the snow crust seemed to weaken and the sledge frequently sank to the slats, requiring our united exertions to move it.

April 30.—At 1 a. m. camped opposite Dragon Point, the dogs being much exhausted by such a heavy load. The clearest day I have yet seen; no wind. Temperature lower than usual. At 4 a. m. finished supper. At 4.20 a. m. thermometer, —1° [—18.3° C.]; barometer, 29.35 [745.48^{mm}]. Halts during march for relashing, &c., about thirty minutes in all. Lieutenant Beaumont's sketches and descriptions of this section very good, as well as I could judge by the eye. At 4.50 a. m. went to bed.

Advanced 16 miles in 8 hours and 13 minutes. Traveled 16 miles in 8 hours and 13 minutes.

FIFTEENTH MARCH, OPPOSITE BEAUMONT FIORD.

At 1.05 p. m. thermometer, —6° [—21.1° C.]; minimum, since last read, —14° [—25.6° C.]; barometer, 29.40 [746.75^{mm}]. Weather very fine; 10.05 a. m., lamp lighted; 2 p. m., breakfast. At 3.40 p. m. thermometer, —0.5° [—18.1° C.]; barometer, 29.4° [746.75^{mm}]. At 5.22 p. m. started with full load.

From 6.07 to 6.25 p. m. stopped to double up, *i. e.*, left half of load. From 7.45 to 7.55 p. m. stopped to rest; it requires our united exertions to get along. At 8.56 p. m. level floe; stopped by hummock; sent Brainard and Christiansen back for rest of load while I proceeded to take a number of compass sights;

results very unsatisfactory, there being differences of 10° in the same bearing. Judging that when sledge returned it would be time to camp I pitched tent and made preparations for supper; 11 p. m., thermometer, 24°; [−4.4° C.]; barometer, 29.38 [746.24^{mm}]; thermometer in tent, 26° [−3.3° C.].

May 1.—At 1 a. m. thermometer, 21° [−6.1° C.]; barometer, 29.47 [748.52^{mm}]; sky somewhat cloudy. at 1.05 a. m. dog-team returned; at 3.10 a. m. supper; thermometer, 15° [−9.4° C.]; barometer, 29.47 [748.52^{mm}]. Weather pleasant during past twenty-four hours; overcast but only moderately so. The dragging very heavy and fatiguing; snow sometimes knee deep, the sledge coming to a stand-still repeatedly. On these occasions the dogs complacently sit on their haunches and observe the operation of pulling it out, which falls to us. After dropping half the load the traveling seemed to improve, due, possibly, to a slight change of direction, which brought us on a line with Cape Britannia. Sergeant Brainard is almost or quite over his snow-blindness. We found the lime-juice pemmican very unsatisfactory and eat it only with great reluctance. Cape Britannia very distinct; due, probably, to the remarkable refraction of the atmosphere. Beaumont Island presented the appearance of an island on top of another, the first inverted. At 4.15 a. m. turned in.

Advanced 6 miles in 3 hours and 34 minutes. Traveled 18 miles in 7 hours and 43 minutes.

Sixteenth March, arrived opposite Cape May.

At 1.30 p. m. cook (myself) arose. English beef for breakfast; 2.45 breakfast ready; the cooking occupied 1 hour and 10 minutes. Used more by half than the ration of alcohol. At 3.20 thermometer, 29.5° [−1.4° C.]; barometer, 29.46 [748.27^{mm}]. Slight breeze from SW.; sky clear; at 4.25 p. m. started from camp with everything; 4.43 to 5.04 p. m. stopped to double up after repeated "stalls"; 6.18 to 6.30 stopped to rest. Sent Brainard back to await return of sledge. At 7.11 to 7.27 stopped at an old floeberg and, taking off load, sent sledge back for remainder. Character of the ice better, so that I determined to try hauling everything at once. The floes in sight very large, broken at long intervals with ranges of low hummocks, isolated mounds scattered here and there, all covered with snow. The floes in places are slightly undulating; at 7.48 p. m., thermometer, −1° [−18.3° C.]; barometer, 29.375 [746.11^{mm}]. In sun ten minutes later, thermometer, 7.5 [−13.6 C.]. Light wind from NE.; weather clear. At 9.40 p. m. thermometer, −1° [−18.3° C.]; barometer, 29.32 [744.71^{mm}]. Very slight breeze; a little overcast; at 10 p. m. sledge returned with rest of load; 1½ hours in coming, and twenty-two minutes afterwards we started with everything. Proceeded thus till 11.23, when it was necessary to throw off half the load. Left Brainard behind with it.

May 2.—At 1 a. m. reached an immense unbroken floe opposite Cape May. At 2.51 a. m. reached line of low, hummocky ice extending across my route, and at 3.13 Christiansen, having assisted me in pitching the tent, started back, I during his absence preparing supper. At 6.35 a. m. dog-sledge reached camp with second half of load. At 9 a. m. thermometer in tent, 25° [−3.9° C.]; barometer, 29.40 [746.75^{mm}]. The traveling much better than yesterday; weather fine, bright and calm. We are hardly more than five miles from Cape May. The large floe last referred to extended north as far as I could see. Supper consisted of tea, lime-juice pemmican, hard bread and a stew (?) of beans and cracker dust; the allowance of alcohol only sufficed to melt the ice and warm the water; the stew was cold. At 9.15 a. m. turned in.

Advanced 12 miles in 6 hours and 45 minutes. Traveled 30 miles in 14 hours and 10 minutes.

Seventeenth March, on Floe west of Stephenson Island.

At 3 p. m. Brainard got up to cook breakfast. At 4 p. m. breakfast. The alcohol not sufficient; tea only warm and stew cold; the tea gave each 1½ pints, thermometer, −4.4 [−20.2° C.]; in sun, 22° [−5.6° C.]. Minimum since last read, 9° [−12.8° C.]. Barometer, 29.35 [745.48^{mm}]. Weather calm and clear. Didn't sleep much; Brainard had the same experience. The Eskimo invariably snores two minutes after composing himself for rest. At 5.35 p. m. thermometer, 8.5° [−13.1° C.]; barometer, 29.32 [744.71^{mm}]. Hazy and calm. Took a number of compass bearings of prominent points, very carefully, and was disappointed to find the instrument no better than before. I had spent some time yesterday in trying to mend it. There seems to be a want of magnetism. At 6.52 p. m. started with full load. From 8.09 to 8.20 p. m. stopped to rest—20 standing hauls since starting. From 8.57 to 9.10 p. m. stopped to double up. Dogs very tired. Brainard remained behind with half-load. From 10.16 to 10.38 stopped to rest. Attempted a

sketch of Stephenson Island—an island to all appearance from here. Saw wolf and fox tracks going north some distance back. Noticed a line of hummocky ice extending from Beaumont Island in the direction of Cape May. Doubled up just in time, the traveling since, up to this spot, being soft and deep, sometimes nearly up to the knees. At 10.45 p. m. came to a crack in the ice which seemed to follow the line of hummocky ice referred to. This crack when first met was the length of a tent pole in width, and full of free water and sludge about 2 feet [610^{mm}], as I remember, below the level of the edge of the ice. Following it south a few hundred feet we found two or three cracks to cross, but only 2 feet [610^{mm}], or a little more, wide, so there was no difficulty in crossing. This place was at the intersection (approx.) of a line from Cape Britannia to Cape Bryant with another between Cape May and Beaumont Island. At 11.05, this being a good opportunity to get the depth, I sent Christiansen back for Sergeant Brainard and the load, the lead and line not being with me.

May 3.—At 1.07 a. m. dog-team back again. The dogs always travel much faster going back or forward over a trail. Selecting a good spot I gave Sergeant Brainard the line; it ran out its full length without touching bottom. I then attached, in succession, four coils of seal thong, a long piece of rope, and, finally, Christiansen's whip—all with the same result, no bottom. Having nothing now left but the traces of the dogs we began drawing the line back, while considering if these should be risked. I had attempted to measure it exactly by arm-lengths as it went down, but found this inconvenient, and decided to wait till we got it all out. We drew out the whip and part of the rope, when the latter suddenly parted, and, of course, the rest was lost. The rope was about one-half inch [13^{mm}] in diameter, and would hardly be thought the first part of the line to give way. The approximate length of line below surface is as follows: Rope, including whip, 148 feet [45^{m}]; 4 coils thong, 240 feet [73^{m}]; 4 pieces twine—each 108 feet [33^{m}] = 432 feet [132^{m}]; total, 820 feet [250^{m}]. Weight of lead, 6 pounds. Thus, besides the loss of the line, all further attempts at sounding were prevented.

At 2 a. m. proceeded *en route* with half-load. In the course of one-quarter hour crossed a narrow line or belt of low hummocks seemingly parallel to that by the ice crack. After this was an immense level floe which extended to the right and left and ahead as far as I could see; it was difficult to see the smallest break or unevenness in its great expanse. At 3 a. m. met a little mound of snow-ice which, as it saved the melting of snow for water, I camped alongside of, and twenty minutes afterwards Christiansen started back to Sergeant Brainard and rest of load. At 4.46 a. m. dog-sledge returned. At 7.25 a. m. thermometer (in tent), 36.5° [2.5° C.]; outside, 26.5° [−3.1° C.]. Barometer, 29.43 [747.51^{mm}]. Very clear, with slight breeze from south.

Advanced 8 miles in 4 hours and 7 minutes; traveled 20 miles in 9 hours and 54 minutes.

Eighteenth march, on Floe southwest of Cape Britannia.

At 4.15 p. m. the usual trouble with the alcohol; used a little extra. Have changed the order of lime-juice pemmican and meat, and will have the latter after getting into camp (supper), the former at breakfast hereafter.

Bearings from this camp: Beaumont Island, SSE.; Cape Britannia, SE. by S.; Stephenson Island, SW. by S.; Cape May, NW. by W. (all magnetic). At 5.30 p. m. thermometer, 19° [−7.2° C.]; barometer, 29.47 [748.52^{mm}]; moderate wind from west. At 6.10 p. m. started with full load.

From 7.30 to 7.42 p. m. stopped to rest; snow very soft. From 8.28 to 8.35 p. m. stopped again at a line of very low hummocky ice, which sweeps in a curve to the northwest on one hand, and on the other to the southwest, toward Cape May. The floe we now saw before us was an unbroken expanse of level snow, and seemed to continue thus and occupy the whole space between Beaumont and Stephenson Islands and Cape Britannia, reminding me very much of the plains of the West. Crust quite hard and firm, enabling us to carry everything at once. At 9.35 p. m. intersection of route with a line between Beaumont and Stephenson Islands. From 10.07 to 10.28 p. m. stopped to rest; snow soft. From 11.05 to 11.20 stopped to throw off half-load. Sergeant Brainard remained behind.

May 4.—At 2.55 a. m. hoped to reach Cape Britannia this march, but it coming on to snow, and the dogs being very tired, I stopped and pitched tent. At 3.09 a. m. Christiansen started back with empty sledge.

At 4.30 a. m. thermometer, 8.5° [−13.1° C.]; barometer, 29.57 [751.06^{mm}]; overcast with light snow. At 7 a. m. thermometer, 27° [−2.8° C.]; barometer, 29.62 [752.33^{mm}].

At 7.10 lighted lamp, seeing sledge approaching. At 8 a. m. sledge arrived. Alcohol insufficient again, and again encroached on the small surplus brought along to make up for leakage or accidents. At 9.55 a. m. turned in.

Advanced 14 miles in 7 hours and 51 minutes; traveled 30 miles in 13 hours and 50 minutes.

NINETEENTH MARCH, REACHED CAPE BRITANNIA.

At 3 p. m. called Brainard to cook. At 4.45 p. m. breakfast; temperature in tent, 40° [4.4° C.]. At 5.45 p. m. thermometer (column separated); barometer, 29.46 [748.27^{mm}]; very calm and perfectly clear. The dogs, during our sleep, got at the pemmican, which was buried as usual under the sledge, and ate two and one-half days' allowance. At 6.20 p. m. started with everything. The traveling very good over hard snow and near shore over small, undulating surface of ice.

At 7.53 p. m. reached Cape Britannia. The line of demarcation between the floe and the shore ice was very slight, and only indicated by one or more indistinct cracks. After pitching the tent on the ice-foot we proceeded to build a cairn 20 or 30 yards [18^{m} or 27^{m}] above, on the side of a little ravine, just below the cliff. The cairn is about 7 feet [2^{m}] high. In it I deposited a record of my journey to date, also five days' rations, three days' dog-food, the extra sledge-runner, shelter tent, little lamp, and the two pairs of snow-shoes. The last three articles were brought along in case the snow east of Cape Bryant was too deep to allow the dog-sledge to travel at all, &c. After ascending the cape I judged we could get along without them. After this I took an observation for latitude. This and subsequent observations for latitude are to be found annexed. Christiansen came in with a ptarmigan; it had commenced to change its plumage; some of the feathers were black.

Coast of fiord east of Stephenson Id.

May 5.—1 a. m., thermometer, 2° [−16.7° C.]; barometer, 29.52 [749.79^{mm}]; calm.

Sergeant Brainard and I started for the top of the cape, or mountain it might properly be called. We followed the water-course referred to; the ascent was quite steep, with several intermediate crests or ridges, each seeming from below to be the top. At 2.35 a. m. reached the summit. At 2.43 a. m. thermometer, 14.5 [−9.7° C.]; barometer, 29.32 [744.71^{mm}]. Windy. We were apparently on an island; its most northern limit ended in a bold headland a half-dozen miles distant. Away to the northeast, or a little south of it, was a bold headland, some 15 or 20 miles off, the termination of a promontory or island stretching to the north. Between it and me were the projecting capes of three similar bodies of land farther to the right, all separated by great fiords stretching to the south and overlapping one another so that little could be seen to the south of them but a confused mass of snow-covered peaks. Glancing round towards the north and west the eye rested on nothing but the ice-pack till Beaumont Island was reached. After that the mountains near Cape Bryant. Stephenson Island is evidently an island; for the opening of a fiord that separates it from Cape May can be seen, and on its east is an immense fiord running to the south. The two fiords are (to all appearances) connected. No land visible at the head of the large one. To the east of this the coast trends off towards the southeast, forming, with the south side of the Britannia coast, an immense funnel ending in a fiord. All to the south is an indistinct mass of snow-covered mountains. We built a cairn on the summit and deposited a record; cairn about 6½ feet [2^{m}] high. Height of cape, as indicated by barometer, 1,950 feet [594^{m}]. Got back to camp at 4.50 a. m. At 5 a. m. thermometer, 12° [−11.1° C.]; barometer, 29.48 [744.18^{mm}]. Saw several hare tracks on side of the mountain. At 5.50 a. m. turned in.

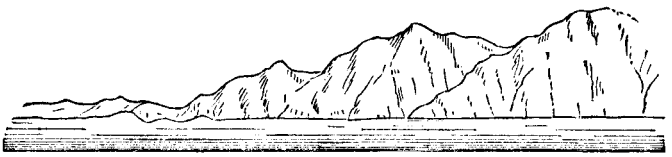
Advanced 4 miles in 1 hour, and 30 minutes. Traveled 4 miles in 1 hour, and 30 minutes.

TWENTY-NINTH MARCH, FROM CAPE BRITANNIA TOWARDS BLACK CAPE.

Bearing of bluff farthest ahead by little compass, E. (mag.).

At 7.05 p. m., breakfast finished and everything ready, we started, traveling at first over ice-foot of clear ice, afterwards on level floe near shore, the undulating "blue-top" ice of which was exposed in many places. The traveling excellent; everything at one load. Saw some fox and hare tracks. At 9.08 p. m. reached the

cape farthest to the north [Cape Frederick], and came in sight of the distant headland seen from summit. Stopped to relash runners. We traveled at a trot almost all the way here, at least 3½ miles an hour. During the delay of the sledge I went out on the floe to the north to take bearing of the headland just referred to, but ten (10) observations with the prismatic compass differed so widely that I decided to depend altogether on my pocket compass. The bearing by this was SE. (mag.). While out here I saw the tide-crack, evidently a continuation of the one crossed west of Cape Britannia. My attention was first attracted to it on stopping the sledge, when we all heard a low, droning sound as of moving ice. No ice in motion was seen, however. At 10 p. m. sledge mended, and we started again. In rounding the cape we had excellent traveling on last year's ice; it continued some distance beyond and reached to the north several hundred yards from shore. From North Cape [Cape Frederick] the tide-crack continued towards Black Cape, curving to the right *en route*. It was plainly marked by a line of heaped-up, hummocky ice, and by being the line separating the smooth and generally level floes inside from the rough pack without. I took a course a little to the right of Black Cape, towards Ridge [Elison] Island, and soon found myself on an old floe with a gently undulating surface. The crust at first was quite hard but afterwards became soft, and progress slow. All inside the ice-crack seems one unbroken floe of smooth, level snow assuming an undulating surface in most places near the ice-crack, caused by ranges of hummocky ice covered with snow-drift.



Coast ahead from camp beyond Britannia.

May 6.—At 10.12 a. m. camped among the hummocks. At 12.50 thermometer, 7.5° [−13.6° C.]; barometer, 29.37 [745.98^{mm}]; calm and clear. Heard the noise as of moving ice again. Christiansen went out to tide-crack, where there was a large pool of open water, to look for seal; he saw none. "Ritenbenk" ate up the ptarmigan shot at Cape Britannia. Cape Britannia is evidently on an island. What appeared to be a point indicating a channel on its south side was quite plain. The fiord at whose mouth we camped ran to the southeast or south an immense distance; no land visible at its head. In this direction, but hardly more than 10 miles off, a fiord ran—or seemed to—in a direction generally parallel to our course and to make islands of the land on the right of our course. At 2 a. m. supper, and after an observation all turned in at 3.20 a. m.

Advanced 11 miles in 4 hours, 13 minutes. Traveled 5 hours, 5 minutes.

TWENTY-FIRST MARCH, —— TO RABBIT POINT [CAPE BENÉT.]

At 9.45 a. m. got up and went out to take observation. At 11.30 breakfast; morning very bright and clear; some wind. At 1.20 p. m. thermometer, 22.5° [−5.3° C.]; barometer, 29.37 [745.98^{mm}]. Light wind from south. At 1.40 p. m. started with everything. At 2.18 p. m. saw some pools of open water at tide-crack, which we now found ourselves quite near. Stopped ten minutes. The crack is here over 50 yards [46^{m}] wide and covered with new ice, except where broken by these pools or lanes. From 3.38 to 3.41 stopped opposite north end of Ridge [Elison] Island. Its west side extends NW. and SE. From 4.54 to 5.09 p. m. stopped to make hasty sketch. At 6.10 p. m., opposite Snow [Markham] Island; a narrow fiord seems to separate this island (?) from the land to the east of it. From 7.15 to 7.24 p. m. reached shore under Blue Cape. Saw fox tracks. Bearing of coast to the south WSW. (mag.), and of Black Cape ENE. (mag.). Continued on towards latter, and instead of having a short distance, and that along coast another bay or fiord was found to intervene. Blue Cape is evidently part of an island. From 8.35 to 9.03 p. m. reached Black Cape and stopped. A great many tracks of foxes, hares, and lemmings along here. We also discovered some old marks on the ice-foot, which Christiansen said were "narsook" (bear). Ice very much piled up, indicating great pressure. Ahead, and slightly to the north of a line joining North Cape [Cape Frederick] and Black Cape, stands out another dark headland (Distant Cape). Intermediate, but more to the right, are several channels or fiords. Towards the first of these we traveled on an ice-foot, first through deep, soft snow for some distance, but afterwards on almost clear ice. Following the slight indentation of the coast we passed a dark, rocky bluff, and at 10 p. m. reached the first opening, which, to all

appearances, is a bay about as deep as wide. At 11.20 p. m. reached east side of bay, resting five minutes *en route;* traveling fair, and at 11.33 p. m. reached Rabbit Cape [Cape Benét], where we camped. Had intended camping at Distant Cape, but it still looked as distant as ever, or rather as near, but no nearer, and was separated from us by a wide fiord. Shortly after getting to camp Christiansen wounded a hare, but it required a vigorous chase of all hands to catch him; there was no more ammunition at hand.

May 7.—At 2.10 a. m. supper finished; 2.55 a. m. thermometer, 22.5° [−5.3° C.]; barometer, 29.30 [744.21^{mm}]; clear and fair; slight wind from the west. At 3 a. m. turned in.

Advanced 17 miles in 8 hours, 43 minutes. Traveled 9 hours, 53 minutes.

TWENTY-SECOND MARCH, RABBIT POINT [CAPE BENÉT] TO LOW POINT.

At 6 p. m. cook arose, Sergeant Brainard, who did all the cooking after leaving Cape Britannia; Christiansen and I helping in chopping ice, &c.; 7 p. m., breakfast. I had intended getting up at 9 for meridian observation, but it commenced snowing during our sleep. Determined there to remain in camp and institute a habit of starting just before midnight (Washington time) in order that the observations would not interfere with sleep. At 9 p. m. thermometer, 16° [−8.9° C.]; barometer, 29.28 [743.70^{mm}[; minimum since last observation of thermometer, 10° [−12.2° C.]; snowing; no wind; 10.45 p. m., thermometer, 15.5°; [−9.2° C.]; barometer, 29.28 [743.70^{mm}]; calm; still snowing. Built a cairn near shore; left in it three days' rations and dog-food (scarce one day's alcohol). Saw two ptarmigan, and hit one of them but it escaped. At 11.15 p. m. broke camp. In a few minutes we found ourselves beyond the hummocky ice which seems heaped up against all these capes, and on the level surface of another bay or channel [Mascart Inlet], which of the two could not be determined on account of the falling snow.

May 8.—At 12.15 to 12.25 a. m. stopped alongside of a solitary hummock to rest; snow soft and deep and traveling laborious. This hummock or berg looks as though it had been there for ages. Between 1.30 and 1.45 a. m. reached farther shore some ways up the fiord. Snow deeper than before, and near shore, under the ice, were cracks in which I would every now and then plunge, thigh deep; the worst traveling experienced since leaving the Brevoort Peninsula. I walked ahead of the sledge to encourage the dogs. We were disappointed in finding a route inside the hummocky ice near shore, and had to keep on the outside for some distance, when, getting over this barrier with a little more than the usual amount of pulling and pushing, a practicable route was found inside, though the snow was deep and there were several bad places, steep grades, &c. We rounded the cliffs at 3.10 a. m., and saw Distant Cape still ahead and another inlet intervening. The snow on this was quite good. I presume this to be a bay, though, like all these bodies of water, there were so many overlapping points at its southern extremity that I couldn't be sure. At 3.52 a. m. reached farther side and traveled along a good ice-foot quite rapidly, and at 4.06 a. m. reached Distant Cape, a grand headland of dark-looking rocks forming a huge cliff. Far in advance, in the same general direction, loomed up another headland, for which we started at 4.33 a. m. At 4.25 thermometer, 17.5° [−8.1° C.]; barometer, 29.32 [744.71^{mm}]. Snowing lightly; sun dimly visible through clouds. Immediately before us was another inlet, and at the extremity of its eastern coast a dark cliff (apparently a promontory), bearing S. (mag.). Just to its left was a low point of land, very obscure on account of the snow; 5.47–56 a. m. reached farther shore near the cliff referred to. Snow so thick as to blot out the land left behind. The inlet just crossed *seemed* a bay, as well as I could judge from what I saw of its shores. The surface was hard, much of it what we call "blue-top" floe, and afforded good traveling. "Ask-him," one of the dogs, seemed quite lame.

At 6.17 a. m. reached a low, shelving point of land (Low Point). The traveling from the cliffs here, which we thought would be good, proved just the reverse; deep snow all the way, interrupted only by stones on which the sledge-runners grated; everything obscured or hid by the snow. Could see no land beyond the fiord which we had now reached, and, being very tired, made an early camp. Shortly after this Brainard suddenly exclaimed that he saw an island. I went up on the hill near by and saw to the northeast, apparently off the farther side of the fiord, a detached cliff (seemingly detached). My little pocket compass gave its direction S. 60° E. (mag.), estimating the degrees. Distant Cape NNW. (mag.). At 8.30 a. m. thermometer, 28° [−2.2° C.]. Barometer, 29.42 [747.25^{mm}]. Supper just finished. We ate half the rabbit in a *stew;* supposed to be cooked, but quite cold and raw. It was very palatable, however.

Brainard and I very tired after this march; we both remarked a frequent feeling of lassitude and weakness of late, due probably to the warm weather. At 11.30 a. m. turned in, after taking an observation for latitude.

Advanced 12 miles in 6 hours, 1 minute. Traveled 7 hours, 2 minutes.

TWENTY-THIRD MARCH, LOW POINT TO POCKET BAY.

At 6.20 p. m. cook arose (Sergeant Brainard). At 6 p. m. thermometer, 10° [—12.2° C.]. Barometer, 29.40 [746.75^{mm}]. Weather overcast, with wind from the west and slight snow. Sun dimly visible.

At 7.25 p. m. breakfast of dog pemmican, after which I took an observation, or rather attempted to. At 10.50 p. m. cloudy, with wind from the west and drifting snow. At 11.20 p. m. left camp.

May 9.—The traveling over the inlet [Jewell Inlet] was quite good, there being much hard snow and blue-top ice. Delayed eight minutes about the middle of the bay to catch a lemming that was running along on the surface of the snow. At 1.53 a. m. reached farther side of bay—if bay it is—and at 2.15 a. m. reached Cape Surprise [Ramsey]; a little beyond we stopped twenty-four minutes for lunch of lime-juice pemmican. The land trended more and more to the south again, and on farther side was another point [Cape Wijkander] bearing SE. by S. (mag.), appearing from present position like a domé-capped island. Intermediate was another bay or channel, which of the two I could not determine on account of the snow. The traveling and its surface was fair. At 4.15 a. m. reached farther side under a line of high, grand cliffs. Was delighted to find an ice-foot of smooth ice, clear of snow, on which the dogs drew the sledge at a trot.

At 4.50 a. m. stopped to take observation, but after spending some time in fruitless endeavor, on account of the heavy wind and drifting snow, I gave it up in disgust. The coast we were following seemed to trend so much to the south that I feared we were going up some fiord, and so resolved to camp and await the clearing up of the weather—in the mean time getting a meridian observation if possible. Walked ahead, opposite a break in the cliffs which lets in a little bay, to find a place where the tent would stand.

At 6 a. m. the sledge came up and we camped. At 8.30 a. m. supper finished. We traveled all day. (or night rather) in the midst of a high, west wind and driving snow-storm extremely disagreeable. At 9 a. m. thermometer, 12° [—11.1° C.]. Barometer, 29.46 [748.27^{mm}]. High wind, with snow. Sun invisible altogether.

Advanced 17 miles in 5¾ hours; traveled 6 hours, 40 minutes.

TWENTY-FOURTH MARCH, POCKET BAY TO SHOE [MARY MURRAY] ISLAND.

At 8.50 p. m. attempted an observation, but the sun looked like a grease spot, and I succeeded poorly. Some time was thus occupied, and afterwards in breakfast, straining mercury, &c. Morning cloudy; the wind greatly subsided. "Ritenbenk" stole rabbit out of tent while we were asleep (the remaining half), but I woke up just in time to get out doors and save enough for a meal. He was lying down, eating it very deliberately, the other dogs looking on.

May 10.—At 1.05 a. m. left camp, and, reaching farther side of Little Bay, followed along under the cliffs on a very good ice-foot; from 1.55 to 2.20 a. m. stopped and built a small cairn on a low, flat piece of ground between ice-foot and a line of hills some distance back. Traveling very good, but weather bad. The coast-line was pretty straight, but had a general trend to the right (south).

From 3.25 to 4.18 stopped and took observation, the sun being dimly visible. Ahead, some miles along the coast, was another cape [Mohn], sloping back to a mountain [Mt. H. S. Gardiner]. To the left oblique, dimly visible, was a cliff bearing southeast (mag.). Nothing could be seen between the two, and, shortly after starting, the cliff ahead disappeared and I had to resort to the compass—no unusual thing in crossing these fiords, but annoying as one is never certain of his course. However, the traveling was good, and at 7.15 a. m. we reached the cliff [Cape Hoffmeyer] which formed the entrance to the fiord [De Long Fiord], bay, or channel we had just crossed. From 7.20 to 8.06 a. m. stopped for a lunch of pemmican; built a cairn under the grand line of cliffs, and proceeded along over a very fine ice-foot, everything very much obscured by the driving snow. From 8.47 to 8.55 a. m. suddenly saw a small [Mary Murray] island to the left oblique, bearing SE. (mag.). Ahead the line of cliffs seemed to end or turn at a cape [Cape Neumayer] bearing S. (mag.). There was no ridge of ice between the ice foot and the floe, and leaving the latter we traveled half-way across very fast, over blue-top ice, with a strong wind from the west. From 9.15 to 9.45 a. m. saw the sun very indistinctly through the clouds and stopped for observation, getting down in lee of the sledge. Proceeding again, we traveled over hard snow. The island had disappeared from sight, but presently reappeared, and at 10.15 a. m. we reached its northwest end. The

island [Mary Murray] is a narrow, rocky ridge, projecting a few hundred feet above the level of the ice, its top inaccessible but in a few places. Followed down farther side of island, but could see no land in any direction, that we had left having also disappeared. At 10.30 a. m. reached southeast end of [Mary Murray] island, which lay like a ship at anchor with respect to the wind. Here we were much protected from the wind, and there being no chance of proceeding farther we pitched tent and camped. At 10.38 a. m. lamp lighted for supper; at 12, noon, supper. Determined to lie over here till the storm moderated, finding it very severe to travel in, and to eat at as long intervals as possible in order to save rations. At 3.07 p. m. went to bed.

Advanced 22 miles in 6 hours, 41 minutes; traveled 9 hours, 25 minutes.

AT SHOE [MARY MURRAY] ISLAND.

May 11.—At 3.15 a. m. got up. Thermometer, 9° [−12.8° C.]; barometer, 29.42 [747.25^{mm}] (both in tent). Weather still stormy, and nothing can be seen nor anything done. At 4.10 a. m. breakfast. Thermometer, 10° [−12.2° C.]; barometer out of order. The wind, in gusts, first on one side and then the other, threatened to blow down the tent. At 9.20 a. m. thermometer, 6° [−14.4° C.] (in tent).

May 12.—At 2.45 a. m. still blowing and snowing without. Brainard and myself, as well as Christiansen, suffered a great deal from cold feet, something unknown since early in April, and quite unaccountable. It interfered a great deal with our sleep, and nothing we could do seemed to help matters much in this respect. At 3.55 a. m. breakfast or supper; thirty-five minutes in cooking. At 5 a. m. Christiansen and I went out to feed dogs. I saw one of them swallowing a lemming as I went out; saw land to the east and northeast, and a very high mountain in the former direction; a bold cliff [Cape Christiansen] to the north of it, terminating the land in that direction, bears SE. by S. (mag.). Some time occupied in taking an observation for latitude, the sun being dimly visible, and afterwards in filtering mercury. At 1.30 p. m. took observation for time, the weather clearing up. Got good view of the coast to the northeast. A little to the left of the first cape was another [Cape Kane], and then beyond that a third [Cape Washington], a long way off; seemingly, continuous land to the south of Shoe [Mary Murray] Island. At 2.30 p. m. turned in; at 8.45 p. m. got up. Intended getting up at 6 and starting on, but we overslept ourselves. It was just as well, for the sun again disappeared, and the storm seemed to have returned as bad as ever. At 9 p. m. thermometer, 9° [−12.8° C.]; barometer, 29.39 [746.49^{mm}]. Lamp lighted for "skoffin;"* cooking occupied twenty minutes.

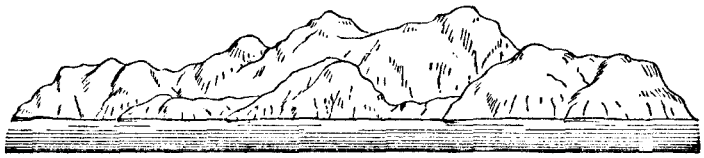
TWENTY-FIFTH MARCH, SHOE [MARY MURRAY] ISLAND TO FARTHEST [LOCKWOOD ISLAND].

May 13.—At 12.30 a. m., thermometer, 11° [−11.7° C.]; barometer, 29.30 [744.21^{mm}]; northwest wind and snow, but the cape ahead [Cape Neumayer] could be seen, and anything preferable to cold feet endured for sixty-two hours. At 1.45 a. m. started from camp after building a small cairn near by. The cape disappeared from view shortly after starting, but the traveling was very good near shore over blue-top floe, and at 3.45 a. m. the cape was reached. Here, and along the line of cliffs beyond which it terminates, immense masses of bergs and hummocks were pressed so close to the foot of the cliffs that it was necessary to get outside on the floe. A tortuous way was found to the top of this ice-wall and the sledge then lowered by means of the traces some 15 feet [about 5^{m}] or more. For some distance then we worked our way slowly through a mass of rubble-ice, with the constant use of the ax, and crossed two or three small lanes of water, and then traveled for a few hundred yards on a clear floe of last year's ice, when, at 5.30 to 6.15 we were stopped by another lead or lane of water. The sun being discernible I took an observation, and at same time sent Christiansen to find a crossing. One being found we continued over a floe of last year's ice at quite a rapid gait on a line generally parallel to the cliffs on our right, which ran, I judged, a little south of east. Presently, the weather clearing, a large, wide inlet [Weyprecht Inlet], with the cliffs and mountains on its farther side, opened up to view, forming a grand panorama—the most remarkable yet observed. To the right oblique the line of cliffs ended in a cape from which the coast turned abruptly to the south and then ran in a curve towards the southeast, forming the western shore of the inlet. Directly ahead was a pyramid-shaped island [Brainard Island] of considerable altitude, which seemed to touch the line of cliffs [Lockwood Island] back of it. This line of cliffs ran almost north and south, ending in a cape to the northeast of our position, and on the other hand gradually curving back to the southeast and forming the eastern side of the inlet [Weyprecht Inlet]. A little to the right of the island [Brainard Island] referred to is another, apparently, of a

*Term used by Danish Eskimo for food.—A. W. G.

cone shape. The land to their rear towered up to an enormous height and formed a mountain certainly not less than 4,000 feet [1,219^{m}], completely dwarfing the island and cliffs beneath. The tide-crack, which we were now on the outside of, ran in a great curve between the two capes, forming the extremity of the inlet. It was marked by a wall of ice-hummocks. Inside was a level surface of snow covering a floe which extended from shore to shore, and outside alternate masses of rubble-ice and smooth floes of last year's ice, or what I judged to be such. Taking a course for Pyramid Island [Brainard Island] we crossed the tide-crack without trouble, and, the snow inside being generally hard, made good time. From 8.15 to 8.37 reached the island and stopped to rest. What was taken for an island south of it appeared to be only a peculiar formation of the land of the main coast. Followed along the shore of the island [Brainard Island] to the north and came to a wide stretch of snow separating it from the shore. The snow had now got very soft. Obliqued to the right towards the main coast [Lockwood Island], hoping to find better traveling, but were disappointed in this. From 9.49 to 9.55 stopped to rest. The traveling after leaving the island [Brainard Island] very laborious through deep snow at every step. Sun like a grease spot in the sky; blowing, snowing, and drifting—impossible to take any observation for latitude. From 10.10 to 10.40 a. m. attempted an observation; very severe work and doubtful of any value. After this the snow got worse, till we found ourselves sinking to the thigh at every step, the dogs to the belly, and the sledge above the slats. It was only for a short distance thus, and the snow light and loose, or it would have been impossible to get along at all. At 11.30 a. m. reached the end of the coast-line [Lockwood Island]—the traveling very bad—and continued on, turning gradually to the east till the cape, strictly speaking, was reached at 11.48 a. m. From here the coast trended to the south again and another fiord [Conger Inlet] appeared. At 2 p. m. attempted observation, but gave it up—sun too obscure and weather too bad. At 3.40 p. m. supper; forty minutes occupied in cooking it. Bearing of farthest point ahead [Cape Kane] SE. by E. (mag.). At 5 p. m. turned in.

Advanced 16 miles in 8 hours, 15 minutes; traveled *— miles in 10 hours, 3 minutes.



Sketch of "Farthest" from the west.

AT FARTHEST [LOCKWOOD ISLAND].

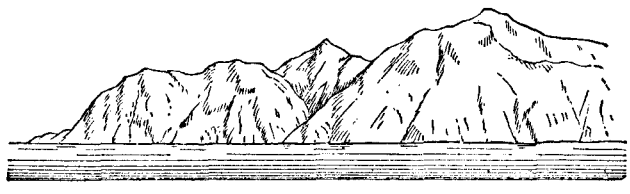
May 14.—At 7 a. m., as I awoke, I saw the small piece of pemmican (dog-food) remaining slowly moving out of the tent. On further investigation I found that "Ritenbenk" had burrowed a hole under the canvas, and had inserted his head far enough in to lay hold of a corner of the sack. He got inside the tent at the last camp, but was as unsuccessful then as now. At 8 a. m., breakfast; the cooking occupied forty minutes; tea only warm and stew cold. Still blowing and snowing; no sun visible. Last night it seemed as if the tent would be blown down. The rations being almost exhausted, I decided to make this cape [Cape Christiansen] my farthest and devote the little time we could stay to determining accurately my position, if the weather would allow it. It seemed very doubtful. At 10 a. m. the sun became visible but had passed the meridian. I feared the high cliffs here would obstruct the observations, and so moved tent, &c., about one-half mile to the west where they were lower and the last fiord [Weyprecht Inlet] opened a view to the south. *En route* we stopped and built a large, conspicuous cairn, about 6 feet [2^{m}] high and same in width at base, on the lower of two shelves or benches. It is about 30 feet [9^{m}] above the level of ice-foot and about the same number of yards distant from it, and just this side of a picturesque mass of rocks which crowns the cliffs. In the cairn I afterwards deposited a record of my journey to date, and also the thermometer (minimum-registering). I regret that the instrument only reads to —65.0° [—53.9° C.]. It was set at +14.0° [—10.0° C.]. After repitching tent Sergeant Brainard and I returned to cairn and collected in that vicinity specimens of the rocks and vegetation of the country, the sergeant making almost all the collections. The weather had now cleared up beautifully, the sun bright and clear, and the atmosphere calm and mild. Most of the time from now till midnight was taken up with observations, &c.

* Omission in original.—A. W. G.

May 15.—At 12.05 a. m. supper, thirty-five minutes cooking; that is, before the alcohol was exhausted. Stew only warmed; chocolate, ditto; two pint cups per man. In order to be awake and get observations at proper times Brainard and I took turns in sleeping; 8.30 to 10.30 a. m. occupied in taking circum-meridian observations for latitude.

At 11.45 a. m. breakfast. At 2.45 p. m. started with Sergeant Brainard to ascend the cliffs (opposite the tent comparatively low and sloping). We ascended without difficulty to a small fringe of rocks which seemed from below to form the top, but found it only a kind of terrace of the main elevation which lay before us. The ascent, at first very gradual, became steeper as we went up, but we had no difficulty, as for some distance below the summit the surface is covered with small stones as uniform in size and position, &c., as those of a macadamized road. Reached the top at 3.45 p. m. and unfurled the American flag (Mrs. Greely's) to the breeze in latitude 83° 24′ N. (according to last observation).

The summit is a small plateau, narrow but extending back to the south to broken, snow-covered heights. The barometer being out of order was not brought along, so I didn't get the altitude. It commanded a very extended view in every direction. The route of our last journey lay very distinct. Beyond Shoe [Mary Murray] Island lay a dark cape [probably Cape Ramsay], but I could not exactly identify it. It bore NW. (mag.), by pocket compass. Between the cape this side and my position lay the broad fiord [Weyprecht Inlet] last crossed, extending in a curve to the southeast, its source shut out by the high mount-



Next point beyond Farthest.

ains south of me. To the northeast (about) projected another rocky headland [Cape Kane] to the north, and at its foot I could perceive another low shore projecting out and forming another cape [Cape Washington] some distance beyond, doubtless separated from the first by a fiord [Hunt Fiord] as the first was from the promontory on which we stood; the fiord [Conger Inlet] just to the east extending south till shut out by the mountains south of us, but it presented every appearance of connecting in that direction with the fiord [Weyprecht Inlet] last crossed. The horizon beyond, on the land side, was concealed by numberless snow-covered mountains, one profile overlapping another, and all so merged together on account of their universal covering of snow that it was impossible to detect the topography of the region. To the north lay an unbroken expanse of ice, interrupted only by the horizon. Could see no land anywhere between the two extreme capes [Washington and Ramsay] referred to, though I looked long and carefully as also did Sergeant Brainard. Delayed on top twenty minutes. Left a short record in a small tin box under a few small stones (there were no larger ones), and then returned to tent, getting back at 4.50 p. m.

RETURN TO FORT CONGER.

First march, Farthest [Lockwood Island] to Cape beyond Shoe [Mary Murray] Island.

At 3.50 p. m. (15th) started on return. Found traveling better, partly on account of the late storm and partly on account of taking a direct course to Pyramid Island [Brainard Island]; the load also consisted of hardly anything but the constant weights; still we encountered a good deal of soft snow. At 9.40 to 10.15 p. m. reached Rubble Cape, and hauled sledge up by hand after unloading. Shortly after starting the weather became overcast, another storm threatening.

May 16.—At 12.19 a. m. reached Shoe [Mary Murray] Island; stopped about ten minutes to leave record in cairn. At 1.40 a. m. reached first cape west of island and went into camp; 4 a. m., supper finished. My eyes began to trouble me a good deal, evidently strained in sextant observations when the sun was obscured. The two inlets [Weyprecht Inlet and Wild Fiord] passed to-day seemed of immense extent and have many lateral branches. The last [Wild Fiord] particularly runs a long way into the interior; I could not see the head of it, due, perhaps, to the state of the atmosphere. A long way up is an island.

Advanced 20 miles in 7 hours, 25 minutes; traveled 8 hours, 10 minutes.

SECOND MARCH, CAPE WEST OF SHOE [MARY MURRAY] ISLAND TO CAPE [RALSTON] WEST OF DOME [WIJKANDER] CAPE.

At 3 p. m. breakfast. Tea only warm and stew cold. At 4.50 p. m. started from camp; at 5.40 p. m. reached inlet [Cape Hoffmeyer, De Long Fiord] and took compass course. Being unable to see anything we got up the fiord too far. At 9 p. m. reached shore [Cape Mohn] on west side; 10 p. m. reached little cairn and deposited record. I also deposited a record in cairn [near Cape Hoffmeyer] met about half an hour after leaving camp. At 11 p. m. reached Pocket Bay, and at 12 m. reached Dome Cape [Wijkander]. The fiord [Gardiner Bay] here appeared closed in like a bay, but I could not be certain on account of the weather.

May 17.—At 1.30 p. m. reached cape [Cape Ralston] on farther side of bay or channel [Gardiner Bay] last crossed and went into camp. At 4 a. m. finished "skoffin"; the chocolate so cold as to be undrinkable; the stew with lumps of ice in it. This march *positively* has been the most uncomfortable *to me* since leaving the Brevoort Peninsula. Wind and snow directly in our face; eyes painful and, strange to say, *cold hands* (the latter I have been very free from while *on the go*). The dogs ate up my seal-skin mits some time ago; 30° or 40° below zero [−34.4 or −40.0° C.], *without* wind, is preferable to this weather.

Advanced 27 miles in 8 hours, 25 minutes; traveled 8 hours, 40 minutes.

THIRD MARCH, CAPE [RALSTON] TO RABBIT CAPE [CAPE BENÉT].

At 5.15 p. m. left camp. From 5.50 to 6 p. m. reached first fiord to the west and, being able to see Distant Cape, made directly for it. From 8.04 to 8.20 p. m. arrived about opposite Low Point and stopped to observe what looked like a glacier [Buys-Ballot Glacier] some distance inland to the east of it. This glacier had all the appearance of a mound-shaped hill covered with snow, with a continuous wall of green ice all along the side towards the sea. The wall must have been of considerable height, though at my standpoint it looked quite low; all around were snow-covered mountains except on the north side, where a uniform and rather low sloping surface came down to the coast. Distance of the wall from the coast, 4 or 5 miles, or much *more* perhaps.

At 9.40 p. m. reached coast near Distant Cape, and in one quarter of an hour had rounded cape and reached small bay on farther side. At 10.35 to 10.44 p. m. opposite side reached; rested. At 11.35 p. m. left the ice-foot on west side of this cape [Cape Payer]. Rested ten minutes in crossing this large fiord [Mascart Inlet].

May 18.—At 2 a. m. reached farther coast and cairn at Rabbit Cape [Cape Benét] and went into camp. The weather to-day variable, thick, with west wind in the morning; afterwards it improved. Traveling quite good, on the whole, especially when compared with the outward journey. The late storms have made the snow much better, but still it is very laborious across the large fiord [Mascart Inlet] just to the east. The three inlets crossed seemed rather bays than channels—impossible to say positively. The rations left here found untouched. Two ptarmigan seen, but Christiansen was unsuccessful in getting either. Fox and hare tracks numerous. At 6.30 a. m. retired to rest.

Advanced 19 miles in 8 hours, 10 minutes. Traveled 8 hours, 45 minutes.

FOURTH MARCH, RABBIT CAPE [CAPE BENÉT] TO FLOE EAST OF NORTH CAPE [CAPE FREDERICK].

At 2.50 p. m. woke up and called Brainard. At 4 p. m. breakfast; very windy last night. At 6.12 p. m. left camp. At 7.30 p. m. reached opposite side of bay [Linn Bay]. At from 8.25 to 8.45 p. m reached Black Cape; stopped to rest; built a small cairn. At 9.53 p. m. reached Blue Cape; stopped about fifteen minutes for lunch.

May 19.—At from 1.13 to 1.20 a. m. stopped opposite Diamond Island [Cape Salor, Elison Island]. A warm sun, and trudging through this soft snow, occasioned frequent stops for rest. At 2.20 a. m. went into camp on floe opposite floe on east side of Cape Britannia Land. Weather beautiful. The traveling better than it was *outward* bound, the wind having hardened the snow crust, but still quite laborious. The dogs still continued to look well, though pulled down in flesh more or less, excepting Ritenbenk (the king), who for some days had been under the weather—going along with his head and tail down, and not pulling at all. The mountains in sight all covered with snow; the fiord [Nordenskiöld Inlet] opposite could be seen to run a long distance inland, straight as a canal; no land visible at its head.

Advanced 17 miles in 7 hours, 25 minutes. Traveled 8 hours, 8 minutes.

FIFTH MARCH, ——— TO CAPE BRITANNIA.

At 6 p. m. left camp. From 9 to 9.10 p. m. stopped not far from North Cape [Cape Frederick]. General trend of the eastern coast is SW. by S. (mag.). Weather clear. Ritenbenk seems lame as well as sick. From 9.27 to 10.05 p. m. stopped; circum-meridian observations.

May 20.—At from 1.27 to 1.46 a. m. reached cairn at Cape Britannia; found cache untouched. Putting the rations on the sledge, and snow-shoes, and leaving the extra sledge-runner and small lamp at the cairn, we continued on, on the floe. At 2 a. m. went into camp a few hundred yards from shore. The sun bright and clear, but a south wind blowing quite strong. At 6 a. m. turned in, after taking an observation.

Advanced 12 miles in 6 hours (about). Traveled 8 hours.

SIXTH MARCH, BETWEEN CAPE BRITANNIA AND CAPE BRYANT.

At 5 p. m. got up. We all seemed to sleep very heavily nowadays. After breakfast I went ashore with Sergeant Brainard and collected specimens of the rocks and vegetation. Traces of musk-oxen (droppings) found, but quite old. Saw some snow-birds. At 9.50 p. m. started on march.

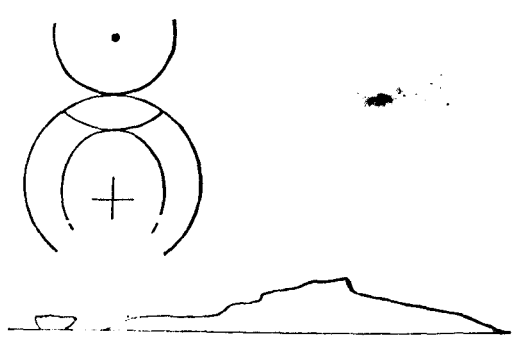
May 21.—At 5 a. m. sun very bright and warm; calm. A singular phenomenon existed several hours this morning; a dense fog obscured the horizon so that no land could be seen, yet not extending high enough to dim the sun. Difficult to keep a straight course and avoid bad ice under such circumstances. At 6.07 a. m. camped on level floe. One hour's delay in all on march. At 9 a. m. supper finished. Everything singularly bright and clear, the sun having disappeared. Shortly after starting this morning I put on the snow-shoes. Regrets at leaving them behind haunted me every day while beyond Britannia. It was my first attempt, but, notwithstanding, the relief experienced was wonderful. Sergeant Brainard soon followed my example, and we wore them continuously thereafter till Cape Bryant was reached, and most of the time afterwards. There was now no difficulty at all in one of us keeping ahead of the dogs to encourage them and pick out a route. The snow was not very soft or deep, but still sufficiently so to be very fatiguing when prolonged through several hours. The dogs seemed to stand it well, and drew the sledge seemingly without much effort, but the sledge was now very light.

Advanced 16 miles in 7¼ hours (about). Traveled 8 hours, 17 minutes.

SEVENTH MARCH, BETWEEN CAPE BRITANNIA AND CAPE BRYANT.

At 8.21 p. m. left camp. From 9.31 to 9.41 p. m. stopped at a low ridge of hummocks. Beautiful day; clear and calm. Sun very warm, and traveling hard on the dogs. Sergeant Brainard and I experienced no trouble on account of having the snow-shoes; 9.55 to 9.58 p. m., reached tidal crack; wanted to get thickness of the ice but the crack was frozen up at this place; 11 to 11.10 p. m., stopped to rest.

May 22.—At from 12.04 to 12.25 a. m. stopped for lunch of pemmican and hard bread; 2.12 to 2.24 a. m. stopped to view a remarkable parhelia, somewhat as follows:



At 4.15 a. m camped. Weather a little cloudy and slightly overcast, threatening snow; 6 a. m., supper. My eyes somewhat painful; Ritenbenk all right again. Two of the bitches are with pups; Christiansen says, "White koony, 16 days."

Advanced 16 miles in 7 hours (about). Traveled 7 hours, 54 minutes.

EIGHTH MARCH, BETWEEN CAPE BRITANNIA AND CAPE BRYANT.

At 8 p. m. overcast and snowing; no land visible; air cooler than yesterday. At 8.40 p. m. broke camp and started. From 10.17 to 10.30 rested. Fox tracks from the northwest seen half an hour previous; fox tracks also here, going north. Land entirely obscured. From 11.57 to 12.26 stopped for lunch. Two more fox tracks going south seen about an hour before stopping. About 1 o'clock the fog lifted, so that Dragon Point could be seen indistinctly.

May 23.—From 1.32 to 1.42 a. m. rested; still snowing but not so foggy. Compass course to-day has been NW. (mag.). From 2.47 to 3 a. m. rested. Sergeant Brainard or I always ahead of the sledge. In this way the dogs travel much better and there is less difficulty in taking the right direction. At 4.40 a. m. camped somewhere about opposite Saint George's Fiord. About one day's more rations is all that is left; several items exhausted some days since. The wind started up after getting into camp. Traveling to-day very heavy. The snow seemed to fall *en masse* as the sledge passed over or rather through it, a section immediately round the sledge falling all together and taking a lower level; this was accompanied by a cracking sound. This phenomenon was noticeable every day. At 8.15 a. m. turned in.

Advanced 16 miles in (about) 7 hours. Traveled 8 hours.

NINTH MARCH, ——— TO CAPE BRYANT.

At 4.45 p. m. got up. Weather calm, but snowing and everything obscure. At 8.40 p. m. started from camp.

May 24.—At 12.08 a. m. reached shore about three-quarters of a mile southeast of Cape Bryant; continued along the coast and pitched tent near old camp. The rations in the cairn near by were found untouched. Some time was occupied in visiting this cairn, in trying to find a tide-crack along shore (in which we were unsuccessful), &c. My left eye being quite painful I remained in tent and at 6.15 a. m. sent Sergeant Brainard and Christiansen out to look for Beaumont's cache, and also to find a tide-crack where we could make tidal observations. At 11 a. m. Sergeant Brainard returned; he had been along the coast to the west, some 2½ miles, but was unsuccessful in finding the cache. Coming back he found a tide-crack opposite the tent but some distance from shore. At 2.20 p. m., after a hearty meal, we all turned in.

Advanced 12 miles in (about) 3½ hours. Traveled 3 hours, 52 minutes.

AT CAPE BRYANT (RETURN).

At 11.20 p. m. (24th) got up.

May 25.—At 12.20 a. m. breakfast (a fine one), musk-meat, bacon, potatoes, and tea, which I got from the cache. An hour afterwards I went with Sergeant Brainard to the tide-crack about half a mile from shore, and, selecting a place, let down a rope with a stone attached. The depth was 103 feet [31^{m}]. This was the only arrangement that suggested itself of getting a record of the tide. The weather was overcast, with snow, and the crack concealed from the shore by several intermediate ranges of hummocks, so that each observation occupied twenty-five minutes out of the hour. We commenced at 2 a. m., and continued the observations till noon (each taking alternate tours of four hours), when I became convinced that our record was worthless, and so stopped the work. One cause of want of success seemed to be a tide or current which inclined the rope to the right (east), and when the stone was raised and lowered several times in succession it seemed to take a different level on each occasion. The divisions on the rope were made with string tied around it. Several crustaceans were brought up from the bottom with the stone.

The dogs during our operations visited the cairn on the hill and ate a few pounds of hard bread, the only thing they could get at. Supper at noon. At 3.40 p. m. returned from cairn with Sergeant Brainard. We rebuilt the cairn, secured the rations to be left in it, &c. (a list appended). We are both made miserable again with our eyes. They were made worse, of course, by the tidal observations, as it was necessary to have them uncovered in walking back and forth. After this we all turned in to sleep.

TENTH MARCH, CAPE BRYANT TO HAND BAY.

At 10 p. m. arose, and in about an hour had breakfast. Beautiful morning; calm and clear; temperature a little lower.

May 26.—At 12.49 a. m. left camp; at 2.35 a. m. stopped. Sergeant Brainard, who was walking on snow-shoes along the slope some distance to the left, called out that he had found Beaumont's cache. The sledge was opposite a water-course, which forms a delta, reaching to the ravine, perhaps a mile inland. On a small, bare hillock, or mound, about 150 yards [137^{m}] from the coast, we found an old Enfield rifle, a pole shod with iron, cross-piece of a sledge, three or four articles of underwear, the wooden sole of a shoe, some cartridges and the loose balls of others, a thimble, sewing-thread, &c. The tent, spirits of wine, pemmican, coverlet, &c., which we expected, were not to be found. Around the foot of the little bluff (or mound) lay several feet of snow, which may, however, have concealed these articles. No cairn, or trace of one, could be found. Abundant fox and hare droppings were about. Some distance farther on I shot a ptarmigan on the top of a very large floe-berg. It was only by climbing a snow-drift that Christiansen got the bird down. This floe-berg was quite a remarkable one, by its size and the regularity of its shape. Its height, above the sea, was about 30 feet [9^{m}] by about 50 feet [15^{m}] long and broad; its form was square; an undulating surface on top covered with snow. *Salt* icicles hung from the south side. The ice composing it was very homogeneous, apparently. How such a mass could be pressed up till it touched the ice-foot is a mystery. At 8.50 a. m. reached cache No. 3; took the rations from it and continued on. At 10.42 a. m. camped on the east shore of Hand Bay; at 12 m. supper. Brainard and I have worn snow-shoes all day. Traveling generally heavy, and far inferior to what it was on the outward journey, especially on Frankfield Bay and the indentations of the coast to the east of it. The influence of the sun on the snow and floe-bergs quite perceptible. Sergeant Brainard suffered a good deal with his eyes to-day, and had to keep them bandaged. My own eyes very sensitive to the light. The buffalo sleeping-bag is almost too warm such weather as this. A great many fox tracks seen during the day. Turned in at 2 p. m.

Advanced 12 miles in 7¾ hours. Traveled 9 hours, 53 minutes.

Eleventh march, Hand Bay to Drift Point.

At 8.55 p. m. Sergeant Brainard rose to cook breakfast, which we ate fifty minutes afterwards. Weather more pleasant, being cooler and somewhat overcast. Ripped open the upper end of seam of sleeping-bag during the night and found it much more comfortable. At 11.22 p. m. broke camp and started.

May 27.—At 12.42 a. m. reached west side of Hand Bay. From 12.47 to 1.15 a. m. stopped at Cape Stanton; traveling across Hand Bay quite good; the Grinnell Land shore very distinct. Cape Joseph Henry visible, or what I took for that cape. The ice to the north of us seemed very rough; rubble-ice in all directions. At 2 a. m. reached Stanton Gorge; a good many fox tracks between here and Cape Stanton. Lieutenant Beaumont's cairn very conspicuous from approach on east side. At 3.0 to 3.37 a. m. reached cache No. 2 and stopped to put the rations on sledge. The traveling from Cape Stanton here along a snow slope; the constant effort to avoid slipping down hill makes it very fatiguing. Saw a great many fox tracks. At 4.30 a. m. reached Black Horn Cliffs. Found tracks covered up. Considered whether to make a wide detour around the rubble-ice made in April, or to follow cliffs. Decided on the latter. Got along without much difficulty for some distance, but then encountered the mass of rubble-ice and hummocks anticipated, and had to use the ax constantly. At 6 a. m. reached west end of Black Horn Cliffs, traveling over the intermediate floe of last year's ice quite rapidly. At 1.05 to 1.15 a. m. reached end of this level floe, about half a mile farther, and stopped to rest. Here the old tracks ran close to shore and I was able to follow them through the rubble-ice without difficulty, but, in a few hundred yards, lost them again. The sledge-runners requiring relashing I proceeded ahead with the ax and selected a route for the sledge, making a road as I went. Found the place where we had taken to the floe on the outward journey, but could hardly identify it, the whole character of the floe-bergs having changed; found the snow-slopes practically impassable. So followed along on the floe, making a road where necessary, till, at the end of the snow-slope, I found a good landing. Returning, and meeting sledge *en route*, we reached this place at 8.05 a. m. Stopped to fix traces. The changed appearance of the ice, especially the floe-bergs, a subject of daily remark. Well known floe-bergs were so much dwindled down in size as to be almost unrecognizable. At from 8.50 to 9.02 a. m. reached the remains of the broken sledge (the *Nares*). Pulled it up the hill a little distance, away from the shore. At 9.20 a. m. reached Drift Point and camped. At 11.20 a. m. supper. At 12.40 p. m. turned in.

Advanced 22¼ miles in (about) 7½ hours. Traveled 9 hours, 58 minutes.

TWELFTH MARCH, DRIFT POINT TO GAP VALLEY.

At 8.20 p. m. Sergeant Brainard got up to cook breakfast. Bad weather again; strong west wind with snow. At 11.54 p. m. broke camp and started, after delaying some time for the wind to moderate.

May 28.—At from 12.50 to 1.04 a. m. reached cache No. 1, the site of our first camp on this coast; the place hardly recognizable; the large piece of hummocky ice, behind which the tents were pitched, hardly half its former size. Found the ice-foot clear of snow most of the way from Drift Point. At 2.15 a. m. reached place on coast directly opposite the flats of Lost River. Having decided to return via the true Gap Valley, if I could find it, we kept on without stopping. The dark object, noticed to the west from here in April, soon recognized as a cairn, and soon afterwards espied a small indentation of the coast, which I knew must be Repulse Harbor. At 2.30 a. m. reached east shore of the harbor, near mouth, and striking directly across found good traveling over undulating ice and hard snow; reach opposite shore at 2.54 a. m.

At from 2.57 to 4.45 a. m. stopped near cairn. Found quite a number of documents at cairn. A chilly wind blowing I took shorthand copies and left the originals in cairn (a copy of these appended). Continuing down the coast over an ice-foot covered with good, hard snow, we reached, in fifty minutes, a narrow gorge, and stopped twenty minutes to make sure it was not Gap Valley. At 7 a. m. reached a wide, straight valley, running almost due south and ending in a ravine, plainly seen about 2½ miles distant. Felt confident that this must be Gap Valley. After getting a little way in, the traveling was found anything but good, the sledge frequently grating on stones, even where the snow was comparatively deep. At 9.09 a. m. reached the ravine running south after delays aggregating twenty-five minutes, on account of drag-rope breaking, &c. Here we entered a narrow, winding cañon. At 11.13 a. m. camped in the ravine near its head after several more delays. My eyes hurt me a good deal. Hardly enough rations left for two meals. The dogs having been on short allowance some time were very ravenous, and even tore open the bag of geological specimens to see if the stones were good to eat; 3 a. m. turned in.

Advanced 17 miles in 8 hours, 18 minutes. Traveled 11 hours, 19 minutes.

THIRTEENTH MARCH, GAP VALLEY TO [*Polaris*] BOAT CAMP.

At 11.15 p. m. Brainard arose to cook breakfast. Weather overcast, with wind from south.

May 29.—At 1.55 a. m. left tent standing, and, with Sergeant Brainard, started out to reconnoiter before advancing the sledge. We soon came to a plain (the divide), and, following the shallow surface drain, saw first the high cliffs of Polaris Promontory and then Newman Bay and the neighboring landmarks. Continued on till we reached a depression running south, which, we could see, changed into a gorge, or ravine, a short distance ahead and evidently very soon found its wayto the bay. Leaving Sergeant Brainard I returned, and getting in sight of Christiansen who had packed up everything in the mean time, I waved to him, and at 3.11 a. m. he started with the sledge. In thirty-five minutes reached the south side of divide, and shortly afterwards made a steep descent on the side of an immense snow-drift. Shortly after this the ravine narrowed to a gorge, and we encountered several delays in getting over stones and down steep snow-drifts. At the last of these was a wonderful snow-cave, its floor formed by the bed of the gorge. It was upwards of 100 feet [30^{m}] long, about 10 feet [3^{m}] wide, and high enough to walk through upright. Its inside resembled, somewhat, the inside of an immense smoke-stack, the joints being represented by a ribbed appearance of snow. Stopped here about twenty-five minutes in examining this place and lowering sledge down the slope by traces. In seven minutes more we reached Newman Bay (5 a. m.). I built a cairn on the edge of the gorge, about 150 yards [137^{m}] back from the ice-foot, and started on again at 6.03 a. m. The traveling across the bay was excellent; a light coat of snow, hard and smooth. The gully just left is the fourth from Cape Brevoort; from which, to Gorge Creek, is about two-thirds the distance. Gorge Creek is the sixth water-course from the cape.

At 8.03 a. m. reached ice-foot near Boat Camp (delaying about ten minutes in crossing Newman Bay), and five minutes afterwards were at the Boat Camp itself, where we saw the 6-man tent pitched near the whale-boat, and inside Sergeants Linn, Ralston, and Elison asleep. While we were pitching our tent they woke up and came out. Sergeant Linn and party arrived here, without event, May 5, their intermediate camps being: (1) Between Frankfield and Hand Bays; (2) cache No. 2 (near Stanton Gorge); (3) Lost River, near seacoast; (4) on Divide; (5) mouth of Gorge Creek; (6) Boat Camp. Sergeant Jewell, Corporal Salor, and Private Frederick left on the 7th for Fort Conger. On the 11th Dr. Pavy came over with dog-team,

bringing some rations, and returning the day following. On the 17th they woke up to find that two bears had paid them a visit during their sleep. The animals came from Newman Bay, and after meandering about the camp and going close to the whale-boat, they departed down the straits via Cape Sumner; their tracks were followed thus far. As the party had only a pistol, the near approach of these bears created a little sensation. With these exceptions, their monotonous stay of twenty-five days at the Boat Camp had been only broken by the sight of some ptarmigan, a fox, and constant gales of wind, which made it difficult to secure their tent. The general health of the party was good. After we had all eaten a good breakfast together I directed Sergeant Linn to make a careful inventory of everything to be left in cache, and then Sergeant Brainard, Christiansen, and I turned in at 1 p. m. Before long, however, the wind, which ever blows here, gave us a specimen of what the other party had experienced, by partially blowing the tent down, and all hands were occupied a half-hour or more in securing it with pins, stones, ropes, &c.

Advanced 10 miles in 4 hours, about. Traveled, 5 hours, 24 minutes.

Fourteenth march, [Polaris] Boat Camp to Cape Beechey.

Got up to find it snowing—and of course blowing—and everything very obscure. I had decided to take everything—except what was to be left in cache—on dog-sledge, and while this bulky and very heavy load was being packed, &c., we built a large cairn near by. In it I deposited a record. At 11.25 left camp with whole party (6). (Inventory of everything left, appended.)

May 30.—At 12.10 a. m. reached ice-foot at Cape Sumner. Having so many to help we got the heavy load along the snow-slopes with only a few short delays. Met with a great many little pools of water in the rubble-ice below, and had several short delays; otherwise the general character of traveling was the same. I took the route along shore to the Gap, which we got opposite at 3.30 a. m. At 5.30 a. m. stopped half-hour for lunch, the traveling anything but pleasant, as only the Polaris Promontory could be seen, and this not distinctly; wind and snow from the northeast. Took a compass course for Beechey, but inclined too much to the right and got in a mass of rubble-ice, which gave us a great deal of trouble and vexation of spirit. However, after a while the west coast loomed up, and by inclining to the south we got out of the rubble-ice, and at 10.35 a. m. reached the tent on the straits, 4½ miles from shore. Sergeant Linn and party had had no sleep since my arrival at the Boat Camp; this, and their long inaction there, made this march very fatiguing. Wishing to reach shore, I suggested to Ralston and Elison to *remain over* at the tent and come in after taking a good rest, but they would not hear of it. After three-fourths hour delay we continued on and reached Cape Beechey at 1.20 p. m. The day's march was a hard one, and could not have been much short of 30 miles. At 3.40 p. m. all turned in, in the 6-man tent.

Advanced 25 miles in 12½ hours, about. Traveled 13 hours, 55 minutes.

Fifteenth march, Cape Beechey to Depot A [Cape Murchison].

May 31.—At 2.30 a. m. called cook (Sergeant Elison), who cooked some tea, which, with crackers, was all we had. At 4 a. m. breakfast. Beautiful morning; clear and calm. Sergeant Ralston much used up with stiff joints; his eyes, also, quite painful. Elison also under the weather. Shortly after breakfast I sent Sergeant Brainard with Christiansen and team out on the straits to bring in the tent, and some time afterwards Ralston and Elison started for the snow house to await my arrival there. Sergeant Elison took the lamps along in order to cook breakfast for us. Dog-sledge returned at 8.14. On its return I deposited in cache, about 150 yards [137^{m}] below, the wall tent brought in, a rubber blanket, and box of medicine. At 9.13 a. m. left with sledge and load, and reached snow house [Depot B] in two hours. Here I found Privates Ellis and Whisler, who had come out to look for us, &c. I delayed here 2 hours and 50 minutes, during which we had a substantial meal, fed the dogs, &c. At 2.25 p. m. left snow house with some articles put on here in addition to my load. Ralston, accompanied by Ellis, proceeded on leisurely some time before my departure. I overtook them on St. Patrick Bay, going along very slowly. Ralston's snow-blindness was so bad that he had not opened his eyes since leaving Sunday Bay. Sergeant Linn's eyes were almost as bad; he held on to the upstander of the sledge constantly. At 6.40 p. m. reached depot A, and we all put up in the wall tent here. We all found ourselves suffering more or less with snow-blindness (excepting Frederick, Ellis, and Christiansen, the Eskimo), and all the opium was speedily used up on bandages. At 9.30 p. m. went to bed.

Advanced 14 miles in 6 hours and 15 minutes. Traveled 9 hours and 27 minutes.

SIXTEENTH MARCH, DEPOT A [CAPE MURCHISON] TO FORT CONGER.

June 1.—At 6 a. m. cook arose. Private Whisler came along during our sleep, about 2 a. m., but, there being no place for him to sleep, he continued on to the station. Breakfast at 7 a. m. At 8.10 Sergeants Ralston and Linn left for station, led by Sergeant Elison and Ellis. At 9.45 a. m. I left with Sergeant Brainard, Christiansen, and dog-sledge. Reached Water-course Bay in about an hour, and there met Lieutenant Greely, whom Whisler's arrival in advance had informed of our near approach. After about ten minutes' delay we all continued on together. On reaching the bare rock near Distant Cape, it being necessary to relash the sledge, Lieutenant Greely and I continued on and reached the station about 2 p. m. The sledge arrived about an hour later.

Advanced 9 miles in (about) 4 hours. Traveled about 5 hours.

Sergeant Brainard's letter of transmittal.

FORT CONGER, GRINNELL LAND, *July* 4, 1882.

SIR: In compliance with your request, I have the honor to herewith transmit an abstract of my sledge journal, from April 3 to April 29, 1882, inclusive.

These notes are a record of the daily experiences of the supporting sledge party, which I commanded, until it turned back at Cape Bryant, where I joined your sledge.

I have endeavored to herein record such events as may be of special interest to you, and which will best describe the character of our labors.

I am, very respectfully, your obedient servant,

D. L. BRAINARD,
Sergeant.

Lieut. J. B. LOCKWOOD,
U. S. Army, A. S. O.

Sergeant Brainard's abstract of sledge journal.

April 3, 1882.—In accordance with instructions from Lieutenant Lockwood, I left Fort Conger at 6.20 p. m., with sledging party of ten men, assigned as follows to the Hudson Bay sledges: *Hayes*, Sergeants Brainard, Ralston, and Private Whisler; *Kane*, Sergeants Linn and Elison; *Beaumont*, Corporal Salor and Privates Biederbick and Connell; *Hall*, Privates Henry and Frederick.

The amount hauled by each man, including the weight of the sledges, was about 75 pounds. The unfortunate members of the party, who, from physical defects or otherwise, were debarred from participating in these expeditions, showed their encouragement and appreciation of this work by giving us three hearty cheers (with a "tiger"), and by firing a salute as we moved away from the station. The commanding officer and Lieutenant Lockwood accompanied us as far as Dutch Island. We found the traveling excellent, and by 10.55 p. m. we had reached Cape Murchison (depot A), having made but two halts since leaving the station. The men not feeling at all hungry, turned into their respective bags without preparing supper. Temperature, −32.0° [−35.6° C.].

April 4.—The cook (Connell) was called at 12.45 p. m., and soon after 2 o'clock we partook of a substantial meal of stewed corned-beef, hard bread, and tea. The party appears to be in excellent spirits, although several complain of their inability to sleep last night, owing to the too thorough ventilation of their sleeping-bags. The sudden change from our well-heated quarters at Fort Conger to a minimum temperature of −41° [−40.6° C.] in tents and sleeping-bags will probably account for the absence of sleep last night. We increased our loads to 90 pounds each and resumed our march towards Cape Beechey at 3 p. m. The traveling across St. Patrick Bay was excellent. The late storm has blown off all the snow, leaving a thick, smooth crust, over which the sledges glided easily. On reaching the north side of the bay we encountered a fresh northeast wind, accompanied by light snow. When about two miles north of this bay the traveling became very heavy, in consequence of deep snow. At Brenta Bay, however, it was somewhat better. We reached depot B at 8.45 p. m., the party feeling very much fatigued after their tramp through the deep snow.

Supper was eaten at 10 o'clock, and we began immediately afterwards to prepare the provisions in the depot for transportation across Robeson Channel to the Greenland coast. Wind increased in velocity at 10.30 p. m. Rice and Jens arrived from the station at 11.30, with a sledge-runner to replace the one broken on their sledge near Cape Union several days ago. Temperature, −29.0° [−33.9° C.].

April 5.—Having completed as much of our work as could be accomplished at once, we retired to our sleeping-bags at 12.30 a. m. Four of the party occupied the small snow house recently constructed, and eight the large one built last autumn. Lieutenant Lockwood, Sergeant Jewell, and the driver, Christiansen, arrived with a loaded dog-sledge at 3 o'clock, having left the station at 9 last evening. At 2.30 p. m. dinner was served to all. Rice and Jens left soon after for Cape Union, taking with them the large sledge-runner. The wind has been increasing in velocity, and I am afraid their trip may result disastrously. The tin cases were removed from preserved meats, which are now solidly frozen, and other preparations made for the start. Both parties left the depot at the same time (8.25 p. m.), and journeyed up the coast together towards Cape Beechey. The loads were increased to about 130 pounds per man. Traveling fair.

April 6.—Arrived at Cape Beechey and crossed the ice-foot to the floe at 12.05 a. m. The time occupied in traveling over the same route during my former trip to this place, with the English 8-man sledge and hauling 100 pounds each, was four and one-half hours. The conditions of traveling appear to be about the same as they were at that time, but our loads are thirty pounds heavier than before; hence, this would seem to indicate that the Hudson Bay sledges are to be preferred for this work. Whisler complained of feeling ill soon after leaving the Cape, but insisted on retaining his place in the drag-ropes, although his presence was obviously detrimental to the others. He grew rapidly worse, and, as we moved but slowly, I sent him forward to the wall tent which I had left pitched on the floe last month, and at which Lieutenant Lockwood now was. A light wind from the northeast, together with the temperature of −49.0° [−45.0° C.], rendered the traveling anything but agreeable to any of us. Camped, at 3.15 a. m., at the wall tent. Supper served at 5.30. The regulated scale of rations for parties in the field took effect this morning, and with rather disagreeable results, which, however, were not wholly unexpected. The allowance of alcohol was not nearly sufficient to bring the chocolate to the boiling point, and our stew of corned-beef and hard-bread crumbs was just barely warm. The regulation *pint* of fluid was not at all satisfactory, neither is it sufficient for the tired, hungry, and chilly men who have been laboring and perspiring incessantly for hours in this temperature.

P. M.—Aroused the cook (Ralston) at 5 p. m., and breakfast was served to us at 7 o'clock. The cook's duties were made very irksome and painful this morning owing to the low temperature and his tender fingers, which were repeatedly frosted. Henry is complaining of rheumatic pains, and asserts that one of his knees is sprained and that he cannot proceed farther. Lieutenant Lockwood ordered him to return to the station, and he accordingly turned back at 8 o'clock. Started with the sledges at 8.25 p. m. Traveling fair. Connell, having unfortunately frozen one of his great toes in the sleeping-bag last night, was urged by some to go back at once, but, with characteristic pluck, he took his usual place in the drag-ropes, although limping painfully. He hobbled along for some time on his blistered feet in this manner, but was at last compelled to fall out and turn back to Fort Conger, Lieutenant Lockwood taking him with the dog-sledge as far as Cape Beechey. Fresh wind from the northwest, but as it was not directly in our faces we were inconvenienced very little thereby. We left the main road at 11.25 p. m. and shaped our course directly towards Cape Sumner. Whisler is now quite well again.

April 7.—After changing our course we encountered a broad, rolling floe, with very little snow to obstruct the sledges, and, taking advantage of the opportunity here offered, pushed forward at a rattling pace for four miles, when the floe terminated abruptly, and we were floundering almost helplessly about in a tangle of rubble-ice. To add to our embarrassment the sledges were being continually overturned, and often nearly buried in deep snow-drifts. After very slow and laborious progress we at last emerged from this execrable pack, and traveled over a floe which was nearly as smooth as the one first mentioned. The men all felt greatly fatigued at 3.45 a. m., so I decided to camp at that time, selecting for that purpose a large berg which extended promises of protection from the high winds which have prevailed all day. Lieutenant Lockwood arrived in camp with the dog-team at 5 o'clock, and supper was served soon after. All were in their sleeping-bags at 6.

P. M.—The cook arose at 5.10 p. m. and discovered that the dogs had forced their way into the tent during the night and had stolen the meat intended for our breakfast. While eating our stew of hard bread

and water (without meat), soon after, many threats were made against the faithful brutes who had unwittingly deprived us of a breakfast. Temperature, −27.0° [−32.8° C.]; brisk wind from the southwest. Started at 9.55 p. m. The traveling is growing worse, instead of better as we had expected.

April 8.—The storm increased in violence to such an extent that I deemed it imprudent to travel longer; so, calling a halt, we camped at 12.30 a. m. I selected a position close beside a huge floe-berg, with high vertical sides, as a very desirable place to locate our tents. The full force of the storm cannot reach us here. Through some misunderstanding on their part, Biederbick and Salor had been separated from us during the progress of the storm, and I now began to feel alarmed regarding their safety. Taking one of the revolvers, to be used as a means of signaling, I started out in search of them, first instructing those in camp to reply to any shots that they might hear, in order that I could find my way back to the tents should I get bewildered or should my tracks become covered by the blinding drift. Choosing a direction which I thought would lead me across their trail, I followed it by compass for about a mile, when I found their tracks. These I followed eagerly for some time, occasionally losing them where they were either blown out of existence or covered by the drifting snow. At last I found them, but their condition was even more pitiable than I had anticipated. They had burrowed in a snow-bank, with the aid of a small sheath-knife, and had nothing but a rubber blanket to protect themselves from the chilling winds. I guided them back to camp, taking with us their sledge. We are greatly concerned about Lieutenant Lockwood, who parted company with us this morning, but there may be no occasion for serious apprehension, as he carried tent and sleeping-bag in his equipment. Supper at 3.45 a. m. At this time the wind is increasing in velocity, and the air is so filled with drifting snow as to prevent us from seeing the other tent, which is only a few yards away. We retired to our sleeping-bags at 4.15 a. m. Every one is feeling wretched from the effects of the severe toil of the day. At 8.45 p. m. another meal was served to us. As usual, the tea did not boil, and the last drop of fuel was consumed before the stew had fairly thrown off its chill. The storm had increased to a gale during the day and yet rages with undiminished fury, threatening each moment to tear down our tents and carry them bodily away. There is, evidently, no chance for a move to-day. The temperature is rising.

April 9.—There is no indication at present (1 a. m.) of a subsidence of the storm. Despite the protection afforded us by the friendly floe-bergs, we were at all times expecting the tent to be torn from its fastenings, but to our surprise it has bravely stood the great strain to which it has been subjected. It has, I think, become materially strengthened in consequence of the huge drifts which have formed all about us. Although these drifts afford greater security to the tent, they are, nevertheless, very inconvenient to us, as they press in the sides of the tent in such a manner as to render our position both cramped and awkward. The full force of the storm cannot be felt here in our sheltered position, but, notwithstanding this, the observer estimates the full velocity at 60 miles per hour [26.8^{m} per second]. The barometer is slowly rising, and we are hopeful of good results.

The barometer is now (at 8 p. m.) stationary, and the temperature has risen to +2.0° [−16.7° C.]. Supper was served at 8.05 o'clock. The wind had now abated somewhat, and our spirits rose at the thought of speedily leaving this miserable place, which has failed to furnish us with one moment of comfort since our arrival. We have been in our damp bags for about forty-five hours, and during that time we have been surrounded by discomforts that are indescribable, and can be appreciated only when one has passed through a similar experience. At 9 p. m. we again started with our sledges; a brisk wind blowing against our backs was of material assistance in driving along the sledges, although occasionally upsetting them. We met Lieutenant Lockwood not more than two miles away from camp, with Christiansen and his team. On comparing notes we learned that he had reached Cape Sumner about the time the storm began, on the evening of the 7th, and that he had hastily built a snow house for himself and Christiansen, under the face of the cliffs overlooking Newman Bay, and had remained there until this morning. He went back to bring up the load which he abandoned on the floe at our second camp southwest from here. The sun dipped nearly to the horizon at midnight; then, rising again slowly, began its circuit about in the heavens. This is the first time this year that the sun has been above the horizon at midnight in this latitude.

April 10.—We reached Cape Sumner at 4.30 a. m., and the boat camp of the *Polaris* expedition, on the southern shore of Newman Bay, at 7 o'clock. The snow-slopes between the cape and this camp were very abrupt and difficult to pass over. The party was nearly exhausted on entering camp, but were in good spirits. The sledges were in rather a dilapidated condition in consequence of their encounters with the small pieces of rubble-ice. *Beaumont*, especially, is badly broken; its bow is crushed in such a manner as to render it entirely useless for all further work in rough ice. It could, however, be used for a few days on

smooth ice, or in deep snow. Our camp is in a windy place, near the mouth of a large ravine, down which the wind rushes in gusts and whirls with such velocity as to occasionally upset the tent. In the melee of the elements the ridge-pole of our tent was broken and everything thrown into confusion. I discovered the tent left by the *Polaris* party, at the entrance to a small ravine not far from our camp. Their boat is lying bottom up in our immediate vicinity. The tent was blown down and contained nothing but a few rounds of rifle ammunition, old clothes, tin ware, boots, &c.

Breakfast was served to us at 10 a. m., and immediately afterward we crawled into our comfortless sleeping-bags for a few hours' rest, feeling in our minds that the tent was perfectly secure. Our slumbers were rudely disturbed at 5 p. m. by one of the violent whirlwinds, which again broke the ridge-pole of our tent and brought the canvas down on the sleeping forms inside. We endeavored to repair the damage, but in vain; the fury of the storm would not again permit us to erect the tent. The alternative left us was to build a snow house in the huge snow-slopes near by. This was completed at 11.15 p. m. The work of excavating the snow-bank was not accomplished without great hardships and disagreeable results. The storm raged worse than at any previous time, the flying snow completely blinding those who were working on the outside entrance and forcing them to abandon their work at intervals. An attempt had been made to cook supper in the wreck of our tent, but in the confusion the lamp was overturned and our ration of alcohol lost. As no allowance is made for wasted fuel we consoled ourselves for the loss of a warm meal by partaking of a lunch of frozen meat and hard bread.

April 11.—Great difficulty was experienced in transferring our effects from the tent to the snow house. Sleeping-bags, rubber blankets, cooking apparatus, and other camp paraphernalia were wrenched away from the strongest men and carried rapidly along the ground by the wind towards the ice-foot, being pursued by a crowd of anxious men who realized that their comfort and perhaps their safety depended upon the retention of these articles. A few articles of tin-ware of minor importance were the only things lost; the others were rescued at the ice-foot three hundred yards [274^{m}] from the tent. An ordinary A tent, used by Sergeant Linn and his three companions, was torn from its fastenings and carried away bodily by the wind. Several of the large iron pins were drawn from the frozen earth, and great seams were opened in the lower edge of the canvas. The occupants were slumbering peacefully in their bags when the shock came, and, standing at a distance, we saw the tent when it began its pilgrimage across the country. Before the confusion had subsided their heads began popping up from the depths of their sleeping-bags, and the look of consternation depicted on their faces, while their eyes were turned *longingly* in the direction of the rapidly retreating tent, was most ludicrous. It now became their turn to dig a snow house from the bank near the cliffs.

Breakfast was served in our new quarters at 3 a. m. The tea was weak and the stew of lime-juice pemmican was cold and unpalatable; consequently it was rejected by all except one (Whisler). This is rather consoling to us, having fasted for nearly twenty hours, during which time we have been performing severe labor in keen, bracing, outside air, and are very hungry.

In sleeping-bags again at 3.30 a. m.; the wind still high.

At 7 p. m. Whisler is complaining with soreness and severe pains in his chest and is also spitting blood. Biederbick has done all in his power to alleviate his sufferings with our slender stock of medicines, but his condition is still precarious. He fainted as soon as he came in contact with the cold outside air, but he recovered in a few minutes and crawled back into the hut. Biederbick is also in a critical state. I found him lying on the dog-sledge near the entrance to the hut, vomiting and apparently in great pain. All were similarly affected with the exception of fainting. These conditions are probably due to improper ventilation, and the absence of oxygen in the snow house. The cooking-lamp refused to burn, and the matches died out immediately after being ignited, although free from dampness. The sleeping-bags were so damp and cold that none of us could obtain the sleep or rest which we so greatly desired. The wind appears to be gradually dying away.

April 12.—Lieutenant Lockwood directed Biederbick and Whisler to return to Fort Conger for medical treatment. The former begged hard to be allowed to accompany us, but the necessity of his immediate return to the station was obvious to all. The storm has subsided somewhat, but a brisk wind is still blowing. The men feel weak from their experience of last evening, and become exhausted after the most moderate exertion.

At 12.15 a. m. we left with the sledges, *en route* to the Gap for provisions, the sick men accompanying us as far as Cape Sumner, where our roads diverged. Lieutenant Lockwood soon followed us with the dog-sledge. We returned to camp at 4.30 p. m.; Lieutenant Lockwood arrived at 6.15 o'clock. Not desiring a repetition of yesterday's experiences in the snow house we had again pitched the tent and loaded down

the corners with rocks and gravel, in addition to the strong lariats which form a network over the top and sides. The wind having fallen somewhat a good night's rest was promised us, without fear of having the tent knocked down over our heads. Supper was served at 8.30, and at 10 p. m. we turned into our sleeping-bags, twenty-eight hours having elapsed since we left them last night to prepare for the trip to the Gap.

April 13.—I called the cook at 5 a. m., and breakfast was announced at 7. It was a great relief to us to get up this morning, as none had been able to sleep owing to the frozen state of our sleeping-bags. So far as comfort was concerned we might just as well have been incased in iron bags as in those we occupied. The allowance of alcohol was not satisfactory at all for the morning's meal. The stew was cold, and an occasional lump of ice was brought up from the bottom of the dish to remind us that we could not expect the comforts of a civilized life in these regions. Lieutenant Lockwood left with the dog-team at 12.45 p. m. for Fort Conger, for the purpose of exchanging the unserviceable sledge-runners now in use on the dog-sledge for another and stronger pair. I left for Cape Sumner with the party, hauling Hudson Bay sledges, at 12.45 p. m., to transport the provisions cached at that point to our camp at this place. Each sledge hauled two loads, the last being completed at 4 o'clock. We exposed our sleeping-bags and damp clothing to the sun and wind to-day, in order that their excessive moisture might, in a measure, be evaporated. The cook called us to supper at 7.30 p. m., and at 10 o'clock we retired to our bags.

April 14.—The wind again rose during the night, and, as before, our slumbers were abruptly disturbed by the ridge-pole of the tent breaking and falling upon us. We made temporary repairs, but did not attempt to sleep again for fear of a similar accident. Breakfast was served at 7.30 a. m., and was greatly enjoyed, owing to the satisfactory result produced by the rations of fuel. I left camp with the party at 9 a. m. for the Gap, taking two Hudson Bay sledges, with which to haul up the remainder of the supplies left by us at that place. Elison was instructed to remain in camp to expose and dry the sleeping-bags, and to look after matters generally during our absence. Soon after rounding Cape Sumner a southwest gale was encountered, which was so strong as to almost render our advance impossible. We were frequently forced backward, and dozens of times we were brought to a dead halt. We soon discovered that the only manner in which we could travel at all was to bend the body forward until it was nearly horizontal and then push forward with all our strength and energy. Huge rocks, started from the precipitous cliffs by the wind and slight thaws, came crashing down on the ice-foot in our immediate vicinity, greatly endangering our lives and warning us that traveling in close proximity to the shore was altogether too dangerous to be persisted in.

At 12.30 p. m. we reached the cache, and started on our return at 1 o'clock. Our greatest difficulty now was to avoid the sledges, which were frequently driven on our heads by the wind when passing over the surface of a smooth floe. While passing one of the numerous ravines in Polaris Promontory we discovered a beautiful snow cascade, which we at first mistook for a small volume of water. It was formed by the wind, which, rushing down a narrow, rocky cut in the face of the abrupt cliffs, carried with it a small volume of snow, which, leaping from rock to rock in its descent, reminded me of the beautiful silver cascades which I have seen in the National Park of the Yellowstone. Reached camp at 5.15 p. m. Elison reports that high winds have prevailed all day in camp, and that his patience as well as his powers of endurance were sorely tried in endeavoring to prevent the tents and sleeping-bags from blowing away. The bags were torn from the rocks which had been placed on their corners and sides to hold them down, and were rolled away to the ice-foot, where they were finally rescued by this indefatigable individual. Supper was eaten at 7.30, and within the next half-hour all were quietly slumbering in their bags.

April 15.—We were called to breakfast at 9.30 a. m. As there are no provisions to be hauled from the Gap we remained in camp all day, preparing rations for our trip to the northward. Among other things done to-day, the tin cases were removed from the preserved meats, alcohol cans were filled, and the hard bread put in small bags, each bag representing a certain number of rations for the entire party. At 7.15 p. m., and only a few minutes after we had finished supper, Lieutenant Lockwood returned from Fort Conger with the entire pair of runners. He also brought a few articles of wearing apparel which our friends were thoughtful enough to send. A very high southerly wind has been blowing all day. We received several letters from our friends at Fort Conger, per the Arctic mail. Retired at 9.20 p. m.

April 16.—The cook was called at 6.30 a. m., and breakfast was finished at 8.15. High winds prevailed all night; occasionally a whirlwind was introduced, by way of variety, which caused great apprehension regarding the safety of our tent. Immediately after breakfast I turned out all hands to repair the sledges. *Beaumont* was found to be hopelessly broken; *Kane* was also rejected as unserviceable. *Hall* is still in good condition, and, with a few repairs, *Hayes* will yet do excellent service. The extra runners which Lieutenant

Lockwood brought from Fort Conger, were fitted with cross ties or slats and named the *Nares*. At 3.30 p. m. dinner was served to us by the indefatigable cook, and immediately afterwards the work of packing the sledges began. All tents, sleeping-bags, and provisions not absolutely required for the journey were packed carefully away in the *Polaris* whale-boat for our return.

A light lunch was served at 9.15 p. m.; the tents were then taken down and placed on the sledges, and at 12.24 we started. We shaped our course diagonally across Newman Bay towards the small opening in the hills which we have decided is Gap Valley, the sledges in the following order: Lieutenant Lockwood, with Christiansen and dog-sledge *Antoinette;* Sergeants Brainard and Ralston and Corporal Salor, sledge *Nares*, with about 220 pounds each; Sergeant Jewell and Private Frederick, sledge *Hall*, 150 pounds each; Sergeants Linn and Elison, sledge *Hayes*, with 150 pounds each. The traveling is excellent.

April 17.—The temperature fell to — 9 [—22.8° C.] at midnight. At 3 a. m. *Nares* dragged so heavily over the small drifts that it became necessary to employ Linn and Elison in the drag-ropes in order to advance it at all. This left only Jewell and Frederick to advance alternately the other two sledges until we should return to their relief. Lieutenant Lockwood, having preceded us to the entrance of the valley with the dog-team, now returned with it to our assistance. At 6.30 a. m. we reached the entrance to the valley, and at once prepared to make ourselves comfortable for the night. Retired at 9.30, having been out of the bags for twenty-six hours. The cook was awakened at 6.30 p. m. Breakfasted on lime-juice pemmican, hard bread, and tea. We had an excellent night's rest, probably the most refreshing and satisfactory that we have experienced since leaving Fort Conger. Calm, light snow falling, and the temperature, —3 [—19.4° C.].

Left camp with *Nares* at 10.15, having five men in the drag-ropes. *Hall* followed closely with two men. *Hayes* was left standing in camp to be returned for later. The traveling was heavy, and great quantities of gravel were occasionally met with, which would require standing pulls. At one point the valley became quite narrow and the cliffs on either side very high and nearly vertical. From this place we returned for *Hayes*, meeting the two men with *Hall*, struggling along slowly and laboriously through the dirty and sandlike snow. This method of alternately advancing the sledges was continued all day with particularly favorable results. Snow ceased falling at 11.30 p. m.

April 18.—At 3.30 a. m. we met Christiansen, who was returning by the direction of Lieutenant Lockwood to our old camp for the remainder of his load. He brought a note to me from the lieutenant which stated that he had advanced for four hours, that the traveling was very heavy, and that he was of the opinion that the divide was not far away. I called a halt at 6.30 a. m. and made camp under the sheltering point of a ledge of rocks, where we were, in a measure, protected from the direct force of the winds. High, northeast wind which drifts heavily. Every one is very tired. The highly arduous duties of cook fell to my lot this morning, and I at once distinguished myself by burning the stew. The cook is the only one who is compelled to remain out in the cold; the others repair to their sleeping-bags as soon as the tent is pitched and banked, thus preventing any unnecessary exposure. When the meal is ready, the men are aroused by the cook who hands each one his cup of tea or chocolate and his plate of hash. They always sit upright in the sleeping-bag with the lower extremities covered while partaking of their meals.

Temperature remains about stationary at —10.0° [—23.3° C.].

P. M.—Left camp at 10.35, first advancing *Nares*, with the entire party in the drag-ropes. The other sledges were then advanced for a considerable distance, when we again returned for *Nares*, which was advanced alternately with the smaller sledges, as yesterday. The traveling is much worse than at the point of entrance to the valley; the snow is much deeper in places, and great patches of bare ground are often encountered, over which our sledges must be hauled at a great expenditure of human power and energy. A strong southerly wind blows directly in our faces when we return for the rear sledges, and the snow, falling in small, round pellets, rattles against our benumbed faces like pigeon-shot, causing a smarting and painful sensation, which does not tend to improve our tempers, already sorely tried.

April 19.—Lieutenant Lockwood's camp of yesterday was passed at 2.45 a. m. with the two small sledges, and *Nares* was brought to the same spot at 4 o'clock. I find that we have been thirteen and one-half hours in traveling over the same route which Lieutenant Lockwood traveled with the dog-team in only four hours. The traveling has improved somewhat, but it is still far from what we should like. A crust covers the surface of the snow, which is neither strong enough to bear our weight when hauling, nor weak enough to break easily at the approach of the sledge-runners. Camped at 6.35 a. m. on a large drift in the

river-bed. Light, southeast wind, and temperature of −13.0° [−25.0° C.] at the time. Snow ceased falling at 8 o'clock. Linn, who officiated as cook this morning, served us with a meal of raw pemmican, hard bread, and tea. Owing to the presence of the sharp, acrid, and unpalatable limes in the pemmican we find it utterly impossible to make use of it in any manner except in its raw state. When prepared in the form of a stew the vile nature of the limes contained in this pemmican is so pronounced that it is rejected by all. Several complain that their mouths have been made sore by eating this incongruous compound.

P. M.—Breakfast was finished at 8.30 o'clock. Snow had fallen during the time that we were sleeping, and continued to fall moderately all day. Calm; temperature, −14.0° [−25.6° C.]; minimum recorded, −15.0° [−26.1° C.]. Several complain that they were unable to sleep last night owing to the damp and frozen state of the sleeping-bags. Before entering, it required the united strength of three men to unroll them, and then we could only get to their lower extremity by thawing them with the warmth from our bodies.

Started at 9.30 p. m. and moved the sledges forward alternately as before. The snow was very deep, and the sledges dragged their slats on the drifts almost continuously. We have occasionally found the valley so narrow that the tops of the cliffs nearly meet over our heads while passing between them. At a point where the cañon diverged we found a small cairn erected by Lieutenant Lockwood to indicate to us the direction which he had taken. We are evidently quite near the divide now, as our barometer denotes that our altitude is considerable.

April 20.—There is evidently some mistake about the length of Gap Valley being only ten miles, as we have already traveled more than that distance now, and have only just reached the divide or water-shed at this hour (2 a. m.). Passing over the summit we traveled down a gently rolling slope for two miles and entered the ravine or valley leading to the coast. The traveling is superior to any that we have had since entering the valley. Made camp at 5.30. Jewell should have been cook, but as he appeared very much exhausted, and complained of sore feet, I relieved him from the unpleasant task and detailed Elison instead. Temperature at 6 a. m., −19.5° [−28.6° C.]. Ceased snowing at 8 o'clock.

P. M.—Called the cook at 6.30, and breakfast was eaten at 8 o'clock. About this time Lieutenant Lockwood arrived from his camp, which is about five miles from this point and seven from the coast. We have yet twelve miles to travel before we can leave this execrable valley behind us. Lieutenant Lockwood left us at 10.30, taking a large load with the dog-team from one of our sledges, which will enable us to proceed without the necessity of doubling. Temperature at 11 o'clock, −39.5° [−39.7° C.]. Minimum recorded, −40.0° [−40.0° C.]. Started at 11.15 p. m., and moved the three sledges forward at one time without doubling. It is generally conceded that this is not Gap Valley.

April 21.—We traveled quite rapidly and succeeded in reaching Lieutenant Lockwood's camp at 4.45 a. m., where we remained for a few minutes only, then again proceeded on our way. The valley, which heretofore had been a very narrow, rocky, and tortuous one, now expanded into a broad and undulating plain, about five miles in length by three in width, and shut in on all sides by high, rugged mountains. On first entering this valley the traveling was good, the slight drifts running at right angles to our course facilitated rather than retarded our movements, but the last half of the distance was accomplished only with the severest labor, on account of the gravel beds from which the snow had been swept clean. Frequently we were compelled to resort to standing pulls, and occasionally all the men were required on the large sledge. Wind from the northeast has been blowing for some time with a velocity of eighteen to twenty miles per hour [8.0 to 8.9^{m} per second.]. At 8.30 a. m. we made camp at the lower extremity of the valley, having traveled 9⅓ hours. The cook, Salor, served supper at 11.45 a. m. The temperature at that time was −6.0° [−21.1° C.], a change of 34° [18.9° C.] in twelve hours. Everybody is very tired this morning, and hungry as well. (The latter condition is chronic.)

P. M.—Lieutenant Lockwood reached our camp this evening while we were partaking of breakfast, about 8.45 o'clock. He remained with us, sending Christiansen back for the remainder of his load. We will again take the load advanced by Lockwood this morning, it being the same that he relieved us of yesterday. The high northeast wind continues. Temperature, −7.0° [−21.7° C.]. Left camp at 11.15 with *Nares* and one of the small sledges, Lieutenant Lockwood assisting in the drag-ropes for a short distance. The creek bed becoming impassable made it necessary for us to drag our sledges over the execrable snow-slopes. After a great deal of hard work this was accomplished, and all the sledges were then advanced together. By this time the wind had increased in velocity to a moderate gale, and the flying snow, driving

directly in our faces with terrific force, rendered progress almost impossible. We struggled along slowly, however, for a short distance when an abrupt turn in the valley brought our backs to the wind, and then we flew along on the smooth surface with almost incredible speed.

April 22.—The gale had assumed such proportions as to raise serious apprehensions for our safety; the cloud of flying snow would not permit us to see the valley for more than fifty yards [46^{m}] in advance, and we kept our course only by feeling our way along the margin of the ice in the creek bed. At 3.45 a. m. we were highly gratified by reaching the ice-foot on the coast in the vicinity of Repulse Harbor. The snow being very deep and soft along the ice-foot it became necessary to double up again with the sledges. As the storm showed no signs of abating, and as the men were well nigh exhausted, I decided to camp at 6.30 a. m. on the lee side of a large floe-berg, which I considered important in protecting us from the blinding drift. At 7.30 the lieutenant arrived with his sledge badly broken and camped in our immediate vicinity. For more than two hours we struggled with the tent before we could get it fastened down to our satisfaction; it was covered with an intricate network of lariats and lashing-lines to prevent it from ballooning and blowing away. Several frost-bites occurred while this work was being done. Supper was served at 10.15 a. m. and immediately afterward we crawled into our sleeping-bags with our wet clothing clinging about our shivering forms. The heat emanating from our bodies is always utilized at night in drying our damp garments. The tent is being badly shaken and threatens to take flight in the increasing storm.

P. M.—The cook announced breakfast at 10.15. The storm continues with unabated violence, and precludes any thoughts of a move from here to-day. The snow forming in drifts against the sides of the tent has caused them to nearly meet, thus preventing us from extending our limbs to their full length. The velocity of the storm is estimated at forty miles per hour [17.9^{m} per second]. Temperature, +8.0° [−13.3° C.].

April 23.—At 4 a. m. the storm had abated sufficiently to enable us to make preparations to resume our journey. The lull in the storm was almost immediately followed by a heavy fall of snow, which, however, ceased at 6 a. m. A small cairn was constructed on the hillside above our camp, in which was cached a few rations for our return to the Boat Camp. We started at 6.45 with the sledges in the usual order. Lieutenant Lockwood overtook us in a short time and desired to exchange his broken sledge-runners for those on *Nares*. Under the shelter of the high ice-wall the change was soon effected, and we again resumed our journey.

After passing Drift Point we encountered the much dreaded snow-slopes so vividly described by Beaumont. He had certainly made no exaggeration in his account of the difficulty experienced in surmounting them. Once we tried sledging on the floe, but on account of the rugged character of the ice we were forced to resume our original course over the slopes. The preponderance of the load naturally falling on the lower runner of the sledge (which unfortunately was the defective one obtained from Lieutenant Lockwood this morning), it was in a short time a total wreck. It was immediately abandoned, and the load placed on the two Hudson Bay sledges lashed together for the purpose. The great resistance offered by the broad surfaces of these sledges would not permit of their being hauled by the entire force (seven men), so we advanced the loads singly and made double trips. Made camp on the floe at the west end of Black Horn Cliffs at 2.45 p. m. While the cooks were preparing supper the remainder of the party cut a road through the fringe of shore hummocks for to-morrow's start. Our supper comprised musk-ox meat (raw and frozen), a stew of beans, and hard bread and chocolate. Temperature, +14.0° [−10.0° C.]. Fresh southeast wind. Jewell, who has occupied a place in my tent since leaving Newman Bay, returned to Lieutenant Lockwood's tent this evening.

April 24.—I called the cook at 4 a. m. A strong wind has been sweeping down over the snow-slopes to our unprotected tent all night. Its velocity was estimated at eighteen to twenty-two miles per hour [8.0 to 9.8^{m} per second]. Starting at 7.50 a. m. we advanced with only about half of our effects; the remainder was to be brought up later. On the whole, the traveling is better than we had expected; still, the ice at this place is far from what we wish it to be. Several large paleocrystic floes are of the greatest importance in expediting our progress with these heavy loads. The spaces intervening between them is filled with rubble, which frequently upsets the sledges, producing a burst of righteous indignation from the unfortunate one whose turn it is to go back and place it right side up again. We halted at 11.30 a. m. on the floe, about half a mile from the line of cliffs, and, depositing our loads, returned for the remainder. Lieutenant Lockwood assigned me to the dog-team during the afternoon while he went up the coast to search for Beaumont's cache at

Stanton Gorge. We afterwards transferred everything to a point nearer the shore, where we camped at 6.30 p. m. High wind has been blowing all day. The temperature has been sufficiently high to melt the snow on the dark surface of the floe, but before retiring this evening the temperature had fallen again; the thermometer indicated +11.0° [−11.7° C.]. Supper at 8.30. In sleeping-bags at 9 o'clock. Snow falling at that time.

April 25.—The cook arose at 4 a. m. and breakfast was announced at 6 o'clock. We started at 8. Christiansen, complaining of illness, was carried on the sledge. I assisted Lieutenant Lockwood with the team while Linn brought up the Hudson Bay sledges with the remainder of the party. The illness of Christiansen, our faithful driver, rendered it imperative for us to camp soon after leaving the floe. This we did at the entrance to a large ravine, southwest, about two miles from Stanton Gorge. One of our tents was erected at once and the sick man tenderly cared for. The best sleeping-bag was given him and a liberal quantity of hot brandy prescribed. We soon heard the sound of deep and prolonged snoring issuing from the tent, and concluded that our remedy was efficacious and that his condition must be improving. Two more trips with the dogs were made to our old camp, the last load being brought in at 2.45 p. m. Ralston and Jewell were directed by Lieutenant Lockwood to proceed up the coast in search of Lieutenant Beaumont's cache. They returned at 5.30 p. m. in high spirits, bringing with them a can of rum which was found in the cache with other articles. The depot is in good condition, and, as far as they traveled along the coast, the condition of the road is above the average. Tracks of hare, foxes, lemming, and ptarmigan are reported by them as being numerous along the ice-foot. I took an inventory of our provisions this evening. The result affords universal satisfaction. Calm, clear weather. Temperature at 7 p. m., −11.0° [−23.9° C.].

April 26.—I called the cook at 2 a. m., and breakfast was eaten at 4.35. We constructed a large cairn, in which were placed provisions for our return, together with all articles of clothing and equipment not absolutely esssential to the completion of our journey. Temperature at 6 a. m., −2.0° [−18.9° C.]; minimum recorded, −14.0° [−25.6°]. Christiansen says that he has entirely recovered from his illness, and that he considers hot brandy the first of all remedies. Everything being in readiness we started 6.40 a. m., reaching Stanton Gorge at 8.20, where we were detained for some time in securing the cache and rebuilding the cairn, in which Lockwood placed a record of our journey.

At 11 a. m. we rounded Cape Stanton and entered Hand Bay. We found the traveling to be excellent on this bay, and at 1.20 p. m. we had reached the ice-foot on the northern side. Lieutenant Lockwood overtook us at 2 o'clock, and leaving his load turned back with the dog-team to bring up the remainder left at Stanton Gorge. Christiansen, still feeling weak from the effects of yesterday's illness, went with my party to camp, while Ralston took his place as driver of the dog-team. On arriving at the point of land which embraces Frankfield Bay on the west went into camp (3.45 p. m.). After pitching the tent we returned to bring up the load left by Lockwood near Hand Bay. I left the cook in camp to prepare supper during our absence. At 6.45 we returned with the loads, having been in the drag-ropes for twelve hours, and in that time we have performed the hardest work that we have ever yet been called upon to do.

Supper at 7.30. The ration of alcohol for fuel did not suffice to prepare our meal properly. The chocolate was not brought to the boiling point, and the stew, when eaten, was apparently down to zero [−17.8° C.]. Lieutenant Lockwood and Ralston arrived at 8.15. A quarter of an hour later and we had retired to our bags. Temperature, −15.0° [−26.1° C.].

April 27.—I called the cook at 4.20 a. m., and at 6.30 we had finished breakfast. Fresh, westerly wind; clear weather, and temperature at 8.30, −17.0° [−27.2° C.]; minimum recorded, −23.5° [−30.8° C.]. Very few of the party can boast of having slept last night, and this morning, when called for breakfast, they appeared as weary and heavy-eyed as yesterday evening after the long march. The sudden change in the weather has frozen our sleeping-bags as stiff as boards, and a thick coating of frost having formed inside during the day they were about as warm and comfortable when they were unrolled at night as a refrigerator would have been. A cache of provisions was made on Breakwater Point sufficient to enable us to return to Repulse Harbor, after which we resumed our course up the coast. A tramp of half an hour brought us to Frankfield Bay at 9 o'clock, and after a steady march of one hour's duration we reached the opposite shore. At this point we ascended a succession of snow-slopes, which were not crossed without great difficulty and frequent overturnings of the sledges. We passed many small bays and indentations, which Lieutenant Beaumont evidently did not consider of sufficient importance to honor with names. The maps of the English, however, are models of accuracy and beauty, every important point, mountain, and indentation being faultlessly delineated.

At 7.40 p. m. we reached Cape Bryant and went into camp at once. We had been traveling for eleven hours and ten minutes, and were very tired from the effects of the severe strain. The traveling was fair. Lieutenant Lockwood arrived at 8.30 with the dog-team and a portion of his load. The remainder was left back near Frankfield Bay, where he will send for it later. Temperature at the hour of entering camp was −15.0° [−26.1° C.]. A fresh southwest wind was blowing at the time, and the fingers of Frederick were badly frost-bitten in endeavoring to lash the broken ridge-pole of our tent.

Lieutenant Lockwood shot five ptarmigan this evening just before entering camp. The sledge *Hayes* has borne up bravely under trying circumstances, but it is now a hopeless wreck; the runners are entirely worn off and its bottom has been repeatedly punctured by short pieces of ice.

Supper at 10.45. As usual in these low temperatures, our ration of fuel was consumed when the meal was not more than half cooked, and we were forced to console ourselves for the hard work just completed by a meal of frozen food. Crawled into our sleeping-bags at 11.15.

April 28.—I called the cook at 9 a. m., and breakfast was announced two hours later. The frozen state of the bags and the low temperature again prevented us from obtaining much sleep. This is a very pleasant morning; clear and calm weather, and an apparently high temperature. On investigating, however, it was found to be −14.0° [−25.6° C.]; minimum recorded, −16.0° [−26.7° C.].

I left camp with Ralston and Elison and proceeded along the coast of Saint George Fiord to the southward in search of Beaumont's cache, which was made in this vicinity. After a long and unsuccessful search we ascended the promontory (Cape Fulford) projecting into the fiord about six miles from Cape Bryant, and, erecting a cairn on its summit, deposited in it a record, in which was stated the date and object of our visit. From our lofty position on this promontory an excellent view of Cape May, Dragon Point, and Mounts Hooker, Coppinger, and Farragut, as well as the fringe of stately, snow-capped mountains along the western shore of this fiord, was obtained. They all stood out boldly, and did not appear to be as far away as they are represented to be on the map. Cape Britannia and Stephenson and Beaumont Islands could not be seen distinctly owing to the hazy atmosphere, but dark, shapeless masses, barely discernible, indicated to us the position of the land which we so much desire to attain. We returned to camp at 6.30, having been unsuccessful in our search for the depot, but having seen several ptarmigan and tracks of foxes, hares, and lemming.

We are greatly encouraged by the appearance of the ice in the fiord looking towards Cape May, and shall look for good results in our sledging in that direction. Ralston, Linn, and myself are suffering greatly from the effects of snow-blindness, notwithstanding the fact of our having worn the goggles at all times.

April 29.—The cook was called at 7 a. m., and at 9 the breakfast was passed to the men sitting in their bags. It is a beautiful morning, but the painful condition of my eyes renders me incapable of enjoying it. Temperature, −14.0° [−25.6° C.]; minimum recorded, −23.0° [−30.6° C.].

Ralston's eyes are improving slowly; Linn's are no better than they were yesterday. Sleep was banished last night on account of the torture which this snow-blindness has inflicted on our eyes.

We built a large cairn, in which all provisions and articles of our equipment, not absolutely necessary for traveling, were stored for future use. I have been detached from the supporting party, and will accompany Lieutenant Lockwood on his journey to the northeast. Sergeant Linn will conduct the supporting party back to the Boat Camp, where he will remain with two men, sending the other three to Fort Conger. They cannot accompany us farther owing to the dilapidated state of the sledges. Linn started back with the party at 4.18 p. m., using the sledge *Hall* to transport their provisions and effects. Half an hour later Lockwood, Christiansen, and myself started with the dog-team and twenty-five days' provisions, shaping our course in a northeasterly direction across Saint George Fiord.

Our load weighs about 700 pounds, or nearly 90 pounds each to our dogs.

Respectfully submitted.

D. L. BRAINARD,
Sergeant.

Record left by Lieut. L. A. Beaumont, R. N., at Stanton Gorge.

STANTON GORGE DEPOT, *June* 3, 1876.

This depot was left by the Greenland party for their use on the return journey, on May 5th, the day on which Dr. Coppinger left to return to the *Alert.*

It was visited by Lieutenant Rawson on May 15th, on his return with James Hand, who was suffering from scurvy, and had to be detached from the advanced party.

Lieutenant Rawson took 40 out of the 120 rations, or 8 days for his 5 men, which was sufficient to enable him to reach the Repulse Harbor Depot.

This depot was lastly visited by Lieutenant Beaumont, in command of the Greenland exploring party, on his return journey on the above date.

Lieutenant Rawson left Lieutenant Beaumont on the 11th May, for the reason stated above.

Lieutenant Beaumont reached his farthest on May 21, and after waiting two (2) days for fine weather started on his return journey, chiefly in consequence of the appearance of scurvy amongst the remaining 6 of his crew.

Since that the weather has been very unfavorable, and a great deal of snow has fallen, making the traveling very heavy. Three of the crew have become worse, and, though just able to walk slowly, are helpless; their names are William Jenkins, Peter Craig, and Charles Paul. Two more show symptoms of it. Wilson Dobing (considerable), and Frank Jones (slight). Lieutenant Beaumont and Alex. Gray (captain of sledge), are well. The party takes 40 rations, as their quicker return and the sickness of the men has enabled them to economise provisions.

Forty rations are thus left at this depot, and these are complete in every respect.

The party starts to-morrow for Repulse Harbor across the floe.

L. A. BEAUMONT,
Lieutenant, R. N., H. M. S. Discovery.

Records left at Repulse Bay by British Arctic Expedition, 1875-'76.

H. M. SLEDGE ALERT, AT REPULSE BAY, *May* 7, 1876.

The above-mentioned 4-man sledge arrived here at 4.40 a. m. of the 7th May, having parted company with Lieutenant Beaumont 19½ miles to the northeast on the coast, and 2½ miles on this side Cape Stanton on the 5th May. All well, but experiencing slow and very laborious traveling.

I meet here H. M. Sledges *Stephenson* and *Clements Markham.* I start to-morrow for Polaris Bay with the *Stephenson* and *Alert.* The adjoining depot contains 92 rations.

The letter to Lieutenant Beaumont, herewith contained, gives full information regarding depot, and can be read by any person visiting cairn before his arrival.

R. W. COPPINGER, M. D.,
Surgeon.

H. M. SLEDGE DISCOVERY, *Saturday, May* 20, 1876.

DEPOT-CROSSING BAY.

Above-mentioned sledge arrived here, May 19th, having left Lieutenant Beaumont on the 10th, about 40 miles along the coast. I was sent back with J. Hand, one of Lieutenant Beaumont's sledge crew, who has got scurvy; we have had to carry him the last day. Lieutenant Beaumont all well, and going on with six men. From the top of a peak the day before I left him, three large fiords were discovered, and a large island. I start for Polaris Bay to-day. Bryan, one of my party. has got a bad leg, but I hope he will soon be all right. I take 20 rations from this depot, including a few loose ones, which are in the wooden box with the provisions I have got. I shall be provisioned up to 30th May. I also take pick-ax and boatswain's bag, which both belong to my sledge.

WYATT RAWSON,
Lieutenant, H. M. Ship Discovery, Depot-crossing Bay, North Greenland.

May 20.—We passed Cape Chase. No big hummocks were seen near Cape Chase. Any person can read my letter to Lieutenant Beaumont.

(To Lieutenant Beaumont:) I am taking on your cooking-stove as far as I can.

REPULSE HARBOR DEPOT, 11.30 *a. m.*, *June* 10, 1876.

Lieutenant Beaumont, in command of sledge *Sir Edward Parry* and 6 men, arrived here on the above date.

The party, after leaving Lieutenant Rawson on the 11th ultimo, reached its farthest point on the 19th May, in latitude 82° 15′ N. and longitude 49°, approximately, having experienced very heavy traveling for the three previous days—across snow, soft underneath and from 3 feet [.9^{m}] to 4 feet 9 inches [1.4^{m}] deep. This not only checked their further advance, but brought out the scurvy in two of the crew, who, in consequence of the want of proper remedies, became steadily worse from that date. They first suffered in the thighs and at the back of the knee, but after being much discolored and very much swelled, the pain has mostly settled in the joints.

The party waited for two days at the last camp in hopes of being able to ascend Mount Farragut, but it remaining thick, and snowing the whole time, the state of the provisions as well as the increased sickness of the crew necessitated their return.

According to orders a cairn was built at the north end of Reef Island, a small island northwest of the last camp, and thus the farthest land attained, and a record left in it containing a brief account of the expedition and the work undertaken by it this year, but considering how unlikely a place it was ever to be revisited, the skeleton chart supplied for the purpose was not left in that cairn, but was reserved for another cairn in a more prominent and accessible position. That the ascent of some high peak on the land that terminates in Mounts Hart, Parr, and May, was not accomplished is much to be regretted, since it leaves undecided whether Nares Land and Stephenson Land are islands separate, or together form part of the mainland. This was deemed an important question, but untoward circumstances prevented its solution. One clear day enabled Lieutenant Beaumont, from the top of Mount Windham Hornby (3,900 feet [1,189^{m}] high) to see much, but left the case of the islands still in doubt, as the same land obstructed the view.

An effort was made to reach Mount Parr, as originally intended, by a forced march by the sound part of the crew, but it had to be abandoned in consequence of strong westerly winds, the continuous fall of snow threatening heavier traveling, and the increased necessity for a speedy return. Just below Mount Windham Hornby, on the shoulder of Dragon Point, which forms the eastern corner of St. George Fiord, a cairn was built, open from Cape Archer through north to Cape Cleveland. In this cairn was put a record in most respects similar to the one at Reef Island, and the skeleton chart, filled up as well as time would permit, was put with it.

From the 25th ultimo the two sick men have not been able to assist in pulling the sledge, but have walked along, holding by the drag-ropes. On the 28th Charles Paul, who had shown symptoms of approaching scurvy, was quite disabled, and from that time, like the other two, has not been able to assist in anything.

On the 30th we deposited as much gear as we could at Old River Point, the chief weight being fifty-six pounds pemmican, two gallons spirits wine, two knapsacks, lower robe, rifle, &c., estimated at one hundred and seventy pounds. The weather, with very few exceptions, has remained most unfavorable; a considerable amount of snow has fallen, and so wet that it has rotted the harder and older snow underneath, and made traveling much more laborious.

The party, thus reduced to four working hands, reached the Stanton Gorge Depot on the 3d June, by which time William Jenkins and Charles Paul were only just able to crawl along slowly, the sledge having to stop and wait for them. Took forty rations to complete with, and started same evening, Paul, who was unable to stand, having to be put on the sledge. With the extra load the four men were unable to take the sledge along the snow-slopes. We now, therefore, took to the ice and followed the line of floes along the Black Horn Cliffs, eventually coming into the outward-bound tracks and reaching the shore at the same place where we had left it on the 1st May. The next day, June 7, Jenkins failed completely, and had to be put on the sledge. This increased weight, as well as the difficulty of passing the Snow and Drift Point slopes, made it necessary to make two journeys each time, the first to carry the weights and provisions, the second to bring up the tent and the sick. Snow Point was thus passed, but the second trip around Drift Point was made by the floe, having failed to get the sledge over the point the first time.

The wet snow which has been falling ever so long is making the traveling heavier and heavier, and for the last two days Craig has not been able to keep up with the sledge, although going quite slowly. On two occasions the four men have not been able to move the sledge through the deep, wet snow and had to unload to extricate her.

The party reached this depot after a long, but necessarily slow, march of twelve hours. Out of seven men forming the whole party, two, William Jenkins and Charles Paul, are absolutely helpless, having to be dressed and carried to and from the sledge. Another, Peter Craig, is just able to walk very slowly. Wilson Dobing is gradually approaching the stage when he will no longer be able to pull, and Frank Jones, though he has unmistakable signs of the same disease, has not become worse until the last few days. Severe work made the stiffness a little more felt; the two last, together with Alex. Gray and Lieutenant Beaumont (who as yet is well in health), are the four working hands upon whom the burden of the work falls entirely. Both Dobing and Jones are working with great spirit and determination; Craig has shown much courage in holding out so long, and all have done their best.

The party proceeds to-morrow, the 11th June, across the straits, to H. M. Ship *Alert*, in preference to overland to Polaris Bay, for the following reasons:

(1) Because the distance from Repulse Harbor to Black Cape, about twenty-three miles, is less this way and known, while to Polaris Bay is greater, and that way unknown. At Black Cape assistance can be obtained from the *Alert*.

(2) Because with three sick, and only four to pull, land traveling has become more difficult than on the ice, while the probability of one more having to be carried and one less to pull will make the gentlest slopes in this snow impassable to the already overworked three.

(3) Even arrived at Polaris Bay without any change for the worse in our condition, the addition to the party would consist of two more sick, James Hand and George Bryant, and four sound ones, Lieutenant Rawson, Dr. Coppinger, and two men; for Captain Stephenson, in his letter to me, says that Dr. Coppihger will be left at Polaris Bay with Hands and the dogs. Only thus there will be, at most, 8 men to manage two sledges and a 20-foot [6m] ice-boat, and take care of five sick and helpless men at the very time when the ice is breaking up.

(4) Having seen no signs of any movement in the ice, as yet, and taking the collapsible boat to use as a last resource, there is reason to hope that the crossing may be effected without mishap, and thereby the safety and welfare of the party insured, and assistance to the few now at Polaris Bay more shortly rendered than could be the case by the addition of so reduced and weakened a crew.

I, Lewis A. Beaumont, who wrote the preceding record, having weighed over very carefully the whole matter, and firmly believe that, to the best of my belief and knowledge, I have taken the right course, and hopefully trust, with God's help, to carry it out.

It is my intention, immediately on reaching the *Alert*, to procure assistance for those at Polaris Bay (believing that they are too few to manage the 20-foot [6m] ice-boat) either from that ship or the *Discovery*.

If any of them reach this depot in search of us they will please take a copy of this record and statement for the purpose of eventually taking it to Captain Stephenson, and they will be able to judge from the condition of this depot what is the best course to pursue with regard to their own return and the chance of assistance reaching them through our means.

L. A. Beaumont,
H. M. Ship Discovery.

June 12, 1876.

I am sorry to state, for a great many reasons, that we are obliged to abandon our intention of going across the straits to the *Alert*. We have been out on the ice, and, after having successfully passed the shore hummocks and the first floe, we came to open water and last year's ice decaying fast. Though we could have got round it I didn't feel justified in running so great a risk as it would be to arrive on the other side eight days later with three helpless men and more open water; so, having no choice left, we are starting for Polaris Bay immediately.

L. A. Beaumont, *Lieut.*

Repulse Harbor Depot, *June* 13, 1876.

Three of us have returned from the camp, half a mile south, to fetch the remainder of the provisions. Dobing has failed altogether this morning. Jones is much worse and cannot last more than two or three days. Craig is nearly helpless; therefore, we cannot hope to reach Polaris Bay without assistance. Two men cannot do it; so we will go as far as we can and live as long as we can. God help us.

L. A. Beaumont.

[Extract from Captain Stephenson's letter to Lieutenant Beaumont.]

You will find a book at Polaris Bay with a memorandum from Captain Nares, in which he desires all officers will carefully enter any provisions removed or used from the American depot, which is equal to 1,000 rations. He wishes 30 pounds tea and 250 pounds ham to be left, which is equal to 1,000 rations, and the remainder of those two articles conveyed to the *Discovery*, so that should you find anything more of those two items, and can bring them over, to please do so.

L. A. BEAUMONT, *Lieut.*

On reading Captain Stephenson's letter I find that three men will be left with Dr. Coppinger, and not Hans only, as I first supposed, but this will not alter my plan, for the other good reasons.

L. A. B.

Observations taken on North Greenland sledge journey.

Locality.	Date, 1882.	Time.	Barometer.		Temperature.		Weather.	Minimum temperature.		Remarks.
			Inches.	*mm.*	*Fahr.*	*C.*		*Fahr.*	*C.*	
Camp I, Cape Murchison.	Apr. 3	12 m'd'gt	29.83	757.67	—32.0	—35.6	----------	-------	-------	Min. ther. set at 10.55 p. m.
	Apr. 4	3 p. m.	29.65	753.10	—32.0	—35.6	----------	—41.0	—40.6	
Camp II, depot B.	Apr. 4	8.45 p. m.	------	-------	—29.0	—33.9	Lt. snow.	-------	-------	Min. ther. set at 8 p. m.
	Apr. 4	12 m'd'gt	29.62	752.33	—28.5	—33.6	Lt. snow.	-------	-------	
	Apr. 5	3 p. m.	29.78	756.40	—22.0	—30.0	NW. fair.	—29.5	—34.2	
On the march	Apr. 5	12 m'd'gt	29.62	752.33	—27.0	—32.8	----------	-------	-------	
Camp III, on the strait.	Apr. 6	4.20 a. m.	------	-------	—46.0	—43.3	----------	-------	-------	Min. ther. set at 6 a.m.
	Apr. 6	6 a. m.	29.62	752.33	—40.0	—40.0	Calm and fair.	-------	-------	
	Apr. 6	8 p. m.	29.55	750.56	—33.0	—36.1	E. lt. fair.	—48.0	—44.4	
On the march	Apr. 6	12 m'd'gt	29.62	752.33	—29.0	—33.9	SE. brisk, cloudy.	-------	-------	
Camp IV, on the strait.	Apr. 7	3.30 a. m.	------	-------	—20.8	—29.3	SW. brisk.	-------	-------	Min. ther. set at 4 a.m.
	Apr. 7	7 a. m.	29.67	753.60	—25.5	—31.9	SE. fresh, fair.	-------	-------	
	Apr. 7	8 p. m.	29.80	756.91	—19.5	—28.6	----------	—28.0	—33.3	
On the march	Apr. 7	12 m'd'gt	29.82	757.41	—17.8	—27.7	SE. fresh, lt. snow.	-------	-------	
Camp V, on the strait.	Apr. 8	9 p. m.	30.47	773.92	+10.0	—12.2	SW. gale.	-------	-------	
	Apr. 9	1 a. m.	30.55	775.96	------	-------	SW. gale.	-------	-------	
	Apr. 9	9 a. m.	30.80	782.31	------	-------	SW. gale.	-------	-------	
	Apr. 9	8 p. m.	30.78	781.80	+ 2.0	—16.7	SW. brisk.	-------	-------	
On the march	Apr. 9	12 m'd'gt	30.62	777.73	+ 9.5	—12.5	SW. fresh.	-------	-------	
Camp VI, Polaris Boat Camp.	Apr. 11	12 m'd'gt	------	-------	+ 3.5	—15.8	----------	-------	-------	
	Apr. 12	6 a. m.	------	-------	— 6.0	—21.1	Calm and clear.	-------	-------	
	Apr. 13	8.30 a. m.	------	-------	— 3.0	—19.4	Fair.	-------	-------	Min. ther. set at 8.30 a.m.
	Apr. 14	8 a. m.	29.25	742.94	+ 8.0	—13.3	SW. fair.	— 7.0	—21.7	Min. ther. set at 8 a.m.
	Apr. 15	8 a. m.	29.02	737.09	+10.3	—12.1	----------	+ 7.2	—13.8	Min. ther. set at 8 a.m.
	Apr. 16	9 a. m.	28.88	733.54	+12.3	—10.9	NE. brisk.	+ 3.8	—15.7	
	Apr. 16	8 p. m.	28.83	732.27	+ 3.0	—16.1	E. lt. and fair.	-------	-------	Mean thermometer —15.8 [—26.6 C.]. Number of obs., 32.
On the march, Newman Bay.	Apr. 16	12 m'd'gt	28.76	730.49	— 9.0	—22.8	E. lt. and clear.	-------	-------	Mean bar. 29.74 [755.38mm]. Number of obs., 21.

Observations taken on North Greenland sledge journey—Continued.

Locality.	Date, 1882.	Time.	Barometer.		Temperature.		Weather.	Minimum temperature.		Remarks.
			Inches.	*mm.*	*Fahr.*	*C.*		*Fahr.*	*C.*	
Camp VII, Brevoort Peninsula.	Apr. 17	9 a. m.	28.85	732.78	+11.0	—11.7	Calm and fair.	-------	-------	Min. ther. set at 9 a. m.
	Apr. 17	9 p. m.	28.93	734.81	— 3.0	—19.4	Calm, lt. snow.	— 3.0	—19.4	
On the march----	Apr. 17	12 m'd'gt	28.88	733.54	— 9.5	—23.1	Calm and fair.	-------	-------	
Camp VIII, Brevoort Peninsula.	Apr. 18	7 a. m.	28.74	729.98	— 3.8	—19.9	Calm and clear.	-------	-------	Min. ther. set at 7 a. m.
	Apr. 18	10 p. m.	28.75	730.24	— 9.0	—22.8	Calm and cloudy.	—10.0	—23.3	
On the march----	Apr. 18	12 m'd'gt	28.70	728.97	— 8.0	—22.2	Calm, lt. snow.	-------	-------	
Camp IX, Brevoort Peninsula.	Apr. 19	7 a. m.	28.62	726.93	—13.0	—25.0	----------	-------	-------	Min. ther. set at 7 a. m.
	Apr. 19	9 p. m.	28.73	729.73	—14.0	—25.6	Calm, lt. snow.	—15.0	—26.1	
On the march, Summit Divide.	Apr. 20	2 a. m.	28.45	722.62	—14.0	—25.6	Calm, lt. snow.	-------	-------	
Camp X, Brevoort Peninsula.	Apr. 20	6 a. m.	28.60	726.43	—19.5	—28.6	Calm, lt. snow.	-------	-------	Min. ther. set at 6 a. m.
	Apr. 20	11 p. m.	28.60	726.43	—38.0	—38.9	Calm and clear.	—40.0	—40.0	
Camp XI, Brevoort Peninsula.	Apr. 21	9 a. m.	29.25	742.94	— 5.0	—20.6	SE., brisk, clear.	-------	-------	Min. ther. set at 9 a. m.
	Apr. 21	11 p. m.	28.98	736.08	— 3.0	—19.4	SE., brisk, cloudy.	— 7.0	—21.7	
Camp XII, coast near Repulse Harbor.	Apr. 22	8 a. m.	------	-------	+ 8.0	—13.3	----------	-------	-------	Min. ther. set at 8 a. m.
	Apr. 23	4 a. m.	29.35	745.48	+ 8.0	—13.3	----------	+ 7.0	—13.9	
Camp XIII, snow slopes.	Apr. 23	6 p. m.	29.57	751.06	+14.0	—10.0	----------	-------	-------	Min. ther. set at 6 p. m.
	Apr. 24	8 a. m.	29.17	740.90	+ 6.5	—14.2	SE., brisk, fair.	+ 4.0	—15.6	
Camp XIV, Black Horn Cliffs.	Apr. 24	6 p. m.	29.25	742.94	+11.5	—11.4	SE., fresh, lt. snow.	-------	-------	Min. ther. set at 6 p. m.
	Apr. 25	7 a. m.	29.43	747.51	+14.5	— 9.7	Calm, lt. snow.	+ 9.0	—12.8	
Camp XV, South Cape Stanton.	Apr. 25	12 noon	29.45	748.02	+ 3.0	—16.1	Calm and fair.	-------	-------	Min. ther. set at 12 noon.
	Apr. 26	6 a. m.	29.53	750.05	— 5.5	—20.8	Calm and clear.	—15.5	—26.4	
Camp XVI, north side Hand Bay.	Apr. 26	7 p. m.	------	-------	—14.0	—25.6	----------	-------	-------	Min. ther. set at 7 p. m.
South side Frankfield Bay.	Apr. 27	7 a. m.	29.55	750.56	—17.0	—27.2	N., clear--	—23.5	—30.8	
Camp XVII, Cape Bryant.	Apr. 27	8 p. m.	29.55	750.56	—14.0	—25.6	SW., cl'dy	-------	-------	Min. ther. set at 8 p. m.
	Apr. 28	12 noon	29.45	748.02	—14.0	—25.6	Calm and clear.	—16.0	—26.7	
	Apr. 28	8 p. m.	29.47	748.52	—16.0	—26.7	Calm and clear.	-------	-------	Min. ther. set at 8 p. m.
	Apr. 29	8 a. m.	29.53	750.05	—11.5	—24.2	Calm and clear.	—22.0	--30.0	Mean ther., —7.4 [—21.9° C.]; No. observations, 39. Mean bar., 29.09 [738.87mm]; No. obs., 25.

Tabulated statement of distance traveled and time consumed.

1882.	Distance (geographical miles).				Time (hours).								Rate per hour of "advance."
	Advanced.	Traveled.	Additional miles traveled.	Toial.	Advanced.		Traveled.		Additional.	Total.			
Out.					*h.*	*m.*	*h.*	*m.*	*h.*	*h.*	*m.*		*Miles.*
Fort Conger to Boat Camp	48	67	157	224	21	30	28	15	54	82	15		2.23
Boat Camp to Sea Coast	36	86	25	111	18	45	44	20	14	58	20		1.92
Sea Coast to Cape Bryant	37½	103½	12	115½	21	30	47	05	4	51	05		1.74
Cape Bryant to Cape Britannia	60	118	------	118	32	00	55	25	----	55	25		1.87
Cape Britannia to Farthest	95	95	------	95	39	40	48	10	----	48	10		2.39
Total (out)	276½	469½	194	663½	133	25	223	15	72	295	15		2.07
Back.													
Farthest to Cape Britannia	95	95	------	95	37	20	41	45	----	41	45		2.54
Cape Britannia to Cape Bryant	60	60	------	60	24	45	28	00	----	28	00		2.42
Cape Bryant to Boat Camp	61½	61½	------	61½	27	30	36	35	----	36	35		2.23
Boat Camp to Fort Conger	48	48	------	48	22	45	28	20	----	28	20		2.11
Total (back)	264½	264½	------	264½	112	20	134	40	----	134	40		2.32
Aggregate (out and back)	541	734	194	928	245	45	357	55	72	429	55		2.19
Aggregate in statute miles	623⅔	--------	------	1,069¾	---------		---------		----	---------			------

The word "advanced," both here and in the journal, refers to the simple distance from camp to camp and the actual time occupied in making that distance, all stops deducted.

The word "traveled" includes total number of miles traveled, the number of miles advanced added to those traveled in going back and forth in "doubling up." The time corresponding refers to the whole time from leaving one camp to arriving at the next, all stops included.

The "additional miles" refers to incidental journeys not numbered as marches.

The rate per hour is the rate of "advance," computed from the time and distance advanced.

The whole statement is confined to the dog-sledge.

List of clothing on person and in bag on leaving Fort Conger.

Articles.	Brainard.	Ralston.	Linn.	Salor.	Elison.	Frederick.	Connell.	Whisler.	Biederbick.
Cloth caps	1	1	1	1	1	1	1	1	1
Seal-skin trousers*	1	1	----	----	1	----	1	1	1
Woolen trousers (Government)	----	----	1	----	----	1	----	----	----
Canvas frocks	1	----	1	----	1	----	1	1	1
Flannel or woolen shirts	3	3	3	2	2	3	2	1	3
Drawers ---- pairs	2	2	1	2	2	2	1	1	1
Guernseys	1	1	----	1	1	1	1	1	1
Seal-skin *temiaks*	1	1	1	----	1	----	1	----	----
Seal-skin mittens	----	1	----	----	----	1	3	----	----
Woolen mittens	2	2	1	2	2	2	----	1	2
Dog-skin mittens	1	----	----	1	----	----	----	----	----
Seal-skin boots	2	1	1	1	1	1	1	1	----
Canvas shoes	1	1	1	----	----	----	----	----	----
Buck-skin moccasins ---- pairs	1	2	1	2	1	1	2	1	1
Woolen socks ---- pairs	4	5	5	5	5	6	4	3	4
Blanket wrappers	2	1	2	1	1	2	2	2	2
Dog-skin and deer-skin *temiaks*	----	----	----	----	----	1	----	----	----
Deer-skin stockings	----	----	----	1	----	----	----	1	----
Coats (woolen)	----	----	----	1	----	----	----	----	----
Blanket vests	----	----	----	----	1	----	----	1	----

* Mostly exchanged afterwards for woolen trousers.

This list was subsequently changed somewhat. The clothing bag of each man was limited to 8 pounds in weight on leaving Fort Conger. On leaving Boat Camp everything possible was left there. Many of the above articles were made by the men themselves out of blankets.

Report of proceedings by Sergeant Jewell while detached.

FORT CONGER, GRINNELL LAND, *March* 30, 1882.

SIR: In compliance with your orders of March 21, received at depot B upon my return to that point from Lincoln Bay, I have the honor to submit the following report.

At 7 a. m. March 25, accompanied by Private Ellis, who by your order joined me yesterday, and Frederick Christiansen, left depot B at 9 a. m. with the load of provisions, composed of the following, viz., 1 bag pemmican, 2 cans alcohol, 3 boxes English beef, 2 bags bread, and 2 cans of lime-juice pemmican. In addition we carried two sleeping-bags, with cooking utensils, &c. Finding that this load was too great for the dogs, upon my arrival at Cape Beechey, at 11 a. m., I lightened it by caching one can alcohol and one box English beef. We here left the ice-foot, and after crossing the rubble-ice near the shore reached a large floe that continued to within about 3 miles of the Greenland shore. In consequence of the dogs becoming very tired I left the other can of alcohol at this place, and after several hours' hard work reached depot E at 11 p. m. We then built a snow house and retired for the night. Minimum temperature, from 11 p. m. 25th to 11 a. m. 26th, 51° below zero [−46.1° C.].

March 26.—I learned a lesson last night, or rather this morning, that hereafter in using a snow house I shall heed. I noticed when I retired that the candle burned very dimly, but thinking nothing of it went to sleep. This morning I felt as usual and ate quite a hearty breakfast. But upon going into the fresh air, I was taken with a dizziness in the head and sickness at the stomach, so severe that at one time I could see nothing at all. The other men were equally as bad off as myself, and for some time it looked very serious, as the temperature was 36° below zero [−37.8° C.]. But after half an hour's brisk exercise it gradually wore away. The cause of this was doubtless foul air caused by insufficient ventilation.

This morning I examined the depot already established and found everything in confusion, the result probably of a severe gale, as the boat was found on the ice-foot completely wrecked, and snow-shoes and other articles scattered all over the ice, some being at least a quarter of a mile from the depot. Ellis, who had frozen his foot coming from Fort Conger to depot B, became worse and I left for the latter place, at which point I arrived at 7.35 p. m. We found the traveling quite severe owing to a brisk wind.

I gave the dogs a rest on the 27th as well as delaying operations, in order to ascertain as to whether Ellis would be able to continue his work.

The next morning (28th) Ellis's foot being much worse, I concluded to take him to Fort Conger, for which place I started at 7.20 a. m., but after walking a short distance he, with a fortitude that does credit to him, insisted upon going alone, so that I could return and continue my work. In consequence I returned and at 8.45 a. m. started for depot E with 1 can alcohol, 1 bag pemmican, 2 bags bread, and 2 boxes lime-juice pemmican. We reached Cape Beechey at 10.40 a. m., and taking on the alcohol and box of English beef left there, started across at 11 a. m. We arrived at the tent at 1 p. m., and within about 3 miles of the Greenland shore at 4 p. m. I here left my load and returned to the tent, arriving at 5.40 p. m.

I left the tent at 8 a. m. (29th) with the provisions previously left there, consisting of 1 large bag of canned goods, 2 boxes pemmican, and 1 box potatoes, and on my way over also added 2 cans alcohol left on the ice, reaching the depot at 3 p. m. Started back for the tent at 3.30, and reached that point at 7 p. m. Upon examining my barometer I found it very low, 28.91 [734.30^{mm}]. The temperature at the time being 51° below zero [−46.1° C.], the conditions were all favorable for a severe storm, and not wishing to be caught on the straits, we prepared and ate our supper, fed the dogs, and at about 9 p. m. left for depot B, at which point we arrived at 1 a. m.

At 1 p. m. of the 30th I started for Fort Conger as I knew that, owing to the storm on the channel, it would be two or three days before I could cross again. I met with a very high wind, especially in crossing St. Patrick Bay, and around Cape Murchison, arriving at 6.40 p. m.

Very respectfully, your obedient servant,

W. S. JEWELL,
Sergeant, Signal Corps, U. S. A.

Lieut. J. B. LOCKWOOD,
Commanding North Greenland Sledge Party.

Memoranda of stores cached at Cape Bryant and Polaris Boat Camp.

MEMORANDUM OF RATIONS AND STORES LEFT IN CACHE AT CAPE BRYANT MAY 24 AND 25, 1882.

	Pounds.
Pemmican (English), eatable, but not good	53
Pemmican (lime-juice)	45
Bacon (English), a little musty	7
Hard bread (English), stale and musty (40 rations)	30
Hard bread (United States), about	17
Alcohol, 2 bags 102 oz., and 1 can 190 oz	18¼
Dried beans, 2 bags	18½

	Pounds.
Chocolate, about	4
Tea	1⅓
Tea (English)	—
1 snow-knife.	
1 haversack with medicines.	
15 rounds breech-loading shotgun (12 gauge) ammunition.	
40 English rations of stearine.	

MEMORANDUM OF RATIONS AND STORES LEFT IN WHALE-BOAT AT *Polaris* BOAT CAMP MAY 30, 1882.

Butter, 3-lb. cans	cans	10
Corned beef, 2-lb. cans	do	3
Extract of beef	do	6
Extract of mutton	do	6
Condensed eggs	do	3
Cranberry sauce	do	3
Potatoes	do	2
Baked beans	do	7
Soup	do	1
Milk	do	18
Hard bread	pounds	70
Tea	do	1½
Dried beans	do	90
Salt	do	8
Eng. potatoes, 1 box	do	14

Sugar	pounds	12
Chocolate	do	2½
Pemmican (lime-juice)	do	40
Lime-juice	quarts	5
Alcohol	gallons	16
Snow-knives		4
Rubber blanket		1
Blanket wrappers	pairs	4
Spade		1
Snow-shoe (odd one)		1
Canvas shoes	pairs	4
Wicking	balls	10
Splints (medical)		4
"Repair-box" for boat		1
Several pieces of tin.		

Copy of records left in cairns at Lockwood Island and elsewhere.

RECORDS LEFT IN CAIRNS AT FARTHEST, WORDED AS FOLLOWS:

I. I left Fort Conger, Discovery Harbor, April 3, 1882, with party of twelve men and equipment consisting of one dog-sledge and teams and four Hudson Bay sledges. Four of the party broke down in crossing the straits and were sent back. Two of the sledges also became useless and another, a large sledge, was substituted for them. Thus equipped the party left the base of supplies (which we had in mean time established at the "Boat Camp," Newman Bay) April 16 and reached Cape Bryant April 27. Near the Black Horn Cliffs the large sledge referred to broke a runner, and at Cape Bryant the two remaining Hudson Bay sledges were unable to go further, being worn out. Here the rest of the party turned back while I continued on with the dog-team, Sergeant D. L. Brainard, general service, U. S. Army, and Frederik Christiansen (Eskimo).

Cape Britannia was reached May 4 and this cape May 13 [1882]. Here I turn back, starting to-morrow the 15th inst. All well at this date.

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, U. S. Army.

II. Shoe [Mary Murray] Island and several intermediate points between that and Cape Britannia, each giving a brief summary.

III. Cape Britannia, brief summary.

IV. Cape Bryant, brief summary.

V. Polaris Boat Camp, brief summary.

VI. Repulse Harbor, brief summary.

APPENDIX No. 54.—*Report of Private Biederbick's journey into Black Rock Vale.*

FORT CONGER, GRINNELL LAND, *June* 2, 1882.

SIR: In compliance with your instructions, for me to proceed to Black Rock Vale and take meteorological observations and magnetic bearings of prominent points, I have the honor to submit the following report.

I left Fort Conger May 31, at 12.30 a. m., accompanying Sergeant Rice's party to the tent in the Bellows, at which point we arrived at 2.15 a. m. Barometer reading at 5.15 a. m., 30.36 [771.13^{mm}]; attached thermometer, 30° [—1.1° C.]; 7 a. m.. barometer, 30.38 [771.64^{mm}]; att. ther., 32° [0.0° C.]; at 4 p. m., barometer, 30.34 [770.62^{mm}]; att. ther., 27.5° [—2.5° C.]. I left the tent at 4.40 p. m., arriving at Knife Edge at 6.50. Barometer at 7 p. m., 30.31 [769.86^{mm}]; att. ther., 27.9 [—2.3° C.]. Magnetic bearing to point A, on accompanying chart, 201; to Bleak Cape, 356. I left this station at 7.20, proceeding up the valley until 8.05, when I came to a lake, from 3 to 3½ miles in length, and varying from 200 to 800 yards [183 to 732^{m}] in width. Picked up some shells. Reading of barometer at 8.05 p. m., 30.30 [769.61^{mm}]; thermometer, 28° [—2.2° C.]. I arrived at point A at 9.35 p. m. Barometer, 30.30 [769.61^{mm}]; thermometer, 31° [—0.6° C.]. Magnetic bearing forward to point B, 255. Arrived at end of lake at 10.40 p. m. Continuing up the valley, I arrived at point B at 1 a. m. June 1. Barometer, 30.13 [765.29^{mm}]; thermometer, 29.9° [—1.2° C.]. Bearing to point C 229, and to point D 215. From here I began the ascent of a high hill on the west side of the valley, but owing to fatigue gave up the attempt, and started on my return to the tent at 2 a. m. Barometer reading at 4 a. m., 30.25 [768.34^{mm}]; att. ther., 23° [—5.0° C.].

I arrived at the tent at 10.15 a. m. Barometer upon arrival, 30.30° [769.61^{mm}]; att. ther., 29.8° [—1.2° C.]. At 2 a. m. June 2, barometer 30.15 [765.80^{mm}]; thermometer, 28° [—2.2° C.]. Left tent at 2.15 a. m. and arrived at Fort Conger at 6.15 a. m.

I am, very respectfully, your obedient servant,

HENRY BIEDERBICK,
Private, Company G, Seventeenth Infantry.

Lieut. A. W. GREELY,
First Lieut., Fifth Cavalry, A. S. O. and Assistant,
Commanding Expedition.

NOTE.—A piece of coal was found above the lake [Heintzelman].—A. W. G.

Original map of Private Biederbick not reproduced, but its features have been incorporated in general map of Grinnell Land.—A. W. G.

APPENDIX No. 55.—*Sergeant Linn's report of journey into Black Rock Vale.*

FORT CONGER, GRINNELL LAND, *June* 13, 1882.

SIR: Pursuant to your instructions, dated June 5, 1882, I, accompanied by Private Bender and by F. T. Christiansen, with his dog-team, left this station on the 5th, at 11.30 a. m., for Lake Hazen. Arrived at tent at 3.40 a. m. on June 6, cooked supper, and slept until 11 a. m., when, after cooking breakfast, we left the tent at 1 p. m., taking the dog-team farther up, for about a mile, and then sending it back to the station. Arrived at mouth of Black Rock Vale at 2.45 p. m., Bender taking bearings, and then proceeded up the vale. Traveling, on account of water from the side hills mixing with the soft snow, was made almost impossible with the extemporized wagon. Arrived at head of lake (Biederbick's discovery) at 6 p. m., which I judge to be about 3 miles long and 1,000 yards [914^{m}] wide. Camped at 7.10 p. m., cooked supper, and slept until 8.40 a. m. June 7, when we started again, following the valley, and taking five days' rations, leaving the rest with tent and wagon at camp. We passed a gap on our left which runs SW. (true), and at 2.17 stopped and saw two peaks. Ascended the hill and found that the peaks seen were undoubtedly of the United States Range. Camped at 3.30 p. m.; ate supper; slept until 10.05 p. m. Left the valley at 10.55 p. m., climbed hill to summit, and saw a small lake, 1 mile long and 300 yards [274^{m}] wide. Crossed the lake, ascended another hill, and at 12.05 a. m. we saw the United States Range and four glaciers, and the northeast end of Lake Hazen. Camped at 12.30 a. m.

June 8.—Arose at 11 a. m. and got breakfast. Bender taking the necessary bearings, started at 11.30 a. m. on our return to station. Saw in the valley five musk-oxen and five geese. Camped at 9.15 p. m. at lake [Heintzelman].

At 4.15 a. m. June 9 arose, cached remainder of rations, and started at 4.55 a. m., bringing wagon and sleeping-bag to the tent. Arrived there at 9.15 a. m., cooked tea, and at 10.15 a. m. started for the station, where we arrived at 5.15 p. m.

The following bearings, with prismatic compass, were taken by Private Bender:

Date.	Hour of observation.	Observation.	Bearing.	Barometer.	
1882.			*Degrees.*	*Inches.*	*mm.*
June 6.	2.45 p. m.	First	205	29.78	756.40
	4.35 p. m.	Second	200	29.61	752.08
June 7.	8.41 a. m.	Third	210	29.64	752.84
	11.34 a. m.	Fourth	270	29.52	749.79
	12.31 p. m.	Fifth	259	29.52	749.79
	2.17 p. m.	Sixth	265	29.28	743.70
	3.30 p. m.	Seventh	227	29.35	745.48
	10.55 p. m.	Eighth	243	29.78	756.40
June 8.	1.20 a. m.	Ninth	220	29.78	756.40

Bearings for mountains and glaciers: First, for mountain SW., 181; second, mountain in center, 230; third, mountain on NE. end, 205. First glacier, SW., 230; second, center, 265; third, NW., 205.

I am, very respectfully,

DAVID LINN,
Sergeant, General Service, U. S. A.

To the COMMANDING OFFICER, LADY FRANKLIN BAY EXPEDITION.

APPENDIX No. 56.—*Lieutenant Lockwood's report of launch trip up Archer Fiord.*

FORT CONGER, GRINNELL LAND, *October* 6, 1882.

SIR: I have the honor to submit the following report of a trip in the steam-launch *Lady Greely*, made August 13 to 16, pursuant to your letter of instructions of August 12, 1882.

August 13.—The party consisting of myself, Sergeants Brainard, Ralston, Cross, and Linn, and Private Frederick left the station in the launch at 8.30 o'clock in the morning, taking in tow the English boat *Valorous*, with Sergeant Rice and a party for Musk-ox Bay. We reached this bay without event or delay and took the party about half-way to its head when, dropping the boat, the launch proceeded towards Archer Fiord via the western entrance. The ice was in small, detached pieces, much scattered and we made a straight course. Outside the ice was much the same and a straight course was taken for Keppel Head; however, when off Miller Island several large floes were encountered, which made necessary a detour to the right towards the island. Above Keppel's Head the fiord was found almost entirely clear of ice, and in the upper part it was rare to meet with even a small piece. Seeing no ice in front I inclined to the left towards the southern shore, and in two and a half hours we were quite near it, not far from opposite Hillock Depot. I took this side on account of game. The north shore is at the foot of a continuous line of steep cliffs, while that along which we now continued up the fiord is a grassy slope, rising gradually to the hills some miles back from the water. In places, however, these hills approach the shore, and here and there the mountain streams have formed great gaps and declivities. We soon saw a herd of half dozen musk-oxen, but though we approached the shore very cautiously and used a good deal of strategy after landing, they made off before any of us got within range. A few miles farther on we got two musk-oxen and twenty ptarmigan, and soon afterwards seven more musk-oxen; these last allowed themselves to be shot down without

resistance. They were a mile from the coast and thus involved a great deal of labor and delay. The meat was left till our return. A good many seal were seen—the entire length of the fiord—but we were unsuccessful in getting any.

August 14.—Reached Bulley's Lump at 5 a. m., after several hours of very squally wind and rough water; the launch shipped several seas. The steep cliffs we now steamed along, within a few yards of, strange to say, hardly seemed to screen off any wind; it seemed to come down vertically, and in one place where we shot a number of geese on and close to shore, several were blown out of sight before they could be got; yet the wind was from the south all the time. Ella Bay is walled in on both sides by steep and high cliffs, which, extending inland, form a valley at its head two or three miles wide and quite level; this valley obliques to the right a few miles from the bay, and the view above that is thus cut off. We reached the head of the bay at 9.30 a. m., and thinking the water deep enough I ran the launch ashore at the mouth of a considerable stream which runs down through the valley. Just before this two musk-oxen were seen, and I sent off two hunters after them. By noon we were all asleep on the shore. During our sleep it rained.

August 15.—Got up at 1 a. m. to find it still overcast, with the launch high and dry, and the tide ebbing out. Out from shore a large shoal extended, which at low tide was bare for one-quarter of a mile out. Feeling stiff, and also uneasy about the launch, I went inland but a short distance; starting out alone after getting something to eat and going as far as a rocky height on the north side of the valley. I was disappointed, however, in seeking the prolongation of the valley from this point. I saw a lake of some extent some distance off and a few miles from it the glacier (quite a large one) which is evidently the same laid down on the English map. I got back in two hours. The two musk-oxen referred to, were got, and this morning another; also three hares and some birds. A large bone of some mammal* was also found. The sun was invisible at noon and before and after, so that no observations were possible. At 11 a. m. the launch was got afloat (it being high tide), and being limited to three days' absence from the station, steam was got up and I prepared to return. We started at 1.20 p. m., and proceeded some miles to the mouth of a water-course on the south shore of the bay where I had observed a large piece of drift-wood; this was put on board. Here and at the head of the bay traces of Eskimo were observed. I stopped at Record Point and left a short notice of the trip and took Lieutenant Archer's record. A small glacier was noticed in Beatrix Bay, a little way off. I next touched at Depot Point, but failed to find the English cache of rations though we found the place where there apparently had been a cache (*i. e.*, a cavity in the rocks in which was a gunny sack, and outside some fragments of tobacco); we found nothing more though we examined the locality from the launch pretty well, running close along shore to do so. The "Point" is a mass of bowlders lying thick and in great confusion on the surface of a steep slope. I stopped but one-quarter hour as there was a doubt of our having enough coal to steam back with. On this account also I proceeded direct to the musk-ox meat on the south shore and thence straight for Bellot Island.

August 16.—Off Miller Island the ice was found crowded pretty close, and some delay was experienced in getting through. Conybeare Bay seemed full. After this we proceeded without difficulty via the western entrance and the north side of Bellot Island, and reached the station at 5.08 a. m., the coal just sufficing.

Game brought back.—12 musk-oxen, 24 geese, 20 ptarmigan, 3 hares, 36 turnstone, 6 knots, and 3 terns.

Memoranda from journal.—August 13, 8.30 a. m. left station; 9.15 a. m. off east cape of Musk-ox Bay; 9.30 dropped boat in tow; 10.30 on line with SE. end Sun Peninsula and Keppel's Head; 1.53 p. m. opposite Keppel's Head; 4.20 to 5.38 and 6.30 to 9.00 p. m., stopped for musk-oxen; 9.15 to 1 a. m., August 14, stopped for musk-oxen; 5.05 a. m. reached Bulley's Lump.

Going out twenty-five hours; less stops, about seventeen hours. Coming back fifteen and three-quarters hours; less stops, fifteen hours.

Very respectfully, your obedient servant,

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, A. S. O.

First Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant, Commanding.

* This was evidently the bone of a whale; it was brought to Fort Conger by Lieutenant Lockwood.—A. W. G.

APPENDIX No. 57.—*Lieutenant Lockwood's report of launch trip up Chandler Fiord.*

FORT CONGER, GRINNELL LAND, *October* 7, 1882.

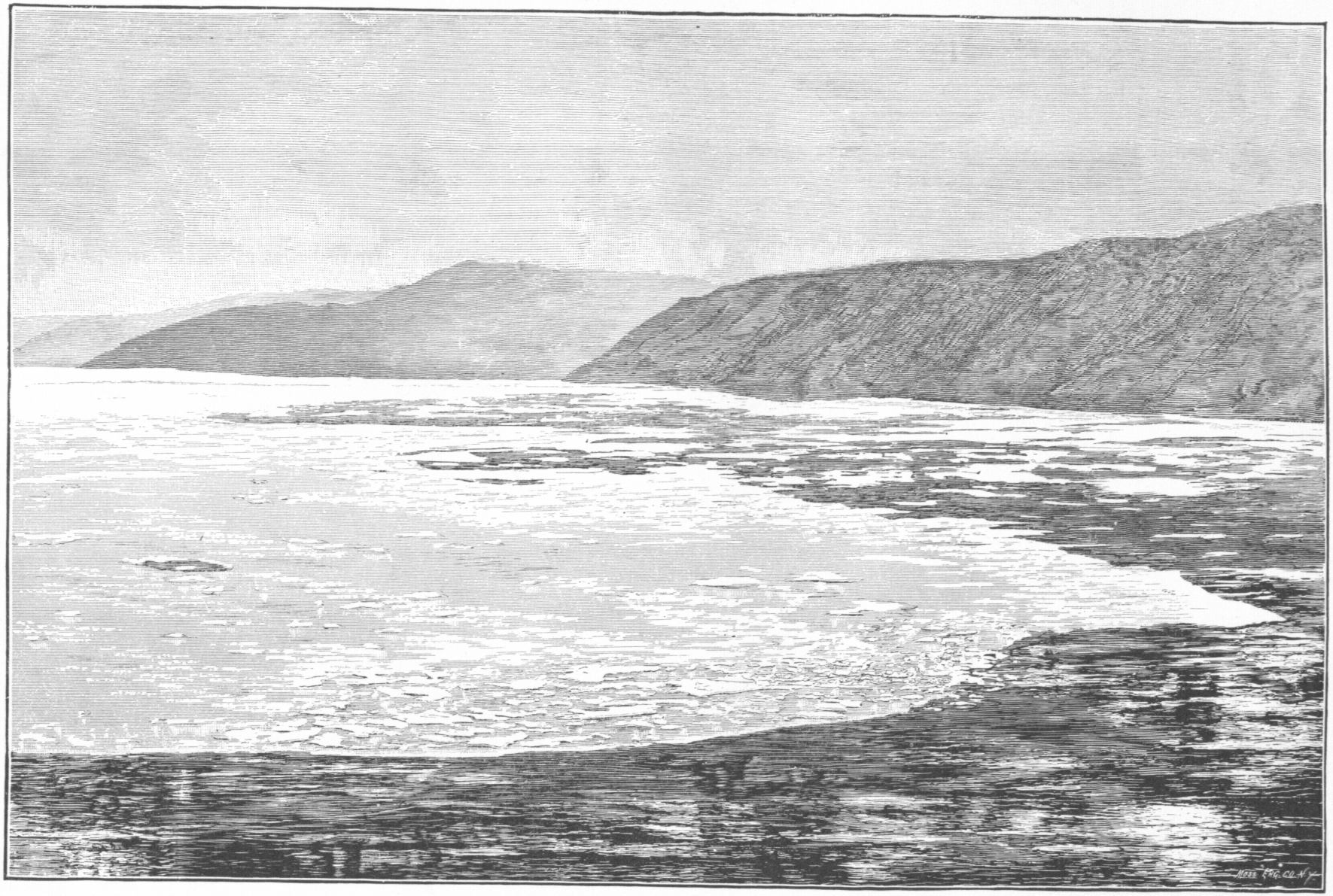
SIR: I have the honor to make the following report on my trip in the steam-launch *Lady Greely* to Ida Bay, pursuant to your orders of August 19, 1882:

The party, consisting of myself, Dr. Pavy, Sergeants Israel, Rice, Cross, Linn, and Elison, and Privates Frederick and Schneider, left the station at 8 a. m. August 19 and reached the western entrance with little or no delay, and then made an attempt to cross Lady Franklin Bay in order to leave Dr. Pavy and Sergeant Elison on the south shore, as contemplated and arranged, but after many delays in working through the ice we were brought to a standstill not far from shore. Seeing no prospect of proceeding I steered for Bellot Island, and getting a good view saw so much ice in the sound [Archer Flord] as induced me to return. We were not able to reach the station, the ice having shifted its position in the east end of the harbor, but landed at Proteus Point. Some hours afterwards the launch was enabled to reach the station. We brought back six geese and a duck, shot near Bellot Island.

August 21.—Started again in the launch at 4 o'clock p. m. with the same party. The western entrance was reached in an hour (the usual time), but I had to make a considerable detour towards the west before an opening in the ice enabled the launch to be steered direct for Red Bluff (a bluff on the opposite shore about 5 miles from Cape Baird). When well out in the fiord we found open water, perfectly free from ice, but on nearing the southern shore we again met the floes. However, we were not stopped, though delayed by the detours necessary, but more especially by a strong head wind, and heavy sea which frequently came aboard. This existed for two or three miles—between the ice last referred to and the shore. Red Bluff was reached at 8.30 p. m. After landing the Doctor and Sergeant Elison, I steered direct for Miller Island. We encountered no ice at all in the fiord, but the strong south wind raised a considerable sea; the island was reached at 11.30 p. m.

August 22.—We continued along the south side of Chandler Fiord. About opposite the west end of the island a musk-ox was seen, but Sergeant Israel, Frederick, and Schneider, who went ashore after him, were unsuccessful in getting within range. We now encountered more or less ice, but made good progress, the pieces being small and widely separated. After discussing the objects of the expedition with Sergeants Israel and Rice, I decided to land at the mouth of a conspicuous valley off to the right oblique (on the north shore). Here a good (in fact the only) base for triangulation offered itself, and a good place to get a set of observations for latitude and longitude, &c. After a rest here I intended going on up the fiord. No satisfactory standpoint for a photograph yet offered itself. We landed accordingly at 1.30 a. m.; several hours were occupied in killing and bringing down a musk-ox several miles up the valley. This morning the measurement of the base line, the several series of observations, and sleep occupied the time till 3.30 p. m., when the launch again started, steering for Ida Bay. We had more and more trouble with the ice, and soon were obliged to work our way very slowly close to the north shore—brought to a stop every few minutes. In this way we reached very near the north arm of the fiord when progress became so difficult that I thought it unadvisable to attempt to go farther—indeed it was hardly possible. To the south and west extended an immense floe of old ice with an unbroken surface. Sergeant Rice and others thought it had formed here. We had been working our way between the edge of it and the shore. Sergeant Rice took a picture of the view towards Miller Island. After this still seeing no prospect of advancing I turned back. We got out of this *cul de sac* with difficulty and then proceeded to the mouth of a ravine on the south shore, about opposite the base line established on the north shore. Here I found extensive traces of Eskimo—perhaps two dozen "meat caches" and several old bone implements. Here a number of angles were taken with the transit and we then proceeded to the west end of Miller Island to complete the survey. The ice was found pretty much as before till we got here; but here a large floe or series of floes stretched from the island a long way towards the northern shore. We were able, however, to start pretty direct for Stony Cape by hugging the north shore of the island—delayed at only one or two places. But we encountered considerable delay some distance further on.

August 23.—I desired to take observations and a picture at Stony Cape, but the sun was invisible and the weather by no means favorable for either, so I ran up to the head of Sun Bay to take a rest and await better weather. We cast anchor at 12.20 a. m. and slept on shore. I walked over to the Bellows, but saw nothing. It rained during our sleep, and when we got up, about noon, the weather was still bad. At 2.25 p. m. started for the station. Fifty minutes were occupied in reaching Cape Clear, after much turning and



CHANDLER FIORD, LOOKING WESTWARD; IDA BAY TO EXTREME LEFT.

(From a photograph.)

twisting among the floes. Here we got in heavy ice which, moving in opposite directions quite rapidly, threatened to crush the small boat towed behind, and farther along the coast the large, rapidly moving floes threatened the launch herself. However, in two and one-half hours, by keeping close to shore, and after many stops, we reached the western entrance, and after more of the same kind of navigation (though without risk) we reached the station at 7.30 p. m.

Very respectfully, your obedient servant,

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, A. S. O.

First Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant, Commanding.

APPENDIX No. 58.—*Dr. Pavy's orders to proceed to Carl Ritter Bay.*

FORT CONGER, GRINNELL LAND, *August* 19, 1882.

SIR: You are hereby ordered with Sergeant* Elison to examine Judge Daly Promontory for an overland route from Cape Baird to Cape Defosses or Carl Ritter Bay.

Such provisions and equipment as you may designate will be furnished. Lieutenant Lockwood has instructions to land you from the launch *Lady Greely*. In case of any delay provisions in depot at Cape Baird will be available as per inclosed memorandum.

I am, respectfully, yours,

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant, Commanding.

Acting Assistant Surgeon O. PAVY,
U. S. Army.

APPENDIX No. 59.—*Sergeant Elison's report of trip to Carl Ritter Bay.*

FORT CONGER, GRINNELL LAND, *November* 2, 1882.

SIR: In accordance with instructions received from you, I herewith respectfully submit the following report taken from my diary:

August 21, 1882.—Doctor Octave Pavy and myself left station on steam-launch under command of Lieutenant Lockwood 3.55 p. m., to be landed on south side of Lady Franklin Bay; landed about 5 miles west of Cape Baird at 8.35 p. m. This is our starting point for an overland trip to Carl Ritter Bay; made a cache at this point of our extra clothing and provisions. At 9.10 p. m., with about 25 pounds strapped to our backs each, our march commenced. We ascended a steep, rough ravine to the summit of the first hills, elevation about 600 feet [183^{m}]. From here we took a westward course for about three-quarters of a mile, then nearly due south for about 3 miles. Here we found a valley leading southwest; so far we had to travel up and down hills. At this point, about 4 miles from the starting point, we saw 5 musk-oxen; 3 took to flight on our approach. A cow and calf stood facing us. I killed the cow and calf, dressed the calf and took the entrails out of the cow; it took us about one hour. At 12.30 a. m., August 22, we started again traveling through the valley in a southwest direction; traveling good. The valley is nearly level and from 50 to 400 yards [46 to 366^{m}] wide. A small river [Pavy river] is running through this valley about 10 inches [254^{mm}] deep on an average, and from 5 to 10 yards [4.5 to 9^{m}] wide. Went in camp 3 a. m. August 22, distance traveled about 11 miles, weather clear and pleasant. During our march we noticed a large break in coast range, apparently leading to Cape Cracroft.

August 22.—Got up at 9 a. m., took breakfast, consisting of corned-beef, and hardbread with good cold water. At 9.30 a. m. we started again, traveling in about the same direction. Mountain range along the coast is high; some mountains attain the height of about 2,000 feet [610^{m}]; we also noticed very high

* Corporal in original, as Elison's promotion to sergeant was not then officially known.—A. W. G.

land to westward of valley; mountain tops covered with snow. At 10.30 a. m. we struck a small lake about 500 yards [457m] long by about 200 yards [183m] wide; the lake is oval in shape, water clear, free of ice and apparently deep, banks steep; had to travel over the hills to get around it. At 11.45 a. m. we got to another lake of about the same dimensions as the former, banks also steep. At 12.45 p. m. we got to another lake, which is the largest of the three. It is about one-half mile [805m] long and 300 yards [274m] wide; it narrows somewhat toward each end. This lake had a belt of ice in its center about 25 yards [23m] wide, extending nearly its whole length; water very clear, banks steep. About 4 miles northwest of Cape Defosses we got to the divide of the valley. From here out the valley turns to east by south, and the decline is quite rapid, but could be traveled by sledges during winter and early spring. We traveled on the east side of the last lake, struck a wide valley about 2 miles west by north of Cape Defosses. Judging from the amount of water flowing in three branches, there must be a mountain stream from the northwest to furnish this supply of water. Went in camp at 3.30 p. m. August 22, about 2 miles inland from Cape Defosses.

August 23.—Got up at 1.30 a. m. Left camp at 2 a. m.; the opening at Cape Defosses is about 1 mile wide. From here out we traveled along the coast; traveling fair, but tiresome; there is loose gravel along the beach. Went in camp 10.10 a. m., distance traveled about 15 miles; it snowed several times during the day. Got up at 6.45 p. m. Left camp 7 p. m., traveling about the same, went in camp 1.30 a. m. August 24 got up at 7 a. m., took a drink of water and started, leaving our traps behind. Arrived at Carl Ritter Bay 8.15 a. m. August 24; found cache undisturbed and in good condition. Doctor Pavy deposited a record. It was cloudy when we arrived here, and we only could see about 5 miles to the south; the channel is free of ice from Cape Lieber to here, and as far south as we could see. On our way here along the coast we could see numerous flocks of dovekies, perched on grounded floebergs near shore; I counted 22 on one berg. Saw musk-ox tracks at Carl Ritter Bay. Vegetation is very scarce around here. The coast has numerous bends and sharp projecting points, which could not be passed at high tide. At Cape Back we had difficulty in crossing at low tide. Made camp 3.50 p. m., having made a good day's march. Got up at 3.30 p. m., started at 9, arrived at Cape Defosses 3.15 a. m.

August 25.—Went in camp 3.45 a. m. Got up 9.15 a. m. Started 9.30 a. m., traveling in the valley. In going around the last lake on our way back, we went down a ravine, trying to get in the valley, but we got to a cascade or small waterfall, which late in the season freezes and then forms a glacier on a small scale. We rolled our knapsacks down; I then attempted to slide down myself. I made holes in the ice with a large knife. I went down about 3 feet [0.9m] when all at once, while I was digging a hole, I slipped and went down about 30 feet [9m] quicker than I can describe it. Doctor Pavy concluded it would be safer to go around the cliffs. I got off with a slight bruise. Went in camp 4.45 p. m.

August 25.—Got up 9.15 p. m. Started 9.30; saw 2 musk-oxen about 400 yards [366m] off about 1 a. m. August 26. Arrived at our cache of meat 1.30 a. m., where we made a fine meal of musk-ox veal. We carried 2 empty beef-cans and some willows for about 15 miles, but we were amply repaid for our labor, as this is our first warm meal since we left station. The sly Arctic fox visited our meat while we were gone and nothing would do him but tenderloin. We took about 25 pounds of the meat with us, the rest we covered with rocks. Arrived at our starting point 4.30 a. m. August 26; made some tea and took a lunch. We rested a few hours and at 7.30 a. m. started again for the tent near Cape Baird, at which place we arrived 9.30 a. m. August 26. Found tent blown down, we pitched it and are quite comfortable now. I got up at 5 p. m. and started toward Cape Lieber across the hills. I found a wide valley here about 1 mile north of Lieber, leading to westward. Judging from the way we traveled, I came to the conclusion that this must be a part of the valley we traveled through. I estimate the distance to where we struck the valley from 5 to 6 miles; I must state here, that at the point where we first struck the valley on our way to Carl Ritter Bay the valley turns to east by north. Steam-launch arrived 11.30 p. m. August 26, arrived at Fort Conger 5.40 a. m. August 27.

Respectfully submitted.

JOSEPH ELISON,
Sergeant, Company E, Tenth Infantry, U. S. A.

First Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant, Commanding Expedition.

APPENDIX No. 60.—*Sergeant Brainard's report of trip to Carl Ritter Bay.*

OFFICE CHIEF SIGNAL OFFICER,
Washington, D. C., June 25, 1885.

SIR: In accordance with your verbal instructions of this date, I have the honor to submit the following report of a sledge journey from Fort Conger to Carl Ritter Bay, during the autumn of 1882, by Dr. Pavy, Jens Edward (Eskimo), and myself. This trip was undertaken for the purpose of ascertaining the condition of the ice in Kennedy Channel; to investigate, if possible, the causes of the non-arrival of a relief vessel, and for general observation:

We left Fort Conger at 7.30 a. m., October 27, 1882 (eleven days after the departure of the sun), with provisions and equipment for ten days, hauled on one of the heavy sledges by eleven dogs. Temperature, —14.0° [—25.6° C.]. After passing Breakwater Point we shaped our course for Cape Baird, long detours being frequently necessary to avoid obstructions in the form of heavy masses of paleocrystic ice, which were found to have attained great elevations from the effects of pressure to which the exposed position of the bay subjected it. Our progress was very slow and difficult. In passing over an unusually rough place the rear cross-tie of our sledge was broken, and we were detained in consequence for some time. Jens finally repaired it in a most skillful manner, and we resumed our course. To our great embarrassment we discovered late in the afternoon that our watch had stopped at 2.40. Judging it to be about three hours later, the time-piece was set accordingly.

Reached the depot tent near Cape Baird at 7.30, and after a hearty meal proceeded on our journey. In following the ice-foot around the cape we experienced great difficulty in advancing our sledge, owing to the huge blocks of ice which had been crushed against this point by pressure from the northern pack. The gloom and darkness of an Arctic night added to our embarrassment in the selection of a route through the rough places. Assuming that the route by Cape Lieber was impracticable owing to open water, we decided to take advantage of the valley explored by Dr. Pavy and Sergeant Elison in August, 1882, which extends diagonally through Judge Daly Peninsula from Cape Baird to Cape Defosses. Moving for a short distance up this valley, we camped at 11.15 p. m., very much fatigued from the effects of the severe toil of the day.

October 28.—Clear and calm weather, temperature, —17.0° [—27.2° C.]. We passed a very comfortable night so far as the cold weather was concerned, but the dog-skin sleeping-bag furnished me by the doctor was decidedly too short, and the cramped position in which I was compelled to lie was anything but pleasant to me. Starting at 7.30 a. m., we at once entered a narrow, tortuous, and rocky gorge with almost vertical walls and a rough, stony bed which was far from agreeable to travel over. The valley soon widened somewhat, and its sides, no longer precipitous, sloped gradually away, ending in low hills. About twelve miles from its entrance at Cape Baird the valley suddenly opened, spreading out in a broad plain at least five miles wide. Reaching the first lake, we found the traveling on its surface to be the best that we had experienced on the trip. The incessant trotting of the dogs, the bright moonlight, and the exhilarating air tended to elevate our spirits and render the journey a pleasant and exceedingly interesting one. At 4.15 p. m. we camped on Lake No. 1, near Elison's Slide (so named from his having fallen from a small glacier in the vicinity), and obtained an excellent supply of fresh water by cutting through 33 inches [838^{mm}] of ice. During the day we had met with many fresh tracks of hares and foxes, and one of the former was seen and pursued but not captured. When it was observed by the team they at once gave chase under full cry, and carried us along the rugged course of the valley at an alarming rate of speed. The doctor, who was holding on to the upstanders, made desperate and gigantic strides to maintain pace with the unruly team, but finding his efforts unavailing, he loosened his hold at an unfortunate moment and was plunged into an adjacent snow-drift.

On the 29th the weather was calm and cloudy; temperature, —14.0° [—25.6° C.]. Starting at 6.30 a. m. we all rode after the racing dogs over a surface of unparalleled smoothness to the end of the lake. Owing to the dim and uncertain light we made a mistake by taking a branch valley leading to the westward, and two hours of the best light were unavoidably lost. Having retraced our steps to the proper valley, we passed two small and two large lakes, and reached the divide at 10.30 a. m. A quick drive of four miles brought us to the coast just south of Cape Defosses. The narrow ravine which we entered soon after leaving the divide opened out into a valley of considerable extent, but again narrowed to a rocky gorge until it was scarcely wide enough to admit the passage of the sledge. Reaching the ice-foot at 12 m., we passed

through a chaotic mass of hummocks and rubble ice, emerging on a smooth floe of newly-formed ice which Jens said was not more than two or three days old. But being over 4 inches [100^{mm}] in thickness, we felt perfectly secure, and, jumping on the sledge, the dogs bounded away over the mirror-like surface of the floe at the rate of six miles an hour. Our course led us across the wide indentation of which Cape Defosses is the northern, and Cape Back the southern, termination.

The exhilarating and exciting ride in which we had been indulging for some time was suddenly brought to a close by the runners of the sledge breaking through the floe. After much difficulty the sledge was extricated, but not until several articles, including sleeping-bags, were thoroughly saturated with water. The doctor's feet were also wet, but Jens and myself escaped by having our trousers tied tightly down over our boots. The ice was very thin and not capable of sustaining great weight. It moved with a wave or undulating-like motion under our tread in passing over its surface. We were a mile from shore and in an extremely hazardous situation. A wrong step, a careless movement, and we would have been plunged into the dark, forbidding waters beneath us. Working carefully towards shore, we soon encountered a belt of rubble ice, in which we found a small paleocrystic floe, on which our tent was pitched. Dark clouds were overhanging the channel [Kennedy Channel], indicating to us that it was entirely open. The clouds were of the greatest density and intensity of color in the direction of Cape Lieber. South of Cape Back, however, the condition of the sky denoted that ice had accumulated there in great quantities.

The weather on the 30th was clear and calm, the temperature only —2.0° [—18.9° C.]. This rise of twelve degrees in the temperature since the night before we attributed to our close proximity to the open water. Starting at 5.15 a. m., we at once left our friendly floe and again ventured on the new ice, which Jens pronounced perfectly safe after the addition of another night's frost. The Greenland coast was visible and well defined throughout the day, or while the light remained good. Not far from our camp the new ice terminated in a large pool of water, which compelled us to take to the ice-foot. Good traveling was afforded here, but in many places the passages were so narrow that we were forced to clamber along the steep slopes above. Near Cape Back the channel was open to the Greenland coast and filled with a restless and resistless pack, which moved about subject to the caprice of the winds and tide. At about noon we were surprised to observe a musk-ox quietly grazing on the gentle slope above us. Taking one of the dogs (which I was compelled to drag after me), I started in pursuit, but the ox disappearing up a narrow ravine leading to the interior, I concluded to abandon the chase. While returning to the sledge I found circles of stones, about 10 feet [3^{m}] in diameter, on a low tableland overlooking the channel, which had once secured the summer tents of a wandering tribe of Eskimo. I found no bones which bore evidence of having been worked among the numerous specimens strewed about in the vicinity of these circles. Just north of Cape Back we saw two cubical-shaped blocks of ice which closely resembled, and without doubt were, icebergs. They were of the greatest interest to us because of their being farther north than any that we had observed. We regretted that time did not permit us to investigate more fully the structure and origin of these remarkable blocks of ice. The sky clouded early, and the darkness forced us to camp at 1.15 p. m., on a narrow ice-foot within a few feet of the water. We had seen numerous tracks of foxes and hares during the day.

On the morning of the 31st the weather was cloudy and threatening. Light westerly wind prevailed, and the minimum temperature was —4.0° [—20.0° C.]. Light snow fell during the early morning, but ceased before we were ready to start on our march. Above our camp the cliffs rose in beautiful castellated towers to a height of over 3,000 feet [914^{m}], and at their base was the accumulation of débris which had been falling from their sides for ages. Starting at 5.35 a. m., we found very good traveling for the first two hours. At that time we were halted by a formidable wall of ice, which had been heaped along the shore through the agency of the pack. As it would require hours of constant and patient toil to effect a passage here for the sledge, we resolved to leave it here in charge of the faithful native and proceed on foot to Carl Ritter Bay. After walking along the ice-foot for about three miles, we reached the depot and found it in excellent order. We had been trying to delude ourselves in the belief that we would find traces of the relief vessel here, and had pictured to ourselves the surprise and delight of our comrades at Fort Conger when we returned to them with mail fresh from their homes, but nothing to indicate that others had visited this spot was found. The bay was frozen solid from cape to cape, but outside the pack was moving up and down the channel under the influence of the tide. To the southward a strong ice-blink was visible. Depositing a record, we returned to the sledge and traveled homeward until 1.15 p. m., when we camped on the narrow ice-foot, not far from our previous camping place.

We rose on the morning of November 1 lame, tired, and unrefreshed. The creaking and doleful sounds occasioned by the grinding pack, which was but a few feet away, did not tend to produce sleep. Weather was cloudy and the temperature —3.0° [—19.4° C.]. Started at 5.30 a. m., facing a strong northeast wind, which produced disagreeable results. At 10 a. m., while passing the place where we saw the musk-ox on our outward trip, we were greatly surprised to find another standing in exactly the same place. He was speedily shot, and a few choice pieces, together with the liver, were taken away. I think the presence of this animal in that high latitude, and at that season of the year, dissipates completely the theory of the migration of animals to a lower and more congenial latitude during the winter months. At 2 p. m. we camped at the entrance to the valley near Cape Defosses. For a long time we had been traveling in almost total darkness, and in pitching the tent we were compelled to grope about the sledge at random for the articles which were desired. Our dogs had grown very weak under the diet of dried fish while performing the hard work which the wretched traveling had imposed on them. These fish, it appeared, were not adapted for these animals while they were undergoing prolonged exertion.

During November 2 the weather was cloudy, and the wind continued to blow from the northeast as it had done the day before; temperature, —7.0° [—21.7° C.]. We started at 5.10 a. m., and reached the divide at 10 o'clock. By barometrical measurement the altitude was found to be about 450 feet [137^{m}]. At our old camp on the lake we halted to refresh ourselves with a drink of water and a light lunch. Snow began falling at noon. Our dogs became very weak, and unwilling to advance. We literally pushed the sledge through the snow without material assistance from them. One of their number (Baby) became exhausted and had to be carried on the sledge. Our discomfort was augmented by the snow-storm, which produced darkness prematurely, and forced us to travel at random. After struggling along through the storm and darkness until 2 p. m., we acknowledged that we were lost, and went into camp to await better weather.

Although cloudy on the morning of November 3, the weather was greatly improved over the day before. Light snow fell at intervals, and the temperature stood at —8.0° [—22.2° C.]. Baby was found dead and stiffly frozen lying near the tent. She was taken with us for future use. Starting at 7.10 a. m., we were fortunate enough to "find ourselves" by running across the outward track, which we continued to follow so long as daylight permitted. The dogs were so weak that we had intended to travel only to the two musk-oxen killed by the doctor and Elison during the previous August, and endeavor to restore their strength by giving them a good meal. But, on reaching the place, it was found that foxes had stripped every particle of flesh from the bones of these animals, so nothing remained for us to do except to continue the march. In order to save the dogs as much as possible, we went ahead of them by turns and selected the best route possible. Camped at 1 p. m. near the northern entrance to the valley. The amount of snow which had fallen during our absence was considerable, and the traveling rendered very heavy in consequence. Four of the dogs were practically useless, and it was with the greatest difficulty that the remainder drew the sledge to camp. Baby was cut into sections with an axe, and the pieces thrown to the now half-starved brutes. The flesh was greedily devoured by her comrades, apparently without the slightest pang of regret for the late departed.

Clear weather during November 4, temperature, —17.0° [—27.2° C.]. A brisk northeast wind added much to our discomfort by frequently frosting our faces. Left camp at 4.35 a. m. The dogs appeared but slightly better after the feast which the death of poor Baby had furnished them with. No remains of that unfortunate animal were found except a fragment of the lower jaw, with a tooth protruding. We reached the depot tent near Cape Baird at 9 a. m. In view of the wretched condition of the dogs, we decided to remain here until the following day, to allow them to recuperate their lost strength. Clear weather, and light westerly winds during November 5; temperature, —34.0° [—36.7° C.]. Started from Cape Baird at 6 a. m., the dogs apparently in good condition. We shaped our course diagonally across Lady Franklin Bay to the western entrance of Discovery Harbor, in order to avoid, if possible, the rough ice which we encountered on our outward trip near the eastern entrance. We found the ice equally as rough, if not worse, than on the outward journey. Tracks of a large wolf were seen near the southeastern point of Bellot Island. While passing through the western entrance of Discovery harbor the light became so uncertain that progress through the broken pack was attended with the greatest danger and difficulty, as the numerous bruises on our limbs could testify. Under certain conditions during the Arctic night the light is such that all outlines and shadows of the hummock ice are lost, and the roughest ice-field presents the appearance of a perfectly level floe.

We reached Fort Conger at 5.30 p. m., having traveled eleven and one-half hours without halting for an instant. We were in excellent condition, and could record no accident to ourselves of a more serious nature than a frosted nose and slightly blistered ears.

I am, very respectfully, your obedient servant,

D. L. BRAINARD,
Sergt., Signal Corps, U. S. A.

First Lieut. A. W. GREELY,
Fifth Cav., A. S. O. and Asst., Comdg. L. F. Bay Expedition.

APPENDIX No. 61.—*Orders establishing day of Thanksgiving.*

FORT CONGER, GRINNELL LAND, *November* 27, 1882.

(Orders No. 7.)

Thursday, November 30, 1882, being without doubt the appointed day of National Thanksgiving, is hereby designated as a day ot thanksgiving and praise.

Exemption from death and disease, success in scientific and geographical work, together with the present possession of health and cheerfulness, may well be mentioned as special mercies for which this command has reason to be devoutly thankful.

A. W. GREELY,
First Lieut., Fifth Cav., A. S. O. and Asst., Commanding the Expedition.

APPENDIX No. 62.—*Dr. Pavy's letter of March 8, 1883.*

FORT CONGER, GRINNELL LAND, *March* 8, 1883.

SIR: I have the honor to respectfully submit to you a few considerations that I value of high importance as concerning the future health of, at least, a part of the command, and therefore aliable [liable] to influence the chances of success in a retreat that you consider inevitable.

As exposure and labor, at an early period of the season of 1883 may result in grave impairment of the health; as also, in case of accident of a serious nature, the patients would probably not have recuperated in August, becoming then an encumbrance, threatening to compromise the safety of all, by rendering the departure impracticable, (as in the case of Dr. Kane) I should *earnestly* recommend that no work entailing exposure of more than a night or two in the field should be undertaken during the month of March.

My personal experience, and the risks run last year by our early parties, with the examples of Dr. Kane and Sir George Nares, satiesfy [satisfy] my mind as to the dangers to be apprehended from sledging during the month of March.

As medical adviser of the expedition, I consider it my duty to state, that although the health of the command has been better this winter than the previous, it will nevertheless not be submitted with impunity to as much hardship as in 1882. If temporarily, it withstood, it would certainly be at the expense of vital energies that I think of the highest importance, perhaps of necessity to husband, in view of the future work of the fall, in which we will have to contend with contingencies that defeated the efforts of Sir John Ross and the detached party of Dr. Kane's expedition.

I will also, respectfully call your attention while it is still time to the important question of coal; as it would be probably injurious to the general health of the command, even perhaps dangerous, in case of sickness, that we should be left without fuel during the three months previous to our departure.

As to the very important question of foot-gear, I should earnestly recommend (considering the insecure state of the mocasins [*sic*] and Labrador Esquimaux boots) that each man employed in any work entailing exposure for several consecutive days should be provided with an extra pair of boots or moccasins, the only appropriate foot-gear at our disposal.

I have the honor to be very respectfully your obt. servant,

Act. Ass. Surgeon OCTAVE PAVY.

To the COMMANDING OFFICER.

APPENDIX No. 63.—*Lieutenant Greely's answer to Dr. Pavy's letter of March 8, 1883.*

FORT CONGER, GRINNELL LAND, *March* 9, 1883.

SIR: I have the honor to acknowledge the receipt this day of a communication from you regarding the future operations of this command.

The letter was undoubtedly called forth by the prospective departure, on March 10, of a party of six, with dog-sledges, to establish depots on which depends the success of our geographical work in North Greenland.

You recommend therein that the energies of this party be devoted to ensuring such conditions as would facilitate a retreat by boats—a *possible* contingency, but not inevitable as you state it.

The grounds upon which you make this remarkable recommendation are but in part medical, and depend largely on future contingencies, *i. e.*, "the fortunes of war," which *may* disable some member of the party and so encumber our *possible* retreat.

You admit that the health of the party has been better this winter than in 1881–'82, * * * * * * * * * *

This expedition was planned and fitted out solely for the purpose of increasing our knowledge of the Arctic regions. While I have the honor to command it, and as long as I am fit for duty, I shall continue to pursue the object in view.

In assuming charge of this work I considered it important and dangerous. As an American soldier I have yet to learn that any prospective dangers or accident should deter a man from pursuing to his utmost any end which is in the line of one's duty, and instead prepare for a prospective retreat.

To practically abandon it and think only of personal safety, especially at a time when there seem possible discoveries which would be valued by the world and creditable to my country, would be difficult for me even under the most adverse circumstances, but now, under favorable circumstances, would appear dishonorable and unmanly. Could I for a moment listen to such a recommendation, your mention of Kane's name evokes to my *memory* such an example of perseverance under trying and adverse circumstances as would render such action impossible.

Your recommendations will not be followed in this respect.

I am, sir, respectfully yours,

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant, Commanding.

Acting Assistant Surgeon O. PAVY, *U. S. Army.*

[* * * * * * * * * A line and a half which cannot be made out from the letter-press copy.]

APPENDIX No. 64.—*Lieutenant Lockwood's orders for preliminary journey northward, 1883.*

FORT CONGER, GRINNELL LAND, *March* 8, 1883.

SIR: I have the honor to direct that you continue this spring in North Greenland the work of exploration which was pushed by you in 1882 to Hazen Coast with so much energy and success. In connection with the work there will be under your full control three selected men, the two Eskimo with sledges, and the best twenty dogs.

As has been previously understood the work looks to a preliminary trip to Greenland via Lincoln Bay the first favorable weather, and subsequently an extended journey of fifty to sixty days' duration, in which the second sledge will accompany you as far as it can be useful. About 400 pounds of supplies at Polaris Boat Camp, and 150 pounds at Cape Bryant, cached by you in 1882, will be used during the trip. Dog-food and other supplies are largely cached at depot A, B, and C, and at Lincoln Bay; the quantity and kind at each point you are familiar with.

Your recommendations regarding the sledge ration are in general approved, and when once in the field it will consist of butter, two ounces; bread, ten ounces; sugar, two ounces; tea, one-half ounce, *or* chocolate, two ounces; milk, one-half ounce; salt, one-third ounce; pepper, one-twentieth ounce; alcohol, six

ounces; lime-juice, one ounce; meat, two ounces: one-half the meat will be fresh, and the remainder divided between sausage, pemmican, bacon, and English beef. The arrangement and carrying out of the necessary details are left to your judgment and discretion.

I am, respectfully yours,

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant, Commanding.

Second Lieut. JAMES B. LOCKWOOD,
Twenty-third Infantry, Acting Signal Officer.

APPENDIX No. 65.—*Lieutenant Lockwood's report on journey ordered in Appendix No. 64.*

FORT CONGER, GRINNELL LAND, *March* 19, 1883.

SIR: I have the honor to render the following report of a preliminary sledge trip to the Greenland coast, pursuant to your letter of instructions of the 8th inst.

The outfit consisted of two sledges—*Antoinette* and *Adola*—and teams of ten dogs each; myself, Sergeant Brainard, and Frederik Thorlip Christiansen (Eskimo) with one, and Sergeants Jewell and Elison, and Jens Edwards (Eskimo) with the other. Rations and dog-food on a liberal basis, for ten days, and also extra dog-food, &c., for use of the contemplated exploring expedition.

The party left Fort Conger March 10 at 8.40 a. m., and proceeded north along the coast. Depot A (Cape Murchison) was reached about 12 m. Here additional dog-food, &c., was taken on, making the draught weight of each team about 930 pounds. The sheep-skin sleeping-bag and rubber blanket were also taken from here. Continuing on I reached depot B (5 miles south of Cape Beechey) at 4.05 p. m. Sergeant Jewell with the second sledge came in half an hour later. The traveling thus far was never better. We camped here for the night, occupying the depot tent and one of the two tents brought along. The two sacks of pemmican left here last fall were not to be found. Traces of foxes were found in the tent and around, and these animals had doubtless eaten the pemmican. Sergeant Elison got sick on the road up, complaining of pain in the legs, fever, &c. Could do nothing for him but make him as comfortable as possible in the depot tent where we had a little stove and fire. Weather fine; thermometer very low.

March 11.—Sergeant Elison said he was all right and could go on. Wooley, one of the dogs, was quite lame and weak, and I left him behind tied to a stake in a hole dug in the snow—leaving him some hard bread for food. We started at 10.30 a. m., and reached Cape Beechey without event. Here but one sleeping-bag could be found, of the two 3-man bags left by me last spring. The rubber blanket, two tents and poles were found. I sent Sergeant Jewell and his sledge back for the two sheep-skin bags left at depot B and continued on. From an elevation of a hundred feet [30^{m}] or more, so much rubble-ice was seen in the straits on a direct line with my objective point, Cape Brevoort, that I decided to continue along the coast via Wrangel Bay, and possibly Lincoln Bay, with the double object of obtaining the pemmican and meat expected at those places, and of finding a better route across the strait. In the first object I was partially disappointed, and in the latter entirely. There was no ice-foot above Beechey, and the straits parallel with the coast presented little else than heavy rubble-ice. We made slow progress and had to work continuously with the ax. At 4.35 p. m. we were half way between Beechey and Wrangel Bay. Wishing Sergeant Jewell to catch up I pitched the tent and sent Sergeant Brainard back with team for half the load which had been left behind a mile or more. He returned with it at 6 o'clock, and with our help Sergeant Jewell got up with his team and load at 6.30 p. m. Weather clear but cold.

March 12.—I got up at 7 o'clock and cooked breakfast, and we got off by 9.45 a. m; the traveling very bad; floes few and small. We encountered rubble-ice in great quantities all day. Got into shore and followed along the foot of the high cliffs some distance, but most of the route was some distance out in the straits. Reached the south cape of Wrangel Bay at 2.30 p. m. The rubble-ice in the bay and to the north looked so rough that I determined to proceed hence direct to Cape Brevoort and visit the caches at Wrangel and Lincoln Bay on my return, when the loads on the sledges would be inconsiderable. I changed my course accordingly and pursued a laborious way with the constant use of the ax till 5.10 p. m., when the men being very tired, we camped on the edge of a mass of rubble-ice.

March 13.—Sergeant Brainard arose to cook breakfast at 5.30 a. m. Shortly afterwards Sergeant Elison was reported sick; he had something the matter with his stomach, and had no appetite; felt too unwell to go farther, but thought he could walk back to depot B by himself. He was evidently too sick for the latter and I sent him back on the second sledge, giving him a drink of hot rum before starting. Leaving the two tents standing, I went forward at 8.20 with the first sledge, Sergeant Brainard and Christiansen taking a load of 600 pounds. After proceeding through the rough ice about 1½ miles, we came to a level floe of new ice, which was succeeded by an immense floe of ancient ice, gently undulating like a prairie, and affording excellent traveling. A severe wind from the north acted as an offset to this, however, and frost-bites were frequent. At 2 p. m. we were more than half-way across the straits, and leaving the load we returned to camp, reaching it at 4. 30 p. m. Sergeant Jewell returned about an hour later.

March 14.—At 8.45 a. m. the two sledges started forward with everything. On reaching the large floe referred to, I transferred both loads to Christiansen's sledge and detached Sergeant Jewell and team to visit Lincoln Bay, the traveling thence from this place seeming good, and on his return to visit Wrangel Bay; directing him to leave what he found in cache at the south cape of the latter. About three quarters of an hour after passing the rations brought forward yesterday, we came to rough ice again. Towards Cape Brevoort the prospect looked very discouraging, but better farther to the south. Everything considered, I thought it best to oblique to the right towards Newman Bay. We struggled through some very rough ice till 5.30 p. m. and then camped. A noticeable feature in the rough ice on both sides the straits was the snow-drifts running north and south, created and packed hard by the late storms. Thus our course was a series of zigzags, and the difficulty was in getting from one ridge to another.

March 15.—During the night it blew violently from the south, but the tent being well secured withstood the storm. At 8.45 a. m. I sent Sergeant Brainard with sledge and driver back for pemmican, &c., remaining behind, and some time later started myself to find a route into the smooth ice of Newman Bay. Intervening, some good floes existed, but between them was rubble-ice, of the worst possible description, entirely impracticable. It evinced, to my mind, strong currents and heavy pressure. In about one and a fourth hours I reached the Boat Camp and satisfied myself that the cache in the whale-boat remained intact. I then proceeded along the foot of the cliffs to Cape Sumner; along the land-foot and snow-slopes there was a sledge route, but not very good. Between Cape Sumner and the tent I found a good route. Reached the latter at 1.20 p. m. and found Sergeant Brainard just returned. The time till 5.30 p. m. was occupied in transporting everything to the land-foot, half a mile east of Cape Sumner. The tent was then pitched on the ice opposite the latter, and then Sergeant Brainard and I walked to the Boat Camp, about 1½ miles away, and made a further inspection. Returned at 8 o'clock, and at 10.30 went to bed. The cache left near Cape Sumner consists of 175 pounds rations, 804 pounds dog-food, alcohol, rifle, shotgun, field glasses, medicines, &c.

March 16.—I inspected the route direct to Cape Beechey from an eminence at Cape Sumner, and determined to return direct, having only constant weights on the sledge (about 100 pounds). We got off at 7.45 a. m., traveled over smooth, slightly rolling floe-ice for about 7 miles, crossing but two belts of rubble-ice. After this a succession of the two was met with till near Cape Beechey, but the floes largely predominated, and the journey from shore to shore occupied just seven hours. Off the coast near Cape Beechey, and above and below much rubble-ice exists. We reached depot B at 4 p. m. Here I found Sergeant Jewell and team. Sergeant Elison had left for the station with the lame dog Wooley.

March 17.—We suffered a good deal from cold at night during the trip, though the temperature was high, except for the first day or two. We suffered especially so last night. Lamp lighted at 3.15 a. m., and at 7 a. m. we were off. At depot A Wooley was found and brought in on the sledge. Privates Schneider and Whisler, with pup-team, were met near by. Fort Conger was reached at 1 p. m. One sleeping-bag (2-man) and a rubber blanket were left at depot B.

The report of Sergeant Jewell is appended.

Very respectfully, your obedient servant,

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, A. S. O.

First Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant, Commanding.

APPENDIX No. 66.—*Sergeant Jewell's report to Lieutenant Lockwood relative to journey ordered in Appendix No. 64.*

FORT CONGER, GRINNELL LAND, *March* 19, 1883.

SIR: In compliance with your verbal instructions, for me to visit the English cache at Lincoln Bay and to procure the meat left there, I have the honor to state that upon being detached with my dog-team (Jens Edwards, driver) from your party, at 11.15 a. m. of the 14th instant, I shaped my course as nearly as the nature of the ice would permit for Lincoln Bay, the point of starting being about 10 miles to the southeast of Cape Frederick VII.

The ice for the first few miles consisted of large paleocrystic floes, fringed with heavy hummocky ice forced up by pressure. As I approached the Grinnell Land shore these floes became smaller and I was obliged to make a detour to the south of my direct course. When within about a mile of the shore, I noticed one floe that was aground, as shown by the tidal action around it, this indicating much shallower water than is usually attributed to Robeson Channel, or a much greater thickness to this ice. Not having the facilities for sounding, I was compelled to forego the elucidation of this very interesting question. By hard work I reached the cache at 4.15 p. m., having had much trouble to get inside of the heavy ice.

During the night I experienced a heavy gale (southerly), with a brisk wind continuing until morning (15th). After breakfast I visited the cache of Dr. Pavy, where I found two boxes of beef; returning with these, I broke camp at 10.15 a. m., and, thinking that I could improve on my route of the day before, made more directly for Cape Frederick VII, but soon became badly entangled in very heavy ice that had been piled up against the cape, which I finally reached at 12 m., and then shaped my course along the coast. But instead of the smooth new ice I found along this coast a year ago, everything indicated an immense ice irruption, it being piled up to a great height along the coast to Wrangel Bay. At places I tried to use the ice-foot, but owing to floe-bergs that had been thrown across it, I found it unreliable, and considered it to my advantage to travel through the rubble-ice, using the large floes when possible.

I arrived at the cache in Wrangel Bay at 5.45 p. m. but could find no traces of the pemmican left there in the autumn of 1881. I found one shovel, some canned goods, and the frame of a pair of snow-shoes, the net-work of the latter having been eaten out by foxes or some other animals. I broke camp at 8.15 a. m. (16th) and found comparatively easy traveling through the bay. This being noticeable in comparison with the character of the ice in Lincoln Bay, the pressure in the latter filling the bay, while in the former the line of heavy ice was very well marked, extending from one point of the bay to the other. Caching the meat near the southern point of the bay, in accordance with your instructions, I followed our former road to depot B, where I arrived at 2.15 p. m., and was joined by yourself at 4 p. m.

In accordance with additional instructions I left depot B at 8.15 a. m. the next morning (17th) for the meat cached at Wrangel Bay, reaching that point at 11.30 a. m.; and, returning again, cached it at the cairn near Cape Beechey, arriving at depot B at 3.20 p. m. Before retiring I placed all the dogs' harnesses and lashings inside of one of the empty tents, but the next morning I found to my consternation that the dogs had got at them, and nothing remained but a few pieces of ivory and the whip-stock; these being spared by them on account of their indigestible qualities. I, however, found a piece of leather in stock at depot B, and having a small coil of lashings left, the dexterous fingers of Jens soon fitted us out with eight complete harnesses. I left the depot at 1.30 p. m., arriving at Fort Conger at 6.10 p. m.

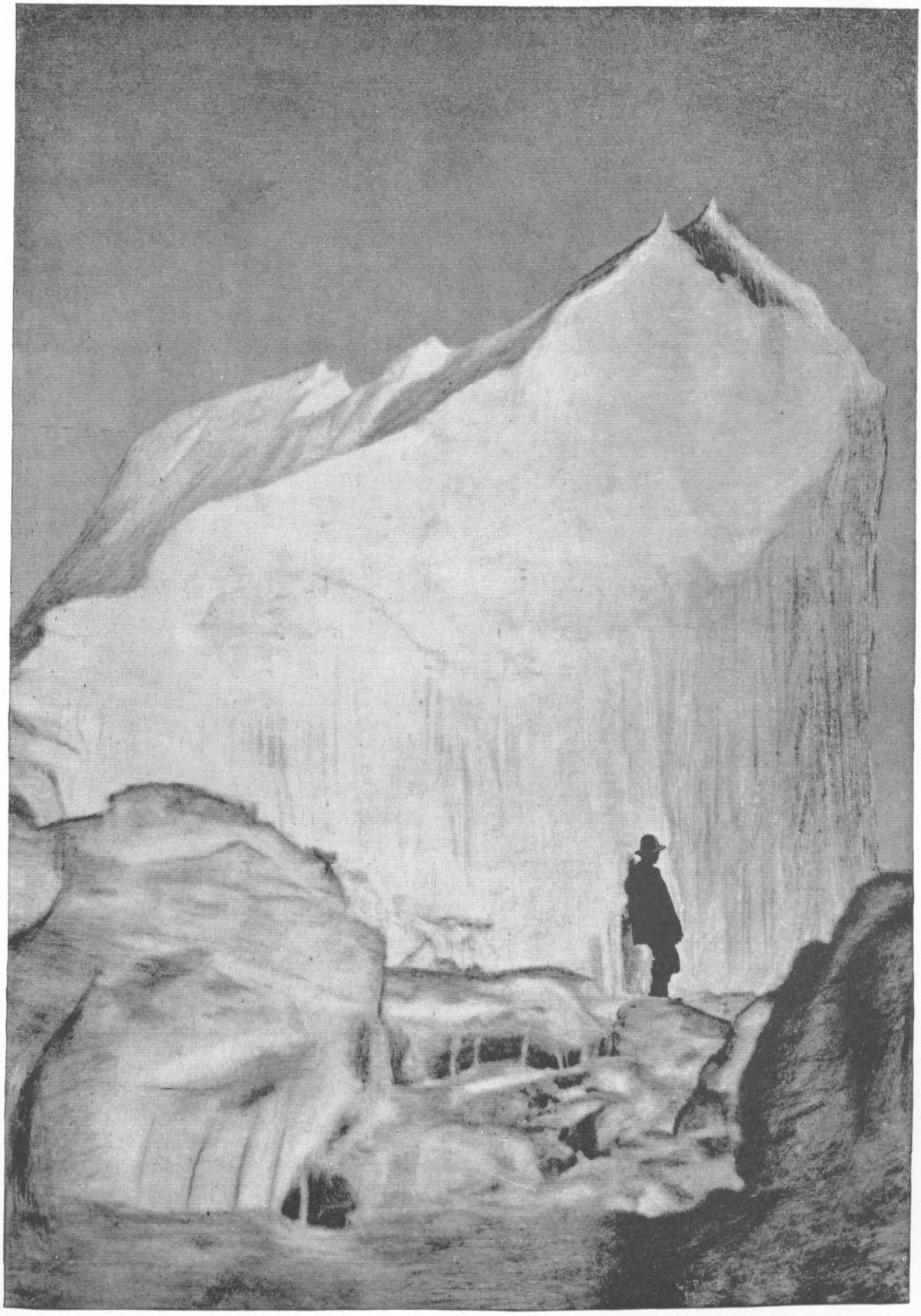
The only animal life seen during the trip was an ermine, about one mile south of Brenta Bay.

Inclosed herewith you will find a report of meteorological observations.

Very respectfully, your obedient servant,

W. S. JEWELL,
Sergeant, Signal Corps, U. S. Army.

Second Lieut. J. B. LOCKWOOD,
Commanding North Greenlamd Sledge Party.



PALEOCRYSTIC ICE IN ROBESON CHANNEL.

(From a photograph.)

Report of meteorological observations taken on trip to Lincoln Bay.

Date, 1883.	Time.	Barometer No 16.		Thermometer.				Wind.		Weather.	Place of observation.
				Observed.		Minimum.		Direction.	Force.		
		Inches.	*mm.*	*Fahr.*	*°C.*	*Fahr.*	*C.*				
Mar. 10.	12 m.	30.10	764.53	—39.1	—39.5	-------	-------	NE	Light	Fair	Depot A.
	6 p.m.	30.15	765.80	—43.0	—41.7	-------	-------	NE	Light	Fair	Depot B.
Mar. 11.	9 a.m,	29.73	755.13	—44.0	—42.2	—48.0	—44.4	NE	Light	Fair	Do.
Mar. 12.	8 a.m.	30.00	761.99	-------	-------	-------	-------	S	Fresh*	Fair	Between Beechey and Wrangel Bay.
Mar. 13.	7 a.m.	29.62	752.33	-------	-------	-------	-------	NE	Fresh	Fair	Off Wrangel Bay.
	1 p.m.	-------	-------	—35.0	—37.2	—48.0†	—44.4	NE	Fresh	Fair	Depot B.
	7 p.m.	29.48	748.78	-------	-------	-------	-------	NE	Fresh	Fair	Off Wrangel Bay.
Mar. 14.	7 p.m.	29.53	750.05	-------	-------	-------	-------	S	Fresh	Fair	Lincoln Bay.
Mar. 15.	8 a.m.	29.85	758.18	-------	-------	-------	-------	S	‡ Brisk	Fair	Do.
	7 p.m.	30.10	764 53	-------	-------	-------	-------	SW	Light	Fair	Wrangel Bay.
Mar. 16.	7 a.m.	30.21	767.32	-------	-------	-------	-------	Calm	-------	Fair	Do.
	3 p.m.	30.21	767.32	Warm	Warm	Warm	-------	NE	Brisk	Fair	Depot B.
Mar. 17.	7 a.m.	30.10	764.53	—24.0	—31.1	-------	-------	SW	‡ Fresh	Fair	Do.
	5 p.m.	29.99	761.73	—24.0	—31.1	-------	-------	S	Light	Fair	Do.

*Heavy wind during night. † Since 9 a.m., 11th. ‡ Gale during night.

APPENDIX No. 67.—*Orders to Lieutenant Lockwood, for exploration of Greenland, 1883.*

FORT CONGER, GRINNELL LAND, *March* 23, 1883.

SIR: I have the honor to furnish you with the following instructions for guidance in your contemplated sledge journey in North Greenland:

Except from unfavorable and unforeseen delays in your return, you will be at Polaris Boat Camp [Newman Bay, Greenland], not later than May 31st. Should any of the following circumstances arise, you will return immediately to this station:

If at any time you think you cannot go beyond Lockwood Island, your farthest of 1882;

If the polar pack shows signs of disintegration;

If you are personally incapacitated for rapid travel;

If any member of your party is badly injured or shows signs of serious illness.

In case of any temporary disability in the party of the supporting sledge, the disabled man will be left in a snow-house with sufficient bedding, food, and fuel to insure comfort and safety; a second man should be left with him only in case of illness.

You are recommended to watch carefully the condition of the ice in the many fiords you will necessarily cross, and to select only such spots for caches as will certainly be secure and accessible.

Regarding observations, collections, &c., you are referred to the instructions of last season.

Full record and maps will be left in cairn at your farthest, Cape Bryant, and Polaris Boat Camp.

A careful watch will be kept from this point on the condition of the ice in Robeson Channel, and a sledge will be sent to Polaris Boat Camp late in May. The small boat will be hauled to Cape Murchison [during your absence], so as to be readily available in case of an emergency, and such other precautions will be taken as you may suggest before your departure, or in letter by return of your supporting sledge.

The dangers attendant on your trip are obvious and serious. I shall not feel free from anxiety until your return. While reposing great confidence in your judgment and discretion, I cannot refrain from cautioning you against more risks than can be possibly avoided. You are the only line and executive officer on duty with this expedition, and to you the party look in case of accident or disability in my own person.

Wishing you a safe return, and feeling certain of great success, if favorable circumstances are commensurate with your energy and perseverance,

I am, respectfully yours,

A. W. GREELY,

First Lieut., Fifth Cav., A. S. O. and Assistant, Commanding.

Second Lieut. JAMES B. LOCKWOOD,

Twenty-third Infantry, A. S. O.

APPENDIX No. 68.—*Sergeant Rice's orders for journey to Thank God Harbor.*

FORT CONGER, GRINELL LAND, *April* 5, 1883.

SERGEANT: You are hereby directed to leave this station about April 10, with ten enlisted men and a dog-sledge, for the purpose of bringing to this point the 20-foot [6m] English ice-boat now at Thank God Harbor.

In connection with this work you will examine with dog-sledge, April 6, the state of the ice off the coast between Distant Cape and Cape Murchison, in order to select the best route toward the Greenland shore.

It is expected that the dog-sledge will move your constant weights, and the energies of your party will be devoted on the outward journey to making suitable roads for the heavy load of the returning sledge.

The boat will be hauled on the 12-man English sledge to be found with it; lashings for boat and sledge will be taken from this side. In addition to the boat the three tins of pemmican will be brought to this point.

Provisions for ten days will be furnished for your party.

Dr. O. Pavy will accompany the party to look after the health of the men, and his instructions touching that particular province will be carefully and promptly followed.

You will understand, however, that you are fully charged with the command of the enlisted force, and that you are responsible for the practical details and successful issue of the journey.

You understand how very important it may be to the interests of this expedition that the boat be safely and successfully transferred to this coast.

A detailed report, with copy of your sledge journal, will be transmitted me within five days of your return.

I am, respectfully yours,

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant, Commanding Expedition.

Sergt. GEORGE W. RICE,
Signal Service, U. S. Army.

(Copy respectfully furnished for A. A. Surgeon O. Pavy, U. S. Army.)

APPENDIX No. 69.—*Dr. Pavy's orders for journey, as surgeon, to Thank God Harbor.*

FORT CONGER, GRINNELL LAND, *April* 5, 1883.

SIR: I have the honor to advise you that the sledge party to Thank God Harbor, which you are to accompany, will leave this station about April 10th, 1883.

The enlisted force will be under the direct command of Sergt. Geo. W. Rice, Signal Service, who has been ordered to carry out any instructions touching the health of any of the party you may communicate to him. A copy of his orders is herewith enclosed.

It appears proper to here note that your anomalous position [results from your] particular report. You explicitly stated to me that your services would be of use during this trip [on] medical [grounds, and] that you were *unfamiliar with the work* to be carried out, and that you would *unwillingly assume both medical and executive responsibility.*

A full written report will be made within three days after your return.

I am, sir, respectfully yours,

A. W. GREELY,
First Lieutenant, Fifth Cav., A. S. O. and Asst., Commanding.

Actg. Asst. Surgeon O. PAVY, *U. S. Army.*

(One enclosure.)

(The partial illegibility of the letter-press copy renders occasional words doubtful; such words are bracketed.—A. W. G.)

APPENDIX No. 70.—*Lieutenant Lockwood's report on trip to North Greenland.*

FORT CONGER, GRINNELL LAND, *April* 14, 1883.

SIR: I have the honor to render the following report on the operations of the sledge expedition on the north coast of Greenland March 27 to April 12, directed by you with the view of continuing the work of exploration in that quarter.

The equipment consisted of two dog-sledges, ten dogs each. With the advance sledge *Antoinette*, were myself, Sergt. D. L. Brainard, and Frederik Christiansen (Eskimo). With the supporting sledge *Adola*, Sergt. W. S. Jewell, Pvt. William A. Ellis, and Jens Edwards (Eskimo). The details of the rations and equipment are appended.

March 27 (*Fort Conger to Cape Beechey*).—At 8.30 a. m. the two sledges (carrying 600 pounds) left the station, accompanied by Lieutenant Greely and pup-team as far as Water-course Bay. Two wolves were seen near Distant Cape making their way south. Traveling excellent. Depot A reached in 2½ hours. A ptarmigan seen some time before reaching there and several fox tracks near the tent. A fox had entered the tent since my last visit. Took the two seals from the tent and continued on over an excellent road, generally speaking, reaching depot A at 1.40 p. m. Here we were delayed forty minutes in adding to the sledge loads the two tents left standing since last trip, sixty pounds of hard bread, some chocolate, &c. Numerous fox tracks around. We reached Cape at 3.55 p. m. and went into camp. Weather overcast with light south wind threatening snow. Pretty much all of us stiff from the last trip, and we found the Beechey march not an easy one. Supper finished by 5.30 p. m.

(Hours *en route*, *———; distance, *———.)

March 28 (*Cape Beechey nearly to Cape Sumner*).—Sergeant Brainard, cook, arose at 5 a. m. Breakfast over at 6.10. Found it snowing fast and the Greenland shore invisible. Took on the English meat, seventy-two pounds, left here ten days since and broke camp at 7.30 a. m. Proceeding along the land-foot a short distance, we crossed the ice wall bordering the shore, and after chopping more or less through upwards of one-half mile of rubble-ice, gained a level floe and took a direct course for Cape Sumner, inclining somewhat to the right as we proceeded. The route lay over old-floe ice mostly of great extent, separated by patches of rubble-ice of a few hundred feet or yards in width generally. The loads being light the dogs got through the last quite readily after a route for them had been selected, and on the old floes kept up a trot most of the time. At 4.05 p. m. we were about three miles from Cape Sumner, and all being quite tired I determined to camp. Private Ellis complained of a pain in his side, and he and Sergeant Jewell, who suffered from a pain in his hip, rode on the sledge over parts of the route. Supper over at 6.15 p. m.

(Hours *en route*, *———; distance, *———.)

March 29 (*from off Cape Sumner into Newman Bay*).—At 5.23 a. m. I got up to cook breakfast. A good deal of wind during the night, which still continued to some extent. At 6.20 breakfast ready. Weather overcast. At 8.17 started off, after a delay of about half an hour, on account of several of the dogs being led off by two of the bitches in heat. The last four dogs were caught one half hour after starting. At 10 a. m. reached Cape Sumner, after some toilsome work in rubble-ice, in consequence of inclining in towards shore too soon. The supporting sledge overturned twice. A route was found parallel with the shore, but some distance out, and the Boat Camp reached in forty-five minutes, after some chopping with the ax. After ten minutes' delay at the boat we continued on, and at 11.55 a. m. stopped on Newman Bay, some miles onward, towards the Gap Valley overland route, the one selected. Pitching the tents and unloading, I started back to the Boat Camp, leaving Ellis behind to prepare supper for the party. At the boat I left Sergeant Brainard to prepare the rations to be taken from her, and continued on along shore to the cache made 15th March near Cape Sumner. Found the snow slopes much worse since my last visit. Fox tracks were seen near by, but fortunately the cache remained untouched, having been pretty well concealed by us with ice and snow. We continued on to Cape Sumner with the contents of the cache and returned to the Boat Camp via the floe. Here, taking on the rations prepared, we all returned to the tents at 4.42 p. m. The ice of the bay up to this point consists mostly of old floes (many with blue tops), separated by narrow belts and ridges of hummocks and rubble-ice. The last, as usual, is abundant near shore. On the floes themselves was little snow and the traveling was excellent. Some time after supper was spent in taking meats out of cans, &c., and issuing to the supporting sledge sixty rations, which would enable them to be

* Omission in original.—A. W. G.

absent 20 days from the Boat Camp and allow the advance sledges 48 days' absence, with 144 rations remaining. The small seal, weighing twenty-eight pounds, was fed to the two teams, but strange to say the dogs did not take to the meat very naturally.

March 30 (*from camp near Boat Camp to Brevoort Peninsula*).—At 5.07 a. m. Sergeant Brainard got up to cook breakfast; ready in an hour. Morning clear overhead, but cloudy around the horizon. A light snow falling; Jewell and Ellis feeling stiff. At 8 a. m. started *en route* with everything, about 1,100 pounds to each team. We got through two or three patches of rubble-ice with little difficulty, and then came to the smooth, new ice of the bay, covered with only a little snow. At 9.50 reached mouth of gorge, and each sledge, throwing off half its load, prepared for the toilsome journey through this narrow cañon. This gorge has steep snow-drifts, from twenty to fifty feet [6 to 15^{m}] high, up three of which roads were made with ax and shovel, and the whole force concentrated on one sledge at a time, pulling and pushing inch by inch. A road-bed was cut around the flank of the fourth, it being nothing but a deep pit, probably 20 feet [6^{m}] deep. The height of the others was about the same, except the one at the end of the gorge, which was two or three times that, but the incline not so steep. The roof of an ice grotto was cut through. A large grotto, occupying the whole bed of the stream, was found beyond it. At 2.25 p. m. the tents were pitched on the divide, out of the gorge, and the empty sledges started back with every one, except Sergeant Jewell, to bring up the remainder of the loads. The mouth of the gorge was reached in just twenty-five minutes, and at 4.40 p. m. we were at the tents once more. The locality not looking in all respects familiar, I walked to an elevated ridge, some three miles to the north, after supper. From here I could see the north shore and set at rest all doubts. The barometer gave me an elevation of 500 feet [152^{m}] above camp; the latter is about the same above the sea-level. Got to bed at 9 p. m.

March 31 (*from divide to mouth of Gap Valley*).—Called Sergeant Jewell at 4.20 a. m., and got up myself an hour later to cook breakfast. I directed Sergeant Jewell to leave his tent standing and send Jens with empty sledge back to last camp for a can of lime-juice pemmican he had accidentally left behind. Morning fine, clear, and calm. At 7.35 a. m. advance sledge started down the valley, carrying its entire load. Traveling very good on hard snow. After proceeding 1¾ hours we were obliged to double up through the narrow gorge into which the valley had here diminished. Soon after we entered the head of the wide Gap Valley, proper, and were able to haul everything at once to the sea-coast. Reaching the latter at 1 o'clock we turned east and proceeded one-fourth of a mile, when we were stopped by the close approach of the ice wall lining the sea-coast, to the foot of the cliff forming the east cape of Gap Valley. Here, for the eighth of a mile, a great deal of labor was expended in cutting through. By 3 p. m. we had got the sledge and half-load through this place, and Christiansen and I continued on with it upwards of two miles, finding the traveling very good. Got back at 4 o'clock, and stopped for the night. The supporting sledge arrived half an hour later. Sergeant Jewell and Ellis suffering a good deal from pains in the groin and side, respectively. Noticed a good deal of new ice along shore.

April 1 (*Gap Valley to Black Horn Cliffs*).—At 5.20 a. m. Sergeant Brainard got up to cook breakfast. Both sledges off by 8.08. As the advance sledge had half its load already through the cutting, we parted company again with the supporting sledge. Reaching the half-load advanced the day before, we continued on with everything, but were delayed fifty minutes, just before reaching Repulse Harbor, by having to relash the sledge. Just north of the English cairn at the latter place, we found the location of the English depot of rations, and in it a sextant, flag, cooking lamp, old articles of clothing, &c. After a short delay the advance sledge started on. The supporting sledge had, in mean time, come up, but delayed to relash. It was necessary to follow round the shore of the harbor. The traveling from here on to the Black Horn Cliffs was excellent. The snow of the snow slopes about Drift Point was hard, and slopes easy. Along this coast the wall of rubble-ice and floe-bergs is not generally so high and imposing as last year. Outside a great deal of smooth, young ice was seen and many leads, apparently lately frozen over, stretched to the north and northwest. One running northeast was in particular noticed, which seemed several miles long. Fox tracks seen in several places along the shore. From the elevation of Drift Point was seen a continuous belt of young ice, a hundred yards [91^{m}] and more wide, between the Polar pack and the shore. Many water-holes and small cracks were seen in it. Thick water clouds were seen to the north. The separate floes of the Polar pack were often fringed with walls of "pushed-up" rubble-ice whose shining green sides and edges indicated recent pressure. At 4.45 p. m. we camped just beyond mouth of gorge, the first to the east of Drift Point, the steep slope at the foot of the bluffs which here mark the west end of the cliffs, making further progress by land impracticable. This is the usual place for taking to the floe. The supporting sledge came up three-quarters of an hour later.

April 2 (*at Black Horn Cliffs*).—Arose at 4.50 a. m. and lighted lamp. Breakfast in an hour. We had but little sleep on account of the cold. A little before 7 o'clock I started with Sergeant Brainard and Christiansen, without sledge, to find some way of getting on the outside floe or of following along the foot of the cliffs. First we examined the young ice bordering shore and found that a stone would go through almost anywhere and that the space of open water along shore was continuous. We then followed along a steep incline covered with stones, and finally were obliged to climb along the top of the ice wall. We got about a mile from camp, when we encountered a very steep drift sloping from a break in the cliffs overhead to the water at the foot. Beyond this the route seemed even worse. We here made an attempt to ascend the cliffs, but after gaining a considerable elevation by cutting steps in the snow I gave it up, principally on account of the certainty of falling into the water should one of us slip. A route along the foot of these cliffs, if possible at all, was certainly impracticable under the circumstances, and in any event would have involved many days' hard work and great risks. Sergeant Brainard pronounced it entirely impracticable. It was impossible to get round the cliffs as done last year. To follow along their base seemed almost equally so. After returning to camp and drinking some tea, I started out again with Sergeant Brainard to discover, if possible, an overland route. During my absence Sergeant Jewell was directed to make tidal observations by means of the rod brought along for the purpose. The gorge at whose mouth we were encamped presented the only inlet into the interior. This we followed up, meeting a high steep snow-drift and a variety of smaller drifts, rocks, &c., for three-quarters of an hour, when we came to a branch stream, a deep, narrow ravine from the southeast. Following up this three-quarters of an hour we came to what seemed its end, at a glacier-like formation of ice, over 100 feet [30^{m}] high, covered with snow, and very steep. The green edges of the ice cropped out in several places. The only means of ascending it would be by cutting steps for the purpose. We climbed up the rocky side to the north and found ourselves on a stony plateau. Proceeding about 1½ miles east we gained an elevated ridge 1,300 feet [396^{m}] high by barometer. The main stream-bed we had ascended continued south till lost in a chain of mountains running east and west probably a half dozen miles from the sea. The branch we had ascended apparently ended in the little glacier referred to. To the east of the last was an undulating plain sloping gently north and south, and forming a surface drain which gradually narrowed to a gorge, and after continuing east some miles then turned north, and apparently met the sea at "Rest Gorge" east of the cliffs, and where I camped April 25, 1882. A huge formation of ice or snow could be seen at the bend of this stream, to the north. From the hill the appearance of the ice was much the same as observed from shore, only more extensive—a series of floes separated by what seemed new ice and fringed with "pushed-up" rubble-ice. One clearly defined lead ran northwest towards Cape Joseph Henry. Misty clouds all along the northern horizon. Reached camp by a direct course and found every one walking vigorously up and down to keep warm. Air clear and calm but very cold. Supper at 6; turned in at 7 p. m. Sergeant Jewell continued his tidal observations till midnight and declined assistance—an extremely severe ordeal under the circumstances.

April 3 (*at Black Horn Cliffs*).—At 5.10 a. m. called Sergeant Brainard, cook. Breakfast at 6 a. m. Morning overcast, light wind. At 7.50 a. m. started up the gorge with Sergeant Brainard, Christiansen, and Ellis. On reaching branch ravine, the only one this stream seemed to possess, I sent Sergeant Brainard forward with Christiansen to examine the glacier more closely, and to examine the country beyond, could any way be found of surmounting the glacier in any reasonable time. With Private Ellis I continued south, hoping to find some other opening towards the east. My course led me directly south till, not far from the mountains, I gained an elevation on the west side which commanded the ravine as far south as the mountains. Not an inlet of any kind presented itself from the east. The stream broke through the mountains from a southwest direction, and its bed was full of many large snow drifts. *En route* back I met Sergeant Brainard who reported that he had ascended the glacier by cutting one hundred and fifty-two steps in the ice, that beyond it the branch ravine still continued, but a wall of ice some 12 feet [3.6^{m}] high would have to be surmounted, and that on getting out on the divide he found a stone covered plain some quarter of a mile across. He regarded advance in that direction so impracticable that he went no farther. He thought it would take two weeks at least to get everything round to Rest Gorge (if it were possible at all); Christiansen fixed on ten days. In this ravine several ptarmigan and fox tracks were seen. The bed of the stream seemed to be a mass of ice, as shown by a grotto we met and seeing ice in other places. Returning to camp, all difficulties of advancing seemed to be set at rest by finding the young ice getting thicker rapidly and promising to bear in the morning. I went out a hundred yards [91^{m}] from shore and it easily bore my weight,

though bending in places and readily giving way to a single blow of the ax. Later in the day Christiansen pronounced it all right, and an approach was cut through the ice wall below camp for the sledges in the morning. Weather very cold; difficult to keep warm. Supper at 6.30 p. m. and in bags by 8. Sergeant Jewell up for several hours later, making tidal observations.

April 4.—At 6.50 a. m. I lighted lamp for breakfast. At 9.45 a. m. I took all five sacks pemmican on advance sledge, leaving the supporting party packing up. Feeling uncertain as to thickness of the ice, the tent, &c., was left behind. The crack near shore was slightly wider, but by throwing in masses of ice the sledge and load went readily over to the new ice. We got several hundred yards out from shore, and towards the east, when Christiansen saying the ice was "all right," I directed Sergeant Brainard to proceed ahead with the ax; while the pemmican having been thrown off, the empty sledge returned to camp for the rest of the load. When almost ashore two or three of the dogs went in the water, and I suddenly perceived that the ice was moving off shore. Leaving Christiansen to find a route ashore, I started after Sergeant Brainard, but was speedily overtaken by the dog-team, which went at once on a gallop after Sergeant Brainard. About 100 yards [91^{m}] from our crossing a small cake of ice was jammed by the moving ice close against a little promontory of rubble, the only place where there was not several yards of open water already. Here I climbed out and up, and brought the dog-team when it arrived a few minutes later. The ice moved up the coast (east) as well as out, and holding the little cake in position, the sledge, dogs, one by one, and pemmican were saved. The last sack of the latter went in the water, but was afterwards fished out as it floated. Soon there was a belt of open water 100 yards [91^{m}] and more in places along shore, and in two hours the ice had moved 200 yards [182^{m}] to the east. A hummock which I had sighted April 1, a mile or more distant, had changed its angle considerably to the east. A seal made his appearance in the open water. Seeing little chance of getting overland, the loaded sledges were turned westward, and at 12.30 we started back, but at Drift Point met so severe a wind from the south, with drifting snow, that the tents were again pitched just beyond. Several slight frost-bites occurred.

April 5.—In tents storm-bound all day.

April 6 (*from near Drift Point to Gap Valley*).—During the storms I determined to attempt the overland route, discouraging as it seemed, taking the sledge to pieces and carrying it and the load up the glacier and over the stony ground and other obstacles beyond by hand. The storm continued during the forenoon, but then dying away we packed up, after forty-six hours in the sleeping-bags, and took up the march to the east again. Shortly after this, seeing a wide lead of open water to the west, I halted to survey the scene, The pack was separated from the shore up and down, as far as the eye could reach, by the belt of open water, perfectly clear of ice, which, from 200 yards [182^{m}] to half-mile [804^{m}] wide, extended to the west in the direction of Lincoln Bay, and expanded into a wide sea from three to five miles wide. The ice to the south seemed to make a straight boundary on that side, but on the north to curve round in a great circle as it neared the Grinnell shore and then to stretch northward. I looked at it attentively through the field glasses, and it had every appearance of extending all the way across the straits. The [main] pack was moving rapidly to the east, as was plainly apparent on aligning any part of it with an object on shore. To the north several large leads of water were seen in the distance and smaller leads nearer to us. Dark, misty clouds hung about the northern horizon. Under the clause of my orders regarding "signs of disintegration in the Polar pack," I did not feel authorized in making any further attempts to proceed, and so reluctantly turned about to return to this station. In that vicinity we noticed and examined a large floe-berg, with very clearly defined strata. A dozen parallel lines were counted, ranging from the top half-way down. The berg was about 40 feet [12^{m}] high, and about the same in its other dimensions. On reaching Repulse Harbor the sextant, flag, &c. [cached in 1876 by Lieutenant Beaumont, R. N.], were put on the sledge; a record deposited in the cairn. The open water here was wider, leads to the north still quite plain, water clouds, &c. The open water crossing the straits seemed to take more the direction of Black Cape. Reached mouth of Gap Valley at 6 o'clock and camped, Ellis complaining of pain in his side again.

April 7 (*in camp at mouth of Gap Valley*).—The rod was set in a low place in the ice wall opposite camp and the day devoted to tidal observations, some hours' work being first performed to clear a place. The rod both here and elsewhere was thus fixed: At low water the ice was cut away from the crack as low down as could be reached readily. A sledge slat was then inserted horizontally in the ice wall, and at such a height that full tide nearly touched the slat. To the end of the slat thus placed the rod was lashed some half-dozen feet [about 2^{m}] above its lower end (*i. e.* about midway). It was held thus perfectly fast. The top of the rod was aligned with two objects on the ice wall, either on the plank or in rear, to give warning

of any movement in the ice wall itself. This was a hardly necessary precaution. At 8.25 a. m. I sent Sergeant Brainard and Ellis with the two sledges to advance the heaviest halves of our loads as far as possible. The sergeant reached Newman Bay in four hours and returned in two (*i. e.* at 2.25 p. m.). A cold wind with drifting snow sprang up in the evening making Sergeant Jewell's observations most trying, especially as he could hardly walk on account of the pain in his groin.

April 8 (*north end of Gap Valley to Cape Sumner*).—Got up at 6 a. m. and called other tent at 7 o'clock. An ice hummock sighted yesterday some distance from shore has since moved to the right several degrees. A large, dark mass of vapor observed up the coast to the east, looming up like a huge cliff. At 9.43 a. m. got off. Found it necessary to carry Ellis on sledge part of the way. Sergeant Jewell very lame. Reached top of divide in 2½ hours, and Newman Bay at 1.10 p. m. Here the loads advanced the day before were taken on. At 5.30 p. m. went into camp off Cape Sumner. Some time spent before and after supper in cutting away the ice for tide rod. Got to bed at 11 p. m.

April 9 (*in camp at Cape Sumner*).—Some more cutting early this morning finished the tide hole, after which, leaving Sergeant Jewell in camp, the rest of us proceeded to the boat camp and took from the boat pretty much everything except the sails, oars, &c., and turning the boat bottom up before leaving deposited a record in the cairn. Sergeant Jewell saw a white owl fly overhead towards the east. The tidal observations continued during the day.

April 10 (*Cape Sumner to camp on straits*).—At 5.50 a. m. got up and lighted lamp. Did not call the other tent till after 6 o'clock, Sergeant Jewell having been up till after midnight of the 9th taking observations. At 9.35 a. m. got off; Sergeant Brainard ahead with the ax; both sledges very heavily loaded. On this account we worked through the rubble-ice, only with great labor. We were fortunate in being able to follow trail made coming out. Encountered a very cold south wind. Camped at 3.35 p. m.

April 11 (*camp on straits to depot B*).—Got little sleep, and Sergeant Brainard arose and lighted lamp at 3.50 a. m. Off at 7.20, following old roads. The dogs did very well to-day in the rubble-ice, and we traveled, as yesterday, without "doubling up." At 12.20 p. m. advance sledge was inside the ice wall just above Cape Beechey. Snow on this coast much increased in depth and quite soft. Beautiful circle around the sun and mock-suns observed. At 2.50 p. m. reached depot B, and pitched tents. Sergeant Jewell and Ellis almost worn out.

April 12 (*depot B to Fort Conger*).—At 5 a. m. I got up to cook breakfast, which was ready in an hour; off at 8 a. m.; at 11.40 a. m. reached depot A and stopped twenty-five minutes; numerous fox and hare tracks about; traveling by no means good—in soft snow; reached Fort Conger at 3.42 p. m.

I would respectfully state in conclusion, that the conduct of those under my orders was all that I could wish. Sergeant Jewell and Private Ellis, though suffering daily from strains incurred during former trips or during this trip, bore up manfully. Sergeant Jewell's zeal in tidal observations in low temperatures and cold winds call for my hearty commendation. Sergeant Brainard showed himself as energetic, zealous, and intelligent as ever, and was my main stay. The two Eskimo I would also call to your favorable notice; Christiansen in particular showed himself willing, capable, and energetic.

Very respectfully, your obedient servant,

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, A. S. O.

First Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Asst., Commanding.

APPENDIX.

Distance traveled.

	Geographical miles.	
Fort Conger to Cape Beechey	23	
Cape Beechey to Boat Camp	25	
Boat Camp to north side Newman Bay	7	
North side Newman Bay to Repulse Harbor	15	
Repulse Harbor to Black Horn Cliffs	9	
		— 79
On return		79
Total (doubling up and foot journeys not included)		158

Constant weights, advance sledge.

	Pounds.	
A tent, poles and pins, 36 pounds; rubber blanket, 9¼ pounds; lamp, 5 pounds	50¼	
Buffalo sleeping-bag (two-man), 23½ pounds; dog-skin sleeping-bag (one-man), 12⅛ pounds	35⅝	
Ax, 6¾ pounds; spade, 5½ pounds; sextant, 3 pounds; artificial horizon and mercury, 6½ pounds	21¾	
Telescope, 3¼ pounds; field glasses, 3 pounds; compass, 1 pound	7¼	
Rifle, 11 pounds; ammunition, 4 pounds; two pairs snow-shoes, 6 pounds; tide rod, 4¼ pounds	25¼	
Extra lashings, 4½ pounds; medicine, 5 pounds	9½	
Three clothing-bags, 36 pounds; cook's bag, 16¼ pounds; store-bag, 18¼ pounds	70½	
		220⅛
Weight of sledge		109
		329⅛

Constant weights, supporting sledge.

	Pounds.	
A tent, poles and pins, 36 pounds; buffalo sleeping-bag (three-man), 38½ pounds	74½	
Rubber blanket, 6½ pounds; one lamp, 6½ pounds; one small lamp, 1¼ pounds	14¼	
Ax, spade, snow-shoes (one pair), 13¾ pounds; shot-gun and ammunition, 12 pounds	25¾	
Extra lashings, 4½ pounds; three clothing-bags, 36 pounds; cook's bag, 11¼ pounds	51¾	
		165¾
(Medicine, 5 pounds); sledge		109
		274¾

Many of these weights would have been reduced by leaving *en cache* as we proceeded.
Two seal-skin *temiaks* not included in above.

Dog-food.

	Pounds.
Salt pork (taken from station)	85
Two seals (taken from depot A)	78
Dried meat, seal, and musk-ox, from cache near Cape Sumner	225
Pemmican, five sacks, from cache near Cape Sumner	579½
Lime-juice pemmican, from whaleboat at Boat Camp	40
Pemmican, English, and lime-juice, to have been taken from Cape Bryant	100
	1,107½

Consumed all except that at Cape Bryant and the five sacks brought back to station. Amount consumed, 203 pounds.

Taken out of whale-boat at Boat Camp, March 29.

	Pounds.
Corned beef, one can	2
Beans, one can	2¼
Potatoes (English)	14
Sugar (all)	14
Alcohol	63
Butter, eight cans	24
Bread, one bag	60
Six balls wicking, and one English snow-knife. Total	179¼

One ration equals—

	Ounces.
Musk-ox meat, sausage, English beef, corned beef, bacon	22
Butter	2
Hard bread	10
Potatoes, beans	4
Tea (or chocolate, two ounces)	0½
Sugar	2
Milk	0¼
Salt	0⅓
Pepper	$\frac{1}{20}$
Alcohol	6
Total ration	$47\frac{21}{60}$

APPENDIX No. 71.—*Sergeant Jewell's report on tidal and meteorological observations made on trip to North Greenland.*

FORT CONGER, GRINNELL LAND, *April* 15, 1883.

SIR: I have the honor, herewith, to transmit report of tidal observations taken by me at the following-named points on the Greenland coast, viz: Near the southwest extremity of the Black Horn Cliffs, April 2 and 3; about 5 miles southwest of Repulse Harbor (at the northern entrance of Gap Valley), April 7, and at Cape Sumner, April 9 and 10, and meteorological observations made during the journey.

The series taken at the first-mentioned station, on the 2d, although showing the flow, are not definite as to the high and low tide, but, as the range disagrees with that afterwards observed, I am led to the conclusion that there was a movement in the gauge that influenced the readings. Upon taking the 8 p. m. observation of that date I found the gauge had been forced up by a piece of ice from below. I then enlarged the tide hole, cleared it from ice, and froze the support to the gauge solidly into the permanent ice wall. The readings thereafter were perfectly satisfactory.

The readings at Gap Valley were without a flaw, the gauge being frozen into the ice wall as at first station, and its position was carefully verified at short intervals by means of two points bearing on it, and no movement detected.

The exposure at Cape Sumner was as good as could possibly be obtained, the gauge being at the extreme point of the cape, secured as at the former stations, and its position verified as explained above. The readings were carefully made and the results all that could be desired. I would state that the greatest care was taken with these observations, especially for at least an hour before the turn of the tide, at which times the gauge was under constant surveillance, and all changes noted.

Very respectfully, your obedient servant,

W. S. JEWELL,
Sergeant, Signal Corps, U. S. A

Lieut. J. B. LOCKWOOD,
Commanding North Greenland Sledge Party.

Tidal observations, southwest extremity of Black Horn Cliffs.

[Date, April 2, 1883.]

Washington mean time.		Gauge.	Washington mean time.		Gauge.	Washington mean time.		Gauge.	Washington mean time.		Gauge.
Observed.	Corrected.		Observed.	Corrected.		Observed.	Corrected.		Observed.	Corrected.	
A. M.	A. M.	*Inches.*	P. M.	P. M.	*Inches.*	P. M.	P. M.	*Inches.*	P. M.	P. M.	*Inches.*
11.55	11.55	28.7	1.00	1.00	27.5	4.30	4.30	27.1	7.30	7.30	28.3
M.	M.		1.30	1.30	27.2	4.45	4.45	27.2	8.00	8.00	27.8
12.00	12.00	28.6	2.00	2.00	27.1	5.00	5.00	27.2	8.26	8.26	26.8
P. M.	P. M.		2.30	2.30	27.1	5.15	5.15	27.2	8.45	8.45	25.8
12.02	12.02	28.5	3.00	3.00	27.3	5.30	5.30	27.3	9.00	9.00	25.6
12.06	12.06	28.3	3.30	3.30	27.0	6.00	6.00	27.8	9.15	9.15	25.0
12.10	12.10	28.0	4.00	4.00	26.8	6.30	6.30	28.1	9.30	9.30	24.4
12.45	12.45	27.7	4.15	4.15	27.0	7.00	7.00	28.4			

[Date, April 3, 1883.]

A. M.	A. M.	*Inches.*	A. M.	A. M.	*Inches.*	P. M.	P. M.	*Inches.*	P. M.	P. M.	*Inches.*
7.10	7.10	31.8	9.25	9.25	32.2	1.30	1.30	23.9	3.27	3.27	22.9
7.20	7.20	32.0	9.45	9.45	31.8	1.45	1.45	23.5	3.37	3.37	22.9
7.25	7.25	32.5	10.00	10.00	31.3	2.00	2.00	23.2	4.00	4.00	23.0
7.38	7.38	32.7	10.15	10.15	30.5	2.10	2.10	23.0	4.22	4.22	23.3
7.47	7.47	32.9	10.30	10.30	30.2	2.13	2.13	23.0	4.40	4.40	24.0
7.53	7.53	33.0	10.45	10.45	29.7	2.17	2.17	22.8	5.00	5.00	24.6
8.00	8.00	33.1	11.00	11.00	29.5	2.20	2.20	22.8	5.30	5.30	25.5
8.05	8.05	33.1	11.15	11.15	29.0	2.25	2.25	22.7	6.50	6.50	29.3
8.10	8.10	33.1	11.30	11.30	28.5	2.30	2.30	22.6	7.30	7.30	30.9
8.17	8.17	33.2	11.45	11.45	28.0	2.35	2.35	22.6	7.45	7.45	31.3
8.22	8.22	33.3	M.	M.		2.41	2.41	22.7	8.00	8.00	31.8
8.27	8.27	33.3	12.00	12.00	27.3	2.45	2.45	22.8	8.08	8.08	32.0
8.35	8.35	33.4	P. M.	P. M.		2.51	2.51	22.8	8.15	8.15	32.0
8.39	8.39	33.3	12.15	12.15	26.7	2.57	2.57	22.8	8.21	8.21	32.1
8.42	8.42	33.2	12.30	12.30	26.4	3.05	3.05	22.7	8.27	8.27	32.2
8.47	8.47	33.2	12.45	12.45	25.6	3.10	3.10	22.7	8.32	8.32	32.3
8.51	8.51	33.2	1.00	1.00	24.9	3.15	3.15	22.8	8.39	8.39	32.2
8.54	8.54	33.1	1.15	1.15	24.5	3.20	3.20	22.8	8.45	8.45	31.8
9.07	9.07	32.8									

REMARKS.—The gauge consisted of the three joints of a signal-staff, graduated in inches. This was lashed securely to a hard-wood slat of the dog-sledge. An excavation was then made in the permanent ice wall, in which the opposite end of the slat was inserted, and secured by weighting with ice, the end of the rod passing into the water through the tidal crack, which was about 15 inches [380mm] wide. There was no known disturbance in the position of the gauge until 8 p. m. of the 2d, when it was found to have been disturbed by a piece of ice from below lifting it slightly. The end of the slat was then frozen solidly into the ice wall, and no other disturbance took place during the series. At the place of observation there were no coast indentations or other local influences liable to affect the free flow of the tide.

Tidal observations, North Greenland coast, about five miles southwest of Repulse Harbor (northern entrance to Gap Valley).

[Date, April 7, 1883.]

Washington mean time.		Gauge.	Washington mean time.		Gauge.	Washington mean time.		Gauge.	Washington mean time.		Gauge.
Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.	
A. M.	A. M.	*Inches.*	A. M.	A. M.	*Inches.*	P. M.	P. M.	*Inches.*	P. M.	P. M.	*Inches.*
6.45	6.46	45.8	11.04	11.05	83.1	4.00	4.01	36.9	6.00	6.01	30.9
7.10	7.11	49.2	11.14	11.15	82.8	4.15	4.16	34.7	6.30	6.31	32.8
7.25	7.26	51.7	11.30	11.31	81.5	4.22	4.23	34.1	7.00	7.01	35.8
7.45	7.46	55.0	11.45	11.46	80.1	4.30	4.31	33.1	7.30	7.31	39.0
8.00	8.01	57.9	M.	P. M.		4.35	4.36	32.6	8.00	8.01	45.2
8.15	8.16	61.0	12.00	12.01	78.7	4.40	4.41	32.2	8.30	8.31	50.9
8.30	8.31	64.0	P. M.			4.45	4.46	31.8	9.00	9.01	57.8
8.45	8.46	67.0	12.15	12.16	76.7	4.50	4.51	31.5	9.30	9.31	63.8
9.00	9.01	69.8	12.30	12.31	74.4	4.55	4.56	31.3	10.00	10.01	70.0
9.15	9.16	72.8	12.45	12.46	71.8	5.00	5.01	31.0	10.30	10.31	74.5
9.30	9.31	75.2	1.00	1.01	68.8	5.05	5.06	30.8	11.00	11.01	78.7
9.45	9.46	78.7	1.15	1.16	65.7	5.10	5.11	30.6	11.05	11.06	79.0
10.00	10.01	80.0	1.30	1.31	62.6	5.15	5.16	30.6	11.10	11.11	79.2
10.15	10.16	81.6	1.45	1.46	60.0	5.20	5.21	30.6	11.15	11.16	79.5
10.25	10.26	82.1	2.00	2.01	57.1	5.25	5.26	30.5	11.20	11.21	79.8
10.30	10.31	82.3	2.15	2.16	54.8	5.30	5.31	30.5	11.26	11.27	79.8
10.35	10.36	82.8	2.30	2.31	51.6	5.35	5.36	30.6	11.31	11.32	79.9
10.40	10.41	83.0	2.45	2.46	48.9	5.40	5.41	30.6	11.35	11.36	79.7
10.45	10.46	83.2	3.00	3.01	45.5	5.45	5.46	30.7	11.40	11.41	79.7
10.50	10.51	83.2	3.15	3.16	43.7	5.50	5.51	30.7	11.45	11.46	79.6
10.55	10.56	83.1	3.30	3.31	41.2	5.55	5.56	30.8	11.50	11.51	79.3
11.00	11.01	83.0	3.45	3.46	38.9						

REMARKS.—The gauge consisted of the three joints of a signal staff graduated in inches. This was exposed on shore ice suspended on a strong hard-wood slat (from dog-sledge) to which it was securely lashed. This slat was frozen solidly into the permanent ice walls. The position of the gauge was verified by the observer constantly by means of two fixed points bearing on the gauge. Position of the gauge on straight line of coast free from all indentations. At 5.25 p. m. a light swell was noticed in tide hole which continued during the rest of the observations, caused by a strong southwest wind acting on a body of open water lying between Repulse Harbor and Lincoln Bay.

Tidal observations, extreme point of Cape Sumner, North Greenland coast.

[Date, April 9, 1883. Latitude, about 81° 55′ N.; longitude, about 60° 45′ W.]

Washington mean time.		Gauge.	Washington mean time.		Gauge.	Washington mean time.		Gauge.	Washington mean time.		Gauge.
Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.	
A. M.	A. M.	*Inches.*	P. M.	P. M.	*Inches.*	P. M.	P. M.	*Inches.*	P. M.	P. M.	*Inches.*
8.33	$8^h\,34.5^m$	60.0	12.09	$12^h\,10.5^m$	100.6	3.30	$3^h\,31.5^m$	66.9	6.41	$6^h\,42.5^m$	40.6
9.05	9 06.5	70.1	12.12	12 13.5	100.6	3.45	3 46.5	63.6	6.44	6 45.5	40.7
9.30	9 31.5	76.4	12.14	12 15.5	100.5	4.00	4 01.5	59.7	6.47	6 48.5	40.8
10.00	10 01.5	82.7	12.19	12 20.5	100.6	4.15	4 16.5	55.6	6.51	6 52.5	40.9
10.30	10 31.5	89.8	12.21	12 22.5	100.6	4.30	4 31.5	53.0	6.53	6 54.5	41.0
10.45	10 46.5	92.1	12.24	12 25.5	100.5	4.45	4 46.5	50.0	7.30	7 31.5	43.0
11.00	11 01.5	94.7	12.27	12 28.5	100.4	5.00	5 01.5	47.2	8.00	8 01.5	47.4
11.15	11 16.5	97.0	12.30	12 31.5	100.3	5.15	5 16.5	45.0	8.30	8 31.5	52.0
11.30	11 31.5	98.7	12.35	12 36.5	99.9	5.25	5 26.5	44.0	9.00	9 01.5	58.8
11.35	11 36.5	99.0	12.45	12 46.5	99.2	5.35	5 36.5	43.5	9.30	9 31.5	64.9
11.40	11 41.5	99.6	1.00	1 01.5	97.8	5.45	5 46.5	42.1	10.00	10 01.5	73.5
11.45	11 46.5	99.8	1.15	1 16.5	95.6	5.55	5 56.5	41.5	10.30	10 31.5	80.1
11.50	11 51.5	99.9	1.30	1 31.5	93.3	6.00	6 01.5	40.9	11.00	11 01.5	88.5
11.55	11 56.5	100.1	1.45	1 46.5	90.9	6.06	6 07.5	40.8	11.15	11 16.5	91.8
M.	P. M.		2.00	2 01.5	88.2	6.12	6 13.5	40.7	11.30	11 31.5	95.0
12.00	12 01.5	100.2	2.15	2 16.5	85.6	6.19	6 20.5	40.4	11.45	11 46.5	98.6
P. M.			2.33	2 34.5	81.6	6.26	6 27.5	40.6	11.50	11 51.5	98.8
12.02	12 03.5	100.3	2.45	2 46.5	78.8	6.30	6 31.5	40.6	11.55	11 56.5	99.5
12.04	12 05.5	100.6	3.00	3 01.5	75.3	6.35	6 36.5	40.6	M'N'T.		
12.07	12 08.5	100.6	3.15	3 16.5	71.5	6.38	6 39.5	40.6	12.00		

Tidal observations, extreme point of Cape Sumner, North Greenland coast—Continued.

[Date, April 10, 1883.]

Washington mean time.		Gauge.	Washington mean time.		Gauge.	Washington mean time.		Gauge.	Washington mean time.		Gauge.
Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.	
A. M.	A. M.	*Inches.*	A. M.	A. M.	*Inches.*	A. M.	A. M.	*Inches.*	A. M.	A. M.	*Inches.*
	12h 01.5m	100.2	12.22	12h 23.5m	102.1	12.40	12h 41.5m	103.3	12.56	12h 57.5m	103.5
12.05	12 06.5	100.9	12.25	12 26.5	102.3	12.43	12 44.5	103.3	12.59	1 00.5	103.4
12.10	12 11.5	101.1	12.28	12 29.5	102.5	12.44	12 45.5	103.4	1.01	1 02.5	103.2
12.13	12 14.5	101.5	12.31	12 32.5	102.7	12.49	12 50.5	103.5	1.04	1 05.5	103.1
12.15	12 16.5	101.7	12.33	12 34.5	102.9	12.53	12 54.5	103.5	1.13	1 14.5	102.7
12.19	12 20.5	102.0	12.37	12 38.5	103.2						

REMARKS.—The gauge consisted of the three joints of a signal staff graduated in inches. This was exposed on shore ice, suspended on a strong, hard-wood slat (from dog-sledge), to which it was securely lashed. It was exposed at extreme point of Cape Sumner. The position of the gauge was verified by the observer constantly by means of two fixed points bearing on the gauge. No change in its position could be detected during the series of observations. Tide-hole entirely free from ice or anything that could interfere with its position.

Meteorological observations during the journey to North Greenland coast.

Date. 1883.	Time.	Barometer No. 11.		Thermometer No. 1, ivory scale.				Wind.		Weather.	Locality.
				Observed.		Minimum.		Direction.	Velocity.		
		Inches.	*mm.*	*Fahr.*	*C.*	*Fahr.*	*C.*				
Mar. 27	4.00 p. m.	29.90	759.45	—11	—23.9			SW.	Light	Fair	Cape Beechey.
28	7.00 a. m.	29.92	759.95	— 9	—22.8	—12	—24.4	Calm.		Lt. snow	Do.
	5.00 p. m.	29.96	760.97	— 7	—21.7			Calm.		Lt. snow	Robeson Channel, near Cape Sumner.
29	7.30 a. m.	29.91	759.70	— 7	—21.7	10	—23.3	S.	*Brisk	Cloudy	Do.
	7.00 p. m.	29.91	759.70	— 7	—21.7			SW.	Fresh	Threat'ing	Newman Bay.
30	7.00 a. m.	29.99	761.73	— 8	—22.2	—12	—24.4	SW.	Light	Lt. snow	Do.
	7.00 p. m.	29.22	742.17	—12	—24.4			Calm.		Fair	On divide, in Gap Valley.
31	7.00 a. m.	29.09	738.87	—28	—33.3	—36	—37.8	Calm.		Clear	Do.
	5.00 p. m.	29.71	754.62	—22	—30.0			SW.	Light	Fair	North end of Gap Valley.
Apr. 1	7.00 a. m.	29.50	749.29	—30	—34.4	—34	—36.7	N.	Light	Clear	Do.
1	7.00 p. m.	29.61	752.08	—40	—40.0			Calm.		†Fair	Near Black Horn Cliffs.
2	7.00 a. m.	29.61	752.08	—37	—38.3			SW.	Light	Fair	Do.
	1.00 p. m.	29.68	753.86	—28	—33.3			NE.	Light	Fair	Do.
	2.00 p. m.	29.65	753.10	—33	—36.1	—45	—42.8	NE.	Light	Fair	Do.
	3.00 p. m.	29.71	754.62	—36	—37.8			NE.	Light	Fair	Do.
	4.00 p. m.	29.72	754.87	—42	—41.1			Calm.		Fair	Do.
	5.00 p. m.	29.72	754.87	—42	—41.1			Calm.		Fair	Do.
	6.00 p. m.	29.71	754.62	—40	—40.0			Calm.		Fair	Do.
	7.00 p. m.	29.60	751.83	—38	—38.9			NE.	Light	Fair	Do.
	9.00 p. m.	29.61	752.08	—42	—41.1			Calm.		Fair	Do.
3	8.00 a. m.	29.68	753.86	—22	—30.0	—52	—46.7	NE.	Light	Cloudy	Do.
	9.00 a. m.	29.69	754.11	—22	—30.0			NE.	Light	Cloudy	Do.
	10.00 a. m.	29.58	751.32	—19	—28.3			NE.	Light	Cloudy	Do.
	11.00 a. m.	29.62	752.33	—20	—28.9			NE.	Light	Cloudy	Do.
	12.00 m.	29.61	752.08	—22	—30.0			NE.	Light	Cloudy	Do.
	1.00 p. m.	29.63	752.59	—24	—31.1			NE.	Light	Cloudy	Do.
	2.00 p. m.	29.61	752.08	—30	—34.4			NE.	Light	Fair	Do.
	3.00 p. m.	29.60	751.83	—34	—36.7			NE.	Light	Fair	Do.
	5.00 p. m.	29.41	747.00	—35	—37.2			NE.	Light	Fair	Do.
	7.00 p. m.	29.57	751.06	—38	—38.9			Calm.		Cloudy	Do.
4	10.00 a. m.	29.51	749.54	—10	—23.3	—43	—41.7	SW.	Light	Cloudy	Do.
5	12.00 m.	30.05	763.26	[‡]				SE.	Gale		About 4 miles from Repulse Harbor.

* High winds during the night. † Water clouds over northern sky. ‡ At 1 p. m. of the 4th overtaken by a severe SE. gale while passing over the snow-slopes; went into camp, where we remained for over forty hours. Gale abated early morning of the 6th.

Meteorological observations during the journey to North Greenland coast—Continued.

Date, 1883.	Time.	Barometer No. 11.		Thermometer No. 1, ivory scale.				Wind.		Weather.	Locality.
				Observed.		Minimum.		Direction.	Velocity.		
		Inches.	*mm.*	*Fahr.*	*C.*	*Fahr.*	*C.*				
Apr. 5	3.00 p. m.	30.01	762.24	-----	-------	-----	-------	SE.	Gale---	------ ---	About 4 miles from Repulse Harbor.
	7.00 p. m.	30.02	762.49	----	-------	-----	-------	SE.	Gale---	---- ------	Do.
6	10.00 a.m.	30.13	765.29	— 7	—21.7	-----	-------	SE.	Fresh--	Cloudy---	Do.
	8.00 p. m.	29.79	756.65	—24	—31.1	-----	-------	SW.	Light--	Fair ----	Do.
7	7.00 a.m.	29.69	754.11	—10	—23.3	—32	—35.6	NE.	Light--	Cloudy---	Do.
	10.00 a.m.	29.71	754.62	— 6	—21.1	----	-------	SW.	Light--	Snow ----	Do.
	12.00 m.	29.76	755.89	—12	—24.4	-----	-------	SW.	Light--	Snow ----	Do.
	1.00 p. m.	29.79	756.65	—13	—25.0	-----	-------	SW.	Fresh--	Cloudy---	Do.
	2.00 p.m.	29.80	756.91	—14	—25.6	-----	-------	SW.	Fresh--	Snow ----	Do.
	3.00 p. m.	29.80	756.91	—15	—26.1	-----	-------	SW.	Brisk--	Snow ----	Do.
	6.00 p. m.	29.81	757.16	—16	—26.7	-----	-------	SW.	Brisk--	Cloudy---	Do.
	7.00 p.m.	29.79	756.65	—14	—25.6	-----	-------	SW.	Brisk--	Cloudy---	Do.
	8.00 p.m.	29.91	759.70	—14	—25.6	-----	-------	SW.	Brisk--	Cloudy---	Do.
	9.00 p. m.	29.92	759.95	—14	—25.6	-----	-------	SW.	Brisk--	Cloudy---	Do.
	10.00 p.m.	29.99	761.73	—12	—24.4	-----	-------	SW.	Brisk--	Cloudy---	Do.
8	8.00 p.m.	29.82	757.41	—29	—33.9	—30	—34.4	SW.	Gentle-	Fair ----	Cape Sumner.
9	9.00 a.m.	29.68	753.86	—12	—24.4	-----	-------	SE.	Light--	Cloudy---	Do.
	11.00 a.m.	29.65	753.10	—13	—25.0	-----	-------	SE.	Light--	Fair ----	Do.
	1.00 p.m.	29.63	752.59	— 9	—22.8	-----	-------	SE.	Light--	Cloudy---	Do.
	2.00 p.m.	29.62	752.33	—10	—23.3	-----	-------	SE.	Light--	Cloudy---	Do.
	3.00 p.m.	29.62	752.33	—13	—25.0	-----	------	SW.	Light--	Fair ----	Do.
	4.00 p.m.	29.61	752.08	—16	—26.7	-----	-------	SE.	Light--	Fair ----	Do.
	5.00 p.m.	29.60	751.83	—18	—27.8	-----	-------	SE.	Fresh--	Fair ----	Do.
	7.00 p.m.	29.59	751.57	—16	—26.7	-----	-------	NE.	Light--	Cloudy---	Do.
	8.00 p.m.	29.61	752.08	—14	—25.6	-----	-------	NE.	Light--	Fair ----	Do.
	9.00 p.m.	29.62	752.33	—18	—27.8	----	-------	Calm.	-------	Fair ----	Do.
	10.00 p.m.	29.64	752.84	—24	—31.1	----	-------	Calm.	-------	Fair ----	Do.
	11.00 p.m.	29.62	752.33	—32	—35.6	-----	-------	Calm.	-------	Fair ----	Do.
10	8.00 a.m.	29.71	754.62	—31	—35.0	—34	—36.7	Calm.	-------	Clear ----	Do.
	7.00 p.m.	------	------	—30	—34.4	-----	-------	SW.	Fresh--	Clear ----	Robeson Channel.
11	6.00 a.m.	29.95	760.72	—24	—31.1	—45	—42.8	Calm.	-------	Clear ----	Do.
	5.00 p.m.	------	------	—29	—33.9	-----	-------	NE.	Light--	Fair ----	Depot B.
12	7.00 a.m.	------	------	—24	—31.1	—36	—37.8	NW.	Light--	Fair ----	*Do.

*Strong SW. wind blowing while crossing Robeson Channel.

W. S. JEWELL,
Observer.

APPENDIX No. 72.—*Sergeant Rice's report on trip to Thank God Harbor.*

FORT CONGER, GRINNELL LAND, *April* 20, 1883.

SIR: I have the honor to report that in accordance with your instructions of April 5, I examined on the following day, with dog-sledge, the ice on this side of Hall's Basin, with the view of selecting the best route towards Thank God Harbor, and decided on Distant Cape as the best starting point.

On April 10, at 8.25 a. m., I left station for Thank God Harbor with a party of 10 men, and accompanied by Dr. Pavy. We were supported by a dog-team driven by Private Schneider. We reached Distant Cape at 10.20 a. m., and picked up tent and turned off into Robeson Channel at 11.10 a. m. A field of new ice carried us some distance; a fringe of hummocks, with soft snow, then intervened; after which a paleocrystic floe furnished good traveling to about three miles from shore. The traveling then became very rough and it was found expedient to put six men on the small sledge and reapportion the loads between the sledges. The remainder of the party were engaged in road-making. More time was occupied in improving the road than was necessary to insure the passage of the dog and man sledges outward bound, as we expected to profit by it when returning with the heavy boat. Many detours were made to connect the small floes and avoid the rubble-ice and snow-drifts, and also in picking a route through the

hummocks. The snow between the floes and among the rubble-ice was soft and deep. We encamped on a paleocrystic floe at 5.15 p. m. I estimated that we were then 6 miles from Distant Cape, 12 from home station, and had traveled at least 14 miles to make good the distance. Weather fine; temperature at 6 p. m., −18° [−27.8° C.]; at 6.30 p. m., −25° [−31.7° C.]; and at 7.30 p. m., −32° [−35.6° C.].

On Wednesday, April 11, we broke camp at 5.30 a. m. The cooks had been called at 3 a. m., at which time the temperature was −28° [−33.3° C.]. I cached a portion of our provisions, to be used returning, and marked the place with a small flag. After picking a way through some rough ice and soft snow a short distance from camp, a large undulating floe opened up, over which we made good time, as the traveling was excellent. The floe was the most part bare, and where the snow lay it was packed sufficiently hard to support the sledges. The snow appeared to decrease in quantity as we left the shore of Grinnell Land. Other floes of like character presented themselves from time to time, and our progress was altogether satisfactory, although the route was not always direct, as detours were still necessary to secure the best floes and avoid the hummocks between them. About 12 m. a heavy haze or fog settled down upon the Greenland shore and completely hid the coast. By noting a line of hummocks before the land was entirely shut from view, we were enabled to continue traveling in a direction nearly correct. A wind was blowing all day, lightly at first, from the SW., veering afterwards to NE., and increasing at 1 p. m. to about 18 miles per hour [8^{m} per second], with drift. The faces of most of the party now suffered frost-bites, and several were quite tired, and affected by the weather. We could no longer see our course nor pick out a route; and at 2 p. m. were forced into camp under the lee of a line of hummocks. I considered 12 miles to have been made good this date, although the shore could not be seen to assist us in judging. We traveled at least 17 or 18 miles. Temperature at 4 p. m. −5° [−20.6° C.].

After camping the storm increased, and at times the tents were so violently shaken by the wind that I feared for their security. They were enveloped in a blinding drift. It was 11.45 p. m. before the weather had sufficiently moderated to admit of a move being made. The cooks were then called; wind still blowing 6 or 8 miles an hour [about 3 or 4^{m} per second].

At 1 a. m. April 12, the temperature was −10° [−23.3° C.]. I cached the small sledge and all our provisions, except one day's rations, and at 2 a. m. we moved on towards Thank God Harbor, still apparently 6 or 7 miles distant. Light wind still blowing. The floes continued to favor us, but appeared heavier, and rather more broken up. The snow banks were also more plentiful. As before, we were compelled to make some concessions to distance in selecting the best traveling, and kept up our road making. The best floes led us towards Cape Lupton where the ice appeared smoother. At 7 a. m., when within 1½ or 2 miles of the observatory, we halted and unloaded from the dog-sledge everything but the lashing and tools required for the fitting up the boat and sledge. Four men were left behind to pitch the tents, with directions to follow us when that was done. With the remainder of the party I proceeded to the observatory, still the most prominent object in Thank God Harbor, where we arrived at 8 a m. We found the 12-man sledge partly covered with snow, but all its parts complete, although one runner was detached, and the lashing of the other loose. While it was being relashed, the snow was shoveled off the contents of the observatory, which is roofless and was drifted full, but all of the articles I was instructed by you to bring from there could not be found. The stearine and stearine lamp were missing. We, however, brought away the pemmican and sundry small articles. The boat was found to be in good condition, and her fittings and gear all complete.

After preparations for leaving the place had been made, we all repaired to the grave of Captain Hall, over which the stars and stripes were draped, while about it were silently grouped the whole party. The deportment of everyone was subdued, decorous, and respectful, and in every way befitting the occasion. All seemed impressed by the contemplation of this isolated resting place, so far removed from the haunts of man, amidst a desolate surrounding of snow and ice.

The graves of the two British seamen, who perished in the discharge of their duty with the English expedition of 1875-'76, were then visited and the ceremonies repeated in the same respectful and sympathetic manner. We found the head-stones of the latter graves thrown down by the wind and broken, the fragments lying on the mounds. As you did not anticipate this, we were, of course, unprovided with the means of replacing them.

We left Thank God Harbor at 12.30 p. m. Found the boat more easily handled than we expected, even over the ice-foot. We reached our tents, pitched on floe, at 2 p. m. Weather very pleasant; temperature, at 4 p. m., −5° [−20.6° C.].

Friday, April 13, was dull and cloudy with light breeze from the northwest, and snow and frost flying in small particles. We pulled out of camp at 3 a. m., the cooks having been called at 12.45 a. m. Temperature at 1 a. m., −13.5° [−25.3° C.]. At 11.05 a. m. we reached the cache last deposited and went into camp. Several of the party suffered frost-bites. We found that the boat rode well, but pulled heavily, especially over the snow-drifts and hummocks, as her bows had to be elevated to a great height before the center of gravity was attained and she could be made to descend again. At times it required at least three of us out of the drag-ropes to ease her down or guide her between hummocks.

Temperature at 12 m., −9.5° [−23.1° C.]; weather growing worse, cloudy and snowy, with raw wind.

At 2 p. m. wind had increased to at least 28 or 30 miles per hour [about 12^{m} per second] from the north, accompanied with heavy drift. The weather was carefully watched with the object of breaking camp, but not until 6.20 o'clock of the next morning was it sufficiently improved to warrant calling the cooks, although life in the sleeping-bags for so long a time—already nineteen hours—was exceedingly tiresome, and traveling preferable.

Saturday, April 14, at 9 a. m. we were again on the march. Temperature at 8 a. m., −14° [−25.6 C.]; wind still blowing 8 or 10 miles an hour [about 3 or 4^{m} per second], with snow-drifts. After getting through the first rough ice, we, at 10 a. m., made sail on the boat and found it a great help. With exception of about half an hour, when the sail was taken in to cross a line of hummocks, we utilized it all day. Our course gave us only a side wind; a fairer breeze would have enabled us to dispense with the drag-ropes. It is a fair estimate to state that the sail did the work of at least five men all day. We carried in the boat all her gear, oars, &c., also cooking-utensils, tent-poles, one tent, one sleeping-bag, and a few small articles and the small sledge. Everything else was carried by the dog-sledge, which was heavily loaded. Private Biederbick had his foot frozen on the march, but it was stripped and circulation soon restored.

At 12.30 p. m. we were met by Sergeant Brainard, with dog-team and small party. We learned that, the North Greenland party having returned, you had dispatched him to meet us and assist in moving some of our constant weights and equipment. We placed on his sledge everything carried in the boat, and added part of the load of our dog-sledge. With the advantage of this assistance, in addition to the sail, I decided to make the first camp of our outward journey, so as to leave but one day's travel before us. We camped near first cache at 5 p. m. The dog-sledges had preceded us, and tents were already pitched. Party considerably exhausted, as we had traveled fast.

Temperature at 6 p. m. −16.5° [−26.9° C.]; at 7 p. m., −18° [−27.8° C.].

Sunday, April 15, at 7.45 a. m. we had breakfasted, packed up, and were again ready to start. The two dog-teams moved on ahead, hauling all our constant weights, provisions, and equipment, leaving us only the empty boat. They soon distanced us. The traveling was very rough, and it took us five hours to reach Distant Cape. At this place we were met by Sergeant Brainard, with fourteen dogs and native driver. By preconcerted arrangements he had returned, with your permission, after having conveyed his load to the station. The road in from Distant Cape being smooth, the dogs were attached to the boat-sledge, and we were soon at Dutch Island, where the boat was left. Party reached Fort Conger at 3 p. m.

I estimate that the distance traveled each way by us between Distant Cape and Thank God Harbor was 36 miles, to which may be added, both going and returning, the 6 miles between Distant Cape and home station.

I desire to acknowledge the assistance of Dr. Pavy, who performed arduous work each day with the dog-sledge, and was untiring in his solicitude for the comfort of the men when in camp. I wish also to state that the conduct of each member of the party was exemplary, and the exertions of all very praiseworthy.

Very respectfully,

GEO. W. RICE,
Sergeant, Signal Corps, U. S. A.

Lieut. A. W. GREELY,
Fifth Cavalry, Acting Signal Officer and Assistant,
Commanding Lady Franklin Bay Expedition.

Accompanying this please find transcript of sledge journal kept during trip.—G. W. R.

SLEDGE JOURNAL OF TRIP WITH PARTY FOR BOAT TO THANK GOD HARBOR, APRIL 10 TO 15, INCLUSIVE, 1883.

Tuesday, April 10, 1883.—Left Fort Conger at 8.25 a. m. Missed poles of six-man tent when near half-way between Dutch Island and Distant Cape. Sent Schneider back for them with dog-team, transferring dogs from large to small sledge, which we unloaded. Put full force of men on large loaded sledge and proceeded. Reached Distant Cape at 10.20 a. m. Picked up cached tent at 11.10 a. m. New ice for some distance into the straits, then a fringe of hummocks with soft snow between. A paleocrystic floe then took us some distance from shore (3 miles). Dog-sledge overtook us at 12.15 p. m. Traveling now rough. Apportioned the loads between man and dog sledges. Six men pulling the small sledge, the rest of party road-making with axe and shovels. Compelled to take serpentine route to pick the best way. Snow between floes and rubble-ice very deep and troublesome.

Went into camp at 5.15 p. m. on paleocrystic floe. We are about 6 miles from Distant Cape, 12 from home, and have traveled at least 14 miles to make it good. Traveling looks more promising for to-morrow. Weather fine. Temperature at 6 p. m., —18° [—27.8° C.]; at 6.30 p. m., —25° [—31.7°C.]; at 7.10 p. m., —32° [—35.6° C.], estimated [being below scale], but marked on thermometer case for verification.

Wednesday, April 11, 1883.—Called cooks at 3 a. m. Temperature at time, —28° [—33.3° C.]; at 5 a. m., —25° [—31.7° C.]. Cached axe, some provisions and dog-food, and marked place with flag. Broke camp at 5.30 a. m. Elison and I went ahead to pick out a road. I put Linn to assist doctor and Schneider with dog-sledge, as it worked heavily yesterday. Picked a way through rough ice and snow-drifts surrounding camp, when we struck good floes and made excellent time. Had to make detours to keep the floes and avoid the fringes of hummocks. About 12 m. the Greenland shore was completely hidden by fog. By noting hummocks ahead we were able to keep on our way, guided partly by the wind. Wind blowing all day, first SW., afterwards veering to NE. At 1 p. m. wind increased to 18 miles per hour [8^{m} per second], with drift. Faces of almost all the party frost-bitten. Not able to see our way, and several of the party tired, and all affected by the wind; could not do otherwise than camp. Have pitched tents under the lee of a line of hummocks, that break the wind somewhat.

I think we have made good 12 miles to-day, although we cannot see either shore. Have traveled at least 18 miles. Temperature at 4 p. m., —12° [—24.4° C.].

Looked out at 10 p. m. and again at 11 p. m. with intention of calling cooks, but weather too bad to admit of start. Storming very hard, shaking the tents violently and threatening to dislodge them. The condensed moisture was showered continually on the sleeping-bags. At 11.45 p. m. called cooks. Weather moderated, but wind still blowing 5 miles an hour [2.2^{m} per second].

Thursday, April 12, 1883.—Temperature at 1 a. m., —10° [—23.3° C.]. Cache all our provisions and dog-food but one day's rations. Also leave behind the small man-sledge, and carry everything on the dog-sledge. Break camp at 2 a. m.; wind still blowing 2 or 3 miles [about 1^{m} per second] an hour. Hall's Rest appears to be 7 or 8 miles distant. I went ahead with small party to select and build the road. Several were left behind to help the heavily-laden dog-sledge along. Floes carried us into Thank God Harbor, although detours were necessary to avoid hummocks and snow-banks. Our route wound us up around Cape Lupton, which we passed close to. Several of the men appear very stiff this morning; I suppose it will wear off after traveling some distance. At 7 a. m. unloaded sledge on small floe about 1½ or 2 miles from the observatory. Left Gardiner behind with three others to pitch the tents. Reached the observatory at 8 a. m.; and Gardiner and his companions soon joined us. The observatory is roofless and only three sides of the wall standing. Found the twelve-man sledge partly covered with snow. One runner detached, but the parts all complete. Frederick, and Elison at once commenced relashing the whole sledge and putting it together. In the mean time others of the party were at work shoveling the snow off the contents of the observatory, which was drifted full. Cannot find all the articles I am instructed to bring to Fort Conger. Had the embankment cleared away from boat and turned her over. Found gear all complete and boat in good condition. The whole party then repaired to the grave of Captain Hall, over which we displayed the national flag. Afterwards visited the graves of Hand and Paul and repeated tokens of respect. Relics were picked up near all three graves and preserved by members of the party.

Deposited expedition record in cairn near Hall's Rest. Lashed boat on sledge and turned our backs on the observatory; reached Thank God Harbor at 12.30 p. m. We brought away the three tins of pemmican, some small articles, and three empty cans; also some packages of farina and a few pounds of

graham bread for our own use. Reached tents on floe at 2 p. m. The boat rides well, but hauls heavily. Men all in good spirits and encouraged, as the boat is handled more easily than they expected. Temperature 4 p. m., −5° [−20.6° C.].

Friday, April 13, 1883.—Called cooks at 12.45 a. m. Temperature at 1 a. m., −13.5° [−25.3° C.]. Pulled out of camp at 3 a. m. Weather cloudy and dull, with light breeze from the northwest and light snow in the air. Made our cache—about 7 miles from Thank God Harbor—at 11.05 a. m. Had to follow the windings of the road made going over, which took us over a good deal of ground; but road required no improvement. Sledge and boat haul heavily over snow banks and hummocks, as they have to be elevated to a great height on one side before they can descend on the other. I have placed Linn and Henry—two of our largest men—in the hindmost belts and at all difficult places they drop out and grasp the bows of the boat to ease her down. Whenever the traveling is rough I stay behind with the boat to guide her. We carry in the boat all her gear and oars; also cooking gear, tent-poles, 1 tent, 1 sleeping-bag, and other small articles. All else is carried on the dog-sledge which is heavily loaded, and doctor and Schneider have to work hard; the dogs are working admirably, following our tracks. Temperature at 12 m., −9.5° [−23.1° C.]; weather disagreeable, cloudy, and snowy, with raw wind. At 2 p. m. wind increased so as to endanger the tents. At 10 p. m. I got up and went outside. Weather would not admit of a start. Wind was blowing 28 or 30 miles an hour [about 13^{m} per second] from the north, with blinding drift.

Saturday, April 14, 1883.—Weather has been carefully watched, with intention of moving so soon as it moderated. Gardiner was out at 2 a. m..and reported the weather still very bad. At 6.20 a. m. it had improved; called cooks. Temperature at 7 a. m., −13.5° [−25.3° C.]. We pulled out of camp at 9 a. m. Temperature at 8 a. m., −14° [−25.6° C.]. Wind is now (9 a. m.) blowing 8 or 10 miles an hour [about 4^{m} per second] with some drift. After getting through first rough ice we—at 10 a. m.—made sail on the boat, and found it a great help. Took in sail at 10.30 a. m. to pass through hummocks. Reached large floe and made sail again at 11 a. m. Carried away step of mast, but lashed it to do temporary duty. Elison will repair it to-night. Carried sail all day, Linn and I steering. At one time whole party were out of drag-ropes, and wind was sufficient to move the sledge along. We were sailing too near the wind—it was NNE.— to receive its full benefit. At 12.30 p. m. we were met by Sergeant Brainard with dog-team and Eskimo Frederik. Lieutenant Kislingbury accompanies him. The North Greenland party has been turned back by open water and Lieutenant Greely sends Brainard to assist in moving part of our load. Receive a letter from commander to that effect. Brainard takes everything out of boat, and part of Schneider's load. I conclude with this help to reach first cache to-night, so as to arrive home to-morrow. Camped a short distance from cache at 5 p. m. The dog-sledges traveled faster than we, and tents were pitched by the time we came up. Most of the party much exhausted, as we traveled very fast. Gardiner had a sick stomach in the morning and vomited his breakfast, but stuck manfully to the drag-ropes. Biederbick had his great toe frozen on the way, but circulation was speedily restored by the application of warm hands.

Temperature at 6 p. m., −16.5° [−26.9° C.]; at 7 p. m., −18° [−27.8° C.]. There are many calls made on Brainard's tent, after supper, to learn the particulars of the northern trip.

Sunday, April 15.—Cooks were called at a little before 6 o'clock. The men were very wakeful last night and wished to have started earlier. All ready to start at 7.45 a. m. The dog-sledges go ahead and carry all our constant weights, provisions, and equipment, leaving us the empty boat. Lieutenant Kislingbury volunteered to stay with and assist us. Traveling from here to Distant Cape is very rough. Sent word to the commanding officer, suggesting that Brainard should return to meet us at Distant Cape, with large number of dogs, to haul this boat in to Dutch Island. Stopped on the way a short time to melt some ice to quench our thirst. Reached Distant Cape in five hours, at 12.45. Was here met by Brainard, at this place and time, with Eskimo Frederik and 14 dogs. Dogs hauled the boat to Dutch Island, over the good road, with ease. Reached Fort Conger at 3 p. m. I am much pleased with the conduct of every one on the trip. All did the very best they could.

Respectfully submitted with report.

GEO. W. RICE,
Sergeant, Signal Corps, U. S. A.

APPENDIX No. 73.—*Dr. Pavy's medical report on trip to Thank God Harbor.*

FORT CONGER, GRINNELL LAND, *April 20th*, 1883.

SIR: I have the honor to report to you on the health of the men during the trip to Thank God Harbor.

The sanitary state has been good, and the party returned without accidents.

The powers of endurance to cold and fatigue have sensibly decreased, even in the best men of our party.

The detachment has moved with remarkable zeal, energy, and discipline, and Sergt. Rice has directed his work with the greatest of skill.

I will mention Pvt. Schneider, driver of my sledge, whose exertions and labor are very creditable.

I am, very respectfully, your obt. servant,

OCTAVE PAVY,
A. A. Surgeon, U. S. A.

To the COMMANDING OFFICER.

APPENDIX No. 74.—*Orders for Sergeant Jewell for tidal observations at Cape Beechey.*

FORT CONGER, GRINNELL LAND, *May* 3, 1883.

SERGEANT:—You are hereby directed to proceed to Cape Beechey, Robeson Channel, in order to make tidal observations at that point.

The observations will cover nine successive tides, and you will leave this station at such time on May 6 as will enable you to observe the first low tide of May 7, which is expected about 10.50 a. m. (Washington mean time).

The following tidal readings will be made:

1. On the even hour of Washington mean time.

2. Each even minute (W. M. T.) for twenty minutes at *one tour*, commencing each set exactly six hours after the preceding high or low water. In case the tide has not changed appreciably at the end of twenty minutes the readings will be continued until such phase has been noted.

In case *Medusæ* or *Annelidæ* are seen they will be carefully observed, if not captured, to enable you to identify them subsequently.

Great care will be taken to insure the security of the gauge to that part of the ice-foot which is immovably attached to the shore. A reference point should be established so as to enable the gauge to be replaced in case of accident.

You will be accompanied by Sergeant Connell, and Private Schneider with his dog team. Sergeant Connell, when not needed, will occupy his time in hunting. Private Schneider will assist you in making the readings.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant, Commanding.

Sergeant W. S. JEWELL,
Signal Service, U. S. Army.

APPENDIX No. 75.—*Report of Sergeant Jewell on tidal observations at Cape Beechey.*

FORT CONGER, GRINNELL LAND, *May* 12, 1883.

SIR:—I have the honor to report that, in compliance with your orders of May 3, I left this station at 6.45 p. m., May 6, for Cape Beechey, for the purpose of taking tidal observations at that point.

I was accompanied by Sergeant Connell and Private Schneider. We arrived at our destination at 2.20 a. m., May 7, and selecting what appeared to be a suitable tidal crack, began the tidal hole, but, after going down about four feet [1.2^{m}], I abandoned it and began another further from shore. After sinking this to a depth of about five feet [1.5^{m}] the water began to percolate through the ice, and before we could get low enough had become so deep that it was impossible to work. I then selected another site, and after following the crack down about seven feet [2^{m}], found water that extended from one side of the tidal hole, which

we sank below the water-level at low tide, and then allowed it to flow in. The permanent gauge was completed about 5.14 p. m. The high tide at 10.54 a. m. having been taken on a temporary gauge erected for that purpose.

The gauge was secured to a shelf projecting from a grounded floe-berg, being lashed to a board that was solidly spiked into the ice. The position was frequently verified by two fixed points bearing on the gauge, and no change could be detected. I continued the observations until after the p. m. low tide of the 9th, and then started to return, leaving there at 7 p. m. Stopping at depot B and picking up what remained of the cache, excepting the tent, sleeping-bag, and one blanket, arrived at Fort Conger at 2.30 a. m., May 10.

I found upon making a comparison of my watch, that it had lost 15 minutes, caused, doubtless, by the minute hand getting loose and moving back. I think this happened during the forenoon of the 8th, as after that time I noticed the minute and second hands did not agree.

Private Schneider assisted me in making the observations, and Sergeant Connell, in accordance with your instructions, spent his time in hunting, only succeeding in getting one hare.

Enclosed* you will find a report of tidal and meteorological observations. The latter having been taken hourly.

Very respectfully, your obedient servant,

W. S. JEWELL,
Sergeant, Signal Corps, U. S. A.

Lieut. A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding Expedition.

APPENDIX No. 76.—*Orders for Sergeant Gardiner for tidal observations at Cape Baird.*

FORT CONGER, GRINNELL LAND, *May* 3, 1883.

SERGEANT: You are hereby directed to proceed to Cape Baird, Lady Franklin Bay, in order to make tidal observations at that point.

The observations will cover nine successive tides, and you will leave this station at such time on May 6 as will enable you to observe the first low tide of May 7, which is expected about 10.50 a. m. (Washington mean time).

The following tidal readings will be made:

1. On the even hour of Washington mean time.

2. Each even minute (W. M. T.) for 20 minutes at *one tour*, commencing each set exactly six hours after the preceding high or low water.

In case the tide has not changed appreciably at the end of the twenty minutes, the readings will be continued until such phase has been noted.

In case *Medusæ* or *Annalidæ* are seen, they will be carefully observed, if not captured, to enable you to identify them subsequently.

Great care will be taken to insure the security of the gauge to that part of the ice-foot which is immovably attached to the shore. A reference point should be established, so as to enable the gauge to be replaced in case of accident. You will be accompanied by Sergeant Elison and Eskimo Jens Edward, with his dog-team. The team will be sent back on Monday and will return for you on Tuesday.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant, Commanding.

Sergeant H. S. GARDINER,
Signal Service, U. S. Army.

---

* The meteorological observations are to be found printed under *field* observations in Appendix No. 138; the tidal observations in Appendix No. 140.

APPENDIX No. 77.—*Orders for Sergeant Israel for astronomical observations at Cape Baird.*

FORT CONGER, GRINNELL LAND, *May* 7, 1883.

SERGEANT: You will proceed by dog-sledge to-night to Cape Baird for the purpose of determining the latitude and longitude of that point.

On your return a brief report, in which are to be embodied your observations, will be made.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding Lady Franklin Bay Expedition.

Observer, Sergeant EDWARD ISRAEL,
Signal Service, U. S. Army,
Astronomer, Lady Franklin Bay Expedition.

APPENDIX No. 78.—*Report of Sergeant Israel on observations ordered in Appendix No. 77.*

FORT CONGER, GRINNELL LAND, *Tuesday, May* 15, 1883.

SIR: I have the honor to make the following report on the trip to Cape Baird and observations made there by me, in compliance with your order of the 7th.

I left the station, with Jens Edward and dog-sledge, at 11.35 p. m., Monday, May 7, taking with me the English sextant, four boxes of provisions, and one of ammunition. I further added a barrel of hard bread to my load at the cache on the floe. Arrived at the tidal station near Cape Baird at 4.45 a. m., May 8, and took the following observations during the day:

(For longitude: Equal altitudes of sun.)

Cover.	Limb.	Time a.m.	2 alt. ⊙.	Time p.m.	T_0	Index corrections.
		h. m. s.	° ′	h. m. s.	h. m. s.	On arc. Off arc.
D	⊙	5 17 55	35 10	4 57 38	[11 07 46.5] Rejected.	
D	⊙	19 05	15	56 40	52.5	
D	⊙	20 14	20	55 26	50.0	
D	⊙	21 22	25	54 20	51.0	
D	⊙	22 29	30	53 17	53.0	a. m. 26′ 30″ 37′ 00″
D	⊙	23 35	35	52 14	54.5	a. m. 26′ 00″ 36′ 10″
R	⊙	25 44	34 40	49 53	48.5	a. m. +5′ 10″
R	⊙	26 46	45	48 59	52.5	p. m. 26′ 20″ 36′ 30″
R	⊙	27 50	50	47 55	52.5	p. m. 26′ 20″ 36′ 30″
R	⊙	28 54	55	46 49	51.5	p. m. +5′ 05″
R	⊙	30 10	35 00	45 37	53.5	
R	⊙	31 15	05	44 25	50.0	
					11 07 51.8±0.36	
Equation of equal altitudes					−1 44.5	
Correction for					−0 00.5	
Eq. of time					+3 40.1	
Watch time of noon					11 09 46.9	

$\Delta h = -2''$. Barometer, a. m., 30.62; p. m., 30.61. Thermometer, a. m., +10.5°; p. m., +10.0°.

The errors of the watch on Fort Conger time, based upon similar sets of equal altitudes, are:

	h.	m.	s.	s.
Watch slow on Fort Conger, May 6	6	48	59.3	±0.26
Watch slow on Fort Conger, May 9	6	49	28.0	±0.31
Watch slow on Fort Conger, May 8, noon		49	18.2	
Watch slow on Cape Baird, May 8, noon		50	13.1	
Longitude of tidal station	0′	54.9″	east of Fort Conger.	
Extreme point of cape, 600 yards [549m], east of tidal station		2.6″	east of tidal station.	
Cape Baird	0′	57.5″	east of Fort Conger.	

(For latitude: Circum-meridian altitudes of sun.)

Cover.	Limb.	Time.	2 alt. ⊙.	l.	Am.	ζ.	Combination to eliminate faulty diameter.	Combination to eliminate error of cover and gradual change in index correction.
		h. m. s.	° ′ ″	m. s.	″	° ′ ″	″	
D	⊙	10 57 09	50 35 20	−10 4	31	64 25 84		
D	⊙	58 40	35 30	8 33	22	58	Cover D { 41.0	
D	⊙	11 01 59	51 40 30	5 14	08	28	38.5	
D	⊙	03 11	40 50	4 02	05	19	31.0	
D	⊙	04 36	40 50	2 37	02	22	29.5	64° 25′ 26.8″
D	⊙	06 08	41 00	1 05	00	19	Cover R { 15.0	26.2
D	⊙	07 11	50 36 50	−0 02	00	40	14.5	22.8
D	⊙	08 12	36 50	+0 59	00	40	14.0	22.2
R	⊙	09 36	37 30	2 23	02	18	12.5	64° 25′ 24.5″±0.9″
R	⊙	10 40	37 20	3 27	04	21		y = 00.4
R	⊙	11 59	51 41 00	4 46	07	12		δ = 17 07 02.8
R	*	13 18	41 00	6 05	11	08		ϕ = 81° 32′ 27.7″±0.9″
R	*	14 48	40 50	7 35	18	06		
R	*	16 16	40 40	9 03	25	04		
R	⊙	17 17	50 36 30	10 04	31	19		
R	⊙	19 25	35 50	12 12	46	24		

* Recorded on lower limb by clerical error.

Index correction.

Before.		After.	
On arc.	Off arc.	On arc.	Off arc.
26′ 40″	37′ 10″	27′ 30″	36′ 00″
26′ 30″	37′ 10″	27′ 30″	36′ 10″
+5′ 18″		+4′ 18″	

Mean, +4′ 48″

Barometer, 30.57; thermometer, +5.0°.

The distance between Fort Conger and Cape Baird is therefore 12.4′.

On the 9th I assisted in taking the tidal and meteorological observations. Returned to Fort Conger with Sergeant Gardiner and party at 4.35 p. m.

I remain, very respectfully, your obedient servant,

EDWARD ISRAEL,
Sergeant, Signal Corps, U. S. Army,
Astronomer to the Expedition.

Lieut. A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding Lady Franklin Bay Expedition.

APPENDIX No. 79.—*Report of Sergeant Gardiner on tidal and ice observations at Cape Baird.*

FORT CONGER, GRINNELL LAND, *May* 14, 1883.

SIR: I have the honor to inclose herewith Record of Tidal and Meteorological Observations,* made at Cape Baird, Grinnell Land, from May 7 to 9, inclusive. Also to make the following report:

I left Fort Conger at 7 p. m. of May 6, 1883, accompanied by Sergeant Elison and Jens Edward with dog-team and sledge. At the cache on the road to Cape Baird I picked up one barrel of hard bread, which I carried to Cape Baird and cached together with five cans of pemmican, one box of corned beef, and one box of baked beans, which I carried from Fort Conger.

I arrived at Cape Baird at 12.30 a. m. of 7th instant. We found a strong gale of wind blowing, which prevented work until 2 a. m. Having made camp about 600 yards [549^{m}] inside of Cape Baird, we immediately commenced fitting up the tide-gauge. The gauge was finished at 6.45 a. m., and commenced observations at 7 a. m. The gauge was located on the seaward side of a large floe-berg, which remained stationary at all times. At 1 p. m. Jens Edward returned with the dog-team to Fort Conger.

Sergeant Israel, with Jens and dog-team with supplies for the cache at this place, arrived at 5 a. m., 8th instant. During the day Sergeant Israel took observations for latitude and longitude.

At 2.30 p. m. I attempted to communicate with Fort Conger by heliographic signals, but was unsuccessful. At 11 p. m., May 8, Sergeant Elison went to Cape Lieber to examine condition of straits to the southward. He returned at 6 a. m. of 9th instant, and reported the channel closed and no water in sight.

In regard to the stratification of floe-bergs, I observed eleven bergs in which strata were clearly defined. These bergs consisted of wide layers or strata of clear or semi-opaque ice, separated one from the other by smaller layers, the latter being also divided into smaller layers or strata of clear ice or snow laid alternately. The largest strata were from 6 to 10 feet [1.8 to 3^{m}] thick; the smallest layers were from 2 to 4 inches [51 to 102^{mm}] in thickness, and five or six of these smallest layers comprised one of those which divided the largest strata. No medusæ or annelidæ were observed.

At 1 p. m. of 9th instant, having completed the series of observations according to your instructions dated Fort Conger, May 3, 1883, I closed the station and started for Fort Conger, where I arrived at 5 p. m.

Very respectfully, your obedient servant,

H. S. GARDINER,
Sergeant, Signal Corps, U. S. Army.

To Lieut. A. W. GREELY,
First Lieut., Fifth Cav., U. S. A., Commanding Polar Expedition.

APPENDIX No. 80.—*Report of Sergeant Jewell on paleocrystic ice.*

FORT CONGER, GRINNELL LAND, *June* 9, 1882.

SIR: I have the honor, in compliance with your instructions for me to proceed to Distant Cape and procure samples of different strata of a paleocrystic floe-berg grounded at that point, to report as follows:

Upon my arrival, I, with the assistance of Private Frederick, found the berg to face to the SW. 26 feet [7.9^{m}], to the S. and SE. 24½ feet [7.4^{m}], E. 35 feet [10.7^{m}], and then rounding from E. to NW. 18⅓ feet [5.6^{m}], and NW. 48 feet [14.6^{m}]. The berg was 28 feet [8.5^{m}] in height [above the sea or main floe], sloping gradually from near the western side of it until it reached the ice-foot at its eastern extremity. The samples were procured from the NW. side and were taken from over three feet [about 1^{m}] from the inside of the berg, so as to get beyond the atmospheric influence from without.

The specimen in vial No. 1 was procured 3⅔ feet [1.1^{m}] from the top, and 5½ feet [1.6^{m}] from side; color dark blue.

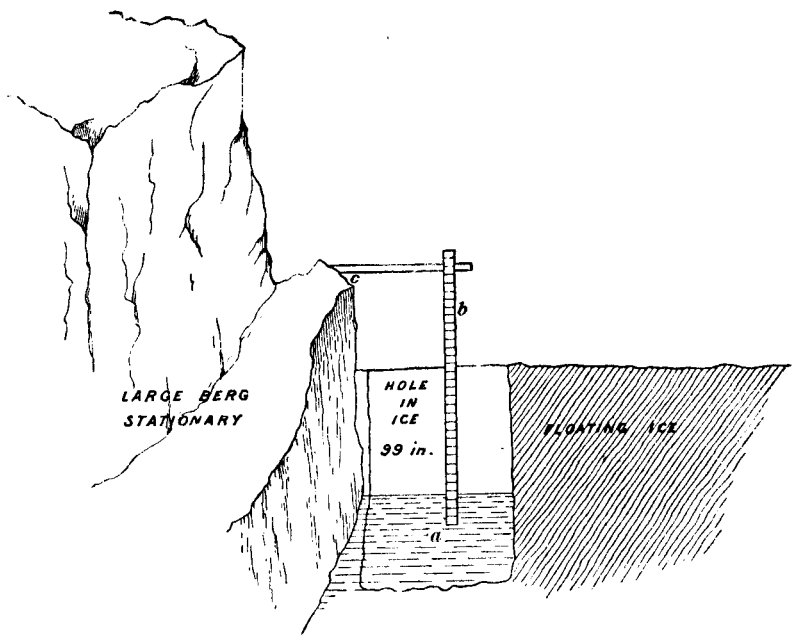
No. 2, three feet [.9^{m}] from side in a stratum 26 inches [.66^{m}] in breadth; color a shade lighter than No. 1.

No. 3, forty-two inches [1.06^{m}] from side. Strata 24 inches [.6^{m}]; color same as No. 2.

No. 4, three feet [.91^{m}] from side. Strata 12 inches [.3^{m}]; color same as No. 2.

---

*The meteorological observations are to be found printed under *field* observations, Appendix 138; the tidal observations in Appendix 140.



TIDE-GAUGE, CAPE BAIRD.

a. Water.
b. Gauge-rod.
c. Support fastened to large berg.

No. 5, three feet [.91m] from side. Strata 22 inches [.56m]; color same as No. 2.
No. 6, three feet [.91m] from side. Strata 18 inches [.46m]; color shade lighter than No. 2.
No. 7, three feet [.91m] from side. Strata 15 inches [.38m]; color same as No. 2.
No. 8 was taken below the last stratum and about 3 feet [.91m] from the ice-foot; color same as No. 2.
The strata were well defined on the surface, and were quite discernible three feet [.91m] from the outside.
The berg appears to be grounded. The base measurements were made about 3 feet [.91m] above the base; *i. e.*, main floe.

Very respectfully, your obedient servant,

W. S. JEWELL,
Sergeant, Signal Corps, U. S. A.

Lieut. A. W. GREELY,
First Lieutenant, Fifth Cavalry, U. S. A., A. S. O. and Assistant,
Commanding Expedition.

APPENDIX No. 81.—*Orders to Sergeant Jewell for tidal observations at Cape Beechey.*

FORT CONGER, GRINNELL LAND, *May* 19, 1883.

SERGEANT: You will proceed on Monday, May 21, with Private Schneider and dog-sledge to Cape Beechey, for the purpose of making special tidal readings at that point.

You will determine the time of nine high and low waters, beginning with that expected about 5.45 p. m., Washington mean time, May 21.

The gauge will be read on the even hour (W. M. T.), at which time the meteorological observation will also be made.

Readings on the even minute (W. M. T.) will be made for not less than 20 minutes around each high and low water.

Such assistance as can be rendered without interfering with your observations will be given Sergeant Rice, the photographer of the expedition, who will proceed to Beechey with you.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O., and Assistant,
Commanding Lady Franklin Bay Expedition.

Sergt. W. S. JEWELL,
Signal Service, U. S. Army.

APPENDIX No. 82.—*Report of Sergeant Jewell on tidal observations at Cape Beechey.*

FORT CONGER, GRINNELL LAND, *May* 25, 1883.

SIR: I have the honor to forward herewith a report of observations* taken at Cape Beechey, in compliance with your orders of the 19th instant.

I left Fort Conger with dog-team at 8.10 a. m. of the 21st, accompanied by Sergeant Rice, the expedition photographer, and Private Schneider. Owing to the recent storms the traveling was very bad, and slow progress was made through the deep snow. A short distance beyond Distant Cape we encountered large cracks in the ice, which necessitated our taking to the ice-foot around Water-course Bay. These cracks are the results of the strong current that flows around the cape. Small pools of water were encountered farther up the bay and also on St. Patrick Bay. But no signs of a general disruption were seen except water-clouds visible in the north from Cape Beechey. We arrived at our destination at 4.35 a. m.

Tidal observations.—As soon as the hole, used in taking our former series of observations at this place, was cleared of the accumulated snow and slush, the gauge was got into position and observations began, as shown by accompanying report. They were continued until the high tide of 11.50 p. m., May 24.

Meteorological observations† were taken each hour as per instructions, except when the minute tidal reading interfered.

* The tidal observations are to be found printed in Appendix No. 140.

† The meteorological observations are to be found printed under *field* observations in Appendix No. 138.

I also took double altitudes of the sun for time, which showed my station to be $7^m\ 22.3^s$ east of Fort Conger, and a circummeridian altitude for latitude, placing me in latitude 81° 52′ 29.1″ north. Inclosed you will find the results as computed by Sergeant Edward Israel, astronomer of the expedition.

A sounding in the tidal hole showed a depth of 44 feet [13.4m] high tide, with gravel bottom.

We started for home station at 12.15 a. m. 24th, arriving at Fort Conger at 6.40 a. m.

Very respectfully, your obedient servant,

W. S. JEWELL,
Sergeant, Signal Corps, U. S. A.

Lieut. A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant, Commanding Expedition.

APPENDIX No. 83.—*Sergeant Brainard's report on journey to Cape Cracroft.*

FORT CONGER, GRINNELL LAND, *June* 5, 1883.

SIR: I have the honor to report that in compliance with verbal instructions received from you on the evening of May 28, 1883, I left the station at 12.15 a. m. the day following, accompanied by Sergeant H. S. Gardiner, Signal Corps, U. S. A., and Eskimo driver Frederik Christiansen, with dog-team and provisions for five days, for the purpose of taking tidal observations at Cape Cracroft, and to make a collection of the fossils which you last August discovered to abound in the cliffs at that point.

To Cape Baird the traveling was better than we had reason to expect after the recent snow-storm of long duration. The road was in all places visible and quite hard, the last snow which covered it to a depth of 4 inches [102mm] so soft that our progress was scarcely impeded. Halted for a few minutes at the depot to get a sleeping-bag and other articles to complete our equipment and then proceeded, keeping well out in rounding Cape Baird to avoid the heavy masses of ice which had accumulated near the shore in its vicinity. A crack in the ice 6 or 7 feet [about 2m] wide was observed to extend from the cape northward for a distance of 400 yards [366m]. The movement was evidently recent judging from the attenuated ice at its borders. From this place the snow was so deep and soft that we frequently sank to our waist and the sledge to its slats. We were prevented from wearing snow-shoes by the rubble-ice, which was of the worst possible character for sledging. Occasionally, however, small floes of ancient ice were met with, which proved of incalculable benefit, and after our hard struggle through the snow were always hailed with delight.

Water several inches in depth, which had been forced up through the fissures in the ice, was frequently found in depressions of the floe; more particularly in the immediate vicinity of heavy ice, which, if possible, was always avoided. In some instances the presence of the pools was probably due to the melting of the snow. There was often no distinguishing feature in these places, and we would have no intimation of their proximity until we had broken through the slight covering of snow and found the chilling water pouring over our boot tops. Camped at 8.30 a. m. 2 miles north of Cape Lieber, having traveled 22 miles; made good 18. Started again at 6 p. m., and for the first two hours found the traveling unchanged from the latter part of our first march, except that water pools became more numerous as we approached opposite to Cape Lieber. An old floe of considerable extent furnished us with excellent traveling for some time; and from this we found the ice to be of an entirely different character, being new and evidently formed at a late period last winter; its surface perfectly smooth and, except an occasional floe-berg stranded near the shore, entirely free of heavy ice. Reached Cape Cracroft at 10 p. m., and in seven minutes had the gauge in position and a reading taken; a tidal crack 3 feet [.9m] wide rendered chopping unnecessary. Traveled 12 miles; made good 10. Our progress during the last two hours of travel had been much retarded by a high southerly wind.

During the 30th and 31st we were employed on the tides, only high and low water being observed. In order to secure the most satisfactory results we began by taking minute readings half an hour before, and continued taking them for nearly half an hour after the change in the tide. But this method was soon discontinued and only each change of 0.1 inch [2.54mm] was recorded. A high wind, often accompanied by driving snow, prevailed during our stay at the cape. At times it was very violent, the velocity estimated at 30 to 35 miles per hour [13 to 15m per second].

On the 31st I sent Frederik Christiansen down the coast for the purpose of hunting. He reported on his return having entered the valley south of Cape Cracroft, where he killed a hare and saw tracks of two musk-oxen which had visited the excellent grazing grounds at the coast and then returned into the interior. I questioned him closely with reference to the practicability of the valley for sledging, with a view of returning by that route to look for the musk-oxen. He did not consider the valley feasible, owing to a rocky creek bed and the scarcity of snow. From an elevated position could discern no open water to the southward. He saw four small seals during his absence, but owing to the smooth surface of the floe he could not approach near enough for a shot. From an elevation of 500 feet [152^{m}] I could detect no material change in the nature of the ice to the east or south.

Sounding taken in tidal crack at the gauge, which gave us 40 feet [12^{m}] of water and a rock bottom. Judging from the movement of the line at this stage of the tide (ebb), it would seem to indicate a strong set of the current to the northward.

During occasional lulls in the storm and the intervals between observations, we made a collection of fossils, which comprised several specimens of each of the different species observed by us.

On the morning of June 1 we returned to Cape Baird, having completed the series of nine observations at 1 a. m. of that date. Several dangerous-looking cracks in the ice, which we had noticed on the outward trip, extending from the ice-foot in the direction of the Greenland coast, had visibly increased in width. I think an early disruption of the ice in Kennedy Channel may be expected this season. Off Cape Lieber we fell into a treacherous fissure, by the giving way of a thin drift which concealed it from our view, and narrowly escaped a ducking by getting quickly on the floating sledge and leaping to the firm ice. Our clothing, however, was thoroughly saturated above our knees and our boots filled with water.

I decided to remain at the Cape Baird depot for a day for the purpose of hunting but our efforts were not crowned with much success, although we hunted indefatigably. Only one hare was shot; another hare, a seal, ptarmigan, and pair of turnstones were all the game seen. The tracks of one fox only were seen. The cliffs east of the tent I found to contain several species of fossils, a few of which are in our collection.

While hunting along the shore of Archer Fiord, about 4 miles southwest of Cape Baird, I ascended the first of a series of low receding hills, the summit of which was about 800 feet [244^{m}] above and one-half mile [804^{m}] from the fiord. Its formation was of black sandstone, very brittle, and easily crumbled between the fingers. By attrition of the wind and weather the rocks had been reduced to a fine sand, through which stratified ridges, of the same general character, occasionally protruded for a few inches.

Near the summit of the hill I discovered the trunk of a petrified tree, about 7 feet [2^{m}] in length and 5 inches [127^{mm}] in diameter. It had broken into sections of from 4 to 10 inches each [102 to 254^{mm}], but no piece was missing from its place. The diameter of the piece was much lessened by the loss of successive layers under action of the elements. It originally must have been at least 10 inches [254^{mm}]. A section of this tree will be found in the collection, marked No. 1. Further search revealed to me the existence of eleven trees in the same state of petrifaction within the limits of 100 yards [91^{m}] square. The trunks of several of these trees were embedded in the sandy soil, and portions varying from 1 to 7 feet [.3 to 2^{m}] protruded above the surface. Not having any instrument with which I could make an excavation, I had no means of ascertaining the length of the buried portion. In one instance, however, it must have been considerable if the length was commensurate with the diameter. Only 3 feet [.9^{m}] of the body was exposed above the surface, and the diameter was about 9 by 16 inches [229 by 406^{mm}], its end being of an oval form, and bore evidence of having been subjected to considerable pressure. This was the largest trunk seen, and was of a firmer structure than any of the others. The next in size was about 12 inches [305^{mm}] in diameter, of a very friable and brittle nature. Of this I brought away a small specimen (No. 2). I also brought a specimen of sandstone (No. 3), which exhibits the general formation of the hill; and other similar pieces of rock (package No. 4) bear impression of fossil twigs, leaves, and stems.

The entire surface of the hill was strewed about with small fragments of the petrifactions, many of which were crystallized. I subsequently discovered other specimens of fossil wood at the base of the cliffs, 2 miles from Baird, but, being already heavily loaded with specimens, I did not feel equal to the task of climbing a thousand feet [305^{m}] up the steep incline to discover their origin.

Starting at 1 o'clock on the morning of May 3, we reached this station at 4.30 a. m. same date. Only 7½ hours were occupied in making the return trip from Cape Cracroft, this being 4½ hours less than the

time consumed in making the outward trip. The difference in time was due to the improvement in the traveling made by the storm which prevailed during our stay at Cape Cracroft.

Sergeant Gardiner rendered me every assistance in his power, and Christiansen fully sustained his previous reputation as an energetic and indefatigable driver.

Very respectfully, your obedient servant,

D. L. BRAINARD,
Sergeant, G. S., U. S. Army.

First Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant, Commanding Expedition.

APPENDIX No. 84.—*Sergeant Gardiner's report on journey to Cape Cracroft.*

FORT CONGER, GRINNELL LAND, *June* 5, 1883.

SIR: I have the honor to make the following report in regard to specimens of fossils collected while at Cape Cracroft, Grinnell Land, during the 30th and 31st days of May, 1883:

All of the specimens were found in a bed of black fragmental rock, which, when struck with the hammer, broke into rough slabs or sometimes lumps. It was of exceedingly fine grain and could not be examined thoroughly without the aid of a microscope. The bed was at the base of the cliffs extending along the sea level. It was traversed vertically by narrow seams of quartz.

The cliffs were 2,000 feet [610^{m}] or over in height and very bold, showing the stratification in long waves though sometimes much contorted and bent at sharp turns. It appeared to be composed of numerous layers of sandstone many feet in thickness, interspersed near the top by some lighter bands of rock.

With the aid of Dana's Manual of Geology I have been able to approximately determine most of the fossils as belonging to the Upper and Lower Silurian Periods.

Specimen No. 2 is similar to Fig. 362, page 202, Dana's Geology. The specimen was broken during transportation. When complete it measured 7 inches [178^{mm}] in length and 3 inches [76^{mm}] in width. It is of a white substance about 1¾ inches [44^{mm}] in width, forming a core from which projects a number of spines extending to the edge where they are bounded by a very narrow edge or rim of white. There is a small indentation in top.

Specimen No. 3 is apparently similar to *M. bellicincta*, Fig. 346, page 201. It is a portion of a conical shell. When complete the shell was probably 5 or 6 inches [127 or 152^{mm}] in length and 3 inches [76^{mm}] in diameter.

Specimen No. 4 consists of a portion of shell being a horizontal section, showing the curve, and was about 2 inches [51^{mm}] in diameter. It is similar to Fig. 349, page 201.

Specimen No. 5 is similar to *Columnaria alveolata*, Fig. 318, page 199. I observed many specimens of this fossil, some of which were a foot or more in diameter.

Specimen No. 6 is of a honey-combed appearance, and is very much similar to Fig. 408, page 224, *Chætetes*. A species of coral.

Specimen No. 7 is similar to No. 6, and also to *Chætetes lycoperdon*, Fig. 320, page 199.

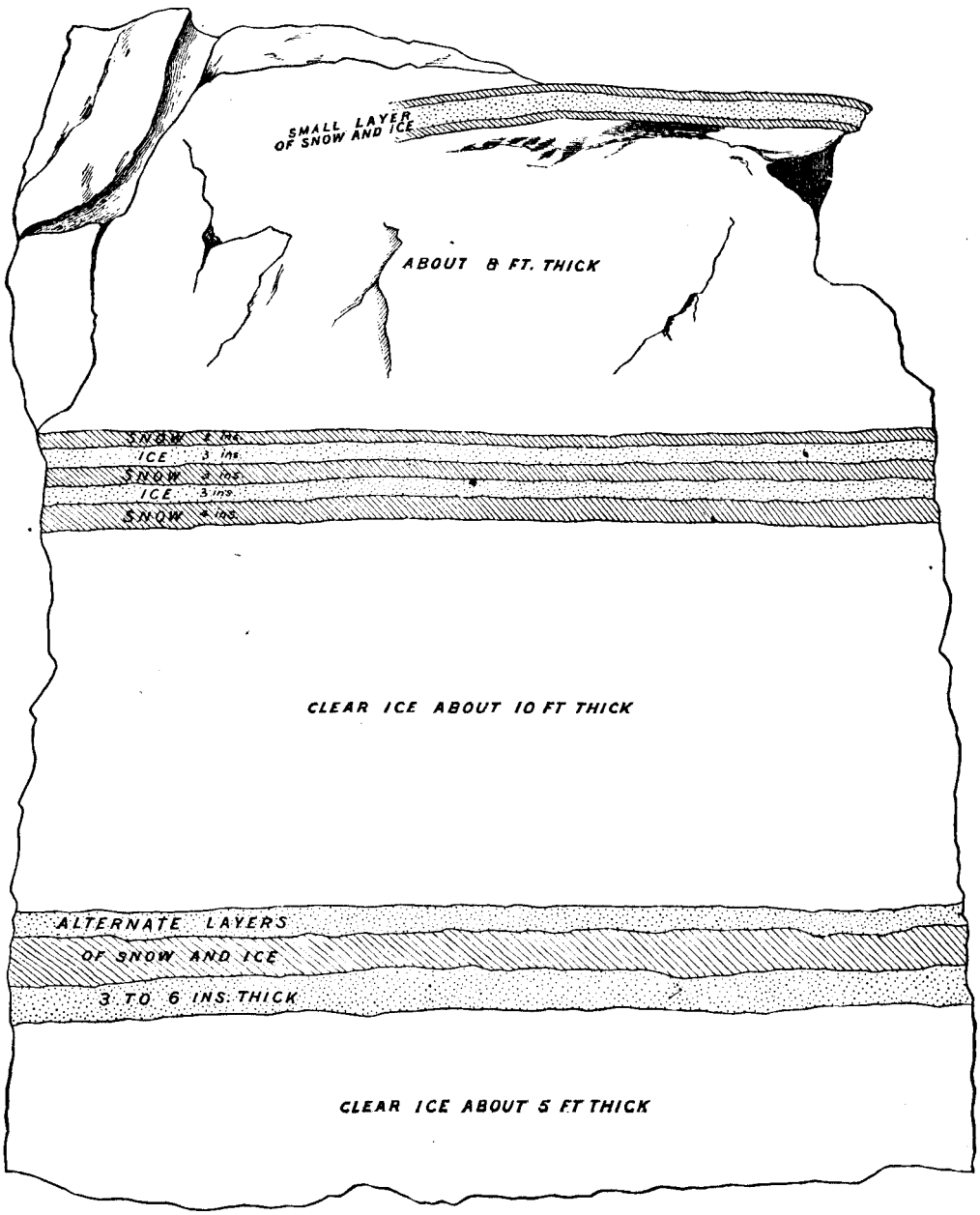
Many specimens were observed, some of which were 3 or 4 feet [.9^{m} or 1.2^{m}] in diameter and a foot [.3^{m}] in thickness. In shape they were nearly flat on the bottom and rounded on top, being highest in the center.

Specimen No. 8 is similar to Fig. 355, page 201, *Ormoceras tenuifilum*. Many of this species seen, but it was difficult to obtain a good specimen. One which I observed was the length of a gun-barrel. It was probably much longer, as the ends were broken or disappeared in the rock.

Specimen No. 9 is 8 inches [203^{mm}] in length and 1¼ inches [32^{mm}] wide at the broadest part, from which it gradually tapers to the smaller end. It appears to be a white core from which projects spines along the sides at spaces of one-fourth inch [6^{mm}].

Specimen No. 10 is a confused mass of small round pieces of coral rock, one-fourth inch [6^{mm}] in diameter, and some of the pieces (may be incomplete) 2 inches [51^{mm}] in length. These pieces have a small black core through the center.

I observed several specimens exactly similar to Fig. 477, page 246. They were one-half to 1 inch [12.7 to 25.4^{mm}] in diameter, consisting of a narrow band or rim of white, from which numerous spines projected towards the center. During my stay at Cape Cracroft, the violent wind-storm which continued during the whole of the time was an effectual drawback to a close examination of the higher stratification. The rocks were falling continually, making it dangerous climbing along the face of the cliff.



Floeberg at Cape Baird, showing stratification. (Height of floeberg, about 25 feet above main pack.)
[From drawing by Sergeant Gardiner.]

Duplicates of all the fossils were obtained, and I have picked from the number a representative specimen of each kind. They have been packed separately and marked according to the foregoing list, and returned with this report.

Very respectfully, your obedient servant,

H. S. GARDINER,
Sergeant, Signal Service, U. S. Army.

Lieut. A. W. GREELY,
First Lieutenant, Fifth Cavalry, U. S. Army, Commanding Polar Expedition.

APPENDIX No. 85.—*Lieutenant Lockwood's orders to cross Grinnell Land.*

FORT CONGER, GRINNELL LAND, *April* 24, 1883.

SIR: You will leave this station on or about April 25 for the purposes of inland exploration to the southwestward via Archer Fiord. You will especially endeavor to reach such an elevated point inland as will enable you to judge conclusively if the mountain range seen to the southwestward from Mount Chester A. Arthur in July, 1882, is on a land separate from Grinnell Land. It is possible that Mount Jeffers may be reached by striking the high land to the southwest of Ella Bay.

In addition to the dog-sledge taken, a supporting sledge will accompany you two days' march from this station.

In case you are turned back before May 1 by the impracticable nature of the country, you can, in your discretion, visit the extreme northern end of Lake Hazen in order to determine the discharge points of the several glaciers which lying northward of the lake are yet apparently separated from it by a range of hills.

You will be absent not exceeding thirty days, and the arrangement of the details of the journey are intrusted to you.

I am, sir, respectfully yours,

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant, Commanding.

Second Lieut. JAMES B. LOCKWOOD,
Twenty-third Infantry, A. S. O.

APPENDIX No. 86.—*Lieutenant Lockwood's report on the crossing of Grinnell Land.*

FORT CONGER, GRINNELL LAND, *June* 21, 1883.

SIR: I have the honor to render the following summary of my last sledge journey to the west, occupying from April 25 to May 26, 1883.

The outfit consisted of Christiansen's team (ten dogs) and sledge, and thirty days' rations, &c. To this I added the small "hand-sledge," shelter tent, two knapsacks, &c., to provide against all contingencies as far as possible, for I hardly expected to get much farther than the head of the fiord with the *large* sledge or to be able to proceed many days beyond with the small one, and expected to use the knapsacks before turning back. The route proposed was to the head of Archer Fiord and thence inland by the valley beyond Ella Bay in a general west or southwest direction until the rations gave out, if it were possible to travel so long.

With Sergeant Brainard and Christiansen, the Eskimo, on the evening of April 25 I left the station, accompanied by a supporting sledge, Sergeant Elison and Jens (Eskimo), for the first two marches. The travel in the harbor proved extremely bad on account of deep soft snow. Beyond, however, it was better. We camped at Stony Cape. After this the travel continued to improve till Ella Bay (at the head of the fiord) was reached. When the supporting sledge turned back on the morning of the third day's journey we were able to get along with everything, about 970 pounds, very well.

The fourth march *out* took us to the head of Ella Bay and of the fiord, about 67 miles from Fort Conger, according to the report of Lieutenant Archer, R. N., who explored this fiord. The valley beyond has a general trend to the southwest and is walled in by grand heights and cliffs on each side; its lower part is occupied by a small lake. One short march took us up the valley as far as we could go, about 10 miles, elevation 150 feet [46^{m}]. Latitude, 80° 59′ 42.5″, longitude, 70° 41′, observed.

Here the terminal face of a large glacier stretched from side to side, and a very short survey of the scene made it evident that nothing could be done in this direction with either of the sledges. On further examination an advance by means of the "pack outfit" seemed almost equally unpromising.

We remained here two days, thirteen hours of which were spent by myself and Sergeant Brainard in ascending the precipitous cliffs to the left, gaining an altitude of [*] feet.

The weather was not very good, and the view from the top somewhat disappointing. The cliffs to the north and east also obstructed the view. To the south lay a maze of cone shaped mountain peaks, separated

* Omission in original.—A. W. G.

by deep and narrow valleys, and the whole covered with ice and snow. Several glaciers were seen in this direction. To the west and southwest many isolated summits were also noticed, but they seemed mostly great dome-shaped heights, rather than peaks, rising like waves on the horizon. A peak, however, of the ordinary kind was noticed at a great distance, probably 75 miles. It bore S. 60° W. (true). To the north and northwest sections of the Garfield Range, and United States Mountains beyond, were quite plain, their profiles projecting up like true sierras.

Beyond the opposite side (north) of the valley, in which lay our camp, could be seen several glacier-like formations, and the country to the west and south was apparently ice-capped. At this season, however, it is very difficult to distinguish at a distance between ice and snow. The only sure test is the sight of a glacier "wall" or break in the surface. These walls almost always have a greenish tint. The valley above camp continued to trend to the southwest for about 20 or 25 miles, when a prominent pyramid-shaped mountain terminated it. The glacier occupied its whole extent, and may have a continuation to the south. A branch glacier came in from the north just above camp.

The whole surface of the country, in every direction, had a great elevation. Nothing like an extended plain or wide valley of any extent was anywhere noticed. The face of the glacier, or width of the valley, near camp was 1,600 yards [1,463^{m}], found by pacing the distance off, and the "wall" was 150 feet [46^{m}] high per sextant angle 100 yards [91^{m}] *out*. Latitude 81° 09′ 50″, longitude 70° 31′, observed. Having taken numerous observations for latitude and longitude, we turned back to Ella Bay and thence proceeded to the head of the northern arm at the head of the fiord, Beatrix Bay, making two marches of the distance, about [*] miles. Having abundant rations I took it quite leisurely. The cliffs around these bays are particularly grand, rising almost vertically 3,000 feet [914^{m}] or more. I measured those on the south side of Ella Bay, and made them 4,097 feet [1,249^{m}]. They are all probably ice-capped. Miniature glaciers were observed hanging over the edges in places.

We lay over a day at Beatrix Bay to find the best way to proceed. Two or three narrow ravines from the west looked so unfavorable that I finally started up the main valley leading in a NNW. direction. The valley is from 2 to 3 miles wide and is walled in by the most imposing cliffs, very steep and of immense height. A march of 9 miles brought us to its head, and it being hardly practicable to proceed farther with the large sledge, we again lay over a day to reconnoitre. Elevation of camp, 700 feet [213^{m}]. Base; latitude 81° 16′ 59″, longitude 70° 46′, observed.

An adjoining mountain, 2,900 feet [884^{m}], was ascended to get an outlook. The most conspicuous object was a line of cliffs about a half dozen miles to the north, seeming to mark a large valley or lake extending towards the east and west. The view at some few miles in either direction was cut off by intervening heights. Between this valley and camp lay an elevated depression, forming a divide between the two water-courses. Much of its surface was occupied by a small lake. We had crossed this in ascending. The ice, where exposed in places near shore, was so transparent that stones could be seen on the bottom. The lake apparently drained both north and south. The Garfield and United States Mountains were quite prominent, and in the midst of the former the Henrietta Nesmith glacier was soon perceived. The intervening country seemed comparatively low and of rather a mountainous aspect. The depression occupied by Lake Hazen was readily seen. The compass bearings of a number of peaks and elevated "domes" were taken, some of which correspond nearly with the positions of Mount Arthur and Mounts Augur and Russell. Two or three branches of the valley referred to were traced towards the southwest several miles. Towards the horizon between southwest and southeast the country seemed greatly elevated and had every appearance of being ice-capped. Off towards the south about 10 miles was an ice wall, doubtless the flank of the branch glacier to the north of our camp in the Ella Bay Valley. Many of the dome-shaped heights, "hog-backs," in this direction must be over 5000 feet [1,524^{m}] in altitude. Several remained visible from every elevation for several days afterwards.

A ravine to the southwest offered a route, though a difficult one, but I decided to make a reconnaissance to the large valley referred to, to the north. After a rest we started accordingly, taking the dog-team and small empty sledge. An hour's fast traveling brought us to the heights overlooking Musk-ox Valley and another hour was occupied in getting down a rocky gorge to the river bed. It was seen to be a valley trending off towards the WSW. on one hand and the NE. on the other. Two hours' journey in the latter direction proved that we were going down stream. The valley is 3 or 4 miles wide on an average, probably

*Omission in original.—A. W. G.

bounded on the north side by cliffs and on the south by great heights, but not so precipitous. The extent of it seen during the day was about 15 miles in a straight line. Before returning to camp we saw four musk-oxen and shot one for dog-food. A better route out of the valley was discovered on our return, to the east of the rocky gorge referred to.

This valley offered the best means of advancing west, but it was necessary to take the little sledge and shelter-tent, and to reduce all weights to the lowest possible limit. The sledge-runners were very much worn by this preliminary journey, and twelve days' absence was all I thought it well to attempt, expecting towards the close to have to resort to the knapsacks, &c. The outfit, consisting of eleven days' rations, 113 pounds pemmican (for the dogs), &c., weighed, by estimate, 328 pounds. We left our base of supplies (the big tent and sledge) at 12.15 a. m., May 8, and, reaching the valley to the east of the Rocky Gorge, traveled about a half-dozen miles up-stream and went into camp. Camp I. Latitude, 81° 18′ 25″, longitude, 71° 01′, observed.

The next day's march took us to what had seemed the end of the valley or height stretching directly across. Here two hours or more were spent in a reconnaissance. The stream came out of a cañon to the south and apparently terminated in a glacier, the walls of which were distinctly visible at 8 or 10 miles in that direction. The general course of the valley was continued in a narrow gap just north of the heights referred to. It was very unpromising, being full of rocks and stones, but the cañon referred to seemed the only other resort. The sledge had overturned shortly after starting on this day's march, the uprights of one runner being all broken short off in the mortises, but were mended "after a fashion." Now the runner "flopped over" so continually that it was necessary to camp and "fix it," after proceeding a few miles up this gap. The march was a short one consequently—about 8 miles. Camp II. Latitude, 81° 15′ 35″, longitude, 71° 46′, observed.

A cache was made here of rations, and, on account of the mishap to the sledge, the snow-shoes, ax, &c., were left behind.

This gap is about 4 or 5 miles in extent. At its western end the stream-bed occupies the middle of a long plain-like valley, spreading out into a lake of some size about the middle. On each side runs a low range of hills, and at its end towards the WSW. is a mountain which appears to close it in, about 15 or 20 miles from the gap. The wall of a glacier apparently runs along the south side of the valley, just back of the low range of hills on that side, and the country behind it seemed one continuous glacier surface. All this was seen from the heights near the gap. The next march, the third from our base, took us WSW., beyond the mountain referred to and close to the glacier wall—the "Chinese wall," as I called it. We had been gradually ascending, and now the barometer showed an elevation of [*] feet. The wall here per sextant angle and distance paced off was 143 feet [44^{m}] high.

We now followed along the wall, gaining a greater altitude in every hour's travel, keeping the same general direction, till we gained the top of what is doubtless the water-shed of Grinnell Land. A detour of a mile or two to the north gave a slightly greater elevation, the barometer showing [*] feet above the sea-level. The view to the south was cut off by the *mer de glace* a few miles from the wall. Its gently undulating surface formed the horizon in that direction. The course of the last three marches, however, was plainly visible—the mountain ascended near our base of supplies, and a few degrees farther to the right (ENE.) several lofty domes, evidently ice-clad.

The view to the north was restricted by the extension in that direction of the ridge on which we stood to the distant mountain ranges. Off towards the northwest several miles a large lake was discovered, probably 10 miles across. A streamlet extended southeast from it to the "Chinese wall" and occupied a depression, forming a wide, sloping valley. Beyond this valley, and extending from the lake to the prolongation of the wall to the southwest, the country was broken and mountainous. A line of cliffs was seen, extending in azimuth from SW. to WSW., marking the valley we descended the next day. A mountain peak appeared to the north, which, from its bearing and distance, I think must have been Mount Arthur. The ground adjoining the great wall, on either side of the divide, had a gradual slope to the north. I was surprised to see no continuous ravine or noticeable water-course which served to drain the melted ice to the east and west. Many lakes were seen and crossed along the wall, and in places narrow, ditch-like gulches, washed out evidently by the water, but the glacier face extended uphill and downhill across the country in a very arbitrary fashion.

---

*Omission in original.—A. W. G.

Some miles beyond the lake-glacier stream referred to, the wall inclined more to the southwest and I left it and obliqued to the right. We soon gained a considerable elevation near a small lake surrounded by mountains (elevation [*] feet). It seemed to drain both east and west. Proceeding west down a narrow ravine we soon came to a steep snow-bank, an almost vertical fall of 60 feet [18^{m}]. Camp IV. Latitude, 81° 05′ 10″, longitude, 74° 41, observed.

We descended this at the next march, the 5th, and proceeding down a narrow gorge, with towering mountains all around, in three-quarters of an hour lost a thousand feet [305^{m}] of altitude and came out into a deep, narrow valley. The route taken seemed to be the only one by which the descent could have been accomplished. Some miles down this valley we came to a branch from the left, filled by a large glacier and discharging into a large lake. Another glacier entered the lake from the south at its farther end and, beyond the line of cliffs marking the south side of the valley or lake, obliqued to the right and was lost to view. We gained the end of the lake and camped. Camp V. Latitude, 80° 56′ 27, longitude, 76° 13′, observed.

A few miles farther the next day (the 6th March) and we discovered salt water and the head of a fiord named Greely Fiord. The last glacier here discharged. A few miles farther west a large twin glacier came in from the south. Bear tracks were here seen. We proceeded about 26 miles down the fiord and camped (the Farthest, May 13, sixth camp) in a heavy snow-storm at 12.30 p. m.

By making a long fast of nineteen hours, and then cutting down the dog-food and the rations still on hand for part of the homeward journey to the lowest limit, we were enabled to remain here till the storm abated and the weather became quite clear at times. Complete sets of observations for latitude and longitude were obtained and many compass bearings, &c. The cliffs on the south side were ascended by Sergeant Brainard and myself and a point reached 3 or 4 miles farther to the west. From this elevation a good view was obtained, except of the mouth of the fiord, which a suddenly rising storm shut out. Later, however, from a position on the fiord itself, several miles from shore, the extreme capes of the fiord were clearly seen. Careful examination with the telescope, from here and from camp, on many occasions, failed to reveal any land between. Distances and bearings are all by estimate and compass sights, it being impracticable to do any satisfactory triangulating on account of the weather, the deep soft snow uniformly covering the fiord, &c.

The fiord is between 60 and 80 miles long, the south shore being considerably longer than the north. Whether the farthest cape on the former side was on the farther side of an intervening branch or on an island, could not be determined. The fiord near its head may be said to be 10 miles wide and 15 or more at its mouth. The whole shore-line is bounded by steep, high cliffs, broken by ravines, valleys, and a few branch fiords. At the head it forms two bays, the one to the north, like the other (which we traversed), being probably the outlet of a long valley or lake. Beyond the shore-line in every direction the country is very elevated. Thirty or 40 miles beyond the north shore and extending east and west was a conspicuous mountain range. Off towards the northwest, somewhat nearer, was a large glacier. From the cliffs ascended the country to the south appeared more uniform in appearance—a series of immense ice-capped undulations of great elevation. A glacier was distinguished some 20 miles to the south, apparently another offshoot of the "Chinese wall," the face of a great *mer de glace* being traced a few miles towards the east and west. Fossil remains were found on these cliffs—of wood and fishes seemingly. It was impracticable to get any tidal observations in this fiord, having no ax or spade along, nor anything that could be used as a rod.

The position of the "Farthest," as since deduced, is latitude 80° 48′ 39″; longitude, 78° 26′ west; magnetic variation, 116° 35′ ± 1° 3′.

We started on return at 8.15 a. m., May 16, camping at the same places as on the outward journey and reaching our base in six marches. At the second camp on return it was necessary to kill one of the dogs for dog-food. The traveling generally and on the fiord especially was rendered much worse by the storm. The homeward route was the same, except that I went to the head of Simmonds Bay (of Archer Fiord) and thence with the little sledge explored the valley beyond. This valley is mostly occupied by a long lake. After proceeding about 15 miles in a NNW. direction we encountered, as expected, the prolongation of Musk-ox Valley trending off towards the northeast and west. I had imagined its outlet was Simmonds Bay, but think now it must be Ida Bay (of Chandler Fiord). Further down Archer Fiord Christiansen killed a harbor seal, a large one of the kind, weight probably 200 pounds.

*Omission in original.—A. W. G.

The snow in Discovery Harbor was found worse than before. "Howler" gave out and was left behind, and has since been found dead. The large sledge was dropped, and we came in with the small one, reaching Fort Conger at noon.

May 26.—The great *mer de glace* discovered on this trip extends, I think without any doubt, continuously from Archer to Greely Fiord. From a mountain near second camp on return the wall was seen trending off towards the southwest a distance I estimated at 40 miles. It was also seen in other places besides those mentioned in the foregoing pages. And the general aspect of the country to the south seemed to confirm the idea.

Of the extent of the *mer de glace* to the south of its northern face it is hard to form an opinion. Ice was often clearly discerned for a half-dozen miles or more, and the prospect towards the south was always white and apparently that of an ice-clad surface, very high. On account of this elevation I could seldom see much farther directly south than this, even from mountains ascended. Judging from this the *mer de glace* must be of enormous depth just back of its face, unless its base rises in altitude towards the south, which the slope of the ground to the north would seem to oppose.

The height of the wall bears a very small proportion to the elevation back of it; that at the head of the valley above Ella Bay was 160 feet [49^{m}], and at camp near "divide" of Grinnell Land 143 feet [44^{m}]. I think, however, the latter was exceptionally low. Both were determined by sextant and distance determined by pacing. The "wall" in some places was evidently much higher. The wall is lined all along its foot by blocks and fragments of ice constantly broken from the face above. The noise was often noticed. No moraines or foreign matter of any kind were observed on the surface, and crevasses were extremely few and insignificant, except on the offshoot above Ella Bay and the two above Greely Fiord. The surface was often noticed to have a mottled appearance, probably due to slight depressions in its gentle undulations. Of moraines along the wall there were very few or none at all, and only noticeable in one place where a low ridge of earth and stones ran parallel with it a few feet out. This wall was generally of a uniform white color; the glacier face above Ella Bay was distinctly marked, green above and white below. In one or two places a few feet in extent the *mer de glace* sloped down to the ground, and here might have been ascended apparently. Elsewhere the wall formed a continuous vertical plane. The ground to the north of it, especially on the divide, &c., had a singularly smooth appearance, as if it had once formed the base of this mass of ice.

Many small icebergs were seen at the head of Greely Fiord in both the bays [temporarily named *Adola* and *Antoinette*], as well as an occasional stray one farther down. They were as far as I could judge entirely similar to the ordinary floe-berg of the straits and the north coast of Greenland, varying like the latter in shape, height, &c. Those in the southern bay or arm of the fiord were close to the glacier and were undoubtedly detachments from it. The others must also have had the same origin. This glacier had great numbers of transverse crevasses near its end, from which it would seem that these bergs break off and fall, rather than become detached by their buoyancy. Similar crevasses were noticed at the end of the glacier, discharging into the lake just to the east. There was no noticeable difference in the character of the ice of Greely Fiord from that of Archer Fiord, &c. There was very little snow in Musk-ox Valley and also on the "divide"; the absence of it was very noticeable on the latter, the small stones with which the ground was covered being continually exposed in small areas.

Tracks of game were quite abundant, but not much game was seen, four musk-oxen, seals on both fiords, a few ptarmigan, and one hare being all. Of these one musk-ox, one seal (Archer Fiord), two ptarmigan, and one hare (Ella Bay Valley and Musk-ox Valley, respectively) were shot. Bear tracks were seen in two places at the head of Greely Fiord, and fox tracks also, but tracks of small game were extremely scarce beyond Camp IV. Very old musk-ox droppings, however, were seen in the valley just beyond. Fresh musk-ox tracks were seen on the divide as well as to the east of it, also along the shore of Ella Bay. Numerous lemming, ermine, and ptarmigan tracks were seen daily. An owl was seen one day and snow-birds were quite numerous. Wolf tracks were seen about Sun Bay and Miller's Island.

With regard to a sledge party (with dogs) going overland and exploring the western coast with the vicinity of this station as a base, I think it would be feasible, at least for a short distance by following the valley north of Simmonds Bay and thence taking my course. The journey would be very laborious.

I append to this some tracings (the outlines) of sketches made during the trip. The details of my journey, &c., may be found in my sledge journal.

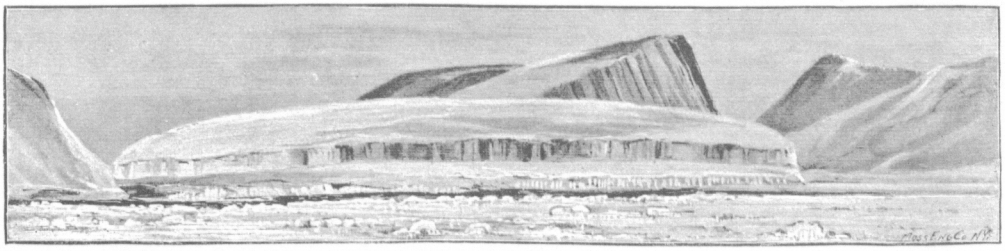


FIG. 1. FACE OF GLACIER ABOVE EMMA BAY (FROM TENT). APRIL 30, 1883.

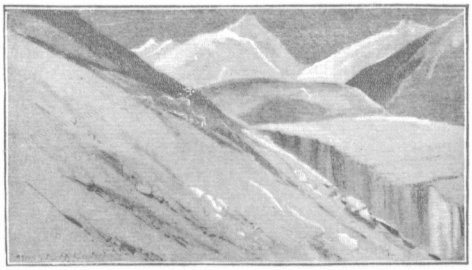


FIG. 2. FLANK VIEW OF SAME FROM SE. CORNER. MAY 1, 1883.

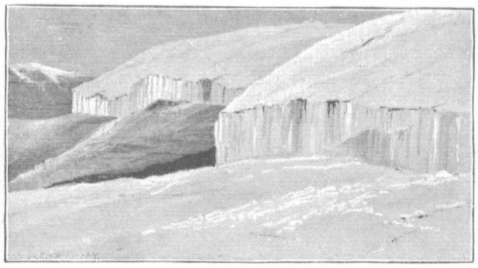


FIG. 3. MER DE GLACE "CHINESE WALL" JUST WEST OF "DIVIDE", LOOKING EAST (AT LAKE HARRY). MAY 18, 1883.

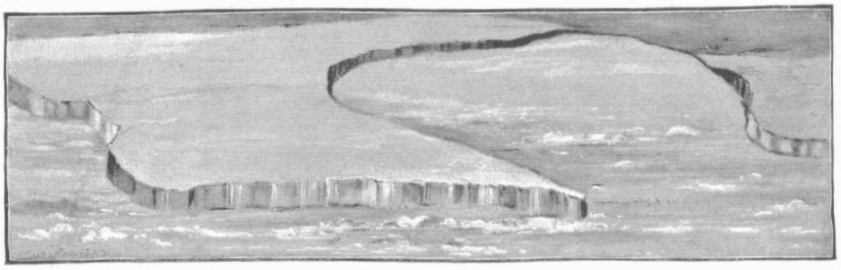


FIG. 4. MER DE GLACE "CHINESE WALL" WHERE FIRST APPROACHED, JUST EAST OF CAMP XI. MAY 10, 1883.

FIG. 5. GLACIER "FLOEBERG," HEAD OF GREELY FIORD (ANTOINETTE BAY). MAY 13, 1883.

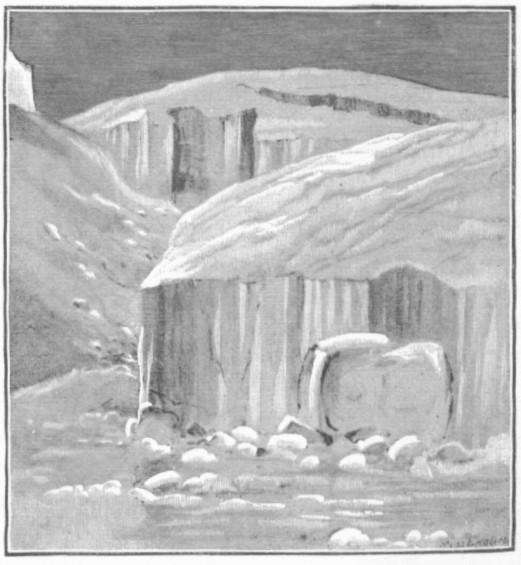


FIG. 6. OFF-SHOOT OF THE MER DE GLACE. THE SAME AS FIG. 8. THE HILL-SIDES ON THE LEFT CORRESPOND. NEAR HEAD OF LAKE BETWEEN CAMPS XII AND XIII. MAY 12, 1883.

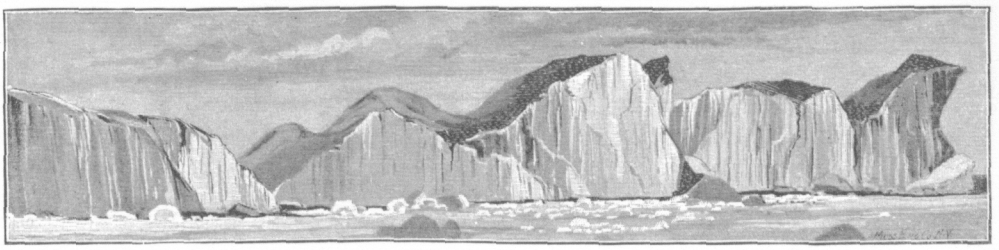


FIG. 7. GLACIER "FLOEBERG" AT GLACIER AT HEAD OF GREELY FIORD, MAY 13, 1883.

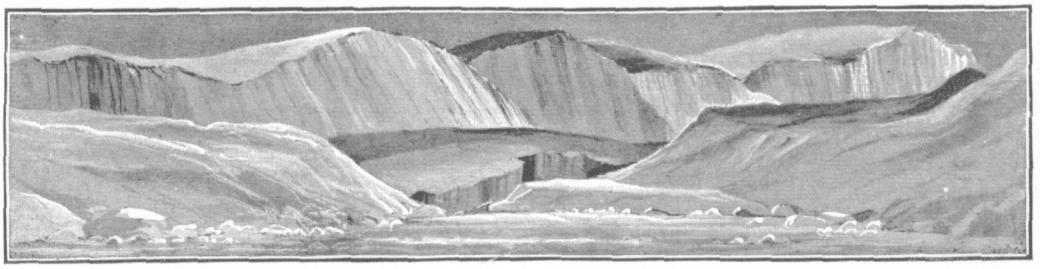


FIG. 8. GLACIER ENTERING VALLEY. THE CLIFFS TO THE RIGHT ARE AT THE HEAD OF THE FIORD (ANTOINETTE BAY). MAY 12, 1883.

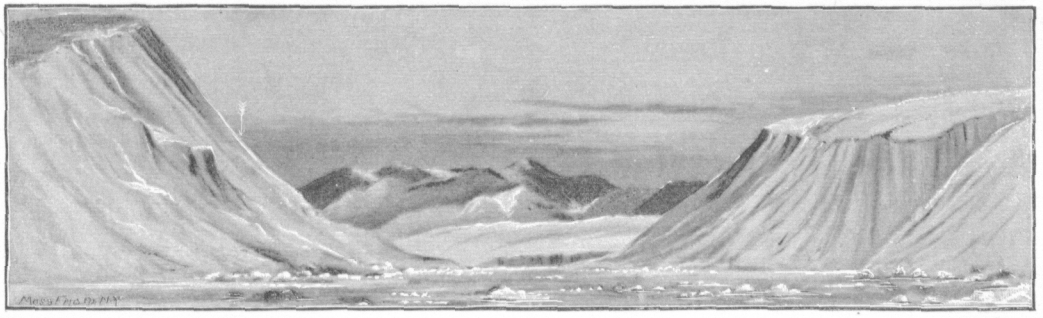


FIG. 9. LAKE, GLACIER, AND MOUNTAINS FROM WEST END OF LAKE, CAMP XIII. THE ROUTE LIES THROUGH THE FOREGROUND OF THE SKETCH IN THE DIRECTION OF THE ARROW-HEAD. MAY 12, 1883.

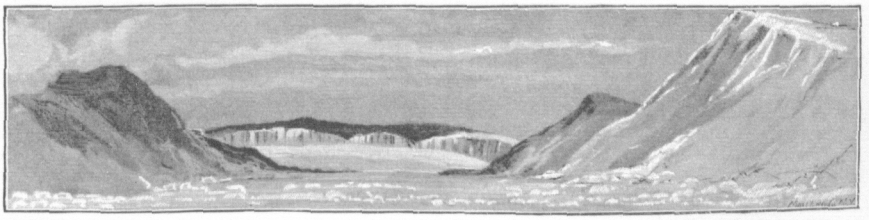


FIG. 10. GLACIER AND CLIFFS FROM EAST END OF LAKE; CAMP XIII IS IN THE RIGHT FOREGROUND. MAY 12, 1883.

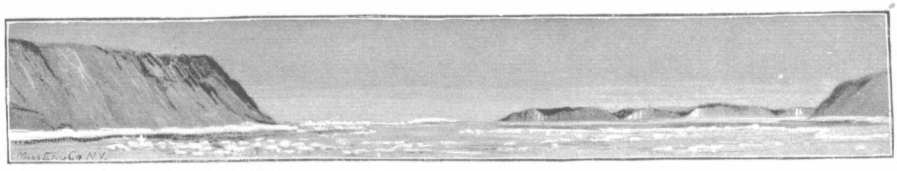


FIG. 11. VIEW TO THE WEST FROM HEAD OF FIORD. THE CAPE TO THE LEFT MARKS WEST EXTREME OF BAY AT HEAD OF GREELY FIORD. MAY 13, 1883.

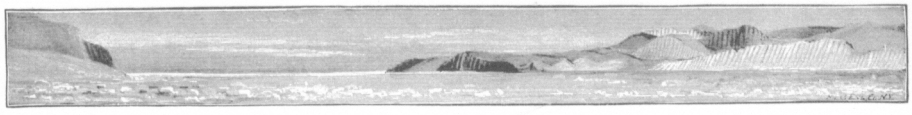


FIG. 12. VIEW TO THE WEST FROM FARTHEST. MAY 14, 1883.

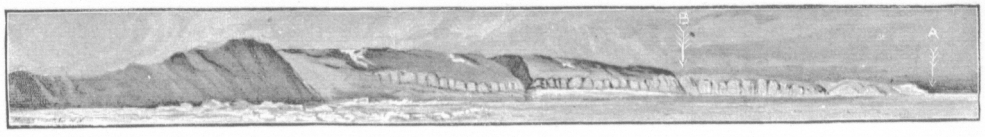


FIG. 13. FARTHEST LAND ON SOUTH SIDE (FROM OUT FROM SHORE SOME MILES). THE ARROW "A" MARKS A SEEMING BRANCH FIORD OR CHANNEL; "B," A PROBABLE BRANCH FIORD. MAY 15, 1883.

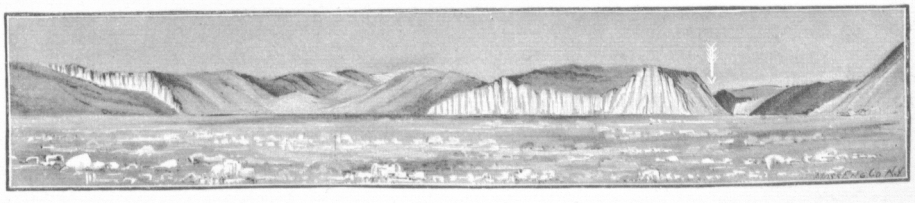


FIG. 14. HEAD OF FIORD FROM FARTHEST. CAMP XIII LIES UNDER THE ARROW. MAY 14, 1883.

In conclusion I would say that Sergeant Brainard displayed his wonted energy and discretion during the trip and merits my most favorable notice. Christiansen also showed himself reliable and willing, and a good dog driver in every respect.

I remain, very respectfully, your obedient servant,

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, A. S. O.

First Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant, Commanding.

Sledge journal of exploring trip to the west coast of Grinnell Land, April 25 to May 26, 1883.

FORT CONGER, GRINNELL LAND, *June*, 1883.

FIRST MARCH, FORT CONGER TO STONY CAPE.

April 25.—At 8 p. m. left the station with the two dog-teams, ten dogs each. Sergeant Brainard, Christiansen (Eskimo), and myself with advance sledge; Sergeant Elison and Jens (Eskimo) with supporting sledge. Rations for thirty days. Total weight on the two sledges about 1,000 pounds, including the hand-sledge and Hudson Bay sledge packed with the loads. Course taken for the northwest extremity of Bellot Island. Found the snow soft and deep, but still the dogs traveled on a trot and good progress was made, though it was extremely fatiguing. We traveled on an unbroken expanse of snow for about the first hour, when hummocks and rubble-ice were encountered, till, opposite the Western Entrance, the large floe of ice formed last fall was gained. The dogs were quite satisfied to relax their pace. Soon after this, snow softer and deeper than ever was encountered in the midst of rubble-ice, in which the sledge went down over the slats and "stuck" incessantly. With much work we managed to gain the shore of Sun Land and got along quite well on an ice-foot, till, leaving it to cut across to Black Nob Point, this execrable snow was again met with. Beyond this, however, in Basil Norris Bay, the traveling became good, and finally excellent.

April 26.—At 1.40 a. m., temperature —14° [—25.6° C.]; weather very fine.

Reached the depot tent, which was found down; repitched it. Left the Hudson Bay sledge and a few other articles intended for the hunting party. Delayed perhaps a half-hour, and then turned towards Sun Bay. The snow overland found soft and deep, but on the bay pretty good. At 3.50 a. m. reached Stony Cape and camped; all much fatigued. Frequent short halts made during the march for rest. Fox tracks seen in two or three places and fresh wolf tracks near present camp, apparently from up or across the fiord and going north. Elison and Jens sleep in the shelter tent and eat with us. Supper at 5.30 a. m., and about 6.30 turned in.

Time *en route*, [*]. Distance traveled, [*].

SECOND MARCH, STONY CAPE TO BEYOND HILLOCK DEPOT.

At 4.20 p. m. Brainard lighted lamp. Breakfast at 5.30; p. m., temperature, +1° [—17.2° C.]; calm and cloudy.

At 7 p. m. started *en route*. At 8 p. m. reached Cape Straight of Miller Island, and in two hours more Keppel Head. A light crust on top the snow and the rapid pace of the dogs made it necessary to rest at times. The traveling near Keppel Head rather better, and beyond that place much more so. Two hours more in getting to Hillock Depot. The dog-food expected evidently eaten by foxes. The metallic case and rubber box and contents put on the sledges, and we continued on for two hours.

April 27.—At 3.05 a. m., temperature —1° [—18.3° C.]; overcast; no wind. Camped by a broad snow-covered shoulder, with gulch just beyond it. Stranded hummocks near by. Several wolf tracks seen during the day and a seal-hole (small) between Miller Island and Stony Cape; fox tracks near the island, and ptarmigan tracks at Hillock depot. Under these high cliffs we traveled in the shade. Barometer, 30.20 [767.07^{mm}].

---

*Omission in original.—A. W. G.

Two days' rations left at this camp (excepting alcohol), the English metal box coming in very conveniently for the purpose. All this part of the fiord is new ice, covered with snow, and extending down thus probably as far as, or below, Keppel Head. Elison cooked. At 6.30 a. m. turned in. Temperature +5.5 [−14.7° C.]. Signs of a coming storm.

Time [*]. Distance [*]. Delays *en route*, nearly or about an hour.

THIRD MARCH, FROM ABOVE HILLOCK DEPOT TO OPPOSITE DEPOT POINT.

At 5.20 p.m. I lighted lamp; 6.40, breakfast. At 7.30 p. m. temperature −5.5° [−20.8° C.]; sky overcast with broken bands.

At 8 p. m. both sledges started forward. At 9.15 p. m. the supporting sledge turned back after twenty minutes delay and reached the depot tent in seven hours. The load on the advanced sledge was now 970 pounds, less food consumed and cached to date. The traveling was very good and continuing to improve. The dogs drew the heavy load readily, the snow being very light. It was a great relief to go at a walk, which the heavy load now obliged. Stopped a few minutes in each hour to rest, as breaking through the snow crust made it fatiguing. Several fox tracks seen.

April 28.—At 2.55 a. m. camped about the middle of the fiord; 3.30 a. m., temperature −5° [−20.6°C.]. Weather very fine; bright and clear. The course for the past four hours has been directly towards Record Point. Traveling excellent; 6 a. m. turned in. At 6 a. m. temperature −5° [−20.6° C.].

Time [*]. Distance [*].

FOURTH MARCH, FROM OPPOSITE DEPOT POINT TO HEAD OF ELLA BAY.

At 4 p. m. Brainard lighted lamp for breakfast. At 6 p. m. temperature −1° [−18.0° C.]; clear and calm.

At 6.25 p. m. left camp with everything. Traveling excellent; snow light with moderately hard crust. In three-quarters of an hour reached cape of Bulley's Lump, nearly opposite Depot Point. Here we delayed half an hour, and two bones showing Eskimo workmanship were found; they were very old.

April 29.—At 12.15 a. m. reached head of Ella Bay. Traveling to the west of Bulley's Lump not so good; snow soft and deeper. After three-quarters of an hour delay in pitching the tent, &c., I proceeded with Frederik Christiansen and empty sledge up the stream-bed. Found it would be practicable to proceed to-morrow with the load in this direction, and then returned to the tent at 2 a. m. Tracks of foxes, hares, lemming, ermine, ptarmigan, and musk-oxen seen in the vicinity. The last indicated these animals making their way along the shore towards Record Point, and were quite fresh at about three days old; 5 a. m. supper. Ice obtained from a hummock which had floated up here from the straits. Sergeant Brainard did all the cooking from this time forth. At 5 a. m. temperature +2° [−16.7° C.]; 6 a. m., barometer 30.425 [772.78^{mm}]. Sky partly foggy and overcast.

Time [*]. Distance (to head of bay) [*]. Delays *en route* [*].

FIFTH MARCH, ELLA BAY UP VALLEY TO GLACIER.

At 6 p. m. breakfast. Temperature −3° [−19.4° C.]; 7 p. m., barometer 30.50 [774.69^{mm}]. Disappointed in not getting equal altitudes, the high cliffs hiding the sun. One day's dog-food and two day's rations left here. At 8 p. m. broke camp and started. My intention was to follow the valley known to exist southwest of the bay to the glacier at its head, thence continue inland towards the west or southwest as circumstances allowed. We found it difficult to follow the ice of the stream-bed; stones and deep snow also made the traveling laborious for some distance, but after about an hour winding around several of the little hillocks and "mesas" so common in the water-courses of this country we found ourselves at the near end of the lake seen by me last summer. Before us to the southwest lay a straight level valley about 2 miles wide, walled in on the south side by high, steep cliffs and closed at its end by a glacier about 10 miles distant. Along its north side extended a rather low ridge, becoming higher as it ran inland. After traveling on the lake some distance I ascended this ridge with Sergeant Brainard at a place where its altitude by barometer was only 400 feet [122^{m}]. It separated the lake from a rather wide ravine running into the bay. Beyond the ravine were extremely high snow-covered heights. Saw the tracks of the three musk-oxen again; also hare,

*Omission in original.—A. W. G.

fox, lemming, and ptarmigan tracks. I estimated the lake as 4 miles long; it occupied the breadth of the valley and was covered with snow. Beyond the lake the ground was covered with ice and hard snow and the dogs traveled rapidly. The glacier face or wall seemed about 10 feet [3m] high. The glacier back of it rose at an easy grade many times the height of the face, but it looked feasible to scale the wall and travel on the surface beyond.

April 30.—At 1.10 a. m. reached the face of the glacier, having left the team with Christiansen back about one-fourth mile. An irregular bank of snow, or more probably a snow-covered moraine, varying in height, but perhaps on an average one-third the height of the wall, lay against and hid its foot. Sergeant Brainard and I walked to the top of this and were able there to touch the wall. Standing on the top of this bank Sergeant Brainard from below estimated the height above my head as twenty-five times my own height. I saw no means of proceeding farther—at present at least—and so returned to sledge and pitched tent. At 2 a. m. temperature −9.5° [−23.1° C.]. At 3 a. m. barometer 30.325 [770.24mm]. Sky clear. Noticed a decided fall in the temperature, due to our proximity to the glacier. The face of the aneroid barometer indicated an altitude above the bay of 150 feet [46m]. Latitude 80° 59′ 42.5″, longitude 70° 41′ west, observed.

Time [*]; distance [*]; delays *en route* [*].

AT GLACIER.

At 5.45 p. m. (30th), breakfast. At 6 p. m. temperature +4.5° [−15.3° C]. At 7.30 with Sergeant Brainard I left camp to reconnoiter, with the hope of finding some way to the top of the glacier or up the valley by its flank. In forty minutes we were at the south extremity of its front, but here the wall was seen to exist all along the flank or almost or quite as high, a grand precipice of ice running close to the steep incline forming the pedestal of the huge cliffs. The incline for many hundred feet up was a mass of immense rocks and bowlders with treacherous cracks between full of loose snow. The angle between the wall and the incline was full of large fragments of ice, lately parts of the wall itself, making progress along the flank so difficult that we took to the bowlders. By using both hands and feet we gained a considerable elevation, and were able to overlook all the lower part of the glacier. The glacier *apparently* occupied the whole bed of the valley and got higher and higher towards the southwest, till it was lost in the mountain peaks which seemed to wall in the end of the valley some 20 or 30 miles off in that direction. As the valley apparently narrowed little or none in width I assumed that its gradient remained the same, and that the glacier attained an immense depth. Very conspicuous was what seemed a branch glacier breaking through a gap to the west but a few miles distant. Near the convex flank of the "branch" its surface had a very steep slope much broken up by lateral crevasses. The general surface seemed undulating and furrowed, and covered in places only with a light depth of snow, but near the edges it sloped down very rapidly. After seeing all this I determined to gain the top of the cliffs for a more extended view, thinking the distance rather a short one. We started, but more severe labor I never experienced. The mountain side was exceedingly steep and appeared interminable. At* — a. m. barometer 27.65 [702.30mm]. When the barometer showed an elevation of 2,550 feet [777m] I found myself on a ledge of rocks from which for some time I could get neither up nor down. From here I could see what seemed a lake in the midst of a glacier, and just beyond the junction of the branch glacier referred to; its level was far below that of the glacier surface on each side; it occupied nearly the whole breadth of the valley and was round in form. Apparently it separated into two parts what I had hitherto regarded as one entire glacier.

May 1.—At 2.50 a. m., barometer 26.15 [664.20mm], reached what had long seemed the summit; but before me lay a gradually rising ice-capped dome. However, progress was now comparatively easy, and Sergeant Brainard appearing said the top was about a mile away; he had already succeeded in reaching it. At 3.45 a. m., barometer 25.25 [641.34mm], we reached it together, and stopped thirty-five minutes to take bearings, &c. We had reached a great height, but still there were other of these peculiar dome-shaped heights as high or a little higher within a few miles, one to the east and another to the north, which cut off the view partly; the sky also was somewhat cloudy. To the south, and extending from what seemed our feet to a distance of 15 or 20 miles or more, occupying perhaps 15 or 20 degrees on either side of the meridian, was a maze of cone-shaped mountains with many deep cañons between filled with glaciers.

[*Omission in original.—A. W. G.]

The whole triangular area thus observed was of a uniform white color, hardly broken by a single protruding rock. The unbroken snow and ice so merged mountains and valleys together that it was difficult to distinguish anything, more especially as our elevation was by no means exceptional. The snow covered the face of the country in every direction, but appearances seemed to indicate more of it and of ice to the south of an east and west line than to the north. The Ella Bay Valley seemed turned from its original course by a noticeable mountain some 20 miles distant, which from its shape I called Pyramid Mountain. There the valley and glacier may extend south, but the view was cut off by other elevations. A deep depression just south of us extended in the same general direction as the valley. Near its western extremity was a large lake or glacier. The Garfield Mountains and several peaks were conspicuous.

Took the following compass bearings (magnetic):

	Degrees.
Pyramid Mountain (15 or 20 miles distant)	156
Mount A (a little to the right, about same distance)	180
Mount C (lofty and snow-clad peak, perhaps 70 miles off)	166
Mount D (estimated at 20 miles)	101
Mount E (large "hog-back" mountain, near glacier or lake)	140
Mount F (twin peaks, probably 50 miles)	142
Garfield Mountains (west end)	259
Garfield Mountains (their extension to the east farther than this cut off)	288
"Hills" (a range of hills on near side of Garfield Mountains)	234
Point west of camp	250
Cliffs northeast side of Simmonds Bay	318

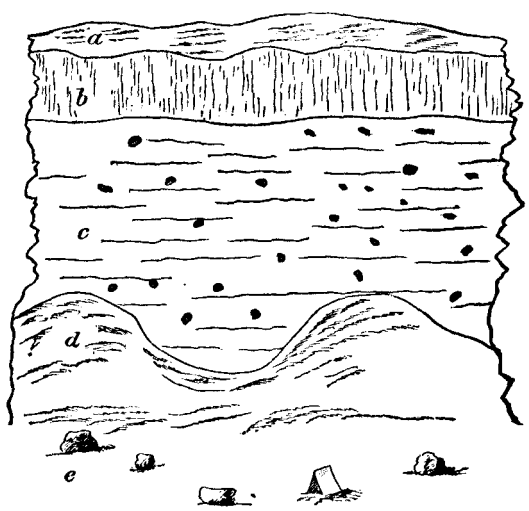
The elevation we were on, which was a "hog-back," the barometer made 5,050 feet [1,539^{m}] above sea-level and nearly that above tent. On the way up I heard a very loud crash, and looking back thought I saw the place where a large section of the glacier face had fallen in.

Returned to camp by same route, following a steep icy ravine along its side. Observed the incessant fall of rocks and stone to lower levels. At 8.45 a. m. reached the tent, and after supper and making observations turned in at 12.40 p. m. Christiansen shot two ptarmigan during our absence.

At 8.45 a. m., barometer 29.85 [758.18^{mm}]. At 12 noon, temperature +3.5° [−15.8° C.]; barometer, 29.85 [758.18^{mm}]. At 5.50 p. m., breakfast.

May 2.—I sent Sergeant Brainard to intersection of glacier face and valley on north side. He advanced one and a half hours, and found route along flank of glacier quite practicable for some distance, but no way of flanking the glacier or attaining the surface. Compass bearing north side of Bulley's Lump, 333°.

Approximate height of face per angle and distance paced off, 160 feet [49^{m}].



Section of face of glacier.

a. Edge of top, overhanging in places, as it appeared from below.
b. Pure ice of a beautiful green color.
c. Ice, white and chocolate color, full of small stones and streaks of mud or earth.
d. Apparent snow-bank, but probably moraine covered with snow.
e. Level of valley, scattered bowlders and lumps of ice.

Remained in camp all day, occupied with observations, &c. At 12.30 a. m., temperature +1° [−17.2° C.]; barometer, 29.60 [751.83^{mm}]; sky overcast. At 8.40 a. m., temperature +11° [−11.7° C.]; barometer, 29.58 [751.32^{mm}]. At 12 noon, temperature +6.5° [−14.2° C.]; barometer, 29.57 [751.06^{mm}]; at 2.20 p. m., temperature +1° [−17.2° C.]; barometer, 29.04 [752.84^{mm}].

SIXTH MARCH, GLACIER BACK TO ELLA BAY.

At 8 p. m., temperature zero [−17.8° C.]. At 8.20 p. m. broke camp and started. There appeared nothing to do but try the valley of Beatrix Bay or Simmonds Bay. The valley between the glacier and lake is generally very level and covered with small stones; it was once probably covered by the glacier. Several ravines on the left were examined *en route*, to find if they afforded a practicable route for sledge or pack, but they seemed very unfavorable. Fox and hare tracks seen.

May 3.—At 12.35 a. m. went into camp near old camp. One of the dogs ate up a piece (several feet) of Christiansen's whip. At 3.30 a. m., turned in. At 3.30 a. m., temperature −11° [−23.9° C.]; barometer, 30.05 [763.26^{mm}].

Time, 4 hours, 15 minutes: delays, 50 minutes; distance, 10 miles.

SEVENTH MARCH, ELLA BAY TO BEATRIX BAY.

At 5.30 p. m., breakfast. Weather bright and clear except to the west, where fog and clouds still remain. Took some angles for height of immense cliff on south side bay; height, 4,097 feet [1,249^{m}]. At 6 p. m., temperature −4° [−20.0° C.]; barometer, 30.17 [766.30^{mm}]; sky slightly overcast. Broke camp and started. Stopped at Record Point and left a notice in the English cairn. Several hare tracks here.

May 4.—Found the snow in Beatrix Bay much harder. Near head of bay is a floe of paleocrystic ice. Immensely high cliffs on all sides, their summits covered with snow and ice; a miniature glacier in one place. At 1.25 a. m. reached head of bay and camped. Christiansen saw a ptarmigan at Record Point flying overhead. At 5 a. m. turned in. Marches short and taken leisurely, as when we abandon the sledge, whether for the small sledge or packs, there will be more rations than we can take along.

At 1.25 a. m., temperature −8° [−22.2° C.]; at 2.25 a. m., barometer 30.09 [764.27^{mm}]; at 4.40 a. m., temperature −13.0° [−25.0° C.]. Sun shining brightly, calm. Latitude, 81° 09′ 50″, longitude, 70° 31′ W. (observed).

Time, 5 hours, 25 minutes. Delays, 40 minutes. Distance, 13 miles.

AT BEATRIX BAY.

At 5 p. m., barometer 30.22 [767.57^{mm}]; clear and bright. At 5.30 p. m., breakfast. At 6 p. m., temperature −2° [−18.9° C.]; at 6.45 p. m., barometer 30.22 [767.57^{mm}]. At 6.45 I started with Sergeant Brainard to reconnoiter the valley, leaving sledge, &c. We walked up about four miles to a projecting "shoulder," a long ridge extending nearly across the valley, and sloping from nearly the top of the cliffs to a level with the stream-bed. These shoulders are very common in this country; this was the third from camp on the north side. The valley is about one and a half or two miles wide and walled in on each side by precipitous, gigantic cliffs; it should rather be called a cañon. Raised "beaches" were very noticeable, and one at the mouth of a gorge to the south was very wide. Between the "shoulders" and beaches the stream-bed followed its winding way. These beaches are covered with small stones very evenly laid, the shoulders with large angular rocks. Bordering the stream-bed in one place were several miniature "mesas" composed of fine dirt about the height of the beach at its lower edge, or 20 to 30 feet [6 to 9^{m}]. Could only identify Mount Neville as the elevated "hog-back" back of the cliffs about two miles up the valley. Elevation of stream-bed four miles from bay 300 feet [91^{m}]. Saw fox, ermine, and ptarmigan tracks, but no hare tracks; saw one ptarmigan. From the shoulder reached, the valley was seen to run in a northwest direction to a dome-shaped elevation, where it apparently ended, nine or ten miles from the bay. This I afterwards called Mount Easy. Reached hut on return, after taking several compass sights, at midnight. Am still feeling quite stiff and sore from the effects of Mount Difficult. Christiansen went hunting but without success.

MAY 5.—EIGHTH MARCH (TO MOUNT EASY).

At 6 p. m., breakfast. At 8 p. m. broke camp and started up the valley. Found ice under the snow in the stream-bed and made good progress. Just beyond farthest reached yesterday we traveled over a lake

about a mile long. At 10.30 p.m., when about two miles from Mount Easy, the valley suddenly narrowed to about one-quarter of a mile, and for 400 yards [366m] was covered with large rocks. It was necessary to "double up," and we were an hour getting everything to the farther side. Beyond the traveling was good, but we shortly came to the end, and after working up a steep ravine full of rocks for some distance, went into camp at 11.55 p. m., it being hardly practicable to proceed farther. Elevation of camp 700 feet [213m].

At 3.30 a. m., temperature −11.5° [−24.2° C.]; barometer, 30.22 [767.57mm]. At 6.40 a. m., temperature −5.5° [−20 8° C.]; barometer, 30.27 [768.84mm]. At 11.35 a. m., temperature 0° [−17.8° C.]; barometer, 30.22 [767.57mm].

At 7 p. m., temperature −2° [−18.9° C.]; barometer, 30.22 [767.57mm]; clear with light wind down the valley. At 11 p. m., temperature −2.5° [−19.2° C.]. Weather clear, but windy. At 12 midnight, temperature −12° [−24.4° C.]. Latitude, 81° 16′ 59″, longitude, 70° 46″ W. (observed).

Time, 3 hours, 55 minutes. Delays, 55 minutes. Distance, 9 miles.

May 6.—Ascent of Mount Easy.

At 1 a. m., temperature +2.5° [−16.4° C.]; barometer, 29.41 [747.00mm]. At 3 a. m., temperature +1° [−17.2° C.]; barometer, 29.48 [748.78mm]. With Sergeant Brainard I left at 3 a. m. We ascended a rocky height on west side of the ravine and saw before us to the north what seemed a water-shed or divide, a level plain much above the elevation of the tent, bounded on the east and west by high mountains and to the north by a line of cliffs, the top of which only could be seen, evidently indicating a wide valley or lake. Traveling in this direction we soon came to a lake occupying the farther side of the plain. Crossing this obliquely to the left we reached a long, gently sloping ridge, which promised an easy ascent to the mountain. The barometer (4.15 a. m., 29.00 [736.59mm]) made the elevation of the lake above sea-level about 1,100 feet [335m]. I estimated the lake as about four miles long and one and a half or two miles wide; in places where the ice was exposed near shore it was so transparent that the stones could be seen at the bottom through the ice, 7 or 8 feet [about 2m] in thickness. The surface of the ridge or shoulder by which we ascended the mountain comprised many *roches moutonnés* or rocks of that appearance. Summit reached at 6.05 a. m. Barometer, 27.25 [692.14mm]. Elevation per barometer, 2,900 feet [884m]. Compass bearings (magnetic) as follows:

	Degrees.
First shoulder above Beatrix Bay	63½
Very high dome-shaped mountain, 20 miles or more distant, and doubtless south of fiord	62½
"Hog back," about 10 miles distant	118
Distant dome-shaped mountain, just above horizon, about 40 miles away	206
South extreme chain of mountains	211
Between this and former a very distant peak; two dark-looking cliffs, probably 40 miles	224

From this point to 304° extends a continuous mountain chain, lost at either extreme by swell of horizon. In this chain at 262° appears what is doubtless a large glacier, and beyond glacier, seen through a depression and much further away, what I take for the United States Range. In same chain at 247° are two or three conspicuous peaks. Towards Ella Bay the country had a very glacial appearance—a glacier wall seen in that direction. At 8 a. m., barometer 27.22 [691.38mm]. Returned to tent through a ravine on south side after two hours spent on the summit. Reached tent at 9.50 a. m.; temperature, +10° [−12.2° C.]; barometer, 29.55 [750.56mm]. Supper at 11.15 a. m.; turned in at 12 noon; temperature, +12° [−11.1° C.]. Sky clear; north wind.

Preliminary journey to Musk-ox Valley.

The cliffs seen to the north from the lake could be seen from the mountain to mark a long valley or lake extending apparently east and west. This and the ravine south of the mountain each offered a way of getting west by using the small sledge. I decided to make a preliminary journey to the former before, adopting either route. At 10.45 p. m., breakfast; 11.15 p. m., temperature +6° [−14.4° C.]; barometer, 29.60 [751.83mm].

May 7.—At 12.10 a. m., putting the dogs to the little sledge, with no load at all, we started from camp. Reached the "plain" after about a mile through the rocky ravine above camp, and soon came to the lake and took a course north. The lake appeared to drain south. After we had crossed it we entered a water-course flowing from it directly to the valley. Traveled very rapidly, and in one hour from camp reached

within one-half mile of the valley. Another hour occupied in getting down. It was necessary to take the dogs out and partly carry, partly pull the sledge through and over the great bowlders filling the gorge, which was here very precipitous. The course of the valley to the left was (approximately) S. 66° W.; to the right N. 35° E. (true), this for a distance of 5 to 10 miles in either direction. The valley appeared about 3 miles or more wide; cliffs and precipitous mountains walled it in.

Turned to the right and proceeded for two hours what proved to be down the valley. In this time, which was equal to about 7 miles, its elevation fell about 120 feet [36^{m}]. The water evidently covers a wide surface; in some places very shallow, but in others we traveled over small lakes and ice 7 feet [2^{m}] or more thick, very transparent. Musk-ox droppings (old) were observed continually. A snow-bird was seen, several hares, and a great many fox tracks, &c. At the farthest reached, the valley obliques to the right a few miles, then to the left around a high cliff, and is lost to sight. Here four musk-oxen were seen. One, which proved to be a female containing a well-developed calf, was shot, and the others driven off. The meat put on the sledge, and, after the dogs had stuffed themselves, we turned back.

Took several compass bearings in the valley. Got out of the valley by a ravine about 2 miles to the west of the one by which we had entered it. The ascent was much longer, but the rocks and stones were comparatively few. However, very deep snow was met in a surface drain on top. The meat was left in cache in the valley. An immensely high "hog-back" lies just east of the lake; this we skirted around in returning. The tent was reached at 10.30 a. m.—four hours returning. At 3.30 p. m., turned in, after making all arrangements for forward trip with little sledge.

At 2.35 a. m., barometer 30.10 [764.53^{mm}]; 4.30 a. m., barometer 30.22 [767.57^{mm}]; 11.30 a. m., temperature +15.5° [−9.2° C.]; barometer, 29.83 [757.67^{mm}]; 3 p. m., temperature +11° [−11.7° C.]; barometer, 29.83 [757.67^{mm}].

Ninth march (small sledge, shelter tent, &c.), Mount Easy to Musk-Ox Valley.

May 8.—At 12.15 a. m., breakfast. The outfit consisted of small sledge (weight 25 pounds), shelter tent, sleeping-bags, snow-shoes, &c., and knapsacks for proceeding without sledge, if necessary, 113 pounds pemmican (dog-food), and 11 days' rations cut down to lowest limit, on which I contemplated advancing six days; total weight on sledge, 330 pounds. The A tent was left standing by large sledge. The sledge-runners had been so much worn the previous day, and the prospective rocks were so many, that I was afraid of attempting more.

At 3 a. m. started from camp; the dogs in excellent condition. Got up to the plain without very much work. From the farther side of the lake I sent Christiansen to reach the valley by the detour of yesterday, while Sergeant Brainard and I kept straight on by the outward route and reached valley at 5.30 a. m., but after going up stream some distance, seeing nothing of the sledge, we returned. It was nearly two hours more before the sledge came in sight and reached "Rocky Gully." Christiansen had shot a hare, and also added to the load the shot-gun and the musk-ox meat left in cache. We all proceeded westward. We traveled at times over very thick, clear ice, and at times over large areas of stones covered lightly with snow; it was difficult to exactly follow the stream bed. Many terrace formations, "raised beaches," along route. The tributary water-courses to this stream are narrow ravines or gorges, some very precipitous. At 9 a. m. stopped to camp about six miles from "Rocky Gully." A mountain about ten miles up-stream seems to close the valley in that direction. Abundant musk-ox droppings (old) seen; also the fresh tracks of two or three animals. One quarter of meat cached here, with rations and the hare, two fed to dogs, and the fourth, cut from bone, to be taken along. At 12.45 p. m. turned in.

At 5.35 a. m., barometer 30.20 [767.07 ^{mm}]; 7.25 a. m., barometer 30.18 [766.56^{mm}]; 9.30 a. m., temperature, +9° [− 12.8° C.]; barometer, 30.10 [764.53^{mm}]; 11.45 a. m., temperature 13.5 [−10.3° C.]; barometer, 30.10 [764.53]. Weather very fine; sun bright and no wind. Latitude, 81° 18′ 25″, longitude, 71° 01′ W. (observed).

Time, 5 hours, 55 minutes. Delays, 30 minutes. Distance, 12 miles.

Tenth march, up Musk-ox Valley.

May 9.—At 12.15 a. m., the sledge being packed, Sergeant Brainard and I started from camp. Christiansen started to follow shortly afterwards, but as he did so, the dogs going on a gallop down the little

terrace made such a short turn on its steep slope of hard snow that the sledge overturned and rolled over and over till it reached the river-bed. The knapsacks seemed the only alternative now left, the uprights of one runner being broken short off in their mortises. It was patched up, however, and after half an hour's delay we proceeded again. We followed the stream for upwards of two hours, moving very fast for some time over little lakes of smooth, clear ice, when we came to the mountain last referred to. A narrow, stony gap between it and the north bank of the valley offered a route for some distance at least farther towards the west, but what seemed the main valley turned off in a cañon towards the south. Spent over two hours in a reconnaissance and concluded to take the gap. The cañon seemed to end at a large glacier and to drain the ice-covered mountains towards its source perhaps eight miles or more away. I took numerous compass bearings. After a delay for Christiansen who had got on the track of a hare, we proceeded. Great numbers of fresh tracks of all kinds (except musk-ox) seen, and many old traces of the latter. A good deal of grass, &c., in the lower part of the gap, but beyond this the bed was of large rocks, between which one's foot would sometimes go up to the thigh. After an hour's travel Sergeant Brainard, who was ahead of the other, reported to me that the sledge-runner could hardly be made to stand, flopping over continually; so at 6.40 a. m. we camped. The runner was fixed as well as could be. Saw a snow-bird near the cañon. Not much snow in the valley, comparatively. Turned in at 1 p. m.

At 12.30 a. m., temperature 4.5° [−15.3° C.]; cold west wind. At 1 a. m., barometer 30.08 [764.02^{mm}]; 8.15 a. m., temperature +5° [−15.0° C.]; barometer, 26.62 [752.33^{mm}]; 12 noon, temperature 12.5° [−10.8° C.]; barometer, 29.60 [751.83^{mm}]. At 10.30 p. m., breakfast. At 11.15 p. m., temperature +7° [−13.9° C.]; barometer, 29.38 [746.24^{mm}]. At 12 p. m., temperature +4.5° [−15.3° C.]. Clear and calm. Latitude, 81° 15′ 35″, longitude, 71° 46′ W. (observed).

Time, 6 hours, 30 minutes. Delays, 3 hours, 30 minutes. Distance, 8 miles.

Eleventh march, from Gap to Glacier.

May 10.—At 12.20 a. m. broke camp and started. Left stream-bed, but followed its course on snowy slope on south side. After traveling about 2½ miles stopped and made cache of two days' food; also left the ax and snow-shoes. Sledge-runner apparently still very weak though mended at camp. Left Sergeant Brainard to continue with sledge while I ascended the heights to the left-oblique. Gained a considerable elevation and had quite an extensive view. Took compass bearings. Mount Easy and the great "hogbacks" in that direction recognized and the farthest reached down the river. Towards the southeast and south the land was very high and appeared ice-capped. The "south-branch" glacier was quite distinct. To the southwest the horizon presented a series of ice-capped domes with the ice wall of a glacier running about east and west and marking the northern limit of immense areas of ice. Farther to the right extended from my present position towards the WSW., for perhaps twenty miles, a long, narrow plain or valley, bounded on each side by low ranges of hills. It seemed to be an extension, beyond the gap, of Musk-ox Valley. Its end was closed in *apparently* by a mountain; above and beyond this mountain was an elevated "swell" of the horizon, in a depression of which I could see what I took for a snow bank. To the right of this the sector of the circle seemed to embrace a low country, comparatively, covered with snow but not ice. Joined sledge at 1.50 a. m. at west end of gap. At 1.50 a. m., barometer 29.18 [741.16^{mm}]. Sergeant Brainard had encountered rocks and stones and then met a small lake. The valley before us was evidently the continuation of this stream. The "snow bank" made the objective point and we proceeded. Valley about two miles wide; large areas of it very level and showing a surface of small stones through the snow. The dogs traveled at a rapid trot, very satisfactory but very tiresome. Old musk-ox droppings and traces of hares and foxes seen. Farther west we traveled on a lake several miles long. "Raised beaches" observed, but not particularly prominent. At 5 a. m. came to a break in the low hills on left flank and saw a long glacier wall evidently connected with wall previously seen; it seemed to extend parallel with the valley and just south of the "hills." The end of the valley was a few miles to the front. Turned to the left, following the streambed and, getting well in towards the glacier wall, again turned to the right.

At 7.15 a. m. camped a few yards from wall and about on a line with last camp and "snow bank." Fresh tracks of five musk-oxen seen just before camping; tracks came from the north and the animals probably on their way east. Approximate height of glacier wall here, per angle and distance paced, 143 feet [44^{m}]. At 1 p. m. turned in.

At 2.50 a. m., barometer 29.12 [739.63^{mm}]; 3.35 a. m., 29.10 [739.13^{mm}]; 8.10 a. m., temperature 17.5° [—8.1° C.]; barometer, 29.73 [755.13^{mm}]. Latitude, 81° 08′ 14″, longitude, 73° 41′ W. (observed). At 12.30 p. m., temperature +17.5° [—8.1° C.]; barometer, 28.73 [729.73^{mm}]. Very strong west wind blowing for some hours.

Time, 6 hours, 55 minutes; delays, 45 minutes; distance, 21 miles.

Twelfth march, over "divide" of Grinnell Land.

May 11.—Breakfast about 1 a. m. Two of the dogs got at the pemmican under the sledge during our sleep and ate about a dozen pounds of it. Cached one day's dog-food here. At 2.35 a. m. broke camp and started, following along the foot of glacier wall. Wall varies little in height. The route gradually ascended. About three miles from camp crossed a small lake; stream running into it from north. Musk-ox tracks observed, apparently from the north and going east. At four miles from camp we were opposite "snow bank" of yesterday—simply the wall with snow bank at its foot. At the lake the wall is lost in one place, the glacier sloping down to the ice of the lake; some apparently submerged sections of the former rise above the surface like the ice off an "ice-foot." The glacier could here have been ascended, apparently. There are also one or two places a few miles farther on where the wall exhibits this peculiarity—short spaces of a few yards. From position at 4 a. m. (about a mile north of "snow bank"), on the side of an elevated "hog-back," took the following bearings:

	Degrees.
Cliff at intersection of gap with Musk-ox Valley	356
Elevated "hog-back" to left of Mount Easy	1
Mount Easy	359
High snow or ice-capped dome, somewhat farther off	2
Another to its right	3
Two long "swells," very high; still farther to the right:	
First	22
Second	24½
(These are at least 50 miles distant.)	
Right extreme of cliffs	177
Left extreme	163
Immensely high, white, dome-shaped mountain top, just seen above horizon, perhaps 75 miles distant	148½

From this position the ice-cap to the south seemed to extend to the east and west indefinitely; a few miles to the south it formed the horizon, rising to a greater elevation than ourselves. To the west fifteen or twenty miles distant was a line of cliffs running *apparently* NW. and SE., and seeming to indicate a valley or lake. To the north could be seen only a few hundred yards. Walking in this direction a couple of miles, the barometer fell to 27.36 [694.93^{mm}]. A large lake made its appearance to the northwest, somewhat of a round form, probably ten miles across. Two or three cañon-like inlets or outlets connected with it on the north and west; also one to the south connecting it with the glacier. The view to the south simply put the ice-bound horizon farther away. All to the north of the glacier seemed simply ground covered with a light depth of snow. That on which we walked was very hard, and ice in small patches showed itself, but stones were all around. The surface was very smooth. Christiansen, with the sledge, followed the general direction of the glacier, and having got to the west of Sergeant Brainard and myself, waited till we came up. At 6 a. m., about six miles from camp, observed a mountain, triangular shaped, bearing 255°; it was east of the large lake a short distance; thought it possibly Mount Arthur. An hour later, after traveling rapidly down hill, we found ourselves on a small lake by glacier wall. This lake is connected with large lake by a small stream. Fresh musk-ox droppings and tracks seen here and, also, some distance back.

Two or three miles farther on we reached another small lake with large cakes and blocks of ice on its surface here and there, doubtless detachments from the glacier wall. Here the wall inclined towards the south for some miles. Reaching the end of the lake we turned to the right-oblique in order to gain a particular cliff seen through a depression from the "divide." The lake-glacier stream forms the middle of a wide valley and we now commenced the ascent of its western side, following a shallow but steep ravine full of deep, soft snow. At its source, in the depression referred to, was another lake forming a basin in a seeming mountain range. At the west end of this lake we found a ravine leading directly towards "the cliff," and apparently draining it in that direction. Followed this some time, till it became a gorge and a

very steep snow bank, 60 feet [18^{m}] down by measurement, stopped farther advance. Made some examination of the locality, and then retracing steps a few yards, camped at 9.50 a. m. A snow-bird seen on the "divide." At 3.45 p. m. turned in. More or less deep snow on all the lakes crossed, &c., but generally the traveling during the march very good.

At 12.30 a. m., temperature 15.5° [—9.2° C.]; barometer, 28.71 [729.22^{mm}]. At 7.15 a. m., barometer 28.52 [724.39^{mm}]; 8.10 a. m., 28.35 [720.08^{mm}]. Latitude, 81° 05′ 10″ N., longitude, 74° 41′ W. (observed]. At 11 a. m., temperature 16.5° [—8.6 C.] barometer, 28.47 [723.12^{mm}]. Weather fine. At 12.30 p. m., temperature, 17.0° [—8.3° C.]; barometer, 28.43 [722.11^{mm}]. At 3.15 p. m., temperature 18.5° [—7.5° C.]; barometer 28.43 [722.11^{mm}].

Time, 7 hours, 15 minutes; delays, 1 hour, 45 minutes; distance, 13 miles.

Thirteenth march, from Snow Bank to near Fiord.

May 12.—At 1 a. m., breakfast. At 2.15 a. m., temperature +21° [—6.1° C.]; barometer, 28.375 [720.71^{mm}]. Calm, cloudy. At 2.45 a. m. started from camp. The sledge was readily lowered down the bank (with load) by means of the long seal thong, and the dogs pushed over after it. Below this the ravine was quite steep and full of ice and hard snow, so that for half a mile one of us guided the sledge while the other two held it back by means of the long line. It finally got away with the guide and went several hundred yards by itself. At 4 a. m., barometer 29.37 [745.98^{mm}]. We got down a thousand feet [305^{m}] in less than an hour, and at 4 a. m. were in a narrow valley walled in by immense high and precipitous cliffs. The route seemed to be the only possible one by which the descent could have been accomplished. Two other ravines entered this valley or cañon here, but they contained precipices of snow extremely high. The valley came from the north, but its continuation in that direction could be seen only a few miles; cliffs down stream, indicating its mouth, lay in a southwest direction. Its gradient was quite small. At 4.40 a. m., temperature 25.5° [—3.6° C.]; barometer, 29.56 [750.81^{mm}].

After some delay we started down-stream at a rapid pace, the dogs with difficulty being prevented from going on a gallop all the time. The view was continually shut out by great "shoulders" projecting from the heights on either hand. At 6 a. m., temperature 17.5° [—8.1° C.]; barometer, 30.04 [763.00^{mm}]. After proceeding a half dozen miles we came to a glacier, meeting the valley at an acute angle. It filled quite a wide cañon or valley coming from the east; towards its source it had a great elevation. We passed it on a terrace between its flank and the cliffs to the right. In a few miles farther, at 6.50 a. m., reached the end of a glacier and the shore of a large lake, going down a steep gully before getting off the terrace. The glacier surface describes an arc where it abuts on the lake, and is broken by great numbers of transverse crevasses; its flank on the valley forms a wall. No stones or moraines observed on its surface. At the farther end of the lake could be seen another glacier coming in from the left, and over and beyond it a turn in the lake or valley to the right oblique. After a short delay for rest, bearings, &c., we started on the lake. Found the traveling very fatiguing on account of a snow crust just hard enough *not* to bear; the dogs however traveled very rapidly.

At 11.15 a. m. reached end of lake and went into camp. The lake ranges from two to five miles in width, and is twelve or fourteen miles long. On each side are high, steep cliffs broken in places by ravines. In two or three of the ravines on south side and some miles back glaciers were perceived. Country generally to the south ice-capped and much resembling that seen from "divide." All these glaciers probably offshoots of the "Chinese wall glacier." A few musk-ox droppings, fox, hare, and lemming tracks seen in the valley, but below a marked scarcity. Vegetation seemed very sparse. This valley may be a mile wide, though the stream-bed is but a few yards and is the only part that has not a steep lateral slope, excepting a few "raised beaches," &c. The glacier by camp has the same general appearance, and occupies same relative position with the valley as the previous one. Little seen of it from tent on account of a narrow ridge, a few hundred feet in height, doubtless a moraine. At 5 p. m. turned in. Latitude, 80° 56′ 27″, longitude, 76° 13′ W. (observed).

At 7.45 a. m. on lake; temperature 26° [—3.3° C.]; barometer, 30.10 [764.53^{mm}], cloudy. At 12.20 p. m., temperature 17.5° [—8.1° C.]; barometer, 30.18 [766.56^{mm}]. At 4.40 p. m., temperature 14.5 [—9.7° C.]; barometer, 30.18 [766.56^{mm}].

Time, 8 hours, 30 minutes; delays, 1 hour, 45 minutes; distance, 12 miles.

FOURTEENTH MARCH, FROM WEST END OF LAKE DOWN FIORD TO FARTHEST.

May 13.—At 6.50 a. m. broke camp and started, proceeding along between the ridge or moraine referred to and a wide, gentle slope lying along the cliffs to the right; this little gap was from 100 to 400 yards [91 to 366m] wide and presented a surface almost level. After traveling nearly an hour quite rapidly we came to the farther end of the moraine and beyond it, having the same relative position to the glacier, a line of what seemed "floebergs." There was no *perceptible* difference in any respect; they were detachments from the glacier. Little or nothing could be observed of the latter itself from here. A wide break in the cliffs beyond it to the left oblique was noticed, however, and I sent Sergeant Brainard to a small elevation on the right to observe it. He reported another glacier and quite a large one, or rather two. They formed one at the cliffs. He could see back about eight miles; width at cliffs about three miles.

After taking bearings and drawing the outlines of some of the bergs we proceeded. Soon after (5 a. m.) we came to an immense berg, and at its base open water had flooded the ice, coming up through a crack. Here I suspected for the first time our proximity to the sea. The water was salt; tidal action evident. It seemed about high tide [a little after]. Just beyond this (5.15 a. m.) reached the head of a wide fiord [Greely Fiord] and the end of the glacier. A tide crack stopped us a few minutes, but we flanked it by going along shore. The tracks of a bear were here seen. The cliffs seen from the lake across the front of our course formed the south shore of the fiord; they apparently terminated in a cape about 20 miles distant; the shore-line evidently here made a bend. Took a course for this cape. The north shore trended off to the right oblique and terminated in a distant promontory. Just beyond was a bay or fiord, and there was seen the north shore trending off towards the west and terminating at a small angle to the right of the 20-mile cape, apparently—but the weather was now very bad and nothing could be seen distinctly.

The ice was covered with deep snow with a light crust; traveling extremely fatiguing, the snow-shoes having been left behind, but the dogs made excellent time notwithstanding. The surface remarkably level. None of the long swells of the paleocrystic ice, so common off the coast of Greenland and the straits, observed. About eight miles from the lake we passed through some low, oval-shaped mounds of ice, a foot or two [.3 or .6m] high, not exactly resembling anything seen before. About two miles farther on crossed tracks of a bear going up fiord; a fox had evidently followed in his wake.

It was now so foggy and snowing so much that all land was at times shut out almost completely Many fox tracks seen and crossed. Some time before this a very high, snow-capped dome observed above and beyond the twin glacier referred to. We passed the cape towards which we had been traveling and shore-line trending more to the left. The snow and fog and a constant succession of points or capes prevented tracing it any distance. The south shore as well as the north was seen to be formed everywhere of long lines of steep, high cliffs. The ice along this shore was much broken by cracks; the ice-foot hardly improved the traveling. Having passed several points—only to find, in each case, another a few miles ahead. At 12.05 we left the shore and proceeding out in the fiord a quarter of an hour went into camp; all much fatigued and suffering more or less from snow-blindness. Singular as it may seem, snow and fog have a worse effect in this respect than a clear sky. Estimated the width of the fiord at this point about 10 miles. Got a view of Land's End [Cape Brainard] on north side of fiord about forty miles off. At 6 p. m. turned in to sleep as long as we could, or until the storm abated.

At 2.15 a. m., breakfast. At 3.20 a. m., temperature 18.5° [−7.5° C.]; barometer, 30.02 [762.49mm]. Snowing lightly; light northwest wind; sky hidden. At 6.30 a. m., temperature 25° [−3.9° C.]; barometer, 29.40 [746.75mm]. Sky hidden, snowing and very foggy. At 12.45 p. m., temperature, 29° [−1.7° C.]; at 2 p. m., barometer, 29.87 [758.68mm]; at 6 p. m., barometer 29.83 [757.67mm]. Magnetic variation from fourteen observations, 116° 35′ ± 1° 3′. Latitude, 80° 48′ 39″, longitude, 78° 26′ W. (observed).

Time, 8 hours, 40 minutes. Distance, 26 miles.

AT FARTHEST (CAMP ON ICE OF GREELY FIORD).

May 14.—At 8 a. m., temperature 25° [−3.9°C.]; barometer, 29.97 [761.22mm]; snowing and blowing, wind west. A few miles of the south shore up and down is all that can be seen. At 9 a. m., breakfast, after nineteen hours fast. Tea only warm on account of the reduced allowance of alcohol. By cutting everything down to the lowest limit, Sergeant Brainard estimates that four more meals can be had before starting

back. On account of depth of snow on the fiord, the bad weather, observations, &c., decided reluctantly not to attempt advancing farther, especially since we could not hope to reach the mouth of the fiord. The day spent in taking observations (the sun being faintly visible), compass bearings, &c. The general direction of the fiord is WSW.; it grows wider on approaching the sea. That we saw the sea we were long before this quite sure, no land being visible to the WSW., even after many sights through the telescope. The fiord ended to the east in two bays [Antoinette and Adola] or arms; on the north side many breaks, marking water-courses, and two or more indicating branch fiords. The country beyond to the north very much broken and very elevated. The surface of the fiord presented one unbroken expanse of deep snow. At 7.15 p. m., supper. At 10.3 turned in.

At 10 a. m., temperature 30° [—1.1 C.]; barometer, 29.94 [760.46^{mm}]; wind light from west. At 10.45 a. m., temperature 32° [0.0° C.]; barometer, 29.97 [761.22^{mm}]. At 12.30 p. m., temperature 34° [+1.1° C.]; barometer 30.00 [761.99^{mm}]. At 1.45 p. m., temperature 34° [+1.1° C.]; barometer 30.02 [762.49^{mm}]. At 3.25 p. m., temperature 37° [+2.8° C.]; barometer, 30.00 [761.99^{mm}]. At 4.20 p. m., temperature 33.5° [+0.8° C.] barometer 30.02 [762.49^{mm}]; snowing all day. At 6 p. m., temperature 27.0° [—2.8° C.]; barometer 30.02 [762.49^{mm}]; light east wind clouds breaking up.

May 15.—The morning was promising, and at 7.35 a. m. I left camp with Sergeant Brainard to ascend the cliffs to the south. We got up by means of the ravine before referred to. Before long, however, a storm began to form in the east, and soon the driving snow shut out everything and prevented a view of the mouth of a fiord. Previously, however, a lofty range of snow-clad mountains was observed on the north side of the fiord, extending generally parallel with it, and estimated at about fifty miles distant. In these mountains a large glacier was seen. To the south, about twenty-five miles off, is another large glacier, probably an offshoot of the "Chinese wall glacier." The whole face of the country in that direction seemed ice-capped. We continued along the edge of the cliffs for about four miles. Here the barometer gave an elevation of 2,250 feet [686^{m}]. To the west the cliffs appeared to trend back much more towards the south, the fiord becoming wider. Several deep valleys run in a general north or northwest direction to the fiord. Beyond all these was to be seen obscurely what looked like a line of cliffs, having a northwest direction, and marking a branch fiord, probably much nearer than "Land's End" [Cape Brainard], the west extreme of north shore.

After half an hour's delay started back. *En route* Sergeant Brainard discovered fossil remains on the mountain top and soon we had quite a collection. One was a shell and the others what we took for petrified wood, fish, &c. A few specimens of grasses, &c., were also collected. A ptarmigan was seen. Reached tent again at 1.35 p. m. Sergeant Brainard stopped back to build a cairn and deposit record at the mouth of the ravine. Spent the afternoon in observations, &c. At 8.45 p. m. we all started out on the fiord with the dog-team and traveled for an hour towards the opposite shore. After getting out some distance another point began to make its appearance beyond the one hitherto farthest seen on the south side; this latter I judged ten or fifteen miles distant, and the former twenty-five or thirty. Between the two seemed a fiord, the same disclosed from Fossil Mount (2,140 feet [652^{m} high]), doubtless, and a few degrees in azimuth farther to the right the land seemed to end in a bold promontory. The atmosphere became much clearer before turning back, and Sergeant Brainard and I examined the mouth of the fiord carefully with the telescope, which, after some time, brought out very faintly a cape [Cape Lockwood, Arthur Land] still farther to the west, projecting a degree or two beyond the east and estimated at sixty miles distant. Between this and "Land's End" [Cape Brainard] was quite distinct. At 11 p. m. turned in.

At 5.15 a. m., temperature, 14° [—10.0° C.]; at 5.45 a. m., barometer, 29.98 [761.48^{mm}]; west wind. At 7.10 a. m. temperature 17° [—8.3° C.]; barometer, 29.93 [760.21^{mm}]. At 10.35 a. m., barometer 27.42 [696.46^{mm}]. At 1.35 p. m., temperature 20° [—6.7° C.]; barometer, 29.73 [755.13^{mm}]. At 5.20 p. m., temperature 25.5° [—3.6° C.]; barometer, 29.80 [756.91^{mm}]. At 6 p. m., temperature 20° [—6.7° C.]; barometer, 29.77 [756.14^{mm}]. At 10.05 p. m., temperature 19° [—7.2° C.]; barometer, 29.75 [755.64^{mm}].

Fifteenth march (on return), Farthest to Lake.

May 16.—At 7 a. m., breakfast, and at 8.15 a. m. we started. The snow soft and very deep and traveling very bad. In two and a quarter hours reached "20-mile Cape." Some time beyond two seals were seen on the ice, the harbor seal "Natsik." Made an unsuccessful attempt to get them. Reached head of the fiord [Greely Fiord] at 5.15 p. m., and the old camp at end of lake at 6.50. The little sledge went fre-

quently above the slats. Journey extremely fatiguing. The dogs begin to show the effects of short rations. There was now nothing to give them. Of our own rations three meals of sausage were made to last six, which with seven ounces of hard bread (short weight), was entirely insufficient. On leaving the large sledge three-quarters pound of bacon was brought along as a day's ration for the three of us. At 9.45 p. m. turned in.

At 7.25 a. m., barometer 29.84 [757.92^{mm}]. At 7.45 a. m., temperature 11.5° [—11.4° C.]; barometer, 29.85 [758.18^{mm}]. Strong west wind; sky clear. At 1 p. m., barometer 29.87 [758.68^{mm}]. At 9.45 p. m., temperature +3° [—16.1° C.]; barometer, 29.92 [759.95^{mm}]. Clear and calm.

Time (*en route*), 10 hours, 35 minutes.

Sixteenth march (from end of Lake to Snow-Bank).

May 17.—At 8.45 a. m. started from camp. Traveling over the lake much improved. Four hours in crossing the lake. Found the ascent of the ravine very arduous, especially near its head, on account of the deep soft snow. The dogs seemed very weak. Arrived at the snow bank; the dogs climbed to the top, and by means of a long seal thong pulled the sledge up from below with everything on it with our assistance; the ascent occupied but fifteen minutes. At 5.05 p. m. pitched tent at place of old camp. The only signs of animal life during the march were the droppings of a hare. Killed one of the dogs, "Button," for dog-food. At 8 p. m. turned in.

At 7 a. m., temperature +14° [—10.0° C.]; barometer, 30.03 [762.75^{mm}]. Bright and calm; east end of lake, barometer 30.03 [762 75^{mm}]. At 5.10 p. m., temperature 17° [—8.3° C.]; barometer, 28.25 [717.54^{mm}]. At 7.30 p. m., temperature 10.5° [—11.9° C.]; barometer, 28.30 [718.81^{mm}].

Time, 8 hours, 15 minutes.

Seventeenth march, across Divide.

May 18.—The carcass of "Button" was completely devoured during the night. At 5.20 a. m., leaving Christiansen and sledge I ascended with Sergeant Brainard a height to the south (barometer, 27.82 [706.62^{mm}]) about two miles distant and got a good view of the surrounding region. Took the following compass sights:

	Degrees.
Continuation of glacier-wall and break in the rolling upland	147
"20-mile Cape"	180
First ice-capped "hog-back"	140
Second ice-capped "hog-back"	135
Third ice-capped "hog-back"	126
Fourth ice-capped "hog-back"	118
Fifth ice-capped "hog-back"	90
Approximate position of next camping place to the east	359

The great wall referred to above could be clearly seen to trend off to the southwest, and where lost sight of in the distance I estimated at forty miles. To the left (east) of it, but much nearer, fifteen miles about, were the ice-capped domes or "hog-backs" referred to. The glacier at the head of the lake was clearly seen to issue from the great *mer de glace;* the point of confluence was only about a half dozen miles distant. The whole surface of the country to the south of "the wall" seemed nothing but ice. After forty minutes' delay (barometer, 27.75° [704.84^{mm}]), I started north towards the little lake, Sergeant Brainard returning to camp and bringing on the sledge, &c., when we continued on the old route together. Reaching the glacier wall I followed close along it, instead of inclining to the north as on the outward journey, and took the following barometer readings in order to get the altitude of the wall (the foot) at the summit: 10.05, at Lake Glacier River, temperature 13.5° [—10.3° C.]; barometer, 28.51 [724.14^{mm}]; 11.05, temperature 15° [—9.4° C.]; barometer 28.05 [712.46^{mm}]; farther on, 27.75 [704.84^{mm}]; 27.65 [702.30^{mm}]; 12.10 p. m., greatest elevation of wall, temperature 16° [—8.9° C.]; barometer, 27.60 [701.03^{mm}].

A small lake discovered near by here. A strong, cold west wind was blowing, making traveling uncomfortable. Sergeant Brainard and I suffered a good deal with our eyes. At 2 p. m. went into camp at old place. A snow-bird seen near divide and hare tracks some time before. The late snow-storm has completely changed the character of the traveling. The snow lies soft and deep everywhere. I had intended ascending the glacier near the divide at the only place where such a thing was possible, but on account of the state of our eyes and the strong wind blowing, &c., gave it up.

At 3 a. m., temperature 7.5° [−13.6° C.]; 4.40 a. m., temperature 4.5° [−15.3° C.]; barometer, 28.37, [720.58^{mm}]; sky clear, light east wind. At 8 25 a. m. (on lake), temperature 14° [−10.0° C.]; barometer, 28.25 [717.54^{mm}]; bright and clear. At 2.30 p. m., temperature 18.5° [−7.5° C.]; barometer, 28.60 [726.43^{mm}] clear and calm. At 4.30 p. m., temperature 18.5° [−7.5° C.]; barometer, 28.62 [726.93^{mm}].

Time, 6 hours, 30 minutes.

Eighteenth march, down Musk-ox Valley.

May 19.—Got little sleep during the night. One of my eyes hurting considerably this morning. At 2.15 a. m., breakfast. The dogs eat the whip, foot-gear, and seal skin in any form they can get hold of. At 3.45 a. m. started from camp. On reaching about the middle of the valley and the lake I stopped the sledge three-quarters of an hour, and Sergeant Brainard and I ascended the low heights to the north and south respectively, with little gain as far as the sergeant was concerned, as farther off and higher elevations cut off the view to the south. I had the same experience in attempting to see the north, but to the south beyond Sergeant Brainard, I could see "the wall" and trace it along for several miles to the east and west. At 11 a. m. went into camp a little beyond cache near old camp. When the lamp was lighted at noon the heat in the little shelter tent, even with the sides and ends raised, must have been above 90°. One or two fox tracks seen during the march, but nothing more. Several snow-birds seen and heard. "The wall" seen again up a ravine to the southeast just before reaching camp, and the mantle on a neighboring "hog-back" was very distinct. Have got down to almost the last pipe of tobacco; it is harder than short rations. Have now nearly full allowance of the latter—left at the cache here.

At 3.20 a. m., temperature 16° [−8.9° C.]; barometer, 28.58 [725.92^{mm}]; clear, with light west wind. At 12 m., temperature 20° [−6.7° C.], barometer, 28.82 [732.01^{mm}]. At 2 p. m., temperature 23° [−5.0° C.]; barometer, 28.82 [732.01^{mm}]; clear and calm. At 10.30 p. m., temperature 24° [−4.4° C.]; barometer, 28.74 [729.98^{mm}]; light west wind.

Time, 7 hours, 15 minutes.

Nineteenth march, down Musk-ox Valley.

May 20.—Breakfast a half hour before midnight of the 19th; 12.25 a. m., started from camp. Saw many fresh fox, hare, lemming, and ptarmigan tracks in the "gap," and also an owl flying overhead. Reached the old cache near the first camp in this valley in three hours, and continued on for about three and one-half miles farther, camping at 4.50 a. m. near the "Rocky Gully" by which we first entered this valley. The traveling during this march and the preceding rendered easier by the snowfall. Sergeant Brainard still suffering a good deal from snow-blindness. Turned in about 9 a. m.

At 5 a. m., temperature 16° [−8.9° C.]; barometer, 29.65 [753.10^{mm}]; at 7.20 a. m., temperature 16° [−8.9° C.]; barometer, 29.62 [752.33^{mm}]; 9.20 a. m., temperature 22° [−5.6° C.]; barometer, 29.57 [751.06^{mm}].

Time, 4 hours, 25 minutes.

Twentieth march, from Musk-ox Valley to head of Beatrix Bay Valley.

At 4.40 p. m., breakfast; no bread, sugar, nor tobacco; rabbit stew, the piece of meat being stolen by "Howler." At 5.40 p. m. started from camp. Got out of the valley by means of a gorge a little west of the "Rocky Gully" referred to above. It was very steep, and one mass of stones and rocks. At first it seemed impossible to get up, but the ascent was accomplished in one hour. On the heights above the tracks of musk-oxen—two or three (one a calf)—were seen, going east, and beyond, fox, hare, and ptarmigan tracks. The travel on the lake was very poor. Reached old camp at 9 p. m.; found the tent blown down, but the rations in it and everything about the large sledge were undisturbed. At 11.15, supper.

At 3.30 p. m., temperature 28° [−2.2° C.]; barometer, 29.50 [749.29^{mm}]; 4 p. m., temperature 30° [−1.1° C.]; barometer, 29.50 [749.29^{mm}]; clear and calm. At 5.15 p. m., temperature 23° [−5.00 C.]; barometer, 29.48 [748.78^{mm}]; 9.15 p. m, temperature 25° [−3.9° C.]; barometer, 29.00 [736.59^{mm}]. Cloudy with light north wind.

Time, 3 hours, 20 minutes.

TWENTY-FIRST MARCH, DOWN VALLEY TO BEATRIX BAY.

May 21.—A very strong south wind during our rest which threatened to blow the tent down. At 9.30 a. m., breakfast. At 10.10 a. m. left camp with original outfit. Found the travel much improved by the late snow and wind. Reached bay in three and a quarter hours; delayed here a half hour, and then proceeding, went into camp at 4.30 p. m., three-quarters of an hour from the cape, where the bay bends to the north, nearly opposite Record Point. The snow on this part of the fiord [Archer Fiord] very thin; the ice fast melting. Got water for first time without melting ice. Supper at 6 o'clock and turned in at 7.30.

At 12.45 a. m., temperature 28° [—2.2° C.]; barometer, 28.95 [735.32^{mm}]; weather fine. At 7 a. m., temperature 33° [+0.6° C.]; barometer, 28.98 [736.08^{mm}]; strong north wind. At 11 a. m., temperature 36° [2.2° C.]; barometer, 28.98 [736.08^{mm}]; light north wind, getting stronger and blowing all day. At 5 p. m., temperature 37.5° [3.1° C.]; barometer, 29.70 [754.37^{mm}]. At 6.45 p. m., temperature 28° [—2.2° C.]; barometer, 29.75 [755.64^{mm}]; wind northeast.

Time, 5 hours, 20 minutes.

TWENTY-SECOND MARCH, DOWN ARCHER FIORD TO SIMMONDS BAY.

May 22.—At 4.30 a. m., breakfast. At 5.50 a. m. started from camp and traveled rapidly, reaching head of bay in about two and a quarter hours. Pitched tent at 8.15 a. m. with the intention of proceeding up the valley with little sledge, to explore it, having had an idea that Musk-ox Valley came out here. "Howler," being unwell, was left behind. With the rest of the team and Sergeant Brainard and Christiansen I left at 9.50 a. m., taking the small sledge. The mouth of the valley is closed in by two immense "shoulders," like huge walls, which separate just sufficiently to form a narrow gap, like a gateway, in which the stream-bed lies. Through this we passed, and passing around several "shoulders," now projecting from the right and now from the left, after passing over several small lakes reached a large one, over which we traveled for two hours, when we reached the end of the valley, a low divide about 200 feet [61^{m}] altitude in the middle, per barometer, above the lake. The lake is from one to two miles wide, and the valley a mile or more wider and probably fifteen long, and walled in on each side by immensely high cliffs, which slope back and gain a greater elevation beyond their crests. From the top of the divide we saw what is doubtless Musk-ox Valley, a valley like it in every respect, extending to the right and left about a half dozen miles, and at about a right angle with the general course of Simmonds Bay Valley. The "divide" is hardly two miles wide, and presents a curious feature in the topography of the region. Several sledges of smooth, polished rocks crop out on top. The lake is about twelve miles long, its north end obliquing to the left from where we left it, and ending about one and a half miles beyond. After taking compass sights, &c., we proceeded back. No game or tracks were seen. Reached camp at 5.15 p. m. The dogs traveled very fast going and coming, the ice being smooth and hard, little or no snow at all. The ice on the lake very thick and quite clear. At 8.15 p. m. turned in.

At 5 a. m., temperature 32° [0.0° C.]; barometer, 29.79 [756.65^{mm}]; calm and foggy. At 5.45 a. m., temperature 27° [—2.8° C.]; barometer, 29.79 [756.65^{mm}]; clear overhead, but foggy around the horizon. At 8.30 a. m., temperature 31° [—0.6° C.]; barometer, 29.73 [755.13^{mm}]; calm. At 5.30 p. m., temperature 27° [—2.8° C.]; barometer, 29.63 [752.59^{mm}]. At 7.35 p. m., temperature 23° [—5.0° C.]; barometer, 29.68 [753.86^{mm}]; calm and clear.

Time, 2 hours, 25 minutes.

TWENTY-THIRD MARCH, SIMMONDS BAY DOWN ARCHER FIORD.

May 23.—At 4 a. m., breakfast. At 5.15 a. m., started from camp. At Depot Point we stopped and examined rocks for the depot, but, like last summer, were unsuccessful. Shortly after this we espied a large harbor seal, and Christiansen nearly succeeded in shooting it. At 9.30 another was seen, and this time Christiansen was more successful—killing it. It was of the same kind, and weighed probably 200 pounds; a very large one. It was skinned, and the meat and blubber taken along. The snow along here was rather soft and deep, and traveling slow. At 11.30 a. m., went into camp. Supper at 1 p. m. The liver of the seal was delicious. At 2.30 p. m. turned in.

At 3 a. m., temperature 21° [—6.1° C.]. At 3.40 a. m., barometer 29.63 [752.59^{mm}]. At 4.45 a. m., temperature 28° [—2.2° C.]; barometer, 29.63 [752.59^{mm}]; calm and cloudy.

Time, 6 hours, 15 minutes.

TWENTY-FOURTH MARCH.

May 24.—Breakfast at midnight. At 1.30 a. m. broke camp and started. Many of the dogs disgorged themselves of the blubber of which they had eaten too much, and traveled badly in consequence. Stopped at place of old camp (the *second out*) and put on cache left there. About a quarter of a mile beyond we crossed a singular crack in the ice, extending from shore towards the opposite shore as far as the eye could reach. Water appeared about a foot [304^{mm}] below the ice surface; crack about fifteen inches [about 380^{mm}] wide. At 9.20 a. m. went into camp about three miles below Hillock Depot, at a conspicuous point. At 11 a. m. supper of fried seal meat, which was found excellent. A few fox and hare tracks seen during the march, and one or two seals. At 12 noon turned in.

At 1 a. m., temperature 25.5° [−3.6° C.]; barometer, 29.79 [756.65^{mm}]. Overcast; threatening snow. At 10 a. m. temperature 27° [−2.8° C.]; barometer 29.84 [757.92^{mm}]. At 12 noon, temperature 28° [−2.2° C.]; barometer, 29.84 [757.92^{mm}]. At 4 p. m., barometer 29.89 [758.94^{mm}]. Snow-storm from the east raging. At 9 p. m., temperature 23° [−5.0° C.]; 9.30 p. m., barometer 29.93 [760.21^{mm}]. Snow-storm from the east. At 10 p. m., breakfast. Stew of seal meat. At 11 p. m., temperature 22° [−5.6° C.]; barometer, 29.89 [759.19^{mm}]. At 12 midnight started from camp. A strong east wind, with snow and fog.

Time, 7 hours, 50 minutes.

TWENTY-FIFTH MARCH, TO BELLOWS.

May 25.—Sergeant Brainard and I wore snow-shoes during the march; one of us always ahead of the dogs. The snow was very deep and travel slow. At 6.55 a. m. we reached the depot tent at Basil Norris Bay and stopped to camp. The snow overland, as well as at times before, came up over the slats. The dogs did well. At 9.15 a. m. supper, and at 11.45 a. m. turned in.

At 7.17 a. m., temperature 22° [−5.6° C.]; barometer, 29.88 [758.94^{mm}]. At 11.15 a. m., temperature 24° [−4.4° C.]; 11.45 a. m., barometer 29.84 [757.92^{mm}].

Time, 5 hours, 55 minutes.

TWENTY-SIXTH MARCH, FROM BELLOWS TO FORT CONGER.

May 26.—At 1.30 a. m., temperature 19.5° [−6.9° C.]; barometer, 29.87 [758.68^{mm}]. Snowing. At 1.45 a. m., breakfast. One of the dogs ate all the net-work out of one of Sergeant Brainard's snow-shoes; the latter, however, replaced it with seal thong so that it answered very well. Several feet of Christiansen's whip were also quickly swallowed, the whip being laid down for a moment. At 4.10 a. m. left camp and proceeded towards Fort Conger via the south side of harbor. The traveling was abominable, worse than ever. Wearing snow-shoes it did not particularly affect me, but Christiansen would frequently go up above the thigh in the deep soft snow. "Howler" gave out opposite the "west entrance," and had to be left. At 9 o'clock, opposite the northwest corner of Bellot Island, I abandoned the large sledge and, transferring what was necessary to the small one, reached the station thus at 12.10 p. m.

Time, 8 hours.

Tabulated statement of distances.

Locality.	Journey.	Hours *en route*.	Delays.	Distance.	Locality.	Journey.	Hours *en route*.	Delays.	Distance.
		h. m.	h. m.				h. m.	h. m.	
Stony Point	1	7 50	1 00	60	Farthest	14	8 40	1 00	26
Fiord	2	8 05	30		Lake	15	10 35	1 00	26
Do	3	6 55	15		Snow-drift	16	8 15	30	22
Ella Bay	4	5 50	50		Glacier	17	6 30	30	13
Glacier	5	5 10	1 20	10	Near Gap	18	7 15	1 00	18
Ella Bay	6	4 15	50	10	Musk-ox Valley	19	4 25	10	11
Beatrix Bay	7	5 25	40	13	Head of Beatrix Bay Valley	20	3 20	20	5
Head of valley	8	3 55	55	9	Fiord	21	5 20	25	9
Musk-ox Valley	9	5 55	30	12	Simmonds Bay	22	2 25	------	64
Gap	10	6 30	3 30	8	Fiord	23	6 15	1 (?)	
Glacier	11	6 55	45	21	Do	24	7 50	20	
Snow-drift	12	7 15	1 45	13	Basil Norris Bay	25	6 55	30	
Lake	13	8 30	1 45	22	Fort Conger	26	8 00	1 00	

	Miles.
Distance traveled out (60+144)	204
Distance traveled back (64+104)	168
	372
Reconnaissances, &c	65
Total miles traveled	437
Distance between heads of Greely and Archer Fiords (about)	85

Altitudes by barometer (reduced).

[Above sea-level.]

Locality.	Feet.	Meters.	Locality.	Feet.	Meters.
Mount Difficult	4,444	1,354	Divide:		
Camp VIII (near Mount Easy)	680	207	At foot of glacier wall	2,210	674
Mount Easy	2,730	832	Two or three miles north	2,610	795
Lake Carolyn	1,105	337	Lake Harry	1,320	402
Mouth of Rocky Gully	340	104	Lake Bessie	1,630	497
Camp IX (in valley)	420	128	Mount Button	2,008	612
Camp X (gap)	685	209	Camp XII (near Mount Button)	1,528	466
Lake Nan	920	280	Lake beyond	*0	*0
Camp XI (near glacier wall)	1,240	378	Fossil Mount (near Farthest)	2,140	652

Sledge ration.

	Ounces.
Meat (English corned beef, bacon, sausage, or musk-meat)	22
Butter	2
Bread	10
Beans or potatoes	4
Tea or chocolate, average about	1
Sugar	2
Milk	½
Salt	⅓
Pepper	1/20
Alcohol	6
Total food	42
Total ration	48

Outfit (*leaving Fort Conger*).

	Pounds.
Tent poles and pins, 36; rubber blanket, 6½; ax and shovel, 12	54½
2-man buffalo sleeping-bag, 22; dog-skin sleeping-bag (1-man), 12	34
Lamp, 5; 2 pairs snow-shoes, 6; sextant, &c., 9½	20½
Telescope, field glasses, and compasses	8
Shotgun, rifle, and ammunition, 27; medicine, 4	31
Cook's bag, 12; clothing-bags, 30; extra lashings, 5	47
	195
Sledge	109
	304
Little sled, 25; shelter tent, poles, and pins, 10; lamp, 1½; 2 knapsacks, 6	42½
90 rations (3 men 30 days), 270 lbs. less 40 lbs. at Hillock Depot	230
3 sacks of pemmican (dog-food)	385
Total	961½

* Assumed.

Outfit of little sledge (May 8, 1883).

Shelter tent, 10; sleeping-bags, 34; lamp, 5; ax, 6¾; sextant, 2	57¾
Horizon, 1; mercury, 2; telescope, 3¼; compasses, 2	8¼
Shotgun, 8¾; ammunition, 3¼; extra lashings, 2; medicine, 2	16
Cook's bag, 6; 3 clothing-bags, 9; rubber blanket, 6½	21½
Record-bag and flags, 3; spare slat, 2	5
	108½
Small lamp, knapsacks, and snow-shoes	13½
11 days' rations for 3, at 45 ounces * (7 ounces bread instead of 10)	92¾
1 sack pemmican (dog-food)	113½
Total	328¼

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, Acting Signal Officer.

WASHINGTON, D. C., *June* 30, 1885.

SIR: In compliance with your instructions of this date, I have the honor to submit the following report relative to the discovery of fossils, &c., on the southern shore of Greely Fiord, in latitude 80° 48.5′ N., longitude 78° 26′ W., the farthest western point attained by Lieutenant Lockwood and myself during the spring journey of 1883.

The cliffs at this place presented a broken and formidable front, and were so abrupt that we could not scale them directly. However, by following a deep and rocky ravine, we managed finally to reach the summit of the cliffs. I quote from Lieutenant Lockwood's journal: "These cliffs have an altitude, per barometer, of 2,140 feet [652^{m}]; almost a vertical fall of that immense height. * * * *En route* we found a number of fossils of what seemed to be trees, snakes, fish, &c. Brainard was the first to notice them."

Lieutenant Lockwood doubtless intended to say that the altitude of the mountain back of the cliffs, instead of the cliffs proper, was 2,140 feet [652^{m}]. Remarking on this journey to the summit, my notes say:

"After a hard climb for over three hours we reached the high country back of the line of cliffs by means of a deep ravine, which opens near our camp. By barometric measurement the summit was found to be 2,250 feet [685^{m}] above the sea-level.

"On the top of the mountain, as well as along the edge of the line of cliffs, we found fossilized marine animals and petrified wood and coral in great quantities. The most remarkable discovery of this character was the stump of a petrified tree firmly embedded in the frozen earth, its protruding roots so perfect and its structure so complete that, in our minds, no doubt existed as to its original growth where it then stood. It was about 10 inches [about 250^{mm}] above the ground, and in diameter about 6 inches [about 150^{mm}]. Not being able to extricate it, we contented ourselves with a small fragment, which we broke off by striking the stump sharply with a large stone."

This remnant of a tree was located in the ravine through which we ascended the mountain, and, as I recollect, was at an elevation of about 1,500 feet [about 450^{m}], or near the top of the cliffs, along which we found in the greatest profusion pieces of petrified wood and the fossil remains of shell-fish, snails, &c. I do not remember that anything of a similar nature was found below this altitude, and the fact that the ground was covered with snow to a depth of several inches along our route to this point would seem to entitle this opinion, although formed at a late day, to considerable weight.

I am, very respectfully, your obedient servant,

D. L. BRAINARD,
Sergeant, Signal Corps.

First Lieut. A. W. GREELY,
Fifth Cavalry, U. S. Army, Acting Signal Officer and Assistant.

---

* Should be 43½ ounces, as alcohol was reduced to 5 ounces and no milk was taken along.

APPENDIX No. 87.—*Orders to Dr. Pavy relative to natural history data.*

FORT CONGER, GRINNELL LAND, *May* 1, 1883.

SIR: I have the honor to request that you furnish me not later than May 31, 1883, with the following information:

1. A list of all plants collected since August 11, 1881. This list will show the generic and specific names when known. Plants unknown will be referred to under the numbers given them, as directed in a communication of this date. The earliest date on which the plants were known to be in blossom will be given. If this is not known it will be stated in each case. In cases of rare plants, the name of the collector will be given.

2. A list of all birds procured since August 11, 1881. In case of stuffed specimens, there will in all cases be given its number, its sex, the locality and time obtained, and the name of the collector. Unknown birds will be referred to with reference to their numbers The date of each bird's appearance will be given, or if not known the record will so set forth.

3. A list of all insects (adding spiders to this list) with data therefor, similar to that required for lists 1 and 2.

4, 5, and 6. Similar lists of mammalia, fishes, and mollusca.

7 and 8. List of all Eskimo remains and driftwood which are in your charge, with full and clear data as to the character, the time and place, and by whom obtained. Where specimens have been transferred to the commanding officer or other person, you will so state.

9. A list showing, with their numbers, all other collections made, but which do not come under the heads above enumerated.

It is desired that you add to these lists such other data or remarks as will facilitate the speedy description of these collections on the return of this expedition, or as will secure similar results if it becomes necessary to abandon them. Such assistance, clerical and otherwise, as is necessary for this work will be furnished you, on your request, between the hours of 9 a. m. and 3 p. m. daily.

I am, sir, respectfully yours,

A. W. GREELY,
First Lieut., Fifth Cav., A. S. O. and Assistant, Commanding.

Acting Assistant Surgeon O. PAVY,
U. S. Army.

APPENDIX No. 88.—*Orders to Dr. Pavy relative to botanical specimens.*

FORT CONGER, GRINNELL LAND, *May* 2, 1883.

SIR: I have the honor to request that you deliver me not later than May 29, 1883, six complete sets of plants obtained by this expedition since August 11, 1881. These sets are to be separate, and in their arrangement should be made as light and compact as possible to admit of being easily stowed in case of a retreat by boats. It is intended that each officer of the expedition shall be charged with duplicate sets in case of such retreat, in preparation for which these sets are needed. One set will be numbered from one upwards in order for easy reference hereafter.

If reasons exist why certain specimens (such as fungi) cannot be so arranged, you will state by letter, giving their number, and, when known, their generic and specific names.

Lichens and friable specimens will be arranged in light pasteboard boxes.

I am, sir, respectfully yours,

A. W. GREELY,
First Lieut., Fifth Cav., A. S. O. and Assistant, Commanding.

Acting Assistant Surgeon O. PAVY,
U. S. Army.

APPENDIX No. 89.—*Orders to Lieutenant Lockwood to relieve Dr. Pavy as naturalist.*

FORT CONGER, GRINNELL LAND, *June* 1, 1883.

[Orders No. 2.]

Second Lieut. James B. Lockwood, Twenty-third Infantry, A. S. O., will relieve Acting Assistant Surgeon O. Pavy, U. S. Army, of the duties of naturalist of this expedition. Acting Assistant Surgeon O. Pavy, on receipt of this order, will transfer to Lieutenant Lockwood all collections and specimens in his charge [* with] an inventory [thereof]. He will also furnish as far as practicable such data as will enable Lieutenant Lockwood to make the written reports required by communications from the commanding officer to Dr. Pavy under date of May 1 and 2, 1883. Lieutenant Lockwood will make the report required by the above-mentioned communications within five days from the completion of the inventory of specimens.

You are advised that at least six hours daily will be given to this work until the completion of this transfer.

The portion of the collections made by Dr. Pavy which he may desire to keep as personal, and which are not needed to perfect the official collections, can be retained by him, awaiting final approval by the Chief Signal Officer of the Army.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding the Lady Franklin Bay Expedition.

APPENDIX No. 90.—*Lieutenant Lockwood's report on natural history specimens received from Dr. Pavy.*

FORT CONGER, GRINNELL LAND, *June* 10, 1883.

SIR: In reply to your communication of the 8th instant, I have the honor to transmit herewith a copy of the "list of specimens" turned over to me by Dr. Pavy, which is the only written data received from him pertaining to the transfer or to the reports required by you, and is substantially the only information elicited, either written or verbal. My efforts to obtain anything more have been unsuccessful.

The "condition of the specimens" I can best state in detail, though, as there was no complete itemized list of any portion, it was difficult to know what was of the collection and what not. All the mounted plants were in your possession; the others in vials with alcohol, in small boxes or bags, or in the large tank with birds, &c. The stuffed birds were, with a few exceptions, wrapped in paper and packed in boxes; those not stuffed were in vials with alcohol or in the tank referred to. The insects (all much covered with dust) were on cork, in two small boxes, one open and the other nailed up, also in many small match-boxes, vials, &c. The two ermines and hares were in the box with the birds; most of the other animals in vials with alcohol, as were also the various water organisms, fishes, &c. The Eskimo relics were mostly packed in one large box, together with most of the fossils, shells, &c. Most of the deer antlers were in a box together. The musk-ox skins were on the roof of the house, and the skeletons on the tripod or under the ice in the water. None of the skeletons are yet prepared. The only specimens regularly packed in boxes were the stuffed birds and animals (with perhaps a few exceptions), some of the insects, and most of the Eskimo relics, fossils, deer antlers, &c. The appended list embraces, with a few exceptions, all of the specimens labeled, but many were found without any descriptive data attached, and few or none with such data complete. The Eskimo relics almost wholly wanted any data by which they could be identified. The specimens were found in and outside of three wall tents, occupied also by medical stores and the personal effects of Dr. Pavy. The collection generally was very much confused, and no attempt at arrangement according to classes, numbers, or otherwise, or at keeping it separate and distinct, was apparent.

Very respectfully, your obedient servant,

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, A. S. O.

First Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant, Commanding.

---

*Bracketed words doubtful owing to illegibility of letter-press copy.—A. W. G.

FORT CONGER, GRINNELL LAND, *June* 1, 1883.

List of birds from July, 1881, *to August*, 1882. *Box Nos.* 1 *and* 2.

No. 503. Black Guillemot, Greenland, July, 1881.
504. Larus Glaucus, Discovery Harbor, June 4.
505. Bernicla Brenta, Discovery Harbor, June 2, 1882.
506. Bernicla Brenta, Discovery Harbor.
44. Snow bunting, by Brainard, Cape Bryant.
507. Turnstone, Discovery Harbor, June 8, 1882.
508. Guillemots, near Littleton Island, July, 1881.
509. Sandpiper, Discovery Harbor, June, 1882.
510. Turnstone, Discovery Harbor, June 8, 1882.
511. Sandpiper, Discovery Harbor, June, 1882.
512. Dovekie, Discovery Harbor, June, 1882.
513. Dovekie, Discovery Harbor, June, 1882.
514. King duck (male), Discovery Harbor, June 18, 1882.
515. King duck, Discovery Harbor, June, 1882.
516. Long tailed duck (female), Discovery Harbor, June, 1882.
517. Long tailed duck (male), Discovery Harbor, June, 1882.
518. Long tailed duck (male), Discovery Harbor, June, 1882.
519. Glacus [Glaucous] Gull, Discovery Harbor, June, 23, 1882.
522. King duck (male), Discovery Harbor, June 30, 1882.
523. Eider duck (male), Dutch Island, July 2, 1882.
526. Skua, Discovery Harbor, July 10, 1882.
524. Sabine gull, shot by Schneider, Discovery Harbor, July 8, 1882.
527. Eider duck, Discovery Harbor, July 10, 1882.
528. Skua, Discovery Harbor, July 10, 1882.
529. Turnstone, Discovery Harbor, July 10, 1882.
530. Turnstone, Discovery Harbor, July 20, 1882.
531. Ermine, shot by Henry, Discovery Harbor, July 22, 1882.
532. Ermine (male), shot by Jewell, Discovery Harbor, July 26, 1882.
533. Eider duck, shot by Long, Discovery Harbor, July 27, 1882.
534. Glaucus [Glaucous] gull, Lake Alexander [Alexandra] Connell, Aug. 1, 1882.
521. Hare, by Lt. Lockwood, Greenland Coast, Rabbit Point.
φ Boxes 3. Lichens.
No. 103. Samples of driftwood from pieces found at St. Patrick's Bay and Discovery Harbor. Descriptive list in the hand of commanding officer. Mark on samples: (1 — 2 — X — 11 — X — 4 4IX —— 6 — VIII — V — XI (11) — VII — 3.
1 Box containing Eskimo remains. To identify these specimens it will be better to be provided with a photograph.
1 set of deer antlers from Lake Hazen.
In box. Skull of Eskimo, and one seal from Littleton Island.
Box 1. Eggs collected in neighborhood of Ft. Conger, Aug., 1882.
Barrel 1. Containing old skull of musk-ox found at Cape Baird by Brainard.
2 skins, seal, small and large, collected at Distant Cape and Discovery Harbor, 7th of June and Aug., 1882.
φ 3 sets of lichens in three boxes (given to commanding officer).
φ Fungi and plants in alcohol (Fungi cannot easily be transported without being crushed).
φ sets 3, mounted plants.
φ sets 1 complete, consisting of 62 plants collected around Discovery Harbor and vicinity; and in which are 1 fern (No. 9), 5 grasses (No. 54, 40, 39, 35 and 41), Equisetace [Equisetaceæ] (No 56), 3 mosses (No. 18, 19 and 51).
Plant (No. 55) is an Erica from Lake Hazen, of which the species is not found around Discovery Harbor.
Skeleton to be prepared.
Foxes, Polar Bear, Bird, Wolf, Musk-ox heads.
A part of these specimens will need to have the fluid changed.

OCTAVE PAVY,
A. A. Surgeon, U. S. A.

FORT CONGER, GRINNELL LAND, *June* 1, 1883.

List of specimens from July, 1881, *to August*, 1882.

No. 45. Cape Delano, fossils, Feilden Peninsula, Grinnell Land, 1882.
80. Annelidæ, Discovery Harbor, July, 1882.
81. Annelidæ, Discovery Harbor, July, 1882.
79. Crustaceæ, Discovery Harbor, July, 1882.
72. Annelidæ, Discovery Harbor, June, 1882..
73. Medusæ, Discovery Harbor, April, 1882.
70. Annelidæ, Discovery Harbor, June, 1882.
75. Annelidæ, Discovery Harbor, June, 1882.
71. Annelidæ, Discovery Harbor, July, 1882.
66. Medusæ, Discovery Harbor, June, 1882.
62. Molluscoidæ, Discovery Harbor, August, 1882.
67. Annelidæ, Discovery Harbor, July, 1882.
No. 69. Annelidæ, Discovery Harbor, July, 1882.
74. Annelidæ, Discovery Harbor, August, 1882.
65. Molluscoidæ (Brachiopodæ), Discovery Harbor, July, 1882.
63. Molluscoidæ, Discovery Harbor, August, 1882.
68. Medusæ, Discovery Harbor, May, 1882.
64. Annelidæ, Discovery Harbor, August, 1882.
109. Molluscoidæ, Discovery Harbor, July, 1882.
105. Molluscoidæ, Discovery Harbor, July, 1882.
106. Rocks, Bellows.
88. Fish, Discovery Harbor, August, 1882.
82. Annelidæ, Discovery Harbor, August, 1882.
108. Rocks, Bellows, 1882.

No. 107. Rocks, Bellows, 1882.
100. Shells, Bellows, 1882.
101. Rocks, Bellows, 1882.
104. Plants, Lockwood Island, 1882.
98. Medusæ, Discovery Harbor, June, 1882.
94. Crustacæ [Crustaceæ], Discovery Harbor, July, 1882.
113. Sand Star, Carl Ritter Bay, August, 1882.
111. 1 lemming, Discovery Harbor, August, 1882.
112. 1 lemming, North Greenland Coast, by Lieutenant Lockwood.
114. Bird, July, 1882.
115. Sounding near Littleton Island, July, 1882.
116. Red snow, Carey Island, July, 1882.
117. Egg of skua.
118. Sounding, Discovery Harbor, September 6, 1881.
120. Entoza [entozoa] of seal, Melville Bay, July, 1881.
124. Egg of benta [brenta], Discovery Harbor, August, 1881.
127. Cryptogamiæ, Cairn Hill, July, 1881.
126. Fœtus [fœtal] hares, Discovery Harbor, July, 1881.
121. Algæ, Discovery Harbor, July, 1881.
125. Skua.
123. 1 egg, Discovery Harbor, July 25, 1882.
136. 2 eggs, Discovery Harbor, August 2, 1882.
129. 5 turnstones, Discovery Harbor, August 2, 1882.
138. Cryptogamiæ, Discovery Harbor, July, 1882.
122. 4 ducks, Discovery Harbor, July, 1882.
130. Rocks, Black Rock Vale, 1882.
131. Rocks, Black Rock Vale, 1882.
134. Shells, Bellows, 1882,
133. Rocks, Bellows, 1882.
132. Shells and bones from Eskimo camps, Bellows, 1882.
106. Rocks, Bellows, 1882.
110. Annelidæ, Discovery Harbor, July, 1882.
135. Fish, Cape Joseph Henry, April, 1882.
140. Rocks and fossils, Cape Delons [Delano], April, 1882.
145. Rocks and fossils, Cape Delons [Delano], April, 1882.
146. Rocks, shells, and rosin, Bellows.
141. Rocks, shells, Lincoln Bay, April, 1882.
90. Crustacæ [crustaceæ], Discovery Harbor, July, 1882.
77. Molluscoidæ (gastero), Discovery Harbor, July, 1882.
78. Annelidæ, Discovery Harbor, July, 1882.
76. Molluscoidæ (gastero), Discovery Harbor, July, 1882.
143. Shells, Lincoln Bay, April, 1882.
144. (Box) 5 crustacæ [crustaceæ], collected by Sergeant Brainard, St. Patrick Bay.
139. Crustacæ [crustaceæ], Discovery Harbor, July, 1882.

No. 84. Molluscidæ [molluscoidæ[, Discovery Harbor, July, 1882.
87. Molluscidæ [molluscoidæ], Discovery Harbor, July, 1882.
89. Fish, Discovery Harbor, July, 1882.
149. Crustacæ [crustaceæ], Discovery Harbor, July, 1882.
148. Crustacæ [crustaceæ] and shells from stomach of seal, May, 1882.
147. Crustacæ [crustaceæ], Discovery Harbor, June, 1882.
142. Medusæ, Upernavik [Upernivik], July, 1881.
156. Medusæ, Discovery Harbor, February, 1882.
157. Sand stars, Carl Ritter Bay, August, 1882.
158. *—— from Carl Ritter Bay, August, 1882.
175. Molluscoidæ, Upernavik [Upernivik], July, 1881.
83. Crustacæ [crustaceæ], Discovery Harbor, April, 1882.
91. Crustacæ [crustaceæ], Discovery Harbor, April, 1882.
86. Molluscoidæ, Discovery Harbor, July, 1882.
50. Crustacæ [crustaceæ], Discovery Harbor, July, 1882.
83. Crustacæ [crustaceæ], Discovery Harbor, June, 1882.
151. Insects, Discovery Harbor, June, 1882.
173. Medusæ, Discovery Harbor, April, 1882.
153. Sand stars, Discovery Harbor, July, 1882.
154. Medusæ collected at head of Archer's Fiord.
93. Crustacæ [crustaceæ], Discovery Harbor, July, 1882.
102. Crustacæ [crustaceæ], Discovery Harbor, May.
95. Annelidæ, Discovery Harbor, February, 1882.
96. Crustacæ [crustaceæ], Discovery Harbor, May, 1882.
52. Parosites [parasites] of ptarmigan, Discovery Harbor, 1883.
43. Rocks from Cape Britannia.
174. Rocks from Lockwood Island.
171. Plants from Cape Britannia.
163. Plants from Lockwood Island.
Box (Nos. 1 and 2), Classe [class] Insecta: Hymenoptua [Hymenoptera], Lepydoptua [Lepidoptera]; Diptera, Hemiptera; Anopura, Arachnida.
1 box reindeer bones, Discovery Harbor, 1882.
3 ermines.
1 glass jar, salmonida [salmonidæ], Lake Alexandra, August, 1882.
7 glass jars, water from paleocrystric berg, 1882.
3 specimens of musk-oxen.
3 kegs, rocks, Water-course Bay and Discovery Harbor, 1882.
1 barrel, coal and fossils from Water-course Bay.
Petrification (Brainard), Discovery Harbor, 1882.
Petrification of whale, Archer's Fiord, August, 1882.
Large log from Archer's Fiord, August, 1882.

* Omission in original.—A. W. G.

APPENDIX No. 91.—*Lieutenant Lockwood's letter and report on natural history specimens.*

FORT CONGER, GRINNELL LAND, *June* 30, 1883.

SIR: In compliance with your instructions of the 1st and 8th instant, I have the honor to submit the accompanying inventory of collections in natural history, classified and arranged, as far as practicable according to your directions and embracing all the data on the subject in my possession.

All additions to the collection received since I have been in charge are *underscored*, and shown generally at the end of each list. Specimens dated prior to June 1, 1883, or without date, were collected before the transfer of these articles to my custody.

Some birds and a few skeletons, hides, &c. (articles in the course of preparation mostly), yet remain to be added to this inventory, it not being convenient to put them on at present.

I am, very respectfully,

J. B. LOCKWOOD,
Second Lieutenant, Twenty-third Infantry, A. S. O.

First Lieut. A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant, Commanding.

Inclosure to Appendix No. 91.—Inventory of collections in natural history.

INDEX.

I. Plants (including fungi) 302
II. Birds 305
III. Insects (including spiders) 308
IV. Mammalia 308
V. Fishes 308
VI. Mollusca(*a*), Crustacea(*b*), Annelida(*c*), Medusa(*d*), Star fish(*e*) (*e* includes soundings and dredging specimens) 309
VII. Eskimo remains 311
VIII. Drift wood 313
IX. Rocks, shells, fossils, and petrifactions 314
X. Horns, bones, and skeletons 315
XI. Hides and skins 315
XII. Miscellaneous (eggs, &c.). Game killed in 1883 316

Box	A.	Eskimo remains (mostly).
Barrel	B.	Birds (stuffed).
Small barrel	C.	Petrified tree.
Keg	D.	Coal from coal mine.
Barrel	E.	Rocks, fossils, &c.
Keg	F.	Rock crystals.
Box	G.	Reindeer horns.
Barrel	H.	Rocks and fossils mostly.
Do	I.	Muskox skull, hare skins, salmon, trout, &c.
Box	J.	Seal in alcohol, 19 quarts alcohol to 4 quarts water.
Barrel	K.	Stuffed birds.
Do	L.	Do.
Crate	M.	Drift wood.
Small box	N.	Bottles and vials with specimens in alcohol.
Do	O.	Do.
Barrel	P.	Insects, plants from 83° 24′, &c.
Small box	Q.	No. 229, lichens, mosses, &c.
Barrel	R.	Stuffed birds.
Box	S.	791, 793, 794, hides.
Do	T.	Bones of bear and musk-oxen.
Barrel	U.	Stuffed birds.
Box	V.	8–10, 811, 816, musk-ox calves' hides, and 814, musk-ox bull hides and skull.
Small box	W.	Chiefly coal from coal mine containing fossils.
Crate	X.	Deer antlers and sledge from Distant Cape.
Package	Y.	651, mammal bones from Ella Bay.
Small box	Z.	Few plants in bottle of alcohol in oil can.
Box	AA.	Skulls of ½ dozen musk-oxen, skeletons of wolf, owl, and fox.
Do	BB.	
Small box	CC.	(851) eggs.
Do	DD.	Can containing birds in alcohol.
Box		Tank U. S. Fish Commission, containing birds in alcohol.
Do	EE.	Lichens, by Lieutenant Kislingbury (in two tin boxes).
Log		(671) Ella Bay.
Small box	FF.	Moss collected near station, summer 1883.

Inclosure to Appendix No. 91.—Inventory of collections in natural history—Continued.

* I.—PLANTS.

No. of tag.	Where packed.	No. of specimens.	Running numbers.	Name.	When found.	A.				B.			C.			Remarks, showing genus and species and name of collector of *rare* specimens.
						1.	2.	3.	4.	1.	2.	3.	1.	2.	3.	
				Mounted plants.†												
----	----	4	1	----------	------	2	---	---	---	2	---	---	---	---	---	Found in blossom June 23, 1883.
----	----	6	2	----------	------	2	---	---	---	---	2	1	---	1	---	Found in blossom June 8, 1883.
----	----	6	3	----------	------	2	---	---	---	2	---	---	2	---	---	
----	----	6	4	----------	------	2	---	---	---	2	---	1	---	1	---	Compositæ. In blossom June 25, 1883.
----	----	6	5	----------	------	2	---	---	---	2	---	---	---	2	---	In blossom June 14, 1883.
----	----	6	6	Purple saxifrage	------	2	---	---	---	---	2	---	---	2	---	Oppositifolia, noticed in bloom June 1, 1882, June 6, 1883.
----	----	2	7	----------	------	2	---	---	---	---	---	---	---	---	---	Ranunculus, noticed in bloom June 19, 1883.
----	----	3	8	----------	------	2	---	---	---	---	1	---	---	---	---	Compositæ. In blossom June 23, 1883.
---	----	5	9	Fern	------	2	---	---	---	1	---	---	1	1	---	In blossom June 13, 1883.
----	----	8	10	Yellow poppy	------	2	---	---	---	4	---	---	---	1	1	Papaver alpinum. In blossom June 17, 1883.
----	----	6	11	----------	------	2	---	---	---	2	---	2	---	---	---	Compositæ. In blossom June, 1883.
----	----	2	12	----------	------	2	---	---	---	2	---	---	---	---	---	Cruciferæ (in bloom). In blossom June 16, 1883.
----	----	---	13	----------	------	2	---	---	---	1	---	---	2	2	---	Cruciferæ (in seed).
----	----	4	14	----------	------	2	---	---	---	2	---	---	---	---	---	Pedicularis cuspitata or nelsonii.
----	----	6	15	----------	------	2	---	---	---	---	2	---	---	1	1	In blossom June 6, 1883.
----	----	8	16	----------	------	2	---	---	---	2	1	---	2	1	---	
----	----	2	17	----------	------	1	---	---	---	1	---	---	---	---	---	In blossom June, 1883.
----	----	8	18	Moss	------	2	---	---	---	4	---	---	2	---	---	
----	----	2	19	----do	------	2	---	---	---	---	---	---	---	---	---	
----	----	6	20	Willow	------	---	2	---	---	---	---	2	2	---	---	Salix arctica, noticed in bloom June 2, 1882, June 6, 1883.
----	----	4	21	----------	------	---	2	---	---	---	1	---	---	1	---	
----	----	4	22	----------	------	---	2	---	---	---	2	---	---	---	---	Cruciferæ. In bloom June 8, 1883.
----	----	6	23	----------	------	---	2	---	---	2	---	1	---	1	---	In bloom June 17, 1883.
----	----	6	24	----------	------	---	2	---	---	---	---	2	2	---	---	
----	----	5	25	----------	------	---	2	---	---	---	2	---	1	---	---	
----	----	5	26	----------	------	---	2	---	---	---	---	1	---	2	---	In bloom June 22, 1883.
----	----	9	27	----------	------	---	2	---	---	4	---	---	1	2	---	Ranunculus. In bloom June 17, 1883.
----	----	5	28	Sorrel	------	---	2	---	---	---	---	---	1	2	---	Noticed in bloom June 5, 1882, June 6, 1883.
----	----	4	29	----------	------	---	2	---	---	---	---	---	2	---	---	
----	----	4	30	----------	------	---	2	---	---	---	2	---	---	---	---	
----	----	4	31	----------	------	---	1	1	---	---	1	---	---	1	---	
----	----	5	32	----------	------	---	2	---	---	---	1	---	---	2	---	
----	----	7	33	----------	------	---	2	---	---	---	---	1	3	---	1	
----	----	4	34	----------	------	---	---	2	---	---	1	---	---	1	---	In bloom June 23, 1883.
----	----	4	35	Grass	------	---	---	2	---	---	---	---	2	---	---	In bloom June 8, 1883.
----	----	3	36	----------	------	---	---	3	---	---	---	---	---	---	---	In bloom June —, 1883.
----	----	1	37	----------	------	---	---	1	---	---	---	---	---	---	---	In bloom June —, 1883.
----	----	5	38	----------	------	---	---	1	---	---	1	---	2	1	---	
----	----	2	39	Grass	------	---	---	2	---	---	---	---	---	---	---	
----	----	1	40	----do	------	---	---	1	---	---	---	---	---	---	---	
----	----	2	41	----do	------	---	---	1	---	---	---	---	---	---	---	
----	----	1	42	----------	------	---	---	1	---	---	---	---	---	---	---	
----	----	1	43	----------	------	---	---	1	---	---	---	---	---	---	---	
----	----	2	44	----------	------	---	---	1	---	---	1	---	---	---	---	In bloom June 22, 1883.
----	----	4	45	----------	------	---	---	2	---	---	---	---	2	---	---	In bloom June 14, 1883.
----	----	1	46	----------	------	---	---	1	---	---	---	---	---	---	---	
----	----	1	47	----------	------	---	---	1	---	---	---	---	---	---	---	
----	----	1	48	----------	------	---	---	1	---	---	---	---	---	---	---	
----	----	1	49	----------	------	---	---	1	---	---	---	---	---	---	---	
----	----	1	50	----------	------	---	---	1	---	---	---	---	---	---	---	
----	----	2	51	Moss	------	---	---	2	---	---	---	---	---	---	---	
----	----	1	52	----------	------	---	---	---	1	---	---	---	---	---	---	
----	----	1	53	----------	------	---	---	---	1	---	---	---	---	---	---	
----	----	1	54	Grass	------	---	---	---	1	---	---	---	---	---	---	

* Data as to plants from Lieutenant Greely's notes and diary. † All found in vicinity of Fort Conger, *G. L.*; exceptions noted.

Inclosure to Appendix No. 91.—*Inventory of collections in natural history*—Continued.

I.—PLANTS—Continued.

No. of tag.	Where packed.	No. of specimens.	Running numbers.	Name.	When found.	A. 1.	A. 2.	A. 3.	A. 4.	B. 1.	B. 2.	B. 3.	C. 1.	C. 2.	C. 3.	Remarks, showing genus and species and name of collector of *rare* specimens.
				Mounted plants—Continued.												
----	----	1	55	----------	------	---	---	---	1	---	---	---	---	---	---	Erica from Lake Hazen.
----	----	2	56	----------	------	---	---	---	1	---	---	1	---	---	---	Equisetaceæ.
----	----	1	57	----------	------	---	---	---	1	---	---	---	---	---	---	
----	----	1	58	----------	------	---	---	---	1	---	---	---	---	---	---	
----	----	1	59	----------	------	---	---	---	1	---	---	---	---	---	---	
----	----	4	60	----------	------	---	---	---	2	---	---	---	1	---	1	Saxifraga flagellaris. In bloom June 19, 1883,
----	----	4	61	----------	------	---	---	---	1	---	---	1	1	1	---	Compositæ. In bloom June 27, 1883.
----	----	2	62	----------	------	---	---	---	---	---	---	1	---	---	1	
----	----	1	63	----------	------	---	---	---	---	---	---	1	---	---	---	
----	----	---	64	----------	------	---	---	---	---	---	---	---	---	---	---	In bloom June 20, 1883.

MOUNTED PLANTS COLLECTED AND MOUNTED JUNE —— TO JULY 25, 1883.

No. of plants.	No. of specimens.	Name.	No. of plants.	No. of specimens.	Name.
1	12	----------	39	12	----------
2	12	----------	40	16	----------
3	12	Woodsia ilvensis	41	9	*Identity doubtful*
4	14	----------	42	2	----------
5	16	----------	43	------	----------
6	15	Saxifraga oppositifolia	44	12	----------
7	14	----------	45	13	----------
8	13	----------	46	12	----------
9	14	----------	47	------	No. 4 going to seed
10	16	Papaver alpinum	48	------	Suspected to be No. 20
11	12	Taraxacum, Dens-leonis	49	------	----------
12	14	----------	50	------	----------
13	------	No. 12 in seed	51	8	Moss
14	12	Pedicularis, Nelsonii	52	------	----------
15	12	----------	53	------	----------
16	12	----------	54	------	----------
17	------	----------	55	12	Erica
18	9	Moss	56	12	Equisetum variegatum
19	12	----do	57	------	Suspected to be leaves of No. 21
20	47	Salix arctica	58	------	----------
21	13	----------	59	14	Found by Lieutenant Greely; identity with No. 59 doubtful.
22	14	----------	60	16	----------
23	12	----------	61	15	----------
24	14	Saxifraga tricuspidata	62	12	Suspected to be variety of No. 2
25	14	----------	63	------	----------
26	13	----------	64	12	Found by Sergeant Cross
27	15	Ranunculus nivalis	65	12	----------
28	15	----------	66	12	Found by Lieut. Greely; variety of No. 15
29	12	----------	67	12	Probably variety No. 23
30	12	----------	68	12	----------
31	12	Lycopodium selago	69	14	Found by Henry
32	12	----------	70	12	Horse tail found by Sergeant Elison. Equisetum arvénse.
33	12	----------	71	12	Found by Cross; variety of No. 23
34	12	----------	72	12	Found by Elison; variety of No. 23
35	13	----------	73	12	Found by Ralston
36	14	----------	74	------	Found by Elison; not mounted
37	14	Colpodium latifolium			
38	12	----------			

Inclosure to Appendix 91.—*Inventory of collections in natural history*—Continued.

MOUNTED PLANTS COLLECTED AND MOUNTED JUNE — TO JULY 25, 1883—Continued.

No. of plants.	No. of specimens.	Name.	No. of plants.	No. of specimens.	Name.
75	14	Cochlearia officinalis; found in bloom June 11, 1882.	82	14	Found by Lieutenant Greely
76	12	Found by Elison; variety of No. 27	83	12	do
77	2	Found by Lieutenant Greely	84	15	do
78	12	do	85	12	Very common; found by Lieutenant Greely
79	12	Found by Elison	86	12	Found by Sergeant Elison
80	12	do	87	4	Found by Lieutenant Greely
81	16	Possibly No. 39, in which case No. 39 would bear resemblance to No. 81. Both found, 1883, by Lieutenant Greely.	88	14	
			89	12	
			90		

Also 1 sheet, 21 bunches mosses.

I. PLANTS—Continued.

No. of tag.	Box where packed.	No. of specimens.	Name.	When found.	Where found.	Remarks showing genus and species, name of collector of *rare* specimens.
			Plants in alcohol.			
188	O		Mushroom order			Different kind; many specimens.
189	N		do			Different kind; many specimens; also fungi.
191	O					Several different kinds.
192	O					
193	O					
194	O					
195	N					2 specimens, one kind.
196	N		Mushroom order			Many specimens, different kind.
197	N	4	do			One kind.
573	O		do			Many specimens.
198		1	Erica			
199	N	1				
200	N	1				
*576			Mosses, grasses, saxifrage, &c.	May, 1883	Fossil Mountain	In bag in box with plants from latitude 83° 24′ N.
*585		2	Willow	1882	Discovery Harbor	
*587			Root or knot	May, 1883	Musk ox Valley	Small tree(?).
*206	P		1 box of plants	May, 1882	Lockwood Island	Grasses, saxifrage, &c.
*104	P		1 bag of plants	do	do	Grasses, saxifrage, &c., in box 206.
*205	P		do	do	Cape Britannia	Do.
229	H		1 box of lichens	do	Vicinity Ft. Conger	With a few mosses; in barrel H.
748	O		Plants			Chiefly water plants.
573	O		Mushrooms, &c		Fort Conger	
849	O		Diseased willow	1883	do	
844	O		Seaweed			
864	O		Mushroom, &c	1883		
852	O		do	1883	Fort Conger	
845	W		Moss and lichens			
	W		Fungus	June, 1883	Near station	
	W		Moss and fungus	1883	do	Small paper box.
	W		Moss and lichens	June 30, 1883	do	
879	O		Fungus			
884	Z		Miscellaneous plants	Summer 1883	Near station	In jars with alcohol.
887	Z		do	do	do	
888	Z		do			In alcohol.

*Not in alcohol.

Inclosure to Appendix No. 91.—Inventory of collections in natural history—Continued.

II.—BIRDS.

No. of tag.	Box.	Name.	When found.	Where found.	Sex.	Date of— Appearance.	Date of— Disappearance.	Remarks.
		Stuffed.						
503	K	Puffin	July, 1881	Greenland				*Mormon Arcticus.*
504	B	Glaucous gull	June 4, 1882	Discovery Harbor.		June 5, 1883		*Larus Glaucus*, reported as seen by Sergeant Connell, Distant Cape; also, *Larus Leucopterus* at same time.
505	B	Brent goose	June 2, 1882	do		June 6, 1883		*Bernicla Brenta.*
506	B	do	July, 1882	do				Do.
44	B	Snow bunting	May, 1882	Cape Bryant		April 24, 1883		By Sergeant Brainard.
507	P	Turnstone	June 8, 1882	Discovery Harbor.		June 2, 1883		Reported seen by Sergeant Brainard at Cape Baird.
508	K	Guillemot	July, 1881	Near Littleton Island.				Bruennich's Guillemot (*Uria Bruennichii*, Cape Sabine).
509	B	Knot	June, 1882	Discovery Harbor.		June 9, 1883		
510	B	Turnstone	do	do				
511	B	Knot	do					
512	P	Dovekie	do	Discovery Harbor.		June 8, 1883		(*Uria Grylle*, L.)
513	B	do	do	do				
514	B	King duck	June 18, 1882	do	Male	June 17, 1883		
515	L	do	do	do	Female			
516	K	Longtail duck	June, 1882	do	do	June 6, 1883		
517	K	do	do	do	Male			
518	K	do	do	do	do			
519	B	Glaucous gull	June 23, 1882	do				
540	B	Dovekie						
538	K	Knot	August, 1882	Near Fort Conger.				By Private Biederbick.
536	B	Snow bird						
539	P	Turnstone						
537	K	Knot	August, 1882	Near Fort Conger.				Do.
522	B	King duck	June 30, 1882	Discovery Harbor.	Male			
523	L	Eider duck	July 2, 1882	Dutch Island.	do	June 26, 1883		
526	B	Skua	July 10, 1882	Discovery Harbor.				
524	K	Sabine gull	July 8, 1882	do				By Private Schneider.
527	B	Eider duck	July 10, 1882	do	Male			
528	B	Skua	do	do				
529	P	Turnstone	do	do				
530	B	do	July 20, 1882	do				
533	L	Eider duck	July 27, 1882	do				By Private Long.
534	B	Glaucous gull	August 1, 1882	Lake Alexandra.				By Private Connell.
707	K	Knot	June 9, 1883	Near Fort Conger.	Male			By Private Biederbick.
705	K	do	do		Female			By Sergeant Ralston.
700	K	Dovekie	June 8, 1883	Distant Cape.	do			By Private Long.
699	K	Ptarmigan	June 11, 1883	Near Fort Conger.	do			By Dr. Pavy.
698	K	do	June 12, 1883		Male			Lieutenant Kislingbury.
697	K	Longtail duck	do		do			Eskimo Frederik.
712	K	do	do		Female			Do.
715	K	Knot	do		Male			By Sergeant Ralston.
713	K	Turnstone	June 13, 1883					Do.
716	L	Brent goose	June 14, 1883	Distant Cape.	Male			By Private Long.
711	L	do	do	do	Female			Do.

Inclosure to Appendix No. 91.—*Inventory of collections in natural history*—Continued.

II. BIRDS—Continued.

No. of tag.	Box.	Name.	When found.	Where found.	Sex.	Date of—		Remarks.
						Appearance.	Disappearance.	
		Stuffed—Cont'd.						
704	K	Longtail duck	June 14, 1883	Distant Cape.	Male			By Private Long.
703	K	do	do	do	Female			Do.
714	K or L	Dovekie	do	do	do			Do.
706	K	do	do	do	Male			
702	K or L	do	do	do	Female			
717	K	do	do		Male			
695	L	Glaucous gull	June 15, 1883	Near Fort Conger.	Female			By Private Biederbick.
694	L	do	June 17, 1883	do	do			By Private Long.
693		King duck	do	Distant Cape.	Male			Do.
701	L	Diver duck	do	Near Cape Lieber.		June 17, 1883		By Sergeant Brainard.
709	K	Snow bunting	June 16, 1883	Fort Conger	Male			By Lieutenant Kislingbury.
710	K	do	do	do	Female			
693		King duck	June 17, 1883	Distant Cape.	Male			By Long.
701	L	Diver	do	Near Cape Lieber.				By Brainard.
709	K	Snow bunting	June 16, 1883	Fort Conger	Male			Lieutenant Kislingbury.
710	K	do	do	do	Female			
693	R	King duck	June 17, 1883	Distant Cape.	Male			By Long.
729	R	do	June 20, 1883	do	Female			Do.
721	R	Tern	June 19, 1883	Near station	do			Whisler.
733	R	King duck	June 21, 1883	Cape Murchison.	Male			Biederbick.
726	R	Phalarope	June 26, 1883	Distant Cape.	Female			Lieutenant Kislingbury.
730	R	King duck	do	do	Male			Long.
731	R	Turnstone	June 22, 1883	Station	do			Bender.
742	R	Dovekie	June 24, 1883	Distant Cape.	do			Long.
732	R	do	do	do	do			Do.
737	R	Owl	June 26, 1883	Station				Found dead by Cross.
741	R	King duck	June 25, 1883	Breakwater Point.	Male			Biederbick.
734	R	do	do	do	Female			Do.
736	R	do	June 26, 1883	Distant Cape.	do			Long.
727	R	do	do	do	Male			Lieutenant Kislingbury.
740	R	do	do	do	do			Long.
744	R	Longtail duck	do	Breakwater Point.	do			Biederbick.
743	R	Ptarmigan	do	Cairn Hill	Female			Cross.
735	U	Eider duck	do	Distant Cape.	do			Lieutenant Kislingbury.
785	U	Tern	June 29, 1883	Station	do			Long.
790	U	Longtail duck	June 28, 1883	Distant Cape.	Male			Brainard.
792	U	Tern	June 29, 1883	Station	do			Long.
778	U	do	do	do	do			Do.
780	U	Longtail duck	June 26, 1883	Distant Cape.	Female			Lieutenant Kislingbury.
779	U	Tern	July 1, 1883	Station	do			Long.
782	U	Phalarope	July 2, 1883	Cape Baird	do			Brainard.
781	U	King duck	do	do	Male			Do.
728	U	Tern	July 1, 1883	Station	Female			Long.
784	U	King duck	do	Breakwater Point.	do			Do.

Inclosure to Appendix No. 91.—Inventory of collections in natural history—Continued.

II. BIRDS—Continued.

No. of tag.	Box.	Name.	When found.	Where found.	Sex.	Date of— Appearance.	Date of— Disappearance.	Remarks.
		Stuffed—Cont'd.						
786	U	Longtail duck	June 26, 1883	Distant Cape.				By Lieutenant Kislingbury.
787	U	Brent goose	July 2, 1883	Station				By Gardiner.
783	U	do	do	do				By Whisler.
831	U	Longtail duck	July 3, 1883	Distant Cape.				By Long.
828	U	do	do	Station				By Lieutenant Lockwood.
799	I	Skua	July 9, 1883	do	Male			By Salor.
802	I	do	do	do	Female			By Long.
806	I	King duck	July 8, 1883	Breakwater Point.	Male			By Biederbick.
805	I	do	do	do	Female			By Eskimo Frederik.
807	I	Ptarmigan	July 14, 1883	Station	Male			By Lieutenant Kislingbury.
821	O	Knot	July	do				
		In alcohol.						
125	N	Skua						
129	N	Turnstones (4)	August, 1882	Discovery Harbor.				
122	N	Eider ducks (2)	July, 1882	do				
122	N	Turnstone						
187	N	Duck						Also two lemmings, all young.
187	N	Turnstone						
	Tank.	Ptarmigan (2)			Male and female.			
	Tank.	Small birds (4)						
	Tank.	Raven						
	Tank.	Dovekies (2)	June, 1883	Distant Cape.				
	Tank.	Knot	do	Discovery Harbor.				
	Tank.	Turnstones (2)	June 22, 1883	Near Fort Conger.				
	Tank.	Turnstone	June 23, 1883	do				
550	Tank.	Owl	1882	do				By Lieutenant Kislingbury (put in tank June 26, 1883).
770	Tank.	Ptarmigan	June 25, 1883	do				
770	Tank.	Longtail ducks (2)	June 26, 1883	do	Male and female.			
770	Tank.	Snow bunting (3)	June 28, 1883	do				
788	Can.	King duck	July 2, 1883	Breakwater Point.	Male			By Long.
	Tank.	Longtail ducks (2)	June 25, 1883	do				
	Tank.	Snow bunting (3)	June 28, 1883	Fort Conger	Female			
796 } 797 }	Can.	Skuas (2)	July 5, 1883	do				
798	Can.	King duck	July 9, 1883	do	Female			
883	Q	Snow bunting	July 11, 1883	do				

Inclosure to Appendix No. 91.—Inventory of collections in natural history—Continued.

III.—INSECTS (INCLUDING SPIDERS).

No. of tag.	Box.	No. of specimens.	Name.	When found.	Where found.	Remarks.
155	N	5	Fly			
159	N	3	Caterpillars			
151	N		Insects	June, 1882		A great many.
152	N		Parasites of ptarmigan	June, 1883	Discovery Harbor	Do.
220	P		Insects			One box containing 17 bumble-bees, 29 butterflies, 10 millers, 8 spiders, 19 flies, and 7 dragon flies.
190						Four cocoons, caterpillars (a great many), and a half dozen very small insects.
568	O	1	Ant		Discovery Harbor	
569	O	1	Worm		do	
570	O	3			do	Two minute red insects and 1 yellow.
571	O	2	Caterpillar		do	
572	O	5	Ants		do	
223	P		Insects		do	Lepidoptera, &c.; small paper parcel, several boxes within containing 11 caterpillars, &c., 5 cocoons, and a bee and several insects.
745	N		Caterpillars			Small pasteboard box containing numerous vials.
746	O		Cocoons			A number in a tin box.
			Miscellaneous			Butterflies, dragon flies, bumble-bees, &c. (in box 851 with eggs).
855		1	Crustacea	July 23, 1882	Dutch Island	(Like a spider.)
880	O	1	Bumble-bees	July 14, 1883	Station	
882	O	5	Dragon flies	do	do	

IV.—MAMMALIA.

No. of tag.	Box.	Name.	When found.	Where found.	Sex.	Remarks.
		Stuffed specimens.				
531	B	Ermine	July 22, 1882	Discovery Harbor		By Private Henry.
532	B	do	July 26, 1882	do	Male	By Sergeant Jewell.
521	B	Hare	May 7, 1882	Cape Benét, north coast of Greenland.		By Lieutenant Lockwood.
535	B	do				
		In alcohol.				
111	N	Lemming	Aug. —, 1882	Discovery Harbor		Two specimens.
112		do	May 9, 1882	Taylor Inlet, north coast of Greenland.		By Lieutenant Lockwood; specimens.
126	N	Two hares		Discovery Harbor		Fœtus, 3 young hares and 1 fish.
137	N	Lemming				One specimen.
187	N	Two lemmings				Also duck and 1 unknown bird.
	J	One seal	June 20, 1883	Discovery Harbor		By Sergeant Connell and Jens.
878	O	Lemming	July 15, 1883	Station		Lieutenant Greely.

V.—FISHES.

No. of tag.	Box.	No. of specimens.	Name.	When found.	Where found.	Remarks.
135	N	1	Unknown fish	Apr., 1882	Cape Joseph Henry	By Sergeant Rice.
89	N	1	do	July, 1882	Discovery Harbor	
201	I	1	Salmon trout	Aug. 22, 1882	Cape Alexandra	Caught in net.
88	N	1		Aug., 1882	Discovery Harbor	
126	N	1				In box with fœtal hares.
217	N	1				Very small.
226		2	Skeletons			Very small; in milk can with crustacea.

Inclosure to Appendix No. 91.—Inventory of collections in natural history—Continued.

VI[a].—MOLLUSCA, &c.

No. of tag.	Box.	No. of specimens.	Name.	When found.	Where found.	Remarks.
62	N	4	Mollusca	Aug., 1882	Discovery Harbor	
65	N	1	do	July, 1882	do	Brachiopoda.
63	N	2	do	Aug., 1882	do	
109	N	5	do	July, 1882	do	Shells.
105	N	1	do	do	do	
77	N	1	do	do	do	Gasteropoda.
76	N	1	do	do	do	
175	N	10	do	July, 1881	Upernivik	Two kinds.
86	N	4	do	July, 1882	Discovery Harbor	
207	N	4	do			One soft, also 1 annelida and 1 star-fish.
209	N	7	do			Nucula postlandica, in shells.
211	N	1	do			Soft.
863	O		Shells	June, 1883		
857	O		do	do		Also crustacea, &c.
859	O		do	do		
767	O		Soft mollusk	do		Annelida, &c.
867	Z		Soft mollusk, crustacea, annelida, star-fish, &c.	do		Caught near house, July 27, in dredge.

VI[b].—CRUSTACEA.

No. of tag.	Box.	No. of specimens.	Name.	When found.	Where found.	Remarks.
79	N	4		July, 1882	Discovery Harbor	
94	N	1		do	do	
90	N	2		do	do	
139	N	1		do	do	
149	N	14		do	do	
148	N			May, 1882		And shells from a seal's stomach.
147	N	4		June, 1882	Discovery Harbor	Two kinds.
83	N			April, 1882	do	
83		1		June, 1882	do	
50	N	2		July, 1882	do	
93	N	4		do	do	
102	N	6		May, 1882	do	
96	N	4		do	do	
91	N	1		April, 1882	do	
85	N	3				
144		5		——, 1882	St. Patrick Bay	By Sergeant Brainard (in box).
81	N	1		July, 1882	Discovery Harbor	Fragments.
208	N	10				
212	N	1				
215 } 226 }	N P	3 4				Fragment of a large one, and 3 small ones complete (dry) in milk can with fish skeleton.
751	O	Many		June, 1883		Shrimps caught in tide hole.
855	I	1		July 23, 1883	Dutch Island	Henry—Nymphon grossipes (?).

Inclosure to Appendix No. 91.—Inventory of collections in natural history—Continued.

VI[e].—ANNELIDA.

No. of tag.	Box.	No. of specimens.	Name.	When found.	Where found.	Remarks.
80	N	3		July, 1882	Discovery Harbor	
72	N	1		June, 1882	do	
70	N	1		do	do	
75	N	2		do	do	
71	N	1		July, 1882	do	
67	N	2		do	do	
69	N	1		do	do	
74	N	1		August, 1882	do	
64	N	1		do	do	
82	N	1		do	do	
110	N	2		July, 1882	do	
78	N	1		do	do	
84	N	1		do	do	
87	N	2		do	do	
95	N	1		Feb., 1882	do	By Lieutenant Kislingbury.
29		3		July, 1882	do	
207	N	1				In bottle with 4 mollusks, &c.
159	N	3				
214	N	13				
767	O	Many		June, 1883		Annelidæ, soft mollusks, &c.
865	O		Annelida, medusa	do		
869		1	do	July 24, 1883		Front of house, in dredges.

VI[d].—MEDUSA.

No. of tag.	Box.	No. of specimens.	Name.	When found.	Where found.	Remarks.
73	N	1		April, 1882	Discovery Harbor	
66	N	2		June, 1882	do	
68	N	1		May, 1882	do	
98	N	3		June, 1882	do	
142	N	4		July, 1881	Upernivik	
156	N	5		Feb., 1882	Discovery Harbor	
173	N	1		April, 1882	do	
154	N			August, 1882	Ella Bay	
177	N	1		Jan., 1883		
66	N	3		May, 1883		1 specimen by Schneider from Cape Beechey.
210	N	2				
213	N	1				
218	N	1				
219	N	1				
858	O				Fort Conger	
866	O			———, 1883	do	

VI[e].—STAR-FISH, &C.

No. of tag.	Box.	No. of specimens.	Name.	When found.	Where found.	Remarks.
113	N	3	Asteroidea	August, 1882	Carl Ritter Bay	
157	N	3	do	do	do	2 kinds.
153	N	2	do	July, 1882	Discovery Harbor	
207	N	1				In bottles with mollusks and annelida.
856	O	1	Asteroidea	June, 1883	Discovery Harbor	
115	N		Soundings	July, 1881	Littleton Island	
118	N		do	Sept., 1881	Discovery Harbor	
150	N		Dredging specimen	July, 1882	do	
843	O	4	Sea porcupine	June and July	do	

Inclosure to Appendix No. 91.—Inventory of collections in natural history—Continued.

VII.—ESKIMO REMAINS.

No. of tag.	Box.	No. of specimens.	Designation.	When found.	Where found.	Remarks.
132	----	------	Shells and bones	1882	Bellows	
652, 653	H	2	Jaw bones (Max)	1881	Littleton Island	
656	H	3	Skulls of Eskimo*	1881	Near Rittenbank	By Lieutenant Lockwood.
657					Littleton Island	By Private Henry.
658					Unknown	
584	H	1	Pointed bone	1882	Near Fort Conger	By Sergeant Brainard; round, and evidently some implement; about 12 inches [305mm] long.
588	H	------	Bone and wood (great many specimens).	1882	Basil Norris Bay	By Sergeant Brainard; a score of fragments; lichens, covered; mostly bone; "worked;" found on "raised beach," about 20 feet [6m] altitude.
591	H	2	Spear head and bone	August, 1882	Chandler Fiord	By Lieutenant Lockwood.
596, 597	A	------	Sledge runners	----do----	Cape Baird	Forming one old Eskimo sledge, complete; made of wood; found at Cape Baird, August, 1882, by Sergeants Brainard and Israel; photograph and descriptive data in hands of commanding officer.
595	----	------	Part of sledge			
47, 179	A	------	Upstanders			
178	----	------	Slat			
609	A	------	Part of sledge			
598, 604	----	------	Forming one slat			
599	A	------	Lower part of 179			
166	A	------	Part			
600, 608	A	------	Fragments			
607	A	1	Cooking lamp	----do----	----do----	Bowl of stone; found by Sergeant Brainard.
611	A	1	Stick of bone	----do----	----------	By Sergeant Brainard.
170	A	1	Spear	----do----	Cape Baird	By Sergeant Brainard; from narwhal horn.
165	A	------	Piece of wood	1882	----------	Oak.
612	A	------	Duplicate of 611	1882	----------	
605	A	------	Top of powder-flask	1882	Cape Beechey	Found floating in the straits 8 or 10 feet [about 2 or 3m] from shore; found by Sergeant Brainard.
603	A	------	Dog "toggle"	1882	Proteus Point	Bone; by Sergeant Connell.
601	A	------	Knife handle	1882	----do----	Do.
602	----	------	Fragments	1882	----do----	Eskimo lamp, birch back and worked wood; by Sergeant Connell.
606	A	------	------do----	1882	Near Fort Conger	By Sergeant Brainard.
615	A	------	Fragments of sledge	1882	Distant Cape	Found about 200 feet [61m] above sea.
610	A	------	Part of sledge runner	1882	Near station	
617	A	------	Fragments	1882	----do----	Bone.
618	A	------	Plate	1882	----do----	Bone; found by Dr. Pavy.
619	A	------	Reindeer hair	June, 1882	Lake Hazen	In valley southwest end of lake by Lieutenant Greely.
620	A	------	Fragments	----do----	----do----	———; 2 bone combs, fragment of bone and wood; found at intersection of Lake Hazen and Ruggles River.
621	A	------	Piece of bone lance	----do----	----do----	Do.
622	A	------	Knife, &c	----do----	----do----	Do.
623	A	------	Fragments of bone	----do----	----do----	By Private Biederbick; found at intersection of Lake Hazen and Ruggles River.
624	A	------	------do----	----do----	----do----	By Private Whisler; found at intersection of Lake Hazen and Ruggles River.
625	A	------	Comb, dog toggle, &c	----do----	----do----	By Lieutenant Greely; found at intersection of Lake Hazen and Ruggles River.
492	A	------	Piece of wood	----do----	Sun Bay	By Sergeant Brainard.
216, 164, 182	A	------	Pieces of sledge runner	----do----	Lake Hazen	By Lieutenant Greely; bone; 4 pieces; runners complete.
162, 593	A	------	------do----	----do----	----do----	By Lieutenant Greely; bone; 2 pieces; runners complete.

* Descriptive tags on each.

Inclosure to Appendix No. 91.—Inventory of collections in natural history—Conlinued.

VII.—ESKIMO REMAINS—Continued.

No. of tag.	Box.	No. of specimens.	Designation.	When found.	Where found.	Remarks.
161, 32	A		Pieces of sledge runner	June, 1882	Cape Baird	Forming with 593 and 30 two runners complete.
168	A		Upstanders	do	Lake Hazen	Wood; intersection of Lake Hazen and Ruggles River.
616, 92	A		Bone upstanders	do	do	Intersection of Lake Hazen and Ruggles River.
37	A		Whalebone sledge slat	do	do	Do.
169	A		do	do	do	Do.
592	A		Whalebone sledge runner	do	do	Do.
227, 228	A		do	do	do	Intersection of Lake Hazen and Ruggles River; pieces at same place; large pine runners were found.
184, 594	A		Whalebone spear	do	do	Intersection of Lake Hazen and Ruggles River.
176	A		Bone sledge slat	do	do	Do.
181	A		Part of same	do	do	Do.
613	A		Part of upstander	do		Wood.
626	A		Fragments of bone and wood.	1882	Sun Bay	Wooden spoon, pieces of sledge, &c.
614	A		Parts of deer horn			
627	A		Fragments of bone and wood.	June, 1882	Archer Fiord	Mostly unworked.
628	A		Fragments	1882	do	Bone and wood.
629	A		do	1882	Lake Hazen	By Sergeant Lynn.
633	A		Old skull	1882	Near station	Musk-ox or seal.
221	A		Piece of sledge runner	1882	Archer Fiord	About 1½ feet [.45m] long.
491			Fragments	1882	Bellows	
53			do	1882		
494			Piece of reindeer horn	1882		
58			Piece of wood	1882		
493	H		Wood	1882	Lake Heintzelman	
494	H		Reindeer horn	1882	do	
661	H		Lignite and petrified wood.	1882	do	Wood; from elevation of about 700 feet [213m].
554	H		Fragments	1882	Junction of Lake Hazen and Ruggles River.	Bone, wood, stone, and teeth; found near Eskimo huts.
771 to 777			Eskimo sledge, wood; very old.	June 26, 1883	Distant Cape	By Private Ellis; 772, 774, runners; 771, 773, 775, wooden slats; 776 and 777, bone upstanders. Found about 40 feet [12m] above water-level. Runners, 1¾″ by 6½″ by 4′ and 4′ 7″ [44mm by 140mm by 1.2m by 1.4m].

Inclosure to Appendix No. 91.—Inventory of collections in natural history—Continued.

VIII.—DRIFT-WOOD.

No. of tag.	Box.	No. of specimens.	Designation.	When found.	Where found.	Remarks.
671			Large log	August, 1882	Ella Bay	7′ 10″ by 10″ [239m by 254mm]. Trunk of tree; pine.
			Drift-wood		Discovery Harbor, St. Patrick Bay	Samples.
33	A		Pieces of log	April, 1882	Near Repulse Harbor.	Descriptive data of log given commanding officer.
57	H		Pieces	1882	Bellows	
197	H		do	1882	do	
198	H		do	1882	do	
1					do	2′ 9″ by 6′ [838mm by 152mm] root, cedar, length and diameter.
2					do	2′ 3½″ by —* [698m by —*] root, cedar.
3					do	2′ 11″ by 4″ by 2″ [889mm by 102mm by 51mm] piece of branch, pine.
4					do	2′ 3″ by 5″ [686mm by 127mm] branch, pine.
6					do	1′ 7″ by 1½″ [483mm by 38mm] pine.
670					St. Patrick Bay	About 30 inches [762mm] sawed off the large tree; diameter, 8½″ [216mm] pine.
680					Bellows	1′ 9″ by —* [533mm by —*] knot with moss on it, pine.
674					do	2′ 9″ by 4″ [838mm by 102mm] branch, cedar.
676					do	2′ 4″ by 4″ [711mm by 102mm] branch, cedar.
688					do	Branch 3½′ by 7½″ [1067mm by 190mm] pine.
687					do	3½′ by 7″ [1067mm by 178mm] sample of log, pine.
11					do	2′ 5″ by 4½″ [737mm by 114mm] pine.
683					do	2′ 5½″ by 4″ [749mm by 102mm] root, pine.
690					do	2′ 5½″ by 6″ [749mm by 152mm] knot, cedar.
677					do	2′ 11″ by 1½″ [889mm by 38mm] pine.
691					do	4′ 9″ by 3¼″ [1448mm by 82mm] pine.
672					do	Log 5½′ by 6″ [1980mm by 152mm] pine.
673					do	Log 5½′ by 6″ [1980mm by 152mm] pine.
669					do	2′ 5½″ by —* [749mm by —*] knot, cedar.
678					do	1′ 5″ by 2½″ [432mm by 64mm] pine.
685					Bellows	1′ 1″ by 1½″ [330mm by 38mm] pine.
692			Small piece		Near Ft. Conger	East shore Discovery Harbor, several hundred feet above sea; perhaps left by the English. 2′ 4¼″ by 3″ [717mm by 76mm] pine.
718			Sample			Sawed off 670 disc, 3″ by 9″ [76mm by 229mm].
719					Sun Bay	1′ by 3″ [305mm by 76mm] cedar.
720				1881	Littleton Island	1′ 3½″ by ¾″ [393mm by 19mm] piece of pine molding.
681				1881–1882	Basil Norris Bay	2′ 7″ by 4″ [787mm by 102mm] root, pine.
5					do	1½′ by 2″ [457mm by 51mm] pine.
8					do	11″ by 2″ [279mm by 51mm] pine or cedar.
9					do	11″ by 3½″ [279mm by 89mm] pine.
682					Bellows	18″ by 3″ [457mm by 76mm] pine.
684					do	11½″ by 2″ [282mm by 51mm] pine.
689					Probably Basil Norris Bay.	3½′ by 4″ [1067mm by 102mm] pine.
675						2½′ by 2½″ [762mm by 64mm] pine.
679						2½′ by 3″ [762mm by 76mm] pine.
10						2′ 8¼″ by —* [819mm by —*] cedar knot.
757			Small piece	June 20, 1883	Proteus Point	Sergeant Brainard.
754			Root	June 10, 1883	Near station	Lieutenant Greely. Piece of willow.
587			do			Do. Do.
585			Branch	Sept., 1881		Do. Do.
495			Few small pieces			

*Omission in original—A. W. G.

Inclosure to Appendix No. 91.—*Inventory of collections in natural history*—Continued.

IX.—ROCKS, SHELLS, FOSSILS, AND PETRIFACTIONS.

No. of tag.	Box.	No. of specimens.	Designation.	When found.	Where found.	Remarks.
45	A	------	Fossils	1882	Feilden Peninsula	
106	A	------	Rocks	------	Bellows	
108	A	1	------do	------	----do	
107	A	------	------do	------	----do	
100	A	------	Shells	1882	----do	2 kinds.
101	A	------	Rocks and 2 shells	1882	----do	
130	A	------	Rocks	1882	Black Rock Vale	
131	A	------	------do	1882	----do	A few lichens on some of the rocks.
134	A	------	Shells	1882	Bellows	
133	A	------	Rocks	1882	----do	
132	A	------	------do	------	----do	
140	A	------	Rocks and fossils	------	Cape Delano, View Point, Feilden Peninsula.	
145	A	------	------do	------		
146	A	------	Rocks and shells	------	Bellows	And rosin.
141	A	------	------do	Apr., 1882	Lincoln Bay	
143	A	------	Shells	----do	----do	
43	E	------	Rocks	May, 1882	Cape Britannia	
202	E	------	------do	----do	Lockwood Island	
Keg.	D	------	Coal	------	Coal mine	
Keg.	C	------	Petrified tree	1882	Discovery Harbor	By Sergeant Brainard.
203	E	------	Rocks	Apr., 1882	Lincoln Bay	1 bag.
204	E	------	------do	------	Discovery Harbor	Several kinds.
574	A	------	Fossils	May, 1883	Fossil Mountain	Of tree and fish; altitude, 2,200 feet [670m].
575	E	------	------do	----do	----do	
577	E	------	Fossils and petrified wood	June, 1883	Near Cape Baird	Sergeant Brainard; altitude, about 800 feet [244m].
578	E	------	Fossils	----do	Cape Cracroft	Sergeants Brainard and Gardiner; altitude, 0.
581	E	------	------do	----do	----do	Do.
582	E	------	Petrified wood	----do	Cape Baird	Sergeant Brainard, 800 feet [244m].
583	E	------	Fossils	----do	Cape Cracroft	Sergeants Brainard and Gardiner, representing all the kinds in 581.
589	A	------	------do	1882	View Point	
590	A	------	Rocks	1882	Fort Conger Creek	
630	A	------	Lignite	June, 1882	Bellows	By Sergeant Rice.
631	A	------	Fossils	Aug., 1882	Cape Cracroft	Lieutenant Greely and party.
632	A	------	Lignite, &c	1882	Bellows	Private Frederick.
643	A	------	Shells	------	------	In 3 small lots, one with a piece of rosin by Private Frederick.
646, 467, 648, 650	E	------	Fossils and petrifactions	June, 1883	Cape Baird	By Sergeant Brainard.
Keg.	F	------	Rock crystals	1882	Vicinity Ft. Conger	One keg full.
666	H	------	Lignite, shells, and rosin	June, 1883	Bellows	Sergeant Connell; found "all along the valley."
549	H	2	Shells	1881	Upernivik	Gasteropod.
663	H	------	Black stone	------	Lake Hazen	
36	H	------	Fragments	------	Bellows	Coal, bones, wood, shells, and rocks.
552	H	------	Lignite	------	----do	
551	H	------	Stone and rock	------	Lake Hazen	
491	H	------	Bone	------	----do	
667	H	------	Rocks	------	Lincoln Bay	
53	H	------	Pieces of coal and a bone	------	Bellows	
665	H	------	Fossils	------	Coal mine	
658	H	------	------do	------	----do	
755	P	------	Shells	June 14, 1883	East shore Discovery Harbor.	By Sergeant Brainard.
756	P	------	Coal	June 20, 1883	Bellows	Christiansen.
760	P	------	Lignite	----do	----do	By Private Frederick.
------	W	------	Coal fossils	June, 1882	Coal mine	Small box nearly full of coal.
847	W	------	Fossils	July, 1883	Cape Baird	Sergeant Brainard; altitude, 800 to 1,000 feet [244m to 305m].

Inclosure to Appendix No. 91.—*Inventory of collections in natural history*—Continued.

IX.—ROCKS, SHELLS, FOSSILS, AND PETRIFACTIONS—Continued.

No. of tag.	Box.	Designation.	When found.	Where found.	Remarks.
------	W	---- Slate	July, 1883	Station	
------	W	---- Pieces of rock	----do	Cairn Hill	
------	W	---- Stone	----do	Mount Cartmel	
------	W	---- Piece of rock	June, 1883	Cairn Hill	
------	W	---- ----do	----do	----do	
860	W	---- ----do	July 24, 1883	----do	Sergeant Brainard; 1,000 feet [305m] above tide water; showing scratches, as of glacial action.
870	----	---- Shells	June, July, 1883	Station	Gathered at various times.

X.—HORNS, BONES, AND SKELETONS.

No. of tag.	Box.	No. of specimens.	Name.	When found.	Where found.	Remarks.
659	H	------	Skull of seal	1881	Littleton Island	
660	L	------	Skull of musk-ox	1882	Cape Baird	By Sergt. Brainard.
655	H	------	Skull of walrus	1881	Littleton Island	
224	G	15	Deer antlers	1882	Discovery Harbor	1 specimen from lake Hazen.
225	H	1	Musk-ox jaw bone	1882	----------	
654	H	------	Walrus lower jaw	1881	----------	
662	H	------	Seal and walrus bones	1881	Littleton Island	
64	...	------	Piece of reindeer horn	1882	Cairn Hill	
651	Y	------	Bone of large mammal	August, 1882	Ella Bay	Lt. Lockwood. Probably whale; found on west shore. Head of Archer Fiord.
724	T	2	Musk-ox (hind legs)	1882	----------	
			Foxes			
739	T	1	Polar bear			
	AA	1	Wolf	1881	Baffin Bay	Skeletons.
722, 723	T	------	Musk-ox head	1882	Vicinity house	
			Bird			
		2	Owls			
725	T	------	Lower jaw of musk-ox	1882	----------	
795	----	1	Reindeer antlers	July 20, 1883	Mt. Cartmel	Connell.
833	----	1	------do	July 20, 1883	----do	Rice.
837	----	1	------do	----------	----------	
836	----	1	------do	1882	St. Patrick Bay	Brainard.
835	----	1	------do	----------	----------	
834	----	1	------do	June 20, 1883	Watercourse Bay	Biederbick; about ¾ miles north of coal mine.
839	----	1	----------	July 21, 1883	Mt. Cartmel	Jens.

XI.—HIDES AND SKINS.

No. of tag.	Box.	No. of specimens.	Name.	Remarks.
------	------	3	Musk-ox	Being prepared.
------	Tank	2	Fox	
------	------	2	Seal	Small and large; collected at Distant Cape and Discovery Harbor June and August, 1882.
------	------	2	Ermine	
769	------	5	Hare skins	Three of them in good order and condition.
793	S	1	Seal hide	
791	S	1	Musk-ox (bull)	
794	S	1	Musk-ox (calf)	

Inclosure to Appendix No. 91.—Inventory of collections in natural history—Continued.

XII.—MISCELLANEOUS.

No. of tag.	Box.	No. of specimens.	Name.	When found.	Where found.	Remarks.
			Eggs, &c.			
117	N	1	Skua			In alcohol.
124	N	1	Brent goose	Aug., 1882	Discovery Harbor	Do.
123	N	4	Turnstone	July 25, 1882	do	Specimen added to 136.
128	N	9	Brent goose			In alcohol.
144		1	Skua			
		2	Turnstone			24 eggs in a box.
		4	Eider duck			
		5	Longtail duck			
		4	Unknown			
136	N	2	Skua			In alcohol.
640	O	1	Unknown	June 11, 1883	Near Fort Conger	Snow bunting? Specimens broken.
851		5	Ptarmigan	June 25, 1883	do	
		4	Turnstones	June 19, 1883	do	
		1	Brent goose	do	do	
		4	Turnstones	June 24, 1883	do	With nest.
		4	do	June 22, 1883	do	
		6	Snow bunting	June 24, 1883	do	With nest.
		7	do	June 20, 1883	North Valley	Do.
848	O	7	do	June 28, 1883	Station	In alcohol with chicks inside.
846	O	1	do	do	do	Do.
846	O	1	do	do	do	Do.
840	I	4	do	June 17, 1883	do	
841	I	2	do	June 20, 1883	do	
842	I		Nest	June 28, 1883	do	Snow bunting,
116	N	1	Red snow	July, 1881	Carey Island	
120	N		Entozoa of seal	do	Melville Bay	
127	N		Cryptogamiæ	July, 1882	Cairn Hill	
121	N		Algæ	do	Discovery Harbor	Three kinds.
138	N	6	Cryptogamiæ	do	North Valley	
158	N	1	Unknown	Aug., 1882	Carl Ritter Bay	
119	N		Penis of white fox			
186	O		Ptarmigan head			Female. In alcohol.
			Ermine head and tail			
			Ptarmigan head			Male.
180	O	S	Eggs of dovekie	June 8, 1883	Discovery Harbor	(Fœtal eggs.)
635	O	S	Eggs of knot	June 10, 1883	do	(Fœtal eggs) and gizzard with contents; female.
634	O		Gizzard of knot	do	do	And testicles; male.
636	O	1	Egg of knot	do	do	Broken by shot, found inside the bird.
637	O	S	Eggs of ptarmigan	do	do	Taken from the bird.
638	O		Eggs of turnstone	do		Do.
639	O		Testicles of knot	do		
641	A		Wool of Brent goose	1882	Water-course Bay	Found with 4 eggs.
642	A		Nest of lemming	1882		
645	O		Fœtal eggs (unknown)	1883		
747	O		Gizzard of king duck	June, 1883	Near station	In alcohol; female.
749	O		Fœtal eggs of tern	do		Do.
750	O		Fœtal eggs of snow bunting	June 12, 1883		Do.
764	O		Fœtal eggs of king duck	June 20, 1883		Do.
753	O		Fœtal eggs of diver	June 17, 1883	Cape Baird	Do.
759	O		Fœtal eggs of glaucous gull	do		Do.
763	O	1	Plant, &c			In alcohol.
761	O		Fœtal eggs of Brent goose	June 14, 1883	Vicinity of station	Do.
762	O		Gizzard, &c	June, 1883	do	In alcohol; gizzard and contents (shrimps, &c.); female; longtail duck.
752	O		Fœtal eggs of Brent goose	June 14, 1883	do	In alcohol.
758	O		Fœtal eggs of ptarmigan	June 11, 1883	do	Do.
768	O		Shells	June 22, 1883	do	Found in gizzard of male king duck.
765	P	3	English record cases		do	Coppinger's [from Boat Camp]: Archer's (from head of fiord), and 1 unknown.
766	P		Miscellaneous articles		do	A few small shells, fossils, pieces of drift-wood, dog toggle (586), &c.; each article labeled.

Inclosure to Appendix No. 91.—Inventory of collections in natural history—Continued.

XII.—MISCELLANEOUS—Continued

No. of tag.	Box.		Name.	When found.	Where found.	Remarks.
			Eggs, &c.—Continued.			
838	I	----	Miscellaneous articles ----	----------	----------	Small box containing 23 small vials of flies, caterpillars, bumble-bees, cocoons, worms, small insects, &c., contents of gizzard of king duck, moss-like formations, sea porcupines, remains of head of lemming, lichens, fungi and moss, piece of rosin—all labeled with date, &c.
758	O	----	Fœtal eggs of ptarmigan--	June 11, 1883	----------	
758	O	----	Contents of gizzard king duck.	----------	----------	
850	O	----	Red snow ----------	June, 1883	Distant Cape ------	Gardiner.
------	W	----	Salt formation----------	July, 1883	Station----------	
881	O	----	Shells----------	June 17, 1883	----do----------	Found in gizzard of male king duck.
874	O	----	Liquids (vials 1, 3, 4, 6, 7, 10, 11).	----------	----------	Liquids exposed at instrument shelter to low temperatures.
877	O	----	Whisky ----------	----------	----------	
873	O	----	Brandy ----------	----------	----------	
868	O	----	Alcohol, medical ----------	----------	----------	
871	O	----	Alcohol, expedition ------	----------	----------	
876	Z	----	Discolored ice ----------	----------	----------	Specimen by Private Schneider, September, 1882, from berg near Dutch Island, 1882.
872	Z	----	------do----------	----------	----------	Do.

J. B. LOCKWOOD,
Second Lieutenant Twenty-third Infantry, A. S. O.

FORT CONGER, GRINNELL LAND,
June 30, 1883.

APPENDIX No. 92.—*Sergeant Brainard's report on Lieutenant Lockwood's trip towards the United States Mountain range.*

WASHINGTON, D. C., *June* 27, 1885.

SIR: In compliance with your verbal instructions of this date, I have the honor to respectfully submit the following report of a journey made by Lieut. J. B. Lockwood, Twenty-third Infantry, and myself to the interior of Grinnell Land, in July, 1883.

Under orders from you to make a journey to the north and west of Fort Conger, to determine more accurately the topography of the country in that direction, Lieutenant Lockwood and myself, with Privates Henry and Biederbick as auxiliaries, left the station at 8.30 a. m., July 11, 1883.

Our equipment consisted of two blanket sleeping-bags, one rubber blanket, an alcohol lamp, snow-shoes, and a revolver, together with provisions for six days; the whole weighing 99 pounds. These articles were divided into four packs suitable to carry on the shoulders, and assigned to the party as follows: Lieutenant Lockwood, 23¼ pounds; Biederbick, 24½ pounds; Henry, 26¼ pounds, and myself 25 pounds. Shaping our course in a NNW. direction, we passed between the large and small Sugar Loaves, and ascended the high ground forming the divide between North Valley and Lake Alexandra, to an elevation of 2,700 feet [823^{m}] above the sea. This divide or "hog-back," as it is frequently called, extended in the direction which we were traveling, and owing to its great elevation our survey of the surrounding country was greatly facilitated. Along the crest, and far down on either side, it was covered with snow to a depth of from one to four feet [.3 to 1.2^{m}]. This being soft, and holding in suspension large quantities of water,

our progress was rendered slow and extremely laborious. Those of the party who wore no snow-shoes would frequently sink to their waists in crossing places where the snow was particularly deep and abundantly supplied with moisture.

The course of North Valley is parallel to the "hog-back," along which we traveled, and appeared to terminate in a small ravine about ten miles from Discovery Harbor. This fact, however, was ascertained by the small party under my charge, which made an excursion up this valley in September, 1881, by your orders. Another valley, considerably larger, and separated from the head of North Valley by a narrow divide, drains the country to the north and discharges its waters into St. Patrick Bay. This valley was also entered by myself and party in the autumn of 1881 and traversed for a considerable distance towards its source. In my verbal report to you at that time, I stated substantially the same as above, but after Lieutenant Lockwood's return from a short trip up St. Patrick Bay Valley the same season, he questioned the correctness, of my observations and conclusions regarding the course of this stream. During the last journey, however, of which this is a description, he was convinced of the accuracy of my report and concurred fully in my opinion, as the following extract from his field notes will testify: "North Valley Creek runs in this direction a few miles, but soon runs out, and a stream discharging into St. Patrick Bay occupies what seems to be its prolongation."

At 5 p. m. the lieutenant decided to camp. We had tramped fourteen miles, and were well nigh exhausted from the exertion of wading through the deep, soft snow.

Selecting a bare spot among the rocks, an oasis in the desert of snow, we rolled away a few of the largest stones and spread down our sleeping-bags. A cup of strong tea and a few morsels of hard bread and meat refreshed us, and with our damp clothing clinging about our shivering forms we retired to our bags to secure a few hours of much needed rest.

The next morning (12th) Lieutenant Lockwood directed Henry and Biederbick to construct a large cairn and then to return to the station, leaving their sleeping-bag behind them for our use on the return trip. We reduced our loads also by caching the rubber blanket, snow-shoes, and sufficient provisions to take us back to the station. Starting at 9.45 a. m., we traveled north towards a spur or elbow-like point of the United States range of mountains containing a large and conspicuous glacier. For the first three miles we tramped through the deep, soft snow, alternated occasionally by mud and stones. After this the snow became deeper and softer than before and the traveling in consequence was more difficult than ever. About this time we crossed two deep, rocky gorges which conveyed a considerable quantity of water to the eastward into the main course. Climbing the north side of the last of these two gorges we gradually ascended a dome-shaped and snow-clad mountain or "hog-back," about 3,000 feet [914^{m}] in elevation. Pushing on a few miles farther we reached the apparent termination of the divide, and descending along its slippery, rocky sides for 1,000 feet [305^{m}], we waded knee deep across a large stream flowing from the northwest. Passing down this stream for a short distance we reached the main water-course, the flank of which we had been following, and camped at 4.15 p. m. The distance traveled was estimated at twelve miles. In the vicinity of our camp we found abundant traces of foxes, hares, lemmings, musk-oxen, and ptarmigan. The traces of the musk-oxen were not recently made. We also saw several snow-buntings and heard the peculiar call of a knot. On awakening the following morning (13th), we were startled to observe that the sky was obscured and that the barometer was rapidly falling. Starting at 8 a. m., a brisk walk of two hours carried us to the summit of a high ridge four miles north of camp, where we obtained a good view of the country beyond. From this point Lieutenant Lockwood decided to return to the station, and an attempt was made to accurately establish our position by a meridian altitude, but this we found impossible to do owing to the cloudy weather which prevailed. A few sights, however, were made with a prismatic compass, and the bearing of a few of the more important peaks as well as the glacier were obtained. These observations will be found recorded in *short hand* in one of Lieutenant Lockwood's volumes of field notes.

Between our position and the United States range of mountains (which was about fifteen miles away), the country was undulating but generally level and of great elevation. The large glacier previously mentioned is an offshoot of the sea of ice which appears to cover the summit as well as the eastern slope of this range. The peaks protrude through the ice-cap, if it may so be called, and show to a considerable height above it, in many places devoid of snow. With the powerful telescope which we carried with us we were enabled to scan closely the face of the huge glacier, and to determine its size and peculiarities with a tolerable degree of accuracy. At the point of entrance to the valley its front was at least six miles across, and

the vertical wall or face from 100 to 300 feet [30 to 91m] high. I hesitate in making the above assertion, as it seems almost incredible, but in justice to Lieutenant Lockwood I think this fact should be stated. We agreed on the height of this wall only after long and careful scrutiny. A dark line extending along the base of the wall we surmised to be its terminal moraine. One peak taller and more conspicuous than the others, and standing alone in the *mer de glace*, was named Mount Arthur Eugene. The elevation of this range is very great. The ridge on which we were standing was about 2,500 feet [762m] above the sea, and the summit of the range towering above us must certainly have been as much more above us.

The country to the eastward of our position was irregular, and much broken by ravines leading into the main water-course. To the west, for a distance of about ten miles, the country appeared about the same as to the northward, but beyond that point high ground (apparently a table-land) obstructed our view.

Building a small cairn in which a record and our remaining provisions were deposited, we started back at 11.45 a. m., retracing our steps to the last camp for our sleeping-bag.

Recrossing the large stream or river of which I have previously spoken, and ascending its precipitous bank until near the snow-line, we halted for lunch and a few hours' rest. Abandoning the sleeping-bag and provisions, nothing was left for us to carry except the spirit lamp and instruments. With this comparatively light load we pushed towards our first camp as rapidly as the nature of the route would permit. At 8 p. m. we reached the camp and found the equipment and provisions which we had cached in excellent order. Dark, threatening clouds had rolled up from the eastern horizon, indicating that an unusual atmospheric disturbance was in progress in that direction. No storm, however, followed, although one had been clearly indicated. This was a great relief to us as we had no protection against the elements except such as could be furnished by a thin blanket sleeping-bag.

On the morning of the 14th we started homeward at 8.50, first caching the snow-shoes, sleeping-bag, and a few cans of fresh meat. We reached Fort Conger at 2 p. m. in good health, but greatly fatigued from the severe exertion which we had undergone.

I am, very respectfully, your obedient servant,

D. L. BRAINARD,
Sergeant, Signal Corps, U. S. Army.

Lieut. A. W. GREELY,
Fifth Cavalry, U. S. A., Acting Signal Officer and Assistant,
Commanding Lady Franklin Bay Expedition.

APPENDIX No. 93.—*Orders to Lieutenant Lockwood to receive medical stores from Dr. Pavy.*

FORT CONGER, GRINNELL LAND, *July* 9, 1883.

(Orders No. 3.)

Acting Assistant Surgeon O. Pavy, having officially declared his unwillingness to renew his contract with this expedition, will transfer to Second Lieut. James B. Lockwood, A. S. O., the medical stores and supplies for which he is responsible. He will also turn over to that officer, not later than July 19, 1883, in a sealed package, his diary. By diary will be understood all notes and observations made during this expedition, as well as memoranda of current events. Similar action will be taken regarding all collections of any kind made since July 20, 1881, which will be packed, boxed, and addressed to the Chief Signal Officer. Clerical and other assistance will be furnished as needed.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O., and Assistant,
Commanding the Expedition.

A. A. Surgeon O. PAVY,
U. S. Army.

APPENDIX No. 94.—*Letter of Dr. Pavy asking the detail of Steward Biederbick.*

FORT CONGER, GRINNELL LAND, *July* 9, 1883.

SIR: I have the honor to respectfully request that for a week, beginning the 10th of July, the help of my hospital steward (or of the man that, since the beginning of the expedition, has been chosen to perform that duty) should be allowed to me, for the complete and detailed inventory of my medical stores.

I will also respectfully request to be officially informed if it is or not the privilege of a surgeon serving with a military command to be, on his demand, furnished with the assistance of his hospital steward, or of the enlisted men detailed for that duty.

I am, sir, respectfully yours,

OCTAVE PAVY,
Actg. Asst. Surgeon, U. S. Army.

To the COMMANDING OFFICER.

APPENDIX No. 95.—*Reply of Lieutenant Greely to Dr. Pavy's request for detail of Steward Biederbick.*

FORT CONGER, GRINNELL LAND, *July* 9, 1883.

SIR: I have the honor to acknowledge the receipt of your letter of this date, asking the undivided services of Private Biederbick for a week from July 10, to make an inventory of your medical stores.

You are advised, as you have already been verbally, that Private Biederbick is under orders for two days' field service, and that he will be at your command from the 12th instant.

The inventory of your stores cannot possibly require more than two days' labor, if they have been properly cared for, and I cannot see that your [* interest will] suffer by the postponement.

As you are to officially abandon this expedition within ten days, I see no reason why your question should be answered, particularly as it bears [* and improperly] on my action in this matter.

I have only to invite your attention to the fact that there is no hospital steward connected with this expedition, nor have you ever requested one. Private Biederbick has assisted you in that capacity for two years without interfering with his other duties, and the interests of the service [*do not demand a change].

I am, sir, respectfully yours,

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Asst., Commanding Expedition.

Actg. Asst. Surgeon O. PAVY,
U. S. Army.

APPENDIX No. 96.—*Letter of Dr. Pavy's, dated July 18, 1883.*

FORT CONGER, GRINNELL LAND, *July* 18, 1883.

SIR: My second contract, expiring on the 20th of this month, I wish to respectfully express my desire not to have it renewed.

As I do not intend to remain in the service and, as (according to your view) our work will, in the short space of a month or two, be virtually ended by the arrival of a ship in Discovery Harbor, or by our reaching her in Kennedy Channel, my action is of minor importance.

As a matter of course I offer my services to the expedition, and declare myself willing and ready to perform the same duties as in the past; still devoting myself entirely to the wellfare [*sic*] and success of our undertaking.

It will be well understood by me, that I shall not consider the Department as being indebted for any remuneration, and that all expenses incurred by my living will remain to my charge.

I am, sir, very respectfully, your obedient servant,

OCTAVE PAVY,
Act. Asst. Surgeon, U. S. Army.

To the COMMANDING OFFICER.

---

* Interpolations from letter-press copy.

APPENDIX No. 97.—*Answer to letter referred to in Appendix No. 96.*

FORT CONGER, GRINNELL LAND, *July* 19, 1883.

SIR: I have the honor to acknowledge the receipt of your communication of July 18, wherein you reiterate your unwillingness to renew your contract as acting assistant surgeon, U. S. Army. I cannot concur in your opinion that such action is of minor importance.

Whether this expedition remains a month or a year without an official medical adviser, *time* is unimportant, the moral aspects important. Ship or no ship, retreat or no, you joined this expediton under a moral obligation to serve during its continuance, and you well know that the Surgeon-General never would have sanctioned your contract had he [*surmised] even the possibility of your quitting, under any circumstance, a command situated without the confines of the civilized world.

I have the honor to advise you that should you at any time consent, I should deem it my duty to renew your contract as before.

I am, sir, very respectfully yours,

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O., and Assistant, Commanding Expedition.

Acting Assistant Surgeon O. PAVY,
U. S. Army.

APPENDIX No. 98.—*Dr. Pavy's refusal to turn over his diary.*

FORT CONGER, GRINNELL LAND, *July* 19, 1883.

SIR: In conformity with the order of July 9th, I have transferred my medical property and the specimens of natural history gathered by myself and addressed to the Chief Signal Officer.

As you are aware, all my private gathering (except the flowers) were, in the first days of June, turned over with the general collections.

As to the question of diary, etc., I will say that to the best of my ability I have furnished you with all my personal views and official opinions by reports, when desired.

My journal, destitute of any official value, is a mere record of events, hypothesis, and reminscences [*sic*], closely mingled with personal and intimate thoughts synthetised [*sic*] from detached notes and reduced into *letters of an entirely private character*, for the only use of my family, but on our return to the United States, if any personal opinion concerning events, or even my appreciation of physical, natural, medical, geographical, etc., etc., phenomena are of any interest to the Chief Signal Officer, I will consider myself honored to be allowed to put at his disposal any extracts of my polar journal and Greenland notes, as well as any of the general Arctic information collected by myself during sixteen years of continued Arctic studies.

I am, sir, respectfully yours,

OCTAVE PAVY.

To the COMMANDING OFFICER.

APPENDIX No. 99.—*Letter transmitting charges to Dr. Pavy.*

FORT CONGER, GRINNELL LAND, *July* 19, 1883.

SIR: I have to herewith transmit to you copy of charge and specifications this day preferred against you, and to inform you that the originals have been forwarded to the Adjutant-General of the Army.

The legal results of this action prevent the termination of your term of service with this day as contemplated by you, but retains you in the Army awaiting trial by a general court-martial.

I am, respectfully, yours,

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant, Commanding Lady Franklin Bay Expedition.

Acting Assistant Surgeon O. PAVY, *U. S. Army.*

*Interpolation from letter-press copy.—A. W. G.

Charge and specifications against Acting Assistant Surgeon O. Pavy, U. S. Army.

CHARGE.—Disobedience of orders.

Specification 1st. In this that he, Acting Assistant Surgeon O. Pavy, U. S. Army, having been directed by orders No. 3, dated Fort Conger, Grinnell Land, July 9, 1883, to turn over to Second Lieutenant James B. Lockwood, Twenty-third Infantry, A. S. O., his diary, did fail and refuse to obey such order.

This at Fort Conger, Grinnell Land, July 19, 1883.

Specification 2d. In this that he, Acting Assistant Surgeon O. Pavy, U. S. A., having been verbally ordered by First Lieutenant A. W. Greely, Fifth Cavalry, A. S. O. and Assistant, commanding, to turn over within two hours his diary to Second Lieutenant James B. Lockwood, Twenty-third Infantry, A. S. O., did positively refuse to obey said order.

This at Fort Conger, Grinnell Land, July 19, 1883.

Specification 3d. In this that he, Acting Assistant Surgeon O. Pavy, U. S. A., having been ordered in arrest by First Lieutenant A. W. Greely, Fifth Cavalry, A. S. O. and Assistant, commanding, did refuse to obey said order, and so refused until Lieutenant Greely called for a guard to enforce it, when he, Acting Assistant Surgeon O. Pavy, said: "I accept the arrest physically but not morally."

This at Fort Conger, Grinnell Land, July 19, 1883.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding Lady Franklin Bay Expedition.

Witnesses:

First Lieutenant A. W. GREELY,
Fifth Cavalry, A. S. O. and Assistant.

Second Lieutenant JAMES B. LOCKWOOD,
Twenty-third Infantry, A. S. O.

APPENDIX No. 100.—*Letter limiting Dr. Pavy's bounds while in arrest.*

FORT CONGER, GRINNELL LAND, *July* 19, 1883.

SIR: Your order of arrest this day made will confine you to your private quarters except the times needful for meals, personal offices, and such exercise as you judge requisite for health. Exercise will be taken within one mile of the astronomical observatory.

Very respectfully, yours,

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant, Commanding the Expedition.

Acting Assistant Surgeon O. PAVY, *U. S. Army.*

APPENDIX No. 101.—*Order for the abandonment of station at Fort Conger.*

FORT CONGER, GRINNELL LAND, *July* 28, 1883.

Orders No. 5.

In case of the non-arrival of a vessel by August 9, 1883, this station will be abandoned and a retreat southward by boats to Littleton Island will be attempted.

Sixteen pounds of personal baggage will be allowed to each officer and eight pounds to each man.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding the Expedition.

APPENDIX No. 102.—*List of commissary subsistence stores abandoned at Fort Conger, Grinnell Land, August 9, 1883.*

Articles.	Quantity.	Articles.	Quantity.
Apples, 3-lb. cans ____ cans	30	Molasses ____ gails	160
Asparagus ____ do	13	Mutton extract ____ cans	14
Allspice ____ lbs	4¾	Nutmegs ____ ozs	25
Bacon ____ do	1,079	Oatmeal ____ lbs	42
Beef, salt ____ bbls	10	Onions ____ cans	143
Beef, extract of, 2-lb. cans ____ cans	114	Pork ____ bbls	21 13/200
Hard bread ____ lbs	9,514	Peaches, evaporated ____ lbs	75
Beans, black ____ do	688	Peaches, preserved ____ jars	26
Beans, baked, 3-lb. cans ____ cans	116	Pepper, black ____ lbs	39
Butter ____ lbs	33	Pepper, Chili ____ do	3½
Corn-meal, 14-lb. tins ____ tins	8	Pepper, Tobasco ____ bottles	4
Coffee, Rio ____ lbs	750	Pickles, saur-kraut, ½-bbl-kegs ____ kegs	11
Coffee, Java ____ do	57	Pickles, onions, 10-gall. kegs ____ do	1
Chocolate, McCobb's ____ do	116½	Potatoes, 2½-lb. cans ____ cans	3
Chocolate, Baker's ____ do	15	Preserved damsons, 2-lb. cans ____ do	48
Cinnamon ____ do	2	Rhubarb ____ do	710
Cloves ____ do	4¾	Salt ____ lbs	1,277 15/16
Eggs, condensed ____ cans	104	Salt, table, 3-lb. bags ____ bags	45
Extract celery ____ bottles	7	Sauce, cranberry, 2-lb. cans ____ cans	281
Gelatine, Swinburn's ____ packets	50	Soup, ox-tail ____ do	28
Gelatine, Nelson's ____ do	13	Soup, mock-turtle ____ do	70
Ginger ____ lbs	9¾	Tea, green, gunpowder ____ lbs	115
Hominy (tins) ____ do	55	Tomatoes, 3-lb. cans ____ cans	15
Hops ____ do	83	Vinegar ____ galls	174
Currant jelly ____ cans	7	Tobacco, plug ____ lbs	360
Lard, 5-lb. cans ____ lbs	375	Castile soap ____ cakes	12
Milk, 1-lb. cans ____ cans	18	Pipe-stems, Weichsel ____ No	30
Mustard ____ lbs	176		

APPENDIX No. 103.—*Medical Reports.*

A.

FORT CONGER, GRINNELL LAND, *March* 4, 1882.

SIR: I have the honor to submit to you the substance of my weekly verbal reports regarding the health of the command, since its arrival at Fort Conger.

August. The health has been excellent during the month of August.

After landing, lime juice has been issued to the men at the dose of half an ounce three times a week.

September. During the month of September the health has been very good, excepting the case of Sergt. Rice, who when travelling with me, from Lincoln Bay, was seized with inflamatory [*sic*] rheumatism and remained under my treatment for ten days.

During this month the use of lime juice has been gradually increased to the dose of one ounce daily.

October. In the month of October the health of the command was very good, and no signs of scurvy had been noticed.

Pvt. Long (cook since we landed) was relieved from duty the 7th, and during two weeks remained under treatment for animia [anæmia].

During the month daily doses of lime juice were issued.

November. Except a case of frost-bitten toe, and a few minor complaints, the health has been good.

Daily doses of an ounce of lime juice were issued.

No signs of scurvy have yet appeared.

December. During the month of December I have not found any symtoms [*sic*] of scurvy, but cases of animia [anæmia] & dyspepsia came frequently under my care; otherwise the health has been good.

Sergt. Gardiner has met with an accident (contracted in line of duty) which resulted in a fracture of the lower extremity of the left leg.

From the 15th to the middle of January we have issued daily rations of can-fruit [*sic*], which I think, with the use of iron and tonics, have produced good results.

January. From the middle of January the general state of the health has improved. During the first two weeks in the month I have found in one of the observers signs of great animia [anæmia] bordering perhaps on scurvy. But after a week, he was able to resume his work.

The only positive but slight premonitory symtoms [*sic*] of scurvy observed this winter were in the case of the Eskimo dog driver Jens Edward, who since December was laboring under a great despondency of mind. At the beginning of February he had entirely recovered.

The daily dose of lime juice was issued during the month.

February. In February the health of the command was excellent, and signs of animia [anæmia] and dyspepsia were less numerous than in the previous month.

Lime juice has been regularly issued.

No signs of scurvy have been noticed.

During the winter the use of fresh beef, can-fruits [*sic*] and vegetables have been instrumental in the preservation of our health.

I would call your attention to the fact that the command is generally affected (of different degrees) with chronic bronchitis.

I would therefore respectfully advise, that, as soon as possible, measure [*sic*] should be taken to prevent the escape of deleterious gas from the stoves from both rooms.

I am, very respectfully, your obt. servant,

OCTAVE PAVY,
Act. Asst. Surgeon, U. S. A.

[*To the Commanding Officer.]

*Address omitted in original.—A. W. G.

B.

FORT CONGER, GRINNELL LAND, *February 28th*, 1882.

SIR: In answer to your request of the 26th of February I will respectfully say, that with three exceptions the enlisted men of this expedition are to-day physically fit for spring sledging, if properly clothed and if not overworked and not exposed to the evil effect of too low temperature.

The three enlisted men excepted are *Sergt. Gardiner*—convalescent from a fracture of the left leg.

Sergt. Cross—easily affected by cold feet.

Pvt. Bender—lungs are liable to be affected by exposure to cold.

I am, very respectfully, your obt. servant,

OCTAVE PAVY,
Act. Asst. Surgeon, U. S. A.

[* To the Commanding Officer.]

C.

FORT CONGER, GRINNELL LAND, *March* 4, 1882.

SIR: In answer to your letter of the first of March, I have the honor to submit to you my advise [*sic*] as to the nutritive value of the aliments that are to compose the sledge rations.

I believe, the quantity and nature of the food, that you have mentioned in your letter, to be very healthy for the sledging parties, that you intent [*sic*] to sent [*sic*] out in the spring.

The only suggestion that I could make would be to replace the 24 oz baked beans by 12 oz baked beans and 12 oz of meat or pemmican, as a ration.

I am, very respectfully, your obt. servant,

OCTAVE PAVY,
Act. Asst. Surgeon, U. S. A.

[* To the Commanding Officer.]

D.

FORT CONGER, GRINNELL LAND, *March 18th*, 1882.

SIR: In answer to your letter of the 16th of March, in which you have given me my instructions for a journey over the polar sea, north of Grinnell Land, I have the honor to state, at your request, that the health of the command is now good, and that we have no reason to anticipate sickness.

I am, very respectfully, your obt. servant,

OCTAVE PAVY,
Act. Asst. Surgeon, U. S. A.

E.

FORT CONGER, GRINNELL LAND, *August 1st*, 1882.

SIR: Since my last sanitary report the health of the command has generally been good. No symptoms of scurvy were detected, but cases of animia [anæmia] and derangement of the digestive organs have at times been noticed.

In the first days of March, Pvt. Bender was confined to the bed with broncho pneumonoia [pneumonia] and Pvt. Long came under my care for hæmoptysia [hæmoptysis], (spitting of blood). At the end of March Pvts. Connell and Ellis suffered of superficial frost bites.

In July G. W. Rice sprained his left foot, but at this date he has resumed his work.

During the spring the command has suffered but little of [from] snowblindness.

Since February a daily dose of lime-juice has been regularily taken.

I am, very respectfully, your obt. servant,

OCTAVE PAVY,
Act. Asst. Surgeon, U. S. A.

To the COMMANDING OFFICER.

---

*Address omitted in original.—A. W. G.

F.

FT. CONGER, GRINNELL LAND, *Sept. 20th*, 1882.

SIR: During the month of August the health of the command has been good, except in few instances, where I have found derangement of the digestive organs and signs of animia [anæmia]. The daily dose of lime juice has been regularily [regularly] issued.

I am, very respectfully, your obt. servant,

OCTAVE PAVY,
Act. Asst. Surgeon, U. S. A.

To the COMMANDING OFFICER.

G.

FORT CONGER, GRINNELL LAND, *October 6th*, 1882.

SIR: During the month of September, with the exception of a few minor complaints, the health of the command has been good.

In answer to your order of Sept. 30th, 1882, "to submit at the earliest practicable moment a detailed report as to the health of the individual members of this command," I will state that, at this date, the health of:

Sergt. Israel is good at present, but may need special attention at times.

" Rice, health good.

" Jewell " good.

" Ralston's health is good at present, but may need special attention during the dark days.

" Gardiner. On this date the health of Sergt. Gardiner is good, but will certainly need special attention this winter, as scurvy would, in his case, in all probability, be accompanied with disunion of the fracture sustained last December.

Moreover, he has since a long time been periodically under my care for anœmia [anæmia] and derrangement [derangement] of the digestive organs. Since I mentioned, in his case, the necessity of exercise, I have, with satisfaction seen him take (what I consider the best and healthiest of exercise) a daily walk.

Sergt. Brainard, health good.

" Connell " good.

" Cross. The health of Cross is apparently good, but I would recommend that he should not be sent in the field this fall and winter.

Corp. Saler [Salor],	health	good.
" [Sergeant] Ellison [Elison],	"	good.
Pvt. Henury [Henry],	"	good.
" Frerick [Frederick],	"	good.
" Linn,	"	good.
" Schneider,	"	good.
" Whistler,	"	good.
" Biederbick,	"	good.

Long and *Bender*.—The health of Long and Bender is at present comparatively good. Since early in the fall of 1881, they have both been repeatedly under my care, one for debility and the other for weakness of the lungs. I have verbally informed you, last spring, of my desire to see them sent home, had a ship reached Discovery Harbor in the summer of 1882.

I will strongly reiterate the recommendation made last spring that, unless absolutely necessary, these two men should not be sent in the field this fall.

Pvt. Ellis. The health of Ellis is good, but he has repeatedly complained of being unable to perform long marches on account of an injured foot. The man must certainly, at a time anterior to the departure of this command, met with some accident which has altered the shape of the left inferior extremity. But, how far the effect of the injury, can now, at times, and under prolonged or violent exercise, be still manifest, I am unable to answer.

Jens (Esk.), health good.
Frederik, " " good.

Such is, at this day, the state of the health of this command.

As to the prospects, in the future, I cannot foretell. We are only on the threshold of a second winter; and our situation, without precedent, has been concidered [*sic*], by eminent medical authorities, as one of great uncertanty [*sic*] and danger.

Moreover, as our dietetic condition must, by necessity, be different from what it was the previous winter, the prospects are thereby far from favorably increased.

The variety of our diet is reduced; we are (compared to the original plan) already under reduced rations of some articles highly conducive to health; and to a great extent deprived of preserved fresh vegetables.

I have mentioned above, the few special cases in which it would be advisable to put some restriction as regard to the field duties. If similar measures become necessary for other members of the command, I will advise you when they arise.

In regard to "the points of sanitary precaution," I will state that the change of stove pipes has been highly beneficial, by stopping the emenation [emanation] of deleterious gas, exceedingly injurious during the past winter. I should recommend that, as far as practicable, a moderate temperature should be kept in our room; also, that a quit [quiet] place of repos [repose] should bee [be] chosen for the observers who have been on duty during the night. To obtain, in the men's quarters, during the day, quitness [quietness] sufficient for the rest of individual members, would be taxing too heavily the general interest, and thereby interfere with the expansion of moderate merriment, an element so necessary to the promotion of health.

I think it advisable that, in view of a retreat so far considered by you as certain, the men, specially those employed this winter and fall in field work, should be well clothed and that special attention should be paid to appropriate foot and hand gear. Serious accidents would perhaps, as in the case of Dr. Kane, encumber and even endanger our retreat.

I should now suggest the propriety of having the leather boots set aside.

I could not *too strongly recommend* that, without it being ordered except in special cases, the habit of daily walks (with all due restrictions dictated by prudence) should be encouraged during the last days of light. The heavy outside work is happily of rare occurrence or necessity. Compulsatory exercise, in my opinion is certainly not as profitable to the health as a voluntary and recreative one.

The general hygeianic [*sic*] regulations established last winter are appropriate and can be with advantage maintained for the present. If I discover in the future any points to be changed, I will at once inform you.

At this date, I have no case under my care for which special diet is required.

During the month of September daily doses of lime juice have been issued.

The last paragraph of your communication orders, that "in case even of a suspicion of scurvy a full and detailed report will be made at once in writing." Scurvy being a disease of very insidious nature, and its primary symptoms resembling closely those of many arctic complaints as anoemia [anæmia] rheumatism, etc., etc., differential diagnostic need, "in initio," some reserve. In many instances I am convinced that arctic scurvy is a condition incident to an animic [anæmic] condition, in which it is difficult to state the precise time at which it assumes characters distinctive enough to be called scurvy. You can therefore understand, that a *suspicion*, being only a mental process of investigation entirely personal to the mind of the investigator, no practicioner [practitioner] will found an opinion on it alone. My attention is unremittingly on the *qui vive;* and as soon as in any case I will have grouped enough symptoms for a diagnosis of incipient scurvy, I will at once advise you by writing.

I cannot answer to the paragraph of your order refering [*sic*] to the "names of all men for whom a special diet is considered desirable," before all the fresh meat is secured at the post. I will also be oblige [*sic*] to examine the list of commissary stores remaining, so as to be able to decide on what I can at present recommend without taxing the future. I deem it of the highest importance, even of absolute necessity to be informed of your project concerning our future stay in the arctic, as well as your plans and means of escape. My stock of medicines (very incomplete and even *absolutely deficient* in *essential* drugs) is very much reduced specially in stores that, in the future, I may be called on to use the most often. Your plans will be in this emergency entirely my *guide* as to my divers expenditures at present and my reserve for the future.

I am, very respectfully, your obd. servant,

OCTAVE PAVY.

To the COMMANDING OFFICER.

Above report received open by the hand of Pvt. Schneider.—A. W. GREELY.

H.

FORT CONGER, GRINNELL LAND, *December 4th*, 1882.

SIR: During the months of October and November without exception, the health of the command has been excellent.

No signs of scurvy or of any epidemical diseases have been detected.

The customary dose of lime juice has been regularly issued.

I have the honor to be, very respectfully, your obt. servt.,

OCTAVE PAVY,
Act. Asst. Surgeon, U. S. A.

To the COMMANDING OFFICER.

I.

FORT CONGER, GRINNELL LAND, *January 4th*, 1883.

SIR: During the month of December the health of the party was generally good.

The loss of appetite has been more or less general, but especially with Linn, Frederick, and the two Greenlanders.

Bender was again under my care for pain in the chest; Long and Frederick for slight soreness of the mouth, and Biederbick for rheumatism.

Lime juice has been regularly issued, except on Christmas eve.

No signs of scurvy or of any epidemic disease have been noted.

I am, very respectfully, your obt. servant,

OCTAVE PAVY,
Act. Asst. Surgeon, U. S. A.

To the COMMANDING OFFICER.

J.

FT. CONGER, GRINNELL LAND, *February 5th*, 1883.

SIR: The health of the command during the month of January, has been generally good. No disease of any contagious or epidemical character have [*sic*] made their [*sic*] appearance and no symptoms of scurvy have been detected.

Daily doses of lime juice were issued.

Sergt. Israel, health good.
" Rice, " "
" Jewell, " "
" Ralston, health apparently good, but this year seemed to be very easily affected by cold.
" Gardiner, health good.
" Brainard, " "
" Connell, " " but often complains of rheumatism.
" Cross, health good.
Corp. [Sergeant] Ellison [Elison], " "
" Saler [Salor], " "
Pvt. Fredericks, " "
" Ellis, " "
" Henry, " " but at times complained of rheumatism.
" Linn, health good.
" Schneider, " "
" Whistler, " "

Pvt. Biederbick, frequently under care for rheumatism.

" Bender has been in the beginning of January sufficiently affected to be carried on the sick list.

Complying with your instruction I would state, I was in need during the month of digitalis, cod liver oil, and generally of tonics.

I am, very respectfully, your obd. servant,

OCTAVE PAVY,
Act. Asst. Surgeon, U. S. A.

To the COMMANDING OFFICER.

K.

FORT CONGER, GRINNELL LAND, *March 3rd*, 1883.

SIR: During the month of February, with the exception of a few cases of muscular rheumatism, the health of the command has been good.

Pvt. Bender has been at times under my care, but at this day his health is relatively good.

Pvt. Long has recovered from an attack of rheumatism with effusion in the knee.

The ordinary dose of lime juice has been regularly issued. No symptoms of scurvy have been detected.

I am, very respectfully, your obt. servant,

OCTAVE PAVY,
Act. Asst. Surgeon, U. S. A.

To the COMMANDING OFFICER.

L.

FORT CONGER, GRINNELL LAND, *April 3rd*, 1883.

SIR: During the month of March, the general health of the command has been good; but as I have stated in my communication of March 9th, our powers of endurance (compared with the previous spring) have, I believe, decreased.

Sergt. *Gardiner*.—During the last days of March Gardiner has suffered with slight tenderness of the gums, but without any symptoms of scurvy.

Sergt. *Ralston*.—The general state of the health of Ralston has not been very good during the past month. His power of endurance seemed to have been less this winter. He has also suffered of tenderness of the gums, but without symptoms of scurvy.

Corp. *Saler* [Salor].—Since the first days of March, and for two weeks, Saler [Salor] has been under my care for general debility.

Corp. [Sergeant] *Ellison* [Elison].—Ellison [Elison] started in the field the 10th of March, his health being apparently good, but returned the 14th, affected with general debility and derangement of the digestive organs.

Pvt. *Bender* has again at times been under my care.

Pvt. *Long* has, in the first days of March, been relieved from duty for a few days an account of inflamation [*sic*] of the throat.

I should recommend that unless absolutely necessary Sergt. Cross, Pvts. Long and Bender should not be send [*sic*] in the field.

The daily doses of lime juice have been regularly issued.

No symptoms of scurvy have been detected.

I am, very respectfully, your obd. servant,

OCTAVE PAVY,
A. A. Surgeon, U. S. A.

To the COMMANDING OFFICER.

M.

FT. CONGER, GRINNELL LAND, *April 30th*, 1883.

SIR: In answer to your request of March 28th,* I have the honor to state that the health of the command for the fiscal year ending June 30th, 1882, has been as follows.

In August the health was excellent.

In September it remained very good, except in the case of Sergt. Rice who suffered with inflammatory rheumatism and remained under treatment for ten days.

During October the sanitary state was very good.

In November the health has been good with the exception of a few minor complaints. In this month Sergt. Gardiner met with an accident of a serious nature, (fracture of the lower extremity of the leg).

During December, anœmia [anæmia] and derrangement [derangement] of the digestive organs as well as bronchities [bronchitis] have been frequently observed. Sergt. Rice was incapacitated for duty the 13th, having met with a severe contusion of the left shoulder.

From the middle of January the general state of the health has improved.

During this month I have found in Sergt. Ralston signs of great anœmia [anæmia] bordering perhaps on scurvy.

The only positive but slight symptoms of scurvy observed this winter were in the case of the Eskimo Jens Edward, who since December, was laboring under a great despondency of the mind. He has not been incapacitated for duty.

In February the health of the command was good, and the signs of dyspepsia and anœma [anæmia] were less numerous than in the previous month.

During the winter, and especially at its end, the command was generally affected with chronic bronchities [bronchitis]. Until the end of the fiscal year of 1882, with the exception of individual cases of anœmia [anæmia] and derrangement [derangement] of the digestive organs, the general health of the party has been good.

In the first days of March Pvt. Bender was confined to the bed by a slight attack of broncho pneumonia and Pvt. Long came under my care for spitting blood. Pvt. Ellis was relieved from duty in March for superficial frost bite of the foot, and in April Sergt. Connell, for the same cause.

Pvt. Biederbick was confined to the bed for general debility in the month of April.

During the spring the command has suffered but little of snowblindness.

The stores furnished by the Medical Department have generally been found of excellent quality; the supply of instruments very complete, but for the books, I should like to have been supplied with more recent editions.

As requested by you, I give a list of some of the drugs generally indispensable in the practice of medicine, and of which none has been furnished me.

For the deficiance [deficiency] of medicine generally considered useful or necessary to practice, the Medical Department at home can from invoices form her own judgment.

List of medicines generally considered as indispensable.

Cod liver oil,	Digitalis,
Hyoscyamus,	Nux vomica,
Strychnia,	Veratrum viride.

List of men that have been incapacitated for duty.

Rice, inflammatory rheumatism, Sept. 8th; relieved for 10 days; contusion of the left shoulder Dec. 13th returned to duty Jan. 3rd.

Ralston.—Anœmia [anæmia] Jan 6th; relieved of duty about one week. Conjunctivitis Jan. 8th; relieved one day.

* The order requiring this report is referred to on page 42.

Gardiner.—Fracture of the lower extremity of the left leg, Nov. 30th.

Connell.—Rheumatical attack Sept. 11th; relieved for one day. Anœmia [anæmia] Dec. 8th: relieved three days. Frost bitten foot Apl. 7th; relieved until Apl. 25th.

Ellison [Elison].—Face burned by explosion of gasoline Nov. 10th; relieved for five days.

Ellis.—Diarrhœa March 19th; one day relieved. Frost bitten toe Mch. 25th; returned to duty April 23rd.

Whistler.—Affection of the sexual organ Oct. 12th; relieved four days. Frost bitten toe Sept. 11; relieved for two days.

Biederbick.—Frost-bite Nov. 7th; relieved for twenty days. General debility 25th Apl.; returned to duty 4th May.

Schneider.—Sore throat Nov. 29; relieved two days. Bronchities [bronchitis] with dyspepsia Dec. 6th; relieved two days.

Long.—Spitting of blood March 4th; relieved three days. Anœmia [anæmia] Oct. 9th; returned to duty Oct. 16th.

Bender.—Oct. 22nd, relieved until Oct. 30th, for pain in the chest. Burn of the hand Jan. 17th to 19th. Broncho pneumonia March 1st to 6th.

Henry.—Attack of rheumatism April 6th; resumed duty April 11th.

I am, very respectfully, your obt. servant,

OCTAVE PAVY,
A. A. Surgeon, U. S. A.

To the COMMANDING OFFICER.

N.

FORT CONGER, GRINNELL LAND, *May* 5, 1883.

SIR: During the month of April the general health of the command has apparently been good.

The inconvenience derived from the need of fires during the nights was felt, and if it has not been the cause of sickness it has certainly not been conducive to health. Any hardships that can be dispensed with, or any comfort that can be procured is in these latitudes (especially after a second winter) eminently influential in helping to keep the state of the health at or above par.

The experience of our party this spring has confirmed the general rule, that after a second winter spent in a high northern latitude, men are less capable of withstanding the hardships of arctic work; physical strength is notably reduced, and the body, far from becoming endured [inured] to cold and exposure, is on the contrary, less prepared to resist its effects.

The ordinary doses of lime-juice have been regularly issued during the month. No symptoms of scurvy have been detected.

I will ask to be allowed (the 20th of this month or about) to undertake a journey in the interior and around Lake Hazen. I think that it would be interesting to study there the effects of glacier action, past and present, as well as the geological formation of this range of mountains.

Although I am doing the functions of naturalist I do not lay any claim to the title, but years ago in the Alps and in Greenland during my stay of 1880–'81, I have studied this question practically.

Moreover, the journey would perhaps contribute to the advancement of arctic zoology in our efforts to establish the fact, or to disprove the belief concerning the wintering of musk-oxen in Grinnell Land, and especially at or in the neighborhood of Lake Hazen.

During this trip musk-oxen could probably be killed, as the neighborhood of the lake has been considered by us as the best resort for game.

I am, very respectfully, your obt. servant,

OCTAVE PAVY,
Actg. Asst. Surgeon, U. S. Army.

To the COMMANDING OFFICER.

O.

FORT CONGER, GRINNELL LAND, *June 4th*, 1883.

SIR: With the exception of individual cases during the month of May, the health of the party has generally been good, but derangements of the digestive organs have been more frequent and more general (not of a serious character) than at any time since the reappearance of the sun.

Sergt. *Ralston.*—During the winter the health of Sergt. Ralston has frequently needed to be under a course of tonic treatment. Since the spring it had improved, but after our supply of musk-ox meat had been exhausted* it began to fail.

The 29th of May my attention was directly called to him for soreness of the mouth and gums, complicated with ragged purple patches at the time, small, but having tendency to enlarge; the functions of the digestive organs were below par, and the bowels were relaxed. Out of door exercise of any length caused exhaustion.

My diagnosis in this case is anœmia [anæmia] and general debility, verging on scurvy, with slight premonitory symptoms of the disease.

He has been put under and [an] internal treatment of iron and quinia [quinine], with local washes of sulphate of zinc. A daily allowance of fresh musk ox meat (reserved for the sick) has been issued to him, and out door exercise prescribed. The daily dose of lime juice, 1 ounce, has not been increased.

At this date, I already see an improvement in the state of his health. Ralston, with Linn and Biederbick, is among the men, who have dislike for seal meat.

Private *Biederbick:* Tenderness of gums and soreness of the palate; signs of anœmic [anæmic] state.

Privare *Linn:* Has been under care for dispepstia [dyspepsia] and rheumatic pains.

Private *Ellis:* Was relieved from duty for a day. Derangement of the digestive organs and bowels.

Private *Whisler:* Relieved from duty for three days. Severe case of snow blindness.

During the month of May the customary dose of lime juice has been regularly issued.

I am, sir, respectfully yours,

OCTAVE PAVY,
Actg. Asst. Surgeon, U. S. Army.

To the COMMANDING OFFICER.

P.

FORT CONGER, GRINNELL LAND, *July 3d*, 1883.

SIR: During the month of June, the health of the command has been good.

For several days during the month Sergt. Brainard was relieved from out of door duty on account of a slight inflammation of the gums, caused by the extraction of a tooth.

Sergt. Ralston has rapidly recovered and at present his health is very good.

The customary dose of lime juice has been regularly issued.

No symptoms of scurvy have been detected during the month of June.

I am, sir, respectfully yours,

OCTAVE PAVY,
Actg. Asst. Surgeon, U. S. Army.

To the COMMANDING OFFICER.

*This statement is inexact and misleading, and does not accord with Dr. Pavy's own words ten lines later, where he refers to reserved musk-ox meat. On May 20 a seal weighing over five hundred pounds was killed, and as a large quantity of musk-ox meat was found tainted inside a few days before, I decided to issue seal meat, and reserve musk-ox meat, hares, &c., for the sick. Sergeant Ralston unfortunately had an aversion to seal meat. Over five hundred pounds of musk-ox meat was obtained May 29, which enabled me to issue it regularly. Until a few days prior to the retreat in August, 1883, the expedition was never without musk-ox meat.—A. W. GREELY, *Lieut.*

Q.

FORT CONGER, GRINNELL LAND, *July* 10, 1883.

SIR: I have the honor to respectfully transmit to you my yearly report for the fiscal year ending June [30th], 1883. During the months of July and August, 1882, the health of the command has generally been good, with the exceptions of occasional cases of derangement of the digestive organs and signs of anœmia. [anæmia].

Pvt. Lynn, from the 10th of July, was relieved from ordinary duty for a few days on account of soreness of one of his feet, contracted in walking during your western journey. From the middle of the same month Pvt. Biederbeck has began to be affected with muscular rheumatism, which have [has] since troubled him from time to time.

The general health of the command has continued to be good during September, October, and November, '82, without any signs of scurvy.

Through December, '82, or even from the end of November, the appetite has in many cases failed, and symptoms of an anœmic [anæmic] state have been shown.

Nevertheless the general health was good.

During January, '83, the sanitary state of the party has been good, with the exceptions of cases of impaired appetite and dyspepsy [*sic*]. During this month Bender has at divers times been under my care (from the 6th to 13th) as well as Long, who remained under treatment, and was relieved from duty during eight days, for incipient, dropsical effusion in the right knee.

In February, '83, the health was good, with the exceptions of a few cases of muscular rheumatism.

During March, although the sanitary state of the party appeared good, our powers of endurance compared with the previous spring were on the decrease.

Pvt. Lynn, whom I considered as one of our men the best fitted for endurance, was obliged to be excused from early sledge work on account of rheumatism.

Sergts. Ralston and Gardiner suffered from slight tenderness of the gums, although without any symptoms of scurvy. The health of Ralston has not been good during the whole winter and spring; his powers of endurance to cold were below par.

At the beginning of March, '83, Copl. Saler [Salor] remained for two weeks under my care, being in a debilitated state, and therefore exempted from any heavy work; occasionally the corporal spat [*sic*] blood.

Copl. [Sergeant] Elison started into the field the 10th of March in apparently good health, but returned the 14th, in a state of debility complicated with derangement of the digestive organs; he was relieved from duty from the 15th to the 20th. In the beginning of March Pvt. Long was exempted from work for five days on account of inflammation of the throat.

In April the health has generally been good, but the party has felt at times the need of fire during the night.

During the last part of May the health of the command was good, except among some of the men who had dislike for seal meat and were in consequence deprived of fresh animal food.

Sergt. Ralston in the last days of the month came under my care, being in an anœmic [anæmic] state verging on scurvy. He was not relieved from duty, and promptly recovered under a treatment of fresh meat and tonics, without any addition of preserved vegetables and lime juice.

In June, with the exception of Sergt. Brainard, who from the 7th to the 10th has been relieved from out of door duty, on account of an inflammation of the gums, caused by the extraction of an ulcerated tooth, the general health of the party has been good.

During the whole of the winter the health of Bender has often been, as during the previous year, bad. Again, from February 10th to 14th, he had been dispensed [excused] from duty.

Our experience this year has confirmed the generally established fact that the powers of endurance in high arctic latitudes, decreases for each successive year.

As our supply of preserved vegetables was less during the winter of 1882–'83 than during the previous one, and as the variety of our diet was also considerably less, I can only attribute the better state of our health this year, to the increased rations of fresh meat and the suppression of the injurious emanations of deleterious gas from the stove pipes during the winter of 1882–'83.

As it is impossible to foretell what prospects this summer will bring, I consider it to be my duty to recommend that a certain amount of preserved vegetables should be kept in reserve. During another winter, without an abundant supply of fresh or even dried musk-ox meat, the prospects of this command would certainly be gloomy and perhaps its fate disastrous.

I am, sir, respectfully yours,

OCTAVE PAVY,
Actg. Asst. Surgeon, U. S. Army.

To the COMMANDING OFFICER.

R.

FORT CONGER, GR. LAND, *February 2d*, 1883.

SIR: I respectfully acknowledge the receipt of your letter of the 2d inst., and will state that it is difficult for me to designate the best men for standing cold.

Personally I know that Sergt. Brainard, Copl. [Sergeant] Elison, and Sergt. Rice (if the last named was not of a rheumatic disposition) are well fitted for that purpose.

I have also confidence in the power of endurance of Copl. Saler [Salor], Pvts. Lynn and Frederick.

The last named is, without being placed on the sick list, under my medical care.

Very respectfully, your obt. servant,

OCTAVE PAVY,
A. A. Surgeon, U. S. Army.

[* To the Commanding Officer.]

S.

Medical report of Hospital Steward Biederbick.

WASHINGTON, D. C., *December* 8, 1884.

SIR: Having acted as hospital steward on the "Lady Franklin Bay Expedition," and being now ordered by you to report on the hygiene and care of the sick during said expedition, I do so herewith as well as my limited knowledge will permit.

We left St. Johns, Newfoundland, on July 7, 1881, on the steam sealer *Proteus*, commanded by Capt. Richard Pike, with a crew of twenty men. Our officers and the sergeants of the Signal Corps were quartered in the cabin of the ship; also the captain, mate, first and second engineers. The third engineer and the ship's cook slept in a small addition to the galley, where Schneider, one of our number, took his quarters. The rest of the ship's crew and members of the expedition slept in the forecastle, the ship's crew single; the expeditionary members by twos.

Dr. Octave Pavy and Mr. Henry Clay joined the expedition at Ritenbenk, Greenland, and also took their quarters in the cabin, and in Upernivik we were joined by two Greenlanders hired in Proven as hunters and dog-drivers, who were quartered under the forecastle.

No other than sea-sickness was experienced on the voyage excepting on August 3, when Julius R. Frederick suffered from an attack of colic.

Our food on board the ship, though not dainty, was fairly good and substantial.

Cleanliness of body, clothing, and quarters, was enjoined from the beginning.

We arrived in Discovery Harbor, Lady Franklin Bay, latitude 81° 44′ north, on August 12, and the work of unloading the vessel commenced at once, both ship's crew and members of the expedition being divided into two parties which worked alternately four hours each. The erection of the house was commenced at once by the carpenters, the unloading of the building materials taking place first. By August 18 all our stores were landed and our baggage moved on shore, where we pitched tents for temporary abode.

Corporal Starr was relieved from duty and ordered back to Washington August 18, on account of his suffering from asthma. Private Ryan was seized with an epileptic fit on August 22, on account of which he also was ordered to return to Washington by the *Proteus*.

---

*Address omitted in original.—A. W. G.

By August 23 our house was so far finished that it permitted us shelter. Its dimensions were: Length, 65 feet [19.8m]; width, 21 feet [6.4m]; and was divided into two rooms, a kitchen and a small hallway. One room occupied by the officers as quarters was about 16 feet [about 5m] by about 21 feet [6.4m], and the other occupied as quarters by the men about 40 feet [12m] by about 21 feet [6.4m], the kitchen was about 14 feet [4m] by 8 feet [2.4m], and the hallway about 7 feet [about 2m] by 8 feet [2.4m]. In order to assure warmth, the house was built with double walls, the outer one being covered on inside and outside with tar paper. Between the walls was an empty space about fifteen inches [about 380mm] wide for the free circulation of air.

The officers, Sergeant Rice, and the two Eskimo slept single, while the rest slept two together. The bunks in the men's quarters were so-called double-deckers, two sleeping in the lower and two in the upper. The bedding consisted of straw sacks, blankets, and a buffalo robe for each bed.

During the winter, ice and snow walls were built around the house, and with constant fires the quarters were always kept in a comfortable temperature.

But little suitable clothing for that extreme climate had been procured in Greenland, and everybody had to be his own tailor, making clothes out of blankets, of which we fortunately had a good supply. Our foot-gear, especially, was extremely sparse, consisting of heavy cork-soled shoes—which did excellent service around the quarters, keeping the feet warm, if suitable stockings were worn, but which were too heavy for work away from the station—a small number of Indian moccasins, and a few Greenland Eskimo boots. We had besides a number of seal-skin boots, made by the Eskimo on the Labrador coast, but these were too small, and had all to be altered before they were worn. In order to supply this want of foot-gear, shoes were improvised out of heavy canvas and were worn by sledging parties in the spring of 1882; whereas in the spring of 1883 heavy German stockings were soled with heavy seal-skin and they rendered very efficacious services.

Our food was varied and of the best, including in the canned supplies all the principal fruits and vegetables, which kept in excellent condition to the last, and not enough can be said of them in praise.

During our two years' sojourn at Fort Conger 103 musk-oxen and quite a quantity of smaller game, such as ducks, geese, hares, &c., were killed, the fresh meat of which, in conjunction with the varied kinds of canned vegetables and fruits, was at all times conducive to preserve the health of the party, as was the case at our station during the entire two years.

During the spring and summer months the party passed most of their time out of doors, those not exploring doing light work around the house, hunting and botanizing; while for the winter months an order was issued that everybody had to take at least one hour of outdoor exercise daily, and no man was allowed to occupy his bed between the hours of breakfast and dinner, excepting the observers on night duty, this order being adhered to during both winters.

Baths were used freely, at least one a week being required.

Our amusements were varied. We had an excellent library, and the greater part of our spare time was passed in reading. Games of cards, chess, checkers, dominoes, &c., were indulged in. In November, 1881, a small bi-monthly newspaper, the "Arctic Moon," was started, but the interest in it lessened considerably after a few months' existence, and its issue was discontinued. A few private theatricals were also indulged in, but, as the talent among us for such entertainments was very limited, interest in these was soon lost. Lieutenants Greely and Lockwood, Dr. Pavy, and Sergeant Israel delivered interesting lectures. Lieutenant Greely especially persisted in his efforts to entertain and amuse his party during the long arctic nights, when, perchance, one or more would show signs of depressed spirits.

A ration of one-half gill of rum was issued to each man every Sunday evening, and an extra allowance for holidays and the birthday of each individual. Only little liquor was carried on exploring trips, but that did excellent service; when coming into camp cold, tired, and worn out, a little liquor would at once revive the spirits and give activity to mind and body and thus enable us to change our foot-gear, a precaution strictly adhered to, and to retire into the sleeping-bag.

Beginning with August 22, 1881, a daily issue of lime-juice of 1 ounce for each person was made, which issue was kept up till our abandoning the station on August 9, 1883.

The spirits of the party during the dark winter months were sometimes a little depressed, but never very low. Loss of appetite and a general feeling of lassitude were quite common complaints, always successfully treated with tincture of iron, taken after each meal, and an extra diet of raw meat. In some few instances extra allowances of cranberry sauce were also given.

Some of the party suffered extremely from snow-blindness while on sledging trips; a solution of sulphate of morphia, 2 grains to 1 ounce of water, did very efficacious service in such cases.

The general health of the party was very good, and I do not know of a single case of cold having occurred. There were two or three very light attacks of tonsilitis. Bender very often complained of pains in left side and chest, always accompanied by a light cough, and in a couple of instances he even spit blood and was very feverish.

Two cases of simple fracture occurred. On November 30, 1881, Gardiner broke his left leg while going to the tide-gauge for an observation, and on December 13, 1881, Rice fractured his left shoulder by falling against a projecting piece of hummocky ice while searching for Jens Edwards, the Esquimo, who had in his depression of spirits taken it into his head to desert and had wandered away into the dark, dreary arctic night to seek his death. Both cases were bandaged by Dr. Pavy and recovered rapidly.

Frost-bites occurred frequently, but were mostly very slight ones. The nose being the organ most exposed suffered most frequently, the fingers and feet next, but none need special mentioning except the few cases enumerated hereafter. On November 8, 1881, I froze my right foot while crossing St. Patrick Bay, returning from Cape Beechey; the tide overran the ice-foot and our feet got wet. The great toe especially was much injured, but got well without needing amputation, which was feared at first. Sergeant Brainard, Corporal Salor, and Private Connell also froze their feet slightly on the same trip. On March 28, 1882, Ellis returned from Cape Beechey with both feet frost-bitten, but recovered soon. On April 8, 1882, Connell froze his right foot in the sleeping-bag, while on northern journey, and had to return in consequence to the station.

Whisler came near freezing on December 13, 1881; he had gone out after the runaway Eskimo, with insufficient clothing, and got so chilled that he partly lost his consciousness. Rice had a hard time to bring him back to the station, where he arrived stiff and unable to move, but was around again in a few hours, uninjured.

Toothache was a common complaint, and several teeth had to be drawn from different members.

Rice, who had been to Lincoln Bay with Dr. Pavy, carrying packs, was suffering from inflammatory rheumatism and was unable to return to the station. He managed with difficulty to reach St. Patrick Bay, from whence the doctor came home to the station for aid on September 9, 1881. A party of five started first, but as they were unable to carry Rice up the steep hill which borders the southwest shore of St. Patrick Bay, more help was sent for, and then he was carried up the hill and there placed on a sledge and carefully removed to the station, where he recovered in a few days.

In July, 1883, I suffered greatly from rheumatism, and had to go to bed on the 20th and remain there for a few days. My right knee was very much swollen and I felt pain in all my limbs; I had been suffering somewhat since July, 1882. I recovered so much that I was able to walk with the aid of a stick by August 9, the date on which we started on the retreat; after that I steadily improved, but the rheumatism never entirely left me. Lieutenant Greely, Sergeant Linn, and Privates Connell and Henry, also suffered at different times from rheumatism.

Other complaints during our sojourn at Fort Conger were: September 16, 1881, Lieutenant Greely started for the United States Range, but had to return on account of pain in his injured knee. November 10, 1881, Sergeant Elison burned his face with gasoline while filling a lamp. January 6, 1882, Sergeant Elison had a boil on his neck. March 15, 1882, Schneider complained of pain in his knees while crossing the straits and had to return to Cape Beechey, where his knees and face were found to be swollen and his gums were red and spongy; but he got well when we reached Fort Conger, a few days after. April 10, 1882, I was struck in the right side with a tent pole, while trying to pitch a tent in Newman Bay, and suffered much pain. I suffered from retention of urine during the night, on account of which I was ordered back to Fort Conger. On my way back I suffered from incontinence of urine. Whisler at the same time complained of pains in his chest and had also to return to the station. On July 1, 1882, while in the interior of Grinnell Land with Lieutenant Greely, I suffered from a bilious headache and vomiting and had to return to the station. July 19, 1882, Lieutenant Greely was sick in the stomach. March 8, 1883, Linn complained of rheumatism and general weariness. March 15, 1883, Sergeant Elison returned from Wrangel Bay on account of sickness in stomach. May 3, 1883, Schneider sprained his right foot slightly.

We abandoned our station at Fort Conger on August 9, 1883. We had a steam-launch and three small boats besides a little dingey. We carried about sixty days' provisions and our sleeping gear—the latter consisting of four single dog-skin, and the remainder of three-men buffalo-robe sleeping-bags. The

officers were allowed sixteen pounds each and the men eight pounds each of extra clothing. During the retreat we spread our sleeping-bags over the oars laid lengthwise in the boats, excepting a few times when we slept on shore and on the ice. On August 26 we were beset in the ice, and on September 10 we abandoned the steam-launch and one of the boats; the dingey had been cut up and used for fuel during the retreat. On September 12 we abandoned another boat and tried to reach Cape Sabine over the ice, carrying one boat on the sledge, but the next night a heavy wind from the southwest broke up the ice and we drifted into the straits on the piece of ice on which we were encamped. We made several hard attempts to reach land but were unsuccessful, till we fortunately drifted into Baird Inlet on September 27, against a high southwest gale, and we succeeded in making land on September 29, on north side of Baird Inlet.

During our drift in Smith Sound a good many of us suffered from diarrhea, probably caused by exposure and eating fatty substances, as seal blubber, and from the use of salt water in cooking.

Sergeant Cross froze his left foot while camping on the floe, and Gardiner suffered with a felon on the first finger of the left hand. Both cases remained sore till the death of the respective patients in January and June, respectively.

At the time we abandoned the launch we made a shelter out of the sails, in the fashion of an Indian "tepee," using the oars as poles, and as soon as we landed we commenced at once the building of stone huts for winter quarters. Rice and Jens went to Cape Sabine to see what supplies had been left at that place for us. They returned on the 9th day of October with the good news that there was a cache of 240 rations left by Mr. Beebe in 1882, and another cache of 240 rations left by Sir George Nares in 1875, besides about 500 rations of bread and a small quantity of canned mutton, lard, vegetables, raisins, rice, and about sixty pounds of tea left by Lieutenant Garlington and party after the sinking of the *Proteus* in July, 1883. We had at this time about ten days' rations left, and there was no possible chance of crossing over to Littleton Island, as young ice was already forming in some places along the shore, and the ice in the middle of the channel was running so fast that it dispelled all thoughts of crossing through it. We had besides only one boat, which was insufficient to hold the whole party in unquiet waters. Our rations had been reduced for some time, and this with the exposure and hard labor had reduced our strength considerably.

Rice and the Eskimo, Christiansen, made also a trip to Cape Isabella, but found there only 144 pounds of beef left by Sir George Nares, in 1875.

As it was easier to move our few rations and our sleeping gear and the records of the expedition to Cape Sabine than to bring the articles from there to our camp, we abandoned our partly completed huts on October 12 and reached the little cove where the cache from the wrecked *Proteus* was, about midway between Cape Sabine and Cocked Hat Island, on October 15. We commenced at once the building of a hut for winter quarters, occupying at first a shelter built of snow blocks and covered with canvas. The hut was built with a wall of rocks 4 feet high [1.2^{m}] and covered with the boat laid lengthwise over in the center, and canvas stretched over them. Around the wall of rocks we built another one of snow blocks, leaving a space between the two of several feet, which was filled up with loose snow. Later the fall and drift of snow covered the whole hut and so excluded all draft. For a door we used a piece of tarpaulin stretched over a wooden frame. From the door we built a long passage of snow blocks, in front of which we stretched a piece of sail. A hole was cut through the top of the boat and a small chimney improvised out of empty tin cans; but this was kept closed except during the hours of cooking. The hut was 25 feet [7.6^{m}] long and 18 feet [5.5^{m}] wide. We slept with our heads to the walls, and in the middle was a passage also used for cooking, &c.

By November 1 all the stores from the different caches had been brought to our camp, and as there was no further manual labor of any moment to be performed, our rations were reduced to four ounces of meat, six ounces of bread, and a small quantity of vegetables and butter. These rations remained the same, with very little change, till the first of March. It was so managed that we had at least a little the better meal Sundays. On Thanksgiving and Christmas days we had the little rice that was found in the cache of the wreck boiled, together with some raisins and a little milk and lard, as an extra meal. After March 1 our rations were still further decreased, the vegetables, butter, &c., having been used up before that date. On April the 11th a small bear, and on the 13th a seal, was killed, which gave a little increase for a few days. Later, when all our supplies were exhausted and no game came in, we were forced to eat our seal-skin lashings, boots and clothing, and coverings from sleeping-bags. The lashings and tanned leather were eaten boiled, while the hairy clothing was roasted over the coals. Shrimps, or rather sea-lice, were

caught in little nets and helped greatly to feed us. Sea-kelp and a little saxifrage formed also articles of food. During the latter part of May, and during June, we gathered rock lichens (*tripe de roche*) and ate them, mostly boiled, but some were eaten raw. They were to our palates good tasting, but caused in the beginning a little diarrhea. The small allowance of food and the insufficient protection against the cold and dampness told at once on the party. Their spirits were remarkably good, considering the circumstances, and only in a very few cases became dejected and sad. But notwithstanding their good nature some one or the other would at times become irritable and unreasonable, but generally be penitent shortly after.

Sergeant Cross died January 18, 1883, at 1.45 p. m., from scurvy and dropsical effusion of the heart. He had been complaining some time previous, but his case took a more serious turn only a few days before his death. The death of Cross had a somewhat depressing influence on some of the party, as Lieutenant Lockwood, Sergeants Linn and Jewell, and Private Ellis, all of whom showed slight signs of scurvy, and daily needed the help of Dr. Pavy and the rest of us to keep them up. The weakness of body showed itself also in mind, some of the party being at times very petulant and childish.

On March 24, while cooking some tea over an alcohol lamp, we omitted to draw out the plug that filled up the chimney through the boat, the only place for ventilation in our hut, and the impurity of the air caused by unburned carbon, produced asphyxia in some of us; others felt extremely unwell, but only partly lost their consciousness. As soon as this state of affairs was noticed, the plug was drawn out and a rush was made for the door to get fresh air and some fainting outside came near freezing. Israel and myself fainted first, and only for the help of those that kept their consciousness, who helped to bring in those out of the cold and revived those inside, a number would undoubtedly have perished. Dr. Pavy, fortunately, was one of those that kept the power of their senses and materially aided the sick. Lieutenant Greely while fainting oustide froze his hands quite severely. It was during these terrible hours that Private Henry was first seen stealing the rations, for the repetition of which crime later he was executed.

The Eskimo, Christiansen, died at 9 a. m. on April 5, from exhaustion. He also showed signs of scurvy. Lieutenant Lockwood and Sergeants Jewell and Linn were very weak at this time.

Sergeant Linn died on April 6, about 7 p. m.; and Lieutenant Lockwood April 9, at 4.20 p. m.; both from exhaustion caused by insufficient nutriment. Rice died on April 9, about 7.40 p. m., in Baird Inlet, where he had gone in company with Julius R. Frederick to recover the English meat abandoned there in the fall previous; Jewell died April 12; Ellis died May 19; Ralston, May 23; Whisler, May 24; Israel, May 27, about 3 p. m.; Lieutenant Kislingbury, June 1; Bender on June 6, at 5.45 p. m.; Dr. Pavy, June 6, at 6 p. m.; all from weakness caused by insufficiency of food.

Private Henry was shot by order of Lieutenant Greely for persistently stealing food.

Sergeant Gardiner died June 12, at 5 p. m., from weakness; his death was hastened by inflammation of the bowels. Schneider died June 18; he showed strong signs of scurvy.

Eskimo Jens was drowned while out hunting on April 30, 1884.

The date of death of Corporal Nicholas Salor,* who also died of weakness caused by insufficient nourment, is not recorded in my diary.

Sergeant Elison died on July 8, at 3 a. m., on the U. S. Steamship *Bear*, in Disco Harbor, Godhavn, Greenland. Sergeant Elison started early in November, 1883, in company with Sergeants Rice and Linn and Private Frederick, for Cape Isabella to bring the 144 pounds of meat left there by Sir George Nares in 1875. On this trip he froze his feet and hands, and was brought into camp about November 11 in a very bad condition. His feet were frozen up above the ankle, and both hands and his nose were also frozen. There was at first little hope of his recovery, but with assiduous care and by giving him from our allowances, pitiful as they were, extra food, his vigorous nature improved remarkably, considering the poor quarters we could, with the best will, give him. The hut dark, cold, damp, and poorly ventilated, was but a pitiful hospital. Were a drop of water spilled on the blankets, it would freeze at once, making a not very inviting sick-bed; besides, this patient suffered during the first few months after his mishap considerably from incontinence of urine. The extract of beef taken with us in the medical stores, besides a few cans of condensed milk, were set aside for his sole use; besides, the commanding officer in consultation with Dr. Pavy would fix, from time to time, the extra amount of food to be given him; this varied according to the state of the patient and the amount and kind of provision on hand. As we could not attempt an amputation, owing to our poor facilities and the want of instruments, we had to allow the diseased parts to slough off, helping as much

*Salor died June 3, 1884.—A. W. G.

as possible with a pair of small scissors and a small scalpel. The wounds were dressed daily with vaseline at first, and later, when our limited supply of it was exhausted, with lard mixed with a little salicylic acid. As we had but a very limited amount of lint and bandages, I had to take the frozen underclothing out of the wreck cache, thaw them in the sleeping-bag and on my chest, and improvise dressing material out of the same. On June 22, the day of our rescue, Elison was yet lying helpless on his mattress; his feet had both sloughed off through the ankle joint and his fingers were dried up with the exception of one, which had been taken off.

Respectfully submitted.

HENRY BIEDERBICK,
Hospital Steward, U. S. A.

First Lieut. A. W. GREELY.
Fifth Cavalry, A. S. O. and Assistant,
Commanding Lady Franklin Bay Expedition.

T.

Lieutenant Greely's supplementary report on hygiene.

The monthly and annual reports of Acting Assistant Surgeon O. Pavy, the surgeon of the expedition, are appended in full (pages 324 to 334).

Five weeks were occupied by the surgeon in making the first annual report and ten days the second. These reports were required in order that the subject of health should be treated generally and fully, while there was ample time and the data at hand, and in order that in case of disaster our experiences might be on record for the benefit of others.

However meager are these reports they could not have been made more complete had the surgeon lived, except from memory, for his diary contains absolutely no medical notes or data apart from that contained in these monthly and annual communications.

Since the return of the expedition, Hospital Steward Henry Biederbick, a very faithful and devoted non-commissioned officer, has rendered a report covering his knowledge of the health condition of the party. It is given in full (pages 334 to 339).

To these reports I deem it necessary to add, in consequence of repeated inquiries from medical men and others, a record of such hygienic precautions and preventives as fell within my own action and province. In so doing few if any references can be made to strictly medical matters, as I am not competent to pass judgment thereon.

It should be borne in mind that Dr. Pavy was in Greenland when the expedition was fitted out. In consequence it became necessary for me to arrange the quarters, clothing, medical stores, provisions, and general outfit. For the manner in which the expedition was fed, clothed, housed, and lived generally at Fort Conger, be it good or bad, I am alone responsible.

The limited appropriation, the very few days allowed for estimates, and the brief time elapsing between the order for the expedition and the date of its sailing, interfered with the completeness of the outfit, but fortunately, as it proved, to no injurious extent.

In regard to the medical supplies, the commanding officer being entirely ignorant of what was needed, the quantity, quality, and character of them was left to the Medical Department, United States Army, which acted with liberality, if not indeed with judgment.

Dr. Pavy, however, made an official statement that the selection was discreditable to the Medical Department, and that even the simplest and most indispensable drugs were wanting. He repeated this statement in a more guarded form in his report dated October 6, 1882, saying that his stock of medicines was "very incomplete and even *absolutely deficient* in *essential* drugs."

He was requested to mention such deficient drugs as were actually needed in practice any month. Cod liver oil and digitalis were the only medicines ever specially mentioned as needed.*

*To meet the want of cod liver oil the entire stock of olive oil was placed at the surgeon's disposal, and a small part of it was used medicinally.

These deficiencies, at all events, proved practically immaterial, as the expedition enjoyed such health that every man but one (who is yet living) was for full duty on leaving Fort Conger, August 9, 1883.

The clothing for the expedition was largely of the kind issued to the Army by the Quartermaster's Department, which was supplemented by purchases of thick underclothing at St. John's, Newfoundland. The foot-gear proved insufficient in quantity. Sergeant Rice was sent into Canada for an expected supply of moccasins which I had written for, but failed to obtain. Later all possible skin boots and clothing—no large amount, however—were purchased in Greenland, but a large quantity could not be obtained without a much longer stay than it was possible to make.

When foot-gear for field work became scarce, Sergeant Frederick succeeded in making from *oosook* skins, that I had purchased in Greenland, skin boots which answered the purpose admirably.

No person, however, suffered from lack of clothing at Fort Conger or during any of the various sledging expeditions, a conclusive proof that skin garments and Eskimo clothing are not essential to safety, if indeed to comfort, in Arctic travel.

The comparative value of woolen and skin garments was acknowledged to be a mooted question, but far the greater number of the expedition found woolen garments the best for general use, as skin garments, easily wet by perspiration, were dried only with difficulty by the heat of the body at a great draught on the vital energies, and with great discomfort.

The quarters provided for occupancy consisted of a wooden building, which was originally planned to be 68 feet [20.7^{m}] by 18 feet [5.5^{m}] in the clear, but the loss of a portion of the lumber, which carried as a deck load was more or less broken, compelled the shortening of the building about 3 feet [.9^{m}]. The lost space was taken from the officers' room, which, in the north or coldest end of the building, was about 18 feet [5.5^{m}] square. The men occupied at the southern end of the building a space about 40 feet [12^{m}] by 18 feet [5.5^{m}] in the clear, leaving a kitchen 9 feet [2.7^{m}] by 12 feet [3.7^{m}], and an entry into which opened four doors from kitchen, officers' room, men's quarters, and the outer door (facing west).

On the north and south ends of the building were additions or *lean-tos*, 20 feet [6^{m}] by 10 feet [3^{m}] in size, which communicated by a door, in the center of the north and south ends, with the quarters of officers and men, respectively, and also had doors opening outwards.

To suit the peculiar climate the building was double, with an air space of 14 inches [356^{mm}] between the inner and outer walls. The outer walls and roof were simply rough inch boards laid as closely together as possible, and covered with thick tarred paper which was secured by battens nailed over the joints. (The black tarred paper absorbed much heat during the presence of the sun, and contributed not inconsiderably to comfortable inside temperatures during several months.) Thinner tarred paper was tacked against the inside studding, before the inside wall of tongued and grooved boards was put on. The lumber being slightly damp when used shrunk some the second year, when the cracks were papered over.

The floor and ceiling, of single inch boards, were also tongued and grooved, so that they were almost air-tight the first winter, but were more open the second.

The rooms had a studding of 8 feet [2.4^{m}], and trap-door ventilators opened into the garret, which, formed by the pointed roofs and containing over half as much space as the lower story, afforded excellent opportunity for storing such articles as would deteriorate too much from exposure to extreme cold.

In winter the outer doors of the *lean-tos* were closed, the whole house banked almost to the roof (entirely so the second year) with snow and ice, while all entrance and exit was through the west door. Over the western entrance was also erected the second winter a large *lean-to* covered with canvas, in which was stored a supply of fuel each week.

In winter the doors and windows were double with ample air spaces between, and close shutters were also affixed outside the latter.

Eighteen of the men occupied double-tier bunks, two men sleeping in each bunk, excepting the Eskimo, who had single bunks, while the astronomer, photographer, and a meteorological observer had their quarters in a corner of the men's room, where chronometers, chronograph, barometer, and other scientific instruments were in position. Generally the bunks were movable.

The men were amply provided with blankets, buffalo robes, buffalo overcoats, and slept on mattresses filled with straw or excelsior.

The four officers occupied the one room, which served both as dining and sleeping apartment.

The quarters were heated by three stoves (counting the cooking range), one in each apartment. The chimneys were made of double terra-cotta pipe, the smoke passing into a 6-inch [152^{mm}] joint which was built up inside a 12-inch [305^{mm}] one. This plan not only tended to guard against fire by lowering the temperature of the chimney adjacent to wood work, but also by leaving an air space, which had an aperture into the rooms, facilitated ventilation of the separate rooms to a considerable extent.

The stoves provided were not suited to burn Cape Breton coal, and they gave much trouble at times with gas and smoke, and never gave out heat commensurate with fuel consumed. As there was no money to purchase heating stoves these had to be taken. The cooking range, however, was an excellent one, fully provided with furniture and well adapted to our needs.

It goes without saying that an equable temperature could not be maintained throughout the entire room, such conditions being almost impracticable under most favorable circumstances in lower latitudes.

For nine months in the year water froze on the floor, and it is probable that the average temperature at one's head was not far from 80° (26.7° C.).

The readings of the attached thermometer of the barometer, 3 feet [$.9^{m}$] above the floor, show how remarkably equable for an arctic house the temperature was. The first ten days of February, 1882, the mean temperature of the outside air was −51.6° (−46.4° C.), while the mean temperature by the attached thermometer in the men's room was +50.1° (10.1° C.), a difference of 101.7° (56.5° C.). The mean inside temperature from 7 a. m. to 11 p. m. for that time was 52.4° [11.3° C.], and from 11 p. m. to 7 a. m., 45.2° [7.3° C.], the coldest night being 42.5° [5.8° C.]. The quarters were therefore fairly if not well heated, as well so as many military quarters in the northern part of the United States during winter months.

During April and May, 1883, it became necessary, on account of scarcity of fuel, to allow the fires to die down after 9 p. m., and for several weeks the mean temperature at night was at or slightly below the freezing point, and on one occasion a single temperature of 22° [−5.6° C.] was noted. These temperatures, although the men were amply supplied with blankets, buffalo sleeping-bags, &c., were considered by the surgeon injurious to the health of the men.

In the men's quarters and next the kitchen was built a bath-room, that was almost always of a comfortable temperature from two chimneys which were within its limits. The bath-room, except in summer, was used for ordinary ablutions, but was never used for washing clothes.

It is thus seen that the quarters, for arctic quarters, were unusually large, well ventilated, and afforded unequaled facilities for personal cleanliness.

The cubic air space per man was very high. On the main floor the space measured 9,360 cubic feet; the air spaces between walls, 1,592 cubic feet; and the attic room, 5,265 cubic feet, aggregating 16,217 cubic feet, or 649 cubic feet per man. The almost constant absence of an observer raised the average space to 675 cubic feet, which the reductions for the space occupied by the bodies of the men and the various articles in quarters could hardly have brought below 600 cubic feet per man.

The living-room, air spaces between walls, and the attic are included in this computation, as they were so arranged that all contributed to the air supply. Besides, two men for several months slept in the attic.

The *lean-tos*, which aggregated 3,000 cubic feet of space (4,500 cubic feet the second winter), have been neglected in this calculation, for, though they were thrown into communication with the living-rooms frequently between 6 a. m. and 11 p. m., yet from 11 p. m. to 6 a. m. such conditions existed but twice an hour, when the observer quitted and entered the main building.

The quarters consequently afforded 600 cubic feet of space to each man, which is the regulation space allowed in the barracks of the British army. The cubic space allowed for quarters to each seaman in the British mercantile service is 72 cubic feet, which really amounts to 144 cubic feet, as one-half the crew is constantly on watch.

A minimum of 857 cubic feet of air space per head, which has been assigned by one authority, has never been possible in an Arctic expedition. The cubic space on the living deck of Arctic ships, given in admiralty reports, shows that in H. M. S. *Resolute* there was 182 cubic feet per man; on H. M. S. *Discovery*, 216 feet; and H. M. S. *Alert*, 280 feet. This makes no allowance for the greater proportional space allowed officers nor for the air displaced by the men and their outfits. It appears that on the *Alert* and *Discovery* the space for each man, after all deductions, was under 200 cubic feet, or less than one-third the space had at Conger. In the Swedish Arctic Expedition, 1872–'73, the men on ship-board had only 80 cubic feet, and those on shore 154 cubic feet per man.

The dryness of the quarters was insured by the air spaces between the walls and by the attic, which served as a condenser. As events proved, the moisture in the warm air which ascended into the attic must have largely passed out between the floor and eaves, for not more than sixty to eighty gallons were precipitated during the first winter (and much less the second) in the shape of frost, which we easily removed before high temperature came. The quarters were so dry that, in the weekly inspection of bedding by me, frost was found only on two occasions, at the head of a bed occupied almost continuously by observers, and at the head of my own bunk, which was very much exposed. Frost occasionally formed in small quantities in extremely severe weather on the mop-boards, caused by the fact that turf had been filled in at the bottom of the air space while building.

The bath-room was always of a comfortable temperature, and, warm water being plentiful, there was no neglect in complying with my orders that each man must bathe weekly. On the contrary two baths weekly were not infrequent, and one officer bathed daily for many months.

The commodious, warm, dry quarters and excellent bathing accommodations doubtless exerted a beneficial influence on the general health. It seems to me advisable, on the score of health, that all future polar expeditions should take temporary quarters, to be erected on land.

The dietary list was made up by me after an examination of those of preceding expeditions, particularly of Nordenskiöld and Nares. It was modified somewhat by my personal opinion that, while the diet of a man serving in the arctic regions should be enlarged in the direction of fresh fatty substances, yet it should also include as far as possible such articles as the men have regularly eaten in lower latitudes.

In addition to the usual ship stores common to all expeditions, the following variety of other provisions was also included. The amounts given are weekly allowances.

Canned vegetables (tomatoes, potatoes, onions, asparagus, green corn, lima beans, carrots, turnips, squash, beets, okra, and green peas), 52 ounces. Enough dry vegetables were taken for soups to raise, in equivalent, the amount to 56 ounces. Canned fish and shellfish (salmon, oysters, clams, shrimps, crab meat, and lobsters), 2.8 ounces. Soup, 5.7 ounces. Fruits and berries in natural juice (apples, peaches, pears, pineapples, gooseberries, blueberries, quinces, cherries, and grapes), 15.7 ounces. Cranberries and rhubarb, 17.9 ounces. Preserves and fruit butters (damsons, ginger, tamarinds, marmalade, blackberries, peach, plum, quince, and pear butters), 44 ounces. Milk, 9 ounces. Butter, 14 ounces. Macaroni, 2.2 ounces. Cheese, 2.5 ounces. Dried fruits and nuts (dates, prunes, evaporated apples, cherries and peaches, figs, raisins, cocoanut, and brazil nuts), 7 ounces. Fresh lard, 3.5 ounces. Dried eggs, 2.1 ounces.

The pickles were of various kinds, including a large quantity of sauerkraut, and the cereals embraced tapioca, corn starch, oatmeal, corn meal, farina, cracked wheat, hominy, and flour.

The foregoing list shows that hardly any article of common use was absent from our dietary list, and so complete was the supply that the hospital stores were not drawn on for the occasional sick.

A proper criticism of the foregoing allowance is that the vegetables (tomatoes, onions, and potatoes) should have been increased at least five ounces weekly, while rhubarb, cranberry sauce, and berries could have been reduced to the same extent.

In 1881 I asked that enough vegetables be sent me in 1882 to raise the weekly allowance to 63 ounces.

My surgeon was pleased in 1881 to commend the list as being substantially perfect, and, in a written communication with the other officers, had no additions to make, even by the expected steamer of 1882, except a little canned poultry.

The return of three men in 1881, and the percentage of damaged provisions (for which a liberal allowance had been made) being very small, enabled me to increase to a considerable extent the allowance for the first year of vegetables and canned fruits, while the regulation allowance for the second year was carefully retained in case—as happened—no visiting steamer reached us with additional supplies in 1882.

The fixing of the bill of fare was a duty I deemed so important that I retained it in my own hands, except for perhaps two months, when absent in the field or otherwise pressingly engaged, when it was assigned to the surgeon or Lieutenant Lockwood.

The rule of no set routine was followed, and, except the cook and myself, no one knew what would be the dinner for any day. The cook was frequently changed, monthly as a rule, which gave variety to the methods in which the food was prepared. In fixing the bill of fare the cook was often consulted and asked to suggest new dishes in the making of which he might be skilled.

Officers and men ate the same food, and only rarely did any delicacy appear on our table which the men did not share. A considerable stock of delicacies had been selected originally by me for the officers' mess, but later I deemed it best to throw these supplies into the general mess.

In case of even slight ailments the surgeon was requested to recommend special diet for the men. Such recommendations were very rarely made, but in all cases were invariably authorized and enforced.

The food actually consumed per man daily, during the two years at Fort Conger, was as follows:

Articles.	Ounces.	Articles.	Ounces.
Fresh musk meat	16.0	Flour	5.5
Fresh birds and hares	0.8	Oatmeal and cornmeal	2.3
Canned meats, soups, &c	1.6	Hard bread	3.2
Canned fish	0.5	Macaroni	0.4
Pemmican	0.4	Farina, corn-starch, &c	0.3
Pork, bacon, and salt beef	2.6	Rice and hominy	1.5
Butter	2.3	Beans and pease	0.4
Lard	0.6	Total farinaceous	13.6
Ham	0.6		
Milk	1.6		
Condensed eggs	0.4		
Cheese	0.4	Canned apples	1.2
		Other canned fruits	1.5
Total meat, &c	27.8	Cranberry sauce and rhubarb	2.0
		Total fresh fruits	4.7
Canned vegetables	10.8		
Sugar (white)	3.5	Dried fruits	0.8
Sirup	1.8	Preserves (including fruit butters)	1.0
		Pickles	1.1
Total saccharine	5.3		

This aggregate of 64.3 ounces would doubtless be increased by coffee, chocolate, tea, spices, condiments, &c., to nearly 70 ounces per man. The waste was very small, far less than in any ordinary family, and this amount may reasonably be assumed as the quantity of food necessary for the maintenance of a man's health in a latitude where the mean annual temperature is $-4°$ ($-20°$ C.).*

Table linen and crockery of good quality were provided, and three courses at dinner were always served the men at the tables—soup, meat, with vegetables and desert. There was no exception to this in the two years. On four days a week the dessert was fruit or berries of some kind, and on four days a made one, both kinds being served on Sunday.

Breakfast was at 7 a. m., and dinner at 4 p. m. At 11 a. m. and 9 p. m. a lunch, consisting of unlimited coffee, tea, hard bread, and butter, was set out for such as desired.

The musk meat contributed in my opinion to the health of the party. Some 20,000 pounds were obtained, of which we probably lost two thousand by foxes and bear, and nearly a thousand pounds spoiled early in July, 1882. Nearly a thousand pounds of birds were brought from Greenland, and at least five hundred pounds more of fresh meat was obtained from seal (a few were eaten) and small game birds and hares. Unfortunately game was abundant at the season of the year when meat was least necessary, and the proportion eaten during the summer months was unduly great.

An attempt to equally distribute the meat throughout the last year failed through the loss by foxes of cached meat which was thought safe.

The following data from my diary show the musk meat eaten after September 1, 1882: September about 1,000 pounds; October, 1,122 pounds; November, 543 pounds; December, 755 pounds; January, 1883, 690 pounds; February, 630 pounds; March to May inclusive, 1,616 pounds; June, 831 pounds; July, 609 pounds. Total for eleven months, 7,696 pounds. In August, 1882, the amount could not have been far from 1,400 pounds, which, with birds, seals, &c., made the fresh meat of the last year aggregate at least 9,500 pounds.

*The convicts at hard labor in England have fifty-one ounces daily, including milk and molasses. The British expedition, 1875–'76, had a ration of forty-six ounces of solids.

Drinking and cooking water was obtained by melting ice from the paleocrystic floes in the harbor, except for two and a half months in summer, when the running brooks furnished a better supply. The water from the floes always contained a certain amount of salt, too great a quantity to allow of its use for photographic purposes, but care in selection of ice prevented the water from being brackish to the taste.

The absence of sunlight (at Conger four and a half months each year) had effect on the men according to temperament. In general there was largely increased irritability of temper, a disposition to sleep (or at times wakefulness) a decrease of appetite, somewhat impaired digestion, lack of energy, apparently decrease in talk, and depression of spirits. Officers and men were alike affected.

The skin assumed gradually a deathly pallor, a waxy yellowish appearance not unlike that of a corpse, which disappeared rapidly after the return of the sun.

The ailments at Conger have been enumerated by the surgeon, but it was always a source of surprise to me that colds were never contracted. Coughs and some bronchial troubles occurred through the emanation of coal gas the first winter, but I recall no genuine influenza from draughts or exposure. This is the more remarkable as the men frequently rushed out of doors, bareheaded and in slippers, when the outer temperature was $-50°$ ($-45.6°$ C.) or lower. The fact has elsewhere been pointed out that the temperature of the air around the head was quite regularly 50° (28° C.) higher than at the feet.

[During the boat journey conditions favoring colds were even more marked. Excessive exertions caused perspiration freely, while clothing and feet were constantly wet from work in ice and water. For days the clothing of the men was never dry, and the sleeping-bags were in like damp condition. On one occasion Sergeant Rice, breaking through rubble-ice, changed his dripping garments on the floe in a brisk wind without apparently suffering from the exposure. Rheumatic pains which had troubled many at Conger disappeared and did not return save in special cases at Camp Clay.]

Hunting and walking were always encouraged at Fort Conger, and every attempt was made to promote indoor amusements, so as to fill up the long night of four and a half months.

Bagatelle, chess, cards, rifle-matches, &c., reading, lectures, and the editing of a paper were resorted to. No indulgence requested or suggested by either officers or men was ever refused. Every possible plan was followed to induce cheerfulness, confidence, and harmony, conditions in arctic service which are not only essential to health but to success.

Discipline was relaxed as far as was possible, never being of a severe stamp, and the general character of the men was such that I had rarely reason to regret such a course.

The men were required to keep regular hours and were obliged to go to bed at 11 p. m., unless their duties fell in night hours. In the second winter, except night observers, no man was allowed to occupy his bed between 8 a. m. and 3.30 p. m. This restriction appeared necessary to promote sleep in regular hours, for strange as it may appear there was the same disinclination to go to bed or to rise regularly in the long arctic night or full polar day as is sometimes noticed in lower latitudes.

An ounce of lime-juice was issued daily to each man, which was omitted whenever cider was drank. The lime-juice was discontinued for a few days on occasions when the surgeon recommended it. Only one or two members of the party ever attempted to evade taking this valuable antiscorbutic.

Exercise was never enforced for itself, but whenever a man was found too much inclined to avoid it, he was given such duty as required exertion in the open air. As a rule it was urged that one hour a day should be spent in exercise or outdoor work. The men were generally fond of hunting, walking, &c., and but little trouble was found on that score.

No ration of spirits was ever issued as such. Generally a quart and a half of New England rum was divided between the party on Sunday evening. As two or three rarely drank rum, it gave a little over a half gill to each man. The birthday of each man was duly celebrated by a dinner which he selected, and by a present of a quart of rum. Holidays were similarly marked. A small personal stock of wine (port, catawba, and sauterne) was distributed by me about equally to the officers and men on special occasions.

About one gill of rum weekly and one-third as much wine is the average amount of spirits drank by each man during the two years at Conger. I cannot now recall a case where spirits were ever prescribed, although possibly there were a few instances.

For sledge parties the following daily ration was fixed:

Articles.	1882.	1883.	Nares, 1875–'76.	Articles.	1882.	1883.	Nares, 1875–'76.
		Ounces.	*Ounces.*			*Ounces.*	*Ounces.*
Meat		22	20	Stearine fuel			3
Butter		2		Tobacco			$\frac{1}{2}$
Bread		10	14	Salt		$\frac{1}{4}$	$\frac{1}{4}$
Milk		$\frac{1}{2}$		Pepper		$\frac{1}{20}$	$\frac{1}{20}$
Sugar		2	2	Onion powder			$\frac{1}{8}$
Tea		1	$\frac{1}{2}$	Curry paste			$\frac{1}{8}$
Chocolate			1	Lime-juice		$\frac{1}{2}$	
Potatoes		*4	2				
Rum			2			$48\frac{7}{20}$	$47\frac{1}{20}$
Alcohol fuel		6	2				

*Or beans.

NOTE.—I recommend as a suitable field ration for an American expedition the following: Pemmican, 11 ounces; boiled bacon, $3\frac{1}{7}$ ounces; fresh meat, $6\frac{2}{7}$ ounces; sausage, $1\frac{1}{7}$ ounces; total meat, 22 ounces. Butter, 2 ounces; bread, 10 ounces; milk, 1 ounce; sugar, $1\frac{1}{2}$ ounces; tea, compressed, 1 ounce; potatoes, evaporated, 4 ounces; salt, $\frac{1}{4}$ ounce; pepper, $\frac{1}{20}$ ounce; curry paste, $\frac{1}{10}$ ounce; total food, $41\frac{9}{10}$ ounces. Lime-juice, $\frac{1}{2}$ ounce; alcohol fuel, 6 ounces; total ration, $48\frac{4}{10}$ ounces. Beef tea and coffee or chocolate might each well replace tea one meal a week, and a ration of $\frac{1}{10}$ ounce of evaporated apples or peaches might be beneficially added.

Lime-juice pemmican was most distasteful, and like all objectionable food is exceedingly dangerous in the field. Chocolate, when drank in the morning, induced thirst in many cases. Tea is by all means the arctic drink, and in our experience stimulated the most with the least apparent reaction.

On leaving Fort Conger August 9, 1883, the entire party was in health except Hospital Steward Henry Biederbick, who was suffering from inflammatory rheumatism, and Private (now Sergeant) Francis Long, who complained of chest pains, but still performed duty. It is notable that these two men, whom the surgeon and I thought would possibly be unable to do any hard work during the retreat, not only did all that fell to them, but are now living, despite the fact that Long, a natural and remarkable hunter, never spared himself in the pursuit of game up to the storm before the rescue, and Biederbick was equally prodigal of his strength and energies in caring for the sick and helpless. Although some of the party suffered from diarrhea during the drift in Kane Sea, yet every man was for active duty on landing at Eskimo Point, September 29, 1883, except Sergeant Cross, who had frozen a foot slightly, and, though able to do other duty, could not work in the drag-ropes for a few days.

The excessive hardships, unremitting work and short rations from the beginning of September told, however, on the health and strength of the men by the time we formally went into winter quarters near Cape Sabine the last of October, 1883.

The building of temporary quarters at Eskimo Point, an apparent necessity at the time, was not only a task which taxed to the utmost the physical strength of the party, but it also wore out hand and foot gear and bruised badly hands, &c., which did not heal with facility. Fully half the party froze slightly their feet during the march from Eskimo Point to Camp Clay, owing to more or less tidal overflow and the salty efflorescence which, melting readily even at low temperatures, saturated the foot-gear.

Our quarters for winter at Camp Clay were a stone hut covered with canvas and a whale-boat. Snow blocks were laid on the roof and piled around the hut, and as winter advanced the whole structure was gradually and completely buried by the drifting snow.

The entire supply of loose rocks was exhausted in erecting the walls to a height of 4 feet [1.2^{m}] at sides and ends. The hut was 25 feet [7.6^{m}] by 18 feet [5.5^{m}] in the clear, and in the center under the boat was a little over 7 feet [2.1^{m}] high.

The floor was coarse gravel, on which was spread canvas to protect the sleeping-bags from the ground. It was of little avail, for within a few days the bags, canvas, and sand were frozen solidly together. Snow brought in on the person and condensing moisture from cooking speedily rendered the inside of the bags more or less damp, and whenever quitted by the occupants the inside of the bags froze as solidly as the lower portions.

In the seven months during which this wretched hut was occupied the temperature when we were lying never reached the freezing point of water, and rarely did the thermometer of the barometer, two feet [.6m from the cooking stove and two feet [.6m] above the ground, show such a temperature.

The cubic space per man was 94½ feet, which was probably reduced to 80 feet by the bodies of the men, sleeping-bags, &c., nearly half the cubic space per man on the *Alert* and *Discovery*, and equal to or greater than that of the sailors of the Swedish Arctic expedition of 1872–73. A tin can in the roof served as a chimney for smoke and as a ventilator at other times. The high winds which prevailed the greater part of the winter served to change the air rapidly (too rapidly we often thought) through the ventilator, and the crevices between the boat and the canvas roof, so that the party suffered little if any for air. The condition of the air was far the worst during the cooking of the two meals. At such times the dense smoke and the vapor from the cooking food rendered it impossible to see even the light a few feet distant. The air was so bad then that but few could remain upright in their bags. To remedy this as far as possible the door was opened, which, as the air ranged from −10° (−23.3° C.) to −40° (−40° C.), chilled every one. It was surprising that the cooks were ever able to prepare the hot drink and food, and it was nothing unusual for them to be thoroughly exhausted from cold, smoke, and work. It is yet more surprising that the two men (Frederick and Long) who suffered most from these unfavorable conditions are yet living.

During the winter no more exertion or exercise was taken than was necessary to perform indispensable work, that being one point on which my surgeon and I were agreed. In certain cases the medical officer professionally advised exercise, which was enforced as far as possible. The results of physical exertion or of abstention therefrom are in doubt. Connell, Gardiner (who died only ten days before the rescue), Henry, Elison, and I did substantially no physical work. Brainard, Biederbick, Frederick, Rice (who died of overwork and exhaustion), and Long did collectively seven-eighths of all the physical work.

The minor office of nature was performed in the hut, a tub being provided for that purpose, which was much frequented, as the cold appeared to weaken the kidneys greatly, and in several incontinence of urine occurred at times.

The more important function gave great trouble owing to exhaustion arising from physical efforts to assist the torpid bowels and also from the exposure to the weather. Some performed two or three times each week, but the average movement was weekly, and in several instances there was no office from fourteen to seventeen days.

The ration during October ranged from twenty to thirty ounces of solids each day, but on November 1 it was necessary to make a very material reduction to insure any chance for life.

The ration from November 1, 1883, to March 1, 1884, was fixed as follows:

Article.	Ounces.	Article.	Ounces.
Meat	4.0	Dog-biscuit	0.8
Extract of beef	0.26	Butter	0.5
Evaporated potatoes	0.4	Lard	0.26
Canned soup	0.6	Rice	0.1
Tomatoes	0.3	Raisins	0.16
Canned peas	0.2	Condensed milk	0.2
Canned corn	0.2	Pickled onions	0.4
Canned carrots	0.1		
Bread	6.0	Total solids	14.48

For beverages was allowed each man daily extract of coffee, 0.44 ounce; extract of chocolate, 0.3 ounce; tea, 0.3 ounce.

There were issued weekly as antiscorbutics and luxuries: Mulberries, 0.2 ounce; rum, 1 ounce; lime-juice, 0.3 ounce, and one-quarter of a lemon. The very small amount of pepper, salt, onion powder, and sugar were reserved for special occasions, but eventually a considerable part of them were set aside for Elison's exclusive use.

The above ration assumed that the canned goods were full weight. It was evident that this was not true of the extract of beef nor of any vegetable. The dog-biscuit was all moldy and unfit for food. It is a liberal allowance to estimate its nutritive value at half of what it was originally. About one-eighth the bread was somewhat moldy and another eighth had been wet and frozen, for which increased weight no allowance was made in issues. Some of the potatoes and chocolate were moldy and part of the bacon

rusty. The lard was not issued during the winter, being set aside for Elison's benefit, as were several cans of milk, soup, and a quantity of butter. Ten pounds of milk and eight ounces of chocolate were stolen. In issuing seal and fox meat no allowance was made for bones.

Sergeant Brainard, the issuing clerk, made it a rule in his week's issues to retain in favor of the general stores any fraction of ounces, and that his improvised scales, as was surmised, gave scant weight, was shown by small surpluses on March 1. It also became necessary to provide for an extra day, the 29th of February, as it escaped my notice in making calculations that 1884 was a leap year. On the other hand, about seventy pounds of fox-meat were added to our supplies, and two fresh seal-skins were boiled and used in soups. Seal blubber, to a certain amount, was issued extra.

The following table, in which allowances have been made for damaged food, &c., gives more correctly the daily ration on which the party (which had been already on a half-ration or less for over a month) subsisted for one hundred and twenty-one days:

Articles.	Ounces.	Articles.	Ounces.
SOLIDS.		BEVERAGES.	
Meat	4.1	Extract of coffee	0.40
Extract of beef	0.2	Extract of chocolate	0.25
Evaporated potatoes	0.3	Tea	0.25
Canned soup	0.5	Rum	0.14
Canned tomatoes	0.25		
Canned peas	0.15	MEDICINAL.	
Canned corn	0.15		
Canned carrots	0.08	Cloudberries	0.03
Pickled onions	0.4	Lime-juice	0.04
Bread	5.5		
Dog-biscuit	0.4		
Butter	0.45		
Condensed milk	0.15		
Rice	0.10		
Raisins	0.15		
Total	12.88		

If this amount of solid food could have been issued daily after March 1, 1884, I doubt that any man would have died from lack of food. A reduction of one-third was, however, necessary after March 1, and the diet was restricted entirely to meat, bread, and tea, averaging probably ten ounces in all, on which diet no deaths occurred for five weeks longer.

Care has been taken to make this statement of our ration as accurate as possible, on the assumption that the medical fraternity would concur in the opinion of my surgeon, that no man could live four months on such a diet. That the party, with one exception, lived far beyond March 1, the time originally fixed as the limit of probability, seems a striking illustration of the endurance and possibilities of selected men.

After the middle of March the bread ration was gradually reduced to two ounces, and about the same time the party commenced eating shrimps, or sea lice, which were caught with great difficulty.

In April the tips of the purple saxifrage (*Saxifraga oppositifolia*) commenced to show green, and many ate of it in quantities, and several times a considerable amount of it was stewed for the party. Opinions differed as to its affording any real nutrition, but in my own case it afforded a feeling of fullness which at least alleviated the gnawings of hunger to some extent.

The effects of hunger were continuous, and at no time in nearly ten months was I personally free from an intense desire to eat. It was, however, the greatest when food had just been taken, and greater when we ate fifteen ounces a day than when we had ten.

The favorite diversion to distract us from our ills was the elaboration of fanciful bills of fare. It was noticeable that talk of food waxed and waned according to the ration issued, there being the least talk when the food supply was at its minimum.

The killing of a bear, in April, and of occasional birds, at intervals, afforded opportunities of increasing and varying the diet. Later in the season a quantity of reindeer moss (*Cladonia rangiferina*) was found from time to time, and the buds and flowers of saxifrage were eaten.

There was quite a plentiful growth of lichens on the rocks, which a number of men ate as early as April, but the surgeon discouraged the use of them on the ground that the experiences of Franklin, Richardson, Hayes, and others proved the danger of diarrhea resulting from the use of them. Any disease, in our enfeebled condition, he thought would be fatal. Early in June, however, the remnant of the party gathered all that they could of these lichens, which were, or appeared to be, very nutritious. When stewed they had a slightly sweetish taste and gave out a gelatinous matter which made the water resemble thin mucilage.

Besides shrimps, sea-weed, saxifrage, reindeer moss and such lichens, resort was had to seal-skin, first the skin without hair on, which was boiled, later the skin with hair on, which was roasted, and lastly to oil-tanned seal-skin. The last remnant of our regular supplies was issued May 12, six weeks before our rescue.

When regular food failed and the party had recourse to sea shrimps, sea-weed, etc., the change of diet caused relaxation in some, with attacks of diarrhea, while in others the constipation was excessive. In my own case inflammation of the bowels was threatened, and Gardiner's death was hastened by that cause. Over exertion and exposure induced in some cases marked deposits of albumen in the urine.

During the winter a small quantity of lime-juice was issued once a week, and iron was given occasionally as the surgeon saw proper.

The cases of frost-bite during the autumn, not at all serious under other circumstances, did not heal readily. Frost-bites were not infrequent in the hut, and in more than one case the frozen limb never healed.

Steward Biederbick has well said: "The weakness of body showed itself also in mind, some of the party being at times very petulant and childish." Two officers and four men displayed, on various occasions, mental weaknesses which were undoubtedly owing to weakness of body.

The deaths, except of Jens, Rice, and Henry, were the result of starvation, though the verbal report of the surgeon, in the earlier cases, was action of water on the heart. Cross had marked signs of scurvy, and Christiansen less evident ones. Possibly a scorbutic taint existed in most, if not all, cases. Inflammation of the bowels hastened Sergeant Gardiner's death, and the taking of nearly four ounces of tincture of ergot caused Dr. Pavy, I presume, to die a day or two earlier than he otherwise would.

In nearly every case temporary wandering preceded death, which was always easy and painless, and generally so quiet that the exact hour of dissolution was not known. Consciousness was changed to the stage of coma with almost startling rapidity, as in several cases the man commenced to eat his food with apparent zest, and would pass into the unconscious state before the meal was ended.

The large numbers of letters I have received bearing on the use of spirituous liquors and tobacco in the polar regions, indicate a wide-spread interest in the subject. My own observations are personal, having no such weight as would those of a trained medical man, being simply those of an intelligent, unprejudiced layman, whose perceptive faculties were sharpened by the fact that the health of the men under his charge (and incidentally the success of the sledging parties) was, in a measure, affected by the use or disuse of those articles. It may be remarked that personally I do not use tobacco, and very rarely touch liquors except the light wines, and those not regularly.

The question of tobacco is the easiest to dispose of. Its use in moderation appeared to have no injurious results, but, in quarters at least, conduced to quietude of mind. One of the party, who used for months over two ounces daily, largely in smoking, informed me that he had once been attacked by aphasia, and that premonitory symptoms at Conger obliged him for a time to use tobacco with greater moderation.

At least one man discontinued smoking whenever serving in the field, and all indulged in it sparingly for one reason, perhaps, that tobacco had to be carried on the person and not as a part of the regular rations. It was noticed by Sergeant Brainard with one party, and by me with another, that tobacco chewers in the field suffered more from thirst than others. When tobacco failed at Cape Sabine, the men almost invariably suffered for a time from mental depression. It has been commented on that four of the six non-tobacco users in the expedition are now living, but it should be remembered that they were also temperate men of good habits.

As to the use of rum, a small quantity of it, in quarters at irregular intervals, served an excellent purpose in breaking the monotony by stimulating the mental faculties. Some of the men would have done as well without it, others would not. It was never used regularly in the field, but on very few occasions when taken during work, or in cases where it was surreptitiously obtained and drank during the day, it appeared not only to diminish the man's power for work, but to impair his resistance to cold, and even to interfere with his appetite for solid food.

During the retreat, rum was frequently, but not invariably, issued with beneficial results. Its use appeared to greatest advantage when given just after the men entered their sleeping-bags, following an

exhausting day, during which matters had gone badly. It then caused a mental stimulus, excited a feeling of warmth (which with me seemed to come from increased circulation), and also appeared to have narcotic properties, for it induced drowsiness and greatly promoted sleep. Half a gill was issued at such time, but where men received on special occasions a gill, they stated that its beneficial results were but slightly if at all increased.

At Camp Clay, nearly pure alcohol, diluted with two or three times its weight in water, was used as food in our dire necessity, each man receiving daily perhaps a quarter of an ounce of alcohol. Its effect was the same as described above, though acting with greater force. The general, as well as my own, impression was that it supplemented food, and had a marked alimentary value.

It was the general opinion of the men, expressed at Cape Sabine, that spirits ought to be taken after the day's labor, and not during hard work. Nearly every one, including my surgeon, who urged it in 1881–'82, believed it should be a constituent of the Arctic ration. My opinion holds now, as then, that in small quantities it is very beneficial, and should be carried by all expeditions and sledge parties, but I think its *regular* issue would be deleterious rather than beneficial. No sledge party of mine ever went without spirits; none ever used it as a ration; and in the exhausting, trying journeys of two years, ranging from ten to sixty days in length, no man ever broke down physically.

In short, Dr. Envall, who served with Nordenskiöld in Spitzbergen, expresses my opinion when he said: "I believe spirituous liquors to be of great use in small and moderate quantities, but exceedingly mischievous and pernicious in case of the least excess."

In connection with the subject of scurvy, attention is invited to the fact that the dietary at Camp Clay was very like in its character to that at Conger. The first marked signs of scurvy were noted in the case of Sergeant Cross, only a few days prior to his death, in January, 1884. The party thus remained free from scurvy two years and five months, and the first man, though with a constitution impaired by free living, only succumbed after four months' slow starvation, whereby his weight had decreased fully twenty-five per centum.* The second person, Eskimo Christiansen, died after seven months of insufficient food, having decreased as much in weight as Cross. But in Christiansen's case scorbutic symptoms were scarcely detected prior to his death, and the disease had made no great progress.

These points are brought forward as having a certain bearing on the question of scurvy and its causes.

The party at Cape Sabine had fresh meat, canned vegetables, butter, milk, lime-juice, cloudberries, and a less deprivation (by twenty days) of sunlight than at Conger. On the contrary, it was subjected to cold, used very great quantities of salt water in its food, was compelled to live in a far less pure and much damper atmosphere, to subsist on a ration so insufficient as to fail in repairing physical waste, and to undergo the continuous physical torture of starvation, and the equally great mental trial arising in many or most from brooding over the grave uncertainties of the future.

Despite all these disadvantages at Camp Clay, no man died of scurvy alone, and practically the expedition was free from the disease during its three years of active service.

These experiences to me as a layman seem to favor the idea that scurvy, while fostered by dampness, cold, over-exertion, and darkness, is a disease which can be obviated by proper dietary precautions; in other words, that it is strictly preventable. This is in consonance with authoritative opinions if one may judge from the general practice in late years, which has intrusted the outfitting of important Arctic expeditions to committees composed of medical and experienced Arctic officers.

If it happened that health abided with the Lady Franklin Bay Expedition, and its surgeon had no occasion to exercise his medical skill, save in trivial ailments cited in his reports, it is, I believe, largely owing to strict compliance with hygienic rules laid down by modern medical science, and to its diet composed of articles approved, as peculiarly suited for arctic aliment, by the leading disciples of that science.

If such be the case, and hygiene is so definitely and clearly elaborated that a layman may apply its rules successfully, even under such disadvantages as arctic service entails, it is only another instance of the spirit and triumph of modern medicine, which, self-denying and generous, prefers first to instruct men how to avoid disease, and then, its advice contemned, to repair as best it may the neglect of the unheeding.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding L. F. B. Expedition.

* The first two cases of scurvy in the British expedition, 1875, '76, likewise occurred in men "addicted to an immoderate use of alcohol."

APPENDIX No. 104.—*Record left at Cape Baird.*

FORT CONGER, GRINNELL LAND, *March 26*, 1883.

General health of party second winter better than the first. All are well at present. Following principal journeys made in 1882: Dr. Pavy's attempt to discover land north of Cape Joseph Henry failed, he being obliged to return by sea opening just north of that cape, by which his party were adrift on the polar pack for a day.

Lieutenant Lockwood, accompanied by supporting man-sledge party to Cape Bryant, rounded North Cape [Cape Frederick] NNW. of Britannia, and followed Hazen Coast to the NE. (true), until compelled by want of provisions, to return, after attaining the highest latitude ever reached. He reached his farthest (Lockwood Island, latitude 83° 23.8′ north, longitude 40° 46′ west), May 13, and returned to Fort Conger June 2, 1882. Land was seen as far as 83° 33′ north and 38° west, but none to the north. A photographic map of his discoveries is herewith inclosed.

The commanding officer in April, 1882, made trips inland via Chandler Fiord and Ruggles River to Henrietta Nesmith Glacier, which discharges into Lake Hazen, a body of water about 600 feet [183^{m}] above the sea, and covering an area of some 500 square miles. A second trip via Black Rock Vale in July [1882] carried him to the summit of Mount Chester A. Arthur, whence, from an elevation of 4,500 feet [1,372^{m}], land was seen on a very clear day as far as vision reached. A range of mountains was seen through depression of country to the southwest which possibly was part of a land west of Grinnell Land. Photographic map of discoveries herewith inclosed. In August [1882] the commanding officer visited Cape Cracroft in launch *Lady Greely*, and with same boat Lieutenant Lockwood visited the head of Archer's Fiord and penetrated some 12 or 15 miles into Chandler Fiord. Dr. Pavy visited Carl Ritter Bay on foot in August and by sledge in October, [1882] both trips overland to Cape Defosses from Cape Baird. Kennedy Channel and Smith's Sound open as far south as could be seen in August, but Robeson Channel never cleared of ice north of St. Patrick Bay. No vessel visited station in 1882. Arrangements are being gradually made to retreat southward by boats early in August in case no vessel arrives. Lieutenant Lockwood starts soon (probably to-morrow), to continue his discoveries beyond Cape Robert Lincoln [Washington]. Taking two dog-sledges, one as a supporting sledge, he will return about May 25, [1883].

The following are results of meteorological observations:

Time.	Mean barometer.		Temperature.					
			Mean.		Maximum.		Minimum.	
1881.	*Inches.*	*mm.*	°*F.*	°*C.*	°*F.*	°*C.*	°*F.*	°*C.*
August	29.842	757.97	+33.3	+ 0.7	+45.0	+ 7.2	+16.0	— 8.9
September	29.802	756.96	+10.9	—11.7	30.0	— 1.1	—10.0	—23.3
October	29.891	759.22	— 9.2	—22.9	+ 9.0	—12.8	—31.0	—35.0
November	29.766	755.89	—24.5	—31.4	+ 3.0	—16.1	—43.0	—41.7
December	29.710	754.62	—32.0	—35.6	—10.0	—23.3	—52.2	—46.8
1882.								
January	29.717	754.80	—38.3	—39.1	—10.0	—23.3	—58.0	—50.0
February	29.754	755.74	—46.5	—43.6	—10.0	—23.3	—62.0	—52.2
March	29.738	755.33	—29.9	—34.4	— 7.0	—21.7	—47.0	—43.9
April	30.151	765.83	— 8.6	—22.6	+ 14.0	—10.0	—42.0	—41.1
May	30.130	765.29	+17.4	— 8.1	+36.0	+ 2.2	+ 1.0	—17.2
June	29.930	760.21	+33.1	+ 0.6	+53.0	+11.7	+13.0	—10.6
July	29.714	754.72	+36.8	+ 2.7	+50.0	+10.0	+30.0	— 1.1
Yearly means	29.845	758.05	—4.95	—20.53	+53.0	+11.7	—62.0	—52.2
1882.								
August	29.810	757.16	+35.3	+ 1.8	+48.0	+ 8.9	+23.0	— 5 0
September	29.741	755.41	+18.1	— 7.7	+27.0	— 2.8	+ 1.0	—17.2
October	29.737	755.31	— 7.8	—22.1	+14.0	—10.0	—24.0	—31.1
November	29.958	760 92	—28.0	—33.3	— 4.0	—20.0	—46.0	—43.3
December	30.134	765.39	—27.8	—33.2	+ 6.0	—14.4	—44.0	—42.2
1883.								
January	29.875	758.81	—35.8	—37.7	—18.0	—27.8	—51.0	—46.1
February	29.590	751.57	—38.9	—39.4	— 5.0	—20.6	—56.0	—48.9

Rainfall, 1881–'82, 3.91 inches [99.3^{mm}].

A. W. GREELY,

First Lieutenant, Fifth Cavalry, A. S. O. and Assistant, Commanding.

This record is left by First Lieutenant A. W. Greely, U. S Army, who leaving Fort Conger, August 9, 1883, retreating southward with party of twenty-five (25), all well, reached Cape Baird August 10, and propose leaving for Littleton Island (and perhaps later Carey Islands) at 11 p. m., August 10, 1883, with steam-launch and three boats.

Three photographic maps showing discoveries inclosed.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant, Commanding.

APPENDIX No. 105.—*Records left in abandoned boats.*

Record left by Lieutenant Greely, commanding Polar Expedition, en route to Littleton Island, with ultimate intention of reaching SE. Carey Island.

I abandoned Ft. Conger, G. L., August 9, 1883, at 3 p. m., with party of twenty-five—all well. Reached Cape Baird Aug. 10th and left same evening at near midnight, launch *Lady Greely* towing boats *Valorous*, *Beaumont*, and whale-boat. On board 5,500 pounds coal and over 40 days' rations.

Took up enough at Cape Cracroft to make 45 days' rations. Had foggy weather with snow and met some ice. Reached Carl Ritter Bay about 10 p. m. Aug. 12, and took up cache, leaving at once with about 50 days' complete rations. Stopped by floe about 80° 43′ N. morning Aug. 13th. Took up depot of 240 rations at Cape Collinson Aug. 22d, and at 1 p. m., Aug. 23d, we tied up to ice-foot about 2 miles south of Cape Norton Shaw, stopped by dense rubble ice which extended as far south as could be seen. All well at that time. Reached Cape Hawkes Aug. 26th; took up 168 pounds potatoes, 111 pounds pickles, 250 pounds bread, 342 stearine. Left same afternoon and were beset that night in about 73° W. 79° 22′ N. in an attempt to reach Victoria Head by direct course. All well Aug. 27, 1883. No ship or sign of a ship or of depots for us have been seen, although the shore has been carefully followed and watched. A NE. gale forced us down to 79° 00.6′ N. (obs.) 74° 45′ W. (D. R.) when temperature fell Sept. 8th to −0°.8 [−18.2° C.], freezing in the party. It is my intention to abandon launch *Lady Greely* and one boat Monday Sept. 10th, and reach Cape Sabine by sledge, with two boats via Cocked Hat Island. Party all well and in good spirits at date. Have about 40 days' complete rations.

Sunday 2 p. m., Sept. 9, 1883, 79° 00.6′ N., 74° 45′ W.

A. W. GREELY,
First Lt., 5th Cav., A. S. O. and Asst., Comd'g Expedition.

Copy of above left on steam launch and in *Valorous*.

It is my intention as soon as separation shall be safe to send an officer and two men to Brevoort Island to obtain record which should be there of the movement of ships and location of depots this year. If boats have been left there it will greatly facilitate our movements and increase our chances of safety.

[A. W. G.]

APPENDIX No. 106.—*Records found on Brevoort Island (deposited by Lieutenant Garlington and Private Beebe).*

U. S. RELIEF EXPEDITION, CAPE SABINE, *24th July*, 1883.

The steamer *Proteus* was wrecked in the ice pack midway between this point and Cape Albert on the afternoon of the 23d inst., while attempting to reach Lady Franklin Bay. She stood the enormous ice pressure nobly for a time, but had to finally succomb [*sic*] to this measureless force. The time from her being beset to going down so short but few provisions were saved. A depot was landed from floe at a point about 3 miles from point of Cape Sabine as you turn into Buchanan Strait. Here were put 500 rations bread, sleeping-bags, tea, and a lot of canned stuff—no time to classify. This cache is about 30 feet [9^{m}] from water-line—12 feet [3.6^{m}] above—on west side of little cove under a steep cliff. Rapidly closing ice prevented its being marked by flag staff or otherwise. Have not been able to land there since. A cache of 240 rations in same vicinity left by expedition of '81—visited by me and found in good order except boat

broken by bears. There is a cache of clothing on point of Cape Sabine opposite Brevort [*sic*] Island—in jamb of rocks—and covered with rubber blankets. English depot on small island in damaged condition not visited by me. Cache on northern point Littleton Island, boat at Cape Isabella. All saved from *Proteus*. The U. S. Steamer *Yantic* is on her way to Littleton Island, with orders not to enter ice. A Swedish steamer will try to reach Cape York during this month. I will endeavor to communicate with their vessel at once, and everything in the power of man will be done to rescue the brave men at Fort Conger from their perilous position.

The crew of *Proteus* consisted of Capt. Pike and 21 men; my own party, Lieut. J. C. Colwell, U. S. Navy, Acting Assist. Surg. J. S. Harrison, 5 enlisted men of the line, 2 Sig. Serv. men, 3 Newfoundlanders, and two Eskimo.

It is not within my power to express one-tithe of my sorrow and regret at this fatal blow to my efforts to reach Lieut. Greely. I will leave for east shore just as soon as 'tis possible and endeavor open communication.

E. A. GARLINGTON,
1st Lt., 7th Cav., Comdg.

2 Siderial [*sic*] chros [chronometers] 1692 & 1693 and 2 Station Barometers in casche [cache].

S. S. NEPTUNE, L. F. BAY SUPPLY EXPEDITION,
"LYING-TO" HARBOR, CAPE SABINE, *August* 18, 1882.

The *Neptune*, under orders from General W. B. Hazen, Chief Signal Officer, U. S. Army, and conveying supplies and men to Lieut. Greely, Discovery Harbor, Grinnell Land, arrived here at one o'clock this morning and dropped anchor in 14 fathoms.

We left St. Johns, N. F., July 8th; Disco, July 20th, and Pandora Harbor, where we had lain at anchor since the 29th July, awaiting an opening through the barrier extending across the Sound from Cape Inglefield to Rosse Bay, on the morning of the 7th inst.

Having penetrated as far Northward as Lat. 79° 19′ (Long. 73° 20′ W.), the ship continued closely beset until yesterday morning, the 17th, when we worked free and stood across to the east side, where we found the ice heavy and close in shore.

Since our arrival at Pandora Harbor, strong southerly and S. westerly (true) winds have prevailed, keeping the ice firmly closed above us. We will remain in this vicinity as long as the season will permit, awaiting an opportunity to resume the voyage.

In the event of failure to reach Lieut. Greely's party, depots will be established at the northernmost points attained on the west side Smith Sound or Kennedy Channel, and on Littleton Island. A whale-boat will be left at the northmost depot, and one at Cape Prescott.

This morning Captain Nare's Record, dated August 1, 1875 (a copy of which is enclosed), was found in the cairn on the summit of Brevoort Island.

The original will be forwarded through the Chief Signal Officer, U. S. A., to the Secretary of the Admiralty, London.

All are well.

W. M. BEBEE, Jr., [Private], G. S., U. S. A.,
In charge of Expedition.
FRED'K H. HOADLEY, M. D.,
A. A. Surgeon, U. S. A.
WILLIAM SOPP,
Capt. Neptune.

S. S. NEPTUNE, PAYER HARBOR (CAPE SABINE), *August* 23, 1882.

SIR: The *Neptune*, with men and supplies for your party, sailed from St. Johns, N. F., July 18th, and reached Godhavn on the 17th, having been detained for forty-eight hours off Cape Farewell by heavy field-ice. Excepting the sleeping-bags and *matak*, all the supplies required from Greenland were secured. Through the courtesy of the officials at Godhavn, four (4) sleeping-bags (their individual property) and a small quantity (47 lbs.) of *matak* were obtained.

Leaving Disco on the 20th, we were beset for forty-eight hours off Cape York, and on the morning of the 29th were stopped by an impenetrable barrier, extending from Cape Inglefield to Rosse Bay, across the Sound. A strong S. westerly gale compelled us to fall back to Pandora Harbor for anchorage, where we remained until August 7th, when we succeeded in reaching a position off Bache Island, where the ship was again caught and beset for nine days.

On the morning of the 17th, taking advantage of a slight opening, we worked our way clear and stood across to the east side; but finding no channel, returned and anchored in this bay—between Cape Sabine and Brevoort Island.

In a cairn on the summit of Brevoort Island, Captain Nare's record, dated August 1st, 1875, was found, and on a long, low island lying near to and nearly due west (true) from Brevoort Island, a small depot left by Captain Stephenson of the *Discovery*, with a record dated July 30th, 1875. This depot, which has been disturbed and scattered, apparently by animals, was restored as securely as possible, and marked by placing upright in the rocks two oars found there with the remains of a skin boat. The stores, consisting of five casks, containing biscuit, chocolate and sugar, tea and sugar, stearine, wicks, potatoes, onion powder, tobacco, matches, salt, pepper, and two tin cans of bacon (40 lbs. each), were found in fairly good condition. Three small spirit casks were leaky and empty. Coming from the northward, and Brevoort Island fairly opening, this small island can be plainly seen between Cape Sabine and Brevoort Island.

We leave this harbor immediately, in the hope of reaching at least as far north as Bache Island, when, if we can get no further, I shall establish your depot "A", and leave the second whaleboat at Cape Prescott.

I prepare this record now in anticipation of having little time to land and establish the depot, as the winds which have prevailed for the past two weeks from the SW. render position in the ice precarious.

20 MILES DUE EAST (TRUE) FROM BACHE ISLAND, *August 28th.*

Every effort to reach land on this shore above Cape Sabine has thus far proved utterly unsuccessful, and as the new ice is forming every night faster than it disappears during the day, I fear that I cannot establish your depot "A" as high up even as Bache Island, nor can I get a whale-boat to Cape Prescott. To-day I will run across and land stores and lumber at Littleton Island, and then wait until compelled by lateness of season to fall back, in effort to establish depots and land whale-boats where they will be of value to you.

Unless the northmost depot shall be in sight of Cape Hawkes, I will return your mail to the States, excepting papers and periodicals, which will be left at Littleton Island.

All your friends were well when I left Washington.

I cannot express my regret at the failure of all my efforts to reach you, or to carry out fully your instructions of last year.

Trusting that you may be providentially protected, and return in safety,

I am, very respectfully, your obt. servant,

W. M. BEEBE, JR.,
[*Private*], *General Service, U. S. A.,*
In charge of Supply Expedition.

To Lieut. A. W. GREELY, U. S. Army,
Commanding Lady Franklin Bay Expedition.

S. S. NEPTUNE, *Aug.* 29, 1882.

Lieut. A. W. GREELY,
Comdg. Lady Franklin Bay Expedition:

The *Neptune* has been in Smith's Sound endeavoring to reach you since July 29th, but unable to penetrate the ice. Strong winds and gales from S. W. have prevailed, but have not freed the shore. Highest latitude reached, Aug. 10th, 79° 20′, with eight (8) miles of impassable ice between us and land (Bache Island).

We land a boat here with great difficulty. Shall hold on until compelled by lateness of season to fall back, in the hope of carrying out your wishes regarding depots and whale-boats.

A party of nine (9) natives were found on Cape Ohlsen yesterday while looking for a place to cache supplies on Littleton Island. If they are still there when we return, I think best to cache supplies on *north* side (true) of Littleton Island, *opposite* Mt. Carey Island.

Your mail will be returned to the States, as directed in your letter of last year. All your friends well when I left Washington.

I shall recommend and earnestly urge that next year's relief ship may leave St. John's as early as the middle of June.

I am, very respectfully, your ob't servant,

W. M. BEEBE, Jr.,
[*Private*], *G. S., U. S. A., in Charge of Exped'n.*

APPENDIX No. 108.—*Sergeant Frederick's report of November journey to Cape Isabella.*

WASHINGTON, D. C., *November* 25, 1884.

SIR: I have the honor to respectfully submit the following report of a journey made by Rice, Linn, Elison, and myself, under your orders, for the purpose of securing 144 lbs. of meat left on Cape Isabella, in 1875, by Sir George Nares, commanding the English expedition.

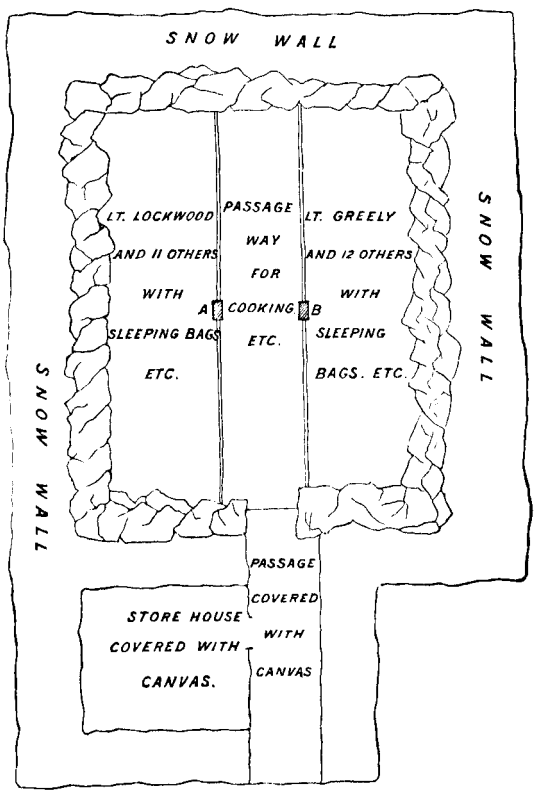
November 2, 1883.—We left Camp Clay about 8 a. m. Our equipment was as follows: A light sledge, one four-man sleeping-bag, one tent-fly, one Springfield rifle, an ax, and 8 oz. of bread and 8 oz. of meat per man per day; lamp and pot for cooking, with alcohol for fuel. The morning being very hazy, making traveling very hard for the first few miles; but, as we approached Cocked Hat Island the day cleared up and traveling was very good, and as we reached Rice's Straits it began to get dusk again, but about one hour later, when we stood before the hunter's camp and cast our eyes on a beautiful plump seal, weighing about 80 or 90 lbs., I am sure it was good cure for sore eyes, for we imagined that we could see a mile farther. We could see in the distance Long coming to meet us. The poor fellow was covered with frost, but he smiled just the same as he would if he was in the land of plenty, and told us that his rations were gone and that the Eskimos was discontented. I told Long that he had better go in, as the days were getting so dark and the temperature so low that it made it quite dangerous to stand over a seal-hole all day, and I also told him that the commander expected him. We then bid our dear companions good-bye, and we plodded along for a few miles farther and went into camp. After taking a light supper we retired to our bag and was soon in the land of dreams.

November 3, 1883.—Broke camp at 7.30 a. m. Very dark and foggy, making traveling very hard. About 11 o'clock we reached a small lake on the divide between Elison Bay and Rosse Bay, where we halted for a few moments. Dropping down in Elison Bay we found traveling good. We reached Eskimo Point about 6 p. m., very tired, but every one feeling that we could make Cape Isabella to-morrow.

November 4, 1883.—Broke camp about 6.30 a. m., every one feeling good after their night's rest, and also believing that they would be able to reach their destination before night; but about 10 a. m. we found our traveling growing worse every step we made to the south. About 12 m. we found Elison eating snow and ice, and Rice spoke to him, but of no avail. We led more to the west for an easier route, but it seems no matter what way we headed the traveling was all the same. About 3.30 p. m. Linn and Elison complained of being tired and wanted to go into camp, but we kept on until it got so dark that it was impossible to travel any longer. So we camped about 6 p. m., every one so tired and worn out that it was impossible to move our limbs. How far or how close we was to Cape Isabella or the coast line was unknown to us, owing to drifting snow, which had completely obscured the surrounding country.

November 7, 1883.—Broke camp about 7 a. m., the weather fine and clear. We got a drink of tea and started for Cape Isabella. We took our sledge and equipment with us part of the way, and then the only suitable place that we found to drop the equipment was on the summit of a glacier where we intended to camp the coming night. We then went on with the sledge only, as our track was very tortuous, and, moreover, we had not a foot of level traveling. Huge masses of ice, from 20 to 40 feet [6 to 12^{m}] in height, were heaped together, around which the fierce winds of winter had piled the drifting snow. In crossing these ridges our sledge would frequently capsize and roll over and over; sometimes the sledge would be half buried in the soft snow, into which it had fallen, in which case its liberation would be attended with great difficulty. We reached Cape Isabella about 2 p. m., and, after ascending about 1,000 feet [305^{m}], we found the meat.

APPENDIX NO. 107.—*Plan of winter quarters at Camp Clay.*



Stone hut about 25′ × 17′. Wall 3½ feet high. Boat extended from one end of wall to the other, and allowed one to stand up between thwarts, in passage way. Oars inserted in holes cut in gunwale and ends resting on side walls allowed house to be covered with canvas, which was also partly supported by interwoven ropes. A and B, upright supports to boat: on A, lamp for light and melting ice; on B, barometer. Cooking done in center of passage. Twelve men had space 6′ × 2′ 1″ for sleeping and living quarters; thirteen, owing to Elison's condition, had only 1′ 10″ × 6′ for sleeping and living quarters.

We picked up the cache at once and started for the sledge, which had been left at the extreme point of the cape. Rice and myself was the first ones to reach the sledge. We started back at once to help Linn and Elison down with their load, and we started back as soon as time would allow us.

As you see from my writing that our road was rough, but the sky was clear and the moon was shining, and from the elevation to which we had ascended—1,000 feet [305^{m}]—we saw open water to the southward as far as the eye could extend. Waves with white caps came rolling in to the very cape [Isabella] itself; a vessel could have navigated here without difficulty, and even at this season, could we have embarked at this point, I have no doubt but that we all would have reached our homes in safety. We were in hopes that we should reach our camp all right, but remember that we traveled all day on a small cup of tea and worked hard and had to face strong western wind, and we found to our sorrow after traveling 12 or 14 hours, on reaching our camp on the glacier, that Elison had frozen both of his hands and feet. Now, it must be remembered that we had no shelter of any kind, nor were we able to light a match or to keep the lamp burning, and without a mouthful of warm food we retired to our frozen sleeping-bag, which was no more nor less than a sheet of ice. Now I took one of Elison's hands and placed it between my thighs, while Rice took the other, and this is the way we drew the frost from his poor frozen limbs. The poor fellow cried all night with pain. This has been one of the worst nights that I ever spent in the Arctic.

November 8, 1883.—We got up about 7 a. m. without having slept during the entire night. Elison looking very bad, we got some warm food, picked up our traps and started on our homeward journey. The morning was very hazy, making traveling very bad. Elison got along very nice for the first few hours, but when he began to weaken, his steps grew slower, and the result was that his hands and feet both frosted. Now it became unsafe to let him travel behind the sledge alone, and so I took the poor fellow on my arm and had almost to carry him, for his legs became as stiff as sticks of cord wood, and he was unable to handle them. This is the closest I have ever been hitched in my life. If there is anything that will try the mettle of men it is to put them in soft snow and hummock ice and a *rue-raddy* over their shoulders; but nevertheless we stood it like men and I never heard a murmur of discontent. We traveled on till about 5 p. m., when it became so dark that it forced us to go into camp. We unloaded our frozen sleeping-bag and then put the frozen man into it. Rice and Linn wedged themselves on each side of him and I stepped out to prepare some warm food for them; it was as dark as pitch. A strong breeze from the northwest. The air was filled with snow and it was with the greatest of difficulty that I got some warm food for my poor starving and frozen companions. Had we a little shelter only, our work would not have been so trying, but to halt and lay your sick on an open field of ice and nothing to shelter them from the Arctic breeze, that has a fair sweep over this open plain, was trying to us indeed.

November 9, 1883.—I got up this morning about 7 a. m. to prepare some warm food for my comrades, which they enjoyed very much, and after Rice and Linn got up, we found that Elison was altogether helpless, and to save Elison's life it became necessary to abandon the meat which we had labored so to save, and marked the place well with a Springfield rifle. We got along very well for the first few hours, but as we all grew weaker every hour with a helpless man on our hands, you can imagine our progress; but after battling along for about 9 or 10 hours we reached Eskimo Point, where we camped for the night. We commenced at once to cut some wood from the ice-boat to thaw Elison out with and to dry his clothing, which was a perfect sheet of ice, and in the mean time we cooked our supper, though the poor fellow suffered when his feet, hands, and face began to thaw from the artificial heat. It was enough to bring the strongest to tears. Rice and myself did not retire until about 1 a. m. We tried to get everything in shape for the following day.

November 10, 1883.—Broke camp about 8 a. m., Elison looking much better. The morning being very cold we started Elison out at once to keep from freezing, but we found that he could not keep on the track; so Linn went with him while Rice and myself packed our traps on the sledge and followed. When we caught up we found that Elison had frozen his face and hands again. Traveling was very heavy and Linn had to come and help to drag the sledge. Now we tried to keep Elison in front of us, but of no avail. He would stagger off to one or the other, but it seems that every moment the frost would eat its way deeper in the poor man's flesh, and we stood helpless at his side.

The load was too heavy for two men to drag, and it was impossible to let poor Elison travel by himself. So we fastened a rope to his arm and then to the sledge, and the three of us took to the traces and tried to make time, but every few rods the poor fellow would fall, and then sometimes before we could see him we would drag him for several feet. There is no person that can imagine the way that poor man suf-

fered. Now when we got in Elison Bay, wind blowing a hurricane, and it getting very dark, and we saw that there is no earthly hope to try to drag along, for we see that poor Elison would perish on our hands before we could get him to Camp Clay, so here we went into camp. I was to remain with Elison and Linn in the sleeping-bag. Rice and myself tried to make a fire or light the lamp to warm some food, but as the wind was blowing so hard and we could find no shelter, we both frosted our fingers and had to give it up, and poor Rice took a piece of frozen meat and started for Camp Clay, which was about 15 miles. As Rice bid us good-bye with tears in his eyes, we clasped his hand and wished him speed. Now I took the ax and cut a small piece of frozen meat for my comrades, and then got in the sleeping-bag to put in the wretched night. Linn laid on one side of Elison and I on the other trying to keep him warm, but as we laid here helpless and shivering with the cold and poor Elison groaning with hunger and pains, so you can imagine how we felt lying powerless at his side. Linn was a strong and able-bodied man, and he was very weak and helpless by the mental strain caused by the suffering of Elison. In fact I was afraid that his mind would be impaired. At one time I had to use all my persuasive powers to keep him in the sleeping-bag. We were but a very few hours in the bag when it became frozen so hard that we could not turn in it, and in the one position we had to lie for about 18 hours, and to our great relief and joy we heard Brainard's cheering voice at our side. There was nothing more welcome than the presence of that noble man who had come in advance of the party with some brandy for Elison and some food for Linn and myself. After preparing some warm food and making some warm tea and giving it to us he said that he would return to meet Lieutenant Lockwood and party and return as quickly as possible. Brainard was accompanied by Frederik [Christiansen], the Eskimo.

Now we felt much better to know that Rice had got back all right and that a relief party would soon be here. It was not long before Brainard returned again; he gave us some more warm food and in about 2 hours Lieutenant Lockwood and party were with us. It was a Godsend to be released from this prison. It was impossible for them to get us out of the bag the way we got in, so it became necessary to chop the top of the bag off with a hatchet to release us. We were unable to stand alone; our clothing was as stiff as boards; our companions helped us to dress and gave us dry gloves and stockings to put on. Linn and myself began walking around to limber up. Now as we were no use to the party they wanted us to go in, as they had to move very slowly with the frozen man on the sledge. Linn and myself started for camp, and we got along very well until we reached Buchanan Strait, where I broke through and got my feet wet. I noticed shortly after that Linn was eating snow and his steps became much slower. I was frightened that it would be another Elison case. I spoke to him about it and showed him the importance of abstaining from eating snow, and in a few hours we brought up at Camp Clay. I am sure that there is not a reader of this report that could find a parlor half so inviting in his city as this small ice hut was to me. As we entered we found our companions with stretched arms to welcome us, and our commander ordered the hospital steward to give us rum, and then Biederbick took off some of our wet clothing and gave us dry ones to put on, and after getting some warm food I assure you that I felt much better, and I will never forget the kindness that was bestowed on me by my comrades on that eventful day.

Respectfully submitted.

Your obedient servant,

JULIUS R. FREDERICK,
Sergeant, Signal Corps, U. S. A.

Lieut. A. W. GREELY,
Commanding the Lady Franklin Bay Expedition.

APPENDIX No. 109.—*Lieutenant Kislingbury's letter, February 19, 1884.*

CAMP CLAY, *February* 19, 1884.

LIEUTENANT: Ten days ago I agreed to give you certain suggestions in reference to our preparations for changing to Greenland side, and I beg permission to submit the following in reference to that subject, and our circumstances generally:

The course I would then have suggested has already been adopted—that of placing in the management and supervision of making hand and foot gear, and repairing of sleeping-bags, Private Fredericks, who, from his former excellent work in these matters, and past week's successful efforts, is, I think, the best possible arrangement.

Without going into details, circumstances different to what we expected have so changed the original plans decided upon at the time of entering on reduced rations, that the original intentions (crossing to Littleton Island the first of March, for instance), need, I feel, reconsideration. You have doubtless nicely considered and arranged everything satisfactorily, and as well as can be for our future, but notwithstanding this, I feel it my duty to make my ideas at this time matters of record, and beg you will not consider me as interfering in your prerogatives as commander. The open water at date permits no communication with Littleton Island, and we cannot reasonably expect relief from, or to cross to, that point on the 1st March, as before arranged.

There is no certainty as to the time we can expect the channel to close, and although we have every reason to congratulate ourselves on our present favorable condition, considering our probably unprecedented experience, we have, at date, two invalids, both of whom will probably have to be hauled by sledge, and there are several others of the party whose strength cannot be safely counted upon even to walk across. Briefly, I do not believe it possible for the party, on our present means, to ever expect to cross as a party at one time, and I see no other way than to arrange and hope to get relief by a party from the other side, or to prolong our lives by extending food longer than we first intended.

With this end in view, I would advocate no further increase of our food. Finally, if relief from the Greenland coast does not reach us, I see nothing left to do, soon as we find water space closed, but for a few of the stronger of us to go to Littleton Island with one of the sledges, get supplies or game, as we can there, and bring to those here who are too weak to cross; expecting, of course, to open communication and get help from the Eskimos. One at least of our natives should go with this party, and feeling myself to be one of the strongest, I would expect to be sent in charge of the same.

Very truly and respectfully,

FRED. F. KISLINGBURY,
Second Lieutenant, Eleventh Infantry, A. S. O.

Lieutenant A. W. GREELY,
Commanding Expedition.

APPENDIX No. 110.—*Private Long's journey into Hayes Sound.*

[* Extract from the journal of Lieut. A. W. Greely, referring to discoveries made by Private Francis Long in Hayes Sound during March, 1884.]

* * * * * * * * *

March 14, 1884, *Friday.*—Private Long returned at 7.15 p. m. last night, having seen during his three days' absence no signs of game, except a fox track which had been made across his trail in Rice's Strait during his absence. He was driven in by not having been able to get into his sleeping-bag during his absence. Leaving Camp Clay at 9 a. m. of the 12th, he overtook Sergeant Rice and Private Ellis hauling his sledge at the east end of Cocked Hat Island. Saw a raven, but was unable to get a shot. At 11.30 a. m. took sledge with Christiansen at the west end of Cocked Hat Island and started towards Alexandra Harbor. Reached Cape Rutherford at 2 p. m. and found that its apparent end was an island, about 800 yards [732^{m}] distant from land. This island was crossed by him on his outward trip. About two miles southeast (true) passed a very low island, which was about 1½ miles distant from land. Just before reaching Cape Viele he saw a valley, which, sloping gently upward, appeared to furnish a route towards Twin Glacier Valley. He concluded to take the valley, as the snow along the ice-foot was becoming deep. The ice to this point was all smooth and appeared to be new ice. The ice in Buchanan Strait was as far as could be seen smooth and favorable for traveling—level floes and few or no hummocks. Before reaching the valley above mentioned he reached a camp on west side of the small island southeast of Viele; at 7 p. m. cooked supper, and at 8 p. m. attempted to turn into bag. Found sleeping-bag frozen up so badly that, after three hours' exertions, was able to get into bag only up to breast. There being no wind, concluded to sleep out. Unable to get any sleep and freezing out about 2 a. m., March 13, concluded to get up and go on, which was done without cooking anything. Got to point near Viele, when tea was made, some bacon being eaten on the way.

* This account, having been written in full from Sergeant Long's statements at the time, presents the discoveries more accurately than can any present or elaborate statement.—A. W. G.

At about 8 a. m., March 13, started up the valley near Cape Viele, taking some hard bread and pemmican in their pockets, leaving sledge and sleeping-bag and cooking apparatus and rum at camp. Took medicine, however. Scarcely any vegetation in valley. Traveled up about three or four miles when he struck the ice—a regular glacier—the north one which terminates in Twin Glacier Valley. Had no trouble crossing the glacier. Found that the whole country around was ice-capped, there being only a small piece of high land visible between the Twin Glaciers. Found that the ice-cap ran down to the southeast, evidently forming the glacier which ends in Rosse Bay. From the highest point east of Twin Glacier Valley had an excellent view to the northwest, and carefully examined the country with his glasses. Bache Island terminated in low land, and to the southwest of it was a small rocky island resembling in its structure very much that of Cocked Hat Island. Princess Marie Bay appeared to connect with Hayes Sound.

All of the western end of Bache Island is low ground, rendering it difficult to say just where the land ended and water commenced. Some distance in rear of Capes Baker and Stephens the land rose gradually, and a range of low mountains or very high land was seen, which however presented to his view no particularly prominent peaks. Could see the entire west side of Alexandra Fiord, but the valleys or gaps were filled with snow and no signs of game anywhere visible. Followed the ice-cap around and descended to water's edge near the head of the fiord. A large glacier terminated the head of the fiord, and about a mile and a half from the glacier was a low island at right angles to the head and nearly extending across the fiord. Climbed up the west side of fiord and attempted to cross the country between Mount Carey and the mountains to the southwest. Met very steep cliffs of some 2,000 feet [610^{m}] elevation, which prevented his passage. To the southwest the country was ice-capped and afforded no chance for game. After nine hours' steady travel he reached a point north (true) of Mount Carey, from whence he was able to look to the westward into Hayes Sound. From Bache Island, commencing with Cape Stevens, he counted five capes on the north side of the Sound. On the south side the land was very high, with valleys filled with snow or ice running into the sound. About twenty miles to the westward high land was visible, and the coast line trending to the northwest, the sound appeared to terminate and the two coasts (north and south) to unite, but of this he could not be certain. The weather was then clear to the west but somewhat hazy towards Cape Stephens. While the high land to the westward appeared to thus shut out the sound, yet the distance was such that he felt no certainty about it. Owing to the Eskimo being somewhat demoralized by the prospects, he concluded to return to the bag, which was done as direct as possible.

Reached Cape Viele at 10 p. m., having been absent fourteen hours and having had only four ounces pemmican and a few ounces of hard bread during the time. Cooked some tea and attempted to turn in. After tea, as Eskimo wished to return at once to station, he concluded to start on. Traveled an hour and then went into camp, *i. e.*, bag. Tried to get into bag, but could only get in up to breasts. After being in bag about three-quarters of an hour, Long was taken sick with cramps and was much exhausted. Christiansen got out, heated some rum, and gave it to Long, with some spirits of ammonia. The medicine soon set Long right. Christiansen remained out of bag and pulled flap over Long. Christiansen made tea, and after that and eating four ounces bacon started about 5 a. m. for Camp Clay. At Cocked Hat Island, 2 p. m., being very much exhausted, stopped and had tea and four ounces pemmican. Reached Camp Clay at 7.15 p. m., March 13, quite exhausted, but in no wise injured or frost-bitten.

APPENDIX No. 111.—*Sergeant Frederick's report of journey to Baird Inlet, April, 1884.*

WASHINGTON, D. C., *December* 24, 1884.

SIR: I have the honor to respectfully submit the following report of a voluntary journey made by Sergeant Rice and myself in the month of April, 1884, for the purpose of recovering the English beef abandoned by us the fall previous.

About the middle of March, Rice and myself volunteered our services for this trip to the commanding officer, who, seeing the dangers that would attend such a journey, would not at first consent; but as Rice and myself kept on talking about it daily, and most everybody thought it would add to our chances of life if we could recover this meat, Lieutenant Greely reluctantly gave his consent about April 1.

In justice to the heroic dead and living, I must state that Rice and myself were not the only ones to volunteer, but every one else expressed his willingness to go; but as Rice and myself had been with the party that was compelled to abandon the meat in the fall, and as our health, if not better, was at least as good as any one else's, it was thought that our chances of success were the best.

Sergeant Rice and myself left the camp about 10 p. m. on April the 6th. Our outfit consisted of one small sledge, one two-man sleeping-bag, and one Remington rifle with ammunition, one ax, one alcohol lamp and pot for cooking, and alcohol for fuel; our allowances of rations were six ounces of pemmican and six ounces of bread daily. We carried besides a small quantity of brandy, some pills, and a small vial of aromatic spirits of ammonia for medical purposes.

Lieutenant Kislingbury, Sergeant Brainard, Ellis, and Whisler had during the day pulled our equipments to the brow of the island, a distance of about 4 miles, from where they returned very much exhausted. The good wishes and prayers of all the party went with us, and three as hearty cheers as their weak condition would allow, followed us through the narrow entrance.

A fresh wind was blowing, which increased to a perfect gale by the time we reached the sledge. We went down the hill very fast and took a good many tumbles till we reached Rosse Bay. We were compelled to stop traveling about 8 a.m. on account of wind and drifting snow. We unrolled our sleeping-bag on the ice, and after partaking of a piece of frozen pemmican crawled into it, and were compelled to remain motionless for 22 hours during a raging snow-storm.

April 8.—We dug our way through the snow drift that had formed around our sleeping-bag. About 6 a. m. started at once, as we were too cold to stop and cook. After about an hour's travel we found ourselves sufficiently warmed up to stop for some warm food, which revived us very much. The traveling was good, only a fresh breeze blowin g and light snow falling, which made it hard in our weak condition. About 7 p. m. it became so dark and blustering that we were compelled to draw our sledge up between a large iceberg and the foot of a glacier near Eskimo Point for shelter.

April 9, left camp about 7 a. m. The morning was calm and the sky clear, the traveling was very good, and we reached Eskimo Point in about an hour. Here we abandoned our sleeping-bag, hoping to be able to travel so much faster with the lighted sledge. We searched closely for the tracks of the previous fall, but were unable to see anything of them. After passing into Elison Bay yesterday we found that in places where the ice was smooth in the fall it was now very rough, and vice versa. Evident signs that it had been broken up since our last journey. We found pools of open water between the grounded icebergs, which threw us out of our course sometimes as much as a mile. Our feet got wet and froze when we stepped on dry ice or snow. To add to our misfortunes a heavy wind sprang up from the northwest about 11 a. m. with a thick snow drifting, so that we were unable to see any distance, and at 3 p. m. we thought that we were at the place where the meat was abandoned the previous fall, but notwithstanding an extended and very careful search, we failed to our great disappointment and sorrow to discover any tracks or traces which would go to indicate the spot where it had been left. At this juncture I proposed to Rice to up-end our sledge and return to our sleeping-bag for the night and resume our unsuccessful search on the morrow. But Rice thinking that the weather would clear up, thought that our best chance of success would be to remain on the spot.

I discovered about 4 p. m. that Rice was weakening. I therefore reminded him of the agreement made before leaving Camp Clay, that in case either of us should show signs of exhaustion his comrade should tell him, in order that necessary steps might be taken to prevent disaster, and I again urged upon Rice the necessity of returning to the sleeping-bag for rest and shelter.

But he said that he was only a little tired, and would soon recover by traveling a little slow. After a short time, however, I could plainly see that Rice was weakening rapidly, and observing an iceberg about 1,000 yards [914^{m}] to the west of us, I urged upon Rice to reach it in order to obtain at least a partial shelter. We fortunately accomplished this. By this time he was almost completely exhausted. I gave him some brandy and spirits of ammonia, which seemed to revive him. I now lighted the lamp and prepared some warm food for him; after having eaten it and drunk a cup of warm tea I endeavored to start him, in order to keep him from freezing, but it was all in vain. His condition was becoming alarming. He was too weak to stand up, and his mind seemed to be taken up with recollections of his relatives and friends at home, of whom he spoke, and he also kept talking of the different meals he would eat when he should have reached home. He seemed to realize his critical condition, for he asked me, in case he should die here and I were to survive, to send his manuscripts to the New York Herald, and his personal effects to his relatives. We

remained here on this desolate piece of ice, with the wind blowing a hurricane, for two hours or more, after which time my poor heroic companion lost consciousness. I did everything for him that my limited means permitted. I wrapped him up in my *temiak* in order to keep him as warm as possible, and remained on the sledge amidst the drifting snow with my unconscious friend in my arms until 7.45 p. m., when poor Rice passed away. My situation can be easier imagined than described. Here I was left alone with the body of my friend in an ice-bound region, out of reach of help or assistance. The death of my companion under these circumstances made a deeper impression on my mind than any experience in my whole life. As here I stood, completely exhausted, by the remains of poor Rice, shivering with the cold, unable to bury the remains, hardly able to move, I knew that my chances to reach Eskimo Point, which was about 7 miles to the north, were small indeed. I was completely disheartened; I felt more like remaining here and perishing by the side of my companion than to make another effort, but the sense of the duty which I owed to my country and companions and to my dead comrade to bear back the sad tidings of the disaster, sustained me in this trial. I stooped and kissed the remains of my dead companion, and left them there for the wild winds of the Arctic to sweep over.

I traveled to the north, and after 7 hours of hard travel I reached the sleeping-bag completely exhausted. I found the bag frozen stiff as a piece of cord-wood, and in my weak condition I was unable to unroll it, and I thought surely that I should have to perish here; but, as fortune would have it, I found in my pocket a small vial which contained a few drops of ammonia, which I took. This revived me so that it enabled me to get into the bag, where I lay until the following morning. I then hustled out, about 8 a. m.; got some warm food, and started back to bury the remains of my companion. This morning being very bright I found the traveling much easier than last night. When I reached the gloomy spot where lay the remains of poor Rice, thinking that he might have something on his person which ought to be returned to his relatives, I searched his clothing, and found several small articles, which I delivered to the commanding officer.

I then began the difficult task of digging a grave for the remains of my poor friend, which was accomplished after hard labor of several hours. I had no shovel, only an ax, and the loose ice I had to remove with my hands, and it is here, on a paleocrystic floe, that I laid the remains of one who was so dear to me. Here, in this icy grave, I leave my comrade, and will endeavor to carry back the sad news to our companions. After a few hours I again reached Eskimo Point, where I camped for the night.

Now it became a question of vital importance to me how I was to reach Camp Clay in my enfeebled condition. I was unable to travel eight or nine hours in one stretch, for after the first three or four hours, I should move so slow that I would freeze in my tracks. I therefore resolved to take the alcohol which we carried for fuel, dilute it with water, and take a small quantity of it whenever I lay down, so I would go to sleep at once.

April 10, 1884.—I broke camp about 7 a. m.; picked up all my traps, and started for Camp Clay. After pulling, hauling, and stumbling for about four hours, I became so tired that I had to go into camp. I turned my sledge upside down, and stretched the sleeping-bag between the runners, and took a small drink of diluted alcohol. I was then soon in the land of dreams, and after lying here for about three or four hours, I woke up completely chilled. I then picked up my traps and traveled until I was thoroughly warm, when I stopped and prepared some food. By the time this was done and the scanty meal eaten, I was chilled again. I would then start again and travel until I was thoroughly warm and tired out; then I would go into camp and repeat the dose of alcohol. When I arrived at the divide between Elison and Rosse Bay I found that I was not able to drag my load over it. I therefore fastened a rope to the sleeping-bag and drew it over first. I then went back for the sledge in this tiresome and laborious way, and in my weak condition, I worked my way back towards Camp Clay, from the 9th to the 13th.

When I reached Camp Clay I met Sergeant Brainard at the entrance of our small ice hut; he at once asked for Rice, and when I informed him that Rice had perished he exclaimed: "My God! It is too bad; for we have just killed a bear, which would have enabled us all to pull through. I am very sorry;" and with a broken heart he entered the hut and reported the disaster, which brought one and all to tears.

The commander ordered rum for me, which was given to me by Biederbick. I then told them of the trials and hardships and the death of poor Rice; I never have seen any party take anything more to heart than this disaster. After having listened to my narrative they gave me the sorrowful news of the death of Lieutenant Lockwood and Sergeants Jewell and Linn, who had perished in my absence. My pen is inadequate to describe the scene in that miserable snow hut, when, after an absence of seven days in the

fruitless search for stores abandoned in the ice, I had to report the failure of the expedition, the death of a cherished and brave companion, and to be informed of the death of three as good and brave men as ever faced the dangers and privations of arctic cold and darkness in the exertion of their duty to their country.

In presenting this report I beg to express my regret that I have not been able to do so at an earlier date. You will, I trust, excuse both the delay and the deficiency.

Respectfully submitted.

Your obedient servant,

JULIUS R. FREDERICK,
Sergt., Signal Corps, U. S. A.

Lieut. A. W. GREELY,
Fifth Cav., A. S. O. and Asst.,
Commanding L. F. B. Expedition.

APPENDIX No. 112.—*Lieutenant Kislingbury's letter, April 22, 1884.*

CAMP CLAY, *April* 22, 1884.

MY DEAR LIEUTENANT: Dr. Pavy has officially advised me of his recommendation to you not at present to reduce the allowance below one pound of meat per day, and that you could not sanction his recommendation. You have again placed the daily allowance of meat at ten ounces. Our hard bread is two ounces per day. The shrimp allowance is ample, but I fear from our recent and present weakened condition, depending so much as we have on them, that they do little more than relieve the direct pangs of hunger, and give little strength, nourishment, or warmth to our poor weakened systems. The party, on the whole, were gradually gaining on the one pound of meat, but are now again losing strength, and I fear for the result if the decreased allowance continues. You are, I know, doing everything for the best, and I have but *one desire, to help you* all I possibly can in this trying ordeal through which your responsibilities as commanding officer carry you. We cannot enter into the question thoroughly now. Your sufferings this morning and weakened condition alarm me. Our stronger men are gradually weakening. The increase to one pound will make but a few days' difference in the shortening of the time our present supply would subsist us. I have well considered the matter, and as your second officer I strongly urge that the meat allowance be again increased to one pound per day. This will, I believe, carry us along gradually improving, and before our present supply is exhausted we should find ourselves safely passed through the coldest weather and at a time when seals and birds will be more numerous and more readily procurable.

I am, truly, your obedient servant,

FREDERICK F. KISLINGBURY,
Second Lieutenant, Eleventh Infantry, A. S. O.

First Lieutenant A. W. GREELY,
Commanding Expedition.

APPENDIX No. 113.—*Letter of Dr. Pavy, April 25, 1884.*

CAMP CLAY, ELLESMERE LAND, *April* 25, 1884.

SIR: The health of the command at this time at the morning inspection is as follows: Very weak, and even shows no improvement in the condition of parties under increased rations. I have respectfully recommended in my oral report, 1st, that Schneider should be relieved for the present of the duties of shrimper and allowed a few days to recuperate, having since a month greatly exerted himself. 2d, that the rations of the two hunters, to be as equal as possible to the work accomplished, should be re-established at what they were after the killing of the last game—one pound and the extra of 8 oz. 3d, that, contrary to my previous recommendation, that one shrimp-catcher should be put again to the increase of 4 oz. daily. 4th, that Israel and Gardiner should for the present be kept under the 4 oz. increase.

I am, respectfully, your obdt. svt.,

OCTAVE PAVY, *M. D.*

To the COM'D'G OFFICER OF U. S. ARCTIC EXP'T'N.

APPENDIX No. 114.—*Letter of Dr. Pavy, April 27, 1884.*

CAMP CLAY, ELLSMERE LAND, *April 27th*, 1884.

SIR: Since my report of the 25th inst., I have found no improvement in the general condition of the party, but a constant decrease in its general strength. A slight improvement is perceptible in the cases of Gardiner and Israel, but not great enough to allow the stopping of increased rations. Ellis is rather better, but Biederbick was, and is, fastly [*sic*] getting weaker. The general atonique [atonic] state of the bowels, and the constant increasing obstinate constipation, compel me to call to your attention a few recommendations, hoping, for the welfare, perhaps even for the safety of the majority of the party, that they will be received favorably. First, that as the state of our bowels is critical, and the general weakness fastly [*sic*] increasing, the following change of diet for the next ten days is necessary: 4 oz. of bacon, alternating with pemmican, in the morning (raw in the plate), with one pint of tea and one of stew consisting of shrimps, and 1 oz. of blubber and 1 oz. of fresh meat, and the usual amount of bread until exhausted. In the evening, one pot of tea and two of stew with shrimps, the ordinary amount of bread, and 7 oz. of meat. This proposed plan of diet would call but for an increase of 1 oz. only of blubber, and the daily use of bacon and pemmican, which would now be of the highest necessity in the present state of the party. I have detected, this morning, a decrease in the strength of the two hunters, and a change unfavorable in their health. I could renew my recommendation of the 25th for an increase of ration, and that in pemmican and bacon. Earnestly hoping that these important, perhaps necessary, recommendations should be favorably received, for the safety of the remaining members of the command.

I am, very respect., your obdt. svt.,

OCTAVE PAVY, *M. D.*

To the COM'D'G OFFICER OF THE U. S. ARCTIC EXP'D.

APPENDIX No. 115.—*Lieutenant Greely's certificate to Dr. Pavy.*

May 14, 1884.

GENERAL HAZEN: Dr. Pavy wishes, for the satisfaction of his wife, that I should write you as to his performance of professional duties during the past terrible winter. His medical skill has contributed to a very great degree in preserving the lives of the party as now constituted, and he has spared himself no physical pains or trouble in carrying out his arduous and trying duties. This, notwithstanding his opinion that he was not legally bound to perform these duties.

A. W. G.

APPENDIX No. 116.—*General certificate to Dr. Pavy.*

CAMP CLAY, *May* 19, 1884.

To whom it may concern:

We, the undersigned, members of the Lady Franklin Bay Polar Expedition, desire to take this means of expressing our acknowledgement of the devoted zeal and professional skill displayed by Dr. Octave Pavy in discharge of his medical duty during the full length of the expedition. During the past winter, 1883–'84, his medical skill has contributed in preserving the lives of the party to the present day.

FRED. F. KISLINGBURY.	D. L. BRAINARD.
C. B. HENRY.	J. R. FREDERICK.
JACOB BENDER.	FRANCIS LONG.
E. ISRAEL.	MAURICE CONNELL.
RODERICK R. SCHNEIDER.	HENRY BIEDERBICK.
Chemnitz, Saxony.	H. S. GARDINER.
NICHOLAS SALOR.	D. C. RALSTON.

APPENDIX No. 117.—*Letter of Lieutenant Greely on Dr. Pavy.*

MAY 21, 1884.

General HAZEN: Learn to-day that Dr. Pavy has drawn up and had copied by Sergeant Israel a statement as to his skill, &c., this winter. Every man is now on the verge of the grave and under the hands of Dr. Pavy, who is the strongest of us all, and we are all at his mercy, so to say. The value of such a certificate is evident. I have sworn evidence of five men that Dr. Pavy has stolen at various times bread from his crippled patient, Sergeant Elison, and also evidence that he has stolen extract of beef from medical stores. He will probably survive. I have no hopes for myself. I close this book to-day to try and secure it to you. Good-bye, general.

A. W. GREELY,
Lieutenant, Commanding.

APPENDIX No. 118.—*Order for Private Henry's execution.*

NEAR CAPE SABINE, *June* 6, 1884.

Sergeants BRAINARD, LONG, and FREDERICK: Notwithstanding promises given by Private C. B. Henry yesterday, he has since acknowledged to me having tampered with seal thongs, if not other food, at the old camp. This pertinacity and audacity is the destruction of this party if not at once ended. Private Henry will be shot to-day, all care being taken to prevent his injuring any one, as his physical strength is greater than that of any two men. Decide the manner of death by two ball and one blank cartridge. This order is *imperative*, and *absolutely necessary* for *any chance* of life.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding Lady Franklin Bay Expedition.

APPENDIX No. 119.—*Report of Private Henry's execution.*

PORTSMOUTH, N. H., *August* 11, 1884.

SIR: I have the honor to report that on June 6, 1884, at Camp Clay, near Cape Sabine, Grinnell Land, it became necessary for me to order the military execution of Private Charles B. Henry, Fifth Cavalry, for continued thieving. The order was given in writing on my undivided responsibility, being deemed absolutely essential for the safety of the surviving members of the expedition. Ten had already died of starvation, and two more lay at the point of death.

The facts inducing my action were as follows: Provisions had been stolen in November, 1883, and Henry's complicity therein was more than suspected. March 24, 1884, the party nearly perished from asphyxia. While several men were unconscious and efforts were being made for their restoration, Private Henry stole about two pounds of bacon from the mess stores. He was not only seen by Eskimo Jens Edwards, but his stomach being overloaded he threw up the undigested bacon. An open investigation was held and every member of the party declared him guilty of this and other thefts. A clamor for his life was raised, but was repressed by me. I put him under surveillance until our waning strength rendered his physical services indispensable. Later he was found one day intoxicated, having stolen the liquor on hand for general issue. A second time his life was demanded, but I again spared him.

On June 5 thefts of provisions on his part having been reported to me, I had a conversation with him, in which I appealed to his practical sense, pointing out that union was necessary to our preservation. He promised reformation, but, distrusting, I issued a written order that he should be shot if detected stealing. On June 6 he not only stole part of the shrimps for our breakfast, but visiting, unauthorized, our winter camp, stole certain seal-skin reserved for food. I then ordered him shot. On his person was found a silver chronograph abandoned by me at Fort Conger and stolen by him. In his bag was found a large quantity of seal-skin, and a pair of seal-skin boots stolen a few days before from the hunter. Suspecting complicity on the part of several, I ordered his execution by three of the most reliable men. After his death the order

was read to the entire party, and was concurred in by every member as being not only just, but as essential to our safety. To avoid public scandal, I ordered that no man should speak of this matter until an official report was made of the facts. I have the honor to request that a court of inquiry be ordered, or a court-martial convened, should the honorable Secretary of War deem either advisable in this case. I have thought it best not to ask the written statements of the surviving members of the party for appendices to this report, lest I might seem to be tampering with them. I have not asked since our rescue—June 22—whether their opinions concurring in my action have changed or not, leaving such questions to your action, if deemed requisite. I necessarily regret that circumstances imposed such a terrible responsibility upon me, but I am conscious that I would have failed in my duty to the rest of my party had I not acted promptly and summarily.

I am, respectfully, yours,

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding Lady Franklin Bay Expedition.

ADJUTANT-GENERAL OF THE ARMY,
(*Through the Chief Signal Officer, Washington, D. C.*)

APPENDIX No. 120.—*Letter of Secretary of War, approving Lieutenant Greely's course regarding execution of Private Henry.*

WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE,
WASHINGTON, *November* 14, 1884.

SIR: Referring to your letter dated August 11, 1884, reporting that on June 6, 1884, at Camp Clay, near Cape Sabine, you had ordered the military execution of Private Charles B. Henry, Fifth Cavalry, a member of the expedition under your command, giving details of the cause of such execution, and asking for the appointment of a court of inquiry in the matter, I have the honor to inform you that upon consideration of your report, in connection with extracts from the diaries of the several members of the Lady Franklin Bay Expedition, and also in connection with the diary of Private Henry himself, the Secretary of War entertains no doubt of the necessity, and the entire propriety of your action in ordering the execution of Private Henry, under the circumstances and in the manner set forth in your report.

The Secretary therefore does not consider that the appointment of a court of inquiry to investigate the matter is required by the public interest.

Very respectfully, your obedient servant,

R. C. DRUM,
Adjutant-General.

Lieut. A. W. GREELY,
Fifth Cavalry, Acting Signal Officer,
(*Through the Chief Signal Officer of the Army.*)

APPENDIX No. 121.—*List of deaths.*

List of deaths in the Lady Franklin Bay Expedition.

Name.	Rank.	Regiment.	Date of death.	Cause of death.
			1884.	
W. H. Cross	Sergeant	General Service	Jan. 18	Scurvy.
F. T. Christiansen (Eskimo).			Apr. 5	Incipient scurvy (probably) and starvation.
David Linn	Sergeant	Company C, Second Cavalry, U. S. A.	Apr. 6	Starvation.
George W. Rice	do	Signal Corps, U. S. A	Apr. 9	Exhaustion during storm.
James B. Lockwood	First lieutenant, A. S. O	Twenty-third Infantry, U. S. A	Apr. 9	Starvation.
W. S. Jewell	Sergeant	Signal Corps, U. S. A	Apr. 12	Do.
Jens Edward (Eskimo)			Apr. 29	Drowned.
W. A. Ellis	Private	Company C, Second Cavalry, U. S. A.	May 19	Starvation.
D. C. Ralston	Sergeant	Signal Corps, U. S. A	May 23	Do.
William Whisler	Private	Company F, Ninth Infantry, U. S. A.	May 24	Do.
Edward Israel	Sergeant	Signal Corps, U. S. A	May 27	Do.
F. F. Kislingbury	Second lieutenant, A. S. O	Eleventh Infantry, U. S. A	June 1	Do.
Nicholas Salor	Corporal	Company H, Second Cavalry, U. S. A.	June 3	Do.
Charles B. Henry	Private	Company E, Fifth Cavalry, U. S. A	June 6	Shot by order.
Jacob Bender	do	Company F, Ninth Infantry, U. S. A.	June 6	Starvation.
Octave Pavy	Acting assistant surgeon	United States Army	June 6	Starvation; hastened by narcotics.
H. S. Gardiner	Sergeant	Signal Corps, U. S. A	June 12	Inflammation of the bowels and starvation.
R. R. Schneider	Private	Company A, First Artillery, U. S. A.	June 18	Starvation, and probably incipient scurvy.
Joseph Elison	Sergeant	Company E, Tenth Infantry, U. S. A.	July 8	Effect of frost-bite.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding Lady Franklin Bay Expedition.

APPENDIX No. 122.—*Order relative to Private Henry, dated June 5, 1884.*

NEAR CAPE SABINE, *June* 5, 1884.

To Sergeants BRAINARD, FREDERICK, and LONG: Private Henry, having been repeatedly guilty of stealing the provisions of this party, which is now perishing slowly by starvation, has so far been condoned and pardoned. It is, however, imperatively ordered, that if this man be detected either eating food of any kind not issued him regularly, or making caches or appropriating any article of provision, you will at once shoot him and report the matter to me. Any other course would be a fatal leniency, the man being able to overpower any two of our present force.

A. W. GREELY,
First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,
Commanding Lady Franklin Bay Expedition.

LIEUTENANT LOCKWOOD'S JOURNAL, FROM AUGUST 3, 1883.

APPENDIX No. 123.

PHILADELPHIA, *April* 6, 1885.

I, Mary S. McCalla, stenographer, do hereby make oath that the translation of the fourth volume of the stenographic notes of Lieutenant Lockwood's journal of the Greely expedition is a correct, perfect, and full copy of the same, no omission having been made, and no changes made either in substance or sense.

MARY S. MCCALLA,
Stenographer.

STATE OF PENNSYLVANIA, }
Philadelphia County, } *ss:*

Subscribed and sworn to before me this 16th day of April, 1885.

C. HOWARD SCHERMERHORN,
Notary Public.

[C. Howard Schermerhorn, SEAL, Notary, Philadelphia.]

AFFIDAVIT.

STATE OF PENNSYLVANIA, }
County of Philadelphia, } *ss:*

I, William B. Mann, prothonotary of the court of common pleas of said county, do certify that C. Howard Schermerhorn, esquire, before whom the annexed affidavit was made, was at the time of so doing a notary public in and for the county and State aforesaid, duly commissioned and qualified to administer oaths and affirmations, and to take acknowledgments, &c., and to all whose acts as such full faith and credit are and ought to be given, as well in courts of judicature as elsewhere, said court being a court of record; and that I am well acquainted with the handwriting of the said C. Howard Schermerhorn, notary public, and verily believe his signature thereto is genuine, and that said affidavit purports to be taken in all respects as required by the laws of the State of Pennsylvania. In testimony whereof I have hereunto set my hand and affixed the seal of said court this 17th day of April, in the year of our Lord one thousand eight hundred and eighty-five.

WILLIAM B. MANN,
Prothonotary.

COURT OF COMMON PLEAS,
Philadelphia, Pa.

Friday, August 3, 1883.—Still no ship. Kennedy Channel is reported as having a good deal of loose ice drifting south. The ice this day is very much as usual. New ice forms every night, and to some extent during the day, but the loose ice drifting about with the tide keeps it from attaining any thickness. One of the pups (Castor or Pollux, I do not know which) followed me along the shore this evening to North Valley Creek. I was afraid of getting lost. This evening Frederik* [Frederik Christiansen] went out in the

*This word, as in other cases, being misunderstood by the translator, is followed by the correct word bracketed.—A. W. G.

kyak after a seal on the ice, about half a mile in front of the house, but the sly seal took a header and down he went before Frederik [Christiansen] got near. We ate the last of the flour this morning at breakfast, and now have only hard bread and cornmeal. The fresh meat has been gone some time, and now pork and canned corned beef comprise the meat. The latter is not good, being dry and tasteless, and the former is worse than the latter. We have a little canned roast beef (a few cans), which will be used going south, with pemmican, pork, &c.

Saturday, August 4.—Foggy and overcast this morning, but later in the day the fog lifted. This evening it is snowing lightly. Lieutenant Greely and several men were on Mount Cornhill [Cairn Hill]. The straits seem to be packed closer than hitherto—between Dutchland [Dutch Island] and Cape Baird especially so. Kennedy Channel seems to have a good deal more ice. No ship, and no chance of a ship as things are now, nor any present chance of our leaving, though I think Lieutenant Greely will make the attempt even with a very poor prospect, and though the ice remains in *statu quo* for weeks yet. Personally I would rather take almost any chance that offered than stay here another long winter night. Lieutenant Kislingbury and Jans [Jens] got a small seal early this morning in front of the house; weight, 47 pounds. Await more seal to-morrow. "Rit" and "Askim" ["Ask him"] had a terrible fight this morning. They are rival lovers. "Askim" ["Ask him"] got "Rit" down once. They had several rounds. I think it will end by "Askim" ["Ask him"] being king and "Rit" going about with drooping head and tail, like that debased monarch, Old H—— [Howler]. I should rather say would end thus under ordinary circumstances, but when we leave here—if in boats, as probable—the dogs will be shot, or perhaps left with a few days' food against the possible event of our return. Of course, in the latter event (barring our return), they would soon starve to death.

Sunday, August 5.—Fine day; warm, sunny, and calm. It is singular we have no wind. Wind is what we want now. Whisler and Ralston report smoke, as of a steamer, down the straits. They were on Cornhill [Cairn Hill]. It has elicited a good deal of discussion. I doubt it being anything else than fog or clouds, and I judge they more than half think so themselves now. The ship is the only subject of discussion now among the men. I say little or nothing, being satisfied to wait. I do not much believe in fine-spun theories all depending on the ice, the movements of which can be put as much faith in as that of the wind—indeed, hardly so well. We had seal for dinner. It was equal to the last; it tasted oily and fishy—a black, soft kind of flesh, without much fiber. Ralston told me he could not keep it down. Oh for a musk-ox or two! I have read "Put yourself in his place" a second time, and am now galloping through some other stories. I think that if we had lots of fresh meat and a few hundred good books I could survive another winter here; under the circumstances I do not. I shaved off my side whiskers on the 2d; they reached behind my neck; wear only mustache now.

Monday, August 6.—The ice is about the same. I went on Cornhill [Cairn Hill] this evening. I have had a neuralgic pain in head all day. The whale-boat took some things down to Dutchland [Dutch Island]. The ice in the harbor is quite loose.

Tuesday, August 7.—Took a walk by the creek to the east. Several men have been on Cornhill [Cairn Hill], and a good deal of open water is reported in Kennedy Channel. The ice at this end of the harbor is very much scattered and drifts about constantly. Several old paleocrystic floes and hummocks have made their appearance. I suppose they have come in through the western entrance. Yesterday or day before Sergeant Brainard suggested to Lieutenant Greely having the small boat and going across to Baird to get a look down the straits, but the latter would not allow it on the score of danger. Some of the men seem to contemplate a hard winter here.

Wednesday, August 8.—It has been blowing all day, reaching twenty-five miles [per hour, or about 11^{m} per second] or thereabouts from the south. It has made great changes in the ice, so much so that operations have been on float since noon to get off should the opportunity occur. Kennedy Channel is clear or almost clear of ice, and two leads from Baird and the western entrance almost meet. There is a good deal of open water opposite Baird and Lieber and also in Hall's Basin. We may be able to get off to-night. Every one is on the *qui vive*, and the last touches are being put on the operations. However, we are not off yet, and I won't believe we are *en route* until we get to Baird. A lookout has been kept up on the ice all or almost all of the day. The sky is overcast with dark flying clouds, and the air is chilly and disagreeable. I do not feel as if I was going away, much less south and on a journey such as this may be. I have felt much more stirred up the day before the sledge journey.

RETREAT SOUTH.

Thursday, August 9.—We all went down to Dutchland [Dutch Island] and started out—the launch, the whale-boat, and the English boat, and the small boat. Proceeded to Preston's [Proteus] Point and left there at 3 p. m. with Lieutenant Greely and everybody. Reached Bellot Island without much trouble, but after that encountered a good deal of ice and worked very hard. Rice fell overboard.

August 10, p. m., went ashore on snow [Sun] peninsula. Started again, and about 2.30 a. m. got nipped in the ice—everything on the floe. Then turned in and went to sleep about 4 a. m. 8.30 a. m., was waked up by Rice; boats laid up again. 8.45 a. m., started west. Here we proceeded some distance and then stopped, while I went with Sergeant Gardiner and ascertained that open water existed all the way across the fiord. Stopped at 10 o'clock, and the launch started again in about an hour. Crossed the fiord nearly opposite Sun Bay. Found plenty of open water on the south side, extending out from the shore probably two or three miles. Shipped a good many seas. Reached the tent near Depot B [at Baird] at about 2 o'clock. I have hardly slept, and eaten almost nothing since we started, nor since we started until now have I had anything to drink but water. I did not succeed in sleeping at all, and very few of the men were able to get to sleep; 11.15 p. m., started with four boats for the south.

August 11, p. m., reached bluff about a mile below Lieber, where further progress was stopped.

Weather foggy and snowing. Remained here a few minutes and then started for the shore, which we reached at the mouth of the ravine (the same where Lieutenant Greely, Whisler, and I ascended mountain in 1881). At 2 o'clock got in a protected place and waited for the ice to move out. I went to bed early on the shore. Snowing. 8.30 a. m., left the vicinity of Cape Lieber and proceeded south along the coast. Saw fighting narwhals one or two miles below. Weather still overcast but calm.

12 m., ran into a fog above Cape Davis, B. W. (or P. W.) [barometer] 29.75 [755.64^{mm}]. 3 p. m., reached C. [Carl] Ritter B. [Bay] Shoal extending out from shore. Low plain along shore here. Very foggy; cannot see much. Left cache near Cape Cracroft at 10.30 a. m. 4.20, started out again down straits for a mile. Hunter found a shoal about six inches [about 150^{mm}] long on the bar under the water near the place we stopped at. Just back of the level water or plain, and at the top of the cliff, are two sister peaks, making a prominent landmark. After starting again at 4.20 p. m. we soon afterwards encountered a dense fog, and after wandering around among the ice, and staring in every direction, we made next stop only a few miles below last stopping place at 6 o'clock p. m. (first new ice met—that at 5.15 p. m.); continued close along the shore. 11.15 p. m., stopped along the shore to rest. Ice moving north though the tide is running in. Seemed more clear. Very foggy during most of the journey. Do not know where we are. We were stopped by ice for half an hour along shore a half mile back. Turned in on shore and went to sleep.

August 12.—7.50 a. m., got up. Boats aground. 9.20 a. m., started off down south. 12 m., stopped on shore to reconnoiter. 2.30, stopped again to reconnoiter. A great deal of ice met with. We are still above Carl Ritter Bay. 4 p. m., started again; foggy, snowy, and SE. wind. 4.30 p. m., stopped by ice again, exactly opposite small island. Had coffee here. Corporal [Sergeant] Elison went down coast and found one of his old camps. He says we are four and a half miles from Carl Ritter Bay. It is now snowing and very foggy. Watch reported clear water; so at 8 o'clock all hands were called, and at 8.30 p. m. we got off again. 9.40 p. m., reached Carl Ritter Bay; took on the stores left there. Reached south cape of bay in fifty minutes. When passing over found little ice, and gradually became less and less for some hours. It has been blowing and snowing and very disagreeable most of the day. After crossing Carl Ritter Bay we kept on, encountering very little ice indeed.

August 13.—1.45 a. m., reached ice barrier extending across to the south as far as eyes could reach; about ten miles below Carl Ritter Bay stopped over and went to bed. 7.15 a. m., called again for breakfast. At 8 o'clock I went with Jans [Jens] on foot down the coast about one and a half miles, and should say saw about a mile farther than this. There was a dark passage close along the ice field. Outside all was ice, ice, ice. Got back at 10 o'clock. 11.10 a. m., started again with the launch. All hands steamed down the coast about a mile, where we were stopped again by ice at 11.30 a. m. It is now snowing and very foggy. There is a small bay just below here. The ice extends to the east and southeast as far as can be seen. We are 12 or 15 miles, probably, below Carl Ritter Bay. 4 p. m., all hands called again and we proceeded. Met with a great deal of hard ice. Weather, snowing and very foggy. 7 p. m., reached the shore a few

miles below last place, near the little bay, and camped here. Small seal shot near here, which we had for supper. It was very good indeed. Wind changed and now blowing a little from the south. Had supper here and turned in at 10 o'clock.

August 14.—Breakfast at 8 o'clock—pemmican stew. Wind from the northeast, and the ice very much the same. Slept on shore last night as usual. I slept without any protection except that of the bag. Some of the men went hunting last night, but got nothing—saw nothing. Remained here during the 14th. Got meridian observation at noon by Israel. Made latitude 80 deg. 44 min. Turned in at 10 p. m. The weather is clearing up, and the wind begins to blow a little from the north. Supper consisted of a bird-stew, coffee, and hard bread.

August 15.—Very fine day, bright and clear, with light wind from the NE. The ice has hardly changed, though it is drifting south slowly. New ice formed near the shore during the night. A danger of open water pool out in the straits opposite camp. There is a marked absence of paleocrystic ice in the straits. It all seems to consist, except a berg here and there, of ice formed in the straits. Not many water leads visible this morning. Ice, ice, ice in every direction. 8 a. m., breakfast—pemmican, hard bread, and coffee. Slept on shore last night, as I do always. Pretty much every one now as well sleeps on the shore when the opportunity occurs.

August 15.—Wind from the northeast all day. Got up to a good breakfast, and Lieutenant Greely thought that the new ice enlarged and danger of freezing us in, and determined to move the launch and boats off shore a half mile to some ground bergs. We started about 9 o'clock and employed all hands, and managed to get the launch out with a great deal of labor through the old and new ice at 3.30 p. m. Then all hands returned to shore, and at 5.30 p. m., after supper, I started with the men and boats, Lieutenant Greely and some others remaining on the launch. Got the boats and their loads out to a ground[ed] berg just north of the launch in about two hours. Young ice has formed quite thick and has become very threatening. The ice has been moving down the straits very fast all day. Sergeant Cross was apparently drunk on the launch while we were getting her out from shore. At one time he looked out on the deck and said the launch was going to be crushed; all the time it was none of his business. He showed his condition by his appearance, his manner, and neglecting to obey orders promptly. Finally Lieutenant Greely sent him ashore and put the engine in charge of Frederick. Cross has been assigned to the whale-boat (Rice). I took a drink of rum, rum being shared to all.

August 16.—I slept on the berg last night, laying my sleeping-bag on top of the spare sheep-skin one, and thus slept quite comfortably. Rice and his crew slept on the berg, but the rest in the boats. Breakfast this morning about 8.30 a. m. The northeast wind still continues, driving the ice down the straits in one confused mass. No open water can be seen anywhere. Breakfast consisted of coffee, hard bread, and corned beef. Affairs do not look very auspicious. We have 50 days' rations from Carl Ritter Bay. 9.30 p. m., on board launch. I have come over on a visit. It seems palatial here compared with the berg where I have my sleeping-bag and my present bed. One can get from there here by traveling in a semicircle around some intervening bergs. I discovered this route myself. This evening Brainard, in endeavoring to get over directly across the wind [pack], got in the water up to his waist. Ice, ice, ice, everywhere round, and still extending; a narrow lead of some length which extends from the cape above obliquely down the straits. The ice in the straits seemed to be crushed and broken up. The fires here on the launch are kept up night and day; Frederick says he burns about 80 pounds per day. Rice and the crew of the whale-boat have moved from the berg down to the boat itself. I am the only one now left on the berg. To-day I gave Brainard, Ralston, Linn, Elison, Jewell, Salor, and Frederick memoranda of my [indebtedness] to them, *i. e.*, to the first $112, $64 to the next three, and $48 to the last three. At full tide this evening, at about 10 o'clock, noticed a large paleocrystic floe about a mile from shore, going north, and outside of it ice near mid-channel, going south.

August 17.—Beautiful morning; bright, clear, and calm. Breakfast at 8 o'clock. After breakfast I went over to the launch, and we moved nearer to the berg where the boats are without using steam. The young ice is now quite thick, but in many places is constantly broken up by the tides and action of the ice. Slight breeze from the west starting up in the afternoon. Ice may be still noticed going south, though very slowly. A small lane from the cliff above us, stretching obliquely down-stream, is all the open water visible. Open water seen along the Greenland shore last night, stretching up and down some distance. Such a day as this seems heavenly compared with the weather we have had to endure for some time past. No game. We obtained water from a small pool on the berg, but have to break through young ice to get it. It snowed last night.

This evening Lieutenant Greely sent for the spare sheep-skin sleeping-bag which I had been using under mine. I cannot continue to lie on the berg; this necessitates my removal to one of the boats where I now am, on board the Valorous. This boat and the "Phalarope" [*Beaumont*], as the men call her, and the whale-boat all lie gathered in a little harbor formed by three icebergs, all protected from the wind and ice. There are five of us on this boat; six on each of the others. The sleeping-bags are arranged on the masts and sides in some way or other, and we manage to make out. How tiresome and dreary this life is, it is difficult to express. I went on land this afternoon. The whole east side of the straits seem to be clear of ice, and opposite Franklin Island there is open water for half-way across. Down the straits in mid-channel no ice can be seen at all in a certain direction. Yet from the berg here all seems to be ice as far as can be seen. The open water does us no good as it is at present, as we cannot reach it. Oh, for a west or southwest wind! We had snow last night. Long fell through the ice into the water near the berg to-night. Pemmican and coffee for supper.

August 18.—A heavy weight of snow has been falling all day. It commenced in the night. This morning we were all covered. Boats managed to place the sails so as to form part protection. This afternoon one of the bergs just by split in two; it created quite a commotion in the waters, and raised a little tidal wave. This berg is about 15 feet [4.5^{m}] high. The watch reports a good deal of open water, and some men have been sent for by Lieutenant Greely this afternoon to man [move] the launch, but just where or how far I do not know. Everything is wet and damp, cold, and dreary in the extreme. Nothing can be done but lie in the sleeping-bag, or go out on the berg and pace up and down in the storm. The wind is now from the south-east, but there is not much of it here. Breakfast this morning of corned beef, beans, one-half can of each; that is, half a pound of the former and about ten ounces of the latter. The ration of hard bread is a pound; pemmican a pound. The launch succeeded in getting the other side of the berg to which she was attached to about one or two hundred yards [about 90 or 180^{m}] of open water. The ice has been floating both north and south. Its chief direction seems to be south. The wind seems to have more effect than the tide. The straits are still comparatively free of ice some distance outside. Things look rather gloomy at times. The snow falls constantly, and everything is wet and dreary. The men seem to be in pretty good spirits, most of them, but there are many gloomy forebodings. Living about a boat all day in this way the blood becomes chilled, and it is hard to keep warm. 8.30 p. m., call from the launch to bring the boats, according to which we started and with little difficulty reached the launch in half an hour. In one and a half hours more we had got the launch to open water, by the aid of all the men. 11 p. m., we started with boats in tow. Resumed my place on the launch and started. Lieutenant Greely fell off the launch overboard. Kislingbury and I got him by the arm as the float returned and hauled him in. Farther on we ran between two rapidly moving floes, which presented danger of a nip. It stopped snowing by the time we left.

August 19.—After a good run through open water, encountering very little ice except in small pieces, much scattered, we went into a little dock formed by two bergs along the ice-foot, at 3.30 a. m. Four and a half hours on the run; distance probably 15 miles, and perhaps 7 or 8 miles from Cape Lawrence. The weather is clear, being beautiful, and the day bids fair to be fine. No wind of any account. Launch slightly aground at low water at present place. The rise and fall of the tides here is tremendous—from the foot of an ice-foot, probably ten or twelve feet [about 3 or 3.5^{m}] high, over and above it two or three feet [.6 or .9^{m}]. 7 a. m., breakfast, before and after which I got a little sleep, a couple of hours in all. At 10.10 a. m., a lead showing itself to the next headland down the coast, we proceed. Passed this headland, and got some distance beyond in the course of an hour—probably three or four miles—when the ice closed up, and for an hour and a half we worked to get through, succeeded in reaching it, passed above the headland referred to at 12.40 p. m. Weather fine, bright and clear. General character of the ice seems loose and broken up with a great deal of sludge. Made the boats and launch fast along shore. The ice outside runs north like a mill race. Some machinery broke down while we were in the moving ice, but it was fixed temporarily until we reached shore. Has since been made all right again. 5.15 p. m., started again and got along with the thickly packed sludge until 6.15 p. m., when we went into shore again. We are still above Cape Lawrence.

8.10 p. m., Sergeant Brainard with Frederik [Christiansen] started out for Cape Lawrence along the shore. The straits seem full of great masses of broken up ice, which are now floating south with the flood-tide. Full moon came out to-night. Several seals made their appearance near the launch and were unsuccessfully shot at by Lieutenant Kislingbury. It is now (9 p. m.) quite calm and clear; that is, the

air is clear, though the sun is not shining. Lieutenant Greely intended going out into the pack with the launch and boats, after supper, and drift south with it, but gave it up on account of the ice packing against the projection below here. I slept on shore to-night.

August 20.—Waked up at 4.30 a. m. Much open water appeared along the shore. 4.40, started off. Sergeant Brainard had not returned. We got along quite readily. Discerned Sergeant Brainard, Frederik [Christiansen], and doctor above, on shore near Cape Lawrence, and took them on board. Sergeant Brainard had been to the cape and found ice. Reported a pack stretching from Cape Lawrence across to Cape Jackson. Weather very fine; light wind from the southwest. 6.55 a. m., stopped just south of Cape Lawrence, and the men had breakfast. Breakfast on the launch some little time before—pemmican, hard bread and butter, and tea. Lieutenant Greely watched along the shore some distance. 10.15 a. m., started again. Encountered little ice until off Rawlins Bay, when a great deal of sludge was met with. The pack stretches to the left along shore here, and probably extends in a series of floes of different sizes all the way across. The mouth of this bay appears to be occupied by broken up sludge ice. 11.15 a. m., stopped again on shore, on north side of Rawlins Bay near its mouth. Sky to the southwest very thick and foggy, and threatening snow. Several seals seen to-day. They are of daily occurrence. Saw also a gull, called an "Ivory" by Lieutenant Greely. Some birds near our stopping place last night made a great noise; Rice and others thought they were falcons. 4 p. m., the launch was found aground, and it was impossible to get her off. The top of the ice-floe is now on a level with her smoke-stack; she lies alongside of a precipice of ice. Lieutenant Greely intended starting this afternoon, having seen from the heights open water across the bay in one place. It is now contemplated to start as soon as the launch floats. Several seals fired at. Wolf, fox, and ermine tracks, and dung of musk-oxen seen near here by Lieutenant Greely. Vegetation in this vicinity very much resembles that about Fort Conger.

8.30 p. m., started again. Had to make quite a detour to get across Rawlins Bay. Several paleocrystic floes were inside of it. Afterwards encountered a good deal of rubble-ice and also more open water. Crossed the bay in two hours.

August 21.—12.20, reached cape some few miles farther on, and camped for the night after a vain endeavor to get farther against the ebb-tide which had just commenced to run north. Left this harbor and went up the coast a quarter of a mile and moored the vessels between two bergs. Weather during the last run extremely foggy, making it most difficult to find a route. Near bays very indistinct, and distant bays quite invisible. The tides along this coast are more rising, and falling some 12 or 15 feet [about 3.5 to 4.5^{m}]. The ice-foot may be put as at about 10 feet [3^{m}] vertical height usually. On account of the moving ice and the rise and fall of the tides, &c., it is about as difficult to find a suitable place for the launch as it would be for a large ship.

7 a. m., tried to sleep on board launch last night, lying on my sleeping-bag in the stern, but hardly got two hours' rest. Got up again at 4.30 a. m. and found a large paleocrystic floe bearing obliquely in, being pushed by a large floe behind it. The berg saved us. We were pushed a little, however, so that we took the ground slightly. Weather overcast, cold and dreary. A good many dovekies seen every day. We started about 10 a. m., after allowing the best opportunity to pass in waiting for Sergeant Jewell, who had gone off on the heights to take a look. I lay down to get some rest while Brainard did the starting. After running about an hour through much ice I was suddenly called, and on getting up and going out found that the risk of a nipping all over imminent. The whale-boat got a nip which sprained some of her timbers and just managed to get the other boats out in time. Likewise there was much difficulty with the launch. Large cakes of ice and sludge were running rapidly north. We stopped about a mile from Cape Wilkes. Then walked down to the cape to get a look for a better harbor than our present place affords. The straits, except a few leads, seem full of sludge ice, with here and there a large floe, though I saw a lead running across Richardson Bay.

P. m., left stopping place near Cape Wilkes and found very good traveling for some distance into Richardson Bay. There, however, we got into several blind leads and had to make several long detours. The ice was so thick that it stopped the launch even after all the boats had been dropped, and great efforts were necessary to get through. However, by perseverance we finally accomplished it and crossing open-water spaces, and winding through pools we finally got through and made the shore on the south side of the bay, some distance from its mouth, in a few hours. We examined this vicinity for the English rations left by Nares at Cape Collinson, but without success. Stopped here an hour and then continued on to the

cape at the south side of the bay at its mouth. No rations were found here. We reached this place at 7 o'clock, about. Sergeant Brainard with Bender sees [goes] to the west cape, distant along shore perhaps four miles. Weather overcast but clear. The straits are full of sludge and floes small and large. There is no wind of any account. Got to bed on shore about 9 p. m.

August 22.—Was wakened up at 4.15, and about 4.30 we got off. Proceeded along, and after various stops and delays reached Joiner Bay about 9 a. m. Here we stopped some time, while I went along the coast and found a harbor about three-fourths of a mile farther on. Going back and reporting this to Lieutenant Greely, the launch and boats started and went into a little natural dock formed by three bergs and fully protected from the ice and wind. At Cape Collinson we took on the 240 English rations. The bread had been partially eaten by foxes, but the rest (about half) was all right. Weather during the day foggy and drizzling at times. Launch ran afoul of a small cake of ice while Lieutenant Greely was directing her course and disarranged some of the machinery. Seals and dovekies seen during the day. We are now about latitude 80°.

Remained in little ice dock. Lieutenant Greely and some others got some sleep, but I got none, as I could not get ashore off the berg except by boat. The men arranged sails over the boats, and most of them slept. The weather was drizzling and raining, with a dull southwest wind—very disagreeable. 3 p. m., the ice opened up along shore and lay scattered out in Scoresby Bay, so we started and ran up the bay a mile or two, when we turned to the right and went ashore to get a look at the condition of the ice. A lead was seen running across the bay, though much filled with broken ice. About this time Frederick discovered that the pump of the engine leaked. About half-way across the bay we got through the ice entirely, and entered a vast expanse, covered, however, with a thick fog shutting out the land. Found a pack of paleocrystic ice on the south shore and rounded it near the farther cape. Saw here two very large bergs aground a long way from shore. 5.45 p. m., reached Cape Norton Shaw and found the water along shore very clear of ice, though the pack lay outside heavy as ever. 6.15 p. m., came to a place after floating along shore and came in close, and we were unable to go farther. Selected a harbor near by and stopped.

August 23.—Got up at 8 a. m. after a very satisfactory sleep on board launch, one of the few good rests I have had on this trip. It was too low water, and a good deal of open water along shore. 8.30 a. m., started and ran up [down] the coast for a half hour, about one and a half miles, I suppose. We then came to a projecting point, against which pack was crowded so close as to stop farther progress. The boats were moored along shore a few hundred yards to the south, but it was not a good place, and after awhile the pack from above came moving down-stream against boats, and they escaped narrowly being nipped. The red boat [*Valorous*] was forced to fly up to the point referred to before finding a safe place. At this place a considerable space of open water exists by reason of a number of bergs aground near shore, forming a kind of breakwater. The sun shines overhead but it is very foggy around the horizon for some distance in altitude, so that nothing can be seen beyond a half mile. The men have put their sleeping-bags out on shore to dry, and are sunning themselves on the beach. It is only on the beach, and other few places here and there, that there is not a great deal of snow. Latitude of this place, by meridian observation by Israel, 79 deg. 51 min.; high tide at 2.15 p. m.

3 p. m. the ice opened up, and we started again and ran through open water for thirty minutes. It gradually took us out from the shore a little ways, and at the end of that time we again encountered pack. It was foggy and snowy; could not see very well. Lieutenant Greely proposed leaving the boats attached to the floe, but afterwards, at my suggestion, decided to attempt running into land. We worked our way through dense masses of sludge ice until about 4 o'clock, when we were able to get no farther, and moored alongside of a little floe about 25 by 35 yards [about 22 by 32^{m}] dimensions. The fog became thicker and heavier. We are still here anticipating a nip, but have had none. The boats are partially pulled up on the floe. Things look somewhat gloomy. Thick sludge ice all around, and no open water now in sight. A slight air stirring is from the northeast. There may be a very slight motion of the floe out from the land, but it is almost imperceptible. The surrounding ice is mostly small pieces, with sludge in between. One very large and another smaller berg are off to the south a few hundred yards. We are now about a mile or so on the north side of the projecting headland, which is probably Cape John Barrow. Steam is kept up all the time and has been on the whole trip, the fire going out but on two occasions, so Linn says. About 80 pounds a day are necessary for banking. The wood of the small boat recently broken up is being used to-night for banking, as we have but a half box of coal left, hardly enough for a day's run.

12 o'clock midnight. I have been on watch, Lieutenant Greely sleeping. The ice has changed but a little. The floe we are attached to seems to have moved out somewhat from land, and also very slightly to the south. Certain movements in the ice have at times caused me some apprehension, and the "Phalarope" [*Beaumont*] was pulled up higher, the ice pressing against her. Every once in a while the ice moves slightly, with a low grinding noise. It is difficult to explain.

August 24.—1.30 a. m. Lieutenant Greely came on deck and sent me below for some sleep. I did not wake up until after we had reached land. It seems that about 6 o'clock the ice loosened up sufficiently to get under way, and in the course of twenty minutes we were able to get in to the ice-foot. We drifted about a mile. Weather very foggy and snowing; wet, drizzling, and generally disagreeable. 9 a. m., our little indentation along the ice-foot afforded poor shelter. The ice moving rapidly to the south threatened to crush the boats, all of which could not get into the little place. As a choice between two evils, I recommended dropping down with the tide to a better harbor about a quarter of a mile below. This we accordingly did with the launch and the *Beaumont*, the two other boats remaining. We worked through the sludge and small floes and pieces with some risk, but accomplished it subsequently. The wind is now from the northeast. There is a body of open water some distance off shore to the northeast, but elsewhere the ice seems heavily packed. We are now at the north cape of Maury Bay. Sergeant Brainard returned at 11 a. m. from the farther side of this bay. He reached what is doubtless Cape Frazer. Could see little ways beyond. Found ice heavily packed. 11 p. m., we are still here. The launch and boats have been moved in between some grounded bergs and the ice-foot, in a very secure position. The rise and fall of the tide here is immense. At high tide we were on a level with the top of the adjoining berg. Now we are way below it. The weather is very foggy, and thick and drizzling—disagreeable in the extreme. However, in the launch here we are pretty comfortable, under the turtle back. The ice has opened up somewhat, but still there is no opportunity of leaving. The fires under the boilers are kept banked with odd pieces of wood, lockers of the launch, &c. Pemmican, tea, and hard bread is our staple article of diet.

August 25.—4.40 a. m. started off, the ice being loose enough and forming small lanes and pools of open water here and there. More or less fog all the time. Light breeze from the southwest made it quite uncomfortable for me at the rudder. Passed two small bays. 7 a. m., stopped, unable to go farther. There is a large bay ahead, with high, precipitous cliffs on the farther side. I think it must be Dobbin Bay. Used about entire load of coal in the run this morning. The ice is moving slowly north with the ebb-tide. I think we have just passed Point Hayes. 12 m. Still here awaiting a break in the ice, which has rounded up somewhat, but still keeps together too close to make farther progress to the south. We are moored to a large, sloping berg. Israel made the latitude 79 deg. 45 min., but expressed a good deal of doubt as to the accuracy of it. This would place us opposite Cape Frazer. I was out also with my sextant, by Lieutenant Greely's wishes, but did nothing, the marker being too dirty. Frederik [Christiansen] shot a seal about 11 o'clock; we got him before he sunk. It is clear overhead, at times the sun shines, but around the horizon very foggy. Some of the men drank the blood of the seal—Bender, Israel, &c. Bender, Biederbick, and Long reached their convalescence.

5.40 p. m. Open water reported some time previously, and at this hour we started. Got through the broken pack-ice in ten minutes and came to what looked like an open sea. But, unfortunately, a dense fog set in. However, ice was seen ahead, and, after an hour's run, we ran in near shore and stopped by some grounded bergs. Had supper here of the seal shot. A very fine natural dock near by, and basin with ice-foot running all around, and an outlet through a narrow gateway. From the top of the berg open water was seen again beyond this ice, which ran out from the shore like a tongue, projecting into the strait a couple of miles out to a large iceberg. At 7.25 p. m. left again and went around this tongue; encountered a dense fog and lost sight of land for awhile; continued on down the coast, very dense fog continuing. In two and a half hours met ice again, extending out from shore indefinitely; could not get by and ran into shore, reaching it at 10.05 p. m. Jewell, Ellis, and Frederick were sent down to Cape Louis Napoleon, some few miles ahead of us. Some of the men went to work on the tongue of the floe projecting against the shore, which seems to form the principal obstacle to our progress. It has now cleared up slightly. I went to sleep about 10.30.

2 a. m. Was wakened up and we started. It was found impossible to get along the shore, but a lead had been seen out from shore by the iceberg, and we took a course in this direction. Stopped at the berg and took a look. Reached shore again by making a long detour around the floating pack. Continued on through dense fog, rendering it necessary to hug the shore very closely. 4.10 a. m., reached Cape Louis

Napoleon. Bear tracks seen in the snow on shore. Got to bed about 4.30 a. m.; got up about 9 a. m. Jans [Jens] shot a big seal alongside the launch, but he sank. 9.15 a. m., left Cape Louis Napoleon. It was very foggy and the opposite coast could not be seen, but we took a course southwest by the sun, went ahead some time until ice appeared ahead pretty thick, when we turned to the right and took a course by the bay. Got near the other shore, but could not get in on account of the ice. Went down the bay again, keeping near the east shore. Exceedingly foggy. Found nothing at all could be seen in any direction. 1.15 p. m. reached Cape Hawkes; came by the west side of Washington Irving Island. 4.25 p. m., started from Cape Hawkes, having found the English depot of rations. We got five boxes of hard bread, keg of rum, 12 cans of potatoes, &c. Weather very fine; calm and clear. Steamed from Hawkes for some time in the open water, but after a few miles came to floating ice, which gradually became thicker. Boats took the launch in tow for awhile, Frederick having something to repair about the engine. 9.30 p. m., stopped in the floe in Princess Marie Bay, it being thought unadvisable to attempt going farther.

August 27.—7 a. m., got up after a good sleep on my sleeping-bag on the floe. Sky overcast and foggy. No land in sight. Israel makes our longitude 73 deg. west, latitude 79 deg. 22 min., assumed. Temperature possibly about 22 degrees [−5.6° C.] last night. There are a great many dangers in being out in the straits in this wet [way], but probably it is better than the other alternative. The English had great difficulty in crossing Allman Bay, having to wade through young ice four inches thick [102^{mm}]. This they managed to accomplish, but of course, the little launch could never get through any such ice. There must be some outlet drift here, so that even if we are held here several days we ought to make several miles south. I blame myself a dozen times a day for leaving my seal-skin coat behind; it would be just the thing here; but it was left under the understanding that no surplus clothing was to be brought. A rule which has not been held to by every one. I find that one of my seal-skin boots is too short entirely. I have nothing besides but an old pair of moccasins. We now have what coal remains in the bunkers. Indeed, one of them is not half full. However, we got a good many barrel staves, &c., at Cape Hawkes, and with any kind of luck ought to be able to reach Littleton Island with the launch. It is much to be desired. I feel no confidence in finding a ship at Littleton Island, but if we could get there with the launch, the coal left there in 1881 would probably enable us to reach the Carey Islands, where we could live on the English cache until next spring. Failing to find stores or a ship at Littleton Island, or to reach Carey Islands, our position would be deplorable in the extreme, and our very existence would depend on being able to find a living with the Eskimo above Cape York and that region. Of course, reaching Littleton Island is now *sine qua non*. 9 p. m. The sky cleared off in the afternoon and the coast became clear. Result of compass observation by Israel seems to show a slight motion of our floe towards the west and north.

Compass bearings from floe, Cape Hawkes, 312, 311, 311. North Cape, Allman Bay, 253, 255, 256.

August 28.—8.15 a. m. got up. 9 a. m., compass bearings, Cape Hawkes, 309, 310, 311, 312 (305 ½.) Compass bearings, Cape X, 254¼, 260, 252¼, 252¼, 248½, 257, 257, 251¾. West end of big berg, 92, 109, 107, 99, 101. Weather clear and perfectly calm. Young ice thicker. No apparent change in our position. A tripod of masts has been erected on the floe, from which we can get an outlook. A proposition was made to Lieutenant Greely to reduce the rations, but he thinks it is not necessary to do so. Green tea and pemmican are the staple articles of diet. The tea has very little sugar and is very bitter. The potatoes are used to some extent. It was two or three hours last night before I got to sleep, owing to cold feet. I have nothing under my bag between it and the snow, and it gets very damp. Several seals made their appearance last night, but none were shot. A gull (burgomaster) also came near.

9 p. m. turned in. I have got the small sail of the "Phalarope" [*Beaumont*], which put under my bag renders it much more comfortable. The sky has clouded over, a sign perhaps of the much hoped for wind. The most of the men have been walking on the floe this evening, singing. This floe is about 150 yards [137^{m}] across in its widest part. The young ice grows thicker. We are in a very precarious position. Thus beset, with only 30 days' rations, is a serious matter. There is no wind at present. The temperature last night fell as low as +13 degrees [−10.6° C.]. The compass bearings, as well as lineaments of objects on shore, seem to establish a slight eastern [northern?] as well as westerly movement. At the same time, Israel's observations to-day gave us 79 deg. 23 min. latitude, which makes farther north than yesterday. The time passes very monotonously. As for me, give me risks and dangers of action rather than this dead calm. If there is help awaiting us at Littleton Island, we are probably all right. If not, I am afraid, very much afraid, and it will be almost impossible to reach the Carey Islands unless we get out of this sound very soon. Time is precious.

August 29.—7.15 a. m. breakfast—pemmican and coffee. The coffee very weak and without milk or sugar which one can detect. Sky overcast but no wind. Young ice looks thicker. The whole day passed after breakfast in sitting beside the engine in a very crowded position. The stern sheets occupied by Greely and others in the sleeping-bags. Some of the men have made use of water found on the ice near by, to wash. I am one of those who remain unchanged and about as black as a sweep. 9.30 p. m., turned in. The sun set behind the cliffs to the west about 9 o'clock. Overcast, though clear most of the day. This evening the sun has been shining brightly. Spent the last two hours in promenading the floe, thinking a little of everything. Wind, wind, wind is what we want. We seem to have drifted somewhat to the south during the day, but hardly more than a mile, if that. The pickles obtained at Cape Hawkes were opened for supper. The young ice lies all around. The spirits of the men seem quite good, considering our position. The signal flag flies from the top of the tripod. Thermometer to-day not so low. It has been decided to let the fire on the launch go out altogether. Barrel staves and one bunker of coal is now about all we have in the way of fuel. Bender is sleeping out on the floe to-day in Lieutenant Greely's sleeping-bag. Some open water pools were noticed to-day in the distance. Cape Hawkes bears north 33 deg. east.

August 30.—Still in the same place. 7 a. m., breakfast—sour tea and pemmican stew. The lowest temperature last night was +10 degrees [—12.2° C.]. Morning clear and calm; sun shining brightly. Our floe seems to have drifted out from shore a little farther, but hardly approachable to the south. Walked the floe until 9 o'clock and then got in my sleeping-bag. Frederik [Christiansen] crossed a small pool near the launch on the young ice. At the present rate it will soon be thick enough to bear. Meridian observation by Israel to-day makes our latitude 79 deg. 22 min. even. An inventory of the rations was taken to-day. It seems we have 1,140 pounds of meat and 1,100 pounds of bread—about 50 days' rations of bread and meat, including some soup. There are also some potatoes, stearine, cranberries, and a little sugar.

8 p. m., turned in, after tramping the floe for nearly two hours. Sky overcast, with slight air starting from the south. Connell has been looking towards Cape Sabine, in which direction he thinks he saw a smoke or something like one. This life is worse than anything. This daily inaction is more trying to me than want of sleep and any amount of risks. The longitude, as found by Israel in the afternoon, was 73 deg. 45 min. Supper to-night cooked with stearine. Tea boiled in half-hour. The air is just cold enough to make it uncomfortable unless on the move. It is a constant effort to keep one's feet and hands warm unless exercising. Three gulls [burgomasters?] seen to-day. The red signal flag flies from the top of the tripod. All around is a vast expanse of ice and snow, broken on the west by the rocky cliffs and the snow-covered mountains behind. Bearing of Cape Hawkes to-day north 17 deg. E.

August 31.—Breakfast at the usual hour. Morning cloudy, snowing, with light wind from the north. The boats put up their sails as coverings. I returned the small sail I had been using and went aboard the launch with my bag. Lieutenant Greely, Israel, and Biederbick slept in the buffalo sleeping-bag, I in my seal-skin bag, and Bender in Lieutenant Greely's bag, stretched on the bunk by the engine; Linn and Frederick forward, as usual. The ice remains apparently in *statu quo*. All land is invisible. 9.30 p. m., temperature 28.8 [—1.8° C.]. It has been 32 deg. [0.0° C.] during the day, and perhaps higher. This rise in the temperature has made a perceptible difference on the ice. There is a good deal of sludge on the bare spots on the floe where the snow has not appeared, and which have formed our promenades. The young ice recently formed also looked rotten. Frederik [Christiansen] says it won't bear now. The other day I walked across the small pool near the launch. It has been cloudy all day, and we had a light north wind, but very light, and it made no perceptible difference in our surroundings. The American flag now floats alongside the signal flag from the top of the tripod. Lieutenant Greely to-day approached the subject of our stay here, provided, of course, the young ice forms thick enough to bear. He mentions the 10th of September as the limit of time it would be advisable to stay waiting for the wind to break up the floes so that we can proceed by boat. In this regard I agreed with him. He proposes, however, to take along but one boat, in case we sledge it over the ice, thinking we could not take more than one. We only have one pair of runners. I said I thought it a very serious matter to proceed with one boat only, and we ought at least to attempt to take two; to make the attempt at least. In case of our departure with one boat, our situation would be terrible should we meet with a wide lead of open water, or even a comparatively narrow one, with fog and snow; and in case Littleton Island were reached and no help found there, our situation would be again extremely critical with but one boat, knowing of course but half of the party could be transported at a time in this way. We have now two recourses of escape. One is by boat as heretofore, which is contingent on

the ice breaking up. The other is over the ice, which is contingent on the young ice getting thick enough to bear. Rice told me to-day that when on Washington Irving Island he thought a ship could have got up to that place. It makes it more unexplainable why we have seen no ship, and to my mind makes it extremely doubtful of our seeing a ship or meeting any help at Littleton Island.

This morning it snowed and I brought my bag in the launch. The stern has been hitherto occupied by Lieutenant Greely, Biederbick, and Bender, and now myself. Frederick and Linn sleep forward. Bender made use of some expressions to-day on account of which Lieutenant Greely made him move on to one of the boats, or rather insisted on his doing as he threatened to do. Israel announces a slight drift since yesterday towards the east and south. I feel some doubt, however, as from bearings on shore, though we have got farther towards the east, I cannot see that we have gone south any. Reading matter is scarce. I brought along a few Shakespeare pamphlets and the Nineteenth Century. We have Kane, Hayes, and Nares on the launch, and the Arctic Papers (English) of 1876. The stearine does very well, though it makes a disagreeable smoke.

September 1, *Saturday*.—Breakfast at the usual hour, 7 a. m. Morning overcast, but clear. No wind. Slight movement to the east during the night. During the night two walrus were heard near by. The Eskimo said they were walrus. (Mean memorandum of) [minimum] temperature 26 deg. [−3.3° C.]. Temperature at this hour a degree or two higher. I did not get to sleep until about 3 o'clock this morning owing to the cramped condition of my body, heat of the sleeping-bag, &c. Meridian observation made our latitude 79 deg. 19 min., probably correct within half a mile. A small seal was brought in by Frederik [Christiansen] and Jans [Jens]. They got him on the ice a mile or two off, having to cross a few recently frozen lanes *en route*. Cape Hawkes bears north 14 deg. E. 8.30 p. m., fog around the horizon; island concealed. Clear overhead, however. At 2.35 p. m. the ice all around in every direction suddenly commenced to move, and the young ice was speedily crushed. The ice adjoining began to make an attack on the launch and boats. The boats were readily hauled out of the water on the floe. The pressure on the launch pushed her up until there was danger of her going over altogether. However, she rose beautifully until the pressure was relieved, and thus remained for many hours. Everything was hastily thrown out on the floe, as we did not know at what moment she might be on her beam end. The ice all around continued in motion, one floe moving one way and another another. We all stood and stood around surveying the scene. About 6 o'clock p. m. the pressure was relieved with the ebb-tide probably, and the launch righted herself. Since the nip the horizon has been quite foggy, so that the amount of drift cannot be determined. The sun shone during the afternoon and was warm and comfortable. Frederik [Christiansen] shot a seal to-day, and we had supper of seal, liked very much by every one. Several pools and lanes of open water have appeared at different times, and the ice all about seems quite loose. There is a chance of our being able to get away to-night and the boiler has been refilled with water. Frederik [Christiansen] and Jans [Jens], who went out after the seal about the time the commotion in the ice occurred, had some difficulty in getting back to the floe, but accomplished it by means of the kyak. I did not get to sleep until 3 o'clock this morning. This evening Lieutenant Greely, Israel, [and] Biederbick are sleeping in the three-man bag on the floe. I have the stern of the launch to myself. Frederick and Linn are also on board. Jans [Jens] shot a small seal shortly before midnight.

September 2.—At midnight last night we had another nip. The launch was lifted bodily up until she was completely out of water, and raised on an even keel. I got up during the commotion, but turned in again. The launch is besides much washed by the loosening in the ice an hour or so afterwards. The commotion continued at intervals during the night, but I got to sleep about 2 o'clock and know of nothing more. 8 a. m., got up to breakfast. Seal meat very good. The sky completely hidden except around the horizon, where it is clear nearly to top of the cliffs. The ice is now practically quiet. The boats are all on the ice and most of the men in their sleeping-bags. Lowest temperature during the night 16° [−8.9° C.]. Cape Hawkes now bears north 15 deg. E. We have probably made a good deal of southing during the last twenty-four hours. Victoria Head looks much nearer. All the seals shot have been small harbor seals. It is cold and disagreeable, and the only way of being at all comfortable is to lie in the sleeping-bag or promenade the floe. The former seems to be the most popular. 1 o'clock p. m., waked up after nap. Foggy, cold, and cheerless. All around is ice. A few pools of water filled with sludge here and there. Between the floes the sludge is pressed very close; in some places almost compact enough to bear one's weight. Every once in a while the ice alongside makes a movement with a slow grinding noise. The launch is now again being raised by the pressure, though not much as yet. I have got used

to this in a manner, and lie and listen to it without rising, unless the commotion is violent. I wonder what they are doing at home. How often I think of the dear ones there. The dangers and uncertainties ahead of us are not alleviated by the thought of the concern felt on my account by those at home. Most of us, I think, have given up the idea of getting home this fall. I dread another winter in this country more than I do anything else. The late commotion in the ice has separated from us a small adjoining floe on which was a little basin of fresh water. This floe is only a little ways off, but at present we are cut off from our supply of water. Light south wind blowing. The ice groans and creaks against the launch as point after point of her bilge gives way before the pressure. 9 p. m., turned in. The nip first referred to raised the launch until her keel was almost on a level with the floe. She remained some time thus and then gradually settled as the pressure was relieved. We had seal again for supper—the one killed by Jans [Jens]. It is cooked with bacon, &c., and is very good. The ice remains pretty much in *statu quo*. It opened up somewhat about supper time and several pools of open water appeared, but they resulted in nothing. Our floe was evidently formed in the straits and is not paleocrystic. A search was made after supper for a larger; but though a larger one is near it does not possess any more advantages. Meals are now cooked altogether with stearine. 11 p. m., moved the launch and boats to a large floe about a quarter of a mile to the southwest, adjoining our old floe.

September 23 [3d].—8 a. m., breakfast, seal meat. Morning overcast. Sun visible at times through the clouds. A bearing of Victoria Head makes that cape south 86 W. The ice around has been quite quiet. The boats are pulled well up on the floe, entirely out of the water. The launch is moored to the ice near by. I suffer a great deal in my hands; very extremely sensitive, more so I suppose than any one else in the party. It is calm with slight air as starting from the south. A meridian observation by Israel makes our latitude 79 deg. 15.6 min. The sun to-day, as on many other occasions, was just visible at noon. Whisler re-enlisted to-day. Our old floe has got ahead of us, and is now some hundred yards to the south. This afternoon, while lying on my bag, I heard the words "Give up," and presently heard Lieutenant Greely call out to Lieutenant Kislingbury and call him to account for criticising his actions with the men; he said that such conduct was but one step from mutiny, as it fomented discontent, &c. Kislingbury denied having said anything that could be so considered, or wishing to cause any dissatisfaction among the men, &c. Some time afterwards Lieutenant Greely called the doctor, Rice, Brainard, and Kislingbury in the launch, and, commencing with Kislingbury, asked each their opinion as to what ought or ought not to be done, stating that our situation was certainly very grave, that we were working for our lives, and he would be glad to have the opinion of each of them. Kislingbury recommended abandoning the launch and making the shore with one or two boats, and "gang [going] around" Buchanan Strait, which he seemed to think was a bay, and thus coasting along shore until we reached Cape Sabine. The doctor's plan was to *abandon everything but one boat*, make the shore, and thus get along. I recommended starting in a day or two. Rice, Brainard, and I were of opinion that it was best to leave matters *in statu quo*, drifting along as at present, and making no immediate move, leaving circumstances to shape our course afterwards to a greater or less extent. This last is, I think, about what Lieutenant Greely intends. So many obstacles and difficulties present themselves in the face of any course of action, that it is extremely difficult to make up one's mind, but they decided for the present that we cannot do better than to remain just as at present. There may be help for us at Cape Sabine, and I think our best course is to make Littleton Island via that place. By doing this we have rations (250) at Cape Sabine, and an opportunity of remaining there till the ice gives us a chance to get across. Lieutenant Greely seems to have an idea that after a while the young ice will form and cement the floes together, so that we can get along by sledge and one boat, in which case he thinks of going directly for Littleton Island. I doubt, however, if we are ever able to do this. During the months of September and October I think the ice will be always broken up and in motion. Lieutenant Greely tells me we have rations at the present rate of allowance to last to November 1—that is, bread, meat, potatoes, and fuel. I go on watch from 10 to 11 p. m., in order to make a kind of "dog watch." Breakfast hereafter is to be at 7 a. m. Our present floe is about half a mile in diameter and near circular in shape. A blubber lamp is kept burning for the smokers. The smokers had two and a quarter pounds of tobacco promised to be shared to them on the 1st.

September 4.—Breakfast at 8. We have drifted several miles since yesterday, though Israel did not succeed in getting observation at noon, it being very cloudy. Victoria Head at that time bore one and a half degress north of west. A large berg that has been near us for several days seemed nearer this morning, and Connell, with Frederik C. [Christiansen] was sent over to it; shortly afterwards I went over and joined them at the

berg. The distance is about a mile as you have to travel. Two large floes intervene between us and it. I saw several leads and pools of open water from the top of the berg, which is probably 100 feet [30m] high, to the northeast and the northwest, &c. Between the berg and shore was a good deal of open water also, or what might be called very loose ice. I saw nothing, however, which offered an opportunity for us to proceed. This berg had a kind of valley about its center, in which were a number of stones. Connell said there was fresh water in her. Young ice immediately around the berg, but thick enough to walk on. One of the floes we crossed was moving, its edge grinding against the next. This afternoon Jans [Jens] shot a small seal. This makes the fourth. He got the usual reward, a drink of rum. Snowing this afternoon. The supplies were taken out of the launch to-day and work on the sledge begun. It is to be a small sledge, not one able to carry a boat. Some of the sails were also cut up in order to make a tent. It is round in form like a Sibley tent. The supports are formed of a number of oars, like the lodge poles of an Indian lodge. 9.30 p. m., a lead opening up towards the south, the boats were launched, and we started in that direction, pushing the launch along as best we could. Steam in the mean time was got up. Proceeded about one hour, when about the time we were ready to use the steam we came to the end of the lead and moored to a small paleocrystic floe of berg. Leads made their appearance further on, but at present there is no chance of reaching them. The lead referred to seems to describe a semicircle, about the middle of which is in a line towards the south from here. Compass bearings of Victoria and Albert Heads from here give for the former 8½ degrees north of west, and the latter S. 34 degrees W. This afternoon from our former floe Victoria Head bore 3½ degrees north of west, and Albert Head S. 34 W. In the afternoon the former was 3 degrees north of west, and the latter S. 34° west. The same as seemed here. Warm enough, so got up. We are probably one and a half miles from our former position. The ice at the present hour, midnight, is squeezing in on us slowly. The boats are hauled up on the floe. The floe has a low mound in the center.

September 5.—Remained up until about 2 o'clock a. m. trying to soften my moccasins; or, rather, they are seal-skin soles. My seal-skin boots are about played out. Besides the sole of one being too short, the material is rotten. My one consolation is that I can manage to make out about as long as we have rations with us, provided there is no sledging over the ice and there is no snow, for in that case I do not know what I should do. Got up to breakfast—coffee and pemmican, hard bread and butter. Sky clear and weather very fine, the sun shining brightly—a great boon in this God-forsaken country. Meridian observations by Israel makes our latitude 79 deg. 8.6 min. We are not very far off Albert Head; it looks quite near. After breakfast I slept until about noon. The fire under the boiler has been allowed to go out. The American flag is displayed at the top of the long pole from the top of our ice mound. The ice crowded against the launch somewhat last night, but there was no particular pressure that I know of. Temperature this evening 13 degrees [−10.6° C.]. Clear and cold. The cooking is still done on the snow. We seem to be drifting along quite rapidly. It is hard to keep warm. Little to do but remain in the sleeping-bag. It is terribly monotonous. I have abandoned my seal-skins, but not yet succeeded in getting my moccasins in working order. They are much ripped and torn. Jans [Jens] went out in his kyak to get a seal, but did not get him.

September 6.—Breakfast of seal meat, as at supper last night. Compass bearings by Israel about 9 o'clock: Victoria Head, 29 degrees north of west; Albert Head 33 degrees south of west. We seem to drift a little north with the ebb-tide generally, though sometimes remain stationary. Morning overcast; air clear. Temperature 23 degrees [−5.0° C.]. Snowed last night. A lead upwards of a mile long made its appearance, which would have enabled us to proceed towards the south, but not enough to make it worth while to cast off from our floe, so it was considered. Biederbick has gone to the boats to sleep for the last two nights, so now Lieuttenant Greely and Israel and myself are the only ones who sleep in the stern. My moccasins are very ragged, and will require much sewing to make them serviceable. The soles are intact. It is their uppers. Meridian observation makes our latitude 79 degrees 6.9 min. A slight wind has recently started in from the north. Dead calms, and southerly breezes have been the prevailing winds. 3.30 p. m. snowing. The tent has been erected over two boats. The other has sails. Long shot a small seal (harbor seal). Jans [Jens] brought it in by means of his kyak. 7.30 p. m., supper. Cold north wind blowing quite fresh. Our neighboring berg seems to be moving along faster than we, and at one time it looked very much as if it were going to come in against our floe.

September 7.—1 p. m., latitude by meridian observation 79 deg. 0.6 min. A gale from the north and northeast has been blowing since yesterday, accompanied at times by snow. The wind has been moderating somewhat, but still we are going along southward, as is shown by sights on shore. The wind has crowded

the ice together very much, and no open water is to be seen in any direction. Our neighboring berg is now very close, hardly more than 50 yards [46^{m}] distant, and apparently will get closer, and perhaps come in contact with our floe. Our floe is about 200 yards [183^{m}] across. Almost circular in form. It is undoubtedly very thick and would stand a good deal of pressure. Quite a number of seals intimate their appearance at different times, but only one has been shot so far. We have passed Cape Albert, and are now about opposite Cape Camperdown. We have moved in quite close to the land. Probably it is not more than three miles distant. The coast from Cape Sabine to Alexandra Harbor is quite distinct. Last night the Greenland coast in the neighborhood of Cape Inglefield was quite plain. Last night we were in danger of a nip at various times, but escaped, fortunately; probably the tongues of ice under water projecting from the floes saved us. Temperature this afternoon 22 degrees [−5.6° C.], and now 23 degrees [−5.0° C.]. Barometer 29.38 [746.24^{mm}]. It is now going up. Cape Sabine bearings at noon 55½ degrees E. Bearings as tested by Israel this afternoon 105 deg. 09 min. Bearings hitherto assumed 110 [degrees], according to English map. The wind went down during the afternoon to almost a calm. The sun came out and it was clear and fine.

9 p. m., thermometer 5 degrees [−15.0° C.]. Clear and calm. Bender made my spoon. The men have got a walk four feet [1.2^{m}] wide around the little hill and running near the floe. 10.15 p. m., retired to rest after a run about the floe for exercise. It is now perfectly calm. There is some danger of our being frozen up. The situation looks more serious.

September 8.—Thermometer rose during the afternoon to 12 degrees [−11.1° C.]. Calm and perfectly clear, and no wind. The sludge became frozen together during the night, and this morning Frederik [Christiansen] went over to the berg. I went shortly afterwards, and was shortly joined by Lieutenant Greely and Rice. The berg is about 100 yards [about 90^{m}] off. A comparatively broad lane of open water or young ice extends from Cape Camperdown two-thirds the way toward the Alexandra Harbor, and except this no open water could be seen. The ice is very rough and extends in every direction. There are floes, and some of them are large and many very small and separated by a good deal of sludge. All this is now frozen together, and the sledges are being got ready for our departure on the ice. We have the English twelve-man sledge, and a small one made from the seats of the launch. The runners are formed from the bands which encased the packing around the boiler. It is now intended to start day after to-morrow, or perhaps to-morrow night. The berg I visited is about a quarter of a mile or more across, broken up by several little valleys. In these valleys are several bowlders and stones. This berg is probably 75 or 100 feet [about 20 or 30^{m}] high. There are several other bergs around, one of them very large, almost like an island in its dimensions. It is proposed to take two boats and abandon one and the launch. The thermometer went below zero [−17·8° C.] last night. Bearings on shore indicate that we have moved none at all, or very little since yesterday. With the ice in its present condition this is not at all surprising. Latitude by meridian observation 79 deg. 0.6 min., the same as yesterday. A walrus was seen last night and shot at by Connell and others. They say he came within three feet [.9^{m}], and though repeatedly hit the shots seemed to have no effect. After awhile a walrus was heard blowing and breaking through the ice near by. Perhaps it was some [same] one. 7.30 p. m., supper. We had the last of the seal. Thermometer went up again to 19 degrees [−7.2° C.]. Connell says they fired a great many shots at the walrus, and none of them seemed to do him any harm. No less than seven shots took effect. Rum to-night and night before last.

September 9.—12 m., lowest temperature last night 8.5 [−13.1° C.] degrees. Cloudy. This forenoon it has been blowing somewhat fresh from the northeast with snow. Still we do not move apparently. The young ice grows thicker, and preparations are under way to abandon the launch to-morrow. A council was called this morning, and the doctor, Kislingbury, Rice, Brainard, and myself, with Lieutenant Greely, and suggestions asked and given with regard to the details of our sledge trip. Two or three miles a day are undisputed. There are seven three-man sleeping-bags and four single bags. An extra bag brought thus far (sheep-skin) is being cut up for sleeping socks and soles. Many of the men are without sleeping-socks. Lieutenant Greely estimates the total weight to be hauled, including the two boats, at 6,500 pounds. We have one English twelve-man sledge, one Eskimo sledge, improvised here, pretty much the same as an ordinary dog-sledge, and also one little hand-sledge about three feet [.9^{m}] long. The launch is to be left chained to the floe. Steam is got up on the launch to-day in order to blow the boiler dry. All are well of the party so far. Biederbick is perhaps an invalid, as he complains of rheumatism. Bender and Long are not

strong, and are liable at any time to break down, but at present they seem all right. Our course is to be to or in the vicinity of Cocked Hat Island, and on reaching shore several things will be left in cache, it being thought advisable to take everything thus far and there abandon them.

SLEDGE TRIP.

September 10 (*1st march*).—Snowing off and on all day. Lieutenant Greely had determined to start to-day but postponed departure on account of the storm. Shortly after noon, however, it cleared somewhat so that the coast near Cape Sabine could be seen. 1.45 p. m., everything being ready, we started with the English boat *Beaumont*, or "Phalarope," as the men call it. Reached camp about one and a quarter miles distant from the launch at 7.15 p. m. It took one and a quarter hours to move the *Beaumont* and load (total with sledge about 1,700 pounds) this distance, hauled by fourteen men. After getting this boat up we went back for the whale-boat. It required two hours to move the whale-boat up. Total weight about 2,100 pounds; 700 pounds are allowed for each boat in this case. Both the small sledges improvised broke down, but the larger of the two was repaired so as to haul one load to our camp. After getting in the whale-boat I went back with a dozen men and hauled in the balance of the stuff which had been moved from the launch a short distance by the improvised sledge referred to. Snowing all the afternoon and very foggy, so as to conceal island and the nearest shore (Cape Camperdown, &c.). The launch [*Lady Greely*] and the red boat [*Valorous*] were abandoned. A record was left on the launch. In the *tepee* improvised twelve men sleep, Lieutenant Greely, myself, Israel, Dr. Pavy, Frederick, Henry, &c. The rest of the men sleep in the two boats, our sails forming protection. The "turtle-back" of the launch has been cut in pieces to go under the sleeping-bags in the *tepee*. The traveling to-day has been through heavy snow, with a few small lakes of level ice, but so few as hardly to deserve notice. Cooking was done in the *tepee* for all hands.

September 11 (*2d march*).—7.15 a. m., breakfast. Morning overcast and calm with very slight breeze. I did not go to sleep until after midnight. Lieutenant Greely thought at first he would not start on account of the weather, but afterwards it cleared somewhat. 8.35 a. m., started off. Made about one and a quarter miles. Probably two miles of latitude have been made during the last two days. Started off with the *Beaumont*, which we hauled to the second camp in one and a half hours. Then returned and brought on whale-boat in one hour, and a third load we had everything in one and a quarter hours. It took an hour to get back to the old camp. Reached camp with the last load at 3 p. m. I went over the route as yesterday five times. Encountered several bands of rubble-ice, but got through without much trouble. Our general course since leaving the launch has been for Cocked Hat Island. For several hours during the march the island was invisible, and it snowed very heavily. Afterwards, shortly after we had returned to camp, it cleared somewhat. The route ahead seems very good. A very wide paleocrystic floe with many small lakes of young ice in the surface. We have found water at every camp and plenty also on the road. Noticed a great difference between the little lakes of fresh water and the surface of exposed ice with salt water underneath. On the latter the sledges moved very hard. Over the former they go with more ease. After getting in we had a lunch of tea and stew saved from breakfast. A half gill of rum was also served out. The traveling to-day has been through heavy snow nearly knee deep, varied in few places by little lakes of smooth ice nearly free of snow. During the afternoon Sergeant Brainard and the doctor went over towards Cocked Hat Island and gained a large berg in that direction. The floe we are now on ends about two miles from here. The traveling over it Brainard reports as through deep snow, though for some distance from camp here there are several little lakes which offer a good route. Beyond this floe Brainard and the doctor report great masses of rubble-ice which extends all the way to the shore apparently. Brainard and the doctor feel sure that they heard dogs bark off in the direction of Cape Camperdown or to the south of it. They heard them three times in succession. After coming back a flag was displayed from a neighboring hummock, and a rifle discharged six times. The outlook at present is rather gloomy. However, if there is help at Sabine we are all right. Indeed, if there is help at Littleton Island we ought not to despair of reaching it, working as we are for our lives. Another council of war to night, the result of the report of the doctor and Brainard. Most recommended moving on to the berg ahead, I among the number. However, the decision arrived at is to stay here. Rice with Jans [Jens] goes out in the morning to reconnoiter. Frederick with Cross went back to the steam-launch and got a box of matches left.

September 12 (*lay over*).—Breakfast at 8 a. m. Air tolerably clear, though the sky is overcast. Rice with the kyak, doctor, and Jans [Jens], left at 8½ o'clock. Thermometer, 17 degrees [−8.3° C.] (mean memorandum) [minimum]; last night, 17 degrees [−8.3° C.]. It seems now that we have rations enough

at the full rate to last forty days more, so Lieutenant Greely said last night. Meridian observation, 78 degrees 58.9 min. Sight not very satisfactory, but probably not more than two-tenths [of a mile] out. Sun came out very bright and warm at about 10.30, but afterwards became obscure again. Rice, doctor, and Jans [Jens] are out; also, Kislingbury and Connell. Hung sleeping-bag, &c., out to dry.

1 p. m., Kislingbury returned. Shortly after him Sergeant Rice, &c. Kislingbury reported sees mass of rubble-ice under the young ice, and saw little chance of proceeding beyond through present floe. His report was very unfavorable. Shortly after this Rice came along. He and Rice [Pavy] said that to the east of the berg, or rather to the east of Cocked Hat Island, the rubble-ice on the floe joined close on to the floe we are now on, and here the young ice lake narrowed to a mere crack. Crossing here and going through upwards of a mile of rubble-ice, they came to a small floe, or it seemed a series of floes, which extended towards Sabine, or to the west of it, into land apparently. Lieutenant Kislingbury, the doctor, Rice, and myself recommended that the whale-boat be abandoned, which was accordingly done. We expect to find boats at Cape Sabine. Lieutenant Greely gave the order to start; 2.10 p. m., we started with the *Beaumont*, and in one hour and twenty minutes reached the end of the floe, where, meeting rubble-ice and a tidal crack, it was decided to go no farther. The small sledge improvised the other day brought up about 500 pounds. Returned, and the load came in fifty minutes, and took the rest of the load to the advance camp again in one hour and fifteen minutes, or at 6.15 p. m. Here we camped. Last share of sugar made [issued] this morning at breakfast. Bear tracks seen to-day on the floe; also fox tracks. Traveling to-day very good comparatively, as of there being a series of small pools or lakes of ice on the surface of the floe. These were covered with about two inches [about 50^{mm}] of snow. Course winding, but quite easy, over these places. Retired to bed about 9 o'clock. Rum to-night; also last night and the night before.

September 13.—7.30 a. m., started. Break through the young ice, frozen after starting; no damage done. Much rubble-ice. Latitude of camp by meridian observation, 79 [78] deg. 56.9 min. Bearing with Cape Sabine, S. 12 degrees; Cocked Hat Island, S. 35 degrees W. Much rubble-ice encountered with small floes. Sledge broke through young ice twice. Bender went through and got wet. Went over the route five times. First advance occupied one hour and fifty-five minutes; second return sixty-five minutes; second advance one hour and twenty minutes; third advance one and a half hours. Saw a walrus. Broke through ice within 35 yards [about 10^{m}] of sledge. Narwhals seen last night, or rather their holes. Fresh bear tracks seen to-day by Brainard ahead of our camp. Sun shone during the afternoon for a few hours. The land now begins to look quite near. The distance from here to the island is put vaguely at from four miles to ten miles. Got in the camp at 3.15 p. m.

September 14.—7.45 a. m., started from camp. Encountered a great deal of rubble-ice. First half-mile very much indeed. Made two trips, going over the road three times. The small sledge broke down while going on the second time, and it was necessary to send small sledge back for it. I did not go back. First advance this morning occupied 3 hours; it took one and a half hours to get back for the second load and then two and a quarter hours to bring the load on. Walrus seen to-day by Brainard while in advance. Large sledge reached camp at 3.35 p. m. Violent SW. gale came on shortly after noon; blowing big guns.

Lieutenant Greely and the doctor had rather a hot argument about supper time. The substance of it was that the doctor said if his advice had been followed he would be at Fort Conger now. This Lieutenant Greely denied. He also said that he had heard Lieutenant Greely give Sergeant Brainard orders this morning to take a direct course for Cape Sabine. Sergeant Brainard, on being called on, said that Lieutenant Greely ordered him to go ahead to the nearest shore, and, other things being equal, to take a route midway between Cocked Hat Island and Cape Sabine. The discussion got quite warm, and criminations and recriminations ensued. The doctor suddenly left the tent. The small sledge broke down and did not get in till 5 p. m. Walrus seen to-day. Since the gale we seem to have drifted to the north or northeast, according to report. Distance traveled to-day about two and a quarter miles. Grinding noise of the moving pack heard all day to the east. Brainard and Jans [Jens], who went ahead selecting, and saw evidences of ice to the south towards the shore. The wind died down altogether about 8 p. m. Our course to-day has been a little to the east of Cocked Hat Island. The issue of pemmican and corned beef commenced to-night.

Latitude by meridian observation, 78 deg. 54.8 min. Water at this camp. We are fortunate in being able to find water at all our camps so far. It has been readily got by cutting through the surface of the little lakes that lie about on the surface of these floes.

September 15.—7.30 a. m. Cooking is being done in here this morning; four lamps. It is still blowing a gale from the southwest. We are now opposite the cape near Albert Head, where we left the launch, &c., on the 10th instant. We are evidently a good deal farther off from this land. It blew, with slight intermissions, all night. I see nothing to do but wait for the storm to go down. We have failed in making the land, and the end and consequence of that may be terrible, as we have only one boat. At the same time, it may not amount to much. Clouds are now hurrying to the northwest. The sun shines through them faintly. The only land visible is the head of Buchanan Strait, Cape Albert and Victoria, and the coast to the north, but the last faintly. Water clouds to the north and west only. Latitude at noon, 79 deg. 1.8 min. The south wind kept up during the day, blowing fitfully [frightfully]. Thermometer ranged between 25 degrees [−3.9° C.] and 30 degrees [−1.1° C.]. We drifted a long ways to the NE. or ENE. The Greenland shore came in sight. We are now this evening, according to compass bearings: Sabine, S. 12 deg. W.; Cocked Hat Island, S. 46 W. Dr. Pavy moved his sleeping-bag from the *tepee* to the sledge to-night. This leaves in the *tepee* Lieutenant Greely, myself, Brainard, Frederick, Henry, Schneider, Whisler, and the two Eskimo, eleven in all.

September 16.—Meridian observation 79 deg. 0.7 min. A beautiful day, calm with sun, the thermometer high. Compass bearings make our position due north of Littleton Island. Brevoort Island clearly visible. Advantage is taken of the weather to dry out the sleeping-bags and clothes. Council called this morning again. The doctor advised starting with as little delay as possible to the SW. The rest pretty generally favor doing nothing for the present until the direction of the drift, &c., are determined. Rice, with Jans [Jens], was sent out to reconnoiter. I went also by myself to the south. Found two large floes extending in a generally eastern direction, which would afford quite good sledge traveling, comparatively safe. The ration is now somewhat cut down, and we eat corned beef entirely. We are now 30 miles from Cairn Point and 19 miles from Sabine. Lieutenant Greely informed me that his present intention is to take a course for the Greenland coast at about Cairn Point. He and I talked over it for some time. The situation is very critical and whether I ever live to write out these notes remains to be seen. Both coasts are plainly visible. The inventory taken to-day of rations. We have 40 days of meat, bread, and potatoes, and near that amount of tea. That is, on the basis of one pound meat, 12 ounces bread, and two ounces of potatoes. Jans [Jens] and Frederik [Christiansen] each shot a seal about 9 p. m. in a water pool about three-quarters of a mile distant. Each seal weighs about 150 pounds. Frederik [Christiansen] goes into his bed whistling on an empty cartridge shell, and the kyak was taken out.

September 17.—Bright, calm, and clear. Slight fog around the horizon, but the Ellesmere shore very distinct. Thought to be about 10 miles distant. Our drift has been southwest since yesterday. Greenland shore very distant, and scarcely visible. Our late sledge tracks now point towards Cape Sabine, and the floe seems still to have a fast, rotary motion. This, or we are drifting very fast. Preparations are being made for starting after noon for the Ellesmere shore. Many things more have to be abandoned. Weights, as figured by Brainard, exclusive of things to be abandoned, 2,737 pounds. Counting our 40 days' ration, at two pounds each, makes 6,700 pounds. Frederik [Christiansen] shot another seal—smaller one. Latitude at noon, 78 deg. 56 min. (Mean memorandum) [minimum] thermometer last night, 2.5° [−16.4° C.]. Rapid rotary motion of the floe. Our old tracks now (1 p. m.) point towards Brevoort Island. Our drift since morning has been towards Cocked Hat Island. We have drifted about two miles since morning. 1.05 p. m., started with the sledge toward Cocked Hat Island. 2.05 p. m., stopped and went back for rest of load. 55 minutes occupied in returning, and one aud a quarter hours in second advance. Bear tracks seen in two places. The old trail near last camp moved 15 degrees in three hours, so Israel reports. After a second advance we moved forward with the boat to a small pool of open water, and got the boat to the edge of it. Left the boat and went back quarter of a mile for supper. After supper advanced rest of the loads across the floe to the edge of the new floe. Got across with everything about 10 p. m. Fine moonlight night. Full moon. Other bear tracks seen to-day. Calm and clear. Biederbick, Henry, and some others complaining. Must have made upwards of three miles to-day. Encountered a great deal of very bad rubble-ice. Looks very close, apparently not more than three or four miles distant. The floe we are now on partakes of the rotary motion, but it is not very fast.

September 18.—8 a. m., started. Stopped for supper on paleocrystic floe at 5.30 p. m. Day calm and clear. Very tiresome—a succession of floes and open water. Hauled sledge for a few hundred yards, and then took the boats. Reached a paleocrystic floe, and then had supper. Rice fell in the water. We have

drifted far to the east, and now (supper time) the land to the south of Cape Sabine opens out very much. Started again at 7 a. m. [p. m.], after a supper of seal meat, and hauled the loads across the paleocrystic floe about three-quarters of a mile. Reached edge of open water at 7.30 [p. m.] and again at 9 p. m., when we found we had drifted farther from shore in the mean time. It being too dark to proceed, we stopped for the night. Two or three walruses seen quite near our last camp just before starting to-day. Bear tracks passed. Our situation is very critical. Latitude at noon 79 [78] deg. 50.3 min. Crossed five leads of open water to-day.

September 19.—We got within two miles of shore last night, when unable to go farther. Waked up this morning and found ourselves drifted away to the northwest [northeast]. We have not gone as far north as we went before, and there is great danger of our being drifted, when the wind subsides, outside of Sabine and down the channel. The floe we are on is entirely surrounded by water, except perhaps on the south side. The *tepee* was not pitched last night, and to-day we lay on the ground [ice]. Our situation is more critical than ever, and our chances of pulling through with our lives depends almost altogether on chance. Breakfast this morning consisted of pemmican and water. There was no cooking done. The sun has been shining brightly all day, but the severe south wind blowing has kept every one in the sleeping-bag. Another council held this evening. The general opinion was to remain *in statu quo* until the direction of the drift assures itself.

September 20.—Got up at 6 o'clock. Cramps in the legs prevented me from sleeping. Morning was very fine. Both shores visible. I could make little or nothing of our position, except that we were a good ways from land. It clouded up at 7.25 a. m., or rather became misty around the horizon, so we could see nothing. About the same time light wind sprang up to the north. The (mean memorandum) [minimum] thermometer is reported at 11 deg. [—11.7° C.] last night. Young ice formed all round the floe. No land can now be seen. This afternoon Frederik [Christiansen] shot a large seal 8⅓ feet [2.5^{m}] long and weighing probably 600 pounds. It was got out of the water by means of Jans' [Jens'] kyak. It required seven or eight men to haul the animal in. No land has been visible since this morning except Brevoort Island, and Cape Albert indistinctly for a few minutes. Drank half a cupful of seal blood. It had very little taste. Lieutenant Greely thought it tasted like raw eggs. Had a stew of seal liver blubber. Snowing all night. Ate some fried blubber just before supper and found it very good. Bearing obtained by Israel of what he thought Brevoort Island in the afternoon was, 12 deg. S. of W. I assumed our latitude as [78°] 50′.

September 21.—Wind and snow all night. Wind from the NW., as well as could be determined. Supper cooked by stearine in the *tepee*. It raised the temperature considerably, but the smoke of the stearine was extremely trying to the eyes, and when the lamps were blown out the fumes were intolerable. It affected Bender's lungs, and Lieutenant Greely sent him to the boat and had him replaced by Connell. This morning there are a great many complaints of the sleeping-bags, which are very wet and unpleasant. The turtle-back of the steam-launch is far inferior to rubber blankets for this purpose. Our prospects look gloomy enough to me. I think we are doomed to drift down the straits and out into Baffin's Bay like the *Polaris*.

12 noon. Still overcast and snowing. All land invisible. Cape Sabine showed itself indistinctly for a few moments and bore about SW., but most of the time even the sun's position has been unknown. All inside the *tepee* is wet, damp, and uncomfortable. Schneider is working on boots—cutting off the tops and uppers and sewing on canvas in the shape of a bag which is drawn tight by means of strings. They answer the purpose around the camp very well. Unfortunately I have no boots. Rice, &c., are building a snow house. The party in the boat are decidedly the most comfortable. The thermometer ranges somewhere above 30 deg. [—1.1° C.]. Cross got his foot frost-bitten some days ago. To-day it is much worse and he can hardly walk. The doctor dressed it. Jans [Jens] shot three seals this afternoon—small ones. Connell is suffering with diarrhea, and has been transferred back to the boat. Corporal Salor takes his place here in the *tepee*. This evening the sky has cleared up somewhat and the snow stopped, and Ellesmere Land and Bache Island became visible. Cocked Hat Island bears 10 deg. S. of W., which, assuming the distance at 20 miles, makes our latitude [78°] 53 min., which is encouraging. The snow house built is secured with uprights, the top of it a sail. It is yet too mild to plaster the holes with sludge. Jans [Jens] shot another seal about nine o'clock in the evening, but he sunk before he could be gotten.

September 22.—Got up to find the snow had ceased, and the sky comparatively clear. Cocked Hat Island and the adjacent coast, also Bache Island, became more or less distinct. Israel made our position by compass bearings [78°] 54 min. and directly north of Cairn Point. A little before 10 o'clock Bender spied the whale-boat on the floe to the south of us, on the other side of a large space of open water, about three-

quarters of a mile across. Rice with the party in our remaining boat quickly went after it, but they found on crossing the water that the whale-boat was still about a half-mile off, and on account of the dense masses of sludge ice which would not bear, it was impossible to get at it. This was a great disappointment. On their return it was practically settled that our boat would hold all, 25 of us. It brings her quite low in the water, but still in a smooth sea we could carry our whole party and some few days' provisions. Meridian observation by Israel makes our latitude [78°] 52.6 min. Observation somewhat uncertain on account of the low latitude of the sun. A few seals seen around this morning. They are now of daily occurrence. Greenland coast invisible. Sleeping-bags in the *tepee* very wet, some of them wringing wet. There was a pool of water under that occupied by Cross and the two Eskimo. *Tepee* changed to a better place this morning. The snow house is quite comfortable. Quite calm, but foggy around the horizon. The latter can be seen only in a few places. The launch could not be seen this morning—probably crushed, or drifted off from moorings. It came on to blow and snow during the afternoon. Wind from the northern quadrant, though there is some difference of opinion as to direction. Thermometer 8° [−13.3° C.].

September 23.—Breakfast about 7.30 a. m. Snowing hard and all land invisible. Air very thick. Temperature has run low. It must have gone down near to zero [−17.8°C.] last night. Wind and snow all night. We are now on allowance of hard bread. Pretty much all the hard bread is in the shape of powder. Each mess has its allowance dealt out at night for supper and for breakfast. Those suffering from diarrhea had corned beef mixed with their seal meat for supper and for breakfast. Impossible to say where we are now. A good deal of new ice is formed. The oil canvas we have under the sleeping-bags keeps out the wet and cold very imperfectly. I lay awake for several hours this morning with cold feet. Thermometer at 9 a. m. 17° [−8.3° C.]. (Mean memorandum) [minimum] 8° [−13.3° C.]. [Barometer] 30.02 [762.49^{mm}]. Israel comes in and reports the result of compass bearings from Ellesmere Land and Bache Island, which have loomed up indistinctly. We are about three and a half miles east of the meridian of Sabine, and about ten miles distant from it. The wind during the night, Israel thinks, must have been from the northeast. The whale-boat is reported in sight again. Everything is wet and cold and monotonous. Those troubled with diarrhea have recovered, or nearly so, but Cross's foot is worse.

September 24.—Coffee and seal meat with five ounces of bread and toast for breakfast. Light wind from the north all night, and still from that quarter, though Lieutenant Greely thinks it blew from the southwest for some time during the night. It has cleared off somewhat this morning. We are getting near Sabine as well as Cocked Hat Island. They were reckoned some time ago as from 6 to 8 miles distant. The whale-boat can still be seen this morning about two miles in the direction of Alexandra Harbor. A wide pool of recent open water, but now very young ice, extends in a general north and south direction to the west of our present floe, and only a few yards distant. Rice thinks it inadvisable to attempt doing anything, and Brainard offers little or no encouragement of being able to make any distance to the west on account of sludge ice, open water, &c. A little before noon a council was held, and it was thought advisable to reconnoiter the situation to the westward; this was advised to be done by means of the kyak. It was decided, however, to send the boats across the water pool to the west of us. I went with Sergeant Brainard and seven men. We proceeded over a floe of last year's ice towards the west, and toward the whale-boat, whose mast was distinctly visible. I sent Jewell with Ellis off to the southwest. After traveling a mile I came across a crack and some open water and left Bender to give the alarm in case the crack widened so as to injure our return. Bender signaled to us after we had proceeded two or three hundred yards [about 180 or 270^{m}]. We returned immediately after having reached the whale-boat, the commotion of the ice making advance very dangerous. Saw a considerable mass of rubble-ice off between us and the whale-boat. This Brainard thought impassable. Had to cut through considerable young ice in crossing the lead near by. We must have drifted to-day, according to bearings by Israel, a mile to the south and about a mile to the east. We were in latitude [78 deg.] 50 min. and about a mile east of the meridian of Brevoort Island about three o'clock. The whale-boat is about two miles distant. Wind from the northwest now and for most of the day. The tea ration has been still further reduced. The temperature is low but still above zero [−17.8° C.].

September 25.—Noon, our position by bearings [78°] 45.8 min., 1.4 miles east of the meridian of Brevoort Island. It has been blowing all day from the northeast very strong. Breakfast this morning at 6 o'clock. About 1 o'clock the floe we are now on split in two and left us on a small piece, the west end, a few acres in extent. A great commotion in the ice preceded this. This masses [mass] of rubble many feet high being pressed up on the edges of the floe and those adjoining. Our drift is somewhat to the south. What

appears like land-locked ice has appeared in the direction of Cape Sabine, but not very far distant. The situation of affairs is very gloomy, and our prospects will be either very much worse or much better in the next twenty-four hours. God only knows what is awaiting us. The wind continues blowing violently and shaking down showers of snow here in the tent. Temperature about 12° [—11.1° C.]. 5.30 p. m., position about half a mile more to the east since supper, which we had at 3 o'clock. We are now, according to Israel's bearings, three miles north of Brevoort Island and two miles east of it. We are very close to a large floe north of Sabine, which appears to extend all the way to shore. We are separated from it by great masses of sludge and rubble-ice pressed together by enormous pressure in the greatest confusion. Frederik [Christiansen] crossed this to the floe referred to awhile ago. It is only about two or three hundred yards [about 180 or 270^{m}] across. The wind has changed around to the northwest, just the wrong direction. It has not blown so hard however as before, but the sky is thick and the night looks stormy. Everything appears against us. Our little floe is now surrounded by a fringe of rubble and hummocks pressed up on its outer edge. The commotion in the ice has recommenced in the last few minutes. God knows where to-morrow morning will find us. Our prospects are gloomy enough. Our fresh water is near by, fortunately, and was not on that part of the floe which was detached. Seal meat, weak tea without sugar or milk, and a little hard bread constitutes our meals. Cross has found another foot frost-bitten, and the doctor dressed it this evening.

September 26.—Not many of us slept last night. The northwest wind continued all night and drove us around Cape Sabine. Considerable open water made its appearance to the north. Breakfast between 5 and 6 o'clock. After breakfast there was some discussion as to the feasibility of reaching shore. Open water apparently extended all the way, but to get to it we had to pass through nearly a mile of sludge ice and it was judged impossible to do it. About noon our little floe again cracked, and the rubble began piling up on the edges very near the tent. At the same time or shortly afterwards we found ourselves near a large paleocrystic floe to the north, but it was judged best to cross over to it. This we accordingly did, meeting a severe northwest gale with snow. It was a severe journey, but the two floes held together and it was made all right. We are now on a large paleocrystic floe, and continuous ice apparently extends to the shore. No fresh water has yet been discovered on this floe. Cross was barely able to walk; could do no work at all, both feet being frost-bitten. The northwest gale at this hour (about 4.30 p. m.) still continues. We are apparently immovable just now, are probably packed and jammed in ice somewhat. God knows what the end of all this will be. I see nothing but starvation and death. The spirits of the party, however, are remarkably good. Rum this evening. Our little floe has had another crack just before starting. It was very wise that we got off it when we did. The gale has continued during the day. Thermometer 15 degrees [about —9.0° C.] or thereabouts.

September 27.—5 p. m. Blowing and snowing still furiously. The gale has continued. We seem to be some half dozen miles above Cape Isabella. Breakfast this morning consisted of hard bread and without anything to drink. An attempt is being made to-night to cook. Everything is covered with snow, and we are miserable.

September 28.—7 a. m. Gale still continues, though moderated a good deal. We are reported about a mile from shore, above Cape Isabella, wedged in a bay or indentation up the coast. We seemed to have moved little or none since day before yesterday. There is a prospect of getting ashore by crossing a lead of open water. Our old floe was visited by Schneider this morning and is all broken up. Rice's party have had an extremely trying time during the gale. Those in this boat fared the best. In the *tepee* the bags are all wet and covered with snow. The canvas shakes incessantly, and everything is miserable. Rice and party took breakfast in the *tepee*. 9.25 a. m. started toward shore for a small island, or what looked like an island; brought everything up to a lead of open water about a quarter of a mile from camp. This lead is about half a mile wide. Got everything across the lead in four loads by boat. Wind blowing heavily and a considerable sea. Got everything across by 12 o'clock. Found ourselves on a large paleocrystic floe upwards of a mile across. Started across this with boats, &c., to its farther end. Made up a load from here of provisions, sleeping-bags, &c., and reached a large berg, perhaps grounded near land, in 70 minutes. Returned in 45 minutes and brought on next load in 65 minutes, reaching camp at 6.05 p. m. The party with small sledge are still out, bringing on some things. The boat is still on the near side of the large paleocrystic floe. Fighting walrus seen on the ice near present camp. Bear tracks near by. We are on the north side of Baird Inlet, and probably half a mile from land. Some new ice too weak to bear, prevents us from going out to-night. The northwest wind still continues, but is quite moderated now. Sky clear. No snow. Cross was able to walk, but that was all.

September 29.—Made the land. Started at 7.40 a. m., and went back one and a half miles after the boat. This morning the small sledge went on towards land. Returned to camp with the boat in the course of two hours, and then continued on towards land. I made two visits by boat over leads. Found a great many small bergs, probably from the nipping glacier. Made land at 5.20 p. m. at a rocky promontory, which they thought at first was an island. Several walrus seen to-day. Men complain of being very tired. Last half-mile sledging over some good ice, but after that we encountered a great deal of rubble. Wind from the north until this evening. This evening from the same direction, but it has moderated, with very slight breeze. It blew last night strong from the north. The two Eskimo have been endeavoring to shoot seal or walrus during the day, but without success. Slept and cooked among the rocks. All very thankful to be on land once more. No ice-foot along here.

September 30.—Wind changed to the south or southwest and blows lightly. We are said to be about 13 miles in a straight line below Cape Sabine. We are on a rock formed like a promontory between two glaciers. Position not exactly known yet. Went on top the promontory this morning. Saw old bear tracks and old Eskimo meat cache. Leave in the morning with nine men for Cape Sabine. Sky overcast and everything dreary. We camped on the rocks last night. Corporal Salor returned with Frederik [Christiansen] just before supper time, and reported that he got about half a mile from the cape, from thence passing over here from the north (which is probably the south cape of Rosse Bay), and there he got on moving ice and encountered open water, and was unable to proceed farther. Saw open water also in the direction of shore, and does not think a sledge could go to Sabine as things are at present. This broke up the arrangement contemplated of my going to-morrow. Rice suggested that he and Jans [Jens] could probably make the trip without taking any sledge, the two using Lieutenant Kislingbury's sleeping-bag. They took no lamp, but some rum and water mixed, also a little pemmican and bread—four days' rations in all. This is accordingly the present arrangement. Rice and Jans [Jens] are to start in the morning. No suitable place for a winter residence has yet been found. The rations we have on hand will last probably 25 days longer. Nothing shot to-day, and nothing seen but a few seals. Cross saw two snow-buntings. Our situation is forlorn.

Monday, October 1.—Rice and Jans [Jens] and two men to accompany them a short distance left at 8.45 a. m. Expect to be back in six marches. Lieutenant Kislingbury returned late last night. He went over the glacier the next to the east, and found that it would be necessary to travel over land to reach Cape Sabine, on account of open water near shore and no ice-foot. Wind changed to the south this morning, and the ice in the straits is moving south again—a good deal of open water near shore. Gardiner suffering a good deal with the felon on one of his fingers. Long saw a great many walrus to-day in the water in front of our camp. He shot one, but the animal sank. Had no kyak at hand. I went to the farther side of the south promontory to examine ground for huts. The doctor, Kislingbury, Brainard, and I decided that this side of the glacier is the best place. All the men were consulted to-day as to the reduction of rations. We have about 35 days here, and count on 10 or 12 at Sabine. Most all the men thought the rations should be made to last (these 356 [rations]) for 45 or 50 days. A fox came in close to camp to-day and was shot at and wounded. We still get fresh water from a small paleocrystic floe.

October 2.—Two foxes came around early this morning, but were not gotten. In the evening Brainard and I found a route to the place selected for the huts. It is about a mile to the north, nearly to the glacier. Moved most of the things over in two loads, leaving most of the things packed to be brought up another time. Got in with the last load at 3 o'clock. A desolate, forlorn place of rocks and stone. Weather overcast but calm. The weather continues very mild, probably between 20° [−6.7° C.] and 30° [−1.1° C.] The ice is very wet and sludgy. Rations cut down this morning to 10 pounds [six and one-half ounces to a man] of bread a day for the whole party. Two and a quarter pound of potatoes and twelve ounces of meat. This is still farther reduced after we get in the huts.

October 3.—Commenced building huts, and found a great many Eskimo meat caches. The place selected is near the shore, a half mile north of the north promontory. Three huts decided on. The boat is to form the roof of one of the huts. Each hut is to be built of stone with a wall of ice around it. Several old walrus and a whale bone found. We have been out every day. The hunters designated are the two Eskimos, Long, and Kislingbury. Day overcast with light snow. Light breeze from the north. Great deal of open water.

October 4.—Colder and tolerably clear. Ration increased by advice of the doctor, commencing this evening, to fourteen ounces of pemmican, eight of hard bread, and one and a half of potatoes. Hunters brought in nothing to-day. Long met a great many walrus out in the straits in the open water. We have

been at work on the houses all day. Brought a load from the cache left at last camp. Thermometer about 10 degrees [—12.2° C.]. The houses have an outer wall of ice, and an inner wall of rock, and wrap roof with canvas. Our tea is now extremely weak. This is a miserable existence, only preferable to death. Get little sleep at night on account of hard sleeping-bag and the cold.

October 5.—Occupied building huts from 9 until 2, when leaving two men continuing the work on each hut, the rest of us went to the old camp and brought back the last remaining load of provisions, &c. Cross shot four ptarmigan this afternoon. The birds alighted near by. Weather dull and overcast, chilly and dreary. There is a great deal of open water in the straits. We now have three chances for our lives: The chance of finding American cache sufficient at Sabine or at Isabella. The chance of crossing the straits when our present rations are gone. The chance of being able to shoot sufficient seal and walrus near by here to last us during the winter. Our situation is certainly alarming in the extreme. Lieutenant Greely is sleeping out with Jewell and some one else in the three-man bag, Gardiner occupying his bag in the *tepee* here. We find it very severe work building these huts. We are all weak, and the rocks are of granite and very heavy, and not easily obtainable. The ice walls of the "whale-boat house" (the one I belong to) are finished, and the stone walls were also almost completed to-day.

October 6.—Moved into the hut to-day: Rice, Jewell, Gardiner, Elison, Ellis, Lieutenant Greely, and myself. Rice has not yet returned. Weather overcast and foggy, as it has been pretty much every day since we got here. There are three huts. Brainard's party have the boat as a part of their roof; also the cover of the steam-launch. The other hut and ours have canvas on the roof. A seal shot to-day by Frederik [Christiansen], weighing about 150 pounds. Entrails and everything are to be saved. We are to keep a blubber lamp burning in the huts all the time, except when cooking or sleeping. The fumes from the stearine are intolerable—very trying on the eyes and throat alike. Another seal was shot, but could not be got before he sank. Several walrus out in the open water of the straits.

October 7.—Clear, but no sunshine. All working on huts all day. Sergeant Connell reduced to the ranks, to date from September 29, for intemperate language. Lieutenant Greely informs me he shall prefer charges against him, if we return to America, for mutiny; also against Dr. Pavy and Lieutenant Kislingbury on the same charges. The "Phalarope" [*Beaumont*], to which they all belong, is a place by no means pleasant. A great deal of criticism has been indulged in by those named which is extremely prejudicial. Long and Frederik [Christiansen] shot a walrus to-day, but the animal has just life enough left to crawl into the water after being shot. The issue of tea was stopped last night. We had coffee for breakfast, however, and to-night we are to have the grounds boiled over again. Rice and Jans [Jens] are expected back to-day but have not yet arrived at this hour, 3½ p. m. Ellis and Whisler have been sent out a few miles to look for them. Frederik [Christiansen] shot a ptarmigan this morning.

October 8.—A dismal day, generally overcast and cold. We have been working on the hut all day. Got the moss on the roof and also several bagsful under the sleeping-bags. We had Hudson Bay pemmican for breakfast, and liked it very much. Rice not yet returned. Lieutenant Greely intended to send me for him to-morrow with a sledge and party, but it seems a sledge cannot get over the glacier, so nothing is to be done at present. Frederik [Christiansen] shot two seals to-day, but they both sank before the kyak could be got to them. Fox came in camp last night and stole three-quarters of a pound of bread.

October 9.—My birthday—occupied in gathering moss chiefly. Rice returned with glorious news of rations and help. *Proteus* wreck—Rice brings a register of 1883, by which it seems I am promoted to be first lieutenant. Rice discovered a strait connecting Rosse Bay with Cocked Hat Island; visited Sabine and Cocked Hat Island. Rations reduced to-day to 12 ounces meat, 6 ounces hard bread, 1½ ounces potatoes, with weak tea or coffee once a day. It has been decided, however, to move up the coast, so now the ration will be increased some again. We all feel now in excellent spirits by the news Rice brought in. The prospect since landing here has looked forlorn indeed, and death by starvation the most probable end to our existence. Now all seems changed. Our huts are almost completed. This one has the moss on the roof, and is now tolerably comfortable. Linn has been made a sergeant, beginning to-day, to date from the first instant. Rice got a fox. Rice discovered three caches—the English cache of 240 rations, the cache left by the *Neptune* in 1882, and the cache brought off the wreck of the *Proteus* in 1883.

October 10.—Intended to start this morning, but it is snowing hard. In the afternoon it cleared off, but it was decided too late to start. Day overcast, damp, and cold. In the huts we are troubled with cold, darkness, and the dense volumes of smoke from the stearine. Considerable complaining at times. We are

all now in comparatively high spirits, and look forward to getting back to the United States with a great deal of certainty. We shall have to live on half-rations or less until April, and contemplate shortness of fuel. Many hardships are obvious, but we all feel sound again.

October 11.—(Mean memorandum) [minimum] last night −7° [−21.7° C.]. At 6.30 p. m., −4° [−20.0° C.]; 6.45, started with sledge and load of things which will not be needed for some days. Lieutenant Kislingbury, myself, Sergeant Brainard, Jans [Jens], 14 of us in all. Lieutenant Greely went along for a mile or two. Rice left about the same time with Frederik, Eskimo, for Cape Isabella to see if there is any American depot there. We hauled load to the east side of Rosse Bay, reaching a projecting point of rocks at 11.30. After a quarter of an hour delay in making the cache we started back and reached huts at 2.50 p. m. It proved clear but cold. Cold wind blowing from the northeast, but not experienced until we passed the Norton [Newton] glacier. This is the first real clear day we have had. Traveling to-day very good. Cross has taken advantage of our absence to get into the rum, and is reported as more or less under the influence. Seal shot to-day about the same size as the last, 150 pounds uncleaned. Two foxes came around this morning and they were shot at, but without success. This makes the third or fourth.

October 12.—7 a. m. (mean memorandum) [minimum] last night, −12.5 [−24.7° C.]. At present, −8.5 [−22.5° C.]. Clear, calm, and cold. 8.15 a. m., started for Rosse Bay. Small sledge started about an hour before us. Load very heavy, though the route got smooth generally. 2.35 p. m., reached cache left yesterday and went into camp. Overcast and threatening snow. Ration increased to 1 pound meat, 10 ounces bread, 1½ ounces potatoes. The doctor recommends full English sledge rations. Distance traveled about 6 miles. Water found near this camp.

October 13.—Crossed Rosse Bay and came out south along Rice Strait, distant about 5 miles. Brought two loads. Advance first load 3 hours—returned in 2 hours and brought second load in the same time as the first. Day overcast, snowing lightly. Got into camp at 5.20 p. m. Anticipate having to make two days crossing this bay. Sleep to-night on the rocks. Light wind blowing. Dark, foggy, cold, and chilly—miserable.

October 14.—5 a. m., cooks called. 7.50 a. m., break camp to march to the north end of Rice Strait, distant about 5 miles. Cold stew for breakfast. Reached the camp with second load at 3.45 p. m. First advance, 2 hours 25 minutes; return, 2 hours. Second advance, 2 hours and 40 minutes. Second advance had to pull sledge and load over the ice-foot on account of open water in the straits reaching to the west shore. Day foggy and overcast, with light wind from the north at times and snow most of the day. Weather dark, dreary, and miserable. Jans [Jens] shot at seals in open water, but did not get any. Water found near present camp. We are to make a cache here to-morrow and advance with one load to the place of our winter quarters. Cocked Hat Island is about one and a half miles to the east of us. Slept little last night or the night before on account of the cold. The alcohol allowance is 4 ounces, but it won't cook the stew except when we find water, and then with difficulty.

October 15.—4.20 a. m. cooks called. 7 a. m., Lieutenant Greely left with Gardiner and Jans [Jens] to visit the caches; 7.25 a. m., the rest of us started with the sledge. Traveling pretty good for some time, but gradually we got into rubble-ice. At 9.30, when about two miles east of Cocked Hat Island, the sledge broke down, the runner splitting. 11.45, got started again. In about one and one-half hours met Lieutenant Greely on return. Reached place of wreck cache left by *Proteus* at 2.15 p. m. Not so many rations found as anticipated. Hard to say how we will be able to pull through this winter. Rice and Frederik, Eskimo, returned shortly after we got into camp. Our winter quarters decided on at this place. Day cold, but clear. The sun now rises very late and sets very early, and never gets far above the horizon. We left behind at last camp about 1,200 pounds of stuff to be brought up after awhile. Snowing lightly this evening. Everything dark and dreary.

October 16.—Went back with eleven men to the cache left last night. The return occupied two hours and fifty minutes, I presume. Returning left camp at 8.10 a. m. and reached camp again at 1.20 p. m.; moving ice, many cracks along shore. Some of the party went down in the cache below us; temporary shelter put here. Northeast wind and driving snow-storm during the day, making travel very disagreeable. Temporary shelter made with snow blocks covered with canvas.

October 17.—Cooks called about 5 o'clock; breakfast of canned mutton and coffee; last night we had chocolate. These drinks are prepared with milk and sugar, and are much liked. The rum is also much liked, being Bedford [Medford]—different from that we had at Fort Conger. After breakfast most of the

party went down to the cache about a mile below here. The whale-boat was hauled over land about 500 yards [about 450^{m}], and thence to this place on the sledge. Afterwards some fourteen of us brought up the rest of the cache, arriving here at 2.30 p. m. Day overcast and foggy, with snow and north wind—cold and disagreeable in the extreme. Several of the party have frost-bites on the fingers, &c. Long was complaining this morning of suffering pain in the chest. We find water in a lake near by here. Water has been found at a number of camps between here and Eskimo Point. We are now in a temporary hut. The whale-tent is pitched near by, and is used for the kyaks, and also by one three-man sleeping-bag. A crow or a raven has been seen around for several days, following us from camp to camp. The men left behind to-day started the foundation of our permanent quarters. It is about two miles from here.

October 18.—Day overcast and foggy; cold wind blowing and snowing; very disagreeable and trying. We have been working on winter quarters all day. Got up the walls of the building. We are all to live in one building. Frederik [Christiansen] shot a blue fox this morning. The ice along the coast is thrown up in the most inextricable fashion. We have rum issued every day after work. Several of the men have frost-bitten fingers. Temperature this morning 1 degree [−17.2° C.]. (Mean memorandum) [minimum] −6 degrees [−21.1° C.].

October 19.—The whale-boat was moved up and put on the walls of the house this morning, after which the snow wall was built around the walls of stone. The spaces between these two walls are filled in with snow and gravel. Cold northwest wind blowing; very disagreeable. All complain of being chilled through. We are unable to stand the cold by reason of short rations. English sledge-runner broke to-day, or rather the shoe. Long and the two Eskimo went hunting, but got nothing. This life is miserable in the extreme. We work from about 9 till 2.30. It grows dark now very soon. The sun has not been seen since we came here. Found carrying heavy box of gravel 200 yards [about 180^{m}] to the wall of the house, in the face of the wind, very severe. Sleep at night much broken by cold feet and general discomfort.

October 20.—Moved into winter quarters at *Proteus* cache. Day miserably stormy, with drifting wind and snow from the northwest. We started between 8 and 9 o'clock. The cooks were called about 5 o'clock. Started to haul sand, but gave it up on account of the storm. Find hut quite warm, comparatively speaking. The boat is in a place along the center of the hut. Hut 18 by 24 feet [5.5 by 7.3^{m}], built of snow and rock, with a snow wall outside. Lamps started for supper at 2 o'clock. Fresh water from the lake near by.

October 21.—Thermometer below zero [−17.8° C.] this morning. At 8 o'clock started with thirteen, Rice, Brainard, &c., and went to Rice Strait for the load left behind there. Found the ice along the coast entirely changed and very rough. Had a hard time making our way through it. Found ice in sight of Cocked Hat Island much the same. Reached cache at 12 o'clock. We took up on the English sledge, whale-tent and four days' rations for Long and the two Eskimo who go up there hunting. The hunters started about the same time as we, but reached cache about an hour before us. Pitched the whale-tent for hunters, and started back at 12.20, and hauled load homeward for three hours, when at 3.20 we dropped the sledge and made for the hut without it, reaching hut at 4.25, all much tired. Rum to-night as usual during the working days. To-night the messes have been reduced from three to two, and the cooking done on three ounces of alcohol. The rations are now 1 pound of corned beef, 8 ounces hard bread, and 1½ ounces potatoes. The meat is now merely ———— [undecipherable word] or hard bread left out of a stew, and we have a slight addition to the coffee, or whatever it is. To-night we have coffee. We are now in our hut; but it is not yet finished, and is cold and uncomfortable. Our constant talk is about something to eat, and the different dishes we have enjoyed or hope to enjoy on getting back to civilization. How often my thoughts turn towards home and the dear ones there. We all suppose Garlington and party are at Littleton Island, but yet doubts will arise as to it. We have found out some scraps of news from slips of newspapers wrapped around the lemons. Each man had a lemon to-night. We are all hungry all the time. Blubber lamp burning to-night for the first time. Lieutenant Greely, Israel, Biederbick, Whisler, Bender, and Gardiner are on the invalid list to-day with sore feet, cramps, &c.—minor ailments. It was snowing hard and very thick by the afternoon. By 3 p. m. it was very gloomy.

October 22.—7 a. m., Rice, with Ellis, Whisler, and Linn, went down to the clothing cache near Cape Sabine, to bring up as much clothing, &c., as they could carry on their backs. 8 a. m., I started with thirteen others to bring up the sledge load left behind yesterday. Walked back in an hour and got in at 11.30. The only ones left in the camp were Lieutenant Greely, Gardiner, and Biederbick. After returning we hauled

sand for the huts, and the snow wall was completed. Knocked off work at 2.15. This evening being Ellis' birthday, we are to have something extra for supper. Biederbick is making a punch of rum, lemons, and cloudberries, which is to be warmed up by expense of two ounces of alcohol. Day overcast and thick with light snow at times. It is yet so cold in the hut that it is difficult to keep one's fingers warm. Everything is uncomfortable and miserable. Gardiner's finger has taken a turn for the worse. Bender is complaining, but the others are all pretty well. Rice and party returned at 4.25 p. m., having left the clothing cache at 2.15. They brought considerable clothing. Found newspaper article by Clay. Rice brought back—found with the lantern near the cache—a newspaper slip by Mr. Clay, written May 13, 1883, from which we infer the loss of the Jeannette and the alarming view which must be taken at home of our situation. We all think that our friends regard us as lost. Rice read the paper aloud this evening, and it has excited a great deal of remark. We all think Clay's paper is almost prophetic, except, of course, our "lying down under the quiet stars to die." The article gives me pain in reflection of the great alarm and sorrow felt by my dear father and mother and sisters on my behalf. Should my ambitious hopes be disappointed, and these lines only meet the eyes of those so dear, may they not add to my many faults and failings that of ingratitude or want of affection in not more frequent allusions to them and my thoughts surrounding [concerning] them.

October 23.—Cooks called at 4 a. m. At 7.10 a. m., started with Rice and others, some twelve of us in all, and went to the cache at Cape Sabine. Ice very good for the first two miles, but after that extremely rough—great areas of rubble, the roughest or as rough as I ever saw. Constant labor with the axe required. Morning very dark and dreary, with cold northwest wind blowing. Reached Sabine in three and a half hours, and continued on to English cache at south side of Payer Harbor, reaching there at 11.50. Left there the records of the expedition, and a pendulum in a cairn which I constructed. Put the English cache on sledge and started on return, after delay of one hour and ten minutes. Blustering and cold northwest wind with driving snow. Extremely uncomfortable. Left sledge and load at Cape Sabine at 2.15 p. m. and continued on, carrying nothing to our winter quarters. The most of the men reached here in two hours from Sabine, but Elison and I dropped behind to look after the doctor, who hurt his foot. Night came rapidly on and we lost the way. Stumbled and floundered among the rubble-ice, and reached the hut at 5.15 p. m. extremely tired and hungry. Mutton stew and tea for supper, and hard bread—in all about one-fourth as much as would satisfy the appetite. Rice read some newspaper scraps in the evening. Fine stew of dog pemmican this morning. To-morrow we go back for the load. Much open water seen in half mile or more water from shore. In Payer Harbor saw open water and one or two seals.

October 24.—4 p. m. [a.m.], cooks called. 7.30 a. m., sledge party with myself left for cache at Cape Sabine. Had a very hard tramp along the rocks and along shore. Found that I had hurt my foot yesterday, and got along with difficulty. Weather very much the same as yesterday. Wind from the northwest, with driving snow. Dark and dreary. Reached cache and allowed the men to eat the moldy bread out of one of the bags. We ate ravenously. 11.40, started back with load consisting of two of the barrels of the English cache, &c. Fifty minutes in crossing from the ice-foot to the shore, a distance of about 50 yards [about 45^{m}]. Farther on, the old part of the sledge, which had been repaired, came out of place. We started on after lashing it. It came on dark and dreary, and everything was very obscure. Reached huts at 5½ p. m. Wind increased to-night. Suffering all day a great deal with my knee. Could hardly walk. To-morrow it will be necessary to stay in camp to repair sledge. Great discussion to-night on the subject of liking of food, especially pemmican.

October 25.—Very little wind to-day though overcast and snowing lightly, as usual. There are three loads remaining down in Sabine, but the sledge remained in camp to-day to be mended. I have remained in bag all day on account of lame knee. Blocks of snow were laid on the roof and make a perceptible difference in the temperature, though it is still cold and uncomfortable inside here. We burn blubber lamp, but it gives but little light and no heat. The discomforts of this life are innumerable, and would be very hard to picture. Long returned this evening with the two Eskimo. Biederbick shot one seal—about 75 pounds of meat dressed—total weight of seal about 150 pounds. Dog biscuit examined to-day; found mostly moldy, a great disappointment to us. Long found very fair weather and saw half a dozen seals in all. Rum issued to-night, as every night since October 15.

October 26.—4 a. m., cooks called. 7 a. m., B. [Barometer] 29.82 [757.41^{mm}]. Thermometer below zero [−17.8° C.] during the night. 7 a. m., party started out for load. I remained in the hut with a lame knee. The party reached cache at 9.30 and started back at 10.30. 1.30 p. m., party started [got?] back. They had crossed the ice-foot and reached within about two miles of camp when the sledge broke down. The runner

gave way (that is, the steel shoe). Elison thinks it can be repaired to-morrow. Day overcast, with little or no sun. Long and the Eskimo went out, but have not yet returned. Temperature in the hut this morning after lighting lights rose to 31.8° [—0.1° C.]. During the day it was 19° [—7.2° C.] at one time. Lieutenant Greely thinks of making the rations last until March 1, and then crossing the straits with 10 ounces of bread, 10 ounces of pemmican and tea. In the meantime after the sledge parties return, which will be about the end of the present month, the rations will be between 6 and 7 ounces bread, 4 ounces of meat, or a little over, and some vegetables; between 13 and 14 ounces in all. It remains to be seen whether we can exist on so little. There is a scarcity of everything, fuel as much as anything else. We had to-night a very animated, not to say warm, discussion on the subject of rations. Lieutenant Greely announced his intention to try and make the rations last until March 1. This is based on the supposition that the 13 ounces referred to will support us in considerable and tolerable health. 4⅓ ounces of meat, between 6 and 7 of bread, and the vegetables we have, and other things distributed. The butter and lard are not included among the meats. (See inventory of October 25 at end of book.) The doctor urged that a great objection to the reductions of ration was that our strength might be reduced and disease, scurvy, &c., brought on, and when too late we would find it impossible to recover. I remarked that the general view taken by the party, as far as I could get at it, was that our rations should be reduced to the very lowest limit, but afterwards increased enough, if necessary, rather than the contrary. So it seems to be fixed upon that we are to try to make out on our food until March 1. Then we shall try to cross the straits on 10 ounces pemmican, 10 of bread and tea included. A great deal was said on the subject generally, confined at first to Lieutenant Greely, the doctor, and myself, but afterwards Rice, Jewell, Brainard, and others joined in to break the gloom and throw a more cheerful light on the subject. Rice read newspaper scraps in the evening from the "Critic," &c. By this we have gleaned a good many items of news. We are all in remarkable spirits considering our circumstances. Rice brought back the Army register, and to-day the sledge party came across a book all frozen up and snow-covered, which seems to be the new Army Regulations. Long and the Eskimo saw several seals to-day but got none.

October 27.—Cooks called 5 a. m. 6.40 a. m., thermometer 33° [+0.6° C.] in the hut; B. [Barometer], 30.05 [763.26^{mm}]. The men worked on the snow wall around the house for some hours—the outer wall about four feet [1.2^{m}] from the inner. The intervening space is to be filled with snow. Corporal [Sergeant] Elison and Schneider went down and fixed the sledge. The sledge party started out about 10 o'clock. I started some time after them. We returned with the sledge and load about 12.30. Ate ravenously of moldy dog-biscuit this morning; surprised myself by the manner in which I ate that which would be at any other time almost repulsive. 58 pounds of good biscuit have been found in a barrel of 110 pounds. The second barrel of the two, which is bread, it is thought may be good. 50 pounds of this 58 remain on hand. The sledge to-day brought up two barrels of the English cache and a lot of clothing. Among other things is the coat of a lieutenant in the navy, which I have taken possession of. Weather to-day overcast and foggy, and quite cold and dismal. Among the clothing are two mattresses, a pair of army pants, blouse, shirts, drawers, &c. Also a number of miscellaneous articles of dress (supposed) thrown ashore at the time of the wreck of the *Proteus*. To-night we have mutton and two cans of salmon for supper—about a third of what would be necessary to satisfy the appetite. This constant hunger is a miserable feeling, and goes not a little ways to make our circumstances more dismal. Still the party all remain in good spirits. I dread next month, however, when we commence a still farther reduction. How often my thoughts wander homeward to the dear ones there. I went along to-day and helped to drag back the sledge, my knee being better.

October 28.—Cooks called at 4 a. m. 7 a. m., B. [Barometer] 29.88 [758.94^{mm}]. Thermometer 38 [+3.3° C]. Sledge party left at 7.30. Morning very dark and overcast, with heavy fall of snow and light wind. The high temperature this morning was while the lamps were burning. The usual height during the day was about 29° [—1.7° C.]. At noon the outside temperature was reported at —2° [—18.9° C.]. The (mean memorandum) [minimum] last night was —17.5° [—27.5° C.]. I did not accompany the sledge party on account of my knee. Some of the party came in at 3.15, and the rest about 15 minutes later. The sledge broke down again about three miles from here. The party encountered violent wind, with heavy snowfall, which, with the darkness, made their trip very trying. The whale-boat at Sabine (the *Narwhal*) has been broken up for fuel, and part of her was brought in to-day. The remainder is all that now remains to be brought up from Sabine. Other sections of the sledge gave way. This life is miserable. We have insufficient supply of everything. Even the blubber will support but one poor light, and that hardly for the winter.

We must rely on the whale-boat and the barrel staves mostly for fuel, the alcohol being mostly exhausted. Cold, dampness, darkness, and hunger are our portion every day and all day. In the hut here one has to grope around in the darkness to find everything laid down. Long went out to-day as yesterday, but with no success. To-day he found so violent a wind and snow storm that he and the two Eskimo came back. Henry read "A Bad Boy" last night, and Rice finished the newspaper scraps. To-night we have Clay's letter again and some more reading.

October 29.—Breakfast at 7 a. m. of boiled meat, hard bread, and tea. This roast beef is liked very much, which is more than can be said of the corned beef. The Castine mutton is full of bones, and has excited the indignation of every one. When issued we have been getting 6 ounces of it each, and it is very trying, when getting so little, to find a large fraction of it small bone. The barometer at 7 a. m. this morning was 30.03 [762.75^{mm}]. Last night the roof dropped [dripped] somewhat. Corporal [Sergeant] Elison engaged for several hours in mending the sledge. Most of the rest occupied a couple hours in bringing sand to put under the sleeping-bags. Two mattresses and old clothes, a few buffalo coats, blankets, &c., were distributed around. I drew for the second mattress, for the doctor and myself, and got it. There are only two. Lieutenant Greely has the other. Gardiner is using it at present, as well as his sleeping-bag. Occupied some time this morning in scratching like a dog in the place where the moldy dog-biscuit were emptied. Found a few crumbs and small pieces, and ate mold and all. Weather overcast and snowing lightly. Long and Frederik [Christiansen] went out to hunt to-day, but got nothing. Long fell in the water. Ellis went out afterwards also for seals, but got nothing. Many seals have been seen, but they are a great ways off, and there is a great deal of open water. Cold, dampness, darkness, and hunger are our daily and hourly portion. We now get about one-fourth what we could eat at a meal, and this limited allowance is to be much farther reduced as soon as the sledging is done, which about November 1.

October 30.—Cooks called at 4 a. m. 7 a. m., barometer 29.81 [757.16^{mm}]. 8 a. m., sledge party started for whale-boat, twelve of us in all—Brainard, Rice, and myself, &c. We had each issued two rations of lime-juice pemmican for breakfast—those of the party. Found high tide, but got along very well. Morning gloomy and overcast, and sky obscured by snow clouds, with a brisk wind from the west. We could hardly see the way; lost it in several places. Old route covered up with snow-drifts. Reached the whale-boat in two and a half hours, and delayed three-quarters of an hour in breaking her up and loading her upon the sledge. The doctor joined the party after starting back—also Brainard. Came along home very well. Reached quarters at 2½ p. m. Rum issued after getting in. Hereafter we shall have it only on Sundays. After getting in spent half an hour in scratching in the snow for the crumbs of moldy dog-biscuit. This dog biscuit, the moldy, has a bad effect upon me. This evening Bender killed a blue fox near the house. He struck him over the head with his fist. Breakfast this morning consisted of 4 ounces of sausage, 4 of hard bread and tea, and 2 ounces of pemmican for the sledge party. This is about double what the ration is to be reduced to in a few days. Even now we are always hungry, with a constant longing for food. Supper to-night consisted of 4 ounces of pemmican and four of hard bread and tea—two cups.

The following is the schedule of daily rations proposed until March 1 next: 4¼ ounces of meat, consisting of roast beef, corned beef, seal, pemmican, or bacon. $\frac{26}{100}$ of extract of meat, $\frac{49}{100}$ butter, $\frac{26}{100}$ lard, $\frac{64}{100}$ soup, $6\frac{5}{16}$ bread, $\frac{9}{100}$ rice; 12 pounds are kept over for Thanksgiving and Christmas. Peas, $\frac{22}{100}$; corn, $\frac{19}{100}$; carrots, $\frac{1}{10}$; raisins $\frac{16}{100}$. Extra allowance Thanksgiving and Christmas. Pickles, $\frac{42}{100}$; $\frac{19}{100}$ milk; extract coffee, $\frac{43}{100}$; tomatoes, $\frac{32}{100}$; extract chocolate, $\frac{19}{100}$; potatoes, $3\frac{9}{10}$; dog-biscuit, $\frac{8}{10}$ oz. This for 120 days from November 1.

4.25 + 1.01=5.26 "meat." .09 + .22 + .19 + .40=.90 "vegetables" (life sustaining). 6.4 + .8 [=] 7.20, bread.

5.26
.90
.19
.64

6.99 + 7.20=13.19 [14.19].

Long and the two natives went up again to Rice Strait.

October 31.—7 a. m., barometer 29.82 [757.41^{mm}], Fox came round this morning at 7 a. m., but it was too dark to shoot with the rifle, and the shot-gun is not in order.

Sledge party got off at 7.50 a. m. Reached load just beyond tide crack in two and a half hours; got back at 12.10 p. m. Clear and moderately calm. Thermometer after breakfast + 2 [−16.7° C.]. (Mean memorandum) [minimum] — 40 [— 40.0° C.]. Very high tide to-day. To-morrow our reduction of rations commences. Whether we can live on such a driblet of food remains to be seen. We are now constantly hungry, and the constant thought and talk run on food, dishes of all kinds, and what we have eaten, and what we hope to eat when we reach civilization. I have a constant longing for food. Anything to fill me up. God! what a life. A few crumbs of hard bread taste delicious. One imagines one thing and another another. I spend much time in thinking of bills of fare. Corporal [Sergeant] Elison is to have a Hudson Bay sledge made by to-morrow, and Rice, Linn, Elison, and Frederick are to start on it afterward for Cape Isabella for the four boxes (144 pounds) of English preserved meat there. They are to have an increase of rations during their absence, which Rice puts at eight days. The hunting party have a slight increase of rations during their absence. I hope to God they have got something. How often my thoughts wander home, and I recall my dear father, mother, and the family generally—then comes the family dishes of all kinds. Numb fingers and want of light—I can write no more. The sledge is to be made out of the timbers of the boat. We now have everything from Sabine and vicinity, and are very glad of it. No sledging any more, excepting Rice's trip, until spring, should we live to see it.

Thursday, November 1.—Cooks called at 5 a. m. Breakfast consisted of a handful of pieces of hard bread and a piece of butter about as big as one's finger. About as hungry after as before eating.

7 a. m., barometer 29.67 [753.60^{mm}] (anerrick) [aneroid]. Temperature inside about 30 [−1.1° C.]. Sky overcast with heavy snow clouds as usual, with light wind from the northwest. This miserable weather we have had since our arrival here—not one clear calm day. Hudson Bay sledge a failure, and Elison has been working all day on the small sledge, which has been made narrower and shorter. This is the sledge that the men call the man-killer. Preparations under way during the day for the departure of the party for Isabella to-morrow. They are to be gone eight days and expect to bring back at least 100 pounds of the 144 pounds of meat there. About noon I went out and walked around for one and a half hours. About five pounds of English potatoes are found moldy and unfit for use. I filled my stomach with these, bad as they are, and take the risk of their making me sick. Feel a constant longing sensation for food. God! what a miserable life. One's hand and feet are constantly cold, and we live in darkness and dampness. A white fox shot this morning by Schneider. We ate the entrails as well as everything else of the animal. Lamps lighted for supper at 2.30 p. m. Supper consists of chocolate and a small piece of roast beef, with a handful of crackers.

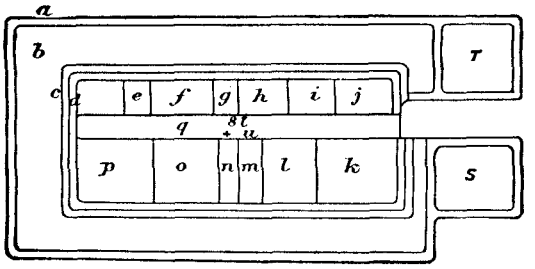
November 2.—7 a. m., barometer 29.71 [754.62^{mm}]. Day like all the rest since we have been here; sky hidden, with snow clouds with light northwest wind, dark and cold. Rice, Linn, Elison, and Frederick got off with the sledge and load about 8.30 a. m. for Isabella. We trust they will be fortunate and get the meat, and thus increase our poor driblet of food. Some time after breakfast Brainard went down to the landing about half a mile from here and shot a blue fox, weight about 3½ pounds. Some time afterwards Ralston shot a white fox quite near the house, weight 5 pounds. Lieutenant Kislingbury was very sick last night and in great pain, so as to nearly make him faint. It was a strain of the private parts, brought on by cold and sledging, &c. We now eat much of our meat cold, having nothing hot but the tea. The stoves were put in use for the first time and proved quite satisfactory. Only half a barrel stave was used up by the two stoves, and a little pine wood for kindling. It will be necessary to use wood for the next three months. We have but little alcohol left. It is decided, however, to use but one stove hereafter, each mess cooking in turn. The stove consists of a simple cylinder of sheet iron, the pot being placed on top. We have had reading so far every night. "A Bad Boy," "Two on a Tower," and the Bible have been read so far. We have Pickwick, and I have some books of "McCarthy's History of Our Own Times." We also have Nordenskiöld, Kane, Hayes, and Nares, with which we are all quite familiar, however. (Mean memorandum) [minimum reading] of the thermometer, between yesterday afternoon and this afternoon, −9.2° [−22.9° C.] (outside). Most of us took an hour or more exercise to-day, mostly in cutting and carrying snow blocks.

November 3.—7 a. m., barometer 29.67 [753.60^{mm}]. We got through breakfast at 7 a. m. The other mess cooked first and we afterwards. Very little wood used. Indeed, nothing was cooked but a cup of tea to each man. Supper last night consisted of tea, a little bread, and some pieces of canned roast beef. Breakfast this morning of a few mouthfuls of hard bread and a little piece of butter, about as large as one's finger. I had some moldy potatoes, which I had at my breakfast. They are spoiled and moldy all the way through,

but anything that fills the stomach is grateful. Cut out and brought in some snow blocks to-day, as yesterday, for exercise; they are to build our house. Long returned about noon, by himself, with the joyful news that the hunters had got another seal; this one, shot by Long, must weigh about 10 pounds more than the last, or about 70 pounds of meat. Thermometer to-day, at 1 o'clock, −13° [−25.0° C.]; (mean memorandum) [minimum] since yesterday the same. Clear sky to-day for the first time, with a light northwest wind. Our constant topic of conversation is food—what we have eaten, and what we expect to eat when we get back to America. Fingers and toes cold nearly all the time; temperature here in the house about freezing point [0.0° C.] all the time. God! this miserable existence cannot be conceived of by any one but ourselves. Constant thoughts of home and dear ones there. Long saw two fresh bear tracks near his tent; they came from Bache Island. Supper to-night consists of one cup of tea, 4 ounces of corned-beef, and about the same of hard bread. Smoke from the stove is intolerable, the only outlet being a small hole in the boat overhead. We shall probably improvise some kind of a chimney or stove-pipe.

November 4 (*Sunday*).—Barometer 29.61 [752.08^{mm}] Long went back this morning, starting about 8 o'clock. Breakfast of hard bread, stew, and tea. For dinner we have a seal stew and tea. These dishes taste deliciously; the only trouble is there is not enough. To-day being Sunday, we have a half gill of rum each, and a quarter of a lemon. Some work done on the snow house for the commissary. It is just south and adjoining our hut. Sky clear this morning and now. Afterwards it came on foggy. Dinner consisted of a stew of fox, seal cracklings, onion, onion pickles, and a little hard bread, in all about a quarter as much as one could eat. We all pronounced it excellent, delicious, and something particularly nice. Oh! for all the turkey and bread we could eat! In the evening we had a general discussion on the subject of the proposed dinner in Washington on our return. The dinner is not to cost more than $5, and Dr. Pavy, Rice, and Schneider are named as the committee to make the bill of fare, &c. A French restaurant, possibly Hayes' Hotel [opposite Willard's], is the place named.

November 5.—8 a. m., barometer 29.60 [751.83^{mm}]. To-day a canvas finally was fixed above the stove, but it is not perfect, and the stove still smokes. Temperature this afternoon −9 [−22.8° C.]. (Mean temperature) [minimum] since yesterday, −20° [−28.9° C.]. Calm and clear most of the day. It is getting darker daily; sun disappeared October 25, and reappears February 16, but being on the north side of a high ridge of rocks, its actual disappearance will be much longer. A good deal of fog all day. The party seem in excellent spirits; conversation mostly about food and dishes. Breakfast this morning consisted of a little piece of lard, and a few spoonsful of hard bread. Supper to-night of tea, 4 ¼ ounces of English meat, and a little hard bread. The hard bread is issued for night and for morning, and it is with great difficulty that one restrains himself from eating up his morning bread at night. Temperature in the hut, during most of the day, about 30 to 32 [−1.1° to 0.0° C.]. The commissary store-house was finished to-day, built of snow covered with canvas.



a. Wall of snow blocks.
b. Space filled with snow.
c. Wall of snow blocks.
d. Wall of rocks.
e. Rice's sleeping-bag.
f. Sleeping-bag of Israel, Jewell, and Gardiner.
g. Sleeping-bag of Lieutenant Greely.
h. Sleeping-bag of Cross, Bender, and Schneider.
i. Sleeping-bag of Brainard, Frederick and Whisler.
j. Lieut. K. [Kislingbury], Frederik, [Christiansen], Jans [Jens], and [in]
l. Ralston, Connell, and Henry.
m. Dr. P. [Pavy].
n. [Lieut.] L——d [Lockwood], Salor, Biederbick, and Long.
o. Linn, Elison, and Ellis.
q. Aisle.
r. Rear.
s. Commissary store-house (*s* and *r* built of snow).
st. Stove.
u. Blubber-lamp.

The building is 18 by 24 feet [about 5.5 by 7.3^{m}] in the clear. The space *b* is about four feet [1.2^{m}]. Over *q* extends the whale-boat, from each side of which to the wall the space overhead is covered with canvas; over all light blocks of snow. Oars, &c., extend from the boat to the wall and support the canvas,

&c. The stove seems to burn at the rate of two barrels a week. Most of the weeks, however, nothing is cooked but the tea, or coffee, or chocolate. Breakfast this morning about 7 o'clock, and supper at 3. Breakfast has been a little earlier heretofore. Reading every evening for about two hours—that is, from about 5 to 7—when we go to sleep.

November 6.—7 a. m., barometer 29.69 [753.86^{mm}]. Brisk wind from the northwest. Noon, thermometer observation —11° [—23.9° C.]. (Mean memorandum) [minimum] since yesterday, —21° [—29.4° C.]. To-day the commissary store-house was finished, and the vestibule or tunnel roofed over. I occupied all the forenoon in sewing on my sleeping-bag. I did not go out to work, and only took a run of a few minutes for exercise. Stew this morning of tomatoes and this evening of seal meat. Animated conversation all day on the subject of food, various dishes, &c. The doctor recommends a cheap dish of egg tripe made of hard-boiled eggs, 1 oz. butter, cream, flour, pepper, and salt. We have a constant longing for food. A little blubber was put in the stew this evening. We could all eat blubber now *ad libitum*, entrails of any kind, or anything else.

November 7.—7 a. m., barometer 29.72 [754.87^{mm}]. Cold wind blowing this morning. Breakfast, tea and stew of carrots, hard bread, and potatoes. Supper of roast beef, tea, and hard bread. Hard bread is issued for night and morning, and it requires great self-restraint to refrain from eating up the morning allowance. Some work done to-day on the out-house, but the wind was so cold that it was very cold work. I carried a dozen snow blocks. About 12 o'clock Frederik, Eskimo, came in, and when first seen we had many fears of accident to the parties out; but he came immediately with the message from Long to the effect that he would come in to-morrow, there being no chance of getting seals. We start up to-morrow with the sledge (eight of us) to bring in the tent, &c. Supper about 3 o'clock. Stove lighted at 2½ every day now. The two messes cook in turn, each cook alternating in cooking first. Brainard found to-day, by actual weighing, that we have 290 pounds of seal blubber on hand. This is very gratifying. We are all in excellent spirits and get along very well so far on starvation rations. It is quite surprising. I cut up my small allowance of bread to-night and poured a little tea in to soften it. The meat I heat up in the same way. The cans of meat are thawed out by being kept in the sleeping-bags during the day.

November 8.—7 a. m., barometer 29.87 [758.68^{mm}]. Cooks called at 4 a. m. Party started for straits at 7.10 a. m. Light northwest wind. Very severe trip. Suffered severely during the day from cold hands and feet. Thermometer during my absence, —25 to —31 [—31.7 to —35.0° C.]. The party who went up consisted of myself, Brainard, Dr. Pavy, Whisler, Ellis, Jewell, Salor, and Frederik, Eskimo. Three and a half hours occupied in going and four and a quarter in returning. Reached hut again on return at 3.15 p. m. Sledge traveling on rations reduced like ours is a very serious matter, but we stood the trip well. Long and Jans [Jens] came back with us. We brought tent, sleeping-bag, &c. Long only shot one seal on this last visit. Shortly after our return, and after our mess had finished supper, Biederbick called attention to some noise heard outside. We thought it was a bear. It was called aloud to find out who was outside, and Schneider was the only one out. Biederbick then went out, and in going on said that he saw some one going out of the commissary store-house, and that the covering of the door was removed. I and others immediately noticed this on coming in. Schneider is suspected of being the man, and has done nothing but his simple denial to prove the untruthfulness of the charge. Most of the party seem to think that Schneider is the guilty one. Supper to-night of tea, half a biscuit, and half the 8 ounces of English meat allowed the sledge party this morning. Weather overcast and threatening snow all day. Those who wished it were issued the Sunday rations of rum to-night. Those of the sledge party thus got two rations, one gill; those of them who wished it.

November 9 —Cooks called at 6 a. m. 7 a. m., barometer 29.95 [760.72^{mm}]. Calm and somewhat clear all day. Some little work done outside. At noon observation, temperature —23.5 [—30.8° C.]. (Mean memorandum) [minimum] since yesterday noon, —30 [—34.4° C.]. Lowest observations in the hut to-day, +14.5 [—9.7° C.], which was when the cook got up this morning. In the afternoon before dinner it was +24 [—4.4° C.]. It is so cold in here that one cannot expose his hands without discomfort. The hut is not yet quite finished, the outer walls being incomplete. Rice and party have not come, though dinner was put off until 3.30. For dinner we had tea, a spoonful of English meat, and a handful of hard bread. Breakfast was chocolate, a little piece of butter, and a little bread. One is more hungry when he gets through these meals than before. To-day I found in the old commissary storehouse a milk can opened, though none of the contents were gone. It was hidden in the corner. Bender identified the knife used as that of Schneider's. Did some sewing on my sleeping-bag to-day. The conversation is constantly on the subject

of food. Lieutenant Greely read McCarthy's history last night instead of myself; I was tired and felt indisposed. This magazine, with Bible, Pickwick, and Peck's Bad Boy, now comprise our nightly reading. Among our many discomforts we are afflicted at each meal with dense volumes of smoke nearly suffocating, and very trying on the eyes.

Bill of fare for week commencing November 8.

Nov. 8. Breakfast, rice and tea; dinner, corned beef and tea.
Nov. 9. Breakfast, butter and hard bread; dinner, English beef and tea.
Nov. 10. Breakfast, vegetable soup, extract meat, and tea; dinner, seal stew.
Nov. 11. Breakfast, stew of hard bread, raisins, lard, and milk; dinner, roast beef.
Nov. 12. Breakfast, chocolate, butter, and bread; dinner, English meat.
Nov. 13. Breakfast, vegetable stew with meat extract; dinner, seal stew.
Nov. 14. Breakfast, coffee, bread, and lard; dinner, English meat.

Three quarter ounces bread; the three ounces to make up the 7¼ ounces being put in the stew.

November 10.—Rice came in suddenly about midnight, or a little before, last night. He reported different disastrous news: That he and the party, Elison, Linn, and Frederick, had got along quite well for some days, but that Elison suffered a great deal from cold, crossing from Eskimo Point to Cape Isabella, and soon showed signs of giving out. However, they kept on, reached Isabella, got the 144 pounds of meat and started back. On the way back Elison became worse and was unable to drag, and hardly able to walk. They let him walk along behind, but Elison became worse and worse, and soon froze his feet, hands, and nose. On reaching the snow slope between Rosse Bay and the little bay on the other side of the neck of land, they were unable to pull their sledge up the grade, and Rice came on for assistance, leaving the other three men behind—Elison very bad. A relief party was immediately organized; myself, Dr. Pavy, Brainard, Jewell, Ellis, Schneider, and the two Eskimo. Brainard started with Frederik [Christiansen] and a supply of liquor, &c., at 4.30 a. m. We had breakfast shortly before, and at 6.20 a. m. the main party started. It was very dark and we floundered in the snow for some time, losing the trail several times. Reached Long's Point at noon, and kept on down Rice Strait with a severe gale blowing. Reached our old camp at the farther side in three hours more. About here I expected to meet Brainard and Frederik [Christiansen] with the two well men on their way back, but seeing nothing of them we kept on in the increasing gloom. It blew hard and was very cold. In about two hours we perceived Brainard and Frederik (Christiansen) coming to meet us. They reported that the three men were unable to do anything for themselves, and were lying under their canvas sail with little or nothing to eat—that Elison was in a very bad way. Rice had reported Elison unable to live, and I was surprised to find him still alive. He could not hold his water and urinated constantly in his sleeping-bag. We kept on until 6.10 p. m., when, having visited the old camp on the farther side of Rosse Bay, we halted and pitched the tent, and after rum, bread, bacon, and tea were served, got into the sleeping-bags. We had three three-man sleeping-bags on the sledge and a single-man bag. We got to bed in the darkness as best we could—Brainard, Jewell, and I slept in one bag, the doctor in the single bag, and the other four in the other bag—about 9 o'clock p. m. We had a little piece of candle, but it only sufficed for supper.

November 11.—4 a. m., got breakfast in the darkness as best we could, and then had a most uncomfortable time in trying to get up frozen foot-gear. About 5.30 a. m., Brainard and Frederik [Christiansen] got off for the party; we followed at 8 o'clock, leaving the tent standing. Reached the poor fellows one hour afterwards. Brainard had got some breakfast ready for them, using our rations. We had only brought along some two days' rations for eight men. Here we had to feed eleven men. Just got Elison in the sand-bag and put him on the empty sledge and started on return at 9.30 a. m. Brainard cooked between two rocks protected from the wind. Reached the tent with our sick men in about an hour, and at 10.40 had the tent packed and started again on return. Got along quite well, eight of us pulling. Linn and Frederick, much broken up, had started for the hut at 9.30 to go through by themselves. They soon got ahead of us. Reached the farther side of the bay in about three and a half hours—very tired. Kept on up the strait, and at 5 o'clock p. m. stopped at Long's Point and pitched tent and ate supper of bacon, hard bread, and tea. The rum was almost all gone—had leaked out this side. Our meat consisted of bacon and English roast beef. No potatoes nor anything else. At 8 p. m. got started again, and the moon shining brightly we got along very well. Our meal exhausted our provisions, and we had nothing left. Elison was

suffering greatly, and everything induced me to try and make the hut without stopping over. We had a long, severe trip to the hut. When near it I went ahead and roused up the main party. Got in with Elison at 2.20. Temperature—found it after getting in—34.5° [—36.9° C.].

November 12.—(Barometer at 8 a. m., 29.78 [—756.40^{mm}]). 2.20 a. m., relief party got in. We preceded them about ten minutes. We were all exhausted and are still quite tired. Linn and Frederick got in about 5 or 6 p. m. on the 11th. Temperature this afternoon, —24 [—31.1° C.]. We encountered no wind after leaving the strait. Nothing new during absence. Ate ravenously after getting in. Ate morning and evening allowance of bread, and had no bread for dinner. Dinner at 2 p. m. consisted for me only of a mouthful of English meat and tea. God knows yet whether Elison's feet will have to be cut off or not. He is now suffering a good deal and his condition is desperate. I sent word by Linn that I would try and make Long Point and come in to-day, and so, though a helping party was organized, and were to start by moonlight for our assistance, no one had started out. Very hard trip, and but one instance of what men can do when necessity compels.

November 13.—Find myself quite stiff to-day and my heel strings very sore. Have remained in the sleeping-bag all day. Breakfast this morning of hard bread and rice made into a stew, with tea. Supper to-night consisted of a stew of fox, seal blubber, seal hide, flavored with onion. It was very nice and quite filling, comparatively speaking. Temperature about noon, —27 [—32.8° C.]; (mean memorandum) [minimum], —33 [—36.1° C.]. It is yet unknown whether Elison will lose his feet or not. If they have to be amputated it will probably end his life, as a small pocket case of instruments is all the doctor has, and of course our miserable surroundings would put the case in its most unfavorable light. Biederbick shot a fox to-day—five and a half pounds dressed—white. These foxes are extra, and this one gives us fox for Thanksgiving Day. Eating and dishes form the chief subject of conversation. Breakfast in the morning consists of lard, hard bread, and coffee. I have saved all my night's hard bread, though with great effort.

November 14.—Breakfast of hard bread, lard, and coffee. I saved all my hard bread issued last night for two meals, and so feel somewhat satisfied this morning. Supper of tea, hard bread, and English beef. The tea only was heated. One tries everything to make these meals seem to go farther. The stew, when we have one, generally comes before the tea. Sometimes I eat my cold meat at once, with or without the bread. Sometimes I keep them until the tea comes. Sometimes I pour hot tea on my cold meat or bread or on both. All of no avail. You cannot make a mouthful of food fill the stomach. Our talk is incessantly about food or dishes. Thermometer at noon, —19 [—28.3° C.]; (mean memorandum) [minimum], —30 [—34.4° C.]. Poor Elison's feet are turning dark. The spirits of the party keep up wonderfully. Smoke at every meal almost insupportable [insufferable]. It is blinding, and hides everything. We are getting used somewhat to the dim light of the Eskimo lamp. All look forward eagerly to Thanksgiving.

November 15.—Very cold. Thermometer at noon, —33.5 [—36.4° C.]; (mean memorandum) [minimum], —38.2 [—39.0° C.]. Temperature inside at noon was +32 [—0.0° C.]. The wall of the commissary store-house, and the vestibule adjoining was plastered to-day with sludge. Breakfast this morning of soup and tea, and for dinner corned beef and tea. Oh! this everlasting hunger—it is a terrible feeling, and I hope never to repeat it—this feeling of never having enough to eat. Our talk is incessantly about food and dishes, restaurants and hotels, and everything in connection with eating. How we watch the cook and speculate on the chances of getting a good or poor share. This we speculate to ourselves, for we all admit that the cooks are as fair as they can be. I went out to-day and worked with the rest. Lieutenant Greely goes out but for a few minutes during the course of the day, and does no work. He is particularly sensitive to the cold. I felt so weak to-day that a small block of snow felt like a weight of lead. To-night we had issued our allowance of butter for two days. That is for to-morrow morning and for Monday morning; also, bread as usual for night and morning. It was with difficulty I saved a little of my morning's bread.

November 16.—Overcast and dull. Thermometer at noon, —12° [—24.4° C.]; (mean memorandum) [minimum], —31 [—35.0° C.]. Worked outside on the vestibule. Talk all day about food. Every one talks constantly about it, and the subject is the one absorbing one, for we suffer a great deal from hunger. The straits apparently closed for the past few days. Many of us are suffering from frost-bites. Our small allowance of food makes us extremely sensitive to the cold. Elison's case not altogether hopeless. He gets a slight increase of ration.

Memorandum: *Arme Ritter*, tripe, eggs, Boston baked beans, and brown bread at Godfrey's; Hamburg beefsteak.

November 17.—7 a. m., barometer 29.62. Noon temperature, —12 [—24.4° C.]; (mean memorandum) [minimum], —28 [—33.3° C.]. Fine seal stew for supper. For breakfast vegetable stew. Day overcast, with a light wind. Roof put on vestibule. Talk all day on the subject of food. Lieutenant Greely made some remarks in the afternoon on the physical geography of the United States. Lieutenant Kislingbury much better. Biederbick has got something like a felon. Cross and Henry suffering from frost-bites.

Memorandum: Cocoanut pudding (alternate layers of crackers and cocoanut); apricot paste; English plum pudding. Very high tide to-day.

November 18.—Breakfast at 7 o'clock. Barometer, 29.50 [749.29^{mm}]. Noon thermometer, —12 [— 24.4° C.]. (Mean memorandum) [minimum], — 14 [— 25.6° C.]. I have not been out of doors all day. We had a fine stew this morning of hard bread and raisins and coffee, two plates three-quarters full for each. The meal was quite filling. Supper: Hard bread, roast beef, and tea. Talk during the day about food, as usual; fruits, nuts, and everything eatable; restaurants, hotels, and everything in connection with food. It is really amusing how this subject absorbs everything. Lieutenant Greely spoke for an hour in the afternoon on the subject of the United States climate, products, &c. Biederbick's finger is better, and bids fair to get well without forming a felon, as feared, Kislingbury is still on the sick list. Henry, Cross, and others are suffering from slight frost-bites. Dinner at 2.30 p. m. We have frequent talks about Fort Conger and the food enjoyed there. Oh! the dear ones at home, how I long to see them. Brainard plants a pole on a neighboring rock to-day, to attract the attention of any party from the other side. Last night Connell and Henry related personal reminiscences of their lives.

November 19.—7 a. m., barometer 29.55 [750.56^{mm}]. Noon thermometer, — 32 [— 35.6° C.]. (Mean memorandum) [minimum], — 34 [— 36.7° C.]. Jans [Jens] shot a blue fox this evening, quite a large one. This is for Christmas. The entrails of this fox go to the other mess; the rest of the meat is divided equally between the two messes. Day overcast. Bread reduced now to 6 ounces a day, and meat to 4 ounces. This is on account of increased rations issued Elison. He gets 10 ounces bread and 8 ounces meat. Ate a lot of moldy dog biscuit to-day, about enough to make a starved dog sick. Feel ravenous, and could eat anything now in the shape of food. Fill up with tea leaves when any are left over; there is quite a demand for them.

Memorandum: Puffery Auflauf [Puffiger Aufläufer, puffy cake]. Sives [Chives] with scrambled eggs. Molasses and butter mixed.

Lieutenant Greely made some remarks this evening on the grain products of the United States. Last evening we had "Pickwick," "Two on a Tower," and the "History of Our Own Times." I have handed the book over to Henry; he has a louder voice. Went out and took a little exercise to-day. About 10 pounds of this barrel of dog biscuit are utterly worthless. There were two barrels in all. Talk this evening all on the subject of eating. This is a fast day; bread and butter for breakfast, and chocolate; and for supper English preserved meat. The English preserved meat goes but a little ways, and satisfies less than any of the rest. Smoke, smoke, smoke at every meal. A canvas chimney has been put up, but only partially carries away the smoke. Another fox shot—blue one. Weight of these two foxes 3½ and 4 pounds, dressed.

November 20.—7 a. m., barometer 29.92 [759.95^{m}]. Noon thermometer, — 16 [— 26.7° C.]; (mean memorandum) [minimum], — 32 [—35.6° C.]. Day overcast, straits apparently closed. Took ten round trips up and down the lake for exercise about noon. Every time I venture out I get my feet so cold that it is hours before I get them warm again. We now have a fox for Thanksgiving and another for Christmas.

Memorandum: *Fromage de Brie*—McGruder's [Magruder's], New York [Avenue]. Liquors at *idem*. Krafts (baker). Catawba wine, $1 per gallon. Scubana [Scuppernong] wine.

Elison, Biederbick, Henry, and Cross suffering from frost-bites. Our talk continues constantly about food, dishes, confectionery, cakes, cheeses, &c. General remarks on American products by Lieutenant Greely this morning. Many arguments about what we shall like when we get back—of fox, seal, &c., that we eat now with so much avidity.

Memorandum: St. John's biscuit (at St. Johns); Canton ginger root; cut oranges and grated cocoanut.

Our spirits remain good, and we manage to get along with our dole of food with resignation. Brainard is to visit at the house when we return, and get some of our Maryland dishes, preserved peaches, &c., &c., and see my folks.

Memorandum; D[B]eschamel sauce; Mayonnaise sauce.

November 21.—7 a. m., barometer 30.00 [769.61^{mm}]. Day overcast and foggy. It is now getting quite dark. Noon thermometer, —14 [—25.6° C.]. (Mean memorandum) [minimum], —23.5 [—30.8° C.]. I did not go out to-day. The conversation has taken a new turn. Most of the men are talking of going into business. Whisler has been singing the praises of Independence, Kans., and we are going to have a client [colony] there. Long is to set up a restaurant at Ann Harbor [Arbor] Mich., and Frederick is to start a saloon at Minneapolis, Minn. Jewell is going to start a grocery at Independence.

Memorandum: Maple molasses (Whisler); pumpkin butter.

Another fox is around. Allowance of lard is to be reduced this coming week, on account of some issued for Elison's frost-bites. No reading last night. American mineral products discoursed on by Lieutenant Greely this morning. Next week there is to be a slight addition of the butter, milk, and raisins. God! what an experience is this I am going through. Such an experience is enough for one's life. How I long for the time to pass. We are all in good spirits and seem to be getting along well so far, but what three more months of this will bring it is impossible to say. An issue of half an ounce of blubber is to be issued instead of the reduction of meat.

November 22.—7.45 a. m., barometer 29.97 [761.22^{mm}]. Spent the day in the hut. My feet cold in the morning. Feeling bright to-night. Lieutenant Greely made some remarks on the geography of the United States in the evening. Conversation during the day as usual on the subject of eating Mutton-pie parties organized for St. John's on our return. Brainard, Linn, Ralston, and myself are to go in a hack to Topsail's, and in another, at the same time, Connell, Biederbick, Salor, and Ellis. On our return we are to stop at Fitzpatrick's for ham and eggs. Long shot another fox this morning (blue), three and a half pounds. We take very little or no exercise; it gives one an increased appetite, and I only go outside with an effort; it is dreary and dull and very dark.

Memorandum: Jewell is to give the c——— [indecipherable word] party chicken croquettes and oyster patties for breakfast. We still find fresh water in the lake, but it is necessary to dig the hole every day. Every imaginable article in the form of food has been discussed to death. We all look forward to the "son-of-a-gun" on Sunday and Thanksgiving; after that [Thanksgiving] when we are to have an extra allowance of food. The "son-of-a-gun" is chiefly made of hard bread.

Memorandum: Sugar-house molasses.

Frederik, Eskimo, shot another fox late this evening, a blue one; weight, when dressed, three and a half pounds.

November 23.—Noon thermometer, —24 [—31.1° C.]; (mean memorandum) [minimum], —41 [—40.6° C.]. Thermometer inside house about this time, +32 [0.0° C.]. Long shot a blue fox to-day; Frederik, Eskimo, also shot one. These foxes weigh generally three and a half or four pounds. We now have foxes to take us up to the third week in January, 1884. They are issued extra. Breakfast this morning consisted of butter, chocolate, and bread. Supper, seal stew and tea. Remarks in the morning on the State of Maine, by Lieutenant Greely and others. Conversation during the day about dishes of all kinds, and desserts, soups, &c. We never seem to weary of this subject. The straits are apparently closed as well as we can judge. I have brought up all the dishes, desserts, &c., we have at home. Chewed up the foot of a fox this evening raw. It was altogether bone and gristle.

Memorandum: Pie of orange and cocoanut. Told them to-night we have at home a blanc mange of a blue color, but no one could tell why it was blue.

November 24.—Breakfast at the usual hour, or a little later. Thin soup of string beans. Dinner of two dog-biscuit and a little English preserved meat. This English meat is very unsatisfactory; it is thin, and goes but a little ways. The quality and flavor is [are] good enough, but we like our mite of meat as lean as possible. I cut my finger to-day, and I noticed how thin my blood was. Suffering a great deal to-day with cold hands and feet—especially feet. These short rations make one feel the cold dreadfully. It is a constant effort to keep one's hands and feet comfortable, or comparatively so. I find my spirits first up and then down. Sometimes, when I think of the months before us of this life of misery and suffering, I do not see how we can possibly pull through. At other times I feel much more hopeful. This is a life of inexpressible misery. Lard is to be issued daily for Corporal [Sergeant] Elison, who has also an additional allowance of bread, meat, &c. This all takes from our portion. Noon thermometer, —24 [—31.1° C.]; (mean memorandum) [minimum] —26 [—32.2° C.]. Weather overcast and dark. I went out to-day for two or three minutes, the first time for three days. I put on an extra shirt. My clothes now consist of five flannel shirts, two vests, one of them made of double blanket, and the soldier blouse. I have my moleskin coat, but do not

wear it now indoors. Talk to-night on home and our families. I live now for to-morrow morning, when we have the hard-bread stew or "son-of-a-gun." My two dog-biscuit to-day were slightly moldy, but they tasted better than the most delicious morsel in civilization. How often I think of home and my dear father, mother, and sisters. God! how I wish I were with them. I pray God they are all well. We watch the cooks, as they divide and dish out our food, like hungry dogs. We all feel that the cooks are very fair and that we all share alike. The bread is issued by Brainard for the two messes to the cooks, who divide it up. The other things are issued weekly.

November 25.—7.45 a. m., barometer 30.15 [765.80^{mm}]. Noon thermometer, 23 [−23 (−30.6° C.)]; (mean memorandum) [minimum] 25 [−25 (−31.7° C.)]. Day windy and disagreeable. We had a fine breakfast of a "son-of-a-gun" (hard bread, raisins, milk, and a little blubber). A little lemon peel was put in, but was hardly perceptible. It was very filling, comparatively, and came near satisfying the appetite. This evening we had a very nice soup of seal meat and fox. These stews, as we call them, are mere soups, being very thin. None of them satisfy the appetite, and for this reason probably seem so delicious. I never in my life enjoyed my food as I do now. A little hard bread seems delicious. To-morrow is a fast day. We have only a little piece of butter in the morning and English preserved meat for supper. Rum and lemon to-day.

Memorandum: Duff *a la Proteus*, pork fritters, ribs of pickled pork or bacon cooked in corn-meal, &c.; coffee cake, molasses candied, cooked in flour dough.

We now look forward to Thanksgiving for the next good meal. A good deal of conversation to-day on the subject of food. The spirits of the party are surprisingly good.

Memorandum: Oatmeal muffins.

Never will I again expose myself to the dangers and the miseries of famine. How often I think of home and picture to myself old familiar scenes. I have intended writing a letter recounting my experience since leaving Fort Conger, but the discomforts of this life have prevented me so far. It is difficult to get the blubber lamp for more than a few minutes during the day, or not at all. The lamp is blown out every evening when we are ready to retire, which is generally about 8 o'clock. Last night Frederick entertained the party with personal reminiscences of his life. Saturday night had been set apart for personal reminiscences. Another fox shot to-day by Frederik, Eskimo. Blowing pretty heavily.

November 26.—Have had cold feet all day and been miserable. Spent several hours this afternoon and evening in putting tongue in sleeping-bag. 7 a. m., barometer 30.25 [768.34^{mm}]. Noon thermometer, −34.5 [−36.9° C.]; (mean memorandum) [minimum], −36.5 [−38.1° C.]. Straits apparently frozen over. Day has seemed very long. Most of us ate all our bread last night and have nothing for breakfast but chocolate. With many others, I ate all my bread at supper this evening. Supper consisted of bread and tea and English meat. It is singular how much more comfortable one is after eating. A little food acts like fuel. Talk during the day mostly about cakes and pies.

Memorandum: Vienna Coffee House, Broadway and Fourteenth street, New York; large assortment of cakes, bread, and pastry; fine chocolate, *omelettes*, and biscuit *glacé*.

We have discussed every dish under the sun, and all forms of vegetables and desserts of all kinds. The temperature inside here during the day from +29 to +31 [−1.7° to −0.6° C.].

November 27.—Cooks called at the usual time, 6 o'clock a. m. 7 a. m., barometer 30.35 [770.88^{mm}]. Noon thermometer 32.5 [−32.5 (−35.8° C.)]; (mean memorandum) [minimum] 43.5 [−43.5 (−41.9° C.)]. Talk during the day about all dishes, specially desserts and cakes.

Memorandum: *Roulades*, Charlotte Russe, *Tortes* [*Torten*] (Vienna Café, New York), roast sucking pig, Irish stew.

Got soup to-night of seal meat. This morning we had a stew of pieces, &c. Weather clear and cold. Another fox around. I have been sewing on my sleeping-bag all day. Most of the party get down in their sleeping-bags and cover up during most of the day. We are looking forward with much interest to Thanksgiving.

Memorandum: *Omelettes* at the Vienna Café. These can be sent for by express from this place; prices moderate.

Some of us eat all of our bread at night, and many are the ways to make our pittance of food seem more satisfactory.

Omelette soufflé.

November 28.—Noon thermometer observation, −11 [−23.9° C.]. (Mean memorandum) [minimum] −34 [−36.7° C.]. Day windy with drifting snow. Day passed very much as usual; conversation same as usual. I have eaten up all my bread at night for the past few days. I find I sleep better and warmer in this way, though generally I regret it at breakfast time. Fox was fired at, but escaped. Very dark now.

Memorandum: Things to be kept in my room at Washington for midnight lunches: Sardines, potted ham, smoked beef, smoked goose and eel, shrimps, anchovy paste, spiced oysters, stuffed olives, Boston pilot bread, buttered crackers, Albert and Arundel crackers, soda and water, ditto ginger, nuts and cakes, can of butter and condensed milk, preserved peaches, strawberries, &c., and blackberry jam, *fromage de Brie*, and Schweitzerkäse, sugar, beer, ale and porter, and cider, and *liqueurs*, and Virginia seedling wine, mustard, vinegar, pepper, salt, &c., and Maryland biscuit, black cake.

November 29.—Cooks called at 6 a. m. 7 a. m., barometer 29.78 [756.40^{mm}]. Noon thermometer, −5 [−20.6° C.]; (mean memorandum) [minimum], −15 [−26.1° C.] Breakfast consisted of the usual ration of bread and double quantity of ox-tail soup, with some rice in it. It was really a large meal, comparatively speaking, but my anticipation led me to finish with a sense of dissatisfaction. Day passed in conversation, &c. Psalms read in the afternoon, followed by singing "My country 'tis of thee," &c. During the afternoon I wrote at dictation bills of fare of different members of the party to be eaten at our next birthdays, at which each one is to invite all the rest of the party who may be at the same place. (See end of this book.) At 2 o'clock the cooking of the day commenced. First, seal stew, or rather soup of seal meat and fox meat, with 8 ounces of bacon for our mess. It was large in quantity comparatively, but I must confess a sense of dissatisfaction the same as in the morning. Just before this, 7 ounces of hard bread were issued, and our butter for three mornings—Friday, Monday, and Wednesday next. With the hard bread issued was the rum, it being issued on account of Thanksgiving; after this came a pudding of rice, raisins, and some seal blubber. Each one had a plate full, and this was cooked on the alcohol lamps instead of stove. Got through this a few minutes ago, about 5.30 p. m. I feel nearer satisfied than I have for many weeks. But still I could eat two or three pounds more of such food without being fully satisfied. The rice was six pounds and the raisins 5 pounds, milk three cans, divided among the two messes (25 men). Two-thirds of the milk was put in the pudding, and the rest goes in the punch, which is to be made this evening. This punch is one gill of rum to each man, and one dozen lemons in all. The chocolate we are yet to drink. Quite a number of the party are asking to see and each seeking to prove that this pudding was the best rice pudding of many eaten at Fort Conger or ever eaten. It is, of course, the effects of hunger. Day cloudy and windy. Straits look as if they were open, judging from the water-clouds. I ate to-morrow morning's and Monday morning's allowance of butter to-night. We had a double allowance of cloudberries to-day. The best part of the day, a hot rum punch, is yet to come. The dinner to-day, which we had in lieu of oysters, turkey, vegetables, pies, cakes, and all the delicacies of the day in civilization, consisted of about 7 ounces of meat, 7 ounces of bread, and about two ounces of rice per man. We kept up our committee [conversation] on this small dole of food from about noon when the cloudberries were issued, to about 10 p. m. when we had the chocolate. Kept up a continuous talk all this time on little else than the subject of food. Then we had the rum punch, which proved very good indeed, and a few songs. About midnight most of the party were asleep. Had cold feet all day until the evening. How often, oh! how often my thoughts have wandered home to the dear ones there.

November 30.—Noon thermometer, +3 [−16.1° C.]; (mean memorandum) [minimum], −5 [−20.6° C.]. Day cloudy, with snow falling and drifting. Breakfast about 7.30. We all feel quite well after our feast of yesterday. Israel alone is a little out of sorts. Leaking inside here to-day. Am very much annoyed by cold feet. It seems to be due to bad circulation, owing, I suppose, to the small ration.

Memorandum: *Tri-roulades* of ham, chicken, &c. How often I picture to myself the old, familiar scenes of home! How I long to know that all are well, and trust their anxiety for me is not too great. I picture to myself where my sisters are living, and the family scenes and conversation at the old roof-tree in the evening.

December 1 (*Saturday*).—Breakfast of tomato soup; very good. Noon thermometer, −6 [−21.1° C.]; (mean memorandum) [minimum], −7 [−21.7° C.]. It has been dripping all day in the hut. Thermometer generally stands about freezing-point [0.0° C.]. Thanksgiving cooking and the high rise in the temperature has produced a very disagreeable drip. Was kept awake last night, off and on all night, by cold feet. My feet and hands seem to alternate in suffering from cold. This evening we had English beef and two dog-biscuit each. These preserved meats are thawed out in the cans by being put in the sleeping-bags, and then

divided without any cooking. I hash up my meat fine, and also the dog-biscuit, and keep them until I get my tea, and then pour some tea on this hash, or whatever it might be called. We try all sorts of expedients to make our little dole of food feel more satisfactory, but one feels hungry all the time—nothing can prevent it. In the morning we have a good stew of the bread, with a little blubber scraps and a few raisins in it. Blowing very hard to-night from an unusual direction—the east. Snow drifting very fiercely against the house. Conversation during the day on the subject of eating. This is the usual subject, varied by discussions on farming and other occupations, which the men, or some of them, intend to adopt on their return to America. Linn is to be a farmer; also Ellis. Jewell is going into the fancy grocery business. Long is going to keep a restaurant at Ann Harbor [Arbor], and Frederick is going to set up a saloon at Minneapolis. Last night I told the narrative of my farming experience. It excited much interest, and every one thinks there is a bonanza in the farm. To-night Bender is giving a general description of Germany.

December 2.—The storm from the east last night continued until noon to-day, blowing with great violence during the night, and occasioned some uneasiness. The entrance to the house was entirely snowed up, and several hours' work were necessary to-day to dig us out. The west side of the house became heavily banked with drifted snow. On the east side a good deal of snow was blown off. I am to eat a cold roast turkey with Linn down at the farm on my return—turkey to be stuffed with oysters and eaten with cranberries. With Ralston, some hot hoe-cakes. With Ellis, spare-ribs. With Long, pork steaks. With Biederbick, "buffers," old regiment dish. With my other neighbor, Connell, I am to eat Irish stew. Connell is to cook this himself. With Bender, a roast sucking pig. With Schneider, tenderloin. With Brainard, peaches and cream. With Frederick, a black cake, to be cooked by one of my sisters, with preserves. With Salor, veal cutlets and lettuce salad. With Whisler, flap-jacks, with molasses. With Jewell, roast oysters, on toast. With Rice, clam chowder. With Israel, hashed-up liver. With Gardiner, Virginia Indian pone (hot). With Elison, Vienna sausage. With Dr. Pavy, *pate de fois gras*. With Henry, Hamburg beefsteak. With Kislingbury, hashed-up turkey, chicken, and veal. With Lieutenant Greely, Parker House rolls and coffee, cheese, omelet, chicken curry, and rice, and preserved strawberries. The Parker House rolls are to be baked at his house, and I am to furnish the preserved strawberries. For supper to-night we had seal stew; very filling.

Memorandum: Charlotte russe.

With Cross, I am to eat Welsh rarebit, with eggnog and black cake.

December 3.—7 a. m., barometer 29.32 [744.71^{mm}]. Breakfast this morning consisted of chocolate and 1½ ounces butter—no bread, for I ate all my bread last night. Many of us eat all our bread at night, and many try to save and manipulate their dole of food in a dozen ways to make the mite of food seem more filling. I have saved from yesterday some scraps of seal-skin, and after Long was through I put the can over the remnants of the fire for a few minutes and the scraps became quite soft. I ate them hair and all. This skin has little on it but the hair, the blubber and meat being cut off as clean as possible. Last night Bender finished his travels in Germany as a journeyman tinsmith. It was quite interesting; it kept us awake until 10 o'clock. To-day the canvas of the vestibule at the door was put back and the effects of the late storm removed as well as possible. I was out about fifteen minutes picking up pieces of wood scattered by the wind. It is now very dark. Our small rations make it very difficult to remain out even a few minutes without suffering much from cold hands and feet, &c. We all look forward now to Christmas, and count the days to the winter solstice—the darkest day of this dreadful winter. Had a bad nightmare last night, caused by getting the air in the bag cut off, so that I could hardly breathe. Remarks on the States by Lieutenant Greely each morning now. After he gets through, the state is generally spoken of by those of the party who know anything. We are now on New York State.

Memorandum: Potato cake.

December 4.—It has been blowing strong from the west to-day, and very few of us have been out. I have suffered from cold feet to-day; found it impossible to keep them warm. It makes this miserable life still more miserable. What would I not give to be away from here—anywhere away from here—anywhere out of the darkness and cold, where there is plenty of food to eat. Have been in low spirits during the day. At times it seems impossible that we can get through such an existence. If we entirely escape scurvy during the winter, as we have so far, I shall always regard it as something almost miraculous. This evening the spirits of the party seem higher, and we have indulged in some singing—singing is something rather rare with us. Thermometer to-day outside, −8 [−22.2° C.]. We have mentioned every vegetable, meat, fruit, and dishes of every kind until the subject is worn out, and yet still it forms the staple subject of conversation.

Our minds dwell continually on food. Our rations, commencing Thursday (for seven days), issued to-day, consist of two cans of English beef (4 pounds each), two cans of soup, two cans of peas, two cans of coffee, three of chocolate, one can and four ounces of corned beef, and half a can of milk. Besides this, hard bread and a little blubber. Besides this we have some rice, &c., to be issued to-morrow.

December 5.—7 a. m., barometer 29.55 [750.56^{mm}]. Violent storm from the east during the night. It blew with great violence and threatened the destruction of our hut. Early this morning it changed and blew from the west, and continued until afternoon. Vestibule and commissary storehouse filled with snow. House is now well banked up by the action of these storms. The straits must be undoubtedly open. Got very little sleep last night, as well as night before, on account of cold feet. To-day my feet have been warm, much to my joy. Cloudberries issued to-day. Lime-juice is issued twice a week, and cloudberries once. No one out to-day excepting a very few. Reading last night of the Bible, [Army] Regulations, and Pickwick. My dress now consists of blouse, double blanket vest, leather vest and five flannel shirts, and three pairs of drawers. Thermometer rose to-day [to] about +4 [−15.6° C.].

December 6.—7 a. m., barometer 29.53 [750.05^{mm}]. Thank God! another day has passed. Had nice warm feet last night, but to-day about noon the circulation left them, and since then I have been miserable. Life in the most miserable "dug-out" in the West seems a paradise in comparison with this life. Thermometer fell to-day to −10 [−23.3° C.]. We have had a severe west wind during the day. Very few of us out—the cooks, Ralston and Ellis, and a few others have been the only ones. Most of us take no exercise to speak of during the day. Nature calls us out, but at long intervals—of some as long as two weeks at a time. Pennsylvania was the subject of discourse this afternoon, and since then food, dishes, and restaurants have been the chief subjects of conversation. We still get water out of the lake, but have more or less trouble with the hole now. Open water is reported close to the shore now, and the straits are open beyond all doubt. We have frequent speculations about food on the other side and party every day, and their probable movements in the spring. Would to God the spring was come. We look forward now to Sunday morning bread pudding, or "son-of-a-gun". Next week we are to have, on Wednesday, three and a quarter ounces of bacon. Next comes our Christmas "feast". We have frequent discussions as to Fort Conger, dishes, &c. Schneider reads our bills of fare over, corresponding to these months. My dinner or supper to-day consisted of corned beef, hard bread, and tea. The bread and meat I cut up finely. Put gunpowder on, and when I get my tea pour considerable of it on them, which makes a warm hash and soaks the hard bread. After this I drink my tea. A can of hard bread was found here, and we use it extensively instead of salt, of which we have a little. Israel reports to-night the wind is blowing about 25 miles an hour [about 11^{m} per second]. A fox shot to-day weighing three pounds—a blue fox.

December 7.—7 a. m., barometer 29.55 [750.56^{mm}]. Noon thermometer, −21 [−29.4° C.]. Wind died away about noon until it nearly stopped. We had considerable trouble getting water to-day. The hole was dug out until it was between 3 and 4 feet deep [about 1^{m}], but it was not until about 3 p. m. that we got water. At one time it looked as if the water for supper would have to be made from ice. A fox was heard last night on the roof, but we did not get him. Two or three are known to be around.

Memorandum: Pumpkin butter, Model Coffee House, Philadelphia, established by Quakers. Fisk and Gould Cafés, New York, Chatham street. Little Pacific House, Chicago. All of these are cheap eating places, where you can get food, vegetables, &c., at 5 cents a dish. Tenderloin cooked between two ordinary beefsteaks recommended as particularly good. Curry paste and chickens.

We had to-night a very good stew, or soup more properly speaking, of seal. Breakfast consisted of coffee, bread, and butter. Elison gets along much better than expected. There is a chance of his pulling through. Reading last night of Bible, Pickwick, and History of our Own Times. Talk all day mostly about restaurants and dishes of various kinds.

December 8.—7 a. m., barometer 29.80 [756.91^{mm}]. Noon thermometer, −24 [−31.1° C.]. About this time temperature inside +29 [−1.7° C.] by thermometer two and half feet [.75^{m}] from the fire, and by another thermometer, about five feet [1.5^{m}], high hung on the gunwale of the boat, [nearly over the cooking stove] +31 [−0.6° C.]. Suffered from cold feet all day until supper time. This constant misery from cold feet is worse in some respects than the cold. Breakfast this morning, soup of peas, &c. To-night we had two dog-biscuit and a mouthful of English beef. I ate my bread and meat together, and then waited for the tea. Of late have generally kept my bread and meat until the tea was ready, but no expedients make much difference. There is never enough. Bill of fare these seven days same as last week. Our issue week commences on Thursday. Roar from the moving ice in the straits quite loud to-day. We do not like to hear it.

[Lieutenant Greely talked on] Pennsylvania this afternoon. Fine "son-of-a-gun" in the morning. We have been looking forward to it all the week. Both messes cook now on one stove, alternating each morning. Smoke in great quantities every day. We have frequent discussions and hot arguments as to what stews, &c., are the best; also frequent arguments as to our fare at Fort Conger, and what we liked there.

Memorandum: Hulled corn. I mentioned to-day the hot cakes eaten at dinner with sugar and wine. It seems a new dish to every one.

All the well ones of the party except Lieutenant Greely, who does no work and goes out only when absolutely necessary, went out to-day and did some work on the vestibule, digging out, &c. A can of alcohol was unfortunately struck with a pick and about one pound lost.

December 9.—7 a. m., barometer 29.90 [759.45^{mm}]. Fine "son-of-a-gun" for breakfast, to which we looked forward all the week past. Thermometer at noon, —19 [—28.3° C.]. Four foxes were shot last night, two by Brainard and two by Long. Weight, 2 pounds 10, 3 pounds, 3 pounds 2, and 4 pounds 10. This means dressed. We have felt better satisfied to-day than for a long time.

Memorandum: Fig pie.

Rum and a quarter of a lemon to each one as usual. Talk to-day much the same as usual, mostly about food. I have been in the sleeping-bag all day—feet alternately cold and warm, but moderately warm. The foxes shot of late have generally been heard on the roof of our hut overhead, thus giving warning of their presence. We feel confident of getting a bear yet. I managed to save half my bread stew this morning, and kept it till this evening and ate it with my lemon. I feel particularly filled to-night. This bread stew, as thus eaten, contained blubber, raisins, and lemon—a terrible mixture for any one but a man on quarter rations in the Arctic. Three of the foxes shot last night were blue and the other half blue and half white. How often my thoughts wander home to the family scenes there—my thoughts, I must confess, are generally accompanied by thoughts of the table. In fact I can think of nothing but eating. For breakfast we have bread, butter, and chocolate. The bread I have mostly eaten—all but three small pieces. The butter I put in the chocolate. Frederick gave his railroad and other experiences last night. To-night Rice gives reminiscences of a trip to the West Indies, and also to the Newfoundland fisheries.

December 10 (Monday).—Temperature, —27 [—32.8° C.]. Strong westerly gale blowing pretty much all day, with drifting snow; very severe. It was my turn, and I went out at 4 o'clock and cut out the water hole. Saw a blue fox. This is blue Monday. Breakfast: bread, butter, and chocolate. Supper: English beef and tea. Lieutenant Greely and Rice have agreed to [alternately] give each other all their Sunday morning bread stews next Sunday and the one following. One will give that [go without] and the other have double allowance.

Memorandum: Guava jelly, pineapple. Raw meat and onions minced and eaten together. Mashed-potato cakes, fried, with a layer of sausage between and a poached egg served on top of each.

We drink our tea without sugar or milk. I have now gotten quite used to it. The tobacco of many of the party is gone, and they are miserable. Maryland was the subject of remark this morning. I made a few remarks. The messes still cook in turn. We count the days to December 21 and Christmas. I have moderately warm feet to-day for a wonder. Slept through last night without getting up. Generally wake up several times, and have to get up two or three times during the night. Another day gone, thank God! Oh! for the time when we shall have all we can eat, and have light and health.

Memorandum: Parker House rolls.

December 11.—7 a. m., barometer 29.88 [758.94^{mm}]. Thermometer at noon, —20 [—28.9° C.].

Memorandum: Vienna sausage at Vienna Café, New York. Stuffed pancakes.

Clear and calm to-day, mostly. Canvas roof of vestibule put on which was blown off lately by the storm. Most of the party went out to help a few minutes. I passed a miserable night last night, having cold, icy feet all night; thought they would freeze. Got no sleep until just before breakfast this morning. Did not go out to-day. Supper to-night of *Proteus* bread and 3¼ ounces English cooked bacon. I minced up my bread and bacon and poured some tea on it, but it got cold before I was ready to eat. Experienced a sense of dissatisfaction. Oh! how glad I shall be when no longer necessary to try to cheat my stomach in this way. A few issues only of this *Proteus* bread left. After that we have only American hard bread and the English. Breakfast hours continue as usual. Fire lighted at 6 a. m. for breakfast and 2.30 p. m. for supper. It smokes now less than formerly. We count the days until the solstice, Christmas and New Year. The time passes fast. Biederbick says that the line of demarkation in Elison's hands and

feet is now quite plain. In the former it is just below the ankle and in the latter through the fingers. Elison seems in good spirits, however. I try all kinds of expedients to keep my feet warm, but almost without any success. It is thought water may last until February.

December 12.—7 a. m., barometer 30.00 [761.99^{mm}].

Memorandum: Hot porter with nutmeg and sugar.

Fine day with bright moonlight, calm and clear. Thermometer —25 [—31.7° C.]. I went out in the afternoon and worked a few minutes, doing some work on the vestibule, which is now about finished. Find myself very weak. I have concluded it best to eat all my bread and cold meat when first dealt out, which is generally half hour or more before we get our tea. The two messes alternate in cooking first. Oh! this wretched existence, where a few crumbs of bread are as highly prized as the most delicious delicacies. For breakfast this morning we had ox-tail soup and rice; and for supper, English beef, cold, and hard bread. I have saved two small pieces of my bread for breakfast in the morning. We lie in our sleeping-bags pretty much all the time. There is no room in the alley-way, it being occupied by the cooks and by Cross, who daily saws and splits wood for the stove. Only nine more days to the solstice. It is wonderful that we all remain in such good health. To-morrow commences issue week. For our thirteen men we get two cans of coffee, two of chocolate, two of English beef, one of soup, one of butter, one of tomatoes, one of green corn, one can corned beef, and one can milk. Some of these are slightly in excess of the ration, and a small fraction has to be carried over. Vice versa, a small fraction is still due to some. The English beef cans contain (or are supposed to) 4 pounds each. Milk, one pound; corned beef, two pounds; soup, two and a half; tomatoes, the same; green corn, 25 ounces; 16 ounces of the last are allowed only. One can (25 oz.) extract meat are allowed for three weeks.

December 13.—7 a. m., barometer 29.80 [756.91^{mm}]. Thermometer, about noon, —23 [—30.6° C.].

Memorandum: Cranberry jelly.

Last night I ate two fox paws raw. They are little else than bone, but I chewed up the bone and everything raw. In the evening, after supper, the other mess had something to say about their cook, Frederick. The doctor, Henry, Whisler, Cross, Bender, Connell, and Schneider testify to having seen several things which looked very suspicious, all looking towards favoritism towards Brainard or towards Frederick, getting himself more of the stew, &c., than his share. It seemed the matter had been talked over before privately among themselves, but nothing said publicly up to this time. Among other things, a *Proteus* biscuit fell out of Frederick's pocket, some days ago, when he drew out his watch to look at the time. On another occasion, the stew of seal meat helped to Brainard was heavier than any of the rest received. After those mentioned had related the facts, Frederick made an explanation which was generally thought to be quite satisfactory, and so the matter stands. Frederick still goes on cooking. To-day we have had a good deal of wind. Breakfast this morning of ox-tail soup; supper of corned beef and tea. Nobody out to-day but the cooks, and a few of the men who went out called by nature. Some have not been out for certain purposes since fifteen days. We have reading every night generally—Pickwick, McCarthy, Bible, &c. Sometimes the blubber lamp is blown out about 7.30, and sometimes we manage to keep awake, often up until 9 o'clock. Brainard is to come to supper at my home, on reaching Washington, and I have promised him sally-lunn, stewed oysters, smearcase, slip, and preserved strawberries with cake. After supper a smoke, and then wine and cake, and some singing by Mary Murray. I have invited Frederick and Long to come to the house and eat some preserved strawberries and black cake.

December 14.—7 a. m., barometer 29.91 [759.70^{mm}]. Thermometer at noon, —17 [—27.2° C.]. Frederik, Eskimo, shot a white fox this afternoon; weight, 4½ pounds. This gives us a fox for the whole party each week until the last week in February. North Carolina formed the subject of discussion during the forenoon to-day. Many of the men are getttng out of tobacco, and smoke tea leaves and the bark of the birch. The other mess had a growl to-night about their soup—got it cold, they said. Bender, as usual, had the most to say, and made it unpleasant for us all for half hour or so. We count the days from one Sunday to another, and to solstice and Christmas.

Memorandum: Leaf dough biscuit (same principle as the pie crust eaten hot at home).

December 15.—7 a. m., barometer 30.12 [765.03^{mm}]. Noon thermometer, —17 [—27.2° C.]. Day clear and calm; we still have the moon. There is a great difference in the amount of light between here and Fort Conger. We had considerable trouble to-day with the water hole, and it was three o'clock before the fire was lighted for supper. Those who go out to work now are all but Lieutenant Greely, the doctor, Israel, Henry, Elison, Cross, Biederbick. Cross saws the wood in the house here, and Biederbick has a sore finger. The cooks are fully employed otherwise.

Memorandum: Bootees opposite Atlantic House, St. John's, $5; same as those advertised in the Manufacturing Journal. Pickled eggs (hard boiled).

Breakfast this morning: stew (or soup rather, for we call them all stews) of tomatoes and rice. It consisted of the usual amount of English beef, cold, and of dog biscuit one and a half ounces each. We look forward to to-morrow for the "son-of-a-gun" with great interest. We watch the operations of the cooks with great interest. North Carolina was dealt with this morning. Gardiner made some interesting remarks on the plantation life there, &c. Our most constant subject of conversation is food of all kinds. We have exhausted the subject, but it assumes new phases every day. Sewed a piece of blanket to my sleeping-bag as a flap. Sewing is here a severe ordeal. Cold, darkness, and all sorts of obstacles to overcome. I have not been out to-day.

December 16.—7 a. m., barometer 29.82 [757.41^{mm}]. Noon thermometer, —21 [—29 4° C.]. Heavy wind last night, which continued until sometime to-day. This morning we had a fine bread stew "son-of-a-gun," hard bread, raisins, blubber, and lemon, a mere taste of everything, however, but bread. I borrowed a dog-biscuit from Biederbick last night, and adding it to this morning's allowance of bread, or rather what was left since last night, was enabled to save part of the bread pudding until to-night. To-night we had a fine seal and fox stew or soup. I feel better satisfied than I have for two months, hardly excepting Thanksgiving. I feel indeed somewhat uncomfortable. Our stomachs, I suppose, have contracted under the small allowance, and I am satisfied an ordinary meal would make us feel badly. It is a noticeable fact that the conversation slackens after these "full" meals. More is said after these sparse ones. It is only on such occasions as the present that my mind reverts for any length of time to anything but food. Five days more to the top of the hill. Thank God!

December 17.—7 a. m., barometer 29.42 [747.25^{mm}]; thermometer, —13 [—25.0° C.]. A fox has been seen near the house several times, but is very wary. However, we expect to have him yet.

Memorandum: Castle Garden for good servants. Hog's marrow eaten on bread with pepper and salt.

This is blue Monday. The tobacco of several is gone and they are in misery. Tea leaves and birch bark are used by some. I am pinching myself to make mine go as far as possible. Last night Lieutenant Greely and Rice had some unpleasant conversation, brought about by the discussion of the relative merits of Indian corn pone. The other mess now have one of their number to hand around the food after the cook has divided it and put it in the plates. We place implicit confidence in Long. Got my feet nice and warm last night by sitting on the stone on which the fire is built. Last night we kept awake until 10 o'clock. I have invited Rice, Brainard, Jewell, and Linn to go down to the farm, see it, and spend the night in the kitchen on the farm, and, by the light of an open wood fire eat some roast oysters, peaches, and cream, &c. My pictures seem to give great pleasure. My feet were nice and warm all day yesterday, and last night I slept through for the second time without waking up. I generally wake up a number of times, and have to get up to use my can three or five times or more, all the effect of the cold. It is singular how provoked now I feel at any dish I have had the chance of eating in civilization and have neglected. The roof and walls of the house are all now heavily coated with frost.

December 18.—Thermometer at noon, —17 [—27.2° C.]. The day has seemed to pass rapidly. We had a stew of corn, &c., for breakfast and fine seal stew for supper. Talk all day about food—what cakes, preserves, and various dishes we prefer.

Memorandum: Suit of Scotch tweed at Halifax can probably be purchased for about $18. Try oranges and pineapple cut up together and eaten with grated cocoanut.

Fine clear night this evening; calm. My thoughts are constantly on food, and my mind dwells constantly on my childhood dishes at home. Oh! my dear home and the dear ones there. Can it be possible I shall some day see them again, and that these days of misery will pass away? My dear father, is he still alive? My dear mother and sisters, Harry, and my nieces and brothers-in-law. How often I think of them. Only three days more to the top of the hill.

December 19.—7 a. m., barometer 29.85 [758.18° C.]. Stormy and windy to-day, blowing hard. The thermometer this afternoon, —21 [—29.4° C.]. I have been in rather low spirits to-day; yesterday my spirits were pretty high; thus they alternate. This unsatisfactory English beef for supper. I ate it just as it came. Cloudberries about 1 o'clock, meat about 1.30, and bread about 2 o'clock, tea about half-past 2. I always eat my bread regretfully. If I eat it before tea, I regret that I did not keep it, and if I wait until tea comes and then eat it, I drink my tea rather hastily and do not get the satisfaction out of the cold bread and meat I

otherwise would. What a miserable life, where a few crumbs of bread weigh so on one's mind. It seems to be so with all the rest. All sorts of expedients are tried to cheat one's stomach, but with about the same result. The issue week commences to-morrow. Provisions issued to-day: One can soup, two and a half pounds; two cans corned beef; three cans coffee, 16 ounces each; two cans chocolate, 12 ounces each; one can milk; one can of eggs, and one can of pease. Some of these cans are a little above and some a little below. Thus this week we get an extra can of coffee. The conversation on food now often assumes an argumentative form. Dishes are almost exhausted. Thank God! day after to-morrow marks the increase of light. The time seems to pass very fast, but does not equal our impatience. A good deal of trouble with the water-hole to-day. The small hole at the bottom froze up, and was only opened by finding the ice-chisel, which had been lost. Working in the storm was a great job. I did not go out. I feel an apathy and cloudiness almost impossible to shake off. We are all very weak. Cloudberries come on Wednesdays only, rum on Sundays; lime-juice issued twice a week. It is a great difficulty we have every night to know just how much hard bread to save for breakfast the next morning—hunger to-night forces hunger to-morrow morning. The cooks use more or less salt water every day.

December 20.—7.30 a. m., barometer 29.80 [756.91^{mm}]; noon thermometer, −25 [−31.7° C.]. Calm, clear day. A good deal of talking going on, and every one apparently in pretty good spirits. Alabama and Tennessee remarked on this morning by Lieutenant Greely. These remarks are generally supplemented by any of the rest of us who know anything particular about the States. A fox was heard on the roof last night several times, and two or three times Long went out, but without success. This afternoon Frederik, Eskimo, shot a white fox—another one—weight, 4⅛ pounds. The straits are apparently closed as far as we can judge.

Memorandum: Metzworst sausage, blood pudding, doughnuts stuffed with preserves; tart forms from Vienna Café, New York, to be filled at home.

I have commenced mixing tea leaves with my tobacco to make it go farther. We now frequently amuse ourselves in improvising dishes of different kinds. Reading last night of the Bible, Pickwick, &c. In anything we read, any mention of food or dishes is always commented upon by some of us.

December 21.—7 a. m., barometer 29.60 [751.83^{mm}]. The top of the hill—the most glorious day of this dreary journey through the valley of cold and hunger—has at last come, and now nearly gone. Thank God, now the glorious sun commenced to return, and every day gets lighter and brings him nearer. It is an augury that we shall yet pull through all right. Exchanged bags with Jewell during the afternoon, and paid Lieutenant Greely and his neighbors a visit. Had a good fox stew this evening. By a great effort was able to save one ounce of my bread and about two ounces of butter for Christmas. I shall make a vigorous effort to abstain from eating it before then. Put it in charge of Biederbick as an additional safeguard. Brainard shot another fox last night, a blue one. We now have a fox for every week up to the end of February and an extra one for Christmas. This makes the twentieth fox killed. Louisiana spoken of to-day. I added to it by recounting my trip from Baltimore to Texas, and then on return to New Orleans and up to Cincinnati.

December 22.—7.10, barometer 29.80 [756.91^{mm}]; thermometer, 29 [−29] [−33.9° C.]. Calm and clear. I was out to-day to cut out water-hole; worked on it some time and finally was helped by Connell. Found myself very weak, and could hardly lift the water I brought in.

Memorandum: Citron preserves.

Fox seen to-day, but not shot. The Eskimo got a small piece of tobacco on [for the] shooting of each fox. I am now smoking tea leaves mixed with my tobacco. It is now very dark, but not so dark as at Fort Conger. We look forward to to-morrow and Christmas. I had no bread this morning, and only one dog-biscuit to-night (one and one-half ounces). I offered to give any one a roast turkey on reaching home for a single dog-biscuit now, but found no takers.

December 23.—Barometer, 29.85 [758.18^{mm}]; thermometer, −24 [−31.1° C.]. Have had clear, calm day till this evening, when it has commenced blowing. Connell's turn to open the water-hole. He went out, but did not succeed. Several others went in turn until every one but the invalids had been out. When Whisler went out he managed to get the ice-chisel stuck in the lower part of the hole, so that before continuing the work it was necessary to get it out. Supper time passed and it was necessary to cook with ice. We had only about half a cup of tea, though a good fox stew, a great deal of smoke, and every one felt miserable. Latter part of the day has been wretched. It is quite an ordeal to go out in the cold. One invariably gets cold hands and feet, and it is difficult to get warm again. Good stew for supper. I saved nearly all

my hard bread for Christmas, though I need it sorely. Breakfast this morning for me consisted of the "son-of-a-gun" only, but it was very thick—the proportion as large as 10 ounces, including seal blubber, raisins, &c. I hope very much we are not to lose our fresh water. It will be a sad loss and necessitate a reduction of our hot drinks and the few soups we have hot. I hope Christmas will be better than to-day. Our requests wander homeward to the roast turkeys, mince pies, doughnuts, &c. I offered to give any one a roast turkey on my return for a single dog biscuit, but could get no takers. A fox has been seen around to-day, but could not be shot. By a tremendous effort I managed to go without rum to-day, in order to have it on Christmas. I shall then have it in addition to the punch. Oh! this dreary life. How often my thoughts wander homeward to the dear ones there.

Memorandum: Pumpkin butter.

December 24.—Barometer, 29.72 [754.87^{mm}]; thermometer, —24 [—31.1° C.]. Water-hole not opened until about 9 o'clock, when Kislingbury and Brainard finally succeeded in bringing water after a long spell by Ellis. Ellis came in and fainted from the effects of the cold and exposure. It took almost double amount of fuel to cook our supper last night. The trouble with the water-hole seemed to throw a damper over the party and all were quite tired. By a great effort I managed to save my bread and my Sunday rum; also my piece of lemon. So my breakfast this morning consisted of nothing but coffee, without anything else. Every one seemed quite tired during the day and there has been little conversation until this evening, when we commenced to talk of what is going on at home. I read over the bills of fare of the birthdays of the party this evening. My supper consisted of tea, English beef, and a few small pieces of bread. I put by half of my bread for to-morrow, for I am determined to have a good day's allowance to-morrow. I made a little hash to-night of my bread and meat. Added salt water and gunpowder, and got Long to warm it on the top of the top funnel. To-night is Christmas Eve, and my thoughts are turned towards home. God preserve me to see this day next year, and enjoy it at home with those I love. To-morrow is to be pretty much a repetition of Thanksgiving. I have saved up my bread and rum. To-day has been clear and tolerably calm. I think of the children at home, the Christmas tree to-night, and the toys, &c. But my fingers are too cold to write more; and I have the extra lamp, and cannot burn it long on account of our short allowance of blubber. Every spoonful of blubber oil used is so much off our food. I picture to myself my dear father and mother, sisters, Harry, my nieces and brothers-in-law, all sitting around the table to-morrow. Turkeys and mince pies are strewn [strewed] on the table. Many thoughts are turned towards me, and where I am at this moment.

December 25.—Barometer, 29.93 [760.21^{mm}]; thermometer —35.5 [—37.5° C.].

Christmas. We have all been talking and waiting anxiously for the hour, and now it is here, and (5 p.m.) nearly gone. Breakfast consisted of the soup of pease and carrots, with a little blubber and some spoonfuls of potatoes. This we had at six o'clock. Cloudberries served out (two cans to each mess). At 1.30 p. m. Long lighted up for the event of the day—dinner. Dinner consisted of a fine, rich, thick stew of all seal meat, with onions, a little blubber, potatoes, and bread crumbs. After this we had, in the course of an hour or so, a fine, rich stew with raisins, a little blubber and milk. These were pretty much the same as Thanksgiving, but the cooks made a great deal that day, and the meals seemed better. The cooks are now preparing some fine chocolate, and that will be followed by a punch of one gill of rum to each man. The party have been in fine spirits to-day. Cheers were given after breakfast for Lieutenant Greely, Corporal [Sergeant] Elison, Rice, and the two cooks. It was agreed that we should give each of the two Eskimos fifty cents from each member of the expedition, to be kept for them till next Christmas.

December 26.—5 p. m. Yesterday has passed, but I find my notes of yesterday very imperfect. The day was a great success. We all had enough, or nearly enough. I had about eight ounces extra, which I had saved up, about one ounce of butter besides, and the rum of the Sunday before. It was agreed early in the morning that nothing should be said to mar the pleasures of the day. Many kindly thoughts were expressed for those at home, and oh! how often we spoke of what was going on at our several homes. Many of the party gave the bill of fare at their homes. Of course, I did not forget to mention roast turkey, cranberries, and mince pies. Reminiscences of home. Invitations to future Christmases—arrangements for future Christmas meetings—paleocrystic, and to the Ann Harbor [Arbor] Hotel. The reading of the records. Some songs in all languages, including French, German, Danish, and Greenland. The birthday bills of fare were read by me. Six pounds rice, three pounds milk, two pounds coffee, two and a quarter chocolate, five pounds raisins, twelve and a half lemons, twelve and a half pounds bread, six and a half pounds bread toast in the stews, two pounds lard, three pounds blubber, eight pounds cloudberries, one pound sugar, 25

ounces carrots, 50 ounces pease, 6 ounces extract of beef, 12 to 14 ounces seal meat, 4 ounces of rum to each man—somewhere about 36 ounces of solid food to each man. The supply in the morning was pretty much as usual, but the seal stew was voted by all as delicious and extremely satisfactory. The rice was the same, and many were the praises given to each. The punch was extremely fine. Chocolate about 7 o'clock, and by this time most of us were too full for utterance, and the conversation gradually slackened off, and with the songs the day ended.

To-day, thermometer, —34.8 [—37.1° C.]. We have all been feeling extremely well all day, nice and warm and comfortable in the extreme. Several of us ate too much yesterday, but only so much as to feel a little uncomfortable, but we all slept well. The cooking was a great ordeal to the cooks, on account of the smoke, there being very little wind, but the cooks were given an extra half-gill of rum. They did nobly. Bender relieved Frederick to-day, his eyes hurting him a good deal. Our talk this morning was of home and our families. Dr. Pavy, Rice, Israel, Brainard, and others, expressed themselves of having conceived a very high idea of my father, from what they had heard from Lieutenant Greely and from me at different times. I have invited them to come to the house particularly. I have extended a general invitation to all the members of the expedition. I spoke this morning of the reunions of my family, and how enjoyable they were. The remarks about my father brought tears—the first time I have shed tears in this country, if I except the occasion at Eskimo Point, when Rice returned with the Garlington records—the only time. I spoke also of my sisters and of Mary Murray, whose many virtues I eulogized highly. Breakfast this morning was late, consisting of a soup made of seal blubber, which was very good. I did not feel very hungry. Supper of English beef, &c. I had a few bread crumbs, salt water, and gunpowder, which Long warmed over the lamp. We spoke a good deal to-day of the prospects of getting across the straits in the spring; of Rice's preliminary trip, of the chances of finding food there, &c. The day has been calm. We count on 240 rations as quite certain, and the coal. Kislingbury was kind enough to make for each of the party a cigarette. Many of us are now out of tobacco entirely, and have succumbed to the inevitable. A fox has been seen around during the day, but our efforts to shoot him not successful so far. The talk this evening is all about food, desserts, &c.

December 27.—Thermometer, —39.5 [—39.7° C.]; barometer, 29.22 [742.17^{mm}]. Calm and clear. I exchanged places with Whisler during the forenoon—he occupying my bag and I his. Had very cold numb hands all the forenoon, but now the circulation seems to have come back, though it has run out of one of my feet. This coldness of the extremities is due evidently to the short rations, and shows how food is fuel in this country. Kentucky spoken of this morning. Jewell made some remarks in connection with horse breeding in that State. Last night Gardiner commenced a book on American shipping, found in the cache here. We gleaned from this that the Navy Board, ordered before we left, recommended the establishment of a formidable navy, and that the President brought the same and the subject of American shipping before Congress. It is singular how we thus pick up little strips of information. Rice read some on McCarthy's book, and thus the evening was prolonged until 9½ p. m. I have amended my breakfast or lunch with Lieutenant Greely. He is to send to California for the recipe of the Chinese way of making curry and rice with chicken. This is to be substituted for the tenderloin steak. With Cross I am to eat Welsh rarebit, black cake, and egg-nog. I am to take to his house the cake—he furnishes the other articles. We count the days to New Year. Brainard shot a blue fox last night—weight 3 pounds 2 ounces. He followed the animal some time, but found him dead. This gives us an extra fox next Sunday. How impatiently we watch the cook as he divides out the bread and meat, each one fearing he may get a little less than his share. The other mess now have one of their number to put around the plates, but we still trust to Long.

December 28.—Barometer, 8 a. m., 30.00 [761.99^{mm}]. Thermometer, —35 [—37.2° C.]. Calm day, with light wind from the west. Nothing new. Rope brought in and cut up for fuel this evening.

Memorandum: Rice flour.

The house has been exceptionally quiet to-day, and most of the forenoon passed with pretty much every one down in the bags—little or nothing said. No particular reason for this quiet. Breakfast this morning of chocolate, bread, and butter. For supper we had fox stew, which our mess found very satisfactory. The other mess found theirs unsatisfactory, for some reason or other, and a good many growls came from that side. When we have these stews or soups eight pots are boiled, four to each mess, two of stew and two of tea, or whatever other drink it may be. The rope this evening made a very bad smoke, extremely disagreeable. This evening a question about the fuel brought up the sum of the time it will last us. It seems we have some sixteen hard wood barrels on hand. Several expressed the opinion that there was

nothing to fear particularly on this score. Long said his experience in cooking with seal blubber showed it very satisfactory; so that if we killed seal here, by which we can prolong our stay, the blubber will furnish fuel. Lieutenant Greely seemed obliged to look on the dark side of the subject, and directed Sergeant Brainard to issue 10 pounds of blubber for experiment on the subject. This is unfortunate, as it will diminish our food by that much blubber. The water still holds out, but there is no knowing when we will have to melt ice. The two messes alternate in cooking first. I am now eking out my tobacco with tea. To-day I found two or three small pieces of raw fox—mere scraps on the floor—and, brushing the dampness off, ate them with great satisfaction. Ohio dwelt upon to-day.

December 29.—Barometer, 30.15 [765.80^{mm}]. Thermometer, —31.5 [—35.3° C.].

Memorandum: Cold breast of veal stuffed. Got Rice's list of dishes.

Heavy blow from the west last night, but the wind went down to-day. To-day has been a market day, every body trading rations, bread for butter, meat for bread, bread for soup, &c. A great deal of talking done, but not very many solid trades made. I traded about half of to-morrow morning's "son-of-a-gun" for about eight and a half ounces of bread—this was with Biederbick and Salor. Then I gave Brainard about one and one-half ounces of butter for two dog-biscuits (3 ounces). I do not believe in this trading, and do not think I shall make any more. Michigan was dwelt upon to-day. There is now a perceptible difference in the amount of light. Only two more days of this year, thank God! The rope burns very well. Got through supper about 3.30 o'clock. Kislingbury protested to-day against the experiment ordered by Lieutenant Greely to ascertain the amount of blubber necessary to cook our tea. I took occasion also to express my disapproval. We do not know yet that the wood will not last through, and the experiment can be as well made when the time comes as now. Cross's feet are worse, and Schneider sawed the wood to-day and chopped it. Bender did the sawing and splitting yesterday.

December 30.—Barometer, 30.00 [761.99^{mm}]. Thermometer, —21 [—29.4° C.]. Last night's "marketing" was continued late into the night, and much impatience was expressed for this morning with its "son-of-a-gun." Schneider with some one else struck up a bargain at 3 o'clock this morning.

Memorandum: Beef *à la mode.*

This morning came at last. Some had a good deal more than they could well eat with comfort, and some had much less. The result of my bargaining was that I had something more than one third of my plate of the "son-of-a-gun," and one-fourth of my coffee; but then I had also about 12 ounces of bread and 1 ounce of butter. I ate only four ounces of bread and have brought the rest over. This evening got issued me about four ounces hard bread for the night and morning (the rest going in the fox stew), and this I have not touched, finding the stew sufficient. Thus I will have plenty for New Year's day. Biederbick had so much "son-of-a-gun" as the result of his bargain that he overate himself, and is suffering from stomach ache. I saved to-day's rum for to-morrow night, when I shall probably remain up to see the old year out. The "son-of-a-gun" this morning was particularly fine, and the stew this evening equally so. Very little conversation, and but little to-day on the subject of eating. Full meals seem to have the effect of inducing silence, the party lying down and enjoying comfortable repose. It is singular how warm and comfortable a good meal makes one. Came on blowing to-day about noon, and a storm is now raging from the east. The rope makes lots of smoke, but it is owing a good deal to the heat and the time occupied in cooking. This morning the smoke was dense and blinding. This evening much better, on account of the wind. I am suffering with my eyes, which seem to have been affected by the smoke.

Memorandum: Cracked wheat with honey and milk.

December 31.—Barometer, 30.02 [762.49^{mm}]. Thermometer, —21 [—29.4° C.]. Thermometer yesterday morning at 1 o'clock inside the house, +24 [—4.4° C.]. Storm raging all last night and all day to-day from the east. This evening it seems to have stopped. About 10 a. m. it was discovered that the water hole was frozen up, and a new hole nearer the shore was commenced. We worked at the new hole from this time until 4.15 p. m., when Brainard succeeded in striking water. It was very severe work. The wind blew in gusts very hard. All the well ones went out except Lieutenant Greely. Those who did not go out were Lieutenant Greely, Elison, Jewell, Gardiner, Henry, the Doctor, Biederbick, Cross, Bender and Whisler, and the two Eskimos; also the two cooks. The two cooks and the Eskimos and the doctor, and Biederbick, do not take part in keeping open the water hole. Whisler was occupied in cutting up the wood. This evening was fixed upon for trying the blubber to cook by, but it has been postponed. The water used by the doctor for dressing the frost bites was warmed up to-day for the first time over the blubber lamp. This might have been done right along. Instead about three ounces of alcohol per day have been used. Break-

fast this morning consisted of ox-tail soup and supper of English meat. My rum issued yesterday I will drink to-night, as I want to sit up and see the old year out. Supper was delayed until about 5 o'clock by the work on the water hole. We all got cold feet by going out. My own became painfully cold, and are still very cold. It is discomfort in the extreme. How glad we all are that the end of the year has been reached again can hardly be expressed. Rice expects to start across about the end of January. We had to cut down through about four feet [1.2m] of ice to reach water.

January 1, 1884 (Tuesday).—Day passed in bag. Lieutenant Greely came over and paid me a visit shortly after breakfast. He told me that the doctor had made overtures with him to make allowance—[alliance] defensive and offensive [owing to] remarks some time ago—but that he had declined. He told me also that some time ago he felt certain that the doctor was eating up, during the night, Corporal [Sergeant] Elison's allowance of bread. Was within two and a half feet [.76m] of the doctor at the time, and would swear to the fact before a court. He thought it right to mention the fact to Brainard, but had said nothing to any one else about it. That this, as well as former matters, he should make the subject of report to the proper authorities on his return, to act upon as they chose. He told me that Elison's hands and feet were soporating [suppurating] fast, and that the line of demarkation was becoming clearer; that amputation would evidently have to be performed, but that nothing would be attempted here, but at Littleton Island. All this seems to have been gained mostly, or altogether, from Biederbick. He [Lieutenant Greely] told me he would do all in his power to aid me in getting a staff appointment on my return. That, if I desired, I could have three or four weeks on my return nominally on duty, but with little or nothing to do particularly, at the Signal Office, and that, if I desired, there would be no trouble in getting three or four months' leave of absence. Salor went out to-day and cut out water hole without trouble. I ate to-day a good breakfast of rice and tomatoes with some bread. At noon I ate three dog-biscuit with butter, and a little later we had cloudberries and rum and lemon. Supper consisted of fine seal meat stew. While eating this I had the misfortune to spill my bread, and in picking it up spilled the last drop of my tea. Very kindly, Lieutenant Greely, Long, and Biederbick gave me a little, so that the cupful was almost regained. Before I got my stew, Schneider offered me seven dog-biscuit and next Sunday's scanty addition of the "son-of-a-gun" for my stew this evening, but afterwards changed his mind. When Ellis perceived I had spilled my tea, he offered to trade me half a cupful, but as he took advantage of my misfortune I declined. We have all been feeling remarkably high-spirited to-day on the coming of the new year, and this evening all seem hopeful. We now speak frequently of going home this year. We are all in high hopes. I go over to-night and take Jewell's place in Lieutenant Greely's bag, with the latter and Israel. The condition of the party is far superior to anything I expected, and the future bids well to come out all right. How my thoughts wander homeward to the dear ones there! Are they thinking of me?

January 2.—Barometer, 30.63 [777.99mm]; thermometer, −28 [−33.3° C.]. After supper last night I went over to Lieutenant Greely's bag and spent the night there, Jewell taking my place here. My hearty feast of food warmed me up like a stove and I slept well through the night, waking up only at 4 o'clock this morning. I remained in the bag until some time in the afternoon, and then got up and cut open the water-hole and emptied slop bucket. It was a fine morning, and I perceived considerably more light than for some time past. Calm and clear. About noon I came back to my own bag. Jewell took a chew of my tobacco, telling me of it, however. I did not like the thing very much. Michigan talked about this morning. Lieutenant Kislingbury told us all about Detroit. The blubber lamp, a butter can, forms the lamp. The issue week commences to-morrow; we get an issue of American bacon (raw) Monday night. Issue supplies: 3 cans coffee, 2 chocolate, 2 English meat, 1 corn, 1 extract of beef, 2 cans pease, 1 can carrots, 1 can milk, 52 ounces bacon, 6½ pounds fox, 3¼ pounds seal, 72 ounces of dog-biscuit, 8 ounces rice, 14 ounces raisins, 38 ounces onions, 35 ounces potatoes, 13 ounces English chocolate, 31 ounces tea, 91 ounces blubber. The marketing [bargaining] still goes on, though not [among] many. I do not like this thing. It resembles gambling, and I think the tendency is bad. In our hunger we are apt to take advantage of the cravings of those about us. Some trade meat for bread. I have traded as yet only what I did on Saturday and Sunday last. Our stew last night consisted of seal, fox, blubber, potatoes, hard bread, and onions, and a half can sausage, and was very fine. The result of the experiment to-day is that one pound of blubber will raise to the boiling-point two and a half gallons of water, and leave one-eighth of its weight in cracklings. The tea boiled over and put the fire out after the first pot was boiled. The first pot occupied forty minutes in boiling. Supper was cooked afterwards with the wood. Soup this morning and English meat to-night. New water-hole started to-day, so as to be on the safe side.

January 3.—Barometer, 30.50 [774.69^{mm}]; thermometer, —31 [—35.0° C.] about noon. Clear and calm. New moon. Illinois discussed during the forenoon. Frederick had a good deal to say about Chicago. Pea soup and tea for breakfast this morning. Pease, potatoes, onion powder, blubber. For supper to-night, corned beef. I gave my bread for the night and morning, and also about one-third issue of butter, for an extra four ounces of corned beef. I thus had half a pound of meat for supper. This I got Long to warm up slightly on the stove. Felt a little disappointed that I did not eat it cold. I gave Bender half my butter, and promised him one of the two dog biscuits I got Saturday night for his pea soup in the morning. The issue of butter for the issue week made to-day. I have left about three-quarter ounces. Brainard shot at a fox this evening and drew the blood, but did not get the animal. Had very cold feet, which made me miserable all night. Since I have taken my half pound of meat this evening my feet have become warm and comfortable.

January 4.—Barometer, 30.10 [764.53^{mm}]; thermometer, —34 [—36.7° C.]. Day clear and pretty good until this evening, when it is somewhat windy. New ice-hole was started yesterday, to be ready for the present one closing up. Brainard reports that footsteps were found around the commissary leading up to the west side, and a slight cut in the canvas of the roof. On further examination he found that about a quarter of a pound of bacon had been bitten off a piece which was at hand inside. As the bacon was all right last night, the thing must have occurred to-day some time. New stove, or rather one of the two old ones, started to-day. Eight minutes occupied this evening in boiling first pot of stew, and seven minutes for the second pot. This is better than the old stove. This morning I enjoyed a fine pea soup from the other mess, and this evening we had a particularly fine fox soup or stew. I have rather preferred the soups, though only our canned soups are generally termed soups. Several trades were made to-day. I traded Sunday's "son-of-a-gun" with Jewell for two issues—8 ounces—corned beef, which I [will] give him next week, and in addition his allowance of bread to-night—about 4⅓ ounces. Afterwards I agreed to give Frederick, the cook, my "son-of-a-gun" the following Sunday for his this coming Sunday, and in addition I give him one dog-biscuit. Connell bet on a shot made by Brainard at a fox to-day, and lost his Sunday's half gill of rum thereby. We are all still in excellent spirits and good health, and look forward with much confidence to getting home this coming summer. We count the days. I have pretty much made up my mind to stop this trading. Lieutenant Greely read some geographical statistics this morning, which is all the geography we have had to-day.

January 5.—Barometer, 29.60 [751.83^{mm}]; thermometer, —35 [—37.2° C.]. Breakfast this morning ox-tail soup with rice; very good. My supper consisted of regular issue of English meat, one dog-biscuit, and three small pieces of hard bread. We had tea at both meals. Brainard shot a black fox last night. I won half a gill of rum from Connell on it. Three other foxes were seen during the day, and some fired at. I was offered by Jewell about one-half of his "son-of-a-gun" to-morrow morning for the two half gills of rum, but withdrew, objections made against the bargain by Lieutenant Greely. I have since swapped this rum for Connell's butter issued next week—about 3¾ ounces. Brainard found another slit in the canvas covering the commissary storehouse. No trace as to who the thief is. To-morrow's "son-of-a-gun" I give to Jewell for eight ounces of meat and 4 ounces of hard bread. Frederick gives me his "son-of-a-gun" to-morrow morning and I give him mine the following Sunday. The "son-of-a-guns" are great favorites. There is now a decided sentiment against this trading, and many of us think of stopping off to-day. Elison seems very hopeful. Wind is now blowing from the north. I was out to-day a little while down at the new water-hole. One cold foot to-day, and to-night both are like ice, which promises a bad night's rest.

January 6.—Barometer, 29.40 [746.75^{mm}]; thermometer, —24 [—31.1° C.]. Another day past and another Sunday nearer Rice's departure and the end of this misery.

Memorandum: Pare pine-apple slices, covered with sugar, and a hole cut in the middle of each—then replaced and the core filled with sugar, and port wine poured in.

Long got too much salt water in the "son-of-a-gun" this morning. I found Frederick's "son-of-a-gun" very fine. Jewell ate two "son-of-a-guns" and made himself half sick. Several others stuffed themselves without much more benefit. Day has passed rapidly, though I have been in somewhat low spirits. Connell enjoyed my rum, but now it is all over and I have his butter to look forward to. There has been no trading to-day, and the business is to be abandoned or will die a natural death. I do not think I shall do any more. Fine soup or stew to-night of fox, bread, &c. I was able to save a good deal of bread for next Sunday and to-morrow morning. The days draw near toward Rice's departure. We all suffer a good deal

from cold feet, &c. To-night Rice, Brainard, and I are to read our bills of fare for the breakfast to be given by Jewell. Day tolerably calm with the moon now shining. Conversation about dishes somewhat slack now and more given to our departure for Littleton Island and expected help.

Memorandum: Cream cakes, look like eggs.

Some of the party do not go out for certain purposes for a week or more. Seventeen days has been the longest thus far any one has gone without a passage.

Memorandum: Cranberry pie.

We now have a fox for the two messes, half to each, until the middle of February; and for the last two weeks, when we shall need more food, we shall have two foxes. 23 of these animals killed to date. How often I think of those at home. Oh, God! what a dream it seems to think of seeing them once more. Oh! my dear father, mother, and sisters. One lamp (blubber) burns constantly, and at times we have one or two extra ones, as is needed.

January 7.—Barometer, ———; thermometer, −31 [−35.0° C.]. Breakfast—soup of string beans, eggs, and hard bread, with chocolate. Day somewhat windy from the west. Suffered with cold feet all day. Bowels rather loose. Minnesota dwelt upon to-day by Lieutenant Greely, with some remarks made by Kislingbury. Last night Biederbick kept us awake until 10½ by a very good description of home life in [on] his father's farm in Walden. Supper this evening—raw American bacon, bread, and tea. The bacon eaten cold and very much enjoyed by every one. Some warmed it up in their tea. This is the first issue of this meat, which is to be continued on Mondays hereafter. This evening Brainard reported some more discoveries. Some one has left a second deposit in a can in the vestibule, as we call the passage way. Brainard reports also that some one has taken a quarter pound of bacon left in the stearine pot by the cook. The loss will fall on their mess. Some one also scraped up the oil out of the blubber lamp. Some one has also recently made a hole with an axe in a barrel of bread and taken about a pound or two. All these acts are doubtless by the same individual, and many are the execrations called down on his head. This morning Whisler, in endeavoring to carry out a tub of urine for Israel, whose duty it was to do this as well as open the water-hole, had the misfortune to stumble and spill half of the contents on the three-man bag that Brainard and Frederick sleep in. This will not dry and will increase the misery of their life during the rest of our stay here. I have felt chilly and cold to-day and in low spirits. To-night Lieutenant Greely is reading out of his diary for 1883. Oh! how I long for the time when this life shall end. Only those now leave the house during the day who have to. Most of the party keep pretty well down in their bags, only getting up at meals and a few other times. No trading to-day. It is to be hoped it will die out. A great deal of frost is now overhead. Brainard reports about 18 pounds of American bread frozen—not so much as he expected. This can readily be used in the stews.

January 8.—Barometer, 29.05 [737.86^{mm}]; thermometer, −28 [−33.3° C.]. Calm during the morning, but about noon commenced blowing, and blew quite strong from the west—still continuing. Breakfast—pea soup, extract mutton, and tea. The extract was tainted a good deal, but we ate it all the same. Dinner consisted of a very thin seal stew, in which we were all much disappointed. That I got had hardly a bone or piece of meat in it. The day has seemed very long. I have been cold and chilly all day, with very cold hands and feet. Feel very much down at [in] the mouth. So it is always—sometimes my spirits are pretty good, and sometimes very bad. I, however, went out to-day to work at the ice-hole, and dug away at the old one, which shows signs of giving out. Slept poorly last night. Last night we had reading—Regulations, History of Our Own Times, and Koningsbee (?) [Coningsby]. It kept us awake, mostly, until 10 o'clock. Iowa was discussed this morning. There is a great abatement on the talk of food. Cold worries me now more than hunger. God! how glad I shall be when this existence comes to a close. We all count the days and weeks, and try to make time fly faster by anticipation. Rice will start on the 2d proximo; he will have a pound of bread, a pound of meat per day for a week before he starts—this in addition to the vegetable soups, I believe. Jans [Jens] has the same ration. I feel an inertness that makes anything like action of every kind very distasteful, and it requires a great effort to do anything. Frederik, Eskimo, thinks the straits are frozen up and all right. Jans [Jens] expresses some doubts, I understand. Beautiful moonlight now. The light is increasing fast. We had a discussion on English history last night; also the President of the United States. The party are all about the same; no signs of scurvy as yet have shown themselves.

Memorandum: Cranberry pie.

January 9.—Barometer, 29.31 [744.46^{mm}]; thermometer, −29 [−33.9° C.]. The average temperature in the house here is about +30 to +32 [−1.1° C. to 0.0° C.], at times, when the stove is lighted, or just

afterwards. At other times it is about +26 [−3.3° C.], or thereabouts. Fine day. All day calm and clear, with beautiful moonlight. Breakfast of seal-skin soup and coffee; English beef, with tea, for supper. We all notice a saltiness in the tea, &c., now, which is only to be accounted for by supposing the sea water to find itself into the lake in some way. At high tide there is very little difference. I went out to-day for a few minutes and worked on the new water-hole. Some of the rest went out. It is going down slowly. Missouri talked about to-day. I said something about St. Louis during the riots, and also of Kansas City. Cold hands and feet alternate with me and with the rest, with few exceptions. When not cold in the hands or feet it is generally my body. Ralston gave a very interesting description last night of his early days on a farm in Iowa. Described country dishes and customs, &c. I go out sometimes in the alley-way and get my feet warm by sitting on the doctor's medicine-box, with my feet on the stone used by the cooking stove. The stove is a mere cylinder, somewhat smaller at top than [at] bottom, about as large as a good size bucket. It has a door. It is cold and chilly in the alley-way during the day, and one is in the way of the cooks at that time, or in the way of Whisler, who is sawing the wood. We commence on the barrels about the 11th inst. Cross, Schneider, and Bender keep down in their bags more than any one else.

Memorandum: Mrs. O'Shea's figs.

Bowels opened—took a dose of opium, which the doctor managed to spare. We are so short of medicine that I have had difficulty in getting openers, and had to use salt water, &c. The health of the party and our spirits are surprising. I am now smoking a mixture of tobacco, tea leaves, and birch bark. We are discussing notes to-night, and have now got on the subject of pigs for broiling. Visions of Fort Conger and everything left behind there in the shape of food frequently come up. Time flies fast.

January 10.—Barometer, 29.97 [761.22^{mm}]; thermometer, −28.5 [−33.6° C.].

Memorandum: St. Louis, between 4th and 5th streets, opposite City Hall, large establishment, where very fine pastry, fancy cakes, &c., may be obtained. Olive street, between 4th and 5th, sugared fruits, place kept by Italians. 6th street, corner of Pine—Silver Moon, quite a cheap restaurant; fine dinner, 50 cents. 7th street, corner of Pine, fine bakery, where excellent bread and something fine in the way of tapioca and cocoanut pies may be obtained.

Very fine day to-day, almost perfectly calm. Moon very bright. Dr. Pavy spoke of St. Louis, and I of Kansas City and St. Louis. Other notes of Missouri finished up this State. Corporal [Sergeant] Elison had both feet taken off at the ankle within the last few days. They were in such condition that it seems it was done without his knowing it. A temporary separation was only attempted. Another and regular amputation will have to be done at Littleton Island. Two fingers were also taken off. All this was done without his knowing it. The doctor drew some pretty pictures last night of farming life in Missouri, and gave his fishing experience, &c. We find a taste of salt in our tea and have come to the conclusion that the salt water finds its way in the lake. Will have to melt ice if this thing continues. New hole progresses slowly. Breakfast this morning of seal-skin soup, tea, and bread. Supper to-night—corned beef and bread. Issue of butter made for to-night. Got 8 ounces of corned beef from Jewell, in addition. My own supper consisted of 4 ounces of corned beef, all my bread, and about two ounces of butter. I now have for Sunday a half a pound of corned beef, three and a half ounces butter, about half pound of bread, in lieu of the "son-of-a-gun," which I gave to Frederick. No fox seen around for some days. Was not out to-day. Bowels loose to-day. I have stopped my trading and the rest of the party have done very little. Intermittent talk on the subject of food and dishes during the day. I dreamed of home last night. Gardiner's fingers slowly improving. The frost bites of various ones get well very slowly. I will have to stop smoking tea leaves and the bark. It seems to have had a bad effect upon me.

January 11.—Barometer, 30.03 [762.75^{mm}]; thermometer, −21.5 [−29.7° C.]. Day clear and tolerably calm. Day passed very much as usual. Eating all my bread last night, I had nothing for breakfast but a cup of coffee and a little butter. Found a salty taste, however, which spoiled it to a great extent. I felt some pain about the bowels during the day; to-night as well as usual. Our spirits remain good, though some at times complain of feeling badly. Elison's feet are off, and some of his fingers. There is now a perceptible difference in the amount of light.

Memorandum: Nova Scotia homespun, Halifax.

Supper to-night—fine fox stew. I have not touched my bread or butter to-night. I have saved enough for a "pat" for myself Sunday. I will have bread, meat, and butter. Kansas spoken of to-day. Not very much said about the State, however; at least not as much as expected. Reading every night, nearly, or some personal experience.

Memorandum: Meerschaum pipe, Halifax.

January 12.—Barometer, ———; thermometer, —18.5 [—28.1° C.]. Sick; diarrhea this evening. Smoking of anything but tobacco forbidden by Lieutenant Greely. Cross's, Schneider's, and Linn's mouths looking badly. I went out, but did not have time to get out quick enough; had a very hard time. I used butter can in the vestibule; threw it outside then.

January 13.—Barometer, 29.86 [758.43^{mm}]; thermometer, —21 [—29.4° C.]. Bread ration increased half ounce. Party generally in better spirits. I found myself feeling so badly after breakfast that I told Connell, the next in turn, he would have to go out and cut the water-hole. The salty taste to the water in the lake still continues, and to-day ice was tied over the blubber lamp and more or less water melted out in this way. It makes a vast difference in the taste of the drinks. We use with the stews more or less salt water, anyhow. Felt very weak and badly all day. My breakfast consisted of my savings, &c., and was quite large. I had one "son-of-a-gun," but had two cans of hard bread (probably 12 or 14 ounces), one issue butter, less that saved by cook to go into the "son-of-a-gun," (3½ ounces), and two issues (8 ounces) of corned beef. These were all mixed together and made me a good stew, and, with the chocolate, a good meal. I ate part at the time and part at about noon. We had a good stew for supper of about two-thirds seal meat. The doctor has forbidden my smoking any more for the present. I got from him two ounces of rum, though he would not give me any rum to-day, the regular issuing day. I got some yesterday, however, feeling very cold and badly. One oak barrel cooks, at the average, thirty-nine pots. This will give us at the rate of one barrel every three days. We have a slight margin over the first of March.

January 14.—Barometer, 29.86 [758.43^{mm}]; thermometer, —18 [—27.8° C.]. I have been in the sleeping-bag all day; am quite weak. Could hardly stand yesterday. I have been in with Lieutenant Greely and Israel since yesterday, exchanging with Jewell. The doctor has shut down on my smoking for the present. I find it a great deprivation. Trouble again with the water-hole; it threatens to freeze up entirely. It is wonderful that we have been able to get water so long.

Memorandum: Eels (*Matelote d'Anguille*), French, well recommended by the doctor.

We now have bacon every Monday, besides we are to have it Thursdays. It is very filling. Some, indeed most of us, cut it up and eat it with the tea. The tobacco of most of the men is now gone. Tea leaves and birch bark have been discontinued, the doctor recommending their disuse; they seem to have a bad effect. Breakfast this morning consisted simply of coffee, bread, and butter. The bread after to-day is increased half ounce. When we have stew or soup the following morning the cook retains part of this to mix with it, and there are some pounds also thus used which come in the form of toast. There seems to be salt water in the lake for some unexplainable reason. It is very perceptible in our drinks. We have commenced melting ice over the blubber lamp, and thus mend matters to a certain extent, though the most of the water still comes from the lake. Day dull and calm. With the diarrhea, with which I have been suffering, I had some affection of the eyes. My bowels seem, in part, to be recovering, and I am getting my strength again. Frederick has been lying in his bag for many days, and to-day was forced to get up and sit in his bag for some time. He also sawed some wood. Whisler has been doing this last for some time. We are now burning old leather boot-soles. Last night Long told us some western experience. To-day Nebraska was talked about. I had something to say for Nebraska.

January 15.—Barometer, 30.02 [762.49^{mm}]; thermometer, —27.5 [—33.1° C.]. I am still quite weak. I find it difficult to move in the bag from a lying to a sitting position. The doctor has stopped my smoking or [and] chewing, which is quite a serious deprivation. The water in the lake gave out to-day. Another hole, the other which has been under way for some time, was then finished, but gave no water. We are to try another hole to-morrow, to make sure, but there is little hope of water. We had one pot of tea to-night, which gave half cups to each man. The seal stew was made up altogether of salt water. Breakfast this morning consisted of corn and extract of meat. It had a delicious flavor. We are to have American bread hereafter on Wednesdays, instead of English, and bacon on Monday and Thursday evenings. This bacon is raw. The English bacon comes cooked in the cans which preserve it. Indian Territory was dwelt upon this morning. The spirits of the party are good, though a trifle below what they have been, perhaps.

January 16.—Barometer, 29.72 [754.87^{mm}]; thermometer, —21.3 [—29.6° C.]. Breakfast consisted of seal-skin stew, very good indeed, and half cup of chocolate. The lake has given out, and now we are reduced to half a cup, though the cooks think that when we have no other hot foods they will be able to have something over just half a cup. We came to the conclusion to-day that there was no more water in the

lake, though to-morrow another hole is to be started as a last trial. The American bread to-night very good, and much preferred by us all. I ate all mine, and also two pieces of English bread I had saved over from last night. English meat to-night. Found myself so weak last night, on getting up, that I could scarcely stand, and came near falling down. The bread ration was increased from to-day a half ounce. This is due to overestimates, and probably also to much of the bread being damp and wet. Foxes seem to have left—none heard of for some time. I have spent the day in sleeping-bag. Something has been the matter with my eyes, but the doctor seems to think they are getting all right. I take a smoke of tobacco to-night. The doctor has at length restored this priceless boon. Spirits of the party have seemed a little down for a few days, but are now better. We count the days forward and back. Rice made some preparations towards getting his sleeping-bag ready to-day. Will have increased rations for a week before starting. Cloudberries to-day. Lime-juice yesterday. Storm this evening.

January 17.—Barometer, 29.56 [750.81^{mm}]; thermometer, —36 [—37.8° C.]. The two messes now have two pots of tea, one melting the ice over the blubber lamp during the day. This gives a half cupful to each man. This is found quite satisfactory. We have no salt in our drink, which is a decided improvement. The party has been rather depressed for some days, owing to exactly what I do not know. To-night we are in better spirits, but still not in as good spirits as two weeks ago. Some singing to-night, the first for some time. The talk during the day has been less than usual. I can hardly rise from a lying to a sitting posture, or from a sitting posture to a rising posture. Considerably more light is now apparent. We now chop ice from the lake. Four and a half days on one barrel, which is very good. I have not written the letter to the dear ones at home, and circumstances may prevent altogether. Our uncomfortable circumstances must be my excuse, if circumstances should be such as to prevent me. God only knows I think enough of those at home. Dakota was cut up [talked of] to-day. We all suffer a good deal from cold feet and hands. I find it extremely difficult to keep warm. We count the days from one "son-of-a-gun" to another. This double sight still troubles me, though it is not so bad. I am very nervous. The doctor has stopped my tobacco since I have been taken thus, but yesterday and to-day has allowed me one smoke each day. Cross has been lying very close in his bag, and is a good deal demoralized and very weak. To-day he was put in the single bag, next to Biederbick, to be watched. He is made to get up every day and saw a little wood. Jewell is still in my bag, but has moved by Lieutenant Greely's orders next to the bag occupied by Schneider. Henry now occupies part of this bag. We are talking a good deal of food this evening. The doctor promises this evening some description of a Spanish bull-fight.

Memorandum: Tomato pie, made of green tomatoes.

Most of the party are comparatively well still. Elison does not know of the loss of his feet yet. He is in good spirits. Breakfast this morning—ox-tail soup, tea, and bread. Dinner—American bacon and bread. The issue of butter for to-morrow morning and next Monday was made for our mess this evening. Many eat a little butter, however, at each meal. "American Shipping" was finished yesterday. Lieutenant Greely also read "Regulations" in the morning; also this morning. American bread issued last night. To-night we have English bread.

January 18.—Barometer, 29.52 [749.79^{mm}]; thermometer, —40 [—40.0° C.]. Cross died to-day about 1.30 p. m., of dropsical effusion of the heart. My attention was first called to him last night, Jewell, who sleeps near him, giving the alarm. He was found insensible by the doctor, but this morning rallied a little, though he did not regain consciousness. He was given brandy and soup to-day, but it was with difficulty, I believe, they were gotten down. He has been moaning all day up to the time of his death. It seems that the doctor told Lieutenant Greely some time ago of this effusion of the heart that Cross had; that his constitution was broken down, &c. His long course of intemperance, both at Fort Conger and before he came up to this region, is the cause of his constitution showing so little reactionary power. His foot that was frozen still remains [remained] unhealed. Yesterday he was up for a short time sawing wood, in order to give him exercise. He will be buried to-morrow on the little neck of land between here and the place where we first landed—that is, at the other end of the lake. Lieutenant Greely made a few remarks after his death as to the cause of it, and said that the rest of us should have no occasion for depression, nor allow his death to depress us. Day very fine, clear, and bright. We had a very fine seal stew for supper. Henry has taken Cross's place in the other mess, for the present at least. Cross's body will be sewed up in coffee sacks and canvas. Cross has been a little out of his mind for some time. More talk about food to-day, and dishes have been discussed.

Memorandum: Sconi [Scotch scones] Bannock cake. Pudding of green corn.

Owe Cross's heirs for twenty pieces of clothing washed by Cross. The party are in very good spirits, everything considered. I am now taking medicine prescribed by the doctor. I find myself still very weak. I am a little better, however, within the past few days. Smoked only once to-day, by the doctors orders. Cold feet to-day. We had a full cup of chocolate for breakfast this morning, with bread and butter. Thermometer inside to-day, about 11 a. m., +30 [−1.1° C.]. Yesterday I noticed it at +23 [−5.0°C.], inside, the lowest I have seen it. How often, in these dreary days, I think of those at home. How I should like to write out a family letter, as a safeguard against what may yet happen. Will the dear ones appreciate my reasons, should anything prevent me from returning to my native land?

January 19 (Saturday)—Barometer, 29.69 [754.11^{mm}]; thermometer, −40 [−40.0° C.], below scale. Breakfast—peas and rice and a good cup of chocolate. Cross was buried to-day at the other end of the lake. Lieutenant Kislingbury, Brainard, Rice, Israel, Whisler, and Salor attended the body to the grave, which was dug about a foot [.3^{m}] deep, and sand and gravel and a few rocks heaped on top. After awhile more rocks will be added, and also a head-board. The body was sewed up in canvas and buried in the American flag. Several of us did not go out on account of frost bites, and the others on account of the lack of foot gear, the number of Arctic overshoes being very limited. Cross was forty years old to-day. This is also Gardiner's birthday; he is twenty-seven. He had a drink of rum and our good wishes. Those of Cross's clothes worth anything, have been, or are to be, divided up among the party. A few trinkets were found in his pockets, &c. The daily ration of bread was increased from to-day half ounce, which makes the total daily allowance 7.8 ounces, including the dog-bread. Rice is to have one pound meat and 12 ounces bread in crossing the straits. The thermometer is below scale, which only registers down to −40 [−40.0° C.]. It is clear and calm out of doors and there is indication of the straits being all right. The burial service was read here in the hut over the remains of Cross before they were taken out. I made a few remarks on Cross, all that were made. I could say little in his favor. Of course I said nothing in detraction.

Memorandum: Lemon butter.

We are all in pretty good spirits, and look forward pretty sanguinely to pulling through. It is thought that the wood will last until the first of March. We have five days of stearine after this, besides alcohol. Rice is to start on the 2d February. Our usual routine has been interrupted purposely as little as possible by Cross's death. To indulge in sadness, &c., would have a very bad effect upon the living.

January 20.—Barometer, 29.71 [754.62^{mm}]; thermometer below scale. Day calm and clear, but very cold out of doors. Unfortunately the low-reading thermometer is lost, and the one left only registers −42 [−41.1° C.]. Fine "son-of-a-gun" this morning, which had the usual effect of putting many to sleep. Piece of lemon and a half gill of rum shortly after noon, and a fine seal stew this evening. Jewell was transferred to the other mess this morning, though he takes still two or three meals with our mess, to equalize rations. I came back to my old place to-day, and Jewell resumes his place in the bag with Lieutenant Greely and Israel. Both of these moves are much to his disgust. I did not find it comfortable in that bag, rendered more so by my extreme weakness, which still continues. I seem to mend very slowly indeed; I do not understand it. I can hardly understand it and can hardly stand up. Very cold feet ever since last night. Our good meals to-day seem to have a good effect. What is to be the end of this remains to be seen. I hope to pull through all right. If I do not I hope the dear ones at home will appreciate the circumstances. Oh! for the conveniences to write a good letter to them. How often my thoughts picture up the family scenes at home. Every moment I use the extra blubber lamp to write these lines, with cold fingers, is so much off our supply of light as well as rations, for blubber is rations. To-night the Esquimaux sang some songs, as well as the others. Henry is now next to the south of me. Some squabbles to-day. Tried to introduce sound to-night, but only got it half way in. This is the first time I have made the attempt since leaving Fort Conger. I find I have a contraction of the ——— and think it is due to this.

January 21.—Barometer, ———; thermometer, −34 [−36.7° C.].

Memorandum: Lemon butter.

Calm and clear. Last evening passed very pleasantly, and conversation was kept up until 9 p. m. I sat up in the darkness till midnight trying to get my feet warm, and, by rubbing them, partially succeeded. To-day my feet have been warm and comfortable all day. I still find myself very weak; was unable to lift myself up to a sitting posture this morning until I got hold of a strap overhead. I do not understand this weakness. In view of my failure last night, however, conclude it might be due to a closing up of the urethra. I went to Lieutenant Greely this afternoon and told him I had been growing weak for several weeks pre-

vious and am breaking down, but had kept silence about it on account of the effect it might have on the party. I urged that, if I find myself in this condition when the time comes to leave here, I be left behind with my share of the rations, and be sent back for on the party reaching Littleton Island. He said that it was something he would never think of for a moment, the idea of leaving any one behind. I gave him and the party generally a better idea of my condition and my extreme weakness. Saw the doctor, and he stopped my tobacco altogether, and has told me to stop using the sound. Brainard took an inventory to-day and found 12 cans of milk stolen. This is quite a serious loss, and the thief gets not a few imprecations. Some of the party seem to have suspected Cross. Cross was found, on examining his bag, to have brought along a number of articles, among others Lieutenant Greely's epaulets, &c. Some slight additions are to be made in the rations notwithstanding. The blubber is increased to 11 ounces per week per man, hard bread to 57 ounces. The extra seal meat we have been getting on Sundays is to be carried to the end of February, so as to make an extra stew. The party in very good spirits this afternoon and evening. It is now much lighter in the day; the light is increasing perceptibly. Breakfast this morning—bread, butter, and chocolate; this afternoon—American bacon (raw), hard bread, and tea. I have not yet found out the best way of eating my bacon. Some of us put it in our tea, and thus get it a little more tender. I try all sorts of ways of making my meals feel more satisfactory.

January 22.—Barometer, 30.00; thermometer, —27 [—32.8° C.]. I got very little sleep last night; my feet felt as if packed in ice, so cold were they. I took a short nap this forenoon, something very unusual. Lieutenant Greely spoke on California. Breakfast this morning consisted of soup of peas and carrots. We had a fine seal-meat stew for supper. The doctor is giving me iron every day since yesterday or day before; also quinine, though I do not know how long it is to be continued. The invalids are now Elison, Gardiner, Henry (frost-bitten toe), and myself. I feel stronger to-day, and so I hope we may all be considered as on the convalescent list. I find total deprivation from tobacco a great hardship and very hard to bear. Fox tracks seen near by to-day. I now have a mattress under me.

January 23.—Barometer, ———; thermometer, —21 [—29.4° C.]. Waked up this morning at 3 a. m. with cold feet; have been miserable ever since with feet icy cold, so much so that I am not quite sure they are not frost-bitten. Total deprivation of tobacco to-day has gone a great ways towards making me feel more miserable. I got up this afternoon and stayed a little too long. It made me so weak that I could not get back to the sleeping-bag without the assistance of Frederik, Eskimo, who helped me. Breakfast—seal soup and chocolate; and dinner—English meat and tea. I have cup of drink in each case. Had American bread for supper, and are to have it three times a week hereafter. There is to be a reduction in English meat, but we are to have bacon, &c., instead. This is a very great change, as English meat seems to go a very short ways. Strong west wind all day. Discussion to-night as to how many barrels we have burned. It is not settled whether we are running ahead or behind on the wood question. This is very important. I am very weak, though a little stronger than of late. Lieutenant Greely spoke of San Francisco this morning. He also read some from a book on agriculture and commercial statistics. Increased rations for Rice and Jans [Jens] will begin on Sunday next. One pound of bread and meat for each until they leave, and three-quarter pound of bread and one pound of meat while crossing. Rice is to take six days' rations. Reading every evening, and conversation generally on food, &c., keeps the blubber lamp burning until 8.30 or 9.30, or thereabouts. After that go to sleep. After midnight until six a. m. there are constant questions as to the time. I gave Frederik, Eskimo, to-night a memorandum for $25, which I promised him on the spring trip of 1882.

January 24.—Barometer, 30.00 [761.99^{mm}]; thermometer, —20 [—28.9° C.] Breakfast—ox-tail soup, bread, and tea (half cup as usual). Supper—American bacon, 9½ ounces to-night, and in the morning American bread and half cup of tea. This additional bread has been saved by the cooks. American bread is to be issued hereafter on Mondays, Wednesdays, and Thursdays, and dog-biscuit on Saturdays. On the mornings when we have nothing but bread, butter, and drink, we are to have a full cup of drink. The bread loomed up in the plate to-night in a most comfortable appearance. Slept well last night, having revived the circulation of my feet on the stove stone, and afterwards got Frederik [Christiansen] to rub them. Frederik [Christiansen] also loaned me a pair of socks, so that I had on under my sleeping boots four pairs of socks. These socks only go to the ankle. Felt well to-day; much better than yesterday. The spirits of the party have been higher to-day, and the talk a good deal on Rice's departure and hopes of soon having news of assistance from the other side. Good deal of conversation in the afternoon on history; chronology table suggested by several important historical dates. Dr. Pavy gave personal reminiscences

on a pedestrian tour in Switzerland. I too made a few remarks on common mistakes in English grammar. Kane's book was commenced last night. To-day generally calm and pretty clear. We all suffer a great deal from cold hands and feet. +14 [—10.0° C.] is the lowest temperature observed in the house up to date. Since the banking and the tunnel, the lowest has been +19 [—7.2° C.]. All of us are on the convalescent list at present, though recovery from frost-bites, &c., is very slow. It is a great effort for me to expose my hands long enough to write this journal. They soon get cold and numb. Anything like sewing requires a great effort. Lieutenant Greely urges at least a little exercise every day—sufficient at least to get the party out of their bags to take a few steps in the aisle.

January 25.—Barometer, 29.85 [758.18^{mm}]; thermometer, —32 [—35.6° C.]. Breakfast—coffee, butter, and bread. Supper—fine seal soup with some American bread particularly crisp and palatable. It was quite demoralizing to know how to manage our supper. Whether to make pap out of all or part of the bread, or put all the bread in the soup (or stew as we call it), or whether to eat the bread dry. Or, if we have any butter left, to eat some butter, or all, or none, is very harassing. The butter is shared for Monday and Friday mornings, when we have nothing else but bread and drink, but some save little or nothing for these mornings, finding it impossible to overcome the temptation in the meantime. Biederbick's birthday to-day—25 years old. He got a drink of rum. Lieutenant Greely read more or less out of a statistical book, and we went over all the chronology dates that could be thought of. Kane, &c., was read last night. Conversation to-day also more or less on food. Rice commences his increased rations to-morrow morning.

Memorandum: Bread with intermixed dried fruit.

I have had icy cold feet all day, which have made me miserable. They commenced to get cold last night, though I was not wakened by them until just before breakfast. We discussed now a good deal our hopes concerning Rice. May he get over safely and find and bring relief, is my prayer. Life of St. Patrick read a little last night. Windy this evening; everything pretty much same as yesterday. Bender made some molds to mold the few pounds of stearine remaining into candles. In this way it is proposed to be able to use the blubber, or most of it, for food.

January 26.—Barometer, 29.92 [759.95^{mm}]; thermometer, —26 [—32.2° C.]. Breakfast—fine flavored soup of rice and tomatoes, and tea. Supper—English meat and dog-biscuit, with tea. Day passed very much as usual. My feet have been warm to-day, and I have felt quite comfortable. The spirits of the party seem much higher. I am getting strong, I am glad to say. I am taking iron now every day. I was able to save half of the bread of last night until to-night. Extra rations issued to Rice and Jans [Jens] for to-night and the morning. They will leave February 2d. Statistical book read from to-day by Lieutenant Greely, and chronology table. Kane read every day now. Koningsbee [Coningsby] will be finished this evening. We shall have no milk in to-morrow's "son-of-a-gun," but a little more blubber than usual. Our conversation often turns on Fort Conger and the cooking there—as to which of the cooks did best, &c. Many think that Long's bread was the best they ever ate. One curious phase of these days of fasting is that the mind can hardly recall any dish of food ever tasted with an actual sense of having disliked it. We have a full cup of drink now, when we have only drink, bread, and butter. I gave Jans [Jens] written memorandum of indebtedness to him for $4, which he says is the amount of my bill for washing. Frederik [Christiansen] helps me in getting in and out my sleeping-bag, &c. I give him a little tobacco each day, and have also promised him some turkey or bird [pork or bread] when we reach B [Proven], provided I can get the article. Increasing daylight is often remarked. Kane's sufferings, starvation, &c., are often contrasted with our own.

Memorandum: Macaroni pudding.

January 27.—Barometer, ———; thermometer, —28 [—33.3].

Memorandum: Instead of cream and sugar for fresh fruit, try cream, sugar, and white of eggs, beaten to a froth.

Another Sunday gone, Rice's last, and but two more for the party before the sun reappears. Breakfast—"son-of-a-gun." We miss the milk which gives the "son-of-a-gun" sweetness, but had a little more blubber, which made it more filling. Supper to-night, a very fine seal stew, made thick with bread dust—almost thick enough for the spoon to stand upright. Rum and a fourth of a lemon shared this evening. I managed to save over my three dog-biscuit from last night, and so, with my bread, this evening fare very well. Conversation to-day on many subjects. Dr. Pavy and Lieutenant Greely said something about traveling in Switzerland and France. We all show a decided disinclination to going out of doors. Got up

about noon, but, strange to say, found myself very weak—more so than usual—and so got back again into my bag, after being up a few minutes. Frederik, Eskimo, helps me in these operations. I told him to-night I would give him some tobacco on reaching B [Proven]. I would rather be seriously ill and sick in a land of civilization than thus indisposed in this place. How heartily I should be thankful when I get out of this, as I hope to. Lieutenant Greely ordered tea grounds to be thrown away after this, several of the men showing great reluctance to giving up their use, though recommended by the doctor to do so. We are all in good spirits, and feel quite sanguine of finding substantial assistance at Littleton Island. Calm to-day, and those out noticed much increased daylight. Our ice is now cut very fine, so it is much more quickly melted. It is partially melted over the blubber lamp. Chocolate for breakfast this morning, and tea to-night at supper. I still have most of my rum, which I will drink later. Also about half my night's issue of bread. Farming seems to have dropped off into the shade. Long seems to be the only one man who still sticks to his original plan, that of opening a restaurant. Two foxes seen to-day; it shows they have not altogether deserted the country, as feared. Much discussion is devoted as to the best way of eating our meals, rum, &c. Bache Island and the country to the north was reported quite distinct to-day at noon. Old leather boots have been cut up; with the rope they add considerably to our fuel. There is great difference in the burning of the stove, as there is little or no wind.

January 28.—Barometer, 29.92 [759.95^{mm}]; thermometer, $-38\frac{1}{4}$ [$-38.9°$ C.]. Breakfast—tea, bread, and chocolate. Supper—bacon, tea, and American bread. Hereafter we are to have 7 ounces of bread on Mondays, Tuesdays, Wednesdays, and Saturdays, 9 on Fridays, and 8 on the other two days remaining—57 ounces in all. Rice gets 4 ounces of blubber per day up to the time of his leaving. Conversation ushered in this morning by many remarks regarding Cross, showing very bad habits, and a lack of principle on his part. It seems to have been Cross who took the milk. The day has passed very quickly. Chronological table this evening. During the evening Brainard gave the particulars of his Indian fight. Good deal of conversation to-day on the subject of Rice's departure, and what we may expect, &c. We all feel quite sanguine. I felt quite strong this morning on getting up, though I had little appetite for my bread. On speaking of this, I was directed to eat it at once. It is quite astonishing not to have a voracious appetite at all times. I did not lose mine by any means, but simply lost some of it this morning. I have felt in good spirits all day, however; slept well last night until 2 o'clock this a. m. Every day we count the days forward to different days ahead. I suppose the subject of food and dishes will never die out until we have all we can eat. It is the subject to which we all recur with most interest. We blow out blubber lamp every night at about $8\frac{1}{2}$ to $9\frac{1}{2}$, or thereabouts. Koningsbee [Coningsby] was finished last night. We find Kane possesses a new interest in the light of our present experience. A number of stearine candles have been made. Fox seen to-day, but Brainard's gun would not go off—it is the shot-gun.

January 29.—Barometer, 29.88 [758.94^{mm}]; thermometer, -32 [$-35.6°$ C.].

Memorandum: Try wine with sauce for fruit mentioned on the 27th inst. Try coon, porcupine, opossum, &c.

Breakfast—soup of corn, extract meat, potatoes, tea, and bread. Supper—fine seal stew with a good deal of bread in it, English bread, and tea. Chronology table to-day; also remarks by doctor on the stomach, &c. Several wordy disputes during the day; among others one on the difference between coon, 'possums, hedgehogs, &c., this afternoon. We have a good many of these wordy disputes, which often start off without any one fully understanding what any one else means. One this afternoon consisted of whether rock candy ever came in sticks or not. Rice commenced his operations for departure yesterday on his sleeping-bag. He and Jans [Jens] take a single man bag, one found in the wreck. It has been enlarged for them. It was discovered to-day that the tobacco found in the English cache was gone. Fox seen to-day, but it seems impossible to get at him. Slept very well last night, and without waking up until 2 o'clock this morning. One of the annoyances of this life is the difficulty we have in trying to cheat the stomach and make our dole of food seem more than it really is. We have more than a half-dozen ways of combining and intermixing our bread, meat, and tea. It is pitiable the value one puts on a miserable little piece of hard, coarse, hard-bread. Calm this morning, but blowing this evening. The wind makes the stove burn quickly and without much smoke, however. The other side of the straits—Bache Island, &c.—are now plainly visible. Rice is to leave on the 2d inst. Of course his coming departure and what he may find are constant sources of conversation. I trust God he may find all that is expected, or at least not miss finding, at the very least, the cache of 240 rations. Rice says to look for his return between the 14th and 15th inst. He will not come back if there is any one there to send. Lieutenant Greely counts on nothing

more than the cache of 240 rations. Most of us hope to find Garlington over there. I get up for a walk in the aisle two or three times every day. I find myself stronger, but still very weak, and requiring aid from Frederik, Eskimo, every time I get up. I take iron now every day. We have a very small supply. Rice and Jans [Jens] also take iron.

January 30.—Barometer, 29.64 [752.84^{mm}]; thermometer, —34 [—36.7° C.], and —36 [—37.8° C.] later. Breakfast—seal-skin soup. Dinner—corned beef, and American bread, and tea. Day fine and calm. I had a fine sleep last night. Last night Dr. Pavy made some interesting remarks on Venice; afterwards Ralston read some from Pickwick. Elison is getting on quite well. He will lose most of his fingers. Cloudberries to-day. I am getting stronger, but very slowly. To-day I was indisposed with cramps, and I had to get Whisler to help me up. The doctor has forbidden me smoking and chewing of tobacco and chewing tea leaves. Biederbick must have reported to him that I was chewing tobacco, for he accused me of it to day. I have stopped smoking and chewing, but may have a little mite in my mouth. I give Frederik, Eskimo, a little tobacco every day. We are now burning candles made of stearine. Spirits of the party very good. Mine have been somewhat low for the past two or three days. The doctor made some remarks on the stomach this morning.

January 31.—Barometer, 29.61 [752.08^{mm}]; thermometer, —6 [—21.1° C.], [and] —2 [—18.9° C.] at 8 p. m. Breakfast—ox-tail soup and chocolate. Supper—bacon, American bread, and tea. The weather has turned cloudy, and with a light wind from the west. Dense smoke at supper, and the pots were a long time in boiling. Rice engaged during the day in preparations for his departure. He takes a sheep-skin bag along covered with the oil-skin of his old bag. Rice estimates his rations, &c., except the sleeping-bag, at 45 pounds weight. The bag will probably weigh 16 pounds. He takes six days' rations along, some little medicine, alcohol, small lamp made to-day by Bender, lime-juice, rum, &c. I believe I am getting stronger slowly, but very slowly indeed. Frederik, Eskimo, helps me up two or three times every day, when I take a little promenade in the aisle. I have not felt in very good spirits to day—rather down at [in] the mouth. I can assign no particular reason. The party are all very anxious for the news expected by reason of Rice's trip with Jans [Jens]. There are said to be some suspicious looking clouds over the east.

February 1 (*Friday*).—Barometer, 29.47 [748.52^{mm}]; thermometer, —15.5 [—26.4° C.]. Breakfast—bread, butter, and coffee; full cup of last. Supper—fine stew of seal meat, 3 ounces per man, 3¼ ounces bread per man, 1 ounce lime-juice pemmican. This is the first time we have had pemmican. We are to have it hereafter three times a week—one stew of pemmican entirely, and an ounce of pemmican in the others. The bread is to be slightly increased—64 ounces per week per man hereafter, without including the dog-biscuit. With the latter it will amount to 70 ounces. The bread is issued differently for the different days of the week, according to the other food during the day—the amount withheld for the stews, &c. Rice and Jans [Jens] get off in the morning. The cooks will be called at 5 o'clock instead of the usual hour of 6 o'clock. This is provided it does not storm. I have not been feeling well to-day, and was very weak when I got up this afternoon. Felt better this afternoon, but one foot very cold. A great deal of attention paid, of course, to Rice's preparations for departure. I trust God, Rice will find the necessary help over on the other side. I do not take it as a matter of course that the straits will be found closed, though as every one else seems to, I say nothing about my fears. How often I think of and long for the dear ones at home. I trust God they are all well.

February 2.—Barometer, 29.43 [747.51^{mm}]; thermometer, —27.5 [—33.1° C.], and —19 [—28.3° C.] in the morning. Kane and Hayes read, but I fell asleep and missed them both. Many times during the early morning hours inquiries were made for the time. The cooks were finally called 20 minutes before 5 o'clock. Breakfast—soup of rice and tomatoes—about the finest flavored soups we have—and chocolate. Rice and Jans [Jens] went to work after breakfast to complete their preparations, and finally got off at 20 minutes before 9 o'clock. Rice and Jans [Jens] were given a quarter pound a piece of extra meat for the morning's meal, and went off in fine spirits, feeling very hopeful. The sky has been slightly overcast and hazy, and very little or no wind during the day. Brainard and Frederik, Eskimo, went along with the party half way to the P [Beebe] cache. It is unnecessary, of course, to give the many hopes that go with them. Rice carried about 38 pounds, and Jans [Jens] about 35. Their sleeping-bags weigh about 30 pounds, and the gun—Kislingbury's—about 9 pounds. I made an attempt to go out of doors to-day, with the assistance of Ralston, but only went as far as the alley-way, feeling too weak. Supper at 2.30, the usual hour, of English meat, dog-biscuit—3—and tea. I find myself very weak, and getting stronger extremely slowly. The new moon made her appearance to-day.

Memorandum: Cup biscuit. Forms for filling with preserves, &c.

February 3.—Barometer, 29.47 [748.52^{mm}]; thermometer, —19 [—28.3° C.], and —26 [—32.2° C.] about 8 p. m. The day has been hazy and calm. A fox was shot early yesterday morning; one of those little blue and white. Brainard thinks he will weigh about three pounds dressed. We have had two fine meals to-day. "Son-of-a-gun" this morning was very thick and satisfactory. "Son-of-a-gun" this morning consisted of 7 ounces American bread, 20 ounces lard, 4 ounces blubber, 11 ounces raisins, and between 5 and 6 ounces butter. For supper to-night the stew consisted of 3 ounces seal meat and 1 pemmican, 3 ounces bread per man, 4 ounces blubber, &c. It was a very fine stew; very satisfactory. I saved a milk can of my "son-of-a-gun" this morning, and ate it about 10 o'clock. About noon I went out of doors for the first time since I have been sick, with the assistance of Frederik [Christiansen]. I find a great difference in the amount of light. I am getting stronger very slowly. The slight increase in the rations will help me rapidly. The doctor gave me iron and quinine to-day. He orders me to take my rum to-day, half at noon and half after supper. The full meals to-day have the usual effect; they lay us all out, and many go to sleep and conversation flags. It is strange such should be the effect. Several of the men have been eating little scraps of stearine; this practice has been forbidden. Every one almost now go [goes] out a little every day. Jewell fainted to-night after supper, just after coming in from outside.

February 4.—Barometer, 29.79 [75^{6}.65^{mm}]; thermometer, —24.5 [—31.4° C.]. Breakfast—chocolate, bread, and butter. Supper—tea, English bread, and roast beef. Day overcast. We had considerable wind last night. Orders issued this morning that no one hereafter was to cover up his head in the sleeping-bag during the day. We have been very much in this habit. The doctor pays more attention now to the men going out a little to take exercise. We now have to melt ice each day. Brainard indisposed to-day and examined by the doctor. Our meals are now better, and the slight increase is quite perceptible. I think I am getting better slowly. My feet are very much swollen. Many of the men are troubled in the same way. The skin is very thick and callous. Elison is getting along well.

February 5.—Barometer, 29.90 (?) [759.45^{mm}]; thermometer, —23 [—30.6° C.]. Day calm without wind. Breakfast—stew of pease, &c., bread, and tea. Very fine and satisfactory stew of pemmican, American bread, and tea. Stew to-night consisted of 1 ounce lime-juice pemmican, and 3 ounces Hudson Bay pemmican, 2½ ounces bread, and blubber, &c. The amount of bread issued in plates was 7½ ounces. Each man gets per week one pound blubber. Ralston is making very good stearine candles, and thus a good deal of blubber is saved for eating. I am ordered by the doctor to divide my bread equally between night and morning. To-night I ate some of my bread cold; then when the stew came on dumped the rest in the stew. The tea overtook me before I had finished the stew, so I then placed the remains of the stew in a can, which I will keep warm in the sleeping-bag, and went to work on my tea. Brainard is now under the weather somewhat. The doctor has discovered albumen in his urine, from which, with certain indications of the chest, he thinks Brainard in some danger. I got up myself to-day, and managed to get out of doors without the assistance of Frederik [Christiansen], but fell down in the alley-way coming back, and also fell down on getting inside here. I am getting stronger, though, daily. This week is to be a feast. Our meals are fine. Smoking is pretty much stopped. I have some tobacco left, but cannot use it. Statistics to-day by Lieutenant Greely. We do not talk so much now about food. My feet are all puffed up and half numb. This is the condition of the feet of many of the men. We think and talk a great deal of Rice, and hope for aid. It is now getting daily lighter. Connell was on the hill to-day and says he saw all the way across to the opposite side of the straits without finding anything like open water.

February 6.—Barometer, 29.96 [760.97^{mm}]; thermometer, —21 [—29.4° C.]. Rice returns.

Fine stew in the morning of ox-tail soup, bread, and tea. Supper—English meat and pemmican in the hot stew, with tea and bread. The stew had 3 ounces English meat and 1 ounce lime-juice pemmican. The party very quiet during the day, the usual result of good feeding. Weather cloudy from the west and also from the east. Statistics to-day by Lieutenant Greely, and remarks by Dr. Pavy on ancient history. Last night the doctor spoke for some time on Alexander the Great. Last night we also had Kane, Hayes, and The History of Our Own Times, &c. Rice returned to-day at 1.15 p. m. with Jans [Jens], both alive and well, though a good deal broken up by the trip, which they found very trying.

Rice did not get across, but thinks he got ten miles out from shore. Here he found open water up and down the straits as far as he could see and as far as he went in the two directions. It seemed to extend north and south indefinitely—moving ice in it and dense water-clouds marking its progress. He does not think he saw the Greenland shore at any time during his absence. Saw old bear tracks but nothing else, and no game. Thinks he traveled 50 miles in all, and would have been across before this, probably to-day,

but for the open water. Jans [Jens] showed signs of fatigue and exhaustion a day or two after his departure, and frequently expressed himself as being no good. He was weak. Both of them got extremely little sleep and many falls in the darkness. The drinking cup got a hole burned in it, and they suffered a great deal for lack of water. Rice and Jans [Jens] returned in pretty good condition. Of course we are all very much disappointed. Our rations have been counted on to extend to the 10th of March, the ten days of March on a ration of 12 ounces bread and 10 of meat for crossing the straits. So here is the upshot of affairs. Our bread is now 64 ounces per week every man. The party take a bold front and are not wanting in spirit. If our fate is the worse I do not think we shall disgrace the name of Americans and of soldiers. I feel stronger to-night. To-day I have been in low spirits, and alternately feverish and chilly. Singular my spirits have raised this evening.

February 7.—Barometer, 29.61 [752.08^{mm}]; thermometer, −27.5 [−33.1° C.]. Fine ox-tail soup with bread, &c., for breakfast. My appetite fallen off somewhat, and I kept over some of the bread until late in the afternoon. Supper to-night, a very fine one, of 3 ounces of English meat and 1 of lime-juice pemmican, with 9 ounces of bread in the plate, besides a little in the stew. Shortly after breakfast Lieutenant Greely announced to the party that there would be no harm in trying to live like canary birds' appetites, and that after thinking over the subject he had concluded to make some slight reductions in the rations, enough to allow us 15 days to cross the straits—that is, we can stay here until the 6th of March, and then have 15 days to cross on 12 ounces bread and 10 of pemmican. The party are very much disappointed, of course, but show wonderful spirit in the face of the terrible death that now stares us in the face. We cannot count on getting game here, and it is idle to do so—that is, until April sets in, if then. I think I am myself getting a little stronger every day. It is hard work under such depressing surroundings. I get the use of this light I am now using grudgingly. Lieutenant Greely gave us some statistics to-day. We had conversation on food. At times my spirits have been very low, I must confess it. Should I leave my bones here, may my dear father, mother, sisters, and Harry, and all know how often they have been in my thoughts, and how often in the late year it has been a source of great regret that I have not been a kinder brother, or a more dutiful or affectionate son. But away with these gloomy thoughts! The dear ones at home shall yet see me, and see me as I would wish to be, not as I have been. Blowing to-day in gusts. Very few of us went out. Rice started on the return here Monday noon.

February 8.—Barometer, 29.82 [757.41^{mm}]; thermometer, −36 [−37.8° C.]; below scale at 1 o'clock. Breakfast consisted of coffee, butter, and hard bread. I made a very good meal. Supper to-night—very fine stew, consisting of one ounce lime-juice pemmican and our last fox. It was very fine with the hard bread and very satisfactory. Our bread expected for Sunday. Bender taken sick last night and called on the doctor; some affection of the side. The Eskimo was moaning, Schneider said crying.

Brainard is better this morning, and I feel stronger and can now get up without assistance. I went out to-day and walked the length of the lake—fell down once. It distresses me a great deal that I, who regard myself as among the strongest of the party, should seem to be among the weakest. Gardiner and others report the Greenland coast as distinctly visible to-day, and between here and Cairn Point apparently no water—that is, no water-clouds. Our situation is deplored [deplorable]. We are hardly able to take ourselves along, and yet will undoubtedly have sick ones to carry. Rice proposes to start out again by himself, and without sleeping-bag, &c. It will be pitiable if this party, after fighting short rations, cold, &c., all winter, is doomed to die in the spring. Poor Elison I am afraid will never survive. How often I think of the dear ones at home, the Sunday evening reunions, and all the bright and happy pictures that present themselves. My dear, good old father, may he look with charity on my many shortcomings. My dear mother and sisters, and Harry, brothers-in-law, and nieces—I trust God they are all well and happy, and if I do not pull through this, will learn to look on my memory kindly. Hayes' book ["Open Polar Sea"] was read last night, and also McCarthy's history.

February 9.—Barometer, 30.01 [762.24^{mm}]; thermometer, −36 [−37.8° C.] to −38 [−38.9° C.]. Breakfast—rice and tomato soup with chocolate. Supper—American bacon and English bread and tea—4 ounces of bacon and 7½ of bread. Also I have some butter yet remaining from the last issue; so made a very good meal.

At noon to-day I ate two dog-biscuit saved from this morning. I find I have not so much appetite as I used to have—especially in the morning. I had to go out immediately after breakfast this morning. Was assisted by Brainard, but got thoroughly chilled through. I find it hard to overcome the apathy and indifference engendered by my present condition and the poor prospects ahead of us. Windy this morning,

but not so much so later in the day. We can remain here until about the 10th of March, so Lieutenant Greely says, and then have 15 days for crossing. It will be necessary to make some small reduction of rations to do this. Nordenskiöld was read last night and also Hayes, &c. To-day we had some personal reminiscences from Rice and others, but the day has passed without very much life.

February 10.—Barometer, 29.80 [756.91^{mm}]; thermometer, —33 [—36.1° C.]. Breakfast—fine "son-of-a-gun," very satisfactory, and chocolate. Supper—fine stew of seal meat, blubber, and lime-juice pemmican, with American bread and tea. I climbed over to Lieutenant Greeley's bag this evening, Jewell taking my place. I shall go back and spend the night at home. I have not been feeling very well to-day—have taken no exercise. Weather calm; moon shining brightly. Very little conversation during the day, the full meals having the usual effect. The temperature inside here now during the day is on the average about +23, or +24 [—5.0 or —4.4° C.] during the evening, and about +28 [—2.2° C.] during the day. The last of the seals comes with stews next Sunday. The last of the fox went on Friday. That one made the 24th fox.

February 11.—Barometer, 29.74 [755.38^{mm}]; thermometer, —36 [—37.8° C.]. Made a satisfactory meal this morning of chocolate, American bread, and butter. Supper to-night consists of 7½ ounces of bread, 4 of bacon and tea. My appetite is now somewhat small, and I get along quite well on the reduced allowance. My face is very thin—my legs like broomsticks; I am getting stronger slowly, but it is very slowly indeed. I can hardly rise from a sitting posture on my haunches to an erect position. To find myself in this condition is very depressing to my spirits. Brainard opened rum barrel to-day, and found a deficit of about several gallons in the rum keg. There will be no more issued except medicinally. There was an overhauling of several boxes to-day to get out frozen clothing, &c., underneath. Frost everywhere, above, below, and around. Schneider made a confession this morning of having made away with some bread at different times, but denied being concerned in the loss of the milk. It is now quite light in the middle of the day. Weather to-day calm. The spirits of the party are very good notwithstanding the fact that six weeks may find us on this side of the straits, with no possible way of crossing on account of open water, no food, and nothing but death before us. Whisler expressed the opinion that we should never reach Littleton Island, but this is the first occasion I have heard anything of the kind said. Personal reminiscences last night.

February 12.—Barometer, 29.71 [754.62^{mm}]; thermometer below scale. Breakfast—pease stew with blubber, bread, and tea. Supper—stew consisting of one ounce lime-juice pemmican, 3 of American roast beef, American bread, and tea. We have 57 ounces of bread per week now. I have not very much appetite now. I went out on the lake to-day with the assistance of Eskimo Frederik, and [am] very weak and very thin. Day fine, though very cold—calm. Roar of ice heard out in the straits. Rice says this moving ice extends up and down indefinitely. Well, it must close up and allow us to cross over in the course of a few weeks or more, or our days are numbered. Smoke, dirt, cold, hunger, and every discomfort. I shall be glad when the end comes, whatever it is to be. I was in very low spirits for some hours after breakfast, but afterwards felt better. My mouth is very much parched with the hot tea. The membrane seems very weak.

Memorandum: Lieutenant Greely has a pocket pistol of mine, nickel-plated.

Some preparations are under way for crossing the straits when the ice allows.

February 13.—Barometer, 29.82 [757.41^{mm}]; thermometer, —34 [—36.7° C.]. Dense water clouds out in the straits, running north and south, and a noise of moving ice heard during the day. It is a very ominous sound—our rations expire before long. Breakfast this morning a stew consisting of 1½ ounces of bacon and 2 of bread, besides a little extract meat—very little. Supper—one ounce lime-juice pemmican and 3 of English meat in a stew. I have felt out of sorts during the day. The feelings of the party do not seem to be what they were, though they remain very high considering our deplorable prospects. We now live from one meal to another. Little is said about the quick approach of the sun. I did not go out to-day as there was too much wind. Get chilled through very easily now. Lieutenant Greely turned over to me my pocket pistol. Rice spoke of the Campbell family during the day. His remarks were quite interesting. We are all extremely dirty and greasy.

February 14.—Barometer, 29.64 [752.84^{mm}]; thermometer, —28 [—33.3° C.] (at noon), —17 [—27.2° C.] afternoon. Breakfast—ox-tail soup. Supper—pemmican and English meat; 3 ounces of bread per man in stew, and 6 in plate. We had considerable wind last night, but during the day the weather has been very good, calm, and bright. Evidences of open water seem to have disappeared to a great extent. The noise of moving ice could not be heard. I went out to-day a little ways on the lake, but soon came back; a little

exercise is very exhausting. Talk all day on the subject of food and dishes. After supper Lieutenant Greely came over to my bed awhile to make inquiries about my health, &c. He is pulling through very well. He retains his strength and flesh very well, and also his spirits. We are all very dirty; my hands and face are actually black in color. All our clothes are covered with grease and dirt. Some light preparations are going on towards our hoped-for departure for Greenland. I hope, almost against hope, that if we are fortunate enough to find the channel closed, I shall be well enough to get along without help.

February 15.—Barometer, 30.03 [762.75^{mm}]; thermometer, —25 [—31.7° C.]. More or less wind from the west. I did not go out to-day. Breakfast—American bread, coffee, and butter. Supper—stew of 1 ounce lime-juice pemmican, roast beef, bread, and tea. The conversation to-day has been kept up very well. I do little talking, finding it difficult to raise my voice. I find myself pursued by *ennui*, aimlessness, apathy, and indifference, produced by hunger, cold, gloom, dirt, and all the miseries of this existence. I am very weak, both physically and morally, and find it impossible to shake these sad thoughts off. However, to-day my spirits have been better than usual. A bright glow on Bache Island reported to-day. Day after to-morrow the sun will be visible above the horizon, though not to us here, as the hills will keep it off our house for some time to come. We now burn stearine candles quite regularly. The spirits of the party remain very good indeed.

February 16.—Barometer, 29.62 [752.33^{mm}]; thermometer, —18.5 [—28.1° C.]. Breakfast—soup of corn and pease. Supper—bacon, English bread, and tea. I feel almost as hungry now as before supper. More or less wind to-day from the west. I went out and took a few steps on the lake, with the help of Frederik [Christiansen]. Feel very weak, extremely so, though in other respects pretty well; though my condition does not conduce to make my spirits very high. Open water is reported close to Cape Sabine. There is no noise of moving ice, however. It was very bright to-day, and the reflection of the sun was seen on Bache Island. The sun does not make us enthuse very much, however; we are too near the end of our rations, with a very poor prospect of increasing them at Littleton Island. Personal reminiscences to-day by Lieutenant Greely, and mythology by the doctor. Not much talk on the subject of the future. We all look forward to the fine "son-of-a-gun" and stew to-morrow. Sunday is a red-letter day in our calendar. My hands are numb with cold, and it is extremely difficult to write with dirty hands in this poor light. I see no prospects of the straits being closed at the end of the month. To my mind we must find game here, or else receive help from Littleton Island. It will soon all be decided, thank God. God bless the dear ones at home, who, I am sure, think and talk daily of me. How often my thoughts wander to them and to the familiar scenes. Oh! would that I had the facilities of writing a letter to them.

February 17.—Barometer, 29.42 [747.25^{mm}]; thermometer, —15 [—26.1° C.]. A fine "son-of-a-gun" for breakfast, though it had no milk—cracklings, lard, and American hard bread. Supper to-night—fine seal stew —our last—very thick and filling, comparatively, and American bread. I say filling, though one finishes the best of these dishes with a great longing for more. During the day Schneider gave some personal reminiscences of the coast trade along the New England coast, and a general conversation was kept up during the day. Roar of moving ice heard in the straits, and open water reported extending up and down the straits indefinitely. Sky somewhat overcast, so that we do not see the sun. It is necessary to go up on Garlington [Bedford Pim] Island to see the horizon to the south. I have remained in the sleeping-bag all day, my feet being very cold, and I am feeling out of sorts. Nordenskiöld's book was read last night and the night before.

February 18.—Barometer, 29.49 [749.03^{mm}]; thermometer, noon, —6.5 [—21.4° C.]; (later, —2 [—18.9° C.]). Breakfast—coffee, bread, and butter, and two ounces of roast beef; this last was an extra issue. Supper to-night—American bacon, bread, and tea. I went out to-day on the lake. Find myself a little stronger, but very, very weak still. It was quite calm. Over the top of the rocks to the south the sky was a beautiful rose color. Long went out to the northeast for about four miles, he says, taking his gun. Saw no seals nor any signs of game, but tracks of one fox. Reports about the ice to day rather contradictory, but there seems to be more or less open water off in the straits. Rice returned from the top of Garlington [Bedford Pim] Island, as it has been called, where he went to get a look-out. He did not succeed in getting very good view, on account of the weather turning cloudy, &c. He reports top sandy and quite level in most places. Where it is not so, the little depressions are full of snow. Rice reports a great deal of open water; could see about eight miles, he thought. Our American bacon, English meat, corned beef, carrots, pease, &c., are now gone. We are drawing nearer the end of our rations. The prospect of getting more is rather dismal. We are all very hopeful, however. We won't say die till die we must.

February 19.—Barometer, 29.58 [751.32^{mm}]; thermometer, +2.2 [−16.6 C.]. Breakfast—ox-tail soup, bread, and tea. Supper—stew of one ounce of lime-juice pemmican, three of American roast beef, besides blubber, and bread. The wind blew quite hard last night, and during the forenoon to-day. In the afternoon the wind died away and the day became fine. Brainard went on the heights and reports open Polar sea extending up and down, just outside of Sabine, and out as far as the water clouds would allow him to see. Heard quite a roar of the moving ice. The thermometer has ranged to-day as high as +8.5 [−13.1° C.], and from that to −3 [−19.4° C.]. This evening it is above zero [−17.8° C.], and we have quite a drip in the hut. We now look forward to our meals. We are afraid to look any farther. Ralston seems to be getting a felon on his finger. Quite a number have sore fingers. The present issue-week is a red-letter one. The following is a memorandum of the bread issued: Saturday, 6=6. Sunday, 8=3. Monday, 7=7. Tuesday, 10=6=7. Wednesday, 7=7. Thursday, 9=9. Friday, 9=6½=2½. The first number of each of these, after the days of the week, shows the total amount. The second, the amount in plate. The third, the amount in stew. Last night Ralston gave us his army experience. Frederick is doing something on the foot-gear, and some other preparations are going on slowly in the way of socks, &c., for our hoped-for departure to the other side.

February 20.—Barometer, 29.92 [759.95^{mm}]; thermometer, −5.5 [−20.8° C.]. Some wind from the west to-day. At one time it blew quite hard. Thermometer at 8 o'clock, −11.2 [−24.0° C.]. Breakfast—ox-tail soup and chocolate; and supper—lime-juice pemmican (1 ounce), and 3 ounces of meat. The straits are open, and I see no prospects of their being frozen up so that we can get across. Of course I hope to the contrary. Of course this means death unless we can find some game here. Long went out hunting with Frederik, Eskimo, this morning, but saw nothing. Brainard was up on the hill again. No game nor tracks of game seen except our raven of last fall. It has been dripping badly in here to-day. We live from one meal to another and look forward to these miserable feasts. The English hard bread, hard and moldy, tastes better to-day than the Vienna bread I got at the Centennial. The spirits of the party are good and we bear up finely against adverse fate. Our spirits are generally best about meal time.

February 21.—Barometer, 29.44 [747.76^{mm}]; thermometer at noon, −3 [−19.4° C.]. Thermometer has ranged during the day from near zero [−17.8° C.], to 7 below [−21.7° C.]. Breakfast—soup of rice and tomatoes. Supper—lime-juice pemmican and canned meat. Rice went on the hill-side to-day and came back about supper time (2.30 p. m.), reporting that continuous ice seemed to exist between Sabine and the opposite coast, needing only cold weather to afford a passage across. The spirits of the party visibly affected by the news. I was out to-day for a turn on the lake. I find myself a little stronger, but very weak. I am very thin. Got out my moccasins to-day from under the sleeping-bag. Ralston has a very bad finger, something like a felon on it. Conversation during the day on food, dishes, &c. Remarks by Dr. Pavy on French History. Reading last night of Nordenskiöld and McCarthy's History—the last is being re-read. The sun has not yet been seen, but the sky looks beautiful, and the reflection on Bache Island is quite conspicuous. It has been dripping in here to-day and especially to-night fearfully.

February 22.—Barometer 29.51 [749.54^{mm}]; thermometer, −6 [−21.1° C.). The range of the thermometer during the day has been about half a dozen degrees, from that near to zero [−17.8° C.]. Breakfast—"son-of-a-gun" and coffee. Supper—stew of all pemmican—4 ounces per man. At noon we had cloudberries—2 cans to each mess; but the two hardly made one can, as they had been punched with holes in some way and were nearly dried out. Our friend of last fall—the raven—has been seen around again. We are waiting to shoot it for food. The "son-of-a-gun" this morning had 20 ounces of lard and about the same of blubber. The blubber tastes deliciously. In fact, it would be hard to say what does not taste delicious now. Our food is slowly increased now in some respects—that is, we get a stronger kind of meat. We watch the cooks, however, in dealing out, like hungry dogs. One never has enough. I went out on the lake to-day and walked the length of it. I am very weak, and have not gotten much stronger since yesterday. Thank God! the end of this comes before very long. It must come to a head one way or another before very long. Ralston has a coming felon on his finger. Day overcast, but sky clear. Bache Island and the island to the north of it quite visible. God protect and take care of my dear father, mother, and those at home. It drips very much inside here of late. The thermometer inside ranges just below zero [Centigrade], and a little above at meals. My feet are all puffed up.

February 23.—Barometer, 30.07 [763.76^{mm}]; thermometer, −4 [−20.0° C.]. The temperature has ranged just below zero [−17.8° C.] during the day. Last night we had a very fierce wind from the east, which continued this morning, drifting considerable snow. The storm went down in the afternoon.

None went out except the men to cut the ice and the Eskimo who bring it in. Breakfast—soup of extract meat and corn. Supper to-night—English bacon, 4 ounces, and hard bread. Shortly after breakfast this morning Lieutenant Greely said that he had had a communication from Lieutenant Kislingbury, the substance of which was that the latter advised making arrangements to send to Littleton Island, just as soon as an opportunity offers, the four strongest of the party to get assistance. Lieutenant Kislingbury saw great peril in the party proceeding as a body, and thought that four of the best men could go and bring back aid in the shape of provisions, &c. Lieutenant Greely did not endorse his opinion on the subject, and it did not seem to meet with favor with any one else. Lieutenant Greely announced that his arrangements and preparations simply anticipated starting with the party just as soon as the straits formed a bridge by which we can get over—the great risk and danger in such an undertaking is, of course, recognized. No reduction of rations is entertained, as what we now get is barely enough, and yet, on the other hand, the rations cannot well be increased. Our prospects are not good. We now live from one meal to another, and the counting of days to dates ahead has stopped completely. A great deal of talk to-day on the subject of food. We discuss every phase of it. I find myself still very weak. I have not been out of the sleeping-bag to-day. I am extremely weak and thin, and any effort requires great exertion. It is now quite light. It has been dripping inside all day in a very bad way. It keeps everything wet and damp.

February 24.—Barometer, 29.99 [761.73^{mm}]; thermometer, −13 [−25.0° C.]. Yesterday's storm continued until late in the afternoon, blowing and drifting with great violence. Breakfast this morning—a thick and filling "son-of-a-gun," to which we looked forward ever since that on Washington's Birthday, on the 22d. Supper to-night consists of a real feast of 5½ ounces of pemmican per man, 3 ounces of blubber, and 3 of bread; it will make a grand stew. No bread is issued this evening. We have tea. I managed to repress my appetite, and saved two American hard-tack from last night, and a few spoonfuls of "son-of-a-gun" from breakfast this morning, so as to have a real meal to-night. I ate half of the latter, however, to-day at noon. It is amazing how pitiable these efforts are to cheat the stomach. I was out this morning for a few minutes. Light sharp wind from the west. Somewhat hazy. Barometer falling. Some of the party went on the hill, and Brainard reports the Greenland coast very clear to view, and a great deal of open water in pools lies in mid-channel to the north of Cape Sabine; none was apparent directly between Sabine and Greenland. I am gaining strength very slowly indeed. This morning I could hardly get up from off my haunches when out of doors, and had to call on Frederik [Christiansen] for assistance. The spirits of the party remain very good—wonderfully so considering. We have a little reading every night. It is generally kept up until about 9 o'clock, though many of the party drop off to sleep before that. My feet, as well as those of quite a number, are all puffed up and swollen, the skin very thick and callous. Dripping inside here is pretty much stopped to-day. The doctor is now making some remarks on French history.

Memorandum: Charlotte of apples.

Ralston has a felon.

February 25.—Barometer, 29.45 [748.02^{mm}]; thermometer, −14 [−25.6° C.]. Breakfast—8 ounces of American bread, chocolate, and butter yet remaining from last week. Supper—7 ounces of American bread, 4 ounces of bacon, and tea, with some butter yet remaining. The meals to-day have been very fine. The English bacon this evening was very much liked and could not be enough praised. All sorts of extravagant statements are indulged in regarding it, though I hold that our situation renders us incapable of judging. A good deal of wind to-day with drifting snow. Blowing all last night. The straits are evidently all open. We are making preparations, of course, however, in the way of getting foot-gear, &c., ready, but the time approaches when we shall be out of rations, and then, unless we get seal, we are done for, in my private opinion, for I see no chance of crossing the straits on the ice, though in this I hope I am mistaken. I have been up twice to-day for exercise, though I did not go out. There is now a good deal of light, though the sun has not been seen directly. How often I think of those dear ones at home, and my own familiar table of sins of the past present themselves. My spirits were low all this morning, but are much better this evening. This depression seems to accompany my loss of physical strength. The range of the thermometer inside here to-day has been about 40; from about +13 [−10.6° C.] to +40 [4.4° C.]. Outside it has been from −10 [−23.3° C.] this evening to −37 [−38.3° C.] this morning.

February 26.—Barometer, 29.81 [757.16^{mm}]; thermometer, −13 [−25.0° C.]. I missed the reading last night. Have gone to sleep shortly after the supper several times of late and slept through. Breakfast—ox-tail soup with extract meat. Supper—fine stew, consisting of 3 ounces roast beef, 1 of lime-juice pemmican, 3 of bread, some blubber, potatoes, &c. We had 5 ounces of bread in the plates to each man. It was

only wanting in the usual respect—not enough of it. We look forward all day to supper, and then to breakfast the next morning. It is all we have to live for apparently. There is little talk of our immediate future. We all seem to dread it. In fact, unless we succeed in getting game on this side, we are very likely to share the fate of Franklin's expedition. Day calm and cloudy. A great deal of water in the straits between here and the opposite shore. I went out to-day with the help of Frederik, Eskimo, and took a walk to the end of the lake. I am regaining strength very slowly indeed. I am very, very weak. Well, every day brings us nearer the end of this, whatever the end is to be, and I am glad of it. The conversation of the party is now constantly on the subject of food again, restaurants, &c. The raven was seen to-day. Would that I could write a letter to my dear father and the dear ones at home, but it is impossible, under the present circumstances, to put down more than these notes.

February 27.—Barometer, 29.90 [759.45^{mm}]; thermometer, —22.5 [—30.3° C.]. The thermometer has since fallen as low as —27 [—32.8° C.]. The day bright and fine. The sky to the east very clear, and it is thought that the sun might be seen from the hill, but those who went up there were disappointed. Breakfast—soup of 1½ ounces bacon and 3 of bread, with chocolate. Supper to-night—3½ ounces roast beef and half ounce pemmican. Our canned stuff is gradually going, and the variety of rations will soon be gone. We now have the strongest left. We shall soon have a shut-down, and I am not sorry for it. The doctor made some remarks on French history to-day. I was out on the lake this morning.

Memorandum: The chronometer in my pocket is the one used on the trip to 83° 24′, and on all my trips in this region. My intention is to buy it, and in case I do not get back I would have it purchased and kept in my family.

February 28.—Barometer, 29.92 [759.95^{mm}]; thermometer, —26.5 [—32.5° C.]. Breakfast—ox-tail soup and tea. Supper—roast-beef stew with 3 ounces of bread in it. Bread and butter issued to-night for morning. Day calm and clear. Walked down to the end of the lake with Frederik [Christiansen]. Felt a little stronger than usual. I got three pieces nearly whole hard-tack in my plate to-night, with some small pieces, in all making about four hard-tack or less, and asked Lieutenant Greely if this was supposed to be six hard-tack. My question was misunderstood as a reflection on the cook or on Brainard. Conversation on the subject of food to-day. Everybody here thinks himself a cook.

February 29.—Barometer, 30.01 [762.24^{mm}]; thermometer, —31 [—35.0° C.]. Breakfast—coffee, bread, and butter. Supper—stew of blubber, roast beef, lime-juice pemmican, and bread; 3 ounces of bread in the stew and two dog-biscuit in the plates. These are the last dog-biscuit. Weather calm and clear, though hazy in the straits. It looks very much as if the straits were now bridged, but it is impossible to make out the Greenland shore as yet. The small sledge was brought in to-day and lashed. Elison is doing well. The ends of the bones of the legs will have to be cut off. The canned stuff and many things are now giving out. Our rations are getting near the end of the string. Was out to-day for a walk. Put on a pair of soldier pants instead of mole-skin. We burn about four barrel-staves to each day. Talk all about food, &c., to-day. We are to have another group taken on returning to Washington, to be taken on Sunday, and we are to have a lunch of beans and brown bread at the photographic gallery—Rice's.

March 1, *Saturday*.—Barometer, 29.92 [759.95^{mm}]; thermometer, —29.5 [—34.2° C.]. The thermometer has ranged from —35 [—37.2° C.] to —28 [—33.3° C.] during the day. Weather, with more or less wind from the west; hazy over the straits. Breakfast this morning—ox-tail soup, bread, and tea. Supper—English bacon, bread, and tea. I have not been out to-day for exercise on account of the wind, but was up for three-quarters of an hour in the alley-way. Doctor Pavy reported to Lieutenant Greely this morning that I had resumed the use of tobacco. This is entirely false. Dr. Pavy came over and examined my mouth before doing so. I gave up my tobacco at Lieutenant Greely's request, one piece to the latter and the other to Frederik, Eskimo.

March 2.—Barometer, 29.69 [754.11^{mm}]; thermometer, —24 [—31.1° C.]. Breakfast—fine "son-of-a-gun," with a good deal of blubber in it; very filling; we have raisins for one more; coffee. Supper will consist of stew of three and a half ounces dog pemmican and one ounce of lime-juice pemmican. I saved a can of my "son-of-a-gun" and ate it at noon. Suffered with cold feet last night. To-day one of my feet is extremely painful—all puffed up and very sensitive to the touch. It has been blowing hard all day from the west. It is a matter of doubt how much this last storm has broken up the ice in the straits. We are all very resigned, however, and take things quietly. Our supplies are gradually decreasing. Last of the lemons issued to-day and the last of the milk, &c. Talk during the day on miscellaneous subjects, and not altogether on the subject of food, as usual.

March 3.—Barometer, 29.79 [756.65^{mm}]; thermometer, —26 [—32.2° C.]. Breakfast—bread, butter, and coffee. Supper—English bacon, bread, and tea. It blew hard last night and has blown more or less during the day until near the present hour. Open water is reported as seen from the hill towards Sabine. I think it quite probable that it is all open between here and Littleton Island. I was over in Lieutenant Greely's bag for some time this morning. Lieutenant Greely announced this morning that we could continue on present rations to the 16th instant, and up to that date still have enough to cross with. That we were then, however, to make up our minds to getting rations here. We have enough rations to carry us to the first week in April. Lieutenant Greely proposes to send a party up to Alexandra Harbor towards the end of the month to hunt, and also some parties in the vicinity of Sabine. I shall be glad when the shut-down comes, bring us what it may. I am getting stronger rapidly, I think. I have not been out to-day on account of the wind. Our last cloudberries go next Friday. Three more issues of lime-juice. Many other things are running out; our vegetable stews will soon be gone.

March 4.—Barometer, 30.09 [764.27^{mm}]; thermometer, —22 [—30.0° C.]. Breakfast—fine stew of corn, blubber, potatoes, hard bread, &c. Supper—stew of pemmican and roast beef, mostly the latter. The bread is to be reduced to fifty-six ounces, a reduction of about an ounce. Other small reductions in our rations will be made. Our canned stuff will soon all be gone. Blowing and snowing to-day, and signs of open water seen by Brainard indistinctly. It is cold and uncomfortable inside here, and a great deal of frost comes constantly. Conversation on the subject of food all the time, morning, noon, and night. Thank God! the day is fast approaching when we shall see the end of all this. The wood still holds out very well. It is very fortunate, as we are enabled to have our food mostly heated.

March 5.—Barometer 29.95 [760.72^{mm}]; thermometer, —23 [—30.6° C.]. Blowing very hard pretty much all during the night and during the day to-day, with drifting snow; very disagreeable. Breakfast this morning—fine stew of corn, &c. Supper to-night—stew of 2 ounces bacon, 2½ lime-juice pemmican, and 1½ of roast beef; 4 ounces in all. The bacon is rancid, but we enjoyed the taste; last night it made Biederbick sick at the stomach, and he threw up his supper. The wood holds out well. Last issue of butter, soup, and extract of meat are made. The end of this month will be very critical. I am glad of it, whatever the end is to be. I have no desire to postpone the end, if that end is a death by starvation. Thermometer inside the house on rising this morning was +19 [—7.2° C.]. It has been very cold and chilly inside here to-day, owing to the high wind outside.

March 6.—Barometer, 29.56 [750.81^{mm}]; thermometer, —22 [—30.0° C.]. Blowing and windy through last night; it continued until about noon, when it gradually became calm. A great deal of wind [water] reported in the straits by those on the hill, as shown by a heavy line of dark clouds running north and south, marking the open water. There is no doubt that the straits are open, though how far this open water is from Sabine, or just how wide it is, is difficult to say. Brainard and Rice usually go out on the hill every day and take a survey of the scene. I have not been out for some days, but get up and stump around inside here twice a day. I am gradually recovering my strength, but feel depressed and in low spirits, usually during the afternoon—a feeling I cannot shake off. I suppose short rations and my convalescing condition have something to do with it. Some work done to-day on the sledge and on the foot-gear, to prepare for our departure. I do not think we shall have an opportunity of crossing, and I think the party are losing confidence. Our hopes must depend upon being able to get game here. Conversation during the day on the subject of food; this is our constant theme. We have reading every night, and occasionally something out of a book of statistics.

Memorandum: Stuffed eggs *à la Paris*.

Last of our soup (ox-tail) eaten this morning for breakfast. Supper to-night—bacon stew; 2 ounces bacon, 1½ of roast beef, and ½ ounce pemmican, with a few pieces of hard bread and a little blubber. Our blubber is almost gone; bacon rancid, and we eat the tallow in which it comes. Both are very strong and spoiled, but we eat them with relish. How often my thoughts wander homeward to the dear ones there and the old family scenes. Oh, God! how many years of my life I would give to be there.

March 7.—Barometer, 29.59 [751.57^{mm}]; thermometer, —16 [—26.7° C.]. Breakfast—4½ ounces bread, and our last chocolate. The bread consisted of two whole crackers, two halves, and some pieces about equal to three-quarters of another cracker. At Fort Conger, 16 or 17 crackers were considered to equal a pound; here the bread seems to be very heavy. Supper—stew of bacon, pemmican, and roast beef. Our last cloudberries issued to-day. Day clear and calm; I went out this morning on the lake. Long went out hunting to-day, and continued on down to Brevoort Island; he did not get back until after Biederbick had

commenced to cook dinner in his place. He saw two old bear tracks, also fox tracks. Rice was on the hill and saw two ptarmigan; sent for the gun, but the birds flew away. The sun was seen for the first time this morning. The water in the straits is reported somewhat different—closing in a little, but accounts are conflicting. Greenland shore is invisible. Heavy water-clouds hang over the middle of the straits, running north and south. Kislingbury went out to the ice-berg, about three-quarters of a mile from shore; saw some old bear tracks. Found a heavy current under the ice, and the ice very thin in places; broke through, but did not get wet. Our chances look rather poor at present, but with the increase of sunlight we ought to get seals.

March 8.—Barometer, 29.48 [748.78^{mm}]; thermometer, +3 [−16.1° C.] after breakfast. Breakfast—rice soup (the last of the rice), tea, and 4½ ounces hard bread. Supper—bacon, 4 ounces, 4½ ounces of bread, and tea. It blew with great violence last night, and a fierce storm has been raging all day, blowing, snowing, and drifting. No one but Linn and the Eskimo [Jens], who went for ice, have been out of doors. Conversation pretty lively to-day. Ralston has a carbuncle on his finger, but it is getting better. Henry has a sore foot. Gardiner is nearly well, but still on the convalescent list. These, with Elison and myself, are the only ones sick or unwell. I have been in pretty good spirits to-day. Generally feel pretty low down in the morning, after breakfast. Last night I had a few unpleasant words with Lieutenant Greely about proposal to change the stews. Both of us were rather fixed. This constant hunger is very productive of ill-temper.

March 9.—Barometer, 29.74 [755.38^{mm}]; thermometer, −7 [−21.7° C.]. Breakfast—"son-of-a-gun" without milk or raisins, but quite filling notwithstanding, with 30 ounces of lard, some blubber, and a thin pint of chocolate. Supper to-night is pemmican stew of 5 ounces, which promises to be very good. The issue for lard for Monday, Wednesday, and Friday next is to be $\frac{4}{5}$ of an ounce for each day. This it has been decided to carry over for the "son-of-a-gun" next Sunday. Conversation all day about food.

March 10.—Barometer, 29.94 [760.46^{mm}]; thermometer, −8.5 [−22.5° C.]. Windy last night and during the afternoon, but after that it cleared off and now bids fair to be fine weather. Breakfast—chocolate and bread. Supper—bacon and bread and tea. Long leaves to-morrow for Alexandra Harbor with Eskimo Frederik, to hunt for game. He takes six days' rations, at the rate of half pound of meat (pemmican and bacon) 10 ounces of bread and tea, also a pint of rum. Rice and Brainard went out to-day and report water in the straits near Sabine. Apparently quite a narrow channel with ice in it. Greenland shore quite distinct. We need now very cold weather to have any chance of the straits freezing over. We have pretty much concluded that the chances of the straits freezing over are very poor. Bacon now on three afternoons every week, cold. Our fuel must be economized. Our rations will last about four weeks longer. After that we must get game or turn up our toes.

March 11.—Barometer, 29.99 [761.73^{mm}]; thermometer, −15.5 [−26.4° C.]. Breakfast—corn stew (our last corn), 5 ounces bread, and tea. Supper—stew of 4 ounces of meat, 2 of bacon, 1½ roast beef, ½ ounce pemmican, 2½ ounces bread (1½ in plate and 1 on the stew); also tea. Day very fine, calm and clear. Long and Frederik, Eskimo, got off this morning before 9 o'clock. Rice and Ellis started about 8 a. m. and pulled the small sledge for them as far as Cocked Hat Island. The sun was seen to-day just over the hill. I was out and went on the hill, the farthest I have been since November last; did not see the sun. The Greenland shore is visible to-day, and the land in other directions very clear. Appearances indicate that the straits will be frozen over if this calm weather continues with cold temperature. The spirits of the party are high. We have reading every night still. Many books have been read through.

March 12.—Barometer, 29.95 [760.72^{mm}]; thermometer, −22 [−30.0° C.]. Breakfast—4½ ounces of hard bread and a pint of tea. Supper—4 ounces bacon, 1½ of roast beef, and ½ ounce lime-juice pemmican, made into a stew. We have with this 2½ ounces of hard bread, 1½ in the plates and the other ounce in the stew. I took a walk to the hill to-day after breakfast, and was up again in the alley-way just before dinner. Weather quite calm about here, with only a slight air stirring from the west. Line of white clouds in the straits. Brainard walked down to Cape Sabine. Found a storm raging in the straits, and discovered a good deal of open water. No game seen and no signs except tracks of a fox. Lieutenant Greely came over this morning and got into Biederbick's bag. Frederick was engaged in repairing that of his. Talk to-day on the subject of food, bills of fare, dishes, &c. Germany and New England we hear a good deal of in this respect, through Biederbick and Lieutenant Greely respectively. Good deal of drip inside here of late, and also a great deal of smoke. The two together add greatly to the discomfort about meal times. I am getting stronger slowly.

March 13.—Barometer, 30.01 [762.04^{mm}]; thermometer, —16 [—26.7° C.]. Breakfast—stew of 1 ounce bacon per man, with a little extract meat and the last of the blubber, and 2 ounces hard bread in it. Supper—4 ounces bacon and 5 of hard bread. All of our coffee and chocolate are now gone, and canned vegetables. We are reduced pretty much to pemmican, bacon, bread, and tea. The breakfast stew had one-third tea-spoonful of potatoes per man, which is the last of the potatoes. Weather to-day calm and clear. Sun shining brightly. It came out over the hill and was seen by those out at noon. Long and Frederik, Eskimo, returned unexpectedly about 7.15 p. m. Long reported that they went to Alexandra Harbor, but were unable to get in the sleeping-bag, and had not had any sleep since leaving on Tuesday last. The bag was found frozen hard. They were able to get their feet down up above the knees, but that was all. They took little naps standing, one at a time. Saw no game whatever, and no tracks except those of one fox. Buchanan Strait seemed to Long to be closed up to the west by high mountainous land, but he could not be sure. The distance accomplished and the trip was most remarkable. Ptarmigan tracks seen near the house to-day.

March 14.—Barometer, 29.92 [759.95^{mm}]; thermometer, —16 [—26.7° C.]. Breakfast—pint of tea and 4½ ounces of hard bread. Supper—stew of 5 ounces English pemmican, 2½ ounces of hard bread (in plate), and pint of tea. Brainard went out to-day and shot three ptarmigan near the house. Their tracks were first seen some two or three days ago. This looks like a good omen, and goes a little way as an offset to the damper made by Long's want of success. I saw the sun to-day for the first time—the first time since October 23 last. Some of the others have seen it a few days ago. Leads of open water in the straits are reported freezing up, but the grinding of ice in the straits is heard nevertheless. Lieutenant Greely announced to-day that we could live here for four weeks more on substantially our present rations. This of course would leave nothing for crossing. Our only hope lies in getting seal.

March 15.—Barometer, 30.10 [764.53^{mm}]; thermometer, —22.5 [—30.3° C.]. Breakfast—stew of one ounce bacon and 2½ hard bread, with pint of tea. Supper to-night—6½ ounces bread and 4 ounces roast beef. Our hard bread is to be cut down from to-day to 50 ounces per man per week. Kislingbury was around to-day by a pool of open water some three miles from shore, and reports fresh bear tracks about three miles from shore. He also saw five dovekies. Reports the condition of the straits is encouraging. Appearances would indicate that a few days of cold calm weather will put them so that we can cross. The weather to-day has been calm and bright, very pleasant for some time past. Rice went over to Rosse Bay yesterday and returned by way of Cape Sabine. He found a practicable route over to Rosse Bay; can go over there in about the same time it takes to reach Long's Point. I went out to-day, but did not feel so strong as yesterday. My foot has been hurting me a good deal to-day. I feel in the morning and afternoon frequently a dreadful depression which I cannot shake off.

March 16.—Barometer, ——; thermometer, —28 [—33.3° C.], at 1 o'clock. Breakfast this morning—fine "son-of-a-gun," 6 ounces of bread, and 4 ounces lard per man, very rich and oily. Supper—stew of 5 ounces of meat, 3 ounces of pemmican, 2 of ptarmigan, and 2½ of bread per man. These three ptarmigan shot by Brainard weighed 3½ pounds dressed—that is, with the entrails, bones, and feathers excepted, though we ate everything. Some of the entrails were not entirely squeezed. Long and Frederik [Christiansen] went out to-day to the berg where there is an open-water pool, and Long shot four dovekies with the shot-gun. They are nice food. Their plumage is white, mostly white. They saw a seal, and Frederik [Christiansen] shot at him, but missed the animal. This success raises the spirits of the party wonderfully, and to-night we are feeling very sound again. Long's want of success at Alexandra Harbor rather threw a damper on us. I was not out to-day, but only up in the alley-way to stretch my legs. It now drips very badly at every meal. The temperature inside here just before breakfast time, +28 or +29 [—2.2 or —1.7° C.]. The kayak was taken out to-day and the birds secured by means of it.

March 17.—Barometer, 30.10 [764.53^{mm}]; thermometer, —22 [—30.0° C.]. Breakfast—4½ ounces hard bread with tea. Supper—5 ounces of bacon, 2½ of bread, with the tea; 7 ounces of bread daily now. All our coffee and chocolate is gone and all the canned stuff. Nothing now remains but pemmican, bacon, and roast beef. Brainard found a large box containing 10 ounces of English chocolate. Kislingbury went with Jans [Jens] out to the water-pool to-day and saw a seal, but got nothing. Kayak taken along and carried back again. The four dovekies gotten yesterday weigh just one pound apiece. This morning as Jans [Jens] was about starting out, he saw and shot a ptarmigan near the house—quite a fat bird and weighs 1¼ pounds. Sun shining brightly to-day. Wind in the straits, but nothing to amount to anything here until this evening, when it blows from the northwest at about five miles [about 2^{m} per second]. I was

out to-day for a walk on the lake and felt much stronger. Was up in the alley-way for between two and three hours. The spirits of the party are very good. All seem confident of being able to get seal meat, &c., and thus support life. We have about given up hope of the straits closing so as to allow us to cross. The conversation is chiefly about food. Reading every night. Hayes' boat journey and the Challenger Expedition have been read for some time. Hayes is voted a fraud.

Memorandum: *Armè ritter.* Citron preserve.

March 18.—Barometer, 29.75 [755.64^{mm}]; thermometer, —13 [—25.0° C.]. Overcast and somewhat cloudy. Storm in the straits from the southwest. Breakfast—5 ounces of hard bread and a pint of tea. Supper—stew of 4 ounces of meat, 1½ ounces bacon, 1½ of roast beef, ½ of lime-juice pemmican, and ½ ptarmigan. Talk all the day on the subject of food. There has been a constant stream of conversation ever since breakfast. I saved about half of my bread this morning to supplement the stew to-night. This stew has 2 ounces of bread in it; none issued in the plate. Did not go out of doors to-day. No one went hunting. The raven came around to-day, but was too wary to be shot. The straits all broken up; no chance, in my mind, of our crossing. Frying in lard, compared with frying in bacon, was heavily argued this morning.

March 19.—Barometer, 29.95 [760.72^{mm}]; thermometer, —10 [—23.3° C.]. Breakfast—5 ounces of hard bread and a pint of tea. Of the hard bread, I saved most for supper. Supper—a stew of 4 ounces of meat, 2 of pemmican, 1½ bacon, and ½ ounce of dovekie. It was stormy and windy last night. Continued most all day with a good deal of drift. No one went out but the ice men, &c. Wind from the southwest. Straits all broken up. I took my exercise in the alley-way. I have felt in better spirits to-day than usual. The talk now is incessantly about food, dishes, and eatables. Thermometer this morning, just before breakfast, inside the house, +25 [—3.9° C.]. Our wood will be gone to-morrow or the next day, and we shall have then to burn stearine, the little there is, followed by alcohol.

March 20.—Barometer, 30.15 [765.80^{mm}]; thermometer, —15 [—26.1° C.]. More or less wind to-day. Cold and chilly in the house. It is more uncomfortable inside here when the wind blows, though with a comparatively high temperature, than when the temperature is low and calm. Long went out to the water-pool, but saw nothing but two dovekies—got nothing. Rice went out to the P [Beebe] cache with a net, and came back at supper time with a few ounces of shrimps. We hope to be able to get shrimps enough to help our rations. Breakfast this morning—our last morning stew. It consisted of 1 ounce of bacon, 2½ of bread, and the last of the potatoes and the extract of beef. Supper to-night—4 ounces of bacon and 4½ bread. The raven was seen to-day by Rice. Henry saw flying overhead what he thought was an owl or falcon. Our fuel gives out to-morrow, all except the whale-boat. We shall then commence cooking with the alcohol. Schneider has made 222 stearine candles since February 16.

March 21.—Barometer, 30.08 [764.02^{mm}]; thermometer, —19 [—28.3° C.]. Breakfast—4½ ounces of bread with a cup of tea. Supper—fine stew or soup of 4½ ounces of American pemmican, with 3 of bread in it; none in the plates nowadays in the evening, except on bacon nights. It has been blowing and drifting all day, and the sun overcast most of the time; the air filled with a kind of haze. No one has been farther than just outside the door. Brainard has been occupied in making a net to catch shrimps; it is baited with part of a dovekie. Rice got a few ounces yesterday, but they are very small, and it will take a good many to go any ways as food. Lieutenant Kislingbury has an inflamed finger, probably a felon coming on. Ralston's finger is improving slowly, I believe. The time draws near when our group comes to an end. We look on it with equanimity, and the spirits of the party, with this prospect of a miserable death, is certainly wonderful. I am glad as each day draws to an end. It puts us nearer the end of this life—whatever that end is to be. How often I think of those at home, and of what they are doing. Oh, God! that I could be with them for a few hours only. Would that it were possible to write down all my thoughts here at length for the benefit of those at home, in case of the worst. The fuel, all except the boat, is about gone—ends with to-morrow. We will then commence on alcohol. "Double-barrel" stew to-night—that is, two pots which nearly fill the plates, and comes somewhere towards giving one enough to eat. Fridays and Sundays we have two pots, and on other stew nights only one. Talk all the time on the subject of food. It forms almost the whole subject of conversation.

March 22.—Barometer, 29.90 [759.45]; thermometer, 3.5 [—19.7° C.]. Breakfast—4½ ounces hard bread with tea; supper—5 ounces bacon, partly tallow, and 2½ ounces hard bread. Saved over nearly half my hard bread from morning to-night. I find these cold meals of hard bread and bacon the most satisfactory of the week—even more so than the Sunday evening stew. Quite a number of the party have

the same experience. I sleep better and feel warmer. Waked up this morning at 2½ a. m., and slept very little afterward. After a supper of bacon, frequently sleep through till after 5 o'clock, even when I dropped asleep the night before very early. Long went out hunting on the ice to-day with Jans [Jens], but saw nothing, and got nothing. He went out on the ice two or three miles from land. Reports seeing nothing but sludge ice and young ice extending as far as he could see. Saw no open water except at the berg. Appearances would indicate a jam in the straits. Rice went down to-day to the creek near the P [Beebe] cache, and got some half-dozen ounces of shrimps. These shrimps are very small. He got back just after supper. Our talk is constantly about food, &c. One can fix his mind on nothing else. Frederik, Eskimo, and Jans [Jens] have swelled faces. I was out to-day on the lake. Some wind to-day, and the sky overcast and snowing at times.

March 23.—Barometer, 30.00 [761.99^{mm}]; thermometer, −10 [−12.2° C.]. Breakfast— 4½ ounces hard bread and tea. Supper—fine stew of 5½ ounces meat with 3 ounces bread in it. The dovekie supplied about 1 ounce per man and pemmican in the rest. I brought over from breakfast a little hard bread, as usual. This allowance of bread is a most insignificant amount. The hard bread weighs heavy, and one cracker with a few pieces seem to make up the 4½ ounces. Lieutenant Greely announced this morning that we would run along on the present ration until April 6, and then by cutting down to 3 ounces of meat per day, without bread, we could exist until about May 1. This is more encouraging. Our present ration is so small, however, that it remains to be seen what the effect of any further reduction will be. We are hungry all the time. It is impossible to fix one's thoughts for any length of time on anything but food. We have various seal skin articles of clothing, foot gear, some stearine, &c., which we now talk of eating. Long and Frederik (Eskimo) went hunting to-day out beyond the berg. Saw nothing but one dovekie and a bear track about two days old. Also a fox track. Long reports the ice moved out. Open water out beyond Sabine. Brainard went down to Rosse Bay, but saw nothing but tracks of a fox and a ptarmigan. Reports open water stretched from Cape Isabella towards the north. No open water around the bergs in Rosse Bay. Traveling on the ice of the bay very good. Brainard started soon after breakfast and got back to dinner. Rice went down to the P [Beebe] cache after shrimps this morning, and again just before dinner. He returned just after dinner quite successful. He got about three pints—that is, an English meat-can—full of shrimps. These shrimps are very small—about one-sixth of the size of the ordinary canned shrimps. Bender and Schneider made a dip-net for him to-day, and also some other implements to catch them. Rice went down again after dinner to try to catch some more. We resumed cooking by alcohol to-day at dinner; it takes longer than by wood. All the wood is now gone except the boat itself, &c. Bender made a fish-hook to-day, and Connell is going to try fishing to-morrow. The temperature inside here, just before breakfast this morning, was +29 [−1.7° C.]. Yesterday morning it was +25 to +26 [−3.9 to −3.3° C.] the morning before.

March 24.—Barometer, 29.97 [761.22^{mm}]; thermometer, −16 to −22 [−26.7 to −30.0° C.]. Slept well last night, not waking up until just before 5 o'clock. Alcohol lamps lighted at 6 o'clock. It was 7.30 when Biederbick's tea boiled, and he had issued the first cupful when he suddenly fainted. He was carried to his sleeping-bag. Then Israel fainted, and Long and several others. We all began to feel the effects of the alcohol fumes in the close house. Those able to, got out in the alley-way, and the rest were helped out. Jewell, Connell, Brainard, &c., fainted as soon as they reached the cold air outside. I got out to the end of the alley-way to help Jewell, when I found myself suddenly affected. I did not lose consciousness, but became like one paralyzed. We gradually came back inside the house. Most, if not all, of the party were given a mouthful of tea, and a drink of rum was isued all around. Biederbick and Israel came near death's door, the doctor says. None of the party that were not more or less affected. Just before dinner time it was discovered that some one had taken advantage of the situation this morning to steal about half a pound of the bacon of Biederbick's mess, and deep are the curses which rained down upon this brute. The allowance of bread has been increased slightly this evening. Breakfast consisted of 4½ ounces of bread; and supper, according to schedule, would be 2½ ounces. At supper this evening the two hatches in the boat are kept open, and the door slightly, so no trouble is found. Henry is sick at the stomach, but was affected before supper time, he says. Fine day to-day, as well as yesterday. Eight half gills of shrimps to-day weighed 14 ounces. Fox tracks seen around to-day. Rice went down to the tide crack at 3 o'clock this morning and brought back 2 pounds more of shrimps. No one out to-day farther than the lake.

March 25.—Barometer, 30.00 [761.99^{mm}]; thermometer, —16.5 [—26.9° C.]. Breakfast—5 ounces of hard bread with tea; saved over about 2 ounces for supper, as usual. Supper—stew consisted of 3 ounces of shrimps per man, 1½ of rancid tallow, and ½ ounce lime-juice, pemmican with 2 ounces hard bread. This stew was pronounced excellent by every one, and many went into ecstasies over it, and thought it the best thing in flavor we have yet had. We were all certainly very agreeably disappointed in the shrimps. Lieutenant Greely estimates that 3 pounds of shrimps are equal to 2 pounds of meat. Last night Brainard killed a fine fox which ran over the roof of the house; white in color, weight 5½ pounds dressed. The bread last night at supper was increased about 5 ounces for that meal, in consideration of the trials of the day. Rice went out again this morning at 3 o'clock, down to the tide-hole and the iceberg, and set his shrimp nets. He went out just before dinner to-day, and returned just after dinner with some more shrimps, larger than the others. Shrimps brought in, in all, by him to date, about 17 pounds. The baits used consist of seal-skin, old bear-skin (socks of Corporal Salor, &c.), feet of ptarmigan, fox-skin, &c. Long and Frederik, Eskimo, went down to Sabine to-day. Long saw two seal or walrus holes, and is confident of finding seals or walrus out on the ice near by before long. Frederik, Eskimo, became exhausted and laid down, but fortunately Long saw him and brought him in. Schnapps and ammonia brought him to all right. After breakfast this morning pretty nearly every one gave some testimony concerning Henry and the stealing of the bacon yesterday morning. Jans [Jens] testified directly that he saw him take the bacon off the shelf. Henry acknowledged that he was sick and threw up bacon, but declared it was after the bacon issued to him was eaten, and it was this bacon he threw up. Private Frederick testified positively to the contrary of this, and the testimony of a number of us was directly opposite to it. It came out also that Henry, at Fort Conger, opened and made way with canned stuff. Schneider testified to-day that it was Henry who stole the milk. Every one of the party was asked his opinion, on hearing all the testimony, and every one, without exception, of the white men of the party, declared his conviction of Henry's guilt. Henry has not been allowed to leave the hut without a guard, nor to leave his bag when no light is lighted. We are now using alcohol. The daylight comes in through the holes above the two stoves during the cooking, and is cheerful. To-day, for several hours, we got along without candles. We are all confident now of pulling through, and the spirits of the party are excellent. I was out for exercise to-day, and walked all the way down to the old hut, the other side of the lake. It has been a beautiful day, bright and warm; quite calm. Lieutenant Kislingbury's finger is doing very well. Elison is doing remarkably well. I suffer a good deal with swollen feet, which are alternately very cold and feverish, and painful with inflammation.

March 26.—Barometer, 30.00 [761.99^{mm}]; thermometer, 0 [—17.8° C.]. Breakfast—5 ounces of hard bread. Supper—stew, same as last night, 1½ ounces of bacon, ½ ounce lime-juice pemmican and 3 ounces of shrimps. Slept well last night, though several of the party complained of sleeping cold. This stew has a very fatty taste. Rice and Jewell went after shrimps this morning, at 4 a. m., but got nothing. The shrimps do not seem to bite at night. During the evening it commenced to storm, and since it has been blowing and drifting from the southeast in a very violent way. Fresh ptarmigan tracks seen by Rice on his return this morning at breakfast time, and three or four went after the bird but did not see him. Brainard got caught in the storm, and returned to the hut with difficulty. It makes it particularly cold and uncomfortable inside the house; no one has been out of the house since. This morning it was discovered that 10 ounces of English chocolate, found by Brainard the other day, and which were placed for the use of Elison under the boat, were missing. Thorough search made, but it could not be found. Henry was standing, the other morning, under the place where it was moved again, it seems. Circumstances all seem to point towards him, but it is not certain. We burn two alcohol lamps. Linn started in, instead of Biederbick, as cook this morning. Biederbick has certain symptoms of anæmia, and the doctor thinks he had better rest a few days.

March 27.—Barometer, 30.08 [764.02^{mm}]; thermometer, —8 [—22.2° C.]. The storm continued with great violence until about midnight, when it ceased. Suffered a good deal with my feet, one of which was inflamed and throbbed with pain all night. Very fine day to-day, calm and clear. Long and Jans [Jens] went out beyond the berg and had wonderful success. Long shot 38 dovekies, 33 of which he brought in. They were secured by means of the kayak. Five of them flew off and could not be gotten. Long promised Lieutenant Greely something to-day in the way of food as a birthday present, and well has he kept his promise. Rice went down to the tide crack, but only got about ¾ pounds of shrimps up to dinner time. I was out to-day for exercise on the hill; am regaining strength slowly. Party all in very good spirits over the success of the hunters. Frederik, Eskimo, is on the sick list just now. Ellis somewhat sick from eating

stearine. Breakfast this morning—3 ounces of bread and 1 ounce of tallow, and $1\frac{7}{12}$ ounce shrimps per man, made in a stew, a very good stew indeed. Supper—4½ ounces bread and 4 ounces of preserved beef.

March 28.—Barometer, 30.13 [765.29^{mm}]; thermometer, X. Breakfast—4½ ounces of bread and cup of tea. Supper—fine stew, consisting of 6 ounces of shrimps, 3 of bread, 1 of tallow, and $1\frac{5}{12}$ of dovekie. Rice got 12 pounds of shrimps yesterday and no less than 27 pounds to-day. Long got 14 dovekies to-day, and Frederik, Eskimo, shot one ptarmigan. We all feel jubilant and sanguine of the future in the highest degree. Long promises 10 dovekies every day, and Rice as many pounds of shrimps. Long saw a small seal to-day. Jans [Jens] gets the dovekies in the kayak, which is carried out for this purpose. Weather to-day bright and warm and calm. About 9 o'clock or thereabouts it was +2 [−16.7° C.] in the sun, and −20 [−28.9° C.] in the shade. Brainard went down to Cape Sabine, but has not returned up to dinner time. Rice went out to his nets at 2 o'clock, but has not yet returned. I was out on the rocks to-day near Cross' grave; am still weak, but getting stronger daily. We all hope great things from the double-barrel "son-of-a-gun" this evening. Frederik, Eskimo, came in exhausted to-day—remained out too long, looking for another ptarmigan. The dovekies are all estimated at one pound each. Ellis and I picked birds this morning for three or four hours. I got chilled through. The wings, heads, and feet of the dovekies are used as bait for shrimps. Brainard went to Sabine and found old Eskimo sledge.

March 29.—Barometer, 30.50 [774.69^{mm}]; thermometer, +1 [−17.2° C.]. Blowing and stormy all day—wind from the east—snow drifting violently. Breakfast—no tea, but stew of 1 ounce of tallow, 6 of shrimps, with 4½ ounces of bread served separately. Pronounced very fine by every one. Supper—stew of 11 ounces of shrimps, 1⅓ of dovekie and 1 ounce of tallow, with 2½ of bread served separately. Rice brought in 25 pounds more of shrimps late last night. To-day Rice brought in 12 pounds. On his way down he saw a flock of 6 ptarmigan, and returning for the gun shot one of them. Long went out on the ice with Jans [Jens] and saw some dovekies, but it blew and stormed so hard he returned. Got none to-day. I have not been out to-day. Slept very poorly last night. Suffered a great deal from my inflamed feet. Meals to-day very filling and satisfactory. Stearine burned at supper instead of alcohol, and to be burned hereafter for the present. Brainard made some shot for rifle out of lead. Fox tracks seen.

March 30.—Barometer, 30.50 [774.69^{mm}]; thermometer about noon, −3 [−19.4° C.]. Breakfast—3½ ounces bread with tea. Stew—6 ounces shrimps and 1 ounce of tallow. Supper—no hard bread, but tea, $4\frac{7}{12}$ ounces shrimps, $4\frac{5}{12}$ ounces fox, 1 ounce of tallow, and 1 ounce of dovekie. The storm continued during the night and continued during the day with great violence, blowing very hard from the east here to the house. No one went out during the day except Whisler, whose turn it was to cut ice. After supper the wind died away to a great extent, and promises to leave us with good weather. Conversation on the subject of food has fallen off during the last few days, owing to increased food. Lots of water now in the straits. Thermometer this morning in the house, +21 [−6.1° C.]. Very cold inside during the day. I exchanged places in sleeping-bags with Lynn day before yesterday; returned to my sleeping-bag to-night. Biederbick is to resume his original place to-morrow or next day as cook. Frederik, Eskimo, still under the weather. The rest of us are doing quite well. Helped Ellis to-day to pick dovekies and ptarmigan. Salor sewed skins of dovekies, heads and feet on a box for bait for shrimps. Large feed of rations shows itself in the opening of our bowels. Shrimps or shells of shrimps noticed in the stools.

March 31.—Barometer, 30.50 [774.69^{mm}]; thermometer, +3 [−16.1° C.]. Breakfast—3½ ounces of bread in plate, a cup of tea, and 4 ounces of shrimps cold and raw. Supper—stew of 5 ounces shrimps, 1 ounce bacon and 1 ounce dovekie per man. We all like the raw shrimps and find them palatable, though most of the party prefer them in stew. If they are had in stew, however, the cup of tea is to be cut off in the morning. Storm raging all day with a slight lull about noon. This storm commenced on the evening of the 28th, and is the worst since the 27th of September last. Long went out to-day and brought in the kayak. We were all very anxious for him. Jans [Jens] was out and shot some ptarmigan, but could not get any. We are using stearine to-night. This is the regular stew now. Frederick thinks 2½ pounds of stearine to-day for both sides sufficient—evidently he is mistaken. The passage-way drifted up to-day. This wind makes the cold inside the house more perceptible than when we have a low temperature. I moved back to my bag this morning. Biederbick resumes his place as cook for our mess in the morning. Schneider is cooking for the other mess this evening instead of Frederick, who complains of having taken a cold. Frederik, Eskimo, is under the weather. He was given a drink of rum to-day and also last night. The doctor recommends a slight increase of food for him. A slight increase is now issued Long and Jans [Jens].

Long saw several dovekies to-day, some three dozen, he says. The open water is encroaching close to the P [Beebe] cache. Long reports a great deal of open water in the straits. I have missed the usual amount of my exercise during the past few days.

April 1.—Barometer, 30.40 [772.15^{mm}]; thermometer, +9 [−12.8° C.]. Breakfast—4 ounces of shrimps, 2½ ounces of bread, with 1 of bacon, all in the stew together; no tea. Supper—6 ounces of shrimps, 1 ounce of bread, 1 ounce of bacon, 1 ounce of dovekie, and a cup of tea. Rice brought in 20 pounds of shrimps before supper; he goes down again after dinner. Long got 11 dovekies. He saw a number of seals in the water, and a walrus on the ice. Could not get at the last on account of the young ice. The open water is now close in to P [Beebe] cache. Brainard went out with a rifle and saw two ptarmigan. Shot at them with some shot-gun cartridges, improvised out of rifle cartridges and lead cut up in pieces, but though he got close to them got none. We have all felt cold and chilly to-day, and a depression is hanging over the party—probably due to the short rations of the past few days and the indication had, and the late storm. To-night Schneider used stearine to cook with, and Biederbick alcohol. The stew and the tea of the former were cooked in 89 minutes, and of the last in 75 minutes. I took a walk up on the hill to-day. Find myself quite weak. Sky hazy and air calm and clear. Greenland coast visible indistinctly. We feel confident now of getting a seal before many days. Frederick resumes his cooking in the morning. This miserable life does not improve our tempers, and we are all more or less irritable. Rice is to bring in some sea-weed, which we are to try as food. 80 pounds of stearine on hand the other day when we commenced to cook with it. The dovekies are skinned and supply the baits for the shrimps. The feet, heads, and tips of wings are used also. The dovekies and ptarmigan are counted in weight as a pound each.

April 2.—Barometer, 30.63 [777.99^{mm}]; thermometer, −13 [−25.0° C.]. Breakfast—stew of 7 ounces shrimps, 1 ounce of bacon, 1¾ ounces of bread, and a cup of tea. Supper—stew of 8 ounces shrimps, 1 ounce of bacon, 1¾ ounces bread, 2½ ounces of dovekie, and a cup of tea. The sky clear and the sun shining brightly all day, and wind from the west. Rice brought in 10 pounds more of shrimps last night after supper, making 30 pounds yesterday. To-day he went down but once, accompanied by Private Frederick, and got 32 pounds. These shrimps are very small, about the size of canned corn, which it very much resembles. The heads, skin, &c., of the dovekies are still used as bait. Long and Jans [Jens] were out hunting to-day, but got nothing. The ice is crowded in towards the shore and closed up the water-pool; better success perhaps to-morrow. Long saw several seals yesterday. Cold and chilly in the house to-day. These shrimps do not take the place of meat by any means. I was out for daily exercise on the lake. No wind is now very trying. Was absent from 7 a. m. until supper time this afternoon. Brainard went out after the ptarmigan, but did not see them.

Memorandum: Pear cider.

A great deal of talk about food all the time now. We have about exhausted our reading. Biederbick reads a little out of Nordenskiöld's book (expedition to Spitzbergen) every few evenings. We talk a great deal about food. How often my thoughts wander homewards to the dear ones there. It is now very light near all night. Connell is going to try fishing pretty soon. Frederik, Eskimo, still complaining and confined to the house.

April 3.—Barometer, 30.67 [779.00^{mm}]; thermometer, −8 [−22.2° C.]. Breakfast—tea, 1¾ ounces of bread, 1 ounce of bacon, and 4⅔ ounces shrimps per man in a stew. Supper—same as breakfast, with the addition of 1½ ounces of dovekie, and ⅔ ounces of shrimps. Rice took Salor down to teach him his way of catching shrimps. Salor is to relieve Rice when the latter goes after the English meat Sunday. They are to have 8 ounces pemmican, 6 ounces of bread, and 6 ounces of alcohol per man per day, for six days. Jans [Jens] saw a bear track to-day. Long saw only a few dovekies. He got none of them, but two ptarmigan near the house on his way back. Brainard went out to-day for ptarmigan, but got none. I have not felt very well to-day; felt chilly and out of sorts.

I am losing my appetite for these shrimp stews. Biederbick and one or two others complain of the same thing. Rice and Salor got 15 pounds of shrimps to-day. Weather very fine to-day excepting light wind from the west. During the forenoon at several times the thermometer in the shade showed −8 [−22.2° C.], and at the same time +15 [−9.4° C.] in the sun. The Greenland shore was very distinct to-day. Brainard counted the rifle cartridges to-day and found 550 on hand and 75 shot-gun cartridges. We have now on hand about 130 pounds of meat, all counted, excepting shrimps, and about 80 pounds of bread, so Brainard tells me. About 40 pounds or thereabouts of stearine remains. Frederik, Eskimo, seems in very low spirits. He says he will not get well. Snow in the vicinity of house packed very hard.

April 4.—Barometer, 30.59 [776.97^{mm}]; thermometer, −3 [−19.4° C.], about. Breakfast—stew of 4 ounces of shrimps, 1¼ ounces of bread, 1 ounce of bacon, with a cup of tea. Supper—stew of 5 ounces of shrimps, 1¼ ounces of bread, 1 ounce bacon, 1⅔ ounces of dovekie, and a cup of tea. Morning reported fine in the morning, but changed suddenly, becoming overcast; afterwards the weather got better. Long and Jans [Jens] out for awhile; but they got nothing. They saw a seal, however, but only three dovekies. Salor was out in place of Rice and got 20 pounds of shrimps. I find it takes an effort to get these shrimps down, and from one meal to another I have a bad, fatty taste in my mouth. I have not felt quite as well yesterday and to-day as before. This evening I have taken Ellis's place in the sleeping-bag. He has mine. Brainard went down to Sabine to-day; saw a bear-track quite fresh and followed it to the broken ice. Reports open water extending up and down the straits—north as far as Cape Napoleon. Frederik, Eskimo, was given a slight increase of rations.

April 5.—Barometer, ———; thermometer, −6 [−21.1° C.]. Frederik Christiansen died to-day. Breakfast this morning—1¾ ounces of bread, 1 ounce of bacon, 4 ounces of shrimps, and cup of tea. Supper—5 ounces shrimps, and 1⅔ ounces ptarmigan, otherwise same as breakfast. Salor brought in to-day 12½ pounds of shrimps. He only worked one net to-day or he might have got more. Long, Kislingbury, and Jans [Jens] out hunting, but got nothing nor saw anything. The ice has moved up again near shore, but there is still a great deal of open water. Very fine weather to-day, mostly calm, with a slight wind at times. Sun shining brightly. Whisler put two windows in the boat to-day; it makes a great difference; everything seeming much more cheerful. One can now see something inside here.

Frederik Christiansen, Eskimo, died unexpectedly to most of us at 9 a. m. this morning. He was taken suddenly worse last night, and everything done for him that suggested itself, I believe. He has been failing for some time past, but still I did not think there was any danger of his death. He was a good man, and I felt a great affection for him. He constantly worked hard in my service, and never spared himself on any sledge trip. He was buried near Cross at 1 o'clock to-day. His death makes me feel very sorrowful. I felt a great difficulty for some time past in eating shrimp stews, and had to force it down to some extent. Fortunately, Jans [Jens] and I are the only ones affected in this way. To-day I had two passages—the last of the nature of diarrhea. I find myself still weaker. To-morrow morning I may be cut off.

April 6.—Barometer, ———; thermometer, −2 [−18.9° C.]. Breakfast—the usual stew for the party, but I had no shrimps issued to me, which in lieu thereof I had about 4 ounces of dovekie, which I ate raw. Supper to-night consisted of stew of 5 ounces of English pemmican with the usual amount of bread. Tea at both meals. We now have two windows in the top of the boat; it makes a very cheerful change. Salor got 15 pounds of shrimps to-day between noon and dinner time. The hunters shot two seals in the water and two dovekies, but got nothing. I had a very loose passage this morning in the nature of diarrhea. Poor Linn is worse to-day. He has been unconscious since about 1.30 p. m. It is now about 5 o'clock. We are all doing our best to keep up our spirits. Rice and Frederick will leave this evening. We all complain of being much weaker since eating these shrimps exclusively. I find myself particularly so; am hardly able to rise without aid. I find to write these notes to-night requires a great effort. Brainard, Kislingbury, Ellis, and Whisler went down this afternoon and pulled the small sledge to the top of the rocks or hill to the south, so as to save Rice that much work. The doctor gives me iron and also opium to-day. Our talk is constantly about food or the delights of home. Lights are done away with, now that we have windows. Snowing slightly this evening. Day calm, though slightly overcast. Jewell gave out to-day and was unable to cut ice.

April 7.—Barometer, X; thermometer, −7 [−21.7° C.]. Breakfast—stew of 6 measure cups of shrimps, 1 ounce of bacon, and 1¾ ounces of hard bread, and a cup of tea. Supper—stew of 7 measure cups of shrimps, 1 ounce of bacon, and 1¾ ounces of hard bread, and a cup of tea.

Sergeant Linn died at 7 p. m. yesterday. He was unconscious since 2 o'clock in the afternoon. He was buried to-day by the side of Cross at 9½ this morning. It seems he felt his end approaching and gave some direction regarding his last wishes. His death was a good deal of a surprise to me. His death has cast a gloom on the party during the day. He was much liked and highly spoken of by all. The burial service was read here at the hut by Lieutenant Greely, and then the body taken to the cemetery on the sledge by Lieutenant Kislingbury, Brainard, Connell, Dr. Pavy, Biederbick, Schneider, and Salor. No volley was fired over the grave, as was done with Cross. Rice and Frederick left for Eskimo Point to get the English meat in Baird Inlet at 9 o'clock last night. They took the small sledge; expect to be back on

Saturday. To-day has been overcast and snowing, but the temperature high—no wind. I find myself almost as weak as ever again. I have not been out to-day nor yesterday. I took a little exercise in the hut to-day. Had a few ounces of dovekie issued to me last evening and this morning in addition to the regular fare. The hunters have made slight addition. We all had a drink of alcohol to-day, made up by Biederbick of 2 parts of water and 1 of alcohol, flavored with a little ammonia, the only thing Biederbick had to put in. Jewell is much weaker to-day.

A.

Lieutenant Lockwood discovered Greenland to be seen northeast for at least 10 to 15 miles beyond the highest point reached (Lockwood Island), latitude 83° 24′, longitude 40° 45′, thus attaining the highest latitude ever made. Lieutenant Lockwood in 1883 failed to reach Cape Bryant, owing to open water in Polar Ocean, and from same cause Dr. Pavy failed in 1882 north of Cape Henry. The commanding officer made important discoveries by two trips into the interior of Greenland in 1882. In 1883 Lieutenant Lockwood crossed Greenland, from Patrick Bay to Greely Fiord, and reached in latter fiord 80° 48′ north, 78° 30′ west, and saw land running south of west about 60 miles, ending in Cape Lockwood. The north side ended about 10 miles west, and from Lieutenant Greely's observation from Mount C. A. Arthur, 4,500 feet [about 1,370^{m}] high, evidently crosses gradually to extreme point seen by Lieutenant Walbridge (?) [Aldrich, R. N.]. The party all well and consists of 25 men, all confident of ultimate safety. Conybeare Bay opens into H [Chandler] Fiord, and thence by R. [Ruggles] River to Lake Hazen, a body of water about 60 by 7 miles in extent. Greenland [Grinnell Land] is ice-capped north and south, except a band of vegetation about 30 [60] miles wide from sea to sea. Eskimo have permanently lived at the junction of Lake Hazen and R. [Ruggles] River and other points. Musk-oxen in quite large numbers found in this land. The coast northwest of Cape Britannia (Nares Land) has been named Hazen Coast; the extreme point north, Cape Robert Lincoln [Washington]; and the range of mountains to the west of Greenland, Garfield Land.

The mean temperature at Fort Conger, 1881–'82, was −4.95 [−20.5° C.], the lowest ever known. The temperature of −0.7 [−18.2° C.] was observed in August, 1883, off Bache Island.

Three further records may be looked for in Brevoort Island, and in coal pile in Littleton Island, or at depot B, of 1882; latter the north side of island.

A. W. GREELY,
Lieutenant, Fifth Cavalry, Lady Franklin Expedition.

B.—Copy of record for Cape Isabella.

Camped south side Newton Glacier, October 11, 1883. Notice left by Lieutenant Greely's party retiring from Fort Conger. Left Fort Conger August 9, with steam launch, Lieutenant Greely, and three boats. Beset, August 26, 1883, in 79° 24′ north latitude, and about 74° west longitude, and after strenuous efforts to reach land, reached shore here with boat and sledge and 35 days' rations, September 29th.

Sergeant Rice visited Sabine, and learned that S. S. *Proteus* sunk in Buchanan Straits July 23, 1883. Winter quarters have been built here, but will be moved to wrecked [wreck] cache between Cocked Hat Island and Cape Sabine, as there are about 1,300 rations, except fuel, near there. Those rations will be made to last until April 1, 1884. If nothing is heard from Littleton Island by March 10th, the party will cross to that point and depend on cache B and hunting, or with the Eskimo below until relieved. Records and pendulum will be left on Brevoort or Littleton Island, according to circumstances. Lieutenant Garlington and *Proteus* crew all saved; left Brevoort Island, July 24th, to communicate with the United States Steamer [Yantic], or British steamer. Sergeant Rice, who discovered Rice Strait, running from Rice Bay to Cape Rutherford, making Sabine an island, will make a second dangerous trip to Isabella to ascertain the amount of English meat, and whether the American steamer has left anything, in addition, in 1882.

C.—Order ticket by Lieutenant Greely.

NORTH SIDE BAIRD INLET, *September* 30, 1883.

To Lieut. J. B. LOCKWOOD,

Twenty-third Infantry, Commanding Second Officer:

SIR: You will proceed to-morrow morning with the English sledge and nine men to Cape Sabine for the purpose of bringing back the depot of 240 rations left there by Nares, provided that this is the only depot there. In case other rations are found there, you will bring back only such few necessaries as we may require while moving the whole of the party up to that place. You will also have the records, &c., furnished [cached] on the site of the English cache. One of the two tin cylinders containing records will be left at the English cache and the other in the English cairn on the island of Brevoort.

D.—Memorandum, September 19.

Sergeant Brainard thinks we should remain here until the first favorable opportunity.

Sergeant Rice thinks that we can take greater chances of reaching the Greenland shore than we can to reach Sabine, but at present sees no opportunity or encouragement to move in either direction.

Minutes, September 24.

Lieutenant Kislingbury does not advise moving to-day, on account of the unsettled condition of the ice, the wind, and the lateness of the hour; and thinks it will be better to wait a few days longer in the hopes of getting a lower temperature, and the ice pressing together.

Dr. Pavy recommends crossing the lead, with the English boat, and reconnoitering, with a view of reaching the whale-boat, owing to the great importance of recovering it.

Sergeant Brainard agreed with the doctor in the plan of reconnoitering.

Sergeant Rice thinks we all ought to be moving to-day, but that the lateness of the hour, and the weather being unsettled, to agree that those who desire to get on the floe with the whale-boat, if possible, to have the kayak sent out.

Lieutenant Lockwood advises moving at once, at least to the body on the floe next to the west, and either reconnoiter with a view to reaching the whale-boat or doing something else.

E.—Memorandum.

Cape Isabella—cairn 700′.—Few cases preserved meat—300′ magnetic west of cairn. About 144 pounds of meat.

Minutes, September 19.

Question to Lieutenant Kislingbury: "If we miss Brevoort Island, do you think we can land to the south of Brevoort Island?"

Answer: "It is a question I cannot answer with certainty."

Lieutenant Lockwood answered the same question, that he could not say; it was a matter of chance of the drift.

Dr. Pavy answered: "I will see after we are a mile from Cape Sabine."

Sergeant Brainard replied to the same question that he thinks there will be some chance of reaching shore south of Brevoort Island in case we find it within a mile or so.

Sergeant Rice thinks there are some chances of reaching the shore off Brevoort Island, as the coast above Cape Isabella was reached.

Kislingbury amended his opinion that there are chances of making the west shore at the north of Cape Isabella.

Lieutenant Greely: "If the party passes Brevoort Island, I think it almost impossible that Cape Isabella—the most favorable point—can be reached."

Lieutenant Kislingbury advises making no move for the present, but wait for the floe to set in to some fixed position.

Dr. Pavy's opinion is to remain here until something develops itself.

F.—*Minutes, September 25.*

Lieutenant Greely endorses reduction of rations, and thinks it would be best to wait a day or two and see what the drift does, and in the mean time keep close watch on it by examining the neighboring floes.

Dr. Pavy endorses reduction of rations. Thinks the ice should be immediately examined, and thinks that if the ice is found practicable we should move at once to the southwest.

Lieutenant Lockwood endorses the reduction of rations. Thinks we should wait a day or two until some knowledge of the drift is ascertained.

Brainard and Rice are substantially of the same opinion as the last.

Sergeant Brainard thinks we should wait over the spring tides.

Lieutenant Greely thinks nothing should be done until the spring tides are passed.

G.—*Miscellaneous Memorandum.*

July 25, 1883. Pieces washed by Cross to date, per Mem. Book	20
July 24, 1883. Pieces washed by Jans [Jens] to date, per Mem. Book	67

Reward offered by me to Greenland sledge party: $450 in all, one-fourth to Brainard, and four-sevenths of the remainder divided equally between Ralston, Linn, and Elison; the remaining three-sevenths divided equally between Jewell, Salor, and Frederik. I promised Frederik, Eskimo, 100 crowns.

Latitude SE., island, Carey group, 76° 42′. Longitude, 72½°.

Hakluyt Islands probably best place to take departure from. It is 34 miles distant, about.

Sept. 15, 1883.—I wonder where I shall be this day 1884—if in this world or in another.

H.—*Left behind at Fort Conger.*

Seal-skin coat lined with doe-skin	10
Old walking coat	15
One suit of chamois-skin	12
Seal-skin footstool	2
Musical instrument	10
Pair of shoes	2
Trunk	10
Suit of merino shirt and drawers	15
Several pairs of socks	3
Vest	6
Two blankets	8
Scents [cologne, etc.]	5
White shirts, cuffs, collars, &c	10
Hat	2
Sleeping boots, &c. (should be paid for out of signal appropriation)	10
Miscellaneous	10
	130

SERGEANT BRAINARD'S JOURNAL FROM BESETMENT.

APPENDIX NO. 124.

Extract from the journal of Sergeant David L. Brainard, from August 26, 1883, to June 21, 1884, inclusive.

* * * * * * *

Sunday, August 26, 1883.—Israel and Whisler, who were on watch at the time (2 a. m.), reported a movement in the ice highly favorable to our wishes. We immediately started, and, rounding Cape Louis Napoleon without serious opposition, entered Dobbin Bay, where we found shelter in a snug little harbor not far from the cape. The weather was exceedingly cold and disagreeable, and here we were forced to remain until 10 a. m., on account of a dense fog which obscured everything beyond our immediate vicinity. The fog at that time was less dense, and our course towards Cape Hawks was shaped by the compass. The bay was comparatively free of ice, and its southern limit at Cape Hawks was reached in about four hours' steaming. After some difficulty the cache of English provisions was found by Lieutenant Greely and Connell. The greater part of the bread was moldy and much of it was entirely ruined. The amounts collected in the aggregate were about 300 pounds. Of other articles there were 168 pounds of desiccated potatoes, 3 gallons rum, and 1 small keg of onion pickles. Rice, who had been dispatched to Washington Irving Island with his boat, the *Narwhal*, to examine the cairn on its summit for records, returned with the discouraging report that it had not been visited since August, 1881, when we passed up the coast in the *Proteus*. He left a brief note in the cairn descriptive of our retreat from Fort Conger. He reported that the ice in the direction of Cape Sabine appeared favorable for being navigated by a ship. At 4 p. m. we resumed our course to the southward, Rice being designated by Lieutenant Greely to act as steersman of the launch. He proved more skillful in this capacity than any one who had preceded him at the tiller. It is but natural that our minds should now be haunted by gloomy thoughts. Where is the ship which we have been looking for so long, and which we confidently expected would meet us ere this? She is either lost in Melville Bay or else in this pack. If a naval vessel has been sent to our relief she would not dare to enter this ice, and she is probably now at Littleton Island, awaiting our arrival.

After rounding Cape Hawks the coast was abandoned and our boats steered directly for Cape Sabine, which stands out boldly fifty miles to the southward. The lanes which we followed soon closed in consequence of a general movement in the pack, and our boats thus checked were tied up to a floe, which had a sluggish southerly drift. It is evident that very few storms have visited this locality during the summer, as the absence of abrasion of the floe-edges is particularly noticeable. It has been a beautiful afternoon, with a clear and cloudless sky and bright sun. The temperature fell to + 18 [− 7.8°C.] this evening, and ice was rapidly formed in consequence. Snow has fallen to a depth of two feet [.6^{m}] at Cape Hawks this year. Rice was again accidentally thrown from his boat to-day and was thoroughly drenched in the sea.

Monday, August 27, 1883.—The boats were firmly frozen into the floe this morning and covered with a thick coating of frost. All our efforts to extricate them were unavailing. It was a beautifully clear morning at 4 o'clock, but at 7 we were enveloped in a dense fog which approached us from the north. The pack is firmly closed and no indication of its scattering is apparent. It appears, however, to have a slight

northerly movement, but the change in our position to-day has been inconsiderable. The flowing tide evidently overcomes the southerly current, and the direction of the drift is thus changed for brief periods each day.

Our position, as determined by Israel, from astronomical observations, is in latitude 97° 22′ north; longitude, 73° 00′ 05″ west. Lieutenant Greely addressed the party briefly this morning, to allay serious apprehensions of danger in our present situation, and to explain his reasons for leaving the land to enter the pack.

Gardiner reports having seen several narwhals in a pool near our position. As the date of our escape from this pack is now a matter of conjecture, I asked Lieutenant Greely to make a reduction in the issue of provisions, in order that they should be extended, but he would not accede to my request.

We rigged a tripod on the floe this evening, on which a flag was placed. It can be ascended to a height of fifteen feet [4.5^{m}], and will afford us an extensive view over neighboring floes. The ice formed over an inch, [25.4^{mm}] in thickness last night. On a small paleocrystic floe, not far from where our boats are hauled up a small pool of fresh water has been found which will supply our party with an unlimited quantity for some days, and in consequence permit us to economize in the use of fuel. A clear, beautiful evening. The temperature fell to +12.5° [−10.8° C.] at 11 p. m.

Tuesday, August 28, 1883.—The pack in which we are imprisoned drifted slightly to the north and east during the night. A southerly motion has also been detected, and we are now pretty well satisfied that our movements are subject to the caprices of the tides. The pack opened slightly last evening, but before we could make any preparation for our departure it had closed again. If the ice is not broken, and the pack thus opened by a gale or by the tides within ten days, to facilitate our movements, we will be compelled to seek safety in abandoning everything except our provisions and the twenty-foot [6^{m}] ice-boat and make a dash for Littleton Island. The new ice is now three inches [76.2^{mm}] thick, and is strong enough to support Connell, who walked over its surface this morning. It has been a bright, pleasant day, and through the clear atmosphere the coast of Greenland to the south and east could be distinctly seen. A well-marked drift to the south was observed during flood tide to-day. Adversity in its worst form would not, I think, be sufficient to depress the spirits of our men. Our situation is desperate. Any moment this ice may crumble beneath our feet and crush the entire party in its icy jaws; but notwithstanding this danger the men, while on the floe exercising this evening, danced and sang as joyously as they would have done in their own homes. They are indeed irrepressible in the face of all this uncertainty, perhaps starvation. The icy grasp of winter is now rapidly encircling us. Something must be done soon.

Wednesday, August 29, 1883.—The weather has continued cloudy and the temperature has remained high all day. The drift continues, but the progress southward is not perceptible to the eye alone. By the aid of compass bearings, however, Israel places the approximate distance of our southerly drift at three miles. Lanes opened out through the pack in the direction of Cape Prescott this morning, but we were unable to get to them owing to intervening ice. The change of tide caused them all to close again. Our time is passed drearily enough in reading, sleeping, and eating. The sergeants in turn take tours of two hours each to watch the movements of the ice. The others perform no duty except that of cooking. The snow is from twelve to twenty inches [.3 to .5^{m}] in depth on the floe. I am fearful that we will find this a serious impediment if it should become necessary for us to abandon the boats (except one) and travel across the floe towards Cape Sabine. Jewell saw a small white fox prowling about the boats early this morning, but before a gun could be secured the little rascal had sniffed danger in the air and disappeared from view. These little animals are often seen on the floe in this manner, far from land and with no apparent purpose. They must secure a very precarious living on these desolate and barren ice-fields. I believe that the English expedition of 1875–'76 shot one on the ice in this vicinity.

Thursday, August 30, 1883.—The drift from midnight until 10 a. m. was about one mile to the northeast. It then turned and drifted to the southwest for a distance of one and two-tenths miles in a short time. At noon we were in latitude 79° 20′ north, longitude 73° 45′ west. The minimum temperature for last night was +11.8 [−11.2° C.]. No party has ever experienced so low a temperature in August. The day has been clear and beautiful, but just before midnight clouds obscured the sky. Numerous water-spaces are visible to the north and east of our camp, and the dark clouds overhanging the southern horizon indicate also that there is an abundance of water in that direction. The cooks used the stearine lamps to-day for the first time and found that they worked in a very satisfactory manner. The length of time required to cook our meals with stearine does not vary materially from that consumed when alcohol is used for the same

purpose. I made an inventory of the provisions this evening and found that fifty-five days' supplies were on hand. These can, however, be extended for seventy days. Lieutenant Greely informed me that he would start with boats and sledges for Littleton Island as soon as the state of the ice would permit. Everything not useful to us, or in the least cumbersome, will of course be abandoned here or at the place where we make the final start. Before beginning the journey over the floe towards Littleton Island the pendulum and records will be cached, if possible, at Victoria Head. Their safety is a matter of deep concern to us.

Friday, August 31, 1883.—The day opened cloudy and with a light northeast wind. At 8 a. m. snow began falling, but about 2 o'clock in the afternoon it ceased. Temperature high for this season. Rain began falling during the evening rendering it necessary for us to hastily improvise rude shelters, under which we found only a partial protection from the elements.

The distance which our floe has drifted to the south during the last twenty-four hours, as estimated by Israel, is three miles. Very little inclination of the floe to the eastward has been noted.

Saturday, September 1, 1883.—Cloudy weather prevailed during the morning, and a dense fog hung over the coast with Victoria Head visible above it. During the afternoon, however, the weather was bright and cheerful and the temperature comparatively high. We are still drifting gradually to the south. Our latitude to-day, as determined by Israel, is 79° 19′. The longitude does not differ materially from that obtained at the last observation. At 2.15 p. m. the northern ice-pack came charging down on our unprotected floe, shattering like glass the ice which opposed its formidable front and heaping it in great quivering and groaning masses about us. Our boats were hauled up, but none too soon; a moment later and they would have been nothing but a bundle of splinters. The relentless pressure opened wide seams in the floe on which we were encamped and severely nipped *Lady Greely*, which was anchored to the ice near us. She did not succumb to the measureless force as we had expected, but rose grandly as the pressure increased, and stood upright high above the water in the cradle formed for her by the grinding ice. At 6.30 p. m. she gradually settled into the water again, the ice having slackened at the turning of the tide and the pressure in consequence removed. About 11 p. m. she sustained another nip from a sudden movement in the floe, but as on the former occasion she rose nobly under the severe strain and remained uninjured. Dense water-clouds of inky blackness are hovering over the horizon to the north and east. A great expanse of water is also supposed to exist near the coast.

Our two natives, Jens and Christiansen, each killed a seal to-day. A good-natured spirit of rivalry in the matter of hunting exists between these faithful fellows. It is suspected that Christiansen, whose blood has been freely intermingled with that of the Danes, often takes an unfair advantage of his darker brother. As an incentive for them to hunt, a drink of rum is given them whenever a seal is killed. Six other seals were seen in a pool not far from our floe, but none were shot. No portion of these animals is lost; even the blood is now considered a luxury, and is eagerly sought for by nearly all of us, and is swallowed without the slightest feeling of repugnance. If drank warm it is very palatable, and in flavor not unlike uncooked eggs. It possesses excellent qualities as an anti-scorbutic. During the evening several individual lanes of water appeared in our vicinity, but as none of them were connected with the pool in which our boats were lying at the time, no attempt was made to reach them. It is observed that ice forms over these pools in an almost incredible short space of time. Our boots are in a most wretched condition, and we refrain from walking about as much as we otherwise would on this account. The greatest discomfort that we are called upon to endure is the constant dampness of our feet because of this defective foot-gear. The only damage sustained by our equipment during the confusion this morning was the crushing of two small alcohol cans, which very fortunately contained none of the valuable fluid.

Sunday, September 2, 1883.—I went on watch at 4 a. m., at which time the launch had settled quietly down in her bed through the loosening of the ice, and appeared to be none the worse for the severe squeezing to which she had been subjected by the pack. The fog cleared away at 5 a. m., permitting us to obtain an excellent view of our surroundings. Our southerly drift since yesterday has been estimated at over three miles. The *Lady Greely* was lifted frequently in her bed to-day by the spasmodic pressure of the ice, but no injuries were received. Our floe, which is only of one year's growth, is slowly but surely crumbling away from beneath us by the tremendous pressure from the northern pack, which is influenced by the currents and tides. An opportunity occurred last night for changing our position a short distance, but it was not taken advantage of. At 11 p. m., however, we moved to another floe, which is larger and thicker than the first, and which we trust will withstand the disastrous effects of a gale. The barometer is falling rapidly. Maximum temperature, +32.2 [+0.1° C.], minimum, +23.5° [−4.7° C.].

Monday, September 3, 1885.—On rising for breakfast this morning, I was much surprised to observe the remarkable progress southward which our floe must have made during the night and this morning while the coast was hidden by a dense fog. Such favorable results in our drifting always produce an upward tendency in the "social barometer" of the party. We do not, however, lose sight of the dangers by which we are surrounded, nor the uncertainties of our position.

A meridian altitude placed us in latitude 79° 15′ N. From compass sights taken during the afternoon it was ascertained that we had drifted with the flood tide to the northward two miles in four hours. A few water pools appear in our immediate vicinity, but to the north, east, and west the floe, to all appearances, is firm and compact. A thick fog veiled the coast during the evening. Some sharp criticisms, which were made by Lieutenant Kislingbury on our present inactivity, were overheard and objected to by Lieutenant Greely. He (Lieutenant Greely) soon afterwards directed me to summons Lieutenants Lockwood and Kislingbury, Doctor Pavy, and Sergeant Rice for a consultation as to the best method of proceeding to land. I was also directed to be present. On invitation by Lieutenant Greely the following recommendations were made: Lieutenant Kislingbury advised that we abandon the launch [*Lady Greely*] and the English jolly boat *Valorous*, and taking the two remaining boats move them across the intervening spaces of water, from floe to floe, to Albert Head, and thence across Buchanan Strait to Cape Sabine. Doctor Pavy would take one boat and proceed in the same direction. He agrees with Lieutenant Kislingbury that the start should be made to-morrow, or as soon thereafter as practicable. Lieutenant Lockwood was of the opinion that it was particularly desirable to reach the shore as quickly as possible, but was not prepared to pass judgment for final action. I did not advise a movement in the present unsettled state of the pack, but would wait until the end of the month, or until the floe had cemented sufficiently to admit of our traveling over it with our heavy loads. In the meantime we would be drifting slowly to the south. When the retreat began I was of the opinion that only one boat should be taken, and that the party should endeavor to reach Cape Sabine. If no considerable quantity of provisions were found there, to divide the party, sending the strongest to Littleton Island with the boat. Rice made substantially the same recommendations that had been made by me. As a result of this conference, Lieutenant Greely decided to remain here until the new ice had cemented the floes together sufficiently to admit of our traveling with facility over them. In the meantime we would take advantage of any and every opening in the ice which would permit us to move southward.

Whisler was discharged from the service and re enlisted to-day.

Tuesday, September 4, 1883.—Our floe continues to drift slowly to the southeast under the influence of the currents. Snow has been falling steadily all day, rendering the condition of the party absolutely wretched.

Frederick, Schneider, and myself, with the assistance of a few others who were to receive the benefits, constructed a "tepee," after the model of those used by the North American aborigines. By crowding closely, it can be made to accommodate sixteen men. The other nine will find shelter in Connell's boat, over which a housing will be placed. Jens was fortunate enough to shoot another small seal to-day. While on duty this evening I observed a movement in the ice and saw a small lead opening. This I at once reported to Lieutenant Greely who ordered the party aroused. Rice ascended the "lookout," and reported the lead in favorable condition for navigation by our boats. Started at 9 p. m., and after working for a short distance through stream ice, we entered a lead which ran in the direction of Cape Albert. After pushing ahead for little more than a mile, the lead closed and our boats were hauled on the floe, and all except the solitary watch retired at 11 p. m. During the brief trip the launch was towed by the boats. This was made necessary by the displacement of her fan (propeller), which occurred yesterday while undergoing the terrific pressure in the pack. Cross and Elison began work on two small sledges, with which, in addition to the large English sledge, we will endeavor to make our escape from this inhospitable floe to a more congenial region. The interior wood-work of the *Lady Greely* will be sacrificed for sledge-runners, and barrel staves will be converted into cross-slats.

Wednesday, September 5, 1883.—A bright, beautiful day, just the opposite to yesterday's dreariness and discomfort. At the breakfast hour we were just abreast of Victoria Head, but at dinner time we were far to the south of it. Paradoxical as it may appear, we drifted southward during the flood-tide when we should have been moving northward. Light southerly winds have prevailed all day. During the last few days the temperature has been ranging from +30 [−1.1° C.] to +11 [−11.7° C.]. No colder weather was ever before experienced by any party, at this season of the year. At noon our position was in latitude 79° 8.6′ N.—a drift of six miles in two days, making all due allowance for the distance gained by boat last evening.

Jens amused himself, as well as the party, by firing shot after shot at a small seal which did not even appear frightened at the noise going on around it. I placed our flag on one of the long masts and planted it firmly in the large knoll which rises from the center of our small paleocrystic floe. If friends are in our vicinity they cannot help seeing this conspicuous signal. The conduct of the men since we have been in this unfortunate plight is above all praise and compliment. They are to be highly commended for their unselfishness, and for having the happy faculty of making the best of everything, even under the most trying circumstances. When we were first imprisoned in this treacherous pack, I had expected to hear repinings and lamentations without end, but, to my surprise, matters are just the contrary. Certainly an ill-tempered remark may occasionally be heard, but where will we find any large party like ours without blemish? Good-natured chaff, hearty, ringing laughter, and snatches of song may be heard at almost any time from this irrepressible little band. Most bodies of men placed in these circumstances would have become discouraged and depressed, and probably would have lost all interest even in matters pertaining to the saving of their lives.

Thursday, September 6, 1883.—Cloudy weather during the morning, with fresh southwest winds prevailing. At 2 p. m. snow began falling, and the wind changed direction to the northwest, and increased in velocity almost to a gale. A small water space opened during the night, but as it did not extend more than three hundred yards [274^{m}] from our position, and as nothing could be gained by moving that distance, I did not disturb Lieutenant Greely, who at the time was sleeping. The Greenland coast, east of Cairn Point, was visible, owing to the very clear atmosphere, at 1 a. m. The sun appeared for a few hours this morning, and under its genial influence the temperature rose to +13.2 [−10.4° C.].

Latitude at noon was 79° 6.9′—a gain of 1.7 miles since 12 o'clock yesterday. A very opportune issue of rum was made this evening, when all were feeling the effects of the exposures and discomforts to which we have been subjected since leaving Fort Conger. Although the quantity issued was small, a stimulating effect was nevertheless produced, and many attempts at singing were made by the lovers of the "ardent." Long was fortunate enough to shoot a small seal this morning. The large iceberg which has been our constant companion for several days, and in which as a protector we had all confidence, is now likely to prove itself a treacherous friend. It is bearing down on our floe and may grind it to powder with its resistless force. The chances are, however, that it will strike one side of our small floe and simply revolve it without injury to us. We are ready to move at any moment. Shelters have been erected over the boats with the spare sails and the "tepee" canvas.

Friday, September 7, 1883.—A northeast gale accompanied by snow was in progress from midnight until 1 p. m. The sky then cleared and the sun shone brightly during the remainder of the day. The gale of this morning has accelerated our drift greatly, and at the same time inclined us towards the land. We passed abreast of Cape Albert at a distance of not more than four miles, but no means of escape presented itself. At noon we were in latitude 79° 0.6′, a drift of six and three-tenths miles during the last twenty-four hours.

I was somewhat surprised this morning when on looking at the original record, and tracing it back to August 30, to find the barometer at that date standing at 30.17 [766.30^{mm}]. To-day it indicates 29.22 [742.17^{mm}], a fall of nearly an inch [about 25^{mm}] in eight days. Since 1 a. m., however, it has been rising slowly and steadily.

Since we have occupied this floe, fresh water from the surface pools has been obtained in sufficient quantities to supply all our wants in that direction, but to-day the last of it was used or congealed, and the melting of ice to furnish us with water was resorted to. At a late hour this evening, however, another pool was found on an adjoining floe, which for the present will obviate the lavish use of fuel in melting ice. Our southerly drift appears to have been arrested since yesterday noon. The reason assigned is that the pack south of our floe rests firmly against the land, where it was driven by the gale this morning, and that the intervening ice is so compactly pressed that no further movement is possible. The land near Cocked Hat Island is evidently about fourteen miles away. From five to six o'clock this evening the thermometer fell ten degrees [5.6° C.], and at the end of the following hour it had fallen four degrees [2.2° C.] more.

Saturday, September 8, 1883.—A beautiful morning, bright, clear, and calm. Stars were seen last night for the first time since last spring. The light was very dim and uncertain at midnight. Connell encountered a walrus sporting in a pool not far from camp, and fired eight shots into him without effect. It appears that the Springfield bullet cannot penetrate their armor-like hide. Connell says that the balls glanced off his skull as they would have done had they been fired against the rounded surface of a rock. The temperature fell last night to −0.8° [−18.2° C.], something quite unknown in these regions at this period of the year.

Our latitude is just the same as yesterday. This fact confirms the opinion which I expressed yesterday in my notes that the pack south of us rested against the land in the vicinity of Cocked Hat Island, thus preventing any further drift in that direction. Ice is forming rapidly about us; the pools are all covered, and the floes will soon be cemented together so firmly as to render traveling feasible. By the direction of Lieutenant Greely I had the sledges lashed together. There are three in number—the large twelve-man sledge brought from Fort Conger, and the two small ones just constructed by Cross and Elison.

Lieutenant Greely says he will abandon the *Lady Greely* and the *Valorous*, and, taking the other boats, with sledges and supplies, endeavor to reach the land in the vicinity of Cocked Hat Island. It is his intention, weather permitting, to start as early as day after to-morrow on this hazardous and difficult journey.

I am going out to-morrow with Christiansen for the purpose of selecting a route for the sledges through the broken and rugged surface of the pack towards land and—safety. I expect this duty to be of rather a dangerous nature, considering the treacherous condition of the pack, but with faithful Christiansen as a companion and counselor, I fear nothing. An issue of rum was a welcome addition to our evening rations. The ice in Buchanan Strait does not appear to have broken up this year. If we are not deceived in our opinion in this matter, it is no wonder to us now—it is no longer a mystery—why the relief ship did not reach us in August. This sort of ice would preclude the advance of any vessel, no matter what her capabilities were for ice navigation. Standing on the summit of a lofty iceberg, we had an excellent view of the ice-pack to the south, and, as a result of our observations, concluded that the floes in the direction of Cocked Hat Island offered greater facilities for traveling than those toward Cape Sabine.

A rough estimate of our constant weights place them at about 6,000 pounds. This includes provisions and ammunition, as well as those articles of our equipment designated as "constant."

Sunday, September 9, 1883.—Nothing has been done to-day owing to the wretched weather. I did not even start out as contemplated to select a road, on account of the hazy atmosphere which concealed the coast from view. The temperature is ranging from +17 [−8.3° C.] to +10 [−12.2° C.] and the barometer has an upward tendency. Fresh northwest winds prevail, accompanied by snow. The large sledge was completed to-day. Dense water-clouds were observed over and southwest of Cape Camperdown. This fact leads us to believe that we were in error after all regarding the breaking out of the ice in Buchanan Straits.

Lieutenant Greely again held a consultation with the same commissioned and non-commissioned officers as before, and as a result of this meeting he decided to start to-morrow morning. The principal reason for calling us together is to get our ideas and opinions generally, but more particularly with reference to the details of loading the sledges and handling the boats.

Monday, September 10, 1883.—The *Lady Greely* and the *Valorous* were dismantled and abandoned. A brief record of the events of our unparalleled retreat to this place was deposited in each. The mainmast of the *Valorous* was placed in position, and from its top a signal flag was left fluttering in the wind to attract the attention of relief vessels should they pass in this vicinity.

Lieutenant Greely conceived the idea of taking packs and endeavoring to reach Cape Sabine by traveling over the floe. He selected Jens (Eskimo) and myself to accompany him on this perilous undertaking, but before we were ready to depart the other officers came forward with objections to the proposed trip, on the ground that the commanding officer should always remain with his party; they however were willing, individually, to undertake the journey, but protested against the departure of the commanding officer. The enterprise was finally abandoned as impracticable under the circumstances.

Owing to the unsettled state of the weather we did not start until 1.45 p. m. I went ahead and selected a route through the hummocks, turning back after having traversed about one mile to assist with the sledge. The small ice-boat *Beaumont* and about 700 pounds of stores were taken on the large sledge at the first load. Following this came the two small sledges, four and six man respectively, at their drag-ropes. Before proceeding far both these sledges broke down although their loads were comparatively light. After hauling the first sledge about a mile, the load was deposited on the floe and the party went back for the whale-boat *Narwhal* and a few articles of baggage. The third and last load with the large sledge comprised the remainder of our property, including oars, ammunition, arms, and provisions. The weights of the three loads hauled on the large sledge is as follows: First load, 1,400 pounds; second, 2,000 pounds; and the third, 1,600 pounds. The small sledges were repaired by Cross and Elison after some difficulty, but they are still of doubtful benefit to us.

The last load reached camp at 7.15 p. m. We traveled five miles, but made good only one. The snow is very deep, and, as predicted several days ago, the labor of hauling the sledge through it is very

severe. One of the runners of the large sledge broke through the ice, but the sledge was saved without serious difficulty. Officers and men worked alike, and without distinction, in the drag-ropes. Rum was issued after entering camp.

Tuesday, September 11, 1883.—The morning was stormy, and light snow has fallen since yesterday. Notwithstanding the disagreeable weather, we started out with the first load at 8.40 a. m. I again advanced ahead of the party to select and prepare a road for the heavily-laden sledge.

Excessive thirst attends, and very naturally, the severe labors of the weary sledgers, but numerous pools are to be found at this season of the year on paleocrystic floes, over which we frequently cross. At these pools the party halt and partake of their refreshing waters. Were it not for these miniature lakes to provide us with fresh water while traveling the sufferings of the party from thirst would be intense. Three trips were made by the large sledge and about 1¼ miles were gained. A heavy snow-storm setting in warned us that it was useless to push farther to-day. We camped on a paleocrystic floe of great extent. At its southern limit is a large grounded iceberg, which Lieutenant Greely directed me to visit with the view of noting the conditions of traveling in that direction. Dr. Pavy accompanied me, by consent of Lieutenant Greely. Climbing to the summit of the berg, we could see a great expanse of new ice spread out before us, studded here and there with small rubble. This ice was not strong enough to bear the weight of our sledges, and it was, in consequence, pronounced impracticable for our purpose.

While standing on the berg and discussing the chances and probabilities of our escape from the pack, a school of walrus came to the surface, breaking the ice with their heads, and after making the air hideous with their discordant bellowing, disappeared from view.

We saw the tracks of a fox not far from the camp, leading in an easterly direction. While returning from our visit to the berg we heard the barking of a dog, which was repeated twice, but, to our great disappointment, saw nothing. The temperature ranges from +14 [−10.0° C.] to +17 [−8.3° C.].

It is my opinion that nothing can be done at present except to move to the edge of the floe and there await the action of the spring tides, or for the new ice to strengthen sufficiently to enable us to travel over it with our loaded sledges. On reporting having heard a dog bark, a gun was fired several times, and the flag, placed on the longest pole, was planted on the tallest of the dome-shaped ice formations near camp. A quantity of the matches having been left at the place where we abandoned the boats, Cross and Frederick volunteered to go back for them this evening.

Lieutenant Greely again held a consultation with the officers, Rice, and myself, for the purpose of eliciting our views regarding the most prudent course to pursue. The general wish is to go to the berg on the south side of this floe and there await the action of the spring tides, which occur in a few days. If the ice withstands the effects of the tides, it will certainly be strong enough to travel over, but should it be broken, then an opportunity may present itself for us to escape to land in our two boats. Lieutenant Greely favors a plan of traveling to the southeast by a series of floes which he thinks extends in that direction, and has directed Rice to make a reconnaissance of eight hours' duration in that direction to-morrow. We will not move to-morrow—at least not in the morning. Snow ceased falling at 1 p. m.

Wednesday, September 12, 1883.—Cloudy weather, light northeast winds, and a temperature of +17 [−8.3° C.]. Minimum recorded last night, +9 [−12.8° C.]. Rice started out towards the southeast to look for a road at 8.15 a. m. He was accompanied by Jens and Dr. Pavy. They returned soon after noon, reporting the traveling in that direction to be good. We at once began preparations for a move, and in a short time everything was ready for the journey.

On the recommendations of the officers, together with those of Rice and myself, the commanding officer ordered the whale-boat to be abandoned. The wisdom of this action is obvious. The sledge has been broken and is daily growing weaker under the weight of the whale-boat, which is 29 feet [8.8m] in length. The sledge is not quite fourteen feet [4.2m] in length, and it would be broken in pieces in another day. Such a calamity would prove a fatal blow to the party. Without a sledge we are helpless. In the boat a record of our fortunes and misfortunes was deposited, and a signal flag nailed to an oar, placed in an upright position, was left flying over it. After traveling two miles we reached the edge of the floe, where our first load was deposited, and the other was afterwards brought up to it. A wide crack at the edge of this floe does not augur well for to-morrow's work. A bear track was seen not far from our present camp, and Jens saw narwhals, seals, and walruses in our immediate vicinity, but he was not enabled to get a shot at them. A large lake of fresh water was found on this floe near the camp. Another council was called this evening, in which the officers, Rice, and myself were represented. A guard was detailed to watch for the bear, which is liable to visit us at any time. Latitude 78° 58′ 9″ north.

Thursday, September 13, 1883.—The morning was bright and beautiful, but the afternoon was cloudy. Minimum temperature, +17.0 [−8.3° C.]. With Jens as a companion, I started out in advance of the sledge to select a route through the hummocks. We saw several walrus and a few narwhals blowing in a pool which we passed. We also saw the bear's tracks again. They indicated by their freshness that his bearship had been prowling near the camp last night, evidently attracted by the odor arising from the food being prepared by the cooks. The first load started at 7.55 a. m. and advanced steadily for two hours, when it was unloaded, and the party returned for the second. Three loads were required to convey all our baggage, boat, &c., the last one arriving in camp at 3.35 p. m. Estimated distance traveled, 7 miles; made good, 1½ miles. Meridian observation places our latitude at 79° 56′ 00″ north.

The new ice is very thin and dangerous; small rubble is scattered over the surface which facilitates rather than retards the progress of the sledge. Once the left runner broke through the floe, but a hearty cheer from Rice, who was behind guiding the sledge, caused all who were in the drag-ropes to plunge suddenly forward, and with one great effort the load was safely landed on firm ice. In transferring a few articles across the crack mentioned yesterday, Bender made a misstep and fell through the ice, wetting himself to the waist.

Friday, September 14, 1883.—While on guard last night Gardiner saw a fox prowling about camp which was evidently anxious to ascertain the quality of our bacon. Jens and myself again went in advance of the first load for the purpose of selecting the best possible route through the broken pack. We were directed by Lieutenant Greely to take the best route to land, no matter at what point we would touch it; but if any two routes were equal in point of smoothness, to take the more easterly of the two, which would enable us to reach the shore in the vicinity of Cocked Hat Island.

The roar of the moving and grinding pack to the east of us, in the axis of the channel, is something so terrible—so awe inspiring—that even the bravest among us cannot appear unconcerned when it is heard. To add color to the scene of desolation on this floe, with the heaving and convulsive masses of ice about us, dark, portentous clouds are hanging over the horizon surrounding us, indicating that our floe is not connected with the land, as we had deluded ourselves into believing, but is drifting helplessly in the open sea; its movements subject to the caprices of the winds and currents. The small sledge broke down while crossing a band of rubble-ice, and proved worthless to us the rest of the day. This necessitated an extra trip with the large sledge. Made good one and one-half miles. Walrus were observed during the day. By 9 p. m. we had drifted for a considerable distance in a northeasterly direction, into Kane Sea, in consequence of a southerly gale which arose just before we reached camp with the last load this evening. In the last few hours we have lost more than twice the distance that we had gained by the severe toil of the last five days.

Saturday, September 15, 1883.—On rising this morning we learned that we were still drifting, under the influence of the gale, in a northeasterly direction. Cape Camperdown is nearly north of us now. Israel's observations at noon yesterday placed us in latitude 78° 55′ north, a gain of 1.9 miles in actual travel for that day. To-day we are in latitude 79° 01.8′ north; a loss of nearly seven miles of our dearly-earned ground. The severe labor to which we have been subjected in hauling the sledges over these almost interminable ice-fields has been for nought. We are miles farther away from land than we were before, and with no immediate prospect of regaining what we have lost! There is open water all along the coast from Cape Sabine to Allman Bay. It is the opinion of many that if we had followed our instructions closely, by confining our line of retreat to the shore, we would now be safe with our four boats in that large expanse of water. But this of course is only conjecturing, for, on the other hand, we might say that if we had entered Allman Bay for protection, in all probability our boats would now be frozen in there for the winter, and our situation equally as deplorable as the present.

The gale subsided at 4 p. m., and our position, by bearings, was at once determined by Israel. We are directly north of Littleton Island, and seventeen miles from Cocked Hat Island; consequently have lost about fifteen miles. The meat ration has been reduced from sixteen to twelve ounces. The temperature is quite high.

Sunday, September 16, 1883.—After the influence of the departing gale had ceased to be felt, the direction of our drift changed to southerly. We are now moving along in the midst of the polar pack, with the currents, which have a strong southerly tendency at this place.

At noon we were in latitude 79° 00′ 07″ N.—a drift of 1.1 miles since yesterday, and that in opposition to adverse winds and tides. We are about thirty miles from Cairn Point, and directly north of Littleton Island. The drift during the continuance of the gale was about twelve miles, instead of fifteen, as stated in my journal yesterday.

Rice and Jens went out this morning to inspect the ice, and on returning reported it impracticable for sledging just at present.

Another council was called by Lieutenant Greely this evening for discussing our situation. All those who had previously attended were present on this occasion. Dr. Pavy insisted that the only possible method of escape was to push forward to Cape Sabine at once over the broken pack. The others (including myself) recommended that no move be made just at present, but that we wait until after the spring tides—which are now at their highest—and until the floe, on which we are now living, takes some definite direction. Lieutenant Greely expressed himself as willing to abandon the pendulum whenever any member of the party should announce himself dissatisfied with hauling it. In this no one would concur, but all thought that it should be kept as long as possible.

I took an inventory of the provisions and found that full rations for forty days remained in store. The hunters were out all day on the ice in search for game. They report having seen bear tracks, and that a small seal was observed in a pool not far from camp. Christiansen shot a large seal this evening which will net us about 125 pounds of meat. A lead passing not far from our floe, and about three-quarters of a mile in width, extends two miles south of us. Its northern limit cannot be seen. Our floe is slowly but gradually settling back to the southwest—its former position—and at the same time it is revolving in the direction opposite to the movements of the sun. Hereafter no member of the party will be allowed to know the result of Israel's observations. Lieutenant Greely is of the opinion that the men would become discouraged if they knew that they were drifting adversely, and has given Israel orders to impart no information to any member of the party relative to our actual position, except to the commanding officer.

Monday, September 17, 1883.—Christiansen shot another small seal this morning. Our floe revolved in such a manner during the night that we are now facing in a direction just opposite to that in which we were facing last evening; consequently the trail made by us through the snow on entering this camp leads towards Cocked Hat Island instead of the north, as it did yesterday. Minimum temperature last night was +2.5 [−16.4° C.]. Our position at noon was in latitude 78° 56′ north. During the morning Rice and myself took an inventory of our rations and effects, and estimated their combined weight at 5,737 pounds. Several articles, and in fact all that we could spare, such as telescopes, shot-guns, tin-ware, &c, were eliminated from our equipment, and abandoned on the floe.

We started with our sledges at 1 p. m., as usual. I went ahead to prepare a road for their advance. The last load was not brought into camp until very late. A large crack in the floe at the camping place warned us that it would not be prudent to leave our load of stores on the opposite side while we went back after the others, so they were deposited on the floe on the same side as our last camp. After hauling up the last load, however, we carried everything across the crack and camped on the southern side. In the event of the place opening during the night, we will not be inconvenienced by having to cross with our boat. The two floes met with such force at this point that abrasion of their sides has heaped for a mile long and six feet [1.8^{m}] high a ridge of pulverized ice. The traveling has been very good, considering the late storm, which broke the pack badly.

After ten hours of exhaustive physical strain (we did not retire until 11 p. m.), it is refreshing, indeed, to lie down in our sleeping-bags—notwithstanding their dampness—and stretch our weary limbs. As the bags are spread on the ice with only one thickness of canvas underneath them, our comfort can well be imagined. This has been the brightest and most comfortable day that we have experienced since leaving Fort Conger.

Tuesday, September 18, 1883.—We turned out of our bags at an early hour with the intention of making a desperate effort to reach the land, which now appears to be not far away. We drifted slightly to the south and east during the night. The crack over which we had passed last evening was found this morning to have opened considerably, and walrus were sporting in the area of water thus formed. Minimum temperature during the night was +9 [−12. 8° C.].

We traveled over a smooth floe for about one mile, making rapid progress, owing to the absence of snow on its surface. At this spot we found a wide lane of water with much brash ice drifting about, which precluded our crossing without the aid of the boat. Our supplies were all brought to this spot, and the boat then launched. They were then ferried over the lane and placed safely on the opposite floe. We soon discovered that the pack had disintegrated, and that the small floes were being rapidly drifted about by the eddying currents. We transferred from one floe to another as quickly as we were able, each man retaining his self-possession, and working with desperation, and for safety. I cannot understand how it is that we were not

separated, or that our boat was not crushed in that grinding mass. It is certainly miraculous that we escaped alive. From 8 a. m. until 6 p. m. we have worked in this manner, expecting momentarily that our efforts, through no fault of our own, would terminate fatally. Latitude at noon was 78°50′, N. While crossing a dangerous place Rice missed his footing and fell head foremost into the water. Dry clothing being furnished him, a change of garments was effected there on the floe, in the low temperature and without protection from the winds.

At 6.30 p. m. we reached a large circular floe about one mile in diameter, and halting on its edge for a few minutes to obtain much needed rest; the cooks hastened to prepare supper in the interval. I had previously been sent ahead by Lieutenant Greely to make an examination of the floe and the ice intervening between us and land. I reported, on my return, that a lane of water on the opposite side of the floe evidently extended to the shore, which was probably not more than three miles away, and which we could most likely reach by boat. I had examined the land carefully for some sign of tripods, signal flags, cairns, or something that would tell us that our friends had visited this spot in search of us, but nothing was seen. We crossed the floe to the water's edge, the last load arriving at 9 p. m., thus making thirteen hours of severe labor in the drag-ropes. We bivouacked on the floe, spreading our bags on the uneven surface of the ice, for a few hours' rest. The shelters were not put up, as it was thought to be unnecessary for our brief stay here. We must make an early start in the morning. We have drifted considerably towards the east to-day with the current, and Cape Isabella, with the adjacent coast, has been opened up to view. I think the land is within our grasp at an early hour to-morrow, if we do not drift too far into the sound during the night.

Wednesday, September 19, 1883.—Alas! we are again doomed to a most bitter disappointment. Misfortune and disaster, hand in hand, have accompanied us along the entire line of this retreat, and were we at all superstitious, we could readily believe that the end of our existence is not far off. The high hopes of escape which we entertained last evening have all been dashed to the ground. We are again drifting helplessly in Kane Sea under the influence of a southeast gale, which sprang up about midnight, and drove us farther than ever from land. Not having erected the "tepee" last evening, on entering camp this morning our bags were found driven full of snow, and saturated with spray from the huge waves which came dashing against the southern edge of the floe. As nothing could be done in the gale, we spent the day in our sleeping-bags, listening to the roar of the waves, the howling winds, and reflecting on our helpless situation in this restless pack.

To our intense relief the gale abated at 6 p. m., and Lieutenant Greely at once called a council of those who had previously attended. The general feeling and wish was to remain here until the floe gets settled in some definite direction. Lieutenant Greely, however, advanced views which differed materially from those expressed by the other members of the conference. He favors an attempt to reach the Greenland coast by abandoning everything except twenty days' provisions, the records, the boat, and sledge. Walrus were seen in an open space near us to-day; seals were also seen, but none were shot. The spaces or pools about us are very extensive.

Thursday, September 20, 1883.— Cloudy and foggy weather, together with fresh northerly winds and a low temperature, are about as disagreeable as anything that could well be imagined. Nothing but water and débris ice in sight now. To be sure, we cannot see far owing to the heavy snow-storm which has prevailed during the evening, but this ice condition is most likely the same everywhere. Could anything be more wretched than having all these troubles come at once? We are certainly bearing burdens of woe sufficient to crush men of ordinary will-power, but it will be found that the texture of our party is of the right sort, and that adversity in its worst forms will have very little effect on their spirits.

Christiansen shot a large "bladder-nose" seal this afternoon which will dress about two hundred pounds. The natives say that they are very plentiful at Upernivik, but are never met with at Proven. The same will also apply to the walrus in those latitudes. The English stearine is now being used for cooking purposes in the absence of wood. Alcohol is far superior as fuel, it being equally as economical, and the disagreeable effects of soot are avoided. Bender, who is suffering with lung troubles, thinks the irritation due to the soot and gases arising from using the stearine lamp in the small "tepee" where our meals are prepared. The lamp throws off a great column of smoke and soot, which almost stifles the strongest man in the party. Bender goes to the boat to exchange places with Connell, who has been ordered to the "tepee." Our drift appears to be tending towards the Greenland coast.

Friday, September 21, 1883.—Snow fell heavily during the night and at intervals to-day. On the whole the weather has been wretched. A northwest gale, which has been in progress for several hours, has not materially altered our position. Our sleeping-bags, from the effects of the drifting snow which melts as soon as it lodges on or in them, are in the most wretched condition imaginable. We have been closely confined to them all day owing to the inclement weather. Jens shot three small seals to-day, all of which were secured. His dusky companion is not less indefatigable in his duties as hunter, but he is less fortunate in discovering game. Rice and those belonging to his boat crew have built an ice-house for protection against these raging storms which sweep mercilessly over this unsheltered floe. Connell and Ralston are suffering greatly with the flux. In consideration of his condition the former was sent back to the boat, and Salor took his place in the "tepee." Ralston has been placed in charge of the ice-boat *Beaumont.* Schneider has been adding canvas tops to our leathern boots, thereby eking out our scanty supply of foot-gear to its fullest extent. The ration of hard bread has been reduced from sixteen to ten ounces per day, and the issue for this evening was made on that basis. The weather cleared somewhat towards night, and we were afforded an excellent view of Cape Sabine, Brevoort Island, and the adjacent land. There is a great deal of water visible about our floe, but no connecting lead towards land.

Saturday, September 22, 1883.—The sun appeared for a short time this morning, but was soon obscured by heavy clouds and a dense fog bank, which drifted across his disk. At an early hour this morning Bender reported having seen the mast of one of our abandoned boats, with the signal flag still attached, at a distance of not more than two miles west of our position. Lieutenant Greely at once directed Pavy, Rice, Gardiner, Salor, Linn, Schneider, Christiansen, Jens, and myself to put off in the ice-boat and attempt to reach it, and bring it back to camp. We crossed a lane about half a mile wide, and leaving the boat in the charge of the others, Rice, Jens, and myself went across the floe in the direction of the whale-boat which we had abandoned and which we thought was ere this in Baffin Bay. When within a few hundred yards of the boat we were abruptly stopped by a lane of water and sludge ice which precluded our advance. The sludge would not bear our weight, and a boat could not be pushed through it. It is formed by the abrasion and wearing of the grinding floes, and is a very serious obstacle to the navigation of these waters by small boats. We examined carefully for some opening which would admit of our passing through, but none being found the enterprise was abandoned.

We transferred the "tepee" to a snow-bank for greater comfort. The snow is warmer than the ice, and will not melt underneath us so quickly, or rather the body of snow below absorbs the moisture. Last nigh a large pool formed under Cross' bag, and this morning his clothing was thoroughly soaked. It was so disagreeable, in fact, that the natives got up long before morning to avoid the misery of lying in a pool of water and went hunting.

Israel's bearings place us about 14 miles east of the meridian of Cape Sabine, and in latitude 78° 53.6′. Jans shot a large seal this morning, which unfortunately sank before it could be secured. On our return from the attempt to secure the whale-boat this morning, the whole party was ordered out and required to enter the ice-boat in order that her buoyancy and capacity might be tested. We were all able to enter, but to do so required some to lie down in the bottom, and others to sit in cramped positions on the thwarts, room being reserved for two oarsmen. After we were all settled down quietly it was found that she could carry about 1,000 pounds more in a calm sea, but not more than half the party in a heavy sea. The gunwale was only about three inches [76^{mm}] above the water-line. With this knowledge before us we feel fairly safe in our present position, and confident of reaching the shore with our boat if the direction of our floe carries us anywhere near it.

Judging from the occasional glimpses which we have caught of the land, our position has not changed materially during the last three days. The boat having been injured this morning by running it over broken ice, was examined and skillfully repaired by Elison. The only shovel in our possession was lost overboard this morning by Jewell. The temperature has been falling all day; at 6 p. m. it was +8.0° [−13.3° C.].

Sunday, September 23, 1883.—A cold, raw, damp and stormy day. A high southeast wind accompanied by snow tends to make this day the most disagreeable one that we have experienced this season. Temperature +8.0° [−13.3° C.].

We appear to be drifting slowly back toward our old position near Cocked Hat Island. At noon we were in latitude 78° 52′, and only about eight miles from the island. Our drift in this direction would seem to indicate the presence of a current through Hayes Sound to the west.

Dr. Pavy has a large corps of patients now who are all down with the flux. Schneider has been quite ill for several days, and is now much worse. Lieutenant Greely having cut one of his fingers badly with a piece of ice is greatly inconvenienced in consequence of its inflamed condition. Cross has frozen slightly the ball of one of his feet and limps painfully in walking. We can now partake of seal-blubber without the least feeling of repugnance or annoyance. In this matter we can compete very creditably with the blubber-eating races of the north. Lieutenant Greely directs me to go out to-morrow to reconnoiter for the chances of obtaining a foothold on the whale-boat floe. To judge from the direction in which we are being drifted, we are impressed with the belief that a current exists to the westward through Hayes Sound and is gradually drawing us in that direction.

Monday, September 24, 1883.—Southwest wind at 4 a. m. At 6 o'clock it changed to northwest, and remained at this point during the day. At 9 a. m. we were six miles north of Brevoort Island, and at 4 p. m. we were in latitude 78° 49′ north. We had at that time moved slightly to the west against the northwest wind, which is almost conclusive proof to our minds of the existence of the current mentioned yesterday and the day before.

I went out this morning in accordance with the instructions received yesterday from Lieutenant Greely, but was turned back not far from camp by the lanes of sludge ice encountered. No route was considered feasible except by the lane to the west of our camp, which had been closing slowly since early morning. In the afternoon I accompanied Lieutenant Lockwood and a small party in the boat to the floe on the opposite side of this lane. Leaving a party to watch the boat, we took Jens and proceeded towards the floe on which the whale-boat was resting. We had not gone far in this direction before we heard repeated calls from Bender, who had been left a short distance behind to watch a suspicious-looking crack in the floe. His frantic gestures warned us that the matter was really a serious one, and we hurried back with all possible speed. We were none too soon. The floe bent, crumbled, and broke underneath our feet with that dismal and groaning sound peculiar to the ice alone, and which will appall the stoutest heart. On reaching the place where Bender stood, we found the narrow crack, over which we had crossed but a few moments before, to be rapidly widening. It was already several feet in width; a few inches more and we would be too late. The eye glanced hastily along the seam to select the most narrow place, and with a quick running leap, into which all our strength and energy was thrown, we landed on the opposite side safely.

The game is getting scarce in this vicinity; only one seal has been seen to-day, and it was not taken. Light snow fell at about 5 p. m., and the wind changed to northeast.

Tuesday, September 25, 1883.—The northeast wind which was blowing last night continued brisk and in the same direction to-day. Minimum temperature last night, +10.0° [−12.2° C.]. Our position at 8 a. m. was 78° 48′ N. latitude, and about one mile east of Brevoort Island. We will probably drift down past the island during the next twenty-four hours, if the storm continues to rage so violently much longer. Living on this floe is worse than prison life. I wonder if we will escape from it soon?

The pack all about us is in motion; it is grinding, crumbling, and piling in masses high around the edges of our friendly floe. The terrific pressure finally became so great, that the small corner of the floe on which we were encamped broke away from the main portion, and before we could transfer with our effects to the larger and more substantial one, we had drifted apart, and the intervening space was soon filled with débris ice. The line of separation ran not far from our "tepee," in which several of our men were at the time. Fast ice is seen between Brevoort Island and Cape Sabine; the former is only about two miles away. At 2 p. m. our suspense and agony of mind was increased tenfold by the sudden change of the wind to the northwest, which soon increased to a gale, and under the influence of its great velocity we were driven down at a frightful rate, past Cape Sabine. During the last few days we have had no watch or guard during the night, but, owing to the dangers by which we are now beset, one will be detailed this evening.

Wednesday, September 26, 1883.—I can never forget our experience in the darkness last night. The suspense of the last few hours has been a terrible strain to our minds and nerves. A wild and awful night was passed in the driving storm; with the dark waters foaming about us, we momentarily expected to be engulfed by their relentless waves. Our crippled floe—already small from abrasion with others of greater size—has been again broken, leaving us scarcely space on which to take refuge with our boat and stores.

The violence of the storm had formed a large pool between us and the land, and the waves, unhampered by ice, came rolling against our crystal raft, throwing spray over those who had the temerity to approach its

borders. We were driven down past Payer Harbor and Rosse Bay at an alarming rate of speed, by the velocity of the wind acting on the surface of our floe.

The cooks were called to prepare breakfast long before daylight, in order that we might be ready at the first streak of dawn to take advantage of the open water, and thereby reach the coast. But when daylight revealed to us the land it was fully six miles away, and for one-third of that distance the water was covered with débris ice through which no boat could be pushed, and for the remaining distance the sea was a seething, foaming ocean which would have swamped our boat in a moment. Even had it been possible to have navigated the clear water, when the sludge or débris ice was reached the boat would have had to turn back.

At 7 p. m. we were in latitude 78° 37′ N. Owing to the heavy pack lying east of us we are being driven almost directly south along the coast instead of southeast, as the direction of the storm would tend to drive us. Should we pass down into Baffin Bay we are inevitably lost, except we make the Carey Islands, which is the only thing that will save us.

Fully one-third of our number has the flux badly. Its presence is attributed to the constant and excessive use of salt water in cooking our food, and also the liberal use of fresh seal meat. The use of salt water is necessary, as our supply of salt has been exhausted for some time.

The pressure of the pack embracing our floe was so great this morning that the little floe was crumbled into fragments, and we were forced to retreat precipitately to another for safety. The storm was in progress at the time and mercilessly drove the fine granulated particles of snow in our faces in such a manner as to barely enable us to make the efforts necessary to effect our escape. The ice-house which Rice and his party had constructed was crushed by an overlapping floe. Had they occupied it at the time of disruption none would have escaped alive. While retreating one remarked: "I don't care if I am not saved; I have suffered untold agonies since leaving Conger, and can see nothing but suffering in the future."

Thursday, September 27, 1883.—The weather is still wretched in the extreme; the atmosphere is so thick and hazy that the coast cannot even be sighted; consequently we have no definite idea of where we are, or whether or not we are yet drifting with the pack. We are certain only of one thing, and that is our terrible sufferings. Everything else is indefinite.

Rice and his party have no shelter for their sleeping-bags, and their condition is necessarily miserable. So great were their sufferings during the storm to-day that they not only refused to get up to supper, but they also declined their ration of rum which Lieutenant Greely ordered to be issued them. No breakfast could be cooked owing to the drifting snow, and our bags were filled with the finer particles of drift; our clothing was saturated, and everybody was feeling as if there was but little pleasure after all in this world, especially if in pursuit of glory in these regions. New victims of flux were announced to-day. I am now included in the list. We spent the most of the day in our sleeping-bags.

Friday, September 28, 1883.—The gale abated somewhat towards evening, and accompanied by Christiansen I traveled to the westward of camp to observe the condition of the pack, with the view of facilitating our escape from this floe. We found a lead of water not far from camp which was about half a mile in width, and which afforded excellent advantages. Our floe, having been lodged against a grounded iceberg, has been held in this position since yesterday. We are in the entrance to Baird Inlet and near its northern shore. Had it not been for the providential intervention of this berg, we without doubt would have been driven into Baffin Bay, and our fate would forever have remained a mystery to the world.

As no movement had been detected in the ice while I was watching it, I hastened back to camp and reported the favorable opportunity which was now offered us. The party was at once stirring; the sledge was hastily loaded and hauled to the lane, where the boat was launched. While Rice with a small party was ferrying over the first load the remainder of the party was hauling to the boat landing the remaining articles of our equipment and provisions. The entire party, together with all our stores, were transferred across this water-space in seven loads. The floe on which we were now landed was about one mile in diameter. Passing to the opposite side of this floe, we were stopped by new ice, which caused us to go into camp for the night. We are about two miles from where we started and a little more than a mile from the land. Through the loss of a shoe to our small sledge to-day our progress was greatly retarded. The boat, which was left back about one mile, will be brought up in the morning. A tenon of our large sledge was broken just before going into camp, but Elison has repaired it as carefully as the circumstances will permit.

Gardiner is quite ill. He reluctantly gave up his place in the drag-ropes this afternoon from sheer weakness. Cross is also an invalid and cannot work in the traces with the others. He is allowed to hobble along after the sledges in the beaten path, in order that his frosted foot may be treated as tenderly as possible.

Saturday, September 29, 1883.—Shore at last! Safe on land once more. Early this morning when the cooks were called, I was directed by Lieutenant Greely to advance toward the land with a view of selecting a route for the sledges. I found that we had been deceived last evening in our expression of opinion that the land was only one mile away. We were then in reality over four miles from the nearest point of land that we could reach. The conditions of traveling were found to be highly favorable for our sledges, and the start was made almost immediately after my return (7 a. m.). We found it necessary to ferry everything over two narrow leads of water before land could be reached. The last load arrived at the shore at 6 p. m. Every one was conscious of our danger, and each one worked with energy amounting almost to desperation. As might be expected all are fagged out.

Our camp was made on the cold, barren, and snow-covered rocks fringing the base of the high conical-shaped hill which had been so conspicuous a land mark, and which we had used as a guide in traveling towards shore. Our sleeping-bags were spread on the rocks, no shelters being erected owing to the weariness of the men.

Walrus and seals have been seen in great numbers to-day, but the hunters have been unable to kill anything, although they have hunted faithfully since morning. The bark of a dog heard by Dr. Pavy and myself a few days ago could have been nothing more nor less than the hoarse bellowing of a walrus. Having heard the sound so frequently to-day, I am convinced of my error on that occasion. Several ravens and a brace of ducks were observed flying about us during the march. The former are considered as birds of ill-omen, and many remarks tending to the subject were made by some of the superstitious ones.

Lieutenant Greely held another consultation with his officers and Rice and myself this evening regarding the future movements of the party. Cross, I am sorry to record, has again abused the confidence reposed in him by his companions, by purloining rum from their stores while they were absent bringing up supplies. Having been excused from work in the drag-ropes on account of a frost-bitten foot, he was left on the floe to guard the first load while the party went back for the second. On returning, we found him in a beastly state of intoxication. Ralston and Schneider were witnesses of his perfidy. That this man has neither honor nor manhood, is the honest conviction of all. He has been trusted repeatedly, but in every instance his uncontrollable thirst for drink has led him to ignore all moral obligations, and even to defy authority.

Sunday, September 30, 1883.—I was detailed this morning, together with eight others of the party, to accompany Lieutenant Lockwood to Cape Sabine, for the purpose of ascertaining what is in store for us there. Lieutenant Greely directed Corporal Salor and Christiansen to reconnoiter in the direction of Rosse Bay, to observe the conditions of the ice for traveling with sledges, and also to examine Leconte Point for caches of provisions which may have been left there by relief vessels. They returned after an absence of a few hours, Salor reporting that serious obstacles in the form of open water and drifting ice would prevent traveling in that direction for the present. For the same reason, they were prevented from reaching the land at Leconte Point. On learning that the route was not practicable for sledges, Rice at once volunteered to go to Cape Sabine by traveling overland. He would take Jens as his companion, and they would carry their sleeping-bag and provisions on their shoulders. He was at once granted permission to make this hazardous journey, and they will start to-morrow morning, taking rations for four days.

It is more than probable that we will be compelled to pass the winter in this place. I am not sure but that it offers superior advantages in the matter of game, but great suffering must necessarily be experienced in wintering in this locality, be game ever so plenteous. While the channel is filled with these grinding masses of ice, which are whirled rapidly about the current of the sound, there is no possibility of crossing to Littleton Island with our one miserable little boat. I have no doubt that just now (while the new ice is forming) if the attempt were made, it would result in disaster to the entire party.

This afternoon Rice found a level spot about half a mile north of camp which offers many inducements as the site for our winter quarters. Whisler discovered three Eskimo huts of ancient origin, which were in a very dilapidated state, and I found several heaps of stone under which the natives had formerly made caches of meat. Henry traveled westward along the north shore of this inlet for a distance of five miles, but saw nothing of interest. Lieutenant Kislingbury crossed the glacier to the north and looked down into Rosse Bay. He saw two ptarmigan and also the tracks of a fox and bear. The latter is quite near our camp. Game is very scarce. The hunters have killed nothing to-day. We are trying to delude ourselves into the belief that relief will yet come to us this fall. After having passed two years in these regions, and

having traveled this far towards home, it is hard to understand that we are compelled to remain for a third year, and that under particularly distressing circumstances.

Monday, October 1, 1883.—Weather cloudy. The sun has fallen so near the horizon that Israel was unable to get an observation to-day, and the sky being so cloudy as to obscure all the stars; our position was determined only approximately by reference to the English chart and the points visible along the coast in our vicinity. In accordance with the arrangements made yesterday, Rice started at 8.30 a. m. accompanied by Jens, the faithful native. Ellis and Whisler accompanied them to transport their packs across the glacier just north of camp, which can be surmounted only with the greatest difficulty. On returning this evening they reported that good progress was being made by the travelers.

Long killed a walrus to-day, but before the Eskimo with his kayak could reach the animal it disappeared from view. I shot and wounded a wretched looking specimen of the arctic fox this evening. He was detected among the bags of provisions nibbling at the stearine, and when wounded by my bullet went slowly up the hill limping painfully and being pursued by Bender, who was not more successful than myself as a marksman.

In company with Lieutenants Lockwood and Kislingbury and Dr. Pavy, I visited the spot indicated yesterday by Rice as a most desirable place on which to locate our winter huts. The place is well sheltered from the winds and in every way perfectly adapted to our purposes. The Eskimo formerly had their winter houses built on this very spot, and that alone speaks volumes in favor of its adoption. Besides the stones from the dilapidated huts and the meat caches in the immediate vicinity, great numbers can readily be obtained from the adjacent hill. The beds of moss growing sparsely on the bleak hillside will also be used as lining to the walls. The huts will probably be three in number, as this place is favored by nearly all the party.

Under the influence of a southerly gale the ice in Smith Sound has all disappeared except the small raft over which we escaped to land day before yesterday. Lieutenant Kislingbury says that last evening at 5 o'clock the sound was entirely open to Littleton Island. Light snow fell at 6 p. m. Jewell, Eli on, and Henry went out after the reindeer moss which grows here in anything but abundance, and they obtained very little; neither did they observe any traces of game during their absence.

Tuesday, October 2, 1883.—The cloudy weather continues. I wonder if we will ever again be blessed with pleasant weather! When Connell arose this morning to perform the duties of cook, he detected a small blue fox in the act of purloining food from the bags of provisions. He immediately fired at the thieving rascal, but without effect.

I took an inventory of the commissary stores last evening, and found but thirty-five (35) days full rations of hard bread and meat remained. These rations, however, can be extended to fifty (50) days by subjecting ourselves to a greatly reduced diet, but the suffering which this would entail would necessarily be extreme in consequence of the low temperatures and the hard work which we will perform in building our houses. Fifty days will carry us to November 15 even if no game be taken in the interval, and at that date we will be either on the Greenland coast or in Baffin Bay. Lieutenant Greely says he will attempt to cross the sound to Littleton Island when but ten days' provisions remain to us, despite the almost certain destruction to the party which would follow such an attempt. Of course if Rice finds abundance of provisions, as we hope he will, at Cape Sabine, this plan will be willingly abandoned for one less dangerous.

By direction of Lieutenant Greely, Lockwood and myself selected a building site for our winter habitation. We found a splendid place about half a mile north of our present encampment, which is well sheltered by the promontory (Eskimo Point) on one side and the hills and glacier on the other two. The buildings will face the sound to the southwest. In the afternoon we moved down the camp equipage and sufficient provisions to last us five or six days. The ice is very wet and sloppy, and our feet were subjected necessarily to great cold and dampness.

Long and Christiansen have been detailed by Lieutenant Greely as permanent hunters; they killed nothing to-day. The native is of the opinion that game of all kinds has left the pools in the vicinity of the grounded bergs and has taken refuge in the open water.

The ration of bread was reduced to six (6) ounces, potatoes to one and one-half (1½), and meat was again reduced to twelve (12) ounces. One ounce of extract of beef has been added to our ration to compensate in a degree for the reduction.

Wednesday, October 3, 1883.—At the council called by the commanding officer this morning it was decided to construct three houses for the winter quarters of the party. A division of the party for occupancy of these houses will be made as follows: House number 1: Lieutenants Greely and Lockwood, Sergeants

Rice, Gardiner, Jewell, and Elison, and Privates Linn and Ellis. Number 2: Lieutenant Kislingbury, Dr. Pavy, Sergeants Connell, Ralston and Israel, Corporal Salor, Acting Hospital Steward Biederbick, and Private Long. Number 3: Sergeants Brainard and Cross, Privates Bender, Henry, Frederick, Schneider and Whistler. The two faithful natives, Christiansen and Jens, are also to be quartered in my hut. Three ancient Eskimo *igloos* furnished abundant material for building purposes, and when we discontinued work this evening the stone foundations to our houses were well advanced. In order that the work may be expedited, and that every man may work to advantage and to his own interest, each of the three parties confined their labors to their own building.

Light snow has fallen and high winds have prevailed all day, making our work anything but agreeable. The hunters saw a few walrus but no seals. A solitary snow-bunting, evidently separated from its mate was observed hopping about the camp, pecking the scanty crumbs and chirping mournfully. It did not remain with us long, but soon took flight to the southward, probably in search of more congenial climes. Cross's foot is improving; Gardiner's finger is also somewhat better. The channel is again filled with heavy paleocrystic ice, which is moving with the current at a rapid rate in the north water, being urged by the pressure of the northern pack. With this the last hope of crossing to Littleton Island is gone.

Thursday, October 4, 1883.—It has been clear and beautiful weather to-day. This will be a great advantage to poor Rice and Jens, who are ever thought of in their lonely and toilsome journey through an isolated and unknown region. A northeast gale threatened to relieve us last night of our shelter, the "tepee," but it stood up bravely against the wind's terrific force. The temperature is slowly falling; at 4 p. m. the thermometer registered +8.0° [−13.3° C.].

Our houses are progressing with astonishing rapidity and they will soon be in readiness to occupy. The old *igloos* are of the greatest value in the supply of stones and mosses which they furnish. We discontinued work on the huts at 2 p. m. to haul down a load of the stores left at our old camp. The hunters saw a walrus on the ice during the day, but it was found impossible to reach him, owing to an intervening lane of water and débris ice. The roaring and grinding noise produced by the convulsive and rumbling pack is fearful to hear; the channel is filled from shore to shore with ice which is being moved with irresistible force by the tide and currents.

Dr. Pavy requested, or rather recommended, that during the working days the corned beef be increased to 16 ounces; pemmican, when used in lieu of beef, to 14 ounces, and bread to 8 ounces. This change was adopted by Lieutenant Greely.

Friday, October 5, 1883.—The day has been very foggy and somewhat disagreeable; temperature, +7.0° [−13.9° C.]. The walls of my house were completed to-day, and the interior was filled with moss collected with great labor and patience from the ridge west of camp. The walls are built of stone, and are about 3½ feet [about 1^{m}] high. We contemplate building a large snow wall about the entire structure, which will prevent the penetration of cold air from the outside. One man from each hut was selected to represent his respective mess, and lots were drawn for the boat, which is to be used as a roof for one of the three dwellings. Unfortunately for the other households the man representing the interests of my hut carried off the prize, and it will be put up to-morrow. The dimensions of my house are 18 feet [5.5^{m}] by 8 feet [2.4^{m}]. The other houses are progressing well but not so fast as ours. The remainder of the stores were hauled up from Refuge Point this afternoon. No game was seen to-day except a ptarmigan, which was shot by Cross.

Saturday, October 6, 1883.—The minimum temperature last night was +12.5 [−10.8° C.]. We placed the boat lengthwise over the hut to-day, and covered the remainder of the space with the launch canopy, which had been brought with us when the *Lady Greely* was abandoned.

Lieutenant Greely detailed several of the party who are to constitute a board to make a division of the canvas, oars, and other material used in the construction of our huts. He had appointed me as one of the members, but I asked to be relieved from acting in this capacity, owing to my position, and on considering the matter he acceded to my wishes. Notwithstanding the fact that I refused to have anything to do with the division of these articles, I was afterwards accused by Israel of being the leader in a "grab game," as he expressed it, "and looking out," he said, "for the interest of my own party too well." I took him before the commanding officer and stated the misrepresentations which had been made regarding my conduct. Israel then told his story and explanations followed which resulted in my vindication.

The houses were all covered to-day, and the messes moved into their respective abodes. Long and Christiansen each shot a small seal, but only one was secured; the other sank before it could be reached,

The one saved will weigh about 75 pounds. It has been intimated to me that Israel was incited in what he did by one of the noncommissioned officers who should have known better, but who has a special aptitude for fault-finding.

Sunday, October 7, 1883.—This has been a clear and beautiful day; minimum temperature, +12.0° [—11.1° C.]. The Greenland coast rose up prominently before us, every ravine and irregularity along the coast line being distinctly outlined. How we all desire to attain that coast—that land with its promises of abundance of game and safety to our party. Notwithstanding the fact that this is the Sabbath the work of construction was resumed this morning and continued all day. Rice is now due here. In anticipation of his return, Ellis and Whistler were sent across the glacier to meet him, but while going over the crest a dense fog rolled up from the sound which turned them back, they having no compass with which to shape their course.

For alleged misconduct Connell was reduced from the rank of sergeant to the grade of private by order of Lieutenant Greely; Linn was advanced from private to sergeant. Israel came to me this morning and apologized in a manly way for his unjust accusations of last evening, and said that he had been influenced to make the remarks by the representations of one of the men of his mess.

I accidentally learned this evening that a feeling of dissatisfaction existed in certain quarters because of alleged partiality on my part in issuing bread to "a favorite few." I immediately requested Lieutenant Greely to relieve me from the onerous and thankless duties of first sergeant, and also that some one else be appointed to issue the provisions. He refused to relieve me from these trying and irksome duties, and said that he had perfect faith in my manner of issuing the provisions, and that he placed implicit confidence in me in every way, notwithstanding the slanderous remarks which were made in secret, and which had never been brought to his notice. In the future I will endeavor to perform the important duties pertaining to my trust as I have in the past with impartiality and a rigid adherence to justice. But it is hard to endure these reflections on my fairness when I have striven so hard to satisfy all. With the confidence of my commander, however, I shall require no other incentive to carry out the duties confided to my care. The base insinuations of the few of my comrades will be borne with that fortitude which all are displaying during this trying period.

Bender and Schneider collected seven bags of saxifrage for our bunks, and the remainder of my little mess gathered moss to cover the roof of our hut. Long and Christiansen shot a walrus on the floe, but the creature had life enough left in its body to roll itself into the water, thus escaping from his tormentors, but leaving the ice and the water where he sank stained for yards around with his crimson blood. It appears as if we were being pursued by the worst kind of ill luck; nothing goes right any more. The greater part of the game killed thus far has sank before it could be reached by the hunters, and almost nothing is added to our slender stock of provisions, which are slowly but surely diminishing. Christiansen shot a ptarmigan before breakfast this morning, and saw a blue fox out on the floe, which he pursued but did not capture.

Monday, October 8, 1883.—The weather has been cloudy all day, and there are many indications of a speedy snow-storm. Minimum temperature last night was +12° [—11.1° C.].

Rice has not yet returned to us. He is probably detained by young ice or a severe storm; nothing else could keep him. God grant that he may return in safety, as we cannot well spare such a noble soul from our party just now. We completed the roof to our shanty and put the finishing touches on our bunks. Bender has made me a pair of scales, which, though rude, will nevertheless greatly assist me in weighing out the scanty allowances of food to the several messes. A mischievous fox visited the camp last night and succeeded in stealing ¾ of a pound of meat, which had been placed on the roof of one of the huts to be beyond the reach of these little thieves. The efforts of the hunters have again met with bad luck. Christiansen shot two seals, but before he could squeeze himself into his kayak and paddle out to them they had both disappeared. It is indeed heart-rending to see this food—which is our very life—sink before our eyes, and we powerless to save it.

Tuesday, October 9, 1883.—Clear and calm weather. Rice returned to us at 4 p. m., and reported having found records at Cape Sabine and vicinity, which placed him in possession of facts most unwelcome and disheartening. The one redeeming feature in his report, however, is the knowledge of the different caches at Cape Sabine which will aggregate about one thousand rations. The records which were taken from the caches at and near Cape Sabine, and those taken from the cairn on Brevoort Island, best tell the tale. The first record stated that in the summer of 1882 the steam sealer *Neptune*, of St. Johns, N. F., under command of Captain Sopp, had visited Smith Sound, and endeavored to reach Lady Franklin Bay, but was repulsed by the impenetrable pack encountered near Victoria Head. They evidently returned to

St. Johns the same season, taking with them all supplies except a small depot of two hundred and forty rations, which they left on the coast just west of Cape Sabine, and a duplicate depot at Littleton Island. There is nothing positive, however, known of the existence of the latter, as the depot had not been made when the record was written. The expeditionary force was commanded by Major Beebe, a member of the Signal Corps, and private secretary to General Hazen at the time we left Washington in 1881.

The second record was signed by Lieut. E. A. Garlington, Seventh Cavalry, U. S. A., and stated that the *Proteus*, while working northward through Smith Sound, was crushed by ice on July 23d of this year; and that everything except a few rations and a few articles of clothing was lost. His own party of fourteen men, with Captain Pike and twenty-one men, were to cross to Littleton Island, and would endeavor—as we interpret the record—to communicate with this coast. He also states that the *Yantic* has orders to reach Littleton Island, and that a Swedish steamer will reach Cape York some time during the latter part of July. The record contains two passages which are particularly encouraging. The first reads as follows: "I will endeavor to communicate with these vessels at once, and everything within the power of man will be done to rescue the brave men at Fort Conger from their perilous position." The second: "I will leave for the eastern shore just as soon as possible, and endeavor to open communication." With assurances such as these, we cannot but feel that our countrymen are in some manner working for our relief. At the best, our situation is a desperate one. There are twenty-five mouths to feed from the rations at Cape Sabine, and that amount cannot last long. If a party desires to aid us, they must come soon.

Rice discovered that Rosse Bay and Buchanan Straits were connected by a narrow strait; this strait Lieutenant Greely at once named in honor of the man through whose heroism and devotion the discovery was made. This discovery makes Cape Sabine an island. Lieutenant Greely has decided to abandon these huts, and move the entire party to Cape Sabine, it being impracticable to bring the rations to this point. We will take the first load to Rosse Bay to-morrow.

Wednesday, October 10, 1883.—A heavy snow-storm has prevented us from moving to Rosse Bay with the first load of stores, as contemplated yesterday. The sledge, however, has been loaded, and we will advance it at the first favorable opportunity. Rice, the brave fellow, has again volunteered for a hazardous service—that of going to Cape Isabella to ascertain if any provisions were left there by Bebee in 1882, when he landed the whale-boat. The temperature has been very high during this snow-storm. Game appears to be very scarce; a few thieving foxes have been seen lately, but they always manage to maintain a safe distance between themselves and our rifles. Several ravens have been observed during the last few days. Two or three of these birds of ill omen flew over our huts to-day, uttering their ominous and discordant croaks as if in derision of our hapless condition.

Thursday, October 11, 1883.—The sky has been bright and clear to-day, and the spirits of our party naturally took an upward tendency. Minimum temperature last night, +7.0 | —13.9° C.]. Rice and Christiansen started for Cape Isabella at an early hour this morning. The sledge party started at 6.45 a. m. for Rosse Bay and returned at 3.15 p. m. On reaching Leconte Island it was found necessary to take to the high ice-foot on account of the young ice outside, which would not support the weight of our sledge. On arriving at the hut we found that Cross had again been tampering with the rum can, and as a natural result of his illicit indulgences he was in a maudlin state of intoxication. I at once reported the circumstances to Lieutenant Greely for his instructions, but he said, and very truly, that nothing could be done with him except to resort to violent measures, and this he would not permit. "To do this," he said, "would bring only reproach to the party; the disgrace which this man has brought on himself would remain unchanged." It is certainly discouraging to labor all day in the low temperatures while this man remains in camp doing nothing except to satisfy an abnormal appetite for strong drink at the expense of those who are trying to save him. To-morrow we intend to abandon the huts and march to Cape Sabine, where, as soon as possible, new winter quarters will be constructed. Long shot a seal this evening which will weigh forty pounds.

Friday, October 12, 1883.—The canvas, ropes, oars, and poles from which the roofs of the huts were constructed, were all removed and taken with us. The ice-boat *Beaumont* was left on the skeleton walls of my hut. The party started with the two sledges at 8 a. m., taking all the property and provisions with them. After seven hours of the severest labor imaginable, we reached Rosse Bay at the point where the load of stores had been dropped day before yesterday. Here we halted for the night, and prepared to make ourselves as comfortable as circumstances would permit.

This is a cold and disagreeable night, and my fingers are so nearly frozen that they can scarcely clasp the pencil. Despite the raw and chilling winds which are sweeping over this desolate spot, our bags have

been spread down on the icy rocks, and without shelter or protection of any kind we have prepared to pass a wretched night. The issue of a small quantity of rum served to brighten the feelings and render us less sensible to our sufferings. Owing to the friction caused by the roughly-shod runners on the small sledge, it will not be used again, but double trips with the large sledge will be made instead.

Saturday, October 13, 1883.—We had left our sledge standing on the floe when we retired last evening, and on rising this morning it was found to have been submerged by the overflowing tide. The bending of the new ice under the weight of the sledge and a portion of its load, caused a depression in the floe which was soon filled by water and the sledge completely covered. The sledge was secured only with the greatest difficulty, one having to wade through the ice-cold water to attach to it a rope, with which it was hauled to a place of safety. We slept very little, or not at all, last night, on account of the frozen bags and the unsheltered position of our camp. We crossed Rosse Bay by keeping close up to the face of the glacier, thus avoiding a few of the many treacherous places where nothing but a thin sheet of ice separated us from disaster and death. Notwithstanding our caution we felt it necessary at times to rely on chance, and so traveled over places where the ice was so thin that it would bend and crack under the combined weight of the sledge and party. Jens, who was selected to perform the important and dangerous duty of finding a route over the young ice, did nobly, and not once did his unerring judgment in these matters serve him badly.

Camp was made on the north side of Rosse Bay at the entrance to Rice Straits, and the two loads deposited here at the end of nine (9) hours from the time of starting this morning. The hauling was comparatively easy, owing to the small rubble studding the floe, which caused the sledge to go dancing along at a merry gait. When returning for the second load, a terrible crash was suddenly heard which caused us to stop short with consternation and fear. Just in front of us the ice was torn asunder as by an invisible hand, and a huge black "snout" forcing itself through this fissure protruded for many feet into the air, throwing fragments of ice in every direction. Supposing that some mighty leviathan of the deep was aiming at our destruction, we proceeded to investigate the matter with extreme caution and alertness. Imagine our surprise and disgust when the "snout" was found to be nothing more dangerous than a huge block of ice, which, having been detached from the base of the berg close by, made its appearance at the surface in the manner described. Occasional incidents of this kind are the only variations of the almost depressing monotony which characterize our marches. We traveled 18 miles; the distance made good, however, was only 6 miles. High wind; temperature this evening, +3 [−16.1° C.]. The alcohol allowance was not sufficient this evening to prepare the supper.

Sunday, October 14, 1883.—High winds accompanied by snow are the worst features of the day. After a frugal breakfast of raw dog-pemmican, we broke camp at 8.15 a. m. and began our toilsome march. As Rice Strait was not entirely frozen over, we were forced to follow the western shore closely. In one instance the water had encroached so near to the ice-foot that it became necessary for us to take to the land. In many places the sledge seemed on the point of breaking through the thin and bending ice, but fortune favored our cause and the impending duckings were escaped. Had the sledge broken through this ice at any time it would necessarily have proved fatal to many of the men, and the sledge and its load of stores would also have been lost. The current ran with such velocity through this channel that it would have swept at once the party under the floe. The two loads were hauled to camp in about nine hours, and the distance traveled was about the same as that traveled yesterday.

A fine hot supper of pemmican was served us in the evening, and for a brief period all our woes and wretchedness were apparently forgotten. The last drop of our Medford rum was issued at the completion of the march to-day. A small white fox, which Rice and Jens had killed with their staff a few days ago, was taken from the rocks where they had cached it, and added to our larder. Henry reports having frosted one of his feet slightly to-day. He was observed to eat with evident relish some of the raw seal intestines containing shrimps. We camped on the south side of Buchanan Strait at the entrance to Rice Strait. The bare rocks were our only beds, and our only protection against the bleak winds were our thin buffalo-skin sleeping-bags. A small lake was found in the vicinity, which will supply us with fresh water for cooking purposes.

Monday, October 15, 1883.—We probably passed the most wretched night of our lives in the howling storm which rose soon after we had retired last night. Had we been under the shelter of tents it would not have been such a serious matter, but without any protection except one thickness of hide, and that frozen as hard as flint, is something that I do not care to experience again. Temperature this morning was −1.0° [−18.3° C.]. Lieutenant Greely, Gardiner, and Jens started out in advance of the party to select a route

through the hummocks along the coast. Gardiner, who has not worked in the drag-ropes on this trip owing to illness, has nevertheless made himself very useful all along in selecting routes for the sledges.

The main party, with loaded sledge, left camp at 7.30 a. m. and traveled along the coast past Cocked Hat Island towards Cape Sabine.

We left a large cache of stores, which we do not require for our immediate use, at the camp which we have just left. The ice along the route was very rough and hummocky, our load very heavy, and, as a sequence to our previous misfortunes, our sledge broke down. Much valuable time was consumed in making the necessary repairs, and when they were completed we did not dare to venture the entire load again, so a portion was left on the floe where the accident occurred. We advanced with the remainder, reaching the *Proteus* wreck cache at 2.30 p. m. This is probably about three miles from Cape Sabine. Lieutenant Greely had already examined the cache, and he expressed much regret at the small amount of meats in comparison with the great quantity of other articles of lesser nutritive value. Of vegetables, raisins, lemons, clothing, boxes, mirrors, &c., there is a profuse display; there is also about twenty pounds of Durham tobacco and ten of plug. A portion of this was issued to the smokers; the non-smokers received a quantity of raisins in lieu thereof. The latter were Lieutenant Greely, Rice, Long, Biederbick, Salor, Frederick, and myself.

Rice and Christiansen arrived from Cape Isabella soon after we had encamped. They report having found 144 pounds of canned meat at Isabella, which Sir George Nares deposited there in 1875; but they were unable to find any trace of the boat which Beebe was to have landed at that point.

Tuesday, October 16, 1883.—The snow has been falling heavily all day, and a high wind greatly adds to its disagreeable effects. A large party was dispatched under Lieutenant Lockwood to bring up the stores abandoned yesterday on the floe where the sledge was broken. Lieutenant Greely, Rice, and myself went to the Beebe cache to prepare it for transportation to this camp, where we are to establish our winter quarters. Lieutenant Kislingbury and Jens went to Payer Harbor to examine the clothing cache. We carried the wall tent contained in the cache back to camp. Rice and myself afterwards returned to get a quantity of the Medford rum for daily issue. The party under Lieutenant Lockwood returned at about 2.30 p. m., and all hands were at once turned out to erect the walls of a snow house. The blocks were cut from a neighboring drift and the walls built about three feet [.9^{m}] high. The roof was made with oars and the spare sails. It is a poor shelter at the best, but still it is better than none at all. The wall tent will be used by the cooks as a kitchen.

Wednesday, October 17, 1883.—A strong northwest wind rose during the night, which sifted the snow through the openings in the walls of our house, and thus rendering the already pitiable condition of our party ten times worse than before. The sufferings of the party are extreme; Biederbick and Long are unable to labor with the others, and Cross and Gardiner are hardly able to assist themselves. With our large party to feed and the few rations at our disposal the prospect for the future is indeed a cheerless one. The Beebe cache, including the whale-boat, was moved up to this camp during the day. The boat is badly broken, and we have nothing with which to repair the injury. Minimum temperature last night, —6.5° [—21.4° C.].

Thursday, October 18, 1883.—Cold, very cold, and the disagreeable snow continues to fall. Lieutenant Greely consulted with the party this morning regarding the site for our winter quarters. It was finally decided to erect the hut on the west side of this point of land, and the construction of the walls was at once begun. The dimensions will be as follows: Length of house, 25 feet [7.6^{m}]; width, 18 feet [5.5^{m}], and the height of walls about 4 feet [1.2^{m}]. The walls were nearly completed this evening; the party to a man working well. All our provisions will be hauled from this point (wreck cache) across the little divide to where the house is being erected. Christiansen this evening shot a blue fox.

Friday, October 19, 1883.—Cloudy, dismal weather; a fresh southwest wind and the temperature 9 degrees below zero [—22.8° C.] are climatic conditions which are not at all conducive either to comfort or happiness. Comfort, in fact, is something of the past; it never greets us now, but in its place the most abject misery reigns.

The whale-boat has been placed lengthwise over the middle of the walls of our hut, and oars fastened at the gunwale by one end sloping downward to the walls, thus serving as rafters. Canvas was drawn over these rude rafters and securely fastened at the sides and ends. Over this frame were placed thin blocks of snow in such a manner as to exclude not only the light, but the wind as well. On the floor of the hut a small quantity of sand was thrown to cover the snow and ice. We moved in during the afternoon, finding these quarters much more comfortable than the battered old walls near the wreck cache. A small lake only

a few yards east of our new house will furnish us with an adequate supply of fresh water during the coming months.

Saturday, October 20, 1883.—The weather is cloudy and disagreeable. A high northwest wind caused considerable drift and necessitated the discontinuance of work at 1 p. m. Temperature, —13.0° [—25.0° C.]. The roof of our dwelling was completed this morning, and snow blocks were prepared for the construction of a protective wall outside and around the building. We are feeling comparatively comfortable in our new quarters, and are of the opinion that with proper food we could endure the cold and dampness very well.

The subject of our winter's schedule of provisions was this evening under discussion by invitation of Lieutenant Greely. With two or three exceptions the entire party concurred in the opinion expressed by Lieutenant Greely, that with strict limitations we could extend our provisions to March 10, at which time we hoped to be at Littleton Island. Dr. Pavy declared this to be an impossibility, and Lieutenant Kislingbury wanted the limit to be placed at February 1 instead of March 10.

Sunday, October 21, 1883.—Weather fair; light westerly wind and a temperature of —3.5° [—19.7° C.] causes the day to be far from disagreeable. A party of sledges numbering fourteen, under the command of Lieutenant Lockwood, proceeded to the entrance of Rice Straits for the cache left there on the 15th inst. Long, who having volunteered with the Eskimo to hunt at Rice Straits, was left in camp at that point with the wall tent, sleeping-bags, &c. We returned to camp with the load at a late hour this evening, thoroughly exhausted from our efforts. Everybody complains of excessive weakness, and even the strongest of our party may be seen to stagger while walking along. A lemon in lieu of lime-juice was issued to each man this evening. The scraps of newspapers in which the lemons were wrapped have been carefully removed and dried for future reading. It will indeed be a rare treat to again receive news from the civilized world. From these scraps we have already learned that Garfield died on September 19, 1881, and that Arthur is now President. Lieutenant Greely, Jewell, Israel, Bender, Biederbick, and Whisler are on the sick-report and did not go out to-day.

Monday, October 22, 1883.—Rice, with three men, was ordered to Cape Sabine, to bring up a few articles of clothing. He was also directed by Lieutenant Greely to place in the cairn on Brevoort Island a record which the latter had prepared. This paper stated, in substance, where we may be found, and also how destitute we are. The other members of the party who were able to work transferred the provisions from our first camp to our present abode. High winds, accompanied by snow, have prevailed all day. Ellis celebrates his forty-third birthday.

Tuesday, October 23, 1883.—Cloudy weather; wind blowing from the northwest; temperature, —16.0 [—26.7° C.]. We took the pendulum and records to Payer Harbor and cached them at the English depot of provisions. We started to return with a portion of this depot, but our sledge broke down, and we were forced to return without it. This accident made a very bad impression on some of the men, who are about discouraged through these series of mishaps. Frost-bites are quite common; almost everybody is afflicted in this manner. Ellis is quite ill. He was compelled to leave the sledge near Payer Harbor to-day and return to the house.

Wednesday, October 24, 1883.—The snow is falling heavily, and a high northwest wind has been blowing all day, causing a disagreeable drift; temperature, —5.5 [—20.8° C.]. Twelve men, including myself, went down to Payer Harbor to repair and haul in the broken sledge. Elison repaired it in a short time, but soon after starting it was again broken and abandoned. The men were very tired and weak from their prolonged exertions and the effects of a meager diet. Our sufferings in this disagreeable storm, while struggling to secure this load of provisions, are such as were never before experienced in these regions.

Thursday, October 25, 1883.—Light westerly winds, accompanied by snow; temperature, —4.0 [—20.0° C.]. The sledge has been repaired by Elison in a most skillful manner, and this afternoon it was hauled to camp without further accident. Work on the snow-wall about the house was resumed this afternoon. The hunters returned from Rice Straits this morning, bringing with them a seal which weighed about 65 pounds. They left their tent and sleeping-bags at the cape, with the intention of taking an additional supply of provisions and returning to resume their hunting.

Two barrels of dog-biscuit, weighing 110 pounds each, were found in the English depot on Stalknecht Island. This afternoon I opened one of them and found a large percentage entirely ruined. That which was thoroughly rotten and covered with green mold was thrown on the ground, and was eagerly devoured by the half-famished party. What, I wonder, will be our condition when we undergo a still greater reduction in our rations?

The first of a series of very pleasant entertainments took place to-night. The scraps of newspapers taken from the lemons were read aloud for fifteen minutes by Rice just after dinner. This will be repeated every night until all are read. I observed an aurora this evening at an early hour.

Friday, October 26, 1883.—Biederbick observed an aurora this morning at 4 o'clock; temperature, —15.0 [—26.1° C.]. Light westerly wind. The sun disappeared below the horizon to-day, to reappear no more until the latter part of February. I wonder how many of us will ever look on his glorious face again? We started for Cape Sabine at 7 a. m. On our return the sledge again broke down under the weight of a bulky load. As it was growing dark at that time, no attempt was made at repairs, but the party at once returned to the hut, where they worked for some time on the snow-wall. There is a vast expanse of open water to the north, but very little can be seen in the direction of the Greenland coast. The hunters were out at the margin of the ice all day, but saw no game.

Saturday, October 27, 1883.—The weather is again cloudy and disagreeable; and the lowest temperature yet experienced by us on these shores was recorded last night, namely, —22.0 [—32.8° C.]. The sledge was once more repaired, and the load which we abandoned yesterday on the floe was hauled to camp. The temperature of the interior of the hut this morning was +33.0 [+0.6° C.]. The hunters were not successful in their efforts to secure game to-day. The commissary store-house was broken into last night and a small quantity of hard bread taken.

Lieutenant Greely has decided to call this place "Camp Clay," in honor of Mr. Henry Clay, a fellow-passenger on the *Proteus* in 1881 to Lady Franklin Bay, from which place he returned to St. John's. We found a Louisville Courier-Journal in one of these caches, which contains an article written by Mr. Clay regarding our deplorable situation, and making certain specific recommendations which, it is needless to say, have not been followed by the Government. He predicts in this article our present condition, and urges that Cape Sabine (where we now are) should be provisioned. Tobacco was issued to the smokers this evening.

Sunday, October 28, 1883.—Temperature, —17.5 [—27.5° C.]; inside the hut it stood at +24.0 [—4.4° C.]. A party of about twelve or fourteen of the strongest men went to Cape Sabine for another load of the clothing, wood, &c., there. On our return the sledge was again broken, but it was nevertheless hauled into camp for repairs. The load, however, was abandoned at the point where the sledge became crippled. This is indeed discouraging. Worse, it is terrible! What are we to do? Every hope which we may have entertained for relief this autumn, any mitigation of our hardships which we may have expected, have been swept away in the last few days. While those of the civilized world—those who have forgotten us in our hour of need—are enjoying the luxuries with which that land is teeming, this band of wretched, shivering creatures are now fighting starvation, and are about to face the frosts of a third arctic winter. Owing to the severity of the storm, the hunters did not go out to-day.

Monday, October 29, 1883.—The temperature has risen suddenly to +5.0 [—14.7° C.]. The barometer has been placed in position so that regular observations of that instrument may be taken. The hunters went out this morning as usual, but returned without having seen anything. Long, unfortunately, fell through the ice to his hips. He reached the hut with some difficulty, where he was subjected to a drying process before he could again venture out. I made an issue of clothing to-day. The garments are covered with ice, and as they are thawed and dried by being placed in contact with the warm body, the process is necessarily a very trying and irksome one. The sledge was repaired this morning, and another load hauled from Payer Harbor. The sledgers complain of great exhaustion after the severe trials of to-day; some are almost prostrated. In consequence of being subjected to greater physical strain, the strongest members of the party will probably be the first to succumb to these privations. Our ration has been again slightly reduced; those detailed for sledging, however, will receive two ounces extra of food each morning before leaving the hut. In order that our minds may be lifted from this mire of morbidness and prevented from sinking into a state of torpor an hour or so is devoted each evening to reading aloud. Gardiner reads the Bible; Lieutenant Greely the Army Regulations; and Rice is perusing one of Hardy's novels, entitled "Two in a Tower." With the exception of Gardiner's Bible, these books, together with several others, were found in the wreck cache.

Tuesday, October 30, 1883.—The temperature has again fallen, the thermometer registering —8.0 [—22.2° C.]. The indefatigable hunters, Long, Jens, and Eskimo Christiansen, went back to Rice Straits this morning, taking provisions for three days. Thirteen of us went to Cape Sabine for a load of provisions; we returned to the house at 3 p. m. Rice having volunteered to lead a party to Cape Isabella, to secure the 144 pounds of canned meat cached there by Sir George Nares in 1875, has been accepted for the duty by

Lieutenant Greely, and a sledge is being prepared by Elison for that purpose. Rice will be accompanied on this hazardous journey by three men, who have not yet been designated. Bender made a platform of stones in the middle of the passage, on which the cooking-lamps will be placed when in use. He also distinguished himself this morning by killing a fox with his fist. The little animal was found with its head in a small tin can, and its capture was easily effected.

An estimate of the provisions now on hand places the approximate limit of their consumption at March 10. This is computed on the basis of an issue of about 15 ounces to each man per diem. Subjected as we necessarily are to hard work, cold, and dampness, how long, we ask ourselves, can we exist on this meager allowance of food?

Wednesday, October 31, 1883.—Thank God! the last of our supplies are now safely housed. The one remaining load was brought into camp this evening. The whale-boat which we had abandoned on September 12 was found to have drifted down on the large floe on which it had been left, and to have lodged between Brevoort Island and the main land (Cape Sabine). It has been broken up, and will be used for fuel during the winter. To think of using it now (even were it in good condition) as a means of crossing Smith Sound would be worse than madness.

The rations, except bread and raw meat, will be issued weekly in bulk. Cloudberries were issued to the messes this evening. The Swedish expeditions use these berries largely as an anti-scorbutic, and Nordenskiöld highly recommends them for use in arctic exploration. Dr. Pavy narrowly escaped freezing his feet this evening. When crossing the ice-foot, on our return from Sabine, he fell into the water, and during the long walk to the hut he suffered intensely. Cloudy weather, light westerly wind, and temperature +2.0 [−16.7° C.]. Lieutenant Greely detailed Schneider for cook.

Thursday, November 1, 1883.—Weather fair; minimum temperature last night, −4.0 [−20.0° C.]. Lieutenant Kislingbury is quite ill, presumably from the effects of overwork while assisting with the last load yesterday. Pavy thinks the strain may result in rupture; in any event it will be serious. He fainted twice this evening while the doctor was making an examination of the injured parts. Poor fellow! he is entirely helpless, and is dependent on his companions for assistance. Elison prepared the small four-man sledge for the contemplated trip of Rice to Cape Isabella. The rest of us did nothing but mope in our bags. Frederick was detailed with Linn and Elison to accompany Rice. I issued them provisions for eight days; at the end of this time we hope to have them again in our midst. Schneider was fortunate enough to shoot a white fox this morning which he espied prowling about our camp in quest of a portion of our scanty supply of provisions. Bender has made a small sheet-iron stove on which our cooking will be done in the future. The barrels and boxes found in the *Proteus* caches, together with our boats, oars, &c., will be used for fuel. Lieutenant Greely decided to reduce our rations, to take effect to-day, in accordance with the following list:

	Ounces.		Ounces.
Meat	4.00	Carrots	0.10
Bread	6.50	Tomatoes	.32
Beef extract	.26	Rasins	.16
Lard	.26	Pickles	.42
Butter	.49	Milk	.19
Soup	.64	Extract coffee	.43
Rice	.09	Extract chocolate	.19
Peas	.22	Potatoes	.40
Corn	.19		

This makes but little more than 14 ounces of food daily per man, on which we will be compelled to sustain life (if possible) after having endured the severest of trials.

Friday, November 2, 1883.—Cloudy weather; minimum temperature for last night, −9.2 [−22.9° C.]. Rice, Linn, Elison, and Frederick started at 8 a. m. for Cape Isabella, taking with them the large four-man sleeping-bag and provisions for eight days. They will have no protection for their bag at night except what will be furnished them by a wall-tent fly. I shot a blue fox this morning in the vicinity of our old camp; weight, 3½ pounds. Ralston shot a white one near our present habitation this evening which weighs 4½ pounds. Lieutenant Kislingbury is slowly improving in health. The cooks prepared our evening meal over the small stoves made by Bender yesterday. The manner in which this work was performed speaks volumes for the new stoves, and the result is highly gratifying to every one; and the amount of fuel consumed was

small, and the time employed in bringing the stews to the boiling-point was only forty-eight minutes. If strict economy in the use of our fuel is practiced the barrels should last us for over eighty days.

Saturday, November 3, 1883.—The weather has been clear and bright all day; minimum temperature, —9.2 [—22.9° C.]. At 8 a. m. Long returned from Rice Straits for a fresh supply of provisions with which to continue his hunting operations. He reports having killed one seal of about seventy-five pounds weight. Notwithstanding the low temperature and his weak condition, the noble fellow is indefatigable in his efforts to procure game with which to prolong the lives of his companions. Jewell is feeling quite ill from the effects of the severe labor which he has performed during the last few weeks. His constitution is evidently a weak one. Israel made an observation for latitude, but deferred its computation. Our meager diet has produced anything but a salutary effect on the minds and feelings of our party.

Sunday, November 4, 1883.—A huge hard-bread pudding for the morning meal made us all feel as happy as possible for a few hours. The sense of repletion to the stomach after eating is something of the dim past, and this terrible gnawing hunger which is ever present is fast driving us mad. I wonder if we will retain control over our minds (certainly not over our tongues) throughout the trying period which seems inevitable to us now. Long started back to Rice Straits at 8 a. m., taking with him provisions for five days more. At the end of that time we are to go down with the large sledge and bring back his tent, sleeping-bags, and game. Long saw the tracks of two bears, which had evidently been traveling together, when he was walking yesterday between Rice Straits and Camp Clay. They came from the direction of Clarence Head. As our hut is but imperfectly ventilated, the dense smoke produced while breakfast was being prepared gave us all a severe headache. At the same time nearly every one complained of an oppressive sense of dizziness from its effects.

This being the Sabbath, the old axiom, "the better the day, the better the deed," was exemplified, as far as lay in our power, by laying a foundation for the new commissary store-house. It abuts on the south end of our house; its size will be about 8 by 10 feet [2.4^{m} by 3.0^{m}], and the one entrance will be from the outside alley or passage way. The old store-house is not at all secure, some one having again broken in. Foxes are quite numerous about our encampment; we partook of a stew this morning made from them, and pronounced it excellent. Temperature, —25.7 [—33.1° C.]. Weather clear and calm.

Monday, November 5, 1883.—Clear and calm weather; temperature, —20.0 [—28.9° C.]. The temperature inside the hut ranges from +24 to +36 [—4.4° C. to +2.2° C.]. It reaches the latter point, however, only when the meals are being prepared. This enables us to feel very comfortable (?) at all times. Our room is illuminated during the day by a small blubber lamp, which emits a flame about half the size of an ordinary tallow candle and about the same power or intensity. Lieutenant Kislingbury is recovering slowly from the strain which he sustained a few days ago. All the members of the party are growing weak from the effects of this slow starvation. It is perceptible, not alone in their wan, pinched faces, but also in their heavy and uncertain gait. The construction of the commissary store-house was completed to-day, and all the provisions, except the blubber and a few barrels of bread, were moved in. Bender modified the chimney or ventilator so that the smoke could escape more freely.

Tuesday, November 6, 1883.—Clear weather, fresh northwest winds, and temperature —21.0 [—29.4° C.]. The snow-wall about the house is not progressing as rapidly as I would wish, but as all have grown so very weak, severe labor cannot in reason be expected from the poor fellows. I made an examination of the mixed tea and sugar found in the English cache at Payer Harbor, and discovered that it had greatly deteriorated from the effects of dampness and exposure. Our conversation now naturally turns on such subjects as cooking; the good and indifferent restaurants that we have known, and the good dishes which we have enjoyed. No person seems to remember that he ever ate anything which was not good. No foxes have been seen for several days. One suggests, as a solution to their sudden disappearance, that they were frightened by our dirty faces and disreputable looking clothing. An excellent stew of seal meat this evening caused us to forget our physical ills for a short time.

Wednesday, November 7, 1883.—Christiansen returned from Rice Strait this morning. He was sent in by Long, who requests that the sledge be sent down to-morrow to remove his equipments to Camp Clay. His withdrawal from the hunting grounds before the date previously agreed upon is owing to the prevailing high winds, which keep the game out of sight.

I issued the provisions for the coming week. I had estimated the weight of the blubber at two hundred pounds, but by actual weight I find that it exceeds my estimate by about ninety pounds. Minimum temperature last night, —20.3 [—29.1° C.].

Thursday, November 8, 1883.—Light winds from the south and a temperature of —31.5 [—35.3° C.] did not tend to produce agreeable impressions on the men. Notwithstanding the severity of the weather, however, a party under the leadership of Lieutenant Lockwood, comprising Dr. Pavy, Jewell, Salor, Ellis, Whisler, Christiansen, and myself, started at 7 a. m. with the large sledge for Rice Strait. At 10.30 we had reached the tent and were somewhat disappointed on learning that the seal reported some days ago by Long was the only one killed. Returning with their effects we reached Camp Clay at 3.15 p. m. In addition to the excessively hard labor of hauling a loaded sledge through the deep snow, the men suffered greatly from the effects of a burning thirst, and on reaching camp were well-nigh exhausted. An issue of hot rum was made immediately on our return, and at no time within our recollection was it ever more welcome than on this occasion.

Schneider was detected in the store-house under very suspicious circumstances, and was openly charged with having stolen provisions. He, of course, vehemently protested that he was innocent, but the fact of his being intoxicated from rum surreptitiously obtained, combined with other circumstances, rendered his guilt only too obvious. Great indignation is felt by the men, and their feelings have been expressed in language somewhat emphatic. He has been relieved from the duties of cook and Bender detailed in his place.

Friday, November 9, 1883.—Matters are growing worse and worse. It is said that honor exists among thieves; if so, in our party, where every man is expected to perform his part with just and honorable motives, no dishonest action should be noted. But it appears that hunger drives from the mind all the nobler attributes that it may have possessed, and places it on the plane in common with the lower animals. We do not know whom to trust in this dire extremity, consequently none in the future will be trusted. A can of condensed milk was found by Lieutenant Lockwood in the old commissary store-house this morning. It had been concealed by the thief under a large block of snow, and an attempt had been made to open it with a blunt-pointed knife. The contents of the can, however, are intact. The marks made by the knife in the attempt to open the can correspond perfectly with the saw-like edge of Schneider's knife. Whether or not he used this knife for that particular purpose is a matter of conjecture among us. Suspicion, however, naturally points to him in consequence of his perfidy of yesterday. Clear weather; temperature, —30.0° [—34.4° C.].

Saturday, November 10, 1883.—Those who were lying awake at midnight were startled by the sound of approaching footsteps through the crisp snow. The next moment Rice entered the room, but from the effects of exhaustion he was unable to speak for some time. At last, and in tremulous tones, the ominous words: "Elison is dying!" brought all to an upright position in their bags. After receiving a small drink of rum he stated how the party had reached Cape Isabella on the evening of the third day, apparently in good condition, and hopeful of the successful issue of their undertaking. But on starting back Elison had become exhausted, and in consequence both hands and feet were frozen, despite all the efforts of his companions. His limbs were placed in contact with the warm bodies of Rice and the others, but without avail. He was carried in their arms, and when this became intolerable he was dragged on the sledge until Eskimo Point was neared. Then Rice decided that the abandonment of the meat was necessary to insure the saving of Elison's life. This was accordingly done, and one of the Springfield rifles was left standing upright beside the cache to mark the spot. From Cape Isabella to this point they had make double trips. They struggled slowly along until the little bay just west of Rosse Bay, and separated from it by a low narrow neck of land, was reached. Here they halted, and after consulting with his comrades, Rice, the noble fellow, had started without resting, to walk to Camp Clay. Nothing has passed his lips since yesterday, except a small piece of frozen meat, which he took in his hands on leaving his companions.

At 4.30 a. m. Christiansen and myself started out with a few tempting articles for the dying man and his two suffering companions. The large sledge, with seven or eight men under the command of Lieutenant Lockwood, was to leave camp at 6 o'clock. On leaving the hut Rice told me that Elison would in all probability have passed away before succor could reach him, and that I would most likely meet Linn and Frederick on their way home with the sledge.

The darkness was intense when we started, and Christiansen and myself floundered about among the hummocks and through the deep snow for some time without advancing very far. We stumbled frequently, and often fell on the rubble, receiving serious bruises. The monotony of the tramp was sometimes broken by my dusky companion, who uttered half suppressed English oaths whenever he fell over a projecting point of ice. About noon we reached the bay and found our three brave comrades huddled together in the

one sleeping-bag in a semi-frozen state. Elison was still alive and somewhat better than when Rice had left him. Linn and Frederick were very weak, and both had frozen their faces and extremities quite severely. After much difficulty I succeeded in making a fire in the rocks above them, and cooked a meat stew, which they thoroughly relished. Later I made hot and delicious drinks, which gave new life to their attenuated frames, and in a measure restored the sluggish circulation. Elison is a pitiable sight, with his face distorted and frozen, and his limbs ice-like and useless. He repeatedly implored me to kill him that the others might be saved. I tried to cheer him with the assurance that we would all escape from these inhospitable shores and return to our homes together, but, shaking his head sadly he would repeat in a low, pleading voice, "Please kill me, won't you!"

I had contemplated placing Elison on the sledge, and with the assistance of Linn and Frederick to haul him back towards Camp Clay until the relief party under Lockwood was met with, but on communicating to them my intentions, they assured me that they could do nothing, in fact they did not believe that they could walk without assistance. There was now but one course left for me to pursue, so making the poor fellows as comfortable as possible I turned back with my faithful ally, Christiansen, to face the howling winds then blowing furiously. When near Rice Straits our eyes were gladdened by the appearance of Lockwood and his party, of Pavy, Jewell, Salor, Ellis, Schneider, and Jens, who had been traveling hard since 6 o'clock this morning. Christiansen and I took our places in the drag ropes and returned with them to the south side of Rosse Bay, where we encamped at 6.10 p. m. The gale has been terrific in its velocity, and considering their weak state it is surprising how the men have endured the severe strain while traveling under its influence to-day. Just before leaving the trio in their frozen sleeping-bag near the head of Elison Bay, I observed a fox walk deliberately to the bag in which they were lying, and attempt to enter. I aimed a blow at him with the axe which was close at hand, but missed; before I could strike again he had escaped to the rocks above.

Sunday, November 11, 1883.—We obtained very little sleep last night, owing to the low temperature and the continuance of the gale. The cook was called at 4.30 a. m., and at 6 o'clock I started forward alone to prepare breakfast for Elison, Linn, and Frederick, while the party was to break camp and follow immediately with the sledge. The poor fellows had not slept during my absence, and when I reached them they were shivering with the cold. It is almost surprising that they survived the cold of last night. They were in a half-starved, half-frozen condition, and the merciless storm had been incessantly beating down on their unprotected covering of buffalo-skin. I stopped for a moment to contemplate the scene. Nothing could be more utterly desolate, dreary, and forsaken than the spot on which those brave fellows were lying. Without shelter save such as was afforded by a small tent-fly, their bag was lying on a narrow terrace only a few feet above the ice-foot and the tides, where it was fully exposed to the fury of the winds. Above them and extending to the summit of the slope was a chaotic wilderness of rocks, through which the winds had carried great quantities of loose snow and heaped it about this place of refuge.

The alcohol lamp, with which I attempted to prepare their breakfast, refused to burn, and I next tried the few pieces of boat which they had brought with them from Eskimo Point. With this I was rather more successful, but my success was at the expense of my poor fingers, which were burned and frosted alternately. At last the men were made comparatively happy by a plate of warm meat stew, which occupied their time until the arrival of the sledge.

The sleeping-bag in which the three poor fellows were lying was frozen in such a manner that it had to be cut from top to bottom with a knife before the occupants could be liberated. Elison with much difficulty was placed in a small dog-skin sleeping-bag and warmly wrapped in a large piece of canvas. Linn and Frederick walked painfully about for a few minutes to stretch their stiffened and frosted limbs, then started to walk the seventeen miles intervening between them and the warmth and shelter of Camp Clay. We turned homeward with the sledge at 9.30 a. m. At Rosse Bay we stopped for a few moments to pick up the tent and sleeping-bags which Lockwood had left in camp. All day long we tramped slowly but steadily against a high wind. Occasionally a halt was made to change the position of Elison, or to give him a swallow of brandy, which was about the only thing he desired. At 5 p. m. we halted at the northern entrance to Rice Strait to prepare some refreshment. The wind had been blowing in our faces while passing up the strait, and in consequence every one was so thoroughly chilled and benumbed that we could scarcely erect the tent. When it was finally secured Elison was taken inside, and, under the influence of hopeful words and good-natured chaff, regained something of his former cheerfulness of manner.

At 8.10 p. m. we again started with our sledge. On entering Buchanan Strait the wind subsided, and

the moon, having risen about this time, shed its soft light over the barren ice fields, making the night one of the most attractive that I had ever known. The iron-bound coast, the chaotic masses of pulverized ice at its border, and the weird scene of desolation spreading like a pall about us on every side, heightened and intensified the forbidding aspect of these inhospitable regions, which had never before seemed so utterly devoid of redeeming qualities. A feeling of awe seemed to have taken possession of the party while it moved forward with its half-conscious burden, slowly and in silence.

Monday, November 12, 1883.—After plodding wearily along for hours, we at last reached Camp Clay at 2.10 a. m. Willing hands came to our rescue, and tenderly the sledge was lifted over the ice-foot and placed on firm footing above. Great was the rejoicing over our safe and speedy return. Never before had our wretched hut assumed the bright and cheerful aspect which it now wore, and never before had rough-bearded men evinced more sympathy in feeling and tenderness in action towards a crippled comrade than did our party. Of the condition of the party on arriving, I can speak only of myself. I was probably one of the strongest; and at no time in my life were my physical powers ever called upon to sustain a trial similar to that of last evening. Even my will-power was wavering, and in another hour I would have probably succumbed to exhaustion and the increasing cold.

Dr. Pavy considers the amputation of Elison's limbs as absolutely necessary, and fears that the process will result fatally to him. Assisted by the ever-faithful Biederbick and a corps of tender-hearted volunteers, he worked for hours to alleviate the sufferings of the injured man. Linn and Frederick arrived at 4 p. m. yesterday, both badly broken down physically. Lieutenant Kislingbury has recovered sufficiently from his accident to enable him to walk about in the alley of our hut. Temperature, —34.5 [—36.9° C.].

Tuesday, November 13, 1883.—The sun is many degrees below the southern horizon, and is daily moving farther away; even at midday the light which we receive from him is very feeble. The weather has been clear, and the moon has shone brilliantly all day; minimum temperature, —33.8 [—36.6° C.]. No work has been done. The men of the relief party are resting quietly, and are endeavoring to recover from the effects of their terrible exposure and hardships. Elison is in a very critical condition. Rice, Linn, and Frederick, although lame and sore from frost-bites and their severe labors generally, will most likely recover under a generous treatment. The others are doing well. Biederbick last evening shot a white fox, which weighed 5½ pounds.

Wednesday, November 14, 1883.—Cloudy and disagreeable weather, together with a raw and biting wind, have kept us confined closely to the house all day; temperature, —30.0 [—34.4° C.]. Nothing has been accomplished to-day tending towards our comfort for the winter. Naturally enough, considering the circumstances, all the energy has disappeared from our little band of sufferers. Our bread ration was reduced one-half ounce to-day—from 6 oz. to 5½ oz. I issued the provisions in bulk for the ensuing week. Biederbick sits up with Elison during the night and Pavy watches over him carefully during the day. He is feeling somewhat better, but still there are no hopes entertained for his recovery.

Thursday, November 15, 1883.—Clear weather; fresh westerly wind, and a temperature of —38.2 [—39.0° C.] caused us to seek the seclusion of the hut during the greater part of the day. We worked, however, for a short time this morning on the commissary store-house, plastering it with moiste ned snow, so as to render the structure stable and unyielding to the gales which will probably visit us this winter. At 11 a. m. the temperature rose to —33.5 [—36.4° C.]. Elison appears to be improving slowly. There is evidence this morning that some person entered the store-house last night without authority for so doing.

Friday, November 16, 1883.—The wind howled dismally about our habitation yesterday and all of last night. At times it blew with great velocity and threatened our destruction by well-nigh unroofing our house. The barometer has fallen half an inch [12.70^{mm}] in the last twelve hours, and a corresponding change in the temperature has also taken place. The minimum temperature last night was —22.0 [—30.0° C.], but at noon to-day it had risen to —12.0 [—24.4° C.]. The spring tides overflowed the space west of the house bordering on the ice-foot, and the water rose several inches on the outside of the hut, but was prevented from flooding us inside by the thickness of the snow-bank surrounding the building. We inclosed the vestibule and put on a canvas roof, securing the whole with moistened snow or "mush," as it is called by some, which, freezing quickly, renders the walls as firm as if hewn from solid ice.

Saturday, November 17, 1883.—Cloudy weather, light westerly winds, and temperature —12.0 [—24.4° C.]; minimum, —28.0 [—33.3° C.]. I placed a wooden door at the entrance to the commissary store-house, and as an additional safeguard supplied it with a lock and key which we found in the *Proteus* wreck cache. This we hope will be an effectual bar to all midnight marauders. The patients are improving

slowly notwithstanding the small amount of food on which we are now living. We are doing better on this low diet than my most sanguine hopes had ever anticipated. Our eyes and lungs are very much affected by the thick smoke, which is unavoidable in cooking with damp wood and with a stove possessing no pipe for conveying it away. Biederbick is suffering with a swollen finger, the nature of which is similar to the felon on Gardiner's finger.

Lieutenant Greely entertained us this morning with a description of the physical conditions of North America, in which he is well versed. In his remarks he confined himself principally to the United States. This will be followed by lectures on astronomy by Israel, and on natural history, physiology, and the history of France by Pavy. The evening's entertainment will be contributed to by all the other members of the party, who will relate their early experiences, converse on various subjects, and read aloud from the few books in our possession.

Sunday, November 18, 1883.—Weather cloudy; light westerly winds; minimum temperature, —14.0 [—25.6° C.]. Rice and myself placed a flag (an old coat) on one of the spare oars and planted it on the extreme outer point of this peninsula, where it may readily be seen by any relief party approaching from Littleton Island. We are still using water from the small lake southeast of the hut. The benefit accruing to us through its use cannot be calculated, as it enables us to economize greatly in the use of fuel.

Monday, November 19, 1883.—Calm and cloudy weather; temperature, —35.2 [—37.3° C.]. I opened the remaining barrel of dog-biscuit to-day and was agreeably surprised to find all except a few pieces in good condition. An odor of mustiness, however, pervades this entire barrel as well as all those found in the English cache. It is indeed hard to be compelled to subsist on food which any well-bred dog would refuse. If we could have even plenty of this kind we would not mind our situation so much, but the limited quantity on which we are now living is nothing more than an aggravation.

Long and Jens each shot a fox to-day. Instead of being issued in lieu of our regular meat they will be added to our Sunday evening meal. The intestines of these animals, and in fact everything of them except the skin, is used in our stews and eaten by the famishing party without the slightest feeling of repugnance. The invalids appear to be doing well; Elison especially appears in a cheerful frame of mind, considering his sufferings. Some person who did not fear the just vengeance of an outraged party was heard last night fumbling about the shelf on which one of the bread boxes was kept. A match was at once struck, but at the first intimation of a light the would-be thief slunk into his bag without being detected. Night before last a large piece of chocolate was stolen from the mess stores of Long—the cook in Lieutenant Greely's mess.

Tuesday, November 20, 1883.—Calm and cloudy weather; minimum temperature, —16.0 [—26.7° C.]. No work has been done on the house to-day owing to the feeling of lassitude so prevalent in our party of late. The sick are doing as well as can be expected, considering the gloom and dampness of the hut and the impoverished state of their systems from insufficient nutrition. Inside the hut the temperature ranges from +14 to +25 [—10.0° C. to —3.9° C.]; sometimes it rises above +32 [0.0° C.] when the fire is lighted, but falls immediately when it is extinguished.

We experience the greatest discomfort from the cold and find it necessary at times to exert ourselves by knocking the feet together in a most frantic manner to prevent them from freezing. Our bags are frozen firmly to the ground, and the hair inside is filled with frost. On lying down at night the warmth of our bodies thaws this frost, and the moisture thus produced is absorbed by our garments, which are usually saturated before morning. It is feared that this exposure will sow the seeds of disease which can never be eradicated from our systems.

Wednesday, November 21, 1883.—Cloudy and disagreeable weather; temperature, —23.5 [—30.8° C.]. A fresh westerly wind has been moaning dismally through the rocks above the hut, causing us to shiver with discomfort and dread.

The daily routine of our lives in this wretched hut is about as follows: The cooks (Frederick and Long) are called at 6 a. m., and breakfast is usually ready at 7 o'clock, and is always eaten by all except the cooks without leaving their sleeping-bags. When this is over, and while the cooks are clearing away the refuse of the meal, the conversation becomes general. As might be expected, the favorite subjects for discussion are cookery, and the good dishes that we remember to have partaken of in the past. Between 9 and 11 o'clock Lieutenant Greely discourses on the geography of the United States, both physical and descriptive. I then go out and issue provisions to the cooks for the following day, and one of the others goes to the lake to cut a hole through the ice to provide the cooks with water for the next two meals. It

is also the duty of this person to empty the contents of the large urinal in the alley. At 2.30 p. m. the cooks light their fire for the preparation of dinner, and at about 4 o'clock the meal is served. We then sit up and converse on all sorts of subjects until 6 o'clock, when the readings begin. We retire usually between 8 and 9 o'clock. I issued provisions to-day for the coming week, except the bread, which I issue daily to avoid extravagance. The list of those who are invalids is recorded as follows: Lieutenant Kislingbury, rupture; is now convalescent. Henry, toe frost-bitten; very bad. Elison, both upper and lower extremities frozen; condition considered critical in the extreme. Gardiner, felon on forefinger; is improving slowly. Linn, rheumatism, and system broken down from recent exposure; mind also affected. Biederbick, felon on forefinger; condition doubtful. Salor, lame back, but is able to go out occasionally. Connell, very weak from the reduced diet. Cross, foot frost-bitten; is improving. Bender complains frequently of soreness in his chest and of lame joints. A bounteous repast was served this morning, with which every one was well pleased. It consisted of seal-skin and fox intestines, together with moldy dog-biscuit. Nothing approaching food is ever wasted with us, and it is a notorious fact that the cooks are not over careful in cleansing the fox intestines. A fox was seen to-day, but was too wary to approach within reach of our ready guns.

Thursday, November 22, 1883.—Long and Christiansen each shot a blue fox to-day. I walked along the ice-foot bordering the peninsula in search of these little animals, but saw nothing. The sky has been beautifully clear and cloudless, the weather calm, and the temperature —28.0 [—33.3° C.]. Standing on the highest point of the peninsula to-day I could discern the dark outlines of the distant Greenland coast. To my intense satisfaction no water-clouds were anywhere visible in that direction, and it is to be hoped that this low temperature, acting in conjunction with the slack tides, will close the sound early and provide a bridge for our relief and deliverance from this horrible bondage. Another stew served this evening was thickened with the rotten dog-biscuit. I believe that the hungriest cur on the streets would refuse this wretched apology for food.

Friday, November 23, 1883.—Calm and cloudy weather; minimum temperature, —41.2 [—40.7° C.]. Long and Christiansen each again shot a fox. Nothing worthy of note has been done except that another hole has been cut through the reservoir, and water to the depth of nine inches [229^{mm}] was found. This will be sufficient to supply us for a long time with all the water needed.

Saturday, November 24, 1883.—Calm and cloudy weather; minimum temperature, —26.0 [—32.2° C.]. All manner of schemes for our future welfare are being discussed. Ralston is trying to persuade some of his companions that they should join him in establishing a colony at some place in Kansas. Rice and myself are also discussing some schemes which as yet are only visionary, but which we trust will assume some tangible form as soon as a favorable opportunity occurs for their consideration. Frederick, or "Shorty," as he is more familiarly known, gave us this evening a brief but very interesting sketch of his life.

Sunday, November 25, 1883.—Calm and cloudy weather; temperature, —25.0 [—31.7° C.]. No water-clouds in the direction of the Greenland coast being visible to-day, our confidence in the freezing over of the sound at an early date has been restored. Should this occur, we will be enabled to effect our escape as soon as the sun returns. Saturday evenings are set apart for the narration of personal adventures and experiences, and are the most enjoyable and interesting evenings that we have. Christiansen shot a large blue fox which weighed 4¼ pounds.

Monday, November 26, 1883.—Clear; light westerly winds; temperature, —36.5 [—38.1° C.]. Albert Head, Cape Camperdown, and the remainder of Bache Island, were distinctly outlined against the northern sky at noon. Jens thinks that water-spaces exist near the middle of Kane Sea, but he is of the opinion that Smith Sound is frozen over between Cape Sabine and Cairn Point. I also went to the hill to confirm his impressions, and, from my observations while there, consider the indications favorable for our release, if the cold continues and no gales appear to break the ice.

Tuesday, November 27, 1883.—Clear weather; minimum temperature, —43.5 [—41.9° C.]. A westerly wind, which blew with a velocity of twenty miles per hour [8.9^{m} per second], sprang up suddenly this evening. I sent Christiansen to the little elevation above Camp Clay for the purpose of observing the condition of the sound. He reported on his return that the ice, in his opinion, was firmly frozen across the channel.

Wednesday, November 28, 1883.—Clear weather, with light westerly winds; temperature, —34.0 [—36.7° C.]. I issued provisions to-day for the ensuing week. We are all looking anxiously forward to the royal feast which occurs to-morrow—Thanksgiving-day: Rice, 3 pounds; raisins, 2½ pounds; lard, ½ pound; milk, 1 can; extract of coffee, 1 can; and extract of chocolate, 1½ cans, will be issued extra to-morrow to

celebrate the occasion. This Thanksgiving will indeed be a great change from others held in memory. Where will we be next year at this time? I find that a bag of bread which I had estimated at 70 pounds has exceeded my estimate by 46 pounds. A seal has also weighed 8 pounds more than my estimate had placed on him. I hope that all our weights will come out ahead as these have done. Another fox was seen near the hut this morning, but he escaped to the rocks before a gun could be brought. Jens has been working on a trap for the capture of foxes.

Lieutenant Lockwood has made a proposition to the party to this effect: Each person will make out a bill of fare which he (the lieutenant) will record in shorthand. These bills will be consolidated, and a copy furnished to each man. If we are fortunate enough to escape with our lives from this place, each member of the expedition will be expected to adhere, as closely as possible, to his bill of fare on each succeeding birthday, as circumstances may allow.

Thursday, November 29, 1883.—Cloudy weather; light westerly winds; temperature, —14.0 [—25.6° C.]. The day has been passed pleasently enough; in fact I think I may say with perfect sincerity that it has been one of the most enjoyable of my life. A double ration of coffee, which was served for breakfast, will ever be held in grateful remembrance. At 2.30 p. m. a stew of fox meat and bacon was served; following this came rice pudding, chocolate, and seven ounces of bread. Twenty-five gills of rum and twelve lemons were used by Frederick in making a punch. This was pronounced by all as being the best of its kind. After the punch had been disposed of, songs and stories filled the interval until midnight, when we retired feeling better and more hopeful of the future than we had felt for weeks. For the first time since we were drifting in Kane Sea, we can feel a sense of repletion after eating.

On examination of the bags of bread found in the *Proteus* cache, I discover that one had been wet, and is now covered with a blue mold. It will be used in small quantities to improve (?) the stews.

Friday, November 30, 1883.—The snow has been falling rapidly all day; temperature, —5.0 [—20.6° C.]. A disagreeable drip of moisture from the roof of the hut is the result of this high temperature. It falls like rain on our sleeping-bags, and the resulting dampness inside renders our condition wretched in the extreme. The party is feeling somewhat dull to-day. This lethargic condition is probably due to the over-feeding of yesterday. If it should be proved that this is true, we may rest assured that the complaint will not visit us often.

Sunday, December 1, 1883.—Light westerly winds and clearing weather; temperature, —7.2 [—21.8° C.]. During the evening the wind veered to the east and blew with great velocity from that direction. The house was shaken to its foundation, and the flying snow was driven underneath the edge of the boat into the interior of the hut. The sound is now entirely open as far north as Cape Albert, and the roar of the grinding pack is heard by us while lying in our sleeping-bags. The high hopes which we had entertained of escaping from this place by the frozen sound have, for the present, been dashed to the ground. The drip from the roof still continues, and our sleeping-bags are now thoroughly drenched. The suffering incident to this condition of clothing and bags in low temperatures is not within my power to describe; it can be imagined only. The doctor thinks that the hands and feet of Elison will have to undergo amputation.

Sunday, December 2, 1883.—The high wind mentioned yesterday having increased to a gale during the night, physical sufferings of the severest nature were thereby caused. We momentarily expected our only protection—the boat—to be carried bodily away by the storm, but it sustained its reputation for stability and remained where it had been placed some weeks ago. The snow drifted in under its edges and covered the six men, including myself, in my section of the house to a depth of over a foot [.3^{m}]. It was a most miserable night, and one which I shall long remember from the sufferings which were experienced. The roof of the vestibule was blown away, and the space between the walls was filled with snow, and our only door to the outside blockaded. The commissary store-house was also filled with the drift. Several hours had elapsed before order was entirely restored and our house again in a habitable condition. We then began to realize how extremely weak this starvation diet had made us. The pieces of wood which we had taken from the whale-boat were blown away, and the minimum thermometer—the only one in our possession—was also lost. The hard-tack pudding (a mixture of salt-water and bread) is considered a most delicious and satisfactory meal, and is one that is looked forward to during the entire week with anxiety and pleasant expectation.

Monday, December 3, 1883.—A violent wind arose soon after midnight, but by breakfast time it had entirely subsided. During its progress the vestibule and store-house were again filled with snow, and the greater part of the day was spent by "reliefs" in clearing this away and in repairing the dilapidated roof.

A portion of the wood which was so widely scattered yesterday was collected and secured. A prolonged search by Ralston revealed no trace of the lost thermometer.

Tuesday, December 4, 1883.—Brisk westerly winds have been howling over our house since yesterday; this evening they were accompanied by snow and heavy drifting. By the new thermometer, just exposed, the temperature is —8.0 [—22.2° C.].

If the dense, dark clouds hanging in the sky to the eastward are a correct index, a vast expanse of water must exist in Smith Sound. Our chances of crossing to Littleton Island on the ice are narrowing slowly, but we still retain slight hopes of being able to do so before April. The invalids appear to be mending slowly. Our conversation, as usual, turns on the subject of food; it seems as if we can never tire of this; it is the one all-absorbing topic in which we are interested, and very naturally too, I think, when of all our miseries hunger predominates. All our energy appears to have departed, but we ask ourselves, "Is one supposed to possess energy when the means of sustaining life has been withdrawn from him?" I think not. Notwithstanding the lack of energy for work, some have developed remarkable powers as grumblers, but making all due allowance for our condition, little fault should be found with the free expression of these minds, made morbid by long and continued suffering; besides, were these feelings to remain pent up, an injurious effect might be wrought on the general health. A highly-flavored stew of fox intestines and seal-skin was enjoyed and favorably commented on by all this evening.

Wednesday, December 5, 1883.—A gale broke suddenly on us at 3 a. m., but subsided at about noon, the sky clearing beautifully. In the evening, however, the gale rose again with great fury and threatened the destruction of our quarters. The door was snowed up, the vestibule blown down, and the commissary house damaged to a considerable extent. Just before noon we were not able to see more than thirty yards [27^{m}] away on account of the blinding drift. Temperature at 1 p. m., +7 [—13.9° C.].

I issued nothing to-day except the necessary bread.

Thursday, December 6, 1883.—We are now having a series of gales which are doing great damage to the ice, and prevents the sound from freezing over. The wind again rose this morning from the west, and continued to blow without interruption all day. These storms have caused a disintegration of the floe even to the ice-foot in the little cove west of the hut. From the hill I observed numerous pools and lanes in all directions, and dark water-clouds hover over Smith Sound to the southward and extend northward to Cape Camperdown. The turbulent pack, grinding and crumbling as if contending for the supremacy of the waters, produces a mournful rumbling sound, which strikes terror to the heart of the listener. Temperature, —10.0 [—23.3° C.]. I discovered that two barrels and several large sections of the boat had been blown away in the melee of the elements last night. After a long search they were found in various places in the rocks above camp and along the ice-foot, and were restored to their places. Long was fortunate enough to shoot a three-pound fox just before breakfast. I issued the week's supply of provisions.

Friday, December 7, 1883.—Brisk westerly winds; temperature, —21 [—29.4° C.]. The moon made her appearance this afternoon; the light shining through the clear atmosphere produced a very pretty effect on the desolate country adjacent to Camp Clay. The water-hole in the lake, having been neglected for several days, was found entirely closed this morning, and great difficulty was experienced in getting it through again. Rice and myself cut a large hole, finally reaching the water after great exertion. Every one is weak, and some are disheartened at the gloomy prospects before us. For several days I have endeavored to induce them to repair the damage done the vestibule by the late storm, but in vain; sufficient energy does not at present exist among us to do this work.

Saturday, December 8, 1883.—Clear weather, brisk northerly winds, and a temperature of —24.0 [—31.1° C.]. The pack appears to be in a great commotion again to-day; there has been scarcely a moment since morning but that it could be heard crashing against the rocky point of our peninsula, and being tumbled about by the current outside. The party worked in the vestibule this morning, clearing and shoveling away the snow and débris which had collected during the past few days. A fox was observed near the hut this morning, but he scampered away just in time to avoid an introduction to a charge of shot. Later than this, however (10 p. m.), I was fortunate enough to kill two blue foxes at the same time. This is considered rather fortunate in view of the darkness and my indifferent marksmanship.

Arguments are legion, but unfortunately there is often a tendency to acrimony in these discussions. One suggests, as a solution to the presence of so much feeling in small matters, that we are being too well fed. Our conversation to-day has been chiefly on the subject of food. Lieutenant Lockwood especially is an earnest debater on subjects of this nature.

Sunday, December 9, 1883.—Clear weather, brisk westerly wind, and temperature —30° [—34.4° C.]. Long shot two foxes this morning. These, together with the two killed by me yesterday, weigh 13⅜ pounds. At the present rate of issue this game furnishes the meat ration for two days. A fine stew of hard bread and sea-water was relished and enjoyed by all of us this morning. A stew of seal meat was served for dinner, and thin and watery as it was, it would have made us supremely happy had there been twice the quantity. These hot drinks and warm stews appear to be the one source of life to us. Taken cold, their effect in serving to resist the dampness and frost would, to a certain extent, be lost.

Monday, December 10, 1883.—A westerly gale has been blowing all day, and our condition, both mental and physical, has been rendered miserable in consequence. A fox was observed in the vicinity of the house, but, unfortunately, he escaped before a gun could be brought from the interior of the house. The party confined themselves closely to their sleeping-bags to-day, and discussed the latest incongruous combination of hash. Temperature, —27.0 [—32.8° C.].

Tuesday, December 11, 1883.—Temperature, —20 [—28.9° C.]. The wind subsided during the morning, the sky cleared, and delightful weather followed. Bache Island loomed up in the distance, sharply outlined against the northern sky. No water-clouds visible to the north or east. The vestibule was repaired to-day. I worked nearly four hours on this structure, and just before its completion was overcome with dizziness; in falling I was revived by striking against the sledge. Jens assisted me into the house, and after a brief period of rest I feel all right again. The wind has risen this evening, and it is now drifting very hard outside. Several members of the party are entirely out of tobacco, and the deprivation is making a bad impression on their minds; some are even willing to exchange their food for it. I am grateful now, if never before, that I care nothing for this weed in any form.

Wednesday, December 12, 1883.—Temperature, —25 [—31.7° C.]. Clear weather; light westerly winds. I issued the weekly rations to the cooks this morning. This is a most irksome task; my fingers have been frost-bitten so frequently in connection with these issues, that they are now very sore and tender. Standing for so long a time in the low temperatures of the store-house and handling the brass cartridges which are used as weights, my hands and feet become benumbed and my body thoroughly chilled.

Accusations were made against Frederick, who is acting in the capacity of cook, by Dr. Pavy, Henry, Bender, and one or two others, of unjustly dividing the food. Frederick has worked faithfully all winter, and everybody except the few who prefer the charges believe him innocent. To avoid discord, however, Lieutenant Greely has directed that other members of the mess make the divisions, but Frederick will still do the cooking.

Thursday, December 13, 1883.—Temperature, —25 [—31.7° C.]. These disheartening winds still continue to blow with undiminished velocity. There was nothing done outside except such work as belongs to the daily routine. Geographical sketches of the United States, by Lieutenant Greely, are given every evening and are highly entertaining.

Friday, December 14, 1883.—Weather clear and calm; temperature, —17.0 [—27.2° C.]. The evening is beautifully clear, and the angular cliffs of Bache Island stand out in bold relief against the sky. The snow which was accumulating in the commissary store-house for several days past has been removed to-day. Christiansen shot a 4½ pound fox this evening. Very little energy is apparent in the party now, and very little is expected under these circumstances. The condition of three members of the party would seem to indicate the presence of scorbutic symptoms.

Saturday, December 15, 1883.—The beauty of the moon's halo to-day was doubly enhanced by the hazy atmosphere through which we viewed it. Temperature, —17.0 [—27.2° C.]. A high westerly wind sprang up suddenly during the evening, and light snow began falling about the same time. No water-clouds were observed over the sound by the numerous visitors to the ridge. The water-hole in the lake was again found entirely frozen up, but through the energy of Ellis it was recut, and an abundant supply of water again furnished us. I visited the old camp in search of foxes, but saw nothing. The flag planted near the spot by Rice and myself was found to have been blown down by the recent gales, and the staff broken. A stew consisting of fox intestines, hearts, livers, lungs, &c., together with a small quantity of seal-skin, furnished us with a most satisfactory and refreshing breakfast.

Sunday, December 16, 1883.—Temperature, —21.0 [—29.4° C.]. High winds, which are causing a blinding drift, make us feel positively wretched, confined as we are to the limited space which our frozen sleeping-bags afford. Dr. Pavy tells me that he can probably save one of Elison's feet; the other, and all his fingers, he will lose. The amputation, he thinks, will not be necessary until we reach Littleton Island in

March. A hard-bread pudding, rich with rice, raisins, and seal blubber, caused us to feel comparatively happy. Although I have never cared anything for smoking, the two cigarettes presented me by Lieutenant Kislingbury just after breakfast were nevertheless greatly enjoyed and appreciated. Regularly every Sunday there is an issue to each man of ½ gill of rum and ¼ of a lemon.

Monday, December 17, 1883.—Cloudy weather; light precipitation of frost this evening, and temperature —13.0 [—25.0° C.]. I cleared the snow from the vestibule this morning; no one except Rice was willing to assist. He is always as ready to do as much for others as for himself. Long and Frederick are the cooks for the two messes, and as such are not expected to perform any outside work. Unless some of the men exhibit more ambition, we will never be able to save ourselves from disaster in the contemplated trip across Smith Sound. I am very weak myself, but when the others complain so bitterly of the same condition, I cannot refrain from doing work which should be performed by others. This afternoon, while working outside, my strength left me and complete prostration followed. I was once so strong and self-reliant that it seems almost incredible that my strength should have been diminished until it will scarcely equal that of a child. Tears spring unbidden to the eyes when I see the reflection of my emaciated features in our mirror, and when I feel my shrunken and well-nigh useless muscles.

Tuesday, December 18, 1883.—The weather is clear and calm; temperature, —17.0 [—27.2° C.]. This is the most beautiful evening that I remember ever having seen. The stars gleam and scintillate brilliantly, like diamonds in their setting of deep blue, impressing the beholder with a feeling of wonderment and awe.

One phase of our starvation diet is that during the discussions which arise frequently in connection with different articles of food, nearly every one reproaches himself for not having eaten more heartily when he had the opportunity, and there is no person in the party who appears to recollect having disliked any dish of which he has ever partaken. Bender's chest complaints appear to have revived again; the trouble tends rather to irritate than to quiet his tongue.

Wednesday, December 19, 1883.—High westerly winds have caused a blinding drift all day, which prevented the party from going outside except for a few moments at a time; temperature, —21.0 [—29.4° C.]. I issued the rations this morning for the ensuing week. When volunteers are called for to perform certain odd jobs necessary to the health and comfort of the entire party, no one responds except Rice, Salor, and occasionally Schneider. Cross saws and prepares the wood for the use of the cooks. When high winds prevail the draft in the hut is increased, and the smoke from the stoves when the meals are being prepared passes out through the ventilators with facility and occasions us but little difficulty; but on calm days it flows out sluggishly, and in consequence we are often nearly suffocated.

Elison's feet are black, shrunken, and lifeless; his ankles especially are a horrible sight; the flesh has sloughed away, leaving the bones entirely devoid of covering. He suffers much, but is very patient, and bears his troubles with manly and heroic fortitude.

Thursday, December 20, 1883.—Clear and calm weather; temperature, —25.3 [—31.8° C.]. This has been the most pleasant day that we have known for weeks. The atmosphere is so clear that Bache Island is distinctly outlined. The order of exercises for every day in the week except Saturday and Sunday is about as follows: The cooks (Long and Frederick) rise at 6 a. m. to prepare breakfast. Cross then prepares the wood with which to cook the next two meals, and Lieutenant Greely begins his instructive and highly entertaining descriptions of the different portions of the United States which he has visited. At noon I make the daily issues of rations. One man in turn each day opens the water-hole at the lake and supplies the cooks with what they require. At 2.30 p. m. dinner is started, and from 7.30 to 9 o'clock the Bible and other books are read. We usually retire at the latter hour. During the daytime the conversation generally reverts to the subject of food, and many copious orders are given from well-filled bills of fare, and many an imaginary dinner eaten. We also speak of our future prospects and our present deplorable condition. Christiansen shot a white fox, which weighed 4⅛ pounds.

Another spring tide has just passed, and this time the ice in Smith Sound was probably not broken up under its influence. There at least is no indication of open water towards the Greenland coast. This fact is rather cheering to us, and will serve to infuse new life and vigor in the half-torpid minds of the party. There is considerable speculation on what may be in store for us at Littleton Island. I find that my estimates of bread and meat were too low; consequently the provisions will be extended several days beyond the limit assigned. I wonder if my scales have anything to do with this discrepancy? In the issues this week, instead of the usual seal-skin for stew, the flippers and intestines of Long's last seal were used. These

will be augmented by the intestines of foxes killed from time to time, together with a small quantity of the moldy hard bread. Bender appears to be improving.

Friday, December 21, 1883.—Weather clear and calm; temperature, —29.0 [—33.9° C.]. There is now no indication of open water in Smith Sound. The natives are of the opinion that the ice is in a favorable condition for traveling. The noble fellows inspire us with hope for the future by assurances of plenty of game when the sun returns.

Two events occur to-day, one of which is interesting to me alone. One is the winter solstice, and the other the 27th anniversary of my birthday. At my home to-day they are most likely discussing our probable fate, and perhaps they mourn me as lost to them forever. How I wish I could tell them that I am in no immediate danger, so that their minds might be relieved from the burden which thoughts of this kind must bring. Lieutenant Kislingbury was kind enough to give me a cigarette to puff while I drank my birthday rum. This is a new kind of dissipation and one I regret cannot be indulged in more frequently.

I shot a fox at 4 p. m., which weighed three pounds and twelve ounces. There are evidently two distinct species of the arctic fox, as the white foxes weigh about two pounds more than the blue foxes. Some, however, contend that there is but one species, owing to the change which is gradually taking place in the blue foxes, *i. e.*, the turning of blue to a dirty white or gray color. A strict account is kept of the intestines of these animals and they are alternately issued to each mess. The heart and liver, however, are the perquisites of the hunter. As an incentive for the natives to be vigilant and watchful for game, an ounce of tobacco is given them whenever they succeed in shooting a fox.

Saturday, December 22, 1883.—The sky has been wondrously clear and bright, and not a breath of air has been stirring to ruffle the serenity of our out-of-door promenade; temperature, —29.0 [—33.9° C.]. We remained quietly in our bags during the greater portion of the day, meditating on the probable fate of our forlorn party. Even the dire calamity which now confronts us is not sufficient to repress the exuberant flow of good nature so conspicuous in our party. A stew of moldy hard bread and one can of ox-tail soup made a fine, comparatively rich, dish for our mess of twelve this evening. At Fort Conger ten cans of this soup were required as an introduction to the dinner; now two cans serve to constitute the dinner for the same number of men. Jewell is suffering with a sore finger (probably a felon), which is similar to those by which Gardiner and Biederbick are afflicted.

Sunday, December 23, 1883.—Temperature, —24.5 [—31.4° C.]. Clear and calm during the morning, but as evening approached the sky clouded and a blustering wind arose, which caused much drifting and much discomfort to the inmates of out wretched hovel. Several foxes were seen, but all proved too wary for our weak and methodical hunters.

We are having considerable trouble with the water-hole at the lake. With his usual disregard for the uture, Whisler broke the ice-chisel and left it, hopeless of recovery, fastened deep in the narrow hole which he had made. Among those who turned out to repair the damage, Rice and Salor were conspicuous for their energy. Ellis also came in for a fair share of glory in this respect, as he fell down in a fainting fit on reaching the hut, after having worked faithfully for a long time. Lieutenant Kislingbury and myself were the last to go out, and not until we had worked for three hours did we succeed in striking water. We were greatly weakened and exhausted in consequence of this exertion. Ice had to be melted this evening for tea, the hole not having been cut until after 9 o'clock.

Pavy tells me that the prospects for the recovery of Elison are favorable. It is thought, however, that he will lose all his fingers and both his feet. Many complain that their feet are sore and swollen to such a degree that they are nearly deprived of their use. The frost-bitten feet of Henry and Cross are especially bad, and they do not appear to improve very much. Adequate warmth and nourishment will now do more to infuse new life in the emaciated frames of our band of sufferers than anything else. The poor cooks retired at an early hour this evening, both ill from inhaling the smoke caused by burning damp wood while cooking. While the meals are being prepared our room is usually filled with a dense smoke, which nearly suffocates us. All except the cooks can protect themselves somewhat by crawling down into their sleeping-bags and covering the entrance closely. It is necessary for the cooks to stand over the fire, and, with their faces close to the stove, blow like a pair of bellows in order to hasten the burning.

I exchanged half of my bread-pudding for half of that of another, to be given me on some future morning. We frequently resort to this method in order to secure a full meal. There is one drawback, however, to this plan; it is necessary to go hungry to-day in order that we may feast to-morrow. Whisler has been particularly disagreeable to-day, and not at all choice in the language used towards his companions.

None of his frequent invitations—issued promiscuously—to go out and fight him have been accepted. But, under the trying circumstances, I do not think he should be credited with too much blame for what he has said and done, for we are more or less "cranky," and I only wonder that we are not all insane. We are all inclined to be rather sullen, and at times even surly.

I wonder if we will survive the horrors of this ice-prison?

Monday, December 24, 1883.—Weather clear; light westerly winds; temperature, —22.5 [—30.3° C.]. Foxes have again been seen, but, as before, escaped the guns of our vigilant hunters.

By direction of Lieutenant Greely I made extra issues for Christmas, as follows: Rice, 3 pounds; raisins, 2½ pounds; blubber, 2 pounds; lard, 1 pound; bread-dust, 4 pounds; sugar, ½ pound; milk, 1½ cans; extract of coffee, 1 can; extract of chocolate, 1½ cans; cloudberries, 1 can; rum, 12 gills, and 6 lemons.

Dr. Pavy is suffering with nervous chills, and we all feel greatly alarmed, for, without his professional advice and skill, our situation would be most deplorable.

The new water-hole in the lake has proved to be a complete success, and the chisel broken by Whisler has been recovered and repaired by Schneider. Salor is 32 years of age to-day.

Tuesday, December 25, 1883.—A merry (?) Christmas. Clear and calm weather; temperature, —35.5 [—37.5° C.]. Lieutenant Kislingbury celebrates his thirty-sixth birthday. Foxes were seen about camp to-day, but none were shot.

Our bill of fare has been substantially the same that it was on Thanksgiving, except an increase of one ounce of bread to each man. The best of good feeling has prevailed and three cheers were given for Lieutenant Greely, Elison, Rice, and the cooks.

The records from Brevoort Island, which were found by Rice in October, were read again to the satisfaction of all; the prophetic letter of our friend Clay was also again read aloud and many moistened eyes were observed at its close. I have all along placed such implicit confidence in the ability and sound judgment of Lieutenant Garlington, that I believe he is at Littleton Island and will cross to us during the full moon in January. There are very few who share my rather sanguine expectations in this connection. The rum punch brewed by Long and Frederick was the best that I have ever tasted (in Camp Clay), and our only regret is that the quantity was not greater. Strange as it may appear, every one felt satisfied at the conclusion of dinner.

I replaced the broken flag-staff at our old camp. While crossing the ridge to visit this place, I had a very good view of the sound, but could see no water-clouds in the direction of the Greenland coast. This fact strengthens our hope of being able to reach the coast of Greenland during the month of March, or that assistance may come to us from that side.

The evening, until after 10 o'clock, was devoted to songs, national and sacred, in which the two Eskimo joined with their wild but sweet native melodies, and the Danish national hymns. The spirits of the party are wonderfully exuberant and joyous in view of our prospect, and should they continue in this way there will be no immediate danger of losing our minds. What a contrast is ours to the party of walrus hunters who were cast away for the winter in Spitzbergen; and although having abundance of food, every man perished in consequence of depression of spirits and from having eaten salt food instead of fresh, when there was an abundance of the latter at hand.

Wednesday, December 26, 1883.—Owing to our dissipation of yesterday no one awoke until 7 o'clock this morning. Frederick and Long are not feeling at all well on account of the injury to their eyes, resulting from the smoke yesterday. In making the weekly issue to-day fox meat was used for two days in lieu of seal. If our supply of fuel and fresh water becomes exhausted, we can eat the seal meat in its raw state. We all enjoyed a stew this morning made of seal-tail, or flipper, fox intestines, and rotten hard bread. Near the hut this evening I shot a fox , which weighed three pounds and two ounces.

Thursday, December 27, 1883.—Clear and calm weather; temperature, —39.5 [—39.7° C.]. A cold, raw day.

Rice having volunteered for the hazardous duty of visiting Littleton Island in quest of information regarding the relief expedition, we had a long discussion over the matter last evening. These long conversations have a very beneficial effect on the mind, in engaging and turning it from the gloomy reflections with which it is crowded. During this discussion many hopeful suggestions were made, and at its close we all felt better and more cheerful than we had previously. It is indeed singular how calmly and with what stoicism we speak of the inevitable result if relief does not come to us soon. When we consider the uncertainty of the future—the ominous clouds of despair hanging over us like the sword of Damocles—it is

indeed wonderful to remark the bright, joyous spirits of the men. It certainly has no parallel or precedent in the annals of arctic history.

It is the opinion of Frederick that Elison brought on himself this dire disaster, of the loss of his limbs, through his indiscretion in eating snow while on the journey to Cape Isabella. Linn also came nearly being a victim to the same injudicious act. The exhausting and debilitating effect of eating snow while traveling in low temperatures is so well known to both Linn and Elison, that I am surprised that men of their intelligence should have done just the thing which of all others should have been avoided.

Friday, December 28, 1883.—Clear weather; light westerly winds; and temperature —35.0 [—37.2° C.]. To eke out our scanty supply of fuel, we are now using a small quantity of tarred rope at each meal, in connection with the barrel-staves. It is quite successful as fuel, but the dense smoke which it creates is almost unbearable. The fox-meat stews are not at all satisfactory, owing to the great number of bones. Their value is fully 50 per cent less than the stews of seal meat. Fearing that our fuel will not last as long as our provisions, Lieutenant Greely has directed me to issue ten pounds of blubber to the cooks for their use in experimenting. To this issue Lieutenant Lockwood objected, and a very disageeable discussion followed. I am now issuing the frozen bread which we found in the *Proteus* wreck cache.

Saturday, December 29, 1883.—Fair weather; temperature, —31.5 [—35.3° C.]. The wind changed to easterly last evening, and blew with a velocity bordering on that of a gale. This morning it had entirely subsided, and pleasant weather prevailed all day. The greater portion of the day was spent in making bargains for the exchange of different articles of food. There is now a regular system of marketing carried on each day by those whose wits have been sharpened by trading or swapping in earlier days. Cross and Bender have been excused by the doctor from the performance of any duty. The frost-bitten foot of the former is much worse, proud flesh having appeared. I dug out of the snow the last piece of the whale-boat *Narwhal*, and it will be burned at once.

Sunday, December 30, 1883.—Cloudy and windy weather; in the evening the wind blew strongly from the east, and the temperature stood at —21.2 [—29.6° C.]. How secure and thankful we should feel in this strong house, miserable and cold as it is, where the howling storm outside cannot reach us.

In the marketing yesterday, I secured the hard-bread pudding of another which, together with my own allowance, made quite a satisfactory meal, and placed me on better terms with myself than I had been for some months. I have been lying in my bag nearly all day in a dreamy, listless state, thinking of home and friends, and wondering if this living death, with all its attendant horrors, will ever end.

This day completes half the time that we expect to remain here; calculating from November 1, the day of the final reduction in rations. If, at the end of the next sixty days, the party is in as good general health as it is to-day, we may expect to squeeze through until relief comes; but if we should be greatly reduced, and no assistance should arrive from Littleton Island, all or the most of us are doomed.

We are very fortunate in having this splendid lake of fresh water so convenient to the house; and, in the absence of salt, we are also fortunate in being in close proximity to the sea, where its water may be secured. We often substitute gunpowder for salt on our food; five pounds of this article having been found among the other stores in the caches. The natives carry all the water for the cooks, and are excused from all other duties. Rum and lemon were issued as is customary on Sundays.

Monday, December 31, 1883.—The wind blew with great violence all night, and continued without interruption to blow all day. Temperature, —20.5 [—29.2° C.]. The water-hole gave out again this morning, but another was at once begun, and by 4.30 p. m. was completed. Only three inches [76^{mm}] of water now remain in the lake. "Marketing" is still carried on quite extensively, and is productive of good results. Three ounces of alcohol have been used daily to heat the water used in bathing Elison's wounds; the same work is now performed by the blubber-lamp without any additional expenditure of fuel.

Will the hour ever arrive when we will be no longer restricted in the amount of food that we may wish to consume? This craving—this constant gnawing of hunger is horrible. It brings with it visions of the most tempting dishes, which to us are most tantalizing, as we have no means of gratifying the desires which thoughts of this kind produce.

Tuesday, January 1, 1884.—Considering the unfortunate circumstances attending our situation, we enter the new year under particularly favorable conditions. The health of the party is generally good; the spirits of the men are excellent, and the provisions are exceeding the estimates placed on them in every instance. The sound appears to be firmly frozen over, as no water-clouds anywhere appear, and every one feels hopeful of deliverance before our provisions are expended.

Connell says that he saw the Greenland coast at noon. I visited the old camp to the east in search of foxes. I fired at one, but unfortunately did not secure him. The short walk left me greatly exhausted.

I made an extra issue of a few articles for the feast to-day which we have been looking anxiously forward to for so long a time. The most of us were awake at midnight to greet the New Year. How are our friends spending the day? Do they believe that we are yet living? These are questions which we frequently ask ourselves. A clear, calm, and beautiful day; temperature, —32.0 [—35.6° C.].

Wednesday, January 2, 1884.—Clear weather, light westerly winds; temperature, —28.0 [—33.3° C.]. Jens reports having heard the grinding of the pack in Buchanan Strait this morning. I sincerely hope that the disruption is not general. Another fox was seen to-day; this time it was a white one. Elison's right foot dropped off this morning without his knowledge. The fact will be carefully concealed from him. One of his fingers fell off a few days ago, and several others will follow in a short time. Dr. Pavy thinks that with warmth, comfort, and a generous diet he might possibly recover, but that the chances are against him. Ralston is quite ill. Biederbick having over-eaten yesterday now suffers with cramp in his stomach. He is doubtless consoled in his pain with the reflection that yesterday's feast will most likely be the last opportunity this winter of making himself ill by over-feeding. I issued the week's supply of provisions this afternoon. Bacon for one meal in lieu of English beef is the great event of the week. In comparison with two weeks ago there is a marked difference in the amount of light furnished by the reflection of the distant sun.

Thursday, January 3, 1884.—Clear weather, light westerly winds, and temperature —31.0 [—35.0° C.]. My fingers were quite badly frost-bitten while making the issues this morning. I shot and wounded a blue fox this morning, but the cunning rascal escaped to the rocks above camp where he secreted himself. I find that a seal from which we have been using during the past month, and which I had estimated at sixty pounds weight, exceeds the estimate by eleven pounds. When the moon rose above the extremity of Cape Sabine this evening it produced a very pretty effect on the icebergs in that direction.

Friday, January 4, 1884.—Cloudy weather, brisk westerly winds, and temperature, —34.0 [—36.7° C.]. I shot at a blue fox this evening, but missed my aim. Four others were seen later during the evening, one of which I killed.

On entering the commissary store-house this morning I found a hole in the canvas roof, evidently cut by some sharp instrument, and about one-fourth pound of bacon missing from the piece directly underneath. Investigating further with the aid of a lantern outside, I found where the marauder had endeavored to break through the roof in another place, but failing in that had cut through the canvas with a knife.

Saturday, January 5, 1884.—Cloudy weather, brisk westerly winds; temperature, —25.2 [—31.8° C.]. This morning I discovered that another hole had been cut through the canvas forming the roof to my commissary store-house, and that it had been so carefully covered with snow-blocks as to escape my notice yesterday. I think the depredator is one of the two men whom I have been watching closely for some days. I gave notice this morning that I had set a spring gun in the store-house, and that any man who entered or interfered with the house in any way did so at his peril. I found so much trouble in setting the gun that I finally abandoned the attempt. Of this fact, however, the party, except Lieutenant Greely, remained in ignorance.

Elison's remaining foot dropped off this morning. It detached itself from the stump when the limb was lifted to be dressed. The practice of exchanging food or "marketing," as it is called, is gradually being discontinued. This evening many debts contracted in that way were settled, and several remarked that they would barter no more. I refilled the rum can from the large cask, and found it the most wretched piece of work that I had ever engaged in.

Sunday, January 6, 1884.—Clear weather, light westerly wind, and temperature —24.0 [—31.1° C.].

The cook in my mess (Frederick) reported that some person had been tampering with the bacon which I had issued him on Thursday. On examination the marks of a knife were found on one side and about four ounces of the piece were missing. A fox-meat stew and a hard-bread pudding made us comparatively happy, both at breakfast and dinner time. Through driving sharp bargains during the market days, Jewell became the possessor of two dishes of pudding, or as Whisler expresses it, "a double-barrel stew," and in disposing of both he made himself sick. I do not think it within the range of possibility to force ourselves to eat these incongruous dishes were we not on the verge of starvation. That our taste is blunted is evinced by the relish and keen enjoyment with which the most disgusting-looking dish of hash is devoured. Jens is of the opinion that there is considerable open water in Smith Sound.

Monday, January 7, 1884.—Weather clear, light winds from the west, and temperature −31.0 [−35.0° C.].

I made the discovery this morning that one of the barrels of English bread had been broken into and about five pounds of its contents extracted. The mark of an ax where the staves were crushed in shows what instrument was used. A person who performed a certain piece of work in the vicinity of these barrels a few days ago had this particular ax in his possession, so in my own mind there is no difficulty in locating the thief, but more evidence is necessary before an open accusation should be made. Repeated calls from all portions of the room were made for the guilty party to come forward and acknowledge openly the atrocity which he had committed, and as an inducement for him to do so, all the others would contribute from their scanty store and feed him, that he might never again be tempted. We can hear the ice moving in Buchanan Strait, but Christiansen says that the open space is probably not extensive. The temperature inside the house ranges from +24.0 to +27.0 [−4.4° C. to −2.8° C.].

Tuesday, January 8, 1884.—Clear weather, light winds from the west, and temperature −28.0 [−33.3° C.].

In view of the irksome duties which I have to perform, Lieutenant Greely kindly offered to increase my ration of bread one ounce; but though weak and badly in need of it I declined on the grounds of injustice to my comrades, preferring to take even chances with them in the struggle for life. A fine stew of seal meat was served for dinner, which drove away all thoughts of care and trouble for a few hours.

Wednesday, January 9, 1884.—Clear and calm weather; temperature, −29.0 [−33.9° C.]. Rice returned from a visit to the hill and reported the existence of a misty atmosphere over the sound, which denotes the presence of open water, although we supposed it to be entirely frozen over. Christiansen and I later verified this report, and saw evidence of the mischief done the floe by the late storm. The vapor was rising in dense clouds from the many fissures in the pack, and the startling noises caused by the moving ice came distinctly to our ears. This is indeed a bitter disappointment, inasmuch as this disruption may prevent us from reaching Littleton Island as we have anticipated. Jens complains of illness. Dr. Pavy says the noble fellow is suffering from mental anxiety rather than physical pain.

It is just five months to-day since we abandoned Fort Conger to begin the retreat, which through the inexperience or incapacity of others has resulted disastrously to us. If relief is to come to us this is a good season for traveling, the moon being full. I was nearly paralyzed by the low temperatures while making the issues this morning. Our stock of tobacco has been nearly all consumed and birch-bark, willow and tea leaves have been substituted. Christiansen drives us nearly crazy by smoking old rags and other promiscuous articles not noted for their delicacy of odor. Lieutenant Kislingbury is not feeling at all well; Gardiner is also ill, and all the others very weak, but during the last fifteen days I do not think any marked change in the general tone has taken place. At this rate we will probably live for some time.

Thursday, January 10, 1883.—The weather is calm and cloudy and the temperature −28.5 [−33.6° C.]. A lunar halo was observed to-day. It possessed no unusual features. Ellis complains of extreme illness. His speech is affected to such an extent that he is barely able to make himself intelligible. The doctor attributes this to the excessive use of tea leaves and other substances in lieu of tobacco. The smoking of these articles has been prohibited by Lieutenant Greely in the cases of Ralston and Ellis. Cross and Schneider, who have been lying down almost constant for several days, except when meals were served, have been directed by Lieutenant Greely to sit up for at least two hours each day. This state of mental, as well as physical, inactivity has already made a serious impression on their health. Rice explained fully to Jens that he is to accompany him on the hazardous journey to Littleton Island in February. The faithful fellow feels deeply touched that he should have been selected for this important and perilous duty. He, however, is in excellent spirits and will do his level best for the party.

Saline matter, for several days past, has been noticed in the lake water, although we have been trying to delude ourselves into believing that it is not so. This morning, however, the presence of the salt was so marked that there could be no longer room for doubt. It is supposed that the tide percolates through to the lake.

Friday, January 11, 1884.—Weather clear; light westerly winds have prevailed during the greater part of the day; temperature, −21.0° [−29.4°]. A slight improvement is noted in the mental condition of those who are sick. As a general thing there is a marked absence of energy among the members of the party. With the exception of Lieutenant Kislingbury, Rice, and Salor, they are reluctant to perform labor of any kind. The cooks, of course, are not included in this category. After all, a person who lacks ambition under

these circumstances should not be criticised or judged too harshly. Place yourself in a similar situation and note the result.

The water in the lake was found very much lower this morning and on testing we were surprised to discover that it had received another solution of salt. The cooks began using the barrel staves for fuel this morning. There are sixteen barrels in all, and we expect them to last forty-eight days.

Saturday, January 12, 1884.—Weather clear; light westerly winds prevail; temperature, —18.5 [—28.1° C.]. Lockwood is very weak; he has saved the greater portion of his bread and meat for several days to enjoy a feast when a sufficiency will be accumulated. He frequently talks to himself about food, and for hours he stares at the dim Eskimo lamp, without taking notice of anything passing on about him. Sometimes he requests that the lamp be kept burning during the night; and in many ways his conduct is almost childish. Biederbick, who sleeps next to him, is of the opinion that his mind is deranged—it certainly is greatly weakened.

This is the thirty-fourth anniversary of Elison's birthday. It is also just two months since we snatched the brave fellow from the grave's brink and brought him to this abode of misery. He has wonderful vitality and clings to life with a pertinacity worthy of his nationality.

Orders have been issued by Lieutenant Greely prohibiting the use of tea leaves as a substitute for tobacco. The excessive use of these leaves has had undoubtedly a bad effect upon the general health of the party, and the order is received as wise and necessary. We were all indebted to Elison this evening for a cigarette, which he desired us to smoke in commemoration of his birthday. Lieutenant Greely directed me to increase the bread ration to 6 ounces per man per diem. It has been 5½ ounces. The change though slight is nevertheless a welcome one.

A large vessel filled with ice is daily suspended over the blubber lamp. In this way much of the water used for our tea and coffee is produced.

Sunday, January 13, 1884.—Cloudy and disagreeable weather; snow-storm in the evening, with fresh wind; temperature, —21.0 [—29.4° C.]. Lockwood is rather petulant, but with the best of reasons. He talks to himself in a quiet way about his favorite dishes. Ellis, Linn, Cross, Ralston, and Jewell are also greatly weakened in mind and badly broken in physical strength. They seldom leave their bags unless coerced. Rum and lemon, with half ounce of bread, in addition to the regular ration, has made this a marked day with us. We find by actual test that one barrel will scarcely suffice for three day's fuel. At the present rate, however, we have enough for nearly two months.

Monday, January 14, 1884.—Weather cloudy, and the wind blew sharply all day; temperature, —18.5° [—28.1° C.]. Dr. Pavy tells me that Cross, Jewell, Linn, and Ralston show symptoms of scurvy. They were made to get up out of their bags for a short time this morning and were given some light employment, which worked a beneficial effect both upon their minds and bodies.

Lockwood is in a more cheerful frame of mind than he has been for days, and in other respects also he appears much better. Elison remains in about the same condition; he is a model of patience and fortitude. Considerable ice is being melted daily over the blubber lamp to supply us with warm drinks. In this way we manage to save a great deal of our fuel. An issue of four ounces of raw bacon for dinner was greeted by all with favorable comments. Though the quantity of food is small we nevertheless have a large variety, and the distributions ordered by Lieutenant Greely are generally satisfactory.

Tuesday, January 15, 1884.—Clear weather, with light westerly winds; temperature, —27.5 [—33.1° C.]. The doctor's patients are apparently somewhat better to-day. The supply of lake water gave out this morning. We cut a new hole through where the lake seemed the deepest, but found gravel instead of water. Another hole was at once commenced, but it will be pursued with but slight hopes of success. Rice began his preparations for the journey across to Littleton Island by making stockings from dog-skin cut from Pavy's sleeping-bag. In consequence of the failure of the lake to supply more water, our ration of tea at meals has been reduced to one-half pint per man. For the present, however, the stews will continue as they are. Cross has resumed his former work of splitting the staves for fuel. Henry assists him by sawing them the proper length for burning.

Wednesday, January 16, 1884.—Light snow, fresh westerly winds, and a temperature of —21.3 [—29.6° C.] kept us confined closely to the house during the day. There has been no particular change in our affairs since yesterday. This morning I made the usual weekly issues of provisions except bread, which, for obvious reasons, is issued daily. Cross is growing weaker very fast; since yesterday morning he has failed to a marked degree in both mental and physical vigor.

Whisler reports having detected the doctor in the act of purloining bread from Elison's rations. The doctor sleeps beside his helpless patient and retains the latter's provisions in his charge.

Thursday, January 17, 1884.—Calm and cloudy weather; temperature, −36.0 [−37.8° C.]. Cross is failing rapidly. He resumed his work this morning, but was soon compelled to abandon it from extreme weakness. Later he was assigned to a single sleeping-bag and placed where the faithful Biederbick could attend to his wants. He appeared to be delirious and talked incoherently of his mother, of his birthday (which occurs next Sunday, when he will be forty years of age), and of the returning sun. Jens is of the opinion that the sound is broken, and that a considerable water space exists in the axis of the channel. The ominous water-clouds alone will denote this state of things to the observer. Lieutenant Greely has named February 2 as the day on which Rice and Jens will brave the elements by beginning their hazardous journey to Littleton Island in quest of assistance.

The reduction in the quantity of drink issued at meals is not so great a deprivation as we had imagined it would be. I issued the weekly allowance of seal meat. This is always a very disagreeable task owing to the frozen and flint-like state of these animals after having been exposed for so long a time in the cold store-house.

Friday, January 18, 1884.—The weather is clear and calm; the thermometer indicated a temperature of −39.0 [−39.4° C.], but as the mercury was frozen and our spirit thermometer lost, we have no means of ascertaining just how cold it has been to-day. The returning light is quite well marked, particularly on the distant points of the coast line.

Cross declined rapidly during the night, and at 1.45 p. m. he breathed his last, having passed quietly away without a struggle. Since dinner yesterday he had been unconscious, but had talked a great deal in a rambling and incoherent sort of way. He will be buried to-morrow at noon on the low gravelly ridge separating Camp Clay from the *Proteus* wreck cache. As wood necessary to construct a coffin cannot be spared, I suggested wrapping him in a large gunny sack which I have in the commissary store-house. He died from dropsical effusion of the heart, and had slight symptoms of scurvy. Disguised under the cloak of obscure words, the cause of his death might be passed over by a casual reader without comment, but to us, who have suffered with him, it is apparent that the primary cause of his death was *starvation*. In a few well-chosen words Lieutenant Greely spoke of the past life of the deceased, and called attention to the fact that our duty should now be to the living and not to the dead, and that this should be no occasion for depression of spirits. Biederbick was unremitting and indefatigable in his attentions to Cross during the last hours of his illness.

While on the hill this morning I saw dense clouds of vapor rising from the waters of Smith Sound. This is indeed unfortunate for Rice's contemplated trip in that direction. We are progressing splendidly on our reduced allowance of tea and other warm drinks.

Saturday, January 19, 1884.—Clear and calm weather; mercury is again frozen.

The remains of Cross were prepared for burial by Biederbick and myself, and wrapped in the heavy sack referred to yesterday. Lieutenant Greely read the beautiful and impressive Episcopal service while we were yet in our sleeping-bags, and at about noon the solemn procession moved slowly across the lake and up the gentle incline to the frozen grave. The body was covered with the stars and stripes, and borne to its last resting-place on the small sledge which already has a history in connection with the Elison disaster of last autumn. We ranged a circle of stones carefully about the grave of our lost companion, it being the only attention that we could bestow on him now. One cannot conceive of anything more unearthly—more weird—than this ghostly procession of emaciated and half-starved men moving slowly and silently away from their wretched ice-prison in the dim and uncertain light of an arctic night, having in their midst a dead comrade, who was about to be laid away in the frozen ground forever. It was a scene that one can never forget. It will forever remain vividly pictured in my memory as the most awe-inspiring of any of the many thrilling scenes experienced in this "Land of Desolation."

The bread ration has been increased to 7½ ounces.

Sunday, January 20, 1884.—Calm and cloudy; the mercury is again frozen, and it is probable that the temperature is about −50.0 [−45.6° C.]. It is to be deplored that we have no spirit thermometer with which to record the extremely low temperature prevailing just now.* A splendid hard-bread pudding for

* NOTE.—All spirit thermometers had been cached except the minimum spirit thermometer which was blown away and lost during a violent gale. It was found the following spring by Brainard.—A. W. G.

breakfast, and a bountiful stew of seal meat for dinner, made this a marked day among the others. It no longer appears strange to us that the mind can expel all high and ennobling thoughts, and dwell constantly on subjects which are connected in some way with food. We think scarcely of anything except of eating, and what we have eaten; and the Sunday bill of fare is gloated over as if it were a feast, instead of a wretched mess prepared from the vilest of compounds.

Lockwood is growing weaker and weaker. He said to me a few days ago: "Brainard, I have lost my grip"—meaning that he had lost the last hope of life. Gardiner is suffering with cramps in his stomach. Dr. Pavy is also suffering with a frost-bitten foot. Henry's feet are badly swollen from the effects of cold and inaction.

Psalms were read this morning by Lieutenant Greely, and the usual issue of rum and lemon was made. Had Cross lived until to-day he would have been forty years of age.

Monday, January 21, 1884.—Clear weather, light westerly wind; temperature, —34.0 [—36.7° C.] While taking account of provisions to-day, I discovered that twelve cans of milk were missing from the stores. They were probably stolen before the supplies were transferred to the building where they are now kept. The weekly ration of blubber has been increased to eleven ounces per man. The bread ration has been increased to 8$\frac{1}{7}$ ounces per man per diem, or 57 ounces weekly. Gardiner has recovered from his indisposition of yesterday. Pavy and Henry are better, but Lockwood is greatly depressed in spirits and has about given up all hope of life. The raw bacon issued for dinner was greatly relished by all; it appears to impart warmth and comfort to our bodies, and in general it is much more satisfactory than any other food in our stock of provisions.

Tuesday, January 22, 1884.—Weather clear, light westerly wind, and temperature —28.8 [—33.8° C.]. The temperature inside the hut this morning was +20.8 [—6.2° C.]. The condition of Lieutenant Lockwood is unchanged since yesterday. Petulant and childish remarks, from those who should know better, have produced acrimonious discussions that are particularly distasteful to many, and which tend to render our sufferings more excruciating than ever. Owing to the light furnished by the rapidly-returning sun, very few stars were visible at noonday.

Wednesday, January 23, 1884.—A cloudy, windy, and stormy day; temperature, —20.2 [—29.0° C.]. Inside the hut it was +19.0 [—7.2° C.]. I made the usual weekly issue of provisions. Thus far we have been using the bread found in the English caches; but now our own bread will be issued four times weekly. The seal-skin stew served for breakfast was an excellent one, and we regret exceedingly that there is only enough remaining for one more issue. Dr. Pavy, who is an indefatigable talker on all subjects and at all times, enlivened the evening by recalling reminiscences of his journeyings through Switzerland and adjacent countries. Kane's Arctic Explorations were also produced and read aloud.

Thursday, January 24, 1884.—Clear weather, with light westerly winds prevailing; temperature, — 20.0 [—28.9° C.]. Inside it is +20.0 [—6.7 C.]. Lockwood appears to be in better spirits to-day. The general health of the party appears to be improving slightly under the effect of the late increase of rations. The "social barometer" has certainly risen several inches in the last two days. Raw bacon, or, as Whisler terms it, "Prairie fish," was again issued this morning with beneficial results. A chronological table, introducing all the principal events since the earliest history of the world, was read this evening by Lieutenant Greely, and proved of great interest to all. Dr. Pavy, who has a wonderfully retentive memory and an abundant store of valuable information at his command, supplies many missing dates that we may want.

Friday, January 25, 1884.—Weather clear, light westerly winds, and temperature —22.0 [—30.0° C.] Nothing of importance has occurred since yesterday. I have closely watched the changes in the souud all winter, and at the present date believe it to be open. I will not, however, speak of it to my companions who think it frozen, for fear it might cause them to feel depressed in spirits. It is better that their minds should remain in a hopeful state. Biederbick is twenty-five years of age to-day. A fine stew of seal meat served at dinner put us all in a cheerful frame of mind.

Saturday, January 26, 1884.—Calm and clear weather; temperature, —26.0 [—32.2° C.]. Inside the house it is +24.0 [—4.4° C.]. Our dinner, consisting of English canned beef and dog-biscuit, was greatly relished by all. The increase of rations to Rice and Jens, to place them in good physical condition to undertake the hardships which they will encounter on their contemplated trip to the Greenland coast, began to-day. Christiansen celebrated his 37th birthday in the usual manner. The doctor's patients are about the same; no material change having taken place during the last week. Jewell's conduct has been that of a child instead of a man during the last few days. But, with hunger slowly consuming his life, the poor fellow

cannot be blamed for saying and doing foolish things. A bag of English bread which I had estimated at 70 pounds, was found, on adding together the various issues, to have actually contained 153 pounds.

Dark water-clouds overhanging Smith Sound suggest to the mind the existence of a great expanse of open water in that direction. In view of this fact I am fearful that Rice will meet with obstacles in the form of leads of water, and will be compelled to turn back to us without accomplishing his mission.

Sunday, January 27, 1884.—A beautiful day; the weather is clear and calm, and a glorious diffusion of light in the southern sky gives promise of the speedy return of the long-absent sun. On returning from a visit to the hill, Rice reported the Greenland coast visible and that no indication of open water anywhere appeared. In order that they might be better able to withstand the effects of the low temperature and the fatigues of their long tramp, Dr. Pavy subjected the feet of Rice and Jens to a severe treatment of rubbing and beating to restore circulation to its normal state. Three white foxes were seen during the day; temperature, −36.0 [−37.8° C.].

Monday, January 28, 1884.—Clear and calm weather; temperature at 8 a. m., −36.0 [−37.°8 C.]; at noon, −38.2 [−39.0° C.]. I visited Lookout Hill during the morning, and notwithstanding the highly favorable reports of yesterday regarding the condition of the sound, I still think it remains unfrozen. I saw a white fox in the rocks above our camp while ascending the hill. Through my inability to discharge the gun—the low temperature having affected the lock—the coveted animal escaped. Rice began work on the sleeping-bag which he and Jens will carry on their trip to Littleton Island. It is a one-man dog-skin bag, and will be enlarged to accommodate two men. Frederick, in addition to his duties as cook, is sewing for Rice on this bag and on his fur garments.

Lieutenant Greely authorized me to make the following extra issue to each mess to-morrow: Bread dust, 10 ounces; and blubber, 8 ounces. On days when English meat and bacon are issued Elison will receive three ounces extra of each.

Lieutenant Greely stated in confidence that, in consequence of the greatly weakened mind of Lieutenant Lockwood, Lieutenant Kislingbury would assume the command in the event of incapacity to himself. This he considered as only justice to the party, owing to the physical as well as the mental incapacity of the second officer. Dr. Pavy said to-day that if Lockwood did not "brace up" he would never recover.

A new industry sprang up in our midst to-day—that of manufacturing stearine candles, with Henry as the director. It is intended to use these as a substitute for blubber in lighting our hut. By so doing we will be enabled to increase our ration of the latter.

Tuesday, January 29, 1884.—Clear and calm weather; temperature, −32.0 [−35.6° C.]. Inside the hut at time of lighting the cooking-stove this morning the thermometer indicated a temperature of +24 [−4.4° C.], but while the cooks were preparing dinner it rose to +38.0 [+3.3° C.]. Rice and Frederick resumed work on their sleeping-bag this morning. Jens is sewing faithfully on dog-skin mittens and stockings, which will be used while on his trip with Rice to Greenland. Henry is still making candles. We are now using the mixed tea and sugar found in the English cache at Payer Harbor. It has been greatly injured by dampness.

Lockwood is weaker. We were provided with an excellent stew of seal meat this evening. This appears to be the greatest blessing with which we are supplied. It does everything to impart warmth to our bodies by replenishing the internal fuel, and it is so palatable that the keenest enjoyment is derived in its consumption. I went out gunning for foxes this morning, but saw nothing.

Wednesday, January 30, 1884.—Calm and cloudy weather; temperature at 8 a. m., −36 [−37.8° C.]; at noon it was −24 [−31.1° C.]; inside hut, +23.0 [−5.0° C.]. Lockwood is growing steadily weaker and weaker; he talks but seldom now, and stares vacantly about. Christiansen is suffering with cramps in his stomach. The noble fellow complains but little of his condition.

Ralston relieved Henry this morning as foreman of the stearine-candle establishment, and he has already made important improvements in the methods of manufacturing. Bender is working on a cooking-lamp for Rice; he is decidedly disagreeable, coarse, and insulting in his remarks. He accused me of being more considerate of the welfare of others than of his own, but brought no facts to support his assertions. Schneider may be considered in the same category, but, being more of a hypocrite than the former, is not so reckless with his insinuations. I issued the last of the canned peas to-day.

Thursday, January 31, 1884.—Weather is cloudy; light wind, and temperature, −6.0 [−21.1° C.]. I put up rations for six days for Rice and Jens to take with them on their Greenland trip. The amounts were as follows: Lime-juice pemmican, 2 pounds; sweet pemmican, 2 pounds; English boiled bacon, 2 pounds;

bread, 9 pounds; tea, ½ pound; alcohol (for fuel), 66 ounces, and rum, 6 gills. Under the most trying circumstances Bender has made an excellent lamp for field service, which Rice and Jens will take with them. Lieutenant Greely has prepared a record for Rice to deposit on the summit of Littleton Island in the event of his failure to meet any one there. He has also made out a short list of provisions which he desires will be brought over by the relief party—provided, of course, a relief party is there; and Dr. Pavy has furnished a list of the medicines most needed at this time, which Rice will also take with him.

A good piece of raw bacon, nine ounces of United States bread, and half a cup of hot tea placed us all on good terms with ourselves this evening. Lockwood, poor fellow, is not improving at all; I think I can see death in his eyes.

Friday, February 1, 1884.—The weather is cloudy and disagreeable; a light westerly wind is causing considerable drift; temperature, −15.5 [−26.4° C.]. Two foxes were seen to-day, but neither was taken by the watchful hunters. Rice's equipment for the dangerous journey to the Greenland coast is now complete, and he will start to-morrow morning if the weather is mild enough to permit him to do so. Lieutenant Lockwood is no better. I wish he would be more cheerful; it would have such a beneficial effect on his condition, and every one else would feel better in his improvement.

One of the finest meals that we have ever known in this place was served this evening. It was composed of seal meat and lime-juice pemmican; the latter imparting a thoroughly agreeable flavor which was doubly welcome because it was a change from the every-day mess.

Bender and Whisler would make good subjects for discipline. They engaged in a serious quarrel and the former, refusing to obey Lieutenant Greely's orders to desist, was sent by him into the vestibule to "cool off."

Saturday, February 2, 1884.—Cloudy weather; light westerly winds; temperature at 7 a. m., −19.0 [−28.3° C.]; at noon, −27.5 [−33.1° C.].

The cooks were called at 4.45 a. m. to enable Rice and Jens to secure an early start. They left at 8.45. While at breakfast every one appeared in the best of spirits and each one endeavored to imbue Rice with his own bright view of the future. But to a close observer, this appearance of cheerfulness was all forced and superficial, to give courage and strength to the brave souls who were about to do battle with the elements and face every danger known to the arctic regions, for us who remain inactive here, powerless to assist. There lurked, deep down in the heart of every man, a feeling of dread of the future—a presentiment of impending evil. Christiansen and myself took their packs (averaging about 40 pounds each) and started ahead in order to give them a "lift" in the beginning of their journey. Before we had gone far Rice and Jens overtook us, and the rifle and packs were transferred to them. A tremulous "God bless you," a hasty pressure of their hands, and we turned away in tears from those brave men who were daring and about to endure so much for our sakes. We waited until their receding forms were lost to view in the bewildering confusion of the ice-fields, and then slowly retraced our steps to the hut. While watching their progress I distinctly heard the hoarse grinding of the moving pack not far away. But of this I said nothing to my companions on returning to them, because of the depressing effect which such information was sure to produce on their minds. It is my opinion that Rice will be turned back by open water and his heroic efforts in our behalf thus rendered fruitless. If he succeeds in reaching Littleton Island and should find no party there, he will endeavor to procure assistance from the natives, and with their teams cross to this side, leaving Jens, who will hunt until our arrival.

After the exertion of carrying the pack this morning I was prostrated with a nervous chill, but have been revived somewhat by aromatic spirits of ammonia and rum. Long was fortunate enough to shoot a blue fox this morning, which will furnish us with nearly meat enough for one meal. Lieutenant Greely ordered the following change in the issues of provisions, which went into effect yesterday: Bread, from 57 oz. to 64 oz. weekly, per man; blubber, from 11 oz. to 17½ oz.

The light was sufficiently strong at noon to admit of the reading of the thermometer without using a lantern. Lockwood appears somewhat better this morning; he went out in the vestibule during the day for exercise, and seemed benefited by the change. Christiansen astonished us all by announcing his intention of committing suicide. He is probably somewhat down-hearted since the departure of his dusky brother.

Sunday, February 3, 1884.—Weather fair; temperature at 8 a. m., −26.0 [−32.2° C.]; at 11 o'clock it rose to −18.0 [−27.8° C.]. A light wind was blowing from the west this morning, but towards evening it increased in velocity to a moderate gale.

Poor Rice! We are all thinking about him and his brave companion, Jens, exposed as they are to the

fury of the storm, which is probably much worse on the floe of Smith Sound than in this place. Jewell fell down in a dead faint this evening, and was revived by the doctor only after great difficulty. Connell has also been feeling unwell. In both cases Dr. Pavy attributes the difficulty to the blubber which was in the stew this evening. The exposure and exertion of yesterday has left me in anything but an agreeable or desirable condition. Having caught a severe cold it has settled in all my joints and muscles, and my face, hands, and limbs are greatly swollen. Notwithstanding the orders of Lieutenant Greely prohibiting the eating of stearine, Schneider was detected in the act of swallowing some of it to-day.

Monday, February 4, 1884.—Cloudy weather, light westerly winds, and temperature —24.5 [—31.4° C.]. The thermometer was read at noon by the light from the southern horizon without the aid of a lantern. Snow began falling during the evening. I feel no better to-day. The doctor seemed alarmed at my condition, but I cannot imagine that it is so serious. Jewell and Connell have recovered from their overdose of blubber taken in the stew yesterday. Lockwood appears to be gaining in strength; he got up and moved about the interior of the hut without assistance. Bender manufactured some candlesticks, and Ralston molded a few stearine candles. Two more stews have been added to the weekly number. I am afraid that this is more than our limited fuel supply can endure.

Biederbick is now apparently in excellent condition, although he has been a faithful and indefatigable worker in the interests of the sick. When he left Fort Conger in August last he could scarcely walk without assistance, so crippled was he in consequence of rheumatism. In the face of all this hunger, dampness, and exposure, he has steadily improved in health.

Tuesday, February 5, 1884.—Calm and cloudy; temperature, —23.0 [—30.6° C.]. The Greenland coast at Cape Inglefield was seen to-day for the first time.

Lieutenant Lockwood has improved greatly during the last few days; I also am much better. The doctor says my illness is the result of exposure and greater physical exertion than my weak frame is capable of enduring. I issued a portion of the weekly allowance to make my duties lighter to-morrow. Blubber has been increased to eighteen ounces per week. Whisler is particularly disagreeable; he appears to be growing more quarrelsome every day.

Wednesday, February 6, 1884.—Cloudy, fresh southeast wind, and temperature —20.2 [—29.0° C.]. Snow fell at intervals, and the weather has been very disagreeable generally.

As I predicted on the morning of their departure, Rice and Jens returned, having met with open water about two miles east of Brevoort Island. They followed along the water's edge to the southward until opposite Baird Inlet, expecting to find some point where the sound was "bridged" over by the ice, thus enabling them to cross to Littleton Island. But on every side they met with bitter disappointments and were at last compelled to return. Rice says the belt of shore ice is about ten miles wide at Baird Inlet, but of the extent of the water he can form no opinion owing to the dense fog and vapor constantly rising from its surface, which prevents an extended view. In this water-space considerable quantities of ice were observed to be drifting with the tide. Last night both suffered greatly; Jens frosted his fingers while in the sleeping-bag and Rice thawed them out by placing them in contact with his own warm body. They then got up and ran about in the snow to keep from freezing until there should be sufficient light to enable them to travel. Jens is badly broken down and Rice is but little better off. Their lamp for melting ice proved ineffective, and for two days they had scarcely a swallow of water. Rice estimates the distance traveled at fifty miles.

Thursday, February 7, 1884.—Clear weather, light west wind; temperature, —27.5 [—33.1° C.]. Lockwood is better. He has been receiving an extra allowance of bread, but owing to his marked improvement it was discontinued to-day. I am in better condition than yesterday. Rice and Jens are very sore and stiff in their joints, but on the whole they are better than we had expected they would be under the circumstances. Poor fellows! how they must have suffered while struggling along on their errand of mercy across the rugged and barren pack. Lieutenant Greely says he will not start before March 6 to cross the channel to Littleton Island. If it (the channel) is not closed at that date there will be but little hope of its closing this season, and we will be compelled to remain where we are. In this event our provisions can probably be extended to some time in April. This is not a particularly cheering view of the future for men who have lived through the worst part of a wretched winter, and now, when the hour of succor is at hand, to die miserably by starvation.

Friday, February 8, 1884.—Clear and calm weather. The mercury is again frozen, but it has been a beautiful day nevertheless. I think I have entirely recovered my health again, but my strength has not yet

returned. I took an inventory of the provisions this afternoon, and found on calculating roughly that we could remain here for 70 days if we restricted ourselves to 4 ounces of meat and 8 ounces of bread per day.

Notwithstanding the impracticability of traveling across the pack to Littleton Island next month, preparations for that trip will go actively forward. Boards composed of members of the party have been appointed by Lieutenant Greely to attend to all details in this matter. Rice and myself have been instructed to estimate the weight of every article that we would take with us, and thus find the approximate weight of our load. Lieutenant Kislingbury was directed to take an inventory of the foot-gear now on hand and to make a list of what was wanted, and then submit his report to Lieutenant Greely.

It is just six months since we left our comfortable quarters at Fort Conger for the uncertainty of meeting a vessel on this coast. Bender was quite ill last evening, but he is somewhat better now.

Saturday, February 9, 1884.—The weather is clear and calm. The mercury is again frozen to-day, but owing to the absence of wind no one appears to mind the increased cold weather much. All the invalids appear to be improving now. Lieutenant Greely has decided to reduce the ration of bread on Monday next to 8 ounces per day.

Sunday, February 10, 1884.—Clear weather, light wind, and temperature −36.5 [−38.1° C.]. Both the morning and evening meals were very satisfactory to-day, and some of the men were almost hilarious in consequence.

A reduction in our bread ration to 59 ounces weekly will take place from to-morrow. The weekly ration of blubber has been placed at 13 ounces per man, and the meat ration has been increased 1½ ounces weekly. On the authority of my inventory of provisions, we can remain here until March 12 on our present ration, and then have full provisions for ten days with which to cross to Littleton Island.

Monday, February 11, 1884.—Cloudy and disagreeable weather; light westerly winds; temperature, −37.0 [−38.3° C.].

I visited the hill this morning and from its summit could hear very distinctly the crushing of the moving pack in Buchanan Strait. It sounded not unlike distant thunder, and there was much in this booming noise to produce a feeling of unrest and dread in the listener. In our situation especially this feeling would naturally result, as our lives depend on the quiescent state of the ice. The heavy water-clouds were unnecessary to indicate to us the presence of much water; the deep moaning of the ice was sufficient to tell the story. Are those portentous clouds an augury of our future? Can we save ourselves from starvation now in view of this? I fear not. Without firm ice on which to cross the sound to Littleton Island but slight hopes for life can remain to us. The words contained in Lieutenant Garlington's record, written after the crushing of the *Proteus* by ice, that "Everything within the power of man will be done to rescue the brave men at Fort Conger from their perilous position," brought tears to the eyes of the strong men who listened to the reading of the letter that night in October in our dimly-lighted hut at Eskimo Point. Situated as we then were his words inspired us with hope, but months have passed without bringing the promised assistance, and now I am of the opinion that his hopeful words were written without due consideration, and without a full knowledge or appreciation of the difficulties to be encountered.

In estimating the weights of the necessary articles to be carried on our contemplated journey across Smith Sound, Rice and myself find that they will aggregate about 1,600 pounds. Nearly every one joined in a discussion this morning relative to our equipment for this trip. Lieutenant Greely directed me to issue stockings, mittens, &c., to those in need of them, in order that they might have them thawed and dried before the date fixed for our departure. I issued the last of the seal meat and also the remainder of the American bacon. The weight of the former exceeded the estimate by 17 pounds, the latter by 8 pounds. In emptying the rum cask I found a shortage in its contents of about two gallons. The deficiency is accounted for from the fact that all issues have been made with an English standard measure instead of the one in use in the United States, the former being the larger.

Tuesday, February 12, 1884.—Clear and calm; the temperature is very low, mercury being frozen. We judge the temperature to be about 50° below zero [about −45.0° C.].

Rice reports having had a good view of the sound from Cemetery Ridge, and says that a large space of open water could be seen. The noise made by the crushing ice can be distinctly heard in our camp. I do not think I am inclined to look on the gloomy side of the future, even after all the dangers and hardships by which we have been beset; but if the state of the sound will not permit us to cross before our provisions are exhausted, and no assistance comes from the other side, we are certainly doomed to die a wretched death by starving.

I opened a new barrel of bread this morning, and found a few of the pieces slightly moldy. This was rather unexpected as the barrel is one of those taken from the Beebe cache. The stew of roast beef (canned) and pemmican prepared for dinner was well flavored and particularly liked.

Wednesday, February 13, 1884.—Clear weather, light westerly winds, and temperature —36.0 [—37.8° C.]. I served some of the members with clothing, and issued the usual weekly supply of provisions. The last of our rice went to-day. The provisions will extend to March 12, at the least calculation. Some have suggested that my scales must possess the power of magic in order to extend the bread and meat as they have done. A stew of bread, bacon, and salt water was tried this evening, and was at once pronounced a decided success. In our present ravenous condition, I do not deem it possible that any dish could be introduced here that would not be voted a success. Frederick has begun the irksome duty of repairing our seal-skin boots; the work tries his wounded fingers greatly, but he is not one to succumb easily to trifles. On overlooking the sound from Cemetery Ridge this morning, I was greatly surprised to find that the water had encroached to Brevoort Island, and that it extended northward as far as the eye could reach.

Thursday, February 14, 1884.—Clear and calm weather; temperature at 8 a. m., —17.0 [—27.2° C.]; at 11 a. m. it had fallen to —28.0° [—33.3° C.]. The water appears to be steadily encroaching on the ice at Cape Sabine. The clouds, however, which are produced by this increasing space of open water, are less marked than yesterday. To day my hunger has led me to think and talk much about food; and all sorts of incongruous combinations that could be suggested to the minds of hungry men were discussed. It now occurs to us that this is St. Valentine's Day, but I think that none of us expect to be the recipient of a missive of that sort just now. A small piece of butter was found missing from a can kept in the whale-boat on the same shelf with Henry's candle-molds.

Friday, February 15, 1884.—Clear weather; fresh westerly wind; temperature, —25.3 [—31.8° C.]; inside the house it ranges from +21.0 [—6.1° C.] to +25.0 [—3.9° C.].

Lieutenant Lockwood is better, but he does not gain as rapidly as we would like. He exercised somewhat this morning. The sun will appear above the horizon to-morrow for the first time this year, if the temperature should fall to —50.0 [—45.6° C.] in the mean time. We are not very enthusiastic over its return, but each one thinks more than he cares to express in words. Schneider, Ellis, and Salor are sewing on boots, stockings, mittens, and other articles for use on our contemplated trip to Greenland. Frederick and Jens perform the most important part of this work—that of preparing the soles of the boots.

The time is dragging wearily, but we try to keep up our spirits even under the most trying and discouraging circumstances. The few moments spent at our meals are the only pleasant ones that we know during the entire day. The party appear to be doing very well on the present reduced ration. I am afraid that Bender will render our condition absolutely wretched if he continues to develop the contemptible qualities with which he has regaled us during the last few days.

Saturday, February 16, 1884.—Clear weather; fresh west wind, and temperature —22.5 [—30.3° C.]. Owing to the high temperature to-day, we were not favored by seeing the sun above the horizon at noon; neither could its reflection be seen on Bache Island. I overhauled the shot-gun ammunition to-day and made an inventory of the same. We have in all two hundred and sixty-five rounds, twenty-five of which are loaded with bullets suitable for killing seals or any large game.

I cannot refrain from again speaking of Bender's despicable conduct. He certainly deserves punishment for the disrespectful manner which he has assumed towards those in authority during the last few days; but what can be done here! We cannot resort to severe measures to correct this evil, but moral obligations and the manly spirit which all are supposed to possess must govern these things.

Sunday, February 17, 1884.—Clear weather; light westerly winds; temperature at 12.30 p. m., —9.5 [—23.1° C.]; at 3 p. m., —21.0 [—29.4° C.].

According to Israel's calculations, the sun must have been 10′ above the horizon at noon. It was not visible to us, however, owing to the dark water-clouds which concealed the southern horizon at the point where it would have appeared. It has now been absent from us for 115 days. Some intimate that it is their intention to remain in the future where the "glorious orb" may be seen at least once in every twenty-four hours.

A wide lane of water is visible from the hill, and the ice is grinding fearfully in Buchanan Strait. The usual Sunday morning bread pudding was partaken of with greater relish than ever, and its excellent quality elicited more than the customary praise. In consequence of the limited quantity of rum on hand, no more will at present be issued.

Monday, February 18, 1884.—Clear and calm weather; temperature at 7 a. m., −15.5 [−26.4° C.]; at noon, −5.3 [−20.7° C.]. The remaining portion of our corned beef, seal meat, mutton, American bacon, seal-skin, peas, string beans, carrots, salmon, St. John's bread, bread from Fort Conger, English chocolate and tea, and onion powder have been issued; also, all our salt and pepper, except a small quantity, which is being kept for Elison. I walked down the coast a short distance in quest of game, but was disappointed in finding not even a trace of animal life. The short walk left me very weak.

Rice climbed to the summit of the island and reported, on his return, that Smith Sound was an open sea, with rafts of ice drifting about its surface. Long went to the iceberg, and then traveled about four miles farther in a northeasterly direction, not reaching, however, the open water. The fact gives him the impression that no open water exists, notwithstanding the report of Rice. If the report of Rice be correct (and I believe it is), I think that we need no longer delude ourselves into believing that we will escape alive; but, however horrible the end, all are prepared to face it like men. One, however (Bender), would rather devour all the provisions now, and die at once, than to prolong them as far as possible, with the hope of ultimate rescue. This person has done very little this winter towards the regular routine of duty, and he has made many unreasonable complaints, which have gained him the contempt of his companions. To-day he complained bitterly that his bread was not up to the standard weight, and although he admitted that no partiality had been shown, and that he had the same quantity as the others, and that no injustice had been done, still, for the sake of grumbling, he felt that he must do something. Assuming that this attack was directed towards me, I at once requested to be relieved from the duty of issuing provisions, but the commanding officer would not listen to my appeal.

Tuesday, February 19, 1884.—Cloudy weather. A southerly gale was in progress during the forenoon, but at 2 o'clock the storm had subsided and the sky cleared; temperature at 8 a. m., +8.3 [−13.2° C.]; at 9.30 a. m., +12.0 [−11.1° C.]; at 11 a. m., +22.0 [−5.6° C.]; and at 2.30 p. m , −1.0 [−18.3° C.]. At 5 p. m. the sky again became obscured by clouds and the temperature soon rose to +3.5 [−15.8° C.]. I went on Cemetery Ridge at 2.30 p. m., and my observations from that point confirmed the report of Rice yesterday regarding the condition of Smith Sound. No ice of any description was visible in the open water, and the waves and white caps were rolling in against the edge of the fast ice with a dismal roar which sounded in our ears like the knell of our impending doom. The water has encroached close to Cape Sabine and extends northward in the direction of Cape Louis Napoleon, and eastward toward the Greenland coast as far as the eye can reach. This condition of affairs is a particularly bad showing for us with our stock of provisions so greatly reduced. What can we do to save the lives of our noble fellows? Frederick is still working on the foot-gear of the party, repairing it the best he can.

Wednesday, February 20, 1884.—Cloudy weather, light west winds, and temperature at 8 a. m. −11.2 [−24.0° C.]. At 5 p. m. it had risen to −2.5 [−19.2° C.]. On the whole the weather to-day has been very disagreeable, and not at all conducive to cheerful spirits.

A raven was observed flying over our camp this morning. Although it is considered a bird of ill-omen, still its presence cannot affect us now. We have suffered and endured the stern reality of the worst phases of arctic life too long to give way to superstitious fears at this hour. Long and Christiansen attempted to reach the open water this morning, but they were turned back by the rising wind, which was found impossible to face. Bender repaired an alcohol can and one of our stew pots in a most artistic manner, considering the materials at hand. On examination I find that we have about 21 gallons of alcohol in stock at this time.

Notwithstanding the fact that a terrible fate awaits us within a few weeks unless "something turns up," we are making all sorts of plans for the future. Rice and myself contemplate a lecturing tour through the Western States, combining profit with pleasure. Others have similar projects. Nothing can repress our expressions of hope of escape from this bondage.

Thursday, February 21, 1884.—Calm and cloudy weather; temperature at 8 a. m., −11.0 [−23.9° C.]; at 11 a. m., −3.0 [−19.4° C.]; and at 4.30 p. m., −10.0 [−23.3° C.]. After a brief visit to the hill Rice reports large water-spaces in Smith Sound northeast of Cape Sabine. This is bad for us, but he imparts the cheering information that the ice has "bridged" across the sound farther to the south, and that means of escape may yet be furnished us. The "mercurial temperaments" instantly rose several degrees at this announcement, and care and suffering were for the moment forgotten. Cold, calm weather is now all that is required to assure our ultimate safety by cementing firmly this newly-formed bridge of drift-ice.

I issued the last of the frozen bread to-day; yesterday the remaining portion of the English beef was used. The large sledge has been shoveled out from the drift which had formed over it, and extensive repairs

on it are contemplated within the week. The temperature inside is now ranging from +30 to +40 [−1.1° C. to +4.4° C.], and the consequent melting of the frost from the roof renders our condition deplorable in the extreme. The sun was not visible to us to-day, but its reflection was seen on Bache Island for the first time since last October. Dr. Pavy is entertaining us with a series of lectures on the history of France from the earliest authentic date to the present time.

Friday, February 22, 1884.—Fresh westerly winds and cloudy weather all day; light snow fell during the early evening; temperature at 6 a. m., −11.0 [−23.9° C.]; at 5.30 p. m., −3.0 [−19.4° C.]. The barometer has been falling with alarming rapidity all the afternoon. From Cemetery Ridge I viewed the ice-fields this morning, and find them in substantially the same condition as that reported by Rice yesterday.

The advent of the anniversary of the birth of Washington was hailed with delight by all because of the proposed change in the matter of meals. In honor of the occasion Lieutenant Greely directed the cooks to depart from the usual routine and prepare a hard-bread pudding for breakfast, in which twenty ounces of lard were used by each of the two messes. This amount of fat rendered the dish both rich and agreeable in taste. For dinner a stew of English and lime juice pemmican was served, which was pronounced the best we had ever eaten. I issued the last of the *Proteus* tea this evening. Lieutenant Kislingbury sent a communication to the commanding officer to-day relative to a change in the scale of rations.

Saturday, February 23, 1884.—This is a stormy and disagreeable day. Winds have been somewhat variable, but chiefly from the south. Light fall of snow, and temperature −6 [−21.1° C.]. The monotony of our existence seldom varies from this apathetic state; we talk of food and long for news from our home and friends. It is conceded by all that the most desirable thing that we could have just now would be a "square" meal. Every one is very enthusiastic now over the flavor of the Wiltshire bacon found in the English cache at Payer Harbor. To be sure it is slightly rancid, but this appears to improve its quality.

Sunday, February 24, 1884.—Brisk westerly winds and cloudy weather; temperature, −16 [−26.7° C.] About three inches [76^{mm}] of snow fell during yesterday afternoon and evening. Owing to the high temperature the annoying dripping of moisture from the roof of the hut still continues. The usual issue of lemons was made to the party to-day, but no rum was served in view of the limited quantity on hand. It appeared to possess almost life-giving qualities, and its absence is greatly deplored.

Considerable water was visible in the sound to-day, and the bridge which had formed a few days ago from shore to shore has entirely disappeared from view under the influences of the lake wind storms. This is something not wholly unexpected, but at the same time it is bitterly disappointing, it being the last faint hope of escape which remained with us. I think, however, that we can bear pain and disappointments with a greater display of fortitude and resignation than ever before in our lives. Ralston is suffering with a sore finger, the affection of which is similar in character to the fingers of Gardiner or Biederbick.

In a letter to the commanding officer, Lieutenant Kislingbury offers to conduct a small party across the sound to Littleton Island to secure relief for those who are too weak to attempt the march. This to be done in the event of Smith Sound freezing over. He also in the same letter objects to any further increase in our meat ration until we have some means of augmenting our supply. For the information of the party generally, Lieutenant Greely stated that he would start for Littleton Island at the first opportunity, but would never divide the command.

Monday, February 25, 1884.—Light snow and brisk westerly winds, which have caused heavy drifting; temperature at 7.30 a. m., −16.1 [−26.7° C.]; and at 5 p. m., −10.1 [−23.3° C.]. Our cooking vessels having become somewhat dilapidated were skillfully repaired by Bender. The barometer has been again falling rapidly; another storm is brewing most likely. The last of the Wiltshire bacon was issued this evening, and by all it was pronounced the best they had ever eaten.

Tuesday, February 26, 1884.—The morning was cloudy and gloomy, but towards evening the sky cleared beautifully and the stars appeared. The high wind subsided at 3 a. m., and in a short time a rise of half an inch [12.7^{mm}] in the barometer was noted. The temperature at 7.30 a. m. was −10.0 [−23.3° C.]; at 5.30 p. m., −16.0 [−26.7° C.], and at 8 p. m., −19.7 [−28.7° C.]. About four inches [about 100^{mm}] of snow has fallen during the last three or four days. The water-spaces in Smith Sound appear to have been considerably enlarged since yesterday. On examination I find that the blubber will suffice for only one more regular issue, and that will be a very small one.

Wednesday, February 27, 1884.—Clear and calm weather; temperature at 7 a. m., −22.0 [−30.0° C.], and at 5 p. m., −27.2 [−32.9° C.]. I passed around the outer extremity of the peninsula this morning in search of game, but saw nothing. This place appears to be entirely deserted by all animal life now. At

noon for the second time this year the sun was seen reflected on Bache Island. Dense clouds of vapor are seen ascending from the water-spaces in Smith Sound and Kane Sea. The remaining portion of blubber, onion pickles, dog-biscuit, extract of beef, and extract of coffee were issued to-day. Henry celebrates his birthday.

Thursday, February 28, 1884.—Calm and cloudy weather. The temperature at 7 a. m. was —23.0 [—30.6° C.]; and at 6 p. m., —27.1 [—32.8° C.]. Yesterday Biederbick reported Lieutenant Lockwood for having used tobacco despite the express orders of Lieutenant Greely and Dr. Pavy. He (Lockwood) emphatically denied having used any, but circumstances elicit the truth of Biederbick's statement. It is evident that Lockwood's mind is so weak that he had forgotten both the orders and the fact that he had used tobacco. He is not improving at all in health, and he is growing somewhat irritable in disposition.

Friday, February 29, 1884.—Clear and calm weather; temperature at 6 a. m., —32.0 [—35.6° C.]; at noon, —30.0 [—34.4° C.]. The horizon has been so hidden by dense vapors that the sun could not penetrate to us to-day. There has been a decided improvement in the spirits of the men during the last week. They appear as cheerful as if they were enjoying the privileges of civilization, rather than this state of barbarism.

Saturday, March 1, 1884.—The weather has been clear, but the fresh westerly winds which have been prevailing all day drive the snow about so recklessly that we do not care to venture out; temperature, —35 [—37.2° C.]. The barometer is again falling. I had the natives unlash the large sledge, preparatory to the repairs which will be made on it next Monday. Yesterday Bender and Whisler placed the small sledge in proper condition for traveling. The former, while cleaning the shot gun, lost one of the important extra parts through neglect. The gun, however, can be used if due care is exercised in handling. I took an inventory of the meat yesterday, and found that we still have 319 pounds on hand. Lieutenant Greely said last night that if circumstances were favorable he would increase the ration on Wednesday next, and start for Littleton Island on the following Monday. To judge from his appearance and conduct, Lockwood's mind must be very weak. Owing to the severity of the storm, no one visited the hill to-day.

Long tells me the following little episode, which he considers a very good joke: On the evening of the day of Henry's birthday, he (Long) neglected to add the allowance of tea while preparing dinner, and did not discover his mistake until after he had issued to each person a cup of hot water. As no one detected the absence of the tea, Long of course did not care to acknowledge this omission, and has said nothing about the matter until to-day, when he related it to me in confidence.

Long and earnest discussions on the subject of food are now being made with greater vigor than ever before. Frederick has at last completed the boots, and he is now working on the sleeping-stockings of dog-skin and blanket. Schneider is making stearine candles for use on the journey across to Littleton Island. I prepared a large piece of tin, on which will be marked the name, age, and date of the death of Cross, and be placed over his grave. We would like to use a portion of our boat to mark his last resting-place, but cannot afford to do so owing to scarcity of fuel. In remembrance of our dead companion, Sergeant Cross, Lieutenant Greely has named the little lake which so long supplied us with water, Lake Cross.

Sunday, March 2, 1884.—Clear weather and brisk west winds; temperature at 7 a. m., —22.5 [—30.3° C.], and at 5 p. m., —24.0 [—31.1° C.]. The blinding drift outside prevents open-air exercise to-day. Of our stock of lemons only two remain. They will be kept for use in the event of illness.

Lieutenant Lockwood appears to be improving in strength again, but his mind is greatly weakened. He does not seem to possess the happy faculty of bearing up against adversity like some of the others—Elison, for instance—who is so brave and patient in his sufferings that his conduct elicits the admiration and love of his more fortunate companions.

Monday, March 3, 1884.—Weather clear. A high westerly wind has been blowing all day, which amounted at times to a moderate gale; temperature at 7 a. m., —27.5 [—33.1° C.]; at 2 p. m., —25.0 [—31.7° C.].

Using my latest inventory of provisions as a guide, the commanding officer has made careful calculations for the future, and says that on the present ration we can live until the first week in April. If no opportunity occurs for crossing the sound to Littleton Island before the 16th instant, all hope of leaving this place must be abandoned; and if we do not succeed in securing game, our end will not be far distant on April 15. On my recommendation, the commanding officer appointed Frederick a sergeant in the general service, vice Cross, deceased. This is a fitting recognition, at this time, for his excellent services this winter.

Biederbick has been very ill with cramps, but he has now improved to such an extent that he is again enabled to perform his duties as nurse and hospital steward. I brought in one of the runners of the large sledge, and Whisler began to make the necessary repairs. Bender's inventive genius appears to be limitless; he has designed and constructed several candlesticks of an entirely new and original pattern, which may be used for a double purpose. Schnieder is making stearine candles, and Frederick is still working on the sleeping-stockings intended for our journey. Ralston's hand appears to be improving under the doctor's careful treatment. Owing to the heavy drifting of the snow to day, we could not get a satisfactory view of the water-spaces in Smith Sound. Temperature inside the hut, +21.5 [−5.8° C.].

Tuesday, March 4, 1884.—Cloudy; the high westerly winds of yesterday have not yet abated, and snow has been falling at intervals all day; temperature at 7 a. m., −21.5 [−29.7° C.], and at 5 p. m., −23.0 [−30.6° C.]. Nothing has been done on the sledge to day in consequence of the indisposition of Bender, who is to assist Whisler in making the alterations and repairs. Lieutenant Greely made a reduction in our ration of bread, which will take effect to-morrow. It has been placed at eight ounces per man per diem. He will increase the ration of meat slightly in a few days. The last of the blubber, Hudson Bay pemmican, and American pemmican were issued this afternoon.

Wednesday, March 5, 1884.—Cloudy and stormy weather; temperature at 7 a. m., −22.0 [−30.0° C.]; at 11 a. m., −23.0 [−30.6° C.]; and at 2 p. m., −19.0 [−28.3° C.]. The wind is blowing with persistent and relentless fury. It continues with the same terrific velocity as yesterday, and confines us closely to the interior of our dwelling. I, however, crawled out for a visit to Cemetery Ridge to look at the sound. The water appeared to be farther away than before, but large spaces still exist, as the somber water-clouds on the horizon will testify. Capes Hawks and Louis Napoleon, with the "delectable mountains" of Hayes in the distance beyond them, were distinctly visible to the eye.

I issued the last of the corn, soup, tomatoes, and English evaporated potatoes. Bender is ill again with the old lung troubles. Bacon stews, with a large proportion of rancid tallow added, are generally liked. The strong rancid flavor is something that a delicate stomach would at once rebel against, but to us it is agreeable and palatable; it affords a welcome change from the ordinary routine by having a peculiar flavor which is both distinct and pronounced in its nature.

Thursday, March 6, 1884.—Clear weather; temperature at 7 a. m., −20.8 [−29.3° C.], and at 5 p. m., −24.5 [−31.4° C.]; the wind subsided at noon, but in the evening it again resumed its original velocity, and in consequence heavy drifting was experienced. I issued the last can of lard to the cooks this morning; a small quantity will be kept to use on Elison's wounds.

On visiting the hill I saw the open water extending to the north as far as my eye could reach. On account of its narrowness the lead resembled a sluice-way; and in view of its direct course to the southward I am of the opinion that it is in the axis of the channel. On making a close examination of the left runner of the large sledge I find two knees broken and one other greatly weakened. Frederick has completed his work on the sleeping-stockings to the satisfaction of all.

Friday, March 7, 1884.—Clear and calm weather; temperature at 7 a. m., −15.4 [−26.3° C.], and at 2 p. m., −18.0 [−27.8° C.]. Rice saw the sun this morning for the first time since last October—nearly five months ago. For this glimpse of old Sol's rosy face he had to pay dearly, it being necessary to climb the rugged sides of the island nearly to its summit. Long ascended Beebe Point, and, after taking a survey of the floe, proceeded to the northeast to the open water which was about one mile distant from the point named. Following along the water's edge to Brevoort Island, he found only a narrow belt of ice between the water and the base of the island. Ascending to the summit of this island, he looked to the north, east, and south, and within the range of his vision nothing but open water was observed. A few pieces only of débris ice were seen drifting along with the current. He saw two bear tracks, one large and one small, and the fresh trail of a fox. Kislingbury went out to the large berg just north of Camp Clay, and accidentally breaking through the ice narrowly escaped being drowned. With great difficulty he returned to the hut; his clothing having frozen so stiffly that it was almost impossible to walk. He reports the existence of considerable water about the berg and says he thinks it will be a paradise for seals in a few weeks, or as soon as the warmer weather approaches. Rice saw a brace of ptarmigan on Cemetery Ridge, but before he could secure a gun they had disappeared from view.

Frederick intended to begin work on the sleeping-bags this morning, but in consequence of their frozen state his operations in that direction have been suspended indefinitely. Bender has been very aggressive in his conduct to-day; he flatly contradicted Lieutenant Greely, and in addition made a very extravagant and reckless use of profanity. I issued the remaining portions of the cloudberries and chocolate extract.

Saturday, March 8, 1884.—A gale rose suddenly from the southeast at about 2 a. m., and continued without intermission during the entire day. It is without doubt the severest storm that has yet visited us here. Temperature at 7 a m., —3.0 [—19.4° C.], and at 1 p. m., —2.4 [—19.1° C.].

The remainder of our rice and tomatoes were used for soup this morning. Frederick transformed a three-man sleeping-bag into one for the use of two men. The poor fellow suffers greatly with his sore fingers while working in the low temperature of the interior of the hut, but he is indefatigable and never complains. Whisler completed the repairs and alterations needed on the large sledge, and it is now ready for the field. Bender assisted him whenever his condition would permit. I broke up another barrel for fuel to-day. Two staves suffice to prepare a meal now, but it may be necessary in the near future to reduce even this meager allowance. Ralston's finger is improving slowly.

For the first time this winter, hair-cutting was extensively indulged in. The style of the cut was comfortable but scarcely artistic. Those wishing to reduce the length of their hair crawled on their hands and knees to the foot of their respective sleeping-bags and held their heads in the passage, while the tonsorial artist passed along the line armed with a huge pair of shears, and about ten seconds were devoted to the removal of the superfluous burden of matted hair on each head. Mine was over six inches in length.

Sunday, March 9, 1884.—The full force of the gale was broken at 4.30 a. m., but it blew, however, with great violence at intervals all day; temperature at 7 a. m., —10.0 [—23.3° C.], and at 3 p. m., —8.4 [—22.4° C.]; inside house, +26.0 [—3.3° C.]. The barometer, which has been falling for two days, rose rapidly this morning. Considerable disagreeable dripping from the walls and roof was experienced this evening during the preparation of the evening meal.

Lieutenant Greely has decided to send Long and Christiansen with the small sledge and six days' provisions to Alexandra Harbor, for the purpose of securing any game that may inhabit that region. I had volunteered with others, and felt confident that I would be one of those selected for this journey. Owing to our greatly reduced strength, this will be a journey of extraordinary danger and hardship.

Monday, March 10, 1884.—The gale continued all last night with relentless fury, but at about noon it abated to a fresh wind and blew steadily from the southeast; temperature at 7 a. m., —9.5 [—23.1° C.], and at 2 p. m., —6.5 [—21.4° C.]. On visiting the hill near Cemetery Ridge, I saw a narrow lane of water just east of Cape Sabine, with ice beyond, which appeared to extend to the Greenland coast, which was then plainly visible. Rice afterwards ascended considerably higher, and reported on his return that the ice appeared continuous from this to the Greenland coast, but that it was badly disintegrated. Should we be fortunate enough to have calm, clod weather to cement this ice, our chances are yet favorable to reach the opposite side of Smith Sound this month.

Biederbick has been detailed as cook in place of Long, who has been relieved to make preparations for his trip to the westward. I issued to him bread and meat at the rate of ten ounces per day of the former and eight ounces per day of the latter. He also takes sufficient alcohol for fuel to last eight days; and, to be used in the event of illness resulting to himself or Christiansen, a pint of rum and a small quantity of aromatic spirits of ammonia will be included in his outfit. I followed along the coast to the westward for a short distance to-day, but I saw nothing of the game of which I was in quest—not even a trace of any living thing. We are now burning stearine candles to light our hut, all our stock of blubber being exhausted. More dissatisfaction occurred in our mess this evening, but Lieutenant Greely promptly settled the matter by directing the cook to make divisions of the food according to the best of his judgment, and to distribute the plates himself instead of having a second party pass them.

Tuesday, March 11, 1884.—Clear and calm weather; temperature at 6 a. m., —19.1 [—28.4° C.]; at 5 p. m., —21.5 [—29.7° C.]. This is one of the most beautiful days that has visited us in this place, and to us it probably seems brighter than any other, as the welcome rays of the sun flooded the exterior of our hut for the first time. To facilitate Long's journey, Rice and Ellis hauled his sledge to the west end of Cocked Hat Island. They say the traveling is good, but that their excessive weakness would not permit them to go far. They returned, however, in fair condition. A short time after the departure of the sledge Long and Christiansen started on their hazardous journey, taking with them the kindest wishes of their less strong but grateful companions, whose eyes would perhaps never again see them in this world. A raven was seen near Cocked Hat Island, but it was too far distant to enable the sledgers to get a shot at it.

From the hill I saw that no apparent change had taken place in the ice-fields since yesterday. The Greenland shore was still visible, and very little vapor could be detected in any direction. It is but natural that I should feel greatly encouraged with the prospect before us now. With a few cold nights, and with

an absence of high winds, we may expect to see the sound close sufficiently to admit of our crossing to the opposite side. Without such conditions—well, we must wait for the ship, I suppose, or—starve! Our rations will last till about the middle of April, and after that we have no hope except in game. The question we are now anxiously asking one another is, "Will Long do something for us by securing game at Alexandra Harbor?" I had Jens lash together the large sledge this morning, so that everything might be in readiness for an immediate start at the proper moment. I saw the track of a solitary ptarmigan in the snow near the house this morning. Our evening stews have been reduced from two to one kettle per meal, in order to save fuel. The solid portion of the stews is the same as formerly, and the reduction is but little missed, and particularly as the second kettle of stew was usually little more than salt water slightly warmed.

Our evening readings continue, and the days are sometimes passed in noisy discussions on the important events of the day in Germany, and in preparing, in the imagination, elaborate combinations of that ever-popular dish known as "hash." All our subjects for conversation appear to have been pretty well ventilated; and for hours at a time, even during the day, silence will reign supreme.

Wednesday, March 12, 1884.—Cloudy weather with light snow occasionally falling; temperature at 6 a. m., —25.1 [—31.7° C.]; at 1 p. m., —16.0 [—26.7° C.]; and at 6 p. m., —23.5 [—30.8° C.]. I tramped through the soft snow in the direction of Cape Sabine in search of game, but had not quite reached the cape when I was compelled to turn back by the rising of a terrific storm, which came from the southward. Saw the track of a fox. The last storm has broken into the floe to the westward of Cape Sabine, and the water has encroached to the vicinity of Beebe's cache. No ice was observed drifting in the water, which was as clear and tranquil as in the month of August. I followed northward along the margin of the floe, and returned to the hut by the way of the large berg. About this berg are several pools, which are probably kept open by the action of the tide. Owing to the absence of water-clouds over Smith Sound, I do not think that water-spaces are as extensive there as in Kane Sea. Frederick resumed work on the sleeping-bags this morning. Elison's ration of bread has been reduced from sixteen to twelve ounces; his meat ration, however, was increased three ounces.

Thursday, March 13, 1884.—Clear, calm weather; temperature at 6 a. m., —23.0 [—30.6° C.]; at 2 p. m., —21.1 [—29.5° C.]; and at 6 p. m., —25.8 [—32.1° C.].

Rice observed ptarmigan tracks near the hut this morning, and Lieutenant Kislingbury and myself, thinking that they might still be near the camp, went out in search of them. A tramp of over two hours' duration revealed nothing of their whereabouts, though they had visited every spot in our vicinity that produced vegetation. The channel looks more favorable now than ever before. The dark water-clouds have entirely disappeared, and light, fleecy vapors have taken their place. It is my opinion that the narrowest part of the sound will "choke" with the drifting masses of ice, and if the cold, calm weather continues, this pack will solidify and thus furnish us with a means of escape. The barometer has been vacillating greatly of late, but it is now quite steady. Long and Christiansen are having excellent weather for their hunting expedition. I have little confidence in their ability to secure large game in that region at this season of the year, but will depend mainly for existence on the seals, which will probably make their appearance in April, or on the arrival of a relief party from Littleton Island, if the conditions of traveling will permit them to cross over.

Friday, March 14, 1884.—Clear and calm weather; temperature at 7 a. m., —27.2 [—32.9° C.], and at 7 p. m., —30.5 [—34.7° C.]. Owing to the presence of the sun the day has been bright and beautiful.

Long and Christiansen returned at 7 o'clock last evening very much exhausted and quite badly frost-bitten in several places. They had been unable to get into their sleeping-bag together, owing to its frozen and cast-iron-like state. Cape Viele had been reached on the evening of their first day, and the next morning they rounded the cape and entered Alexandra Harbor. Finding no traces of game in this place, they crossed near the head of the deep bay of which Alexandra Harbor is an inlet, reaching Mount Carey, which they ascended for the purpose of observing the surrounding country. They had an uninterrupted view of about 10 miles on the north side and 20 miles on the south side of Hayes Sound beyond the most distant point seen by the English Expedition of 1875–'76. Three capes, heretofore unknown to explorers, were discovered by them on the north side of the sound, the most westerly one of which was named by Lieutenant Greely, in honor of its discoverer, "Cape Long." The sound appears to be the narrowest opposite Weyprecht Island and the widest about 15 miles farther to the westward. After an absence of over fourteen hours they returned to Cape Viele, where their sledge and equipment had been left, to obtain rest and recuperation, which their prolonged exertions and exposure made necessary. While here Long was taken suddenly ill, and for a brief period he despaired of ever again meeting his companions who were so anxiously

awaiting his return. Only one at a time was enabled to occupy the frozen sleeping-bag, and then it was necessary to lie in a cramped position. Long crawled into it, and the faithful native walked up and down through the deep snow until his companion should feel well enough to resume the march. In consequence of the low temperature, Long knew that he could not long survive unless something was speedily done, so taking a few drops of the ammonia in a liberal allowance of hot rum, he soon felt greatly relieved, and at once started homeward. They reached us after having tramped for fourteen hours from Cape Viele. No game was seen, and only one track, and that a fox, was met with. This is a bitter disappointment to us, as we had reason to expect small game at least from Alexandra Harbor, which the English reports say was teeming with game. Lieutenant Greely is going to send out another party in a few days, which will consist of Long and myself, I having volunteered for this duty several weeks ago. We will probably be absent for eight days, and may cross Buchanan Straits to Bache Island, if there is sufficient inducement to do so.

Elison says the spell is broken and that we may expect to get plenty of game in the future. I shot three ptarmigan this morning; hence his remark. No portion of these birds except the feathers was wasted. Everything else—feet, heads, legs, and intestines—was thrown into our stews and devoured without the slightest feeling of repugnance.

Rice went across the islands to select a route to Rosse Bay. He contemplates a journey to Baird Inlet in a few days to look for the meat abandoned there last fall, and by going directly across the island the distance will be greatly shortened. He returned at 7 p. m. and reported the route practicable. Coming back by the way of Cape Sabine enabled him to obtain a good observation of the condition of the sound. He says that the ice is nearly closed on this side, but thinks that a considerable space of open water exists on the Greenland shore. He saw a raven.

Biederbick was promoted by Lieutenant Greely to hospital steward to-day. His appointment, of course, is subject to the approval of the Secretary of War on our return. On recommendation of Dr. Pavy, Elison's ration of bread has been increased to sixteen ounces and his ration of meat to six ounces.

Saturday, March 15, 1884.—Clear, calm weather; temperature at 6 a. m., —30.8 [—34.9° C.]; at 11 a. m., —21.0 [—29.4° C.], and at 5 p. m., —31.3 [—35.2° C.]. I hunted along the coast in the direction of Cocked Hat Island, but saw nothing except a few ptarmigan tracks made several days ago—probably by the birds which I shot yesterday. Those birds, by the way, netted us three pounds and ten ounces. Lieutenant Kislingbury went out to the open water towards the northeast, and saw a bear track which he judged to have been made four days ago, and he also saw five dovekies sporting in the water. This is cheering news to us, and the future certainly looks much brighter and more hopeful than it has for a long time.

The bread ration has been reduced to fifty ounces per week to each man, and will take effect on Monday morning. It may yet be necessary to send a party to Cape Hawks to secure the small quantity of bread that was left by us there; but I fear that the foxes have eaten it all. Moldy and rotten as it was, if we had it now it would make a welcome addition to our scanty store and would be eaten with avidity to prolong our lives. We can live on our present ration little more than a month longer. The sound looks still more favorable to-day than it did yesterday; the pools near Cape Sabine are evidently closed, but a large water-space is observed in Kane Sea. A very enjoyable and palatable stew served for breakfast was made of tallow, salt water, and crumbs of bread.

Sunday, March 16, 1884.—Clear and calm weather; temperature at 6 a. m., —34.7 [—37.1° C.], and at 5 p. m., —31.7 [—35.4° C.]. In the sun it rose to —19.0 [—28.3° C.]. The sound looks more favorable than ever for crossing to Littleton Island. If it continues to improve during the coming week as it has during the week just passed, I think escape by this means is most probable. Long and Christiansen went out to the open water this morning, taking with them the kayak. They returned with four dovekies and report having seen and fired at a small seal. The dovekies are small but plump, and are dressed in their winter suits—white plumage with black tips. In addition to the birds killed, the hunters say that several others were seen, but, owing to their timidity, all efforts to secure them failed.

Matters now appear to be in a favorable state for our ultimate relief and safe return to our homes. We hope soon to leave behind us these desolate and inhospitable regions and find a haven of rest under more congenial skies. If the game of the country fails us, which I think is improbable, we still have hope of assistance from Lieutenant Garlington and party, who I think must be at Littleton Island or in that vicinity. But if we receive no assistance from this source, we can retreat across the sound, if it closes, when on our last legs. If the meat abandoned in Baird Inlet last autumn can be obtained, we can survive until about

May 1. Long's success this morning in hunting has had an excellent effect on the spirits of the men. During the last few days very few subjects have been under discussion except they bore a direct relation to food, or would suggest it in some way. No other subject appears to possess half the attraction for our poor hungry fellows that this one does.

Lieutenant Greely contemplates sending Jens and myself to Rice's Straits in a few days to look for seals and other game. I volunteered also to go down to Payer Harbor in quest of game, and to observe the chances for future operations there. I proposed to Lieutenant Greely this morning that we make an attempt to catch shrimps to eke out the slender stock of supplies in our larder. If possible, I will prepare a net for that purpose to-morrow and give the matter further thought. I exposed a tempting bait on the rocks in the vicinity of our hut as an inducement for the raven to visit us that we may effect his capture. While on the hill this morning to observe the condition of the sound the sun burst forth in all his radiant splendor, and for a long time I lingered among the rocks to enjoy the warmth and comfort which it brought. To use the apt expression of Dr. Kane, "It was like bathing in perfumed water."

Monday, March 17, 1884.—Cloudy weather; temperature 6 a. m., —25.0 [—31.7° C.], and at 5 p. m., —23.5 [—30 8° C.]. The barometer is falling slowly. There are indications that a severe storm is now in progress in the Sound, and the newly-formed ice will probably be entirely broken under its influence, thus destroying our last chance of escape to Littleton Island. The cold weather during the past week had aroused our most sanguine expectations of escape from this place, and now to realize the downfall of our bright anticipations is hard indeed to bear. Jens shot a ptarmigan this morning which weighed twenty ounces. The dovekies killed yesterday average in weight about one pound each.

Lieutenant Kislingbury and Jens visited the open water this morning, but returned without having killed anything. They, however, saw a seal, but it was too far distant to admit of being shot. I designed and made an apparatus with which to catch shrimps. Rice, having volunteered to act in the capacity of shrimper, will take the contrivance to Beebe Point to give it a thorough test. I spent some time on the large sledge this morning to prepare it for immediate use when required. New drag-ropes were also supplied to it.

In overhauling the stores in the commissary room I found ten ounces of English chocolate which had been overlooked in the darkness and confusion of last winter. It will not be issued to the general mess, but by the direction of Lieutenant Greely it has been given to one of the cooks to issue to Elison from time to time as he may desire. His ration is now more than double that of the others, but it is the wish of all that it should be so, for none can forget the devotion which the brave fellow has showed us in the past. He maintains a wonderful control over his feelings and is ever cheerful. The ration of the party is now eleven to twelve ounces each per day—no more. A large pool of water has opened near the berg, and I would not be surprised if we were shooting seals there in a few days if the weather should prove agreeable. Brisk wind, causing considerable drift, began at 1 p. m.

Tuesday, March 18, 1884.—Cloudy and stormy weather. The snow is being drifted in a blinding sheet by a high northeast wind. The high, rocky point between our house and the sea protects us somewhat from the full fury of the blast. Temperature at 6 a. m., —16.0 [—26.7° C.]; at 11 a. m., —7.0 [—21.7° C.]; and at 2 p. m., —15.0 [—26.1° C.]. The barometer has been nearly stationary all day notwithstanding the tumult of the elements. I went on the hill during the forenoon and saw that a terrific storm was in progress in the sound, and that the ice was suffering greatly in consequence. Long did not make his customary trip to the open water to-day on account of the severity of the weather. The raven was observed to be investigating the fox-skin which I had placed on one of the rocks near the house yesterday, but being very wary he escaped the load of shot intended for him.

Wednesday, March 19, 1884.—Cloudy, stormy, and generally disagreeable weather. A brisk westerly wind, which at times came in gusts, hurled the snow in every direction with great violence, and kept us confined closely to the house. Temperature at 6 a. m., —16.3 [—26.8° C.]; at 11 a. m., —9.8 [—23.2° C.]; and at 5 p. m., —12.0 [—24.4° C.].

Lieutenant Lockwood appears to be improving in health and strength. If our daily ration was only half the amount that a man would ordinarily consume in these regions, how well we could live through the winter to summer and—relief. In consequence of the rising barometer we entertain strong hopes of an improvement in the weather to-morrow. This storm has broken a large space about "Expectation Berg," from which we may hope to secure many seals during the warm weather which will follow soon. It also has damaged the floe greatly in the vicinity of Beebe Point, where a great sea is now rolling. A few days ago this same place was covered with a vast ice-field.

I find that the tallow contained in the English bacon cans is in excess of the forty pounds of bacon as marked on the outside of the cans. The recent reduction in our rations has once more revived the old topic of conversation—food—and many hours are passed quite pleasantly in telling one another of the bills of fare that we would order if we were in a civilized land. It is pitiful, sad, and aggravating to hear these things, but when the relentless wolf, hunger, is gnawing in this terrible manner at our very life, what are we to do or say? Try as hard as we may to think of other things—to concentrate our minds on subjects more elevating and instructive—we cannot do it for five minutes at one time without reverting again to that old familiar theme—food.

Thursday, March 20, 1884.—Clear weather; temperature at 6 a. m., —20.5 [—29.2° C.]; at noon, —14.0 [—25.6° C.]; and at 5 p. m , —19.0 [—28.3° C.]. The barometer is about stationary. Fresh westerly winds have caused much drifting to-day and rendered outside work very trying and disagreeable. Notwithstanding the wind, Long went out to the open water in search of game. He saw two dovekies, neither of which was secured. Rice went to Beebe Point to test the shrimp net or trap which I made for him a few days ago. He found a very good place to lower the net into the water not far this side of the point. At low tide quite a large opening is formed between the floe and the ice-foot, thus enabling the contrivance to be lowered without cutting a hole. He succeeded in catching about two ounces of the minute crustaceans, and says that, with slight modifications of the trap, this new industry can be prosecuted very successfully. This opens to us another avenue of escape—another chance for life. How eagerly we grasp at even the faintest hope of ultimate safety, and how anxious are we to leave this horrible place where we have suffered so much, met with so many disappointments, and even now are standing face to face with Death!

An owl and a raven were seen to-day; the former was taking flight towards the north, and the latter was scouting about the camp for scraps, of which there are none. Christiansen is not feeling well; his late trip to the westward with Long has doubtless exhausted all his energies, and despondency seems to have overcome his usually happy disposition. Linn also is evidently losing much of his vigor of mind. Since the terrible exposure which he experienced last autumn, when on the Cape Isabella trip, he has not been himself, and probably never will again fully recover his faculties. The doctor frequently remarks the great change that has taken place in him. Lieutenant Kislingbury was unfortunate enough to pierce one of his fingers with a needle a few days ago. The injured member is now greatly swollen and inflamed, and Kislingbury suffers severely. At my suggestion Lieutenant Greely has directed that in the future the kayak will be conveyed to the open water each morning by some member of the party not otherwise employed, and thus lighten the labors of the hunters, who are doing all in their power to procure for us the means of sustaining and prolonging life. Long, Christiansen, and Jens are doing all the hunting at present.

Friday, March 21, 1884.—The weather continues cloudy, and the fresh westerly wind of yesterday, which caused so much disagreeable drift, has not yet abated; temperature at 6 a. m., —19.8 [—28.8° C.]; at noon, —13.0 [—25.0° C]; and at 5 p. m., —22.2 [—30.1° C.]. The barometer has again taken a downward tendency, and we may expect a storm at any time. I made a light dip-net for Rice's use in shrimping; and I also devised a peculiar hook with which we will attempt to catch some fish in a few days. Gardiner has invented and manufactured an apparatus for capturing floating sea-weed. We contemplate using this vegetation largely as an article of food if it can be easily secured.

Lieutenant Kislingbury fainted this evening while having his finger lanced by the doctor. He was soon restored, however, but for some time afterwards he felt very weak and sick. Both the natives are very much swollen about the face and limbs. Dr. Pavy thinks the difficulty is similar to that which I experienced a few weeks ago from over-exertion.

Saturday, March 22, 1884.—The weather continues cloudy, and fresh westerly winds prevail; temperature at 6 a. m., —14.0 [—25.6° C.], and at 6 p. m., —12.0 [—24.4° C.]. During the afternoon the wind changed direction to the southeast and light snow began falling. Long and Jens went out to where the open water had existed a few days ago and found it entirely closed by débris ice, which, having drifted down from the north, had lodged at this point and was now thoroughly cemented together. For three miles beyond the point which they had previously visited while hunting no signs of open water appeared. In returning to camp they passed the large berg about which the pools had formed, but saw nothing of the seals which we expected would make their appearance there at an early date.

Rice was quite successful in his shrimp fishing to-day; he secured about six ounces and expects to get at least a quart as the result of to-morrow's fishing. The long pole with hooks, prepared by Gardiner yes-

terday to fish out sea vegetation, is not just the thing required, but with slight alterations Rice thinks it can be adapted to the purpose for which it was intended. He reports that it is necessary to do the fishing at low tide, as the crack through which the nets are lowered closes at high tide. The maximum depth of water here is about thirty feet [9m], and while the shrimps are collecting on the baits the nets rest quietly on the bottom. These little animals are only about the size of a half-grown fly. Near the place where his nets rest on the bottom of the sea, is a long white object resembling the rib of a whale, but Rice thinks it possible that it may be the limb of a petrified tree.

If the weather is favorable to-morrow I am going to visit Rosse Bay for the purpose of hunting seals. Lieutenant Greely said this evening that if no game were secured by the first week in April he would reduce our rations to a basis that would enable us to exist until May 1. I made two nets for Rice this evening, using fox-skins in both for bait. The dovekie legs are also excellent bait, and will be reserved for this purpose in the future.

Sunday, March 23, 1884.—Clear weather, with light westerly winds; temperature at 6 a. m., —25.5 [—31.9° C.], and at 6 p. m., —22.8° [—30.4° C.]. The barometer fell slightly at an early hour this morning, but during the rest of the day it remained stationary. The indefatigable worker, Rice, went down to his shrimp nets at 3 a. m., but he did not succeed in getting many in consequence of a broken net guy, which caused the trap to upset, thus spilling the contents. At dinner time he went down again, this time catching about four pounds. We could not refrain from giving the dear fellow a hearty cheer after this achievement.

As contemplated yesterday, I crossed the island to Rosse Bay, making the ascent on this side by the glacier, and descending to the bay on the other by a deep ravine. I examined carefully the face of the glacier at the head of the bay, but could find no evidence of its having kept the ice broken during the winter. I had expected to find pools of water near its front, through which the seals could crawl to the floe above. The ice, of course, had been broken by the steady advance of the glacier, but the pools of water so formed must have closed immediately. On my return to the island I visited all the bergs and places at which I thought it likely a seal or walrus would appear, but nothing of that nature was met with. All the northern half of the bay is a level plain of new ice with an occasional small berg, while the southern side is thickly studded with large icebergs and huge masses of paleocrystic ice. While on this floe a high wind prevailed, which eddied about me with great violence. In following the tortuous windings of the ravine to the summit of the island, I escaped the full force of the storm, but in crossing the divide, I was enveloped in a blinding drift, and could scarcely find my way. At one time I thought of surrendering, so dense was the cloud, and so weak had I become from the unusual exertion, but I made another effort, and in a short time was walking down the slope on the other side. In this struggle my nose, face, and fingers were quite badly frost-bitten. I saw the tracks of a fox and ptarmigan in Rosse Bay.

Long went out to the open water, but he saw nothing but one dovekie. Bender has covered himself with glory by making a large fish-hook which possesses all the advantages of any that can be bought. The use of wood for fuel has been discontinued, and all our cooking for the present will be done with alcohol.

Monday, March 24, 1884.—Weather clear; light westerly wind. Temperature at 5 a. m., —23.0 [—30.6° C.], and at 2 p. m., —21.0 [—29.4° C.]. Exposed in the sun at 11 a. m. the thermometer registered —6.0 [—21.1° C.]. Rice made three trips to the shrimping grounds to-day, which resulted in adding about seven pounds of shrimps to our supplies. Nothing could be more gratifying to us than this success in fishing, which gives us a firm grasp on the future.

A terrible scene occurred in our wretched hut during the morning. While preparing breakfast (tea) the cooks had forgotten to remove the bundle of rags from the ventilators in the roof, and the fumes thrown off by the alcohol lamps, being confined to the small breathing space, soon produced asphyxia. Biederbick, one of the cooks, was the first to succumb to its effects, and Israel immediately afterwards became insensible. At the suggestion of Gardiner, all the rest of us rushed for the door, and the plugs were at once removed from the roof and the lamps extinguished. By prompt attention Dr. Pavy succeeded in reviving Israel and Biederbick. Those who went outside were less fortunate than those who fainted in their bags. As soon as they came in contact with the pure outside air all strength departed and they fell down on the snow in an unconscious state. In consequence of the absence of all animation many of us were frost-bitten—Lieutenant Greely and myself quite severely. The lives of several of the men were probably saved through the noble efforts of Gardiner, who, though weak and sick, did all in his power to get us in the hut. Lieutenant Greely said that when he came out and saw me lying on my back in the snow, with my face perfectly rigid and white, and to all appearances stiffly frozen, he thought me dead. Gardiner said that I appeared to suffer

most, and that I fell not less than a dozen times. I would recover, stagger to my feet, and immediately fall fainting again. Lieutenant Greely, Connell, and myself were affected more than any of the others, although all fainted except Pavy, Frederick, Elison, Salor, Henry, and the two Eskimo. The doctor and Frederick worked like Trojans to assist those who were less fortunate than themselves. During the excitement of the hour about half a pound of bacon was stolen from Lieutenant Greely's mess, and as soon as the fact became known great indignation was expressed that in our midst lived a man with nature so vile and corrupt—so utterly devoid of all feelings of humanity—as to steal food from his starving companions when they were thought to be dying. A deed so contemptible and heartless could not long remain concealed from those who had been injured. We were not disappointed in the discovery that Henry was the thief. He had literally bolted the bacon, and his stomach was overloaded to such a degree that, in its enfeebled state, it could not retain this unusual quantity of food, and his crime was thus detected. Jens afterwards reported having seen him commit the theft, and illustrated by signs his manner of doing it. Threats of lynching were privately spoken of, but no public accusations have yet been made against the perpetrator of this foul deed. The conduct of this fiend Henry, who, clothed in the garb of innocence, deliberately appropriates to himself the food belonging to his comrades, and at a time when he supposed them dying, is sufficient reason for me to lose all confidence in mankind.

On account of our sufferings during the morning two and one-half ounces of bread were issued to each man in addition to the regular allowance. A fox track having been seen near the house, Jens at once volunteered to follow it. Near Cape Sabine he overtook the little animal, but it escaped. Fox, bear, and seal skins (the latter oil-tanned) are being used for shrimp bait; seal thongs and dovekie legs are also used largely for the same purpose. I shot a white fox at 8.30 this evening, which weighed five pounds and two ounces, net. The intestines were divided, as heretofore, between the messes. I can never forget this terrible day, and how near we were to a horrible death.

Tuesday, March 25.—This has been a clear and beautiful day, with light westerly winds; temperature at 6 a. m., —28.0 [—33.3° C.], and at 5 p. m., —12.0 [—24.4° C.]. The thermometer, exposed directly to the sun's rays at noon, registered —0.5 [—18.1° C.]. Rice and Whisler went down to the shrimping grounds, and on their return set a net at the large berg. Owing to a movement in the ice the nets had been overturned and the baits lost, consequently no shrimps were obtained. In the evening, however, Rice caught nearly four pounds. Schneider prepares the bait by sewing seal or other skins over large stones; these placed in the bottom of the nets serve as a weight to sink them and at the same time they form a surface on which the little crustaceans can collect. Long and Christiansen went down to the open water, but saw no game. They report, however, the existence of two "blow-holes" through the floe near Cape Sabine. Shells and mollusks were scattered about the openings to bear testimony to the fact that seals or walrus had been visitors there. If we had a few days of good weather it is more than probable that we would secure some game. Christiansen, who accompanied Long to the open water to-day, returned greatly exhausted and nearly unconscious, having been supported and half carried by the latter all the way from Cape Sabine. Had it not been for Long's timely assistance Christiansen must have perished from the effects of the low temperature.

Henry opened his own case this morning by protesting his innocence, but he was at once confronted with the evidence collected last evening, and all the disgusting details of his theft were brought out. Jens, in his imperfect English, aided by signs, again illustrated to us the manner in which the act had been accomplished. Biederbick and Frederick told how they had observed that he ate none of the ration issued to him yesterday, and testified to having seen the large quantity of bacon which he vomited into a can last evening. The testimony of others was now given, but that of Jens and the two others mentioned was sufficient to convict him. Long saw him steal and drink an extra ration of the rum which was issued to us yesterday to counteract the effects of our terrible exposure. Ellis now reports him as having stolen canned goods at Fort Conger, and Connell related how he had seen Henry in a very suspicious and compromising situation last fall; and how he had afterwards observed an empty roast-beef can in his possession, long before any of the roast beef had been issued. Rice stated his opinion very clearly, and suggested that violent measures would be appropriate under the circumstances. Lieutenant Greely requested the individual opinion of each man, all of whom, without a single exception, were unanimous in the expression of their belief that he was guilty and that punishment should be meted out to him in proportion to his crime. He then placed Henry in arrest. He is not to leave his bag without permission, and in no case will he go out of doors without being accompanied by some other member of the party. He still asserts that he is innocent of the charge brought against him, but the evidence brought to bear on the case is conclusive and will admit of no doubts.

The shrimps are now mixed with pemmican in the stews, and are considered quite palatable. Biederbick was relieved from the duties of cook this morning and Linn was detailed to take his place. Last evening Ellis requested to be allowed to "fill up" by eating tea leaves. It is needless to say that this rather extraordinary request was not granted by Lieutenant Greely. This evening, in violation of strict orders, he was detected in the act of taking a sly smoke. Lieutenant Greely's hands are frozen to a greater depth than they were at first supposed to be; they are much blistered, and he can scarcely use them. My own, being very sore, kept me awake a great deal last evening, but they will not interfere with my duties. The snow has been removed in several places from the boat, and holes to admit the light cut through. Over the openings thus made white canvas has been fastened, and we are now, for the first time since entering the hut, enabled to distinguish faces across the room without the aid of artificial light.

Wednesday, March 26, 1884.—During the early morning the weather was calm and cloudy; at 9 a. m. a slight breeze from the west was perceptible, and snow began falling. At 11 a. m. the wind changed direction to southeast and increased to a gale. It was the most violent storm of the season, and we trembled for the safety of our shelter. I was out hunting when it began, and so great was the velocity that I was knocked down by the first shock. My weakness will probably account for my inability to stand up against its terrific force. Temperature at 7 a. m., −10.0 [−23.3° C.]; at 11 a. m. it had risen to zero [−17.8° C.], and at 4 p. m. it had fallen to −2.0 [−18.9° C.].

Rice reports having seen a ptarmigan track on Cemetery Ridge. He hunted unsuccessfully in that vicinity for some time, as did Long and myself. Rice's efforts at shrimp fishing did not meet with flattering success to-day, though success was deserved. With a total disregard for personal safety he went down to visit the nets through the howling storm, and returned utterly exhausted. At the berg only a few specimens of crustacea were obtained, and at the main fishery nothing of importance was captured. Bender, Schneider, and Whisler made for him a long spear with an attachment in the form of a hook, which can be used for collecting sea-weed (kelp) from the bottom of the sound.

The English chocolate which I found a few days ago, and which had been reserved for the sole use of brave Elison, was missed this morning from the place where it had been stored for safety. Circumstances point strongly to Henry as the guilty party. It was discovered to-day that Ellis had been smoking roots of saxifrage in violation of orders. Lieutenant Greely's hands are badly frost-bitten. Shrimps combined with tallow make a very good stew. Lieutenant Greely publicly announced the appointments of Sergeant Frederick and Hospital Steward Biederbick.

Thursday, March 27, 1884.—Weather fair and calm; temperature at 7 a. m., −12.0 [−24.4° C.]; at noon, −10.0 [−23.3° C.], and at 3 p. m., −9.0 [−22.8° C.]. To our intense relief, the gale subsided at midnight. Lieutenant Greely to-day celebrated the fortieth anniversary of his birth.

Long and Jens went out to the open water this morning accompanied by Salor, who carried the kayak. The latter returned in about two hours with fifteen dovekies which Long had shot, and which Jens secured with the aid of his kayak. Lieutenant Kislingbury and Connell at once went out with more ammunition, and soon returned with eighteen more birds. Long was the hero of the hour, and probably the proudest moment of his life was when he threw these few birds at the feet of Lieutenant Greely as a birthday offering. Cheer after cheer was given the hunters, and general good feeling prevailed. In value, each dovekie is equal to about one pound of meat. This appears to be the turning point in our fortunes. Rice caught about twelve pounds of shrimp, but to accomplish this result he made four trips to the fishing grounds. The legs, heads, wings, and feet of the dovekies are being largely used for bait.

Henry asked Lieutenant Greely to be allowed to perform some share of the daily routine in the hut, and on being refused said: "You will kill me with injustice if you do not." Crocodile tears to create sympathy came at his bidding, and flowed freely from the eyes which, a few days ago, looked on the wretched condition of his companions without remorse or pity. He has been socially ostracized. Snow began falling at 7 p. m. Jens was taken with a slight illness this evening, but speedily recovered under the careful attention of Dr. Pavy, who administered aromatic spirits of ammonia and rum. Christiansen asked to go out to the open water with Long to-morrow, but being refused permission on account of his enfeebled condition, he worked himself into a towering passion, and cursed promiscuously in broken English. Ellis was again detected in the act of eating stearine, and to prevent a repetition of this violation of orders he was placed under guard. His entreaties and promises were made with so much earnestness and sincerity, that he was finally released.

Lieutenant Greely has decided to allow Rice and Frederick to go to Baird Inlet to secure the meat abandoned last autumn when Elison was so badly frozen. They have volunteered for the service, and will probably start about April 8. Israel tells me that he detected the doctor in the act of stealing bread from Elison's store. I took an inventory of the provisions this morning. The morning stew of 36 ounces of bread, 12 ounces of tallow, and 7 ounces of shrimps, made a highly gratifying meal for us. The cooks are using 2½ ounces of alcohol per man each day for fuel. Schneider is at present doing well, and trying to redeem himself in the eyes of his companions for his misdeeds of the past. Lieutenant Greely contemplates sending out the wall-tent to be pitched near the open water. The kayak will be kept inside this tent to avoid the necessity of carrying it back and forth.

Friday, March 28, 1884.—A beautiful bright day, light westerly winds; temperature at 7 a. m., —24.0 [—31.1° C.]; at 4.30 p. m., —18.0 [—27.8° C.]. Exposed in the sun at noon the thermometer recorded +5.0 [—15.0° C.]. I went down to Payer Harbor this morning by crossing over the island. I took an aneroid barometer with me for the purpose of determining the altitude of the island; this I found to be 1,900 feet [579^{m}]. I experienced great difficulty in clambering down the abrupt cliffs overlooking the harbor, but at last I accomplished it in safety, bearing with me, however, several bruises as mementoes. I found many traces of ancient Eskimo encampments, and the remains of a broken sledge of bone with wooden runners. These interesting relics were carefully placed together in a conspicuous position where they can be found later. As it is Lieutenant Greely's intention to move camp to this harbor before warm weather, I selected a site between two small lakes for our encampment. The record cache is in excellent condition, no portion of the cairn having fallen.

There is a large pool of water lying between Brevoort and Stalknecht Islands which was probably caused by the swiftness of the eddying currents just at that point. I observed two small "blow-holes" in the floe, which have been recently made by seals. From Brevoort Island I followed the open water to a point just north of Cape Sabine and then turned homeward. The open water washes against the east side of Brevoort Island. On the west side the ice is intact. During my tramp I saw several dovekies and fresh fox tracks. The sledge tracks which we made across Payer Harbor last fall are quite distinctly marked in the hard snow and easily followed. This fact gives me hope that Rice and Frederick will be able to follow their old tracks in Baird Inlet to the place where they abandoned the meat. Jewell started out with the kayak this morning, but being too weak to proceed with it Lieutenant Kislingbury relieved him of his burden. Long shot fourteen dovekies to-day, and Rice, the persistent and tireless worker, captured twenty-seven pounds of shrimps.

The tent was taken out of the house, but it is so full of ice that it will be spread on the rocks for a few days with the hope that it may be made lighter by evaporation. Christiansen shot a ptarmigan on Cemetery Ridge this morning. He returned immediately to the hut thoroughly exhausted with the exertion of walking. He seems very despondent, and says that he will never again return to his home in Proven. His companion, Jens, is in excellent spirits and fair physical condition, and is very hopeful of the future. Lieutenant Greely notified me that from Sunday next only four ounces of bread per man would be issued daily. The meat ration, however, will be increased slightly. Lieutenant Lockwood appears to be growing much stronger. The evening readings, which have been a source of so much gratification to us in the past, were discontinued this evening owing to an inclination on the part of some to sleep rather than hear them.

While on the summit of the island to-day I had an excellent view of Smith Sound and Kane Sea. The former is free of all ice near the channel except "brash", or that of a few days' formation, and any vessel could steam up to Cape Sabine without difficulty or danger. The water touches Isabella and appears to reach to the Greenland shore. I am of the opinion that next summer will be equally as favorable for navigating the waters to Lady Franklin Bay as was the summer of 1881.

Saturday, March 29, 1884.—A gale rose suddenly at about 8 a. m., and continued without interruption during the entire day. It was accompanied by a heavy fall of snow, and in consequence the drifting was heavy. Temperature at 6 a. m., —4.5 [—20.3° C.]; at 9 a. m., zero [—17.8° C.]; at noon, +1.0 [—17.2° C.]; and at 2 p. m., —5.0 [—20.6° C.]. Our breakfast consisted of 4½ ounces of bread, 1 ounce of bacon, and 6 ounces of shrimps to each man. No tea was served and its absence was not considered a serious loss. For dinner we had each 1⅓ ounces of dovekie, 1 ounce of bacon, 2½ ounces of bread, and 11 ounces of shrimps. This made a most delightful stew, and its solid contents were rather more than we had been accustomed to eat for both meals. Although this makes only three full (?) meals (with the shrimps), we are already beginning to note a favorable change in our condition.

Rice shot a ptarmigan this evening, and reports having seen five more on the hill near Cemetery Ridge. He caught shrimps to the amount of twelve pounds. Long went out to the open water, but the storm drove him back within an hour. He cached the kayak on a floe. We discontinued using alcohol as fuel and substituted stearine, of which we have a moderate supply. Recently we have all complained of feeling chilly, and some have suggested that it is due to the late change in our mode of living. Lieutenant Greely says if we are successful in procuring game before May, he will send me out in command of a party during that month to explore Hayes Sound and the adjacent country. Israel and Frederick have been named as the two who will accompany me; they, as well as several others, having volunteered for the duty.

Our bread ration has now been reduced to 3½ ounces per day. The rations of Long and Jens (the hunters) have been increased to five ounces of dovekie meat per day. Poor suffering Elison! This morning he turned to the doctor and said: "My toes are burning dreadfully, and the soles of my feet are itching in a very uncomfortable manner; can you not do something to relieve this irritation?" He little dreams that he has neither toes nor feet; they having sloughed off in January.

Sunday, March 30, 1884.—The gale continued all last night with relentless fury, but at 4 p. m. a slight lull occurred which enabled us to heave one huge sigh of relief, and then it began again as strong and hard as ever. Temperature at 1 p. m., −3.0 [−19.4° C.]; at 5 p. m., −5.5 [−20.8° C.]; inside the hut, +20.5 [−6.4° C.]. When the lull in the storm occurred this evening I started out in search of game, but was almost immediately driven back to the house for shelter. The storm has broken all the newly-formed ice in the vicinity of Cape Sabine, and the water has encroached considerably on Buchanan Straits. Great anxiety had been felt concerning the fate of the kayak which Long left yesterday on the floe near the open water. To quiet the fears which had arisen that it had been washed away, Long tramped down to the spot and found it all right. The barometer is fluctuating greatly; in fact since the beginning of the storm it has been very unsteady. Ralston's finger has improved so much that he is now pronounced by the doctor to be in condition for duty.

Monday, March 31, 1884.—The gale continued all night with terrific violence, but at about noon to-day it lulled for a little while. During this brief respite it seemed to gain additional strength, as the wind blew with redoubled fury a short time afterwards. Temperature at noon, +3.0 [−16.1°C.]. During the lull this morning Long went down and brought the kayak nearer to the land. He reports having seen many dovekies, and that the white caps were rolling in and breaking over the edge of the floe. The water is gradually encroaching on the floe, and is now opposite Beebe Point. No ice of any considerable importance was observed in the water. Jens saw two ptarmigan, but could get a shot at neither.

Christiansen complained this evening of feeling faint and sick. A drink of rum was administered, which seemed to restore him somewhat. Frederick was also ill—too ill, in fact, to perform the duties of a cook. Schneider very kindly volunteered to take his place for the present. The stew this evening was very thin and unsatisfactory, but it was accepted with a very good grace by all. The temperature inside the house this morning was +18.0 [−7.8° C.]. This is the lowest we have experienced since the house was banked last fall. I suppose it is owing to the disagreeable weather. We have been very unsociable and unpleasant towards one another to-day, and, to augment our trouble irritable remarks have been made by those who should know better. The barometer has been steady, or nearly so, notwithstanding the storm.

Friday, April 1, 1884.—The gale of yesterday continued until about 4 a. m., when it subsided. Weather cloudy; light westerly winds; temperature at 5 a. m., −5.5 [−20.8° C.]; at 11 a. m., +6.0 [−14.4° C.]; at 2 p. m., +10.0 [−12.2° C.]; and at 3.45 p. m., −2.5 [−19.2° C.]. Rice made four trips to the shrimping grounds, capturing thirty pounds of shrimps. Long killed eleven dovekies and saw four seals, one of which he fired at, but unfortunately missed. He also saw a large walrus on a drifting floe near Cape Sabine.

Having reduced several rifle-balls to fine pieces, I reloaded them, with the view of utilizing them as shot. Finding a brace of ptarmigan, I fired twice at only ten paces without injuring either. As a substitute for shot-gun cartridges they certainly are not a success. During my tramp this morning I found many meat caches and circles of stones, which indicated that the Eskimo—perhaps ages ago—had pitched their tents on this spot during the summer months. I also found the skull of a walrus, which bore traces of great antiquity, and also another bone, which I was unable to identify, owing to its friable and decomposed state. It is very probable that the natives killed the walrus here only when it crawled to the rocks to bask in the sunshine. Then it could have been captured easily by an expert native with his tried weapons of bone.

This is one of the worst days that I have passed in this place. I am so weak from the effect of our long fast that I can do little better than reel along like a drunken man. Our wan, pinched faces and hollow, lusterless eyes are turned wistfully towards the southern horizon in hope of succor. Will it ever come to

us, after this long period of anxious watching and waiting? I am afraid it will not. It is with the utmost difficulty that we can persuade ourselves to move about or, in fact, to do anything requiring physical effort. Even the moral powers appear to resist the employment of physical energies. No tea was served for breakfast, a thin, watery stew being substituted.

Wednesday, April 2, 1884.—Clear weather; brisk westerly winds; temperature, —13.0 [—25.0° C.]; nearly stationary all day. Rice and Frederick remained at the fishing grounds for seven hours, and during that time they caught thirty-two pounds of shrimps. The drift ice had crowded down again from the north, completely filling the water spaces, and thus preventing the hunters from seeing any game. The great water channel, which two days ago was entirely devoid of drift ice, is now covered by a grinding pack. The absence of frost, smoke, or vapor, in this low temperature, leads me to believe that the sound is entirely choked by ice.

Frederick was relieved from the duties of cook, and Schneider has been detailed to fill the office thus vacated. During the entire winter Frederick has performed the irksome duty of cook with fidelity and untiring energy, and he is deserving of more praise than is in my power to bestow. Christiansen has had his ration increased to the same amount as that received by the hunters; still he does not improve perceptibly. He acts in a very sulky and angry manner because he is not given more food; but he has always been so faithful and so devoted to the interests of the expedition that we should not complain of him now, when it is hunger and not the man that speaks.

Notwithstanding the fact that 3 ounces of dovekie, 2 ounces of bacon, 2½ ounces of bread, and about 12 to 15 ounces of shrimps are being consumed daily by each member of the expedition everybody is ravenously hungry, and all are growing daily weaker. The shrimps are of very little benefit; they possess little or no nutriment, and in fact they serve only to fill the stomach. In no case have they ever alleviated the pangs of hunger. We are all longing for a thick, rich stew of the flesh and blood of a seal, to strengthen and restore our reduced and emaciated bodies to their former vigorous condition. Food! food! is the constant cry of the hungry—the continual topic of conversation among us! This gnawing hunger has driven from our minds all other thoughts and feelings; and, like animals, we have little left except the instinct for eating. Even the passions peculiar to men in vigorous health are dormant and forgotten in our weakness and the craving for food.

Thursday, April 3, 1884.—Clear weather; light westerly winds; temperature at 6 a. m., —16.5 [—26.7° C.]; at noon, —9 0 [—22.8° C.], and at 6 p. m., —14.0 [—25.6° C.]. At noon another thermometer, exposed in the sun, registered +15.0 [—9.4° C.]. Rice went down at an early hour to the fishing grounds and remained working faithfully all day. Owing to a scarcity of bait he succeeded in capturing only 15 pounds. Salor, who assisted him on this occasion, will hereafter take charge of this important work, to enable Rice to make preparations for his contemplated journey to Baird Inlet.

Long and Jens again went out to their old hunting grounds. This time they found that the lane had opened slightly, and in it they saw a seal, at which they fired, but unfortunately missed. They also saw three dovekies and the tracks of a bear. While returning from the open water, Long shot two ptarmigan on Cemetery Ridge. Lieutenant Kislingbury also went to the open water to-day, but he returned empty handed.

While hunting over the peninsula to-day I found several bones and another walrus skull, which denoted extreme age. From the traces of the Eskimo which I have observed on this island, I have formed the opinion that their visits here were made at a date some considerable time prior to their wanderings about Discovery Harbor. Everything that we have found in this vicinity bears marks of greater antiquity than any of the relics discovered in the vicinity of Fort Conger. Christiansen is now given half a dovekie each day more than the others.

Friday, April 4, 1884.—At 5 a. m. the weather was clear and calm, and the temperature at the same time was —10.0 [—23.3° C.] In an hour the sky had clouded and the temperature changed to +8.0 [—13.3° C.]. At the same time the wind rose and blew briskly from the west. Snow began falling at noon. Long and Jens went as usual to the open water, and I tramped to Cape Sabine in search of game. During the night the channel had cleared out again, and there is now an extensive water space between Cairn Point and Cape Sabine. The storm was so violent that I turned back when in the vicinity of Payer Harbor. I saw a bear track which was made not more than two days ago. This same track was also seen by Jens and Long much farther north. The hunters also saw a seal and several dovekies, but they were not fortunate enough to capture anything. With even an inferior bait, Salor was remarkably successful in catching fifteen pounds of shrimps to-day. I purpose to make a trip in a few days to the valley west of Rice Straits, with the view of ascertaining if game may be procured there. Bender is again complaining with soreness

of his lungs. The rations for Lockwood and Linn have been increased by giving each one-fourth of a dovekie daily.

Saturday, April 5, 1884.—Clear weather and light westerly winds; temperature at 6 a. m., —10.0 [—23.3° C.]; at 12 m., —6.0 [—21.1° C.]; and at 4 p. m., —13.0 [—25.0° C.]. Christiansen, who had been ailing for some time, died at 9 a. m. The exposure incident to the trip which he made with Long to Mount Carey last month is the immediate cause of his death, but the primary reason is patent to all—starvation claimed him as a victim. On his return from the trip mentioned his system was so far reduced that his meager ration was not sufficient to recuperate him. At 2 p. m. his remains were interred on Cemetery Ridge, and a military salute was fired over his grave. Jens, his dusky companion, did not display the stoicism that is usually attributed to the people of his race, but, on the contrary, he manifested feelings of deep and heart-felt emotion. The "Little Man," as he is called, speaks hopefully of the future, and recommends Eskimo Point as a most desirable hunting-ground.

Although they worked faithfully, no game was seen by the hunters to-day. I worked nearly all day to get Rice and Frederick ready for the field. They start for Baird Inlet to-morrow morning, weather permitting. Their ration will be six ounces of bread, eight ounces of pemmican, and six ounces of alcohol (the latter for fuel) each per day.

I fear that Lockwood and Linn will soon follow the faithful Eskimo who has just died. They cannot or will not eat the shrimps any more, and, though they are given an extra allowance of dovekie, it is not sufficient to restore their depleted strength. Heaven help them, we can do no more.

Jens is to receive a double ration until further notice, which we hope may counteract to some extent the gloomy impressions made on his mind by the death of his associate. The death of Christiansen was very sudden and unexpected; he had wandered out of doors during the night and returned to his bed without assistance; he ate his breakfast only two hours before he passed away, and no one thought him in any immediate danger until a few minutes previous to this event. He was a noble and faithful fellow, and it is consoling to know that his end was painless. Whisler cut two holes through the boat and covered them with canvas. The light furnished by these openings will do us good, and it will also be the means of saving much fuel. Salor caught twelve pounds of shrimps with the skins and skeletons of two dovekies.

Sunday, April 6, 1884.—Calm and cloudy weather; temperature at 4 a. m., —10.0 [—23.3° C.]; at 3.30 p. m., +2.0 [—16.7° C.]; and at 7 p. m., —8.0 [—22.2 C.]. The traveling equipment intended for Rice and Frederick was hauled this morning by Kislingbury, Ellis, Whisler, and myself to the summit of the island on which we are living. The small sledge was used, and we were forced to ascend to the summit by way of the glacier near the shrimping grounds, which, owing to its steep and slippery surface, made our work very severe and laborious. We have never, until to-day, realized the full extent of our weakness. This trial has fully convinced us of the utter hopelessness of escape to Littleton Island, because of our reduced state. Four hours and ten minutes of steady traveling were required to attain the top of the island, and one hour and thirty minutes were consumed in returning to the hut. Light snow fell during the morning.

The hunters were again unsuccessful at the open water; they saw a seal and two dovekies, but unfortunately took none. The bird of ill-omen—the raven—is now seen almost every day. We would consider it a bird of paradise if we could introduce one of them in our thin stews. Salor caught fifteen pounds of shrimps.

Linn—our genial comrade, our tried and trusted friend—passed quietly away at 7 p. m. How indifferently we regard anything of this nature now; what stoicism is shown when the skeleton hand of Death removes from our midst one of our intimate companions. But could it be otherwise? Our own condition is so wretched, so palpably miserable, that death would be welcomed rather than feared. During the winter Linn had been rather petulant and irritable; but this was not, however, his natural disposition. It was owing to the terrible exposure to which he was subjected while on the Cape Isabella trip in November last. His sufferings there affected his mind to a certain degree; but we will remember him only as he was when at Fort Conger—a noble, generous-hearted, faithful man; a friend whom one could admire, respect, and love. After his death Rice and Ralston slept soundly in the same sleeping-bag with the corpse. This fact alone will demonstrate how utterly indifferent we are to the presence of death.

As contemplated, Rice and Frederick departed on their hazardous mission at 9.15 p. m. Farewells were uttered with husky voices and tremulous lips; the silent prayers of those who remained went with them, and eyes to which tears were strangers now became dimmed from emotion. Emaciated, weak, and despondent, they take their lives in their hands and go out alone in the bleak, dreary wastes of an arctic desert to suffer mental tortures indescribable, and to endure famine and to face the frosts of winter to save or prolong the lives of their comrades.

Monday, April 7, 1884.—Snow has been falling heavily all day; calm weather; temperature at 6 a. m., —8.7 [—22.6° C.]; and at 1 p. m., +2.0 [—16.7° C.].

Poor Linn was buried at 10 a. m. Lieutenant Kislingbury scooped out a grave for him on Cemetery Ridge. After the first six inches [152^{mm}] from the surface, the gravel was frozen as hard as marble, so the grave was necessarily a shallow one. It was all that eight of us could do to haul the body to the ridge on the large sledge. The weight of the corpse was trifling as compared with that of an ordinary sized man. He was literally a skeleton.

I shot two ptarmigan this morning with one shot. I saw another bird which was flying to the westward over our camp uttering hoarse croaks as it went. The cry was not familiar to me. Biederbick diluted a quantity of alcohol, and with the addition of some slight flavoring made an excellent "moonshine" drink, which imparted life and warmth to the poor fellows for a brief time at least. Lieutenant Greely contemplates making periodical issues of this drink on the recommendations of Dr. Pavy. Owing to the severity of the snow-storm the hunters did not go out; the shrimper also did not face the storm to-day. We fear that Lieutenant Lockwood and Jewell will soon follow Linn; they are both very weak and are failing rapidly. Jens is in good spirits and predicts success in hunting when we are blessed with warmer weather. Several are writing their wills, as well as letters to their friends.

Tuesday, April 8, 1884.—All of last night and throughout the entire day the snow has fallen heavily and high winds have prevailed. In consequence of the great velocity of the wind, the drift was at times terrific. Our brave companions, Rice and Frederick, must be suffering greatly from the effects of this storm. Temperature at 7 a. m., +13.5 [—10.3° C.]; and at 3 p. m., —5.0 [—20.6° C.].

Lieutenant Lockwood fell fainting in the passage-way this evening, and much difficulty was experienced in resuscitating him. Jewell is nearly helpless, and his mind has lost much of its vigor; he will be a total wreck in a few days. "Moonshine" was again issued to-day, and with an effect equally as satisfactory as yesterday. Salor says that he is no longer able to walk to the shrimping grounds, and I have undertaken to relieve him from his arduous duties. After dinner I went down through the howling storm to the fishing place, returning at nine o'clock with fifteen pounds of shrimps. The mode of procuring these crustaceans is as follows: An iron barrel hoop is placed inside the open end of a gunny sack, and such bait as we could use was fastened in the bottom; the sack or net was then lowered through the ice-hinge or tidal crack to the bottom of the sea (about 20 feet [6^{m}] at low tide), where myriads of these minute animals collected on the surface of the baits. A haul of these nets is made every few minutes, and amounts varying from two or three ounces to as many pounds are secured each time. The fishing place is about one mile east from Camp Clay, near Beebe Cache.

Wednesday, April 9, 1884.—The storm has not yet abated; temperature at 7 a. m., —7.0 [—21.7° C.], and at 11 a. m., +1.5 [—16.9° C.]. Lieutenant Lockwood became unconscious at an early hour this morning, and at 4.20 p. m. he breathed his last. His end was painless and without a struggle. This will be a sad and unexpected blow to his family, who evidently idolize him. To me it is also a sorrowful event; we had been companions during long and eventful excursions towards the north and towards the west, and my feelings towards him were akin to that of a brother. Biederbick and myself straightened his limbs and prepared his remains for burial. It was the saddest duty that I have ever yet been called upon to perform, and I trust I may never experience the like again. Jewell's condition is about the same as yesterday. Jens' extra ration has been discontinued for the present. "Moonshine" was again issued to-day.

The order of August, 1881, relieving Lieutenant Kislingbury, at his own request, from duty with the expedition, was revoked to-day by Lieutenant Greely. On restoring him to duty Lieutenant Greely eulogized him in the highest terms for his efficient assistance in the retreat from Fort Conger, and expressed a wish that their future intercourse might be of the most agreeable nature.

I had Ellis prepare a shrimp-net with which Whisler attempted to fish at a small island near the camp. Ellis was again detected eating stearine, and as a punishment for his offense his dinner was denied him. He wept and begged in the most abject manner for a remission of his sentence, and Lieutenant Greely finally modified it so that only half his tea was taken from him. Jens shot at a ptarmigan this morning, but for some inexplicable reason the bird escaped injury. Owing to the excessive weakness of nearly all the men, Dr. Pavy has volunteered to cut all the ice required for cooking purposes. Bender is again complaining with chest trouble. I took an inventory of the provisions this morning with the following result: Meat of all kinds, 156 pounds; bread, 70 pounds. We ask one another, "Can we prolong life until the 10th of May?" Although the answer is usually a favorable one, we know that many chances are against us. Our future is dark and gloomy, and I doubt if arctic clouds are ever seen with a silver lining.

Thursday, April 10, 1884.—This severe storm which has been raging for four days, continued until about 8 p. m. to-day, when it abated to a fresh breeze and snow ceased falling. Temperature at 4 a. m., +2.5 [−16.4° C.]; at 2 p. m., −9.0 [−22.8° C.], and at 7 p. m., −14.0 [−25.6° C.]. Jewell is endeavoring to rally from the stupor into which he has fallen, but the effort is a feeble one, and he is not likely to succeed. He neither relishes nor eats the shrimps any more, and his death by starvation seems inevitable. The last sad rites were performed over the remains of our late comrade, Lockwood; and he was interred with the others on Cemetery Ridge. I visited the shrimp fishery at 4 a. m. and at 8 a. m., and again during the evening; the three hauls aggregating twenty-two pounds. I have assumed these duties permanently in addition to the work connected with the issuing of provisions.

Although Biederbick is quite ill, yet he nevertheless continues in wonderfully good spirits, and he does all in his power to cheer his more despondent companions. Gardiner is gradually drooping, and Connell and Ellis are beginning to feel, to a marked degree, the effects of this horrible life. Jens also is feeling far from well. What could we do without his co-operation in hunting? Nothing. Without him the kayak cannot be used; and without the kayak no game can be taken.

Whisler made a most startling statement to Lieutenant Greely and myself, relative to the disloyal and dishonorable conduct of Dr. Pavy during the autumn of 1881, when they were traveling together in the attempt to reach Cape Joseph Henry for tidings of the missing *Jeannette*.

The alcoholic drink was again issued, and pleasant results followed. I used the last of the bird skins for shrimp bait this evening. I will now have to use their skeletons, and all the oil-tanned seal-skin that I can find.

Friday, April 11, 1884.—This is the most beautiful day that we have had this month. The weather has been clear and calm, and the minimum temperature, observed at 4 a. m., was −23.0 [−30.6° C.]. We hope that this bright sunlight will have a salutary effect on the condition of all who venture out to enjoy it. Long and Jens saw nothing at the water's edge except a walrus, which they could not approach owing to intervening leads. Long had a narrow escape from being carried out to sea this morning. A piece of the floe, on which he was standing at the open water, broke from the main body of ice and drifted out into Kane Sea. Jens having discovered Long's desperate situation, immediately paddled out to him in his kayak. Long earnestly urged him, but in vain, to return to the fast ice and save himself. The faithful fellow doggedly refused to go, and said in his simple way, "You go, me go too!" Fortunately the turning tide wafted their ice raft to the fast ice, and they escaped.

Physically, Israel is completely broken down; but his mental condition seems to be as vigorous as ever. Jewell does not rally, except under the influence of stimulants. He became unconscious late this evening. In consideration of my heavy duties in connection with the shrimping, Lieutenant Greely directed me to issue to myself two ounces of pemmican daily, in order that my strength be kept so that I can work for the others. He also directed that the daily rations of Israel and Jewell be increased four ounces. We are all once more at work making imaginary bills of fare, and partaking, in the same way, of sumptuous repasts.

Whisler volunteered to relieve me at the shrimp fishery this morning, and at 4 o'clock he made a trip, returning with about three pounds. At noon after three hours' fishing I brought in eight pounds more. After dinner I went down again, and while waiting for the tardy little crustaceans to collect on my wretched bait, I walked up and down in the beaten path to keep from freezing, my mind being occupied with thoughts of our deplorable situation and the particular dishes that I would like to partake of just at that moment. Chancing to glance in the direction of Beebe Point, I espied a medium sized bear, not more than two hundred yards [183^{m}] away, coming directly towards me with a shambling gait. My first impulse was to secrete myself behind a hummock near the shrimping hole and to make an attack on the animal with the hatchet and sea-weed spear when he approached my place of concealment. These weapons, however, did not strike me as being particularly desirable ones with which to engage in mortal combat with a ferocious and hungry bear, and especially when wielded by one whose strength was scarcely equal to that of a child. It occurred to me that, under the circumstances, discretion was the better part of valor, so taking the bucket containing the five pounds of shrimps which I had collected (I could not afford to lose both the shrimps and the bear) I hastily decamped. Dodging through the belt of heavy ice lining the shore, I gained unseen the well-trodden path leading to the hut. I have not the remotest idea of how I managed to reach the house, but I do know that ages seemed to elapse while I was dragging myself over Cemetery Ridge, and that I

discarded my heavy mittens and shrimp bucket near the house. Crawling through the entrance on my hands and knees I pushed the door open with my head, and falling into the passage completely exhausted called out, "A bear!" Long and Jens hastily made preparations to start; in the mean time a quantity of diluted alcohol had been given me, and as soon as I could speak my story was briefly told and some advice given as to the best way to proceed to effect the capture. Lieutenant Kislingbury soon followed the hunters, but having ran to Cemetery Ridge, he returned in a few minutes completely exhausted and broken down. At 9.50 p. m. the hunters were heard approaching the hut, and a moment later they announced to their anxious companions that the bear was dead, and that he was lying within a few feet of the open water about three miles away. During the interval between the time we heard the approaching footsteps of Long and Jens to the moment their success was made known the suspense was terrible; our hearts almost ceased to beat; our lives were hanging in the balance—chances for life or death were equal.

Within twenty minutes after the arrival of the hunters the large sledge was made ready, and Dr. Pavy, Long, Schneider, Henry, Whisler, Ralston, Salor, Ellis, and myself started with it towards the open water. Three ounces of bacon were given each man before starting, in order that his strength might be better maintained. The open water was reached at midnight, and with considerable difficulty the animal was loaded on the sledge and securely fastened. The blood which had flowed over the ice from the bullet wounds was chopped out with a hatchet and saved. This is Good Friday—so I am told—and it is also the last "fasting" day that we are likely to experience in these regions.

Saturday, April 12, 1884.—Clear, calm weather, and on the whole a brighter day even than yesterday; temperature at 2 a.m., —24.0 [—31.1° C], and 7 p. m., —20.1 [—28.9° C.].

We started back from the open water soon after midnight and reached the hut at 2.20 a. m., having accomplished a most remarkable journey, taking into consideration our deplorable condition. Ellis did not accompany us for more than a half mile when he became exhausted, and I sent him back to the hut. With feeble cheers our still more feeble men hauled this glorious prize, the bear, through the passage to the middle of the room, where he was turned over to Bender and Biederbick to be skinned and dressed. Everything connected with this animal will be utilized—intestines, lungs, heart, head, &c., will each be used in time. The liver, wind-pipe, feet, and the stomach (which is nearly empty) will be used by me for shrimp bait. The blood will be used for thickening stews. We look on this fellow as the means of our salvation; without him, in two weeks, Ellis, Connell, Bender, Biederbick, Israel, Gardiner, Salor, and Kislingbury would be in their graves; as it is, they are just snatched from its brink. What words are adequate to express the rejoicing manifested in our little party to-night? There are none; words cannot express our feeling of happiness and contentment. For days and weeks we have been expecting death at any time, and its approach had been robbed of all its terrors by our sufferings. Life had seemed to us a vague something in the misty distance, which was beyond our power to retain or control. The knowledge that it is now restored to us, and that ere many months we will have returned in safety to our homes, is sufficient cause for tears among the weaker members of the party. Life now seems ten times sweeter than at any former period of our existence; and we trust that this lesson will not be lost on us in the future. Jewell died at 10 a. m. to-day without a struggle. Biederbick and myself closed his eyes and straightened his thin, emaciated limbs. At 2 p. m. he was placed beside the others on Cemetery Ridge. Poor fellow! he might, in all probability, have been saved had the bear been killed twenty-four hours earlier.

Lieutenant Greely was kind enough to transfer me to the Signal Corps with my present rank. This transfer, of course, is subject to the approval of the Secretary of War. Our meat ration has been increased to eight ounces per day. The hunters and shrimper (Long, Jens, and myself) are to receive in consideration of our severe labor a double ration of meat. Elison also receives the same allowance as the hunters. Long and Jens rested to-day while Bender repaired their guns.

Sunday, April 13, 1884.—Clear and calm weather; temperature at 7 a. m., —9.0 [—22.8° C.], and at 7 p. m., —14.0 [—25.6° C]. I brought up twenty pounds of shrimps immediately after breakfast.

A gloom was cast over our party to-day by the arrival of Frederick, who reports the death by exposure of our beloved friend and comrade Rice, at Baird Inlet, on the 9th instant, during the progress of the severe storm which raged at that time. Together they had reached Eskimo Point, where everything was cached except the sledge, rum, fuel, and a few rations. They then proceeded out on the floe in search of the meat; but no trace of it could anywhere be discovered in the driving storm. Rice finally (3 p. m.) broke down from exhaustion and weakness, and at 7.45 p. m. he breathed his last. He had drawn to the very last moment from his mental and physical resources, and it may be truly said that he died while walking. With

cheering words, stimulating drinks, and all available means in his power, Frederick tried to revive his dying companion, but in vain. Could one conceive of a sadder picture than that of the nearly distracted survivor lying on the sledge with his dead friend in his arms, miles away from any human being, and conscious that no power on earth could extend him aid. The storm howling loudly about him, combined with the blinding drift, added physical suffering to mental torture. He scooped a shallow grave in the snow, and in it the body of his cherished comrade was placed. A few pieces of ice heaped over it was all that marked the resting-place of one who was as brave and noble as any that the world has ever known. Frederick returned the sledge and all the equipment as far as Cocked Hat Island, where he left it for the present.

Frederick has performed his duty nobly, and this trip in which he and Rice participated will always be conspicuous as the most heroic effort ever made by any party in these regions. Frederick says that many pools of water exist at Eskimo Point, and that a long lane of water has opened in Rice Straits, in which he saw a small seal. He also saw a snow-bunting near that place, and a fox not far from this house. Long shot a small seal at noon, and Whisler and myself hauled it in this evening. It will weigh about eighty-five pounds including the blubber. Jens says he saw a white whale near Cape Sabine this morning. Lieutenant Greely has increased our meat ration to one pound daily. He promoted and transferred Frederick to the Signal Corps, to fill the vacancy caused by the death of Rice.

Monday, April 14, 1884.—The weather here under the shelter of the island has been beautiful to-day, but the hunters say that the wind has been blowing with great velocity at the open water, and that no game was seen there. Temperature at 7 a. m., —15.0 [—26.1° C.]. After a long and tedious period spent at the fishing grounds, I brought in twenty-two pounds of shrimps. The hunters report having seen a bear track near the open water. It was made recently. In a letter which Rice committed to the care of Lieutenant Kislingbury before departing on his last journey, he appoints M. P. Rice, of Washington, D. C., Lieutenant Kislingbury, and myself as executors, and gives explicit directions regarding the disposition of his property. Connell saw a snow-bunting on the hill above camp to-day. Frederick has slept nearly all day, and he is recovering from the effects of his late trip as speedily as could be expected under the circumstances. Lieutenant Greely contemplates sending the hunters to Payer Harbor with the wall tent in a few days. Later on the entire party will move down, and our effects, such as are not needed for immediate use, will be transferred by easy stages.

Lieutenant Greely has not been feeling well for the last few days. The doctor says that he is suffering with an irritation of the heart. In view of the fact that all who were greatly reduced had received extra rations, Lieutenant Greely felt justified in using a few additional ounces of bread and pemmican this evening, and, as a natural result, he felt a decided improvement in his condition. Extra rations were issued to Gardiner all of last autumn and about half of the winter; to Elison all winter; to Rice and Jens just before starting to Greenland, and again to Jens only a few days ago; to Lieutenant Lockwood, Jewell, Israel, Long, Linn, Frederick, Christiansen; and I also was directed to increase my ration by two ounces.

Tuesday, April 15, 1884.—Clear weather, light westerly winds; temperature at 7 a. m., —10.8° [—28.2° C.], and at 3 p. m., —12.0 [—24.4° C.]. I caught fifteen pounds of shrimps to-day. Schneider assisted me greatly by coming down and carrying my can to camp. His timely aid was more than welcome to me, as I was very weak and tired, having been reduced by severe labor during the last week. At the open water Long and Jens saw three seals, one of which was shot by the latter, but it sank before the kayak could be brought. Elison's bread ration has been reduced to four ounces; the general ration is two ounces. The issue of diluted alcohol will be continued until further orders. Lieutenant Kislingbury and Ellis are quite ill from the effects of overexertion during the bear excitement on the evening of the 11th inst. Gardiner fainted this morning, but this evening he says he feels much better. Lieutenant Greely has been troubled with flux to-day, and he was feeling generally so much weaker than usual that he directed a small extra issue of bread and pemmican for himself.

Wednesday, April 16, 1884.—A heavy snowfall with moderate winds from the west visited us to-day; temperature at 7 a. m., +5.0 [—15.0° C.]; at 3 p. m., +19.8 [—6.8° C.]; and at 7 p. m., +2.0 [—16.7° C.]. During the morning's fishing I caught eighteen pounds of shrimps; in the evening I again hauled the nets, which resulted in taking twenty-three pounds more. In the future I will leave the nets down when I am through fishing instead of taking them out of the water altogether, and will do my fishing at the low tides. By this means the nets may be hauled in a few minutes, and I will thus avoid much of the dampness, cold, and exposure which several hours' fishing in this place renders unavoidable. This hard work is rapidly diminishing what little strength I have left, notwithstanding the eight ounces of meat which I receive in

addition to my regular ration. Owing to his extreme weakness, Israel's ration has been increased eight ounces. Lieutenant Greely is feeling somewhat better than he was yesterday; he ate a few ounces of bread and pemmican in the store-house while I was issuing provisions. Kislingbury and Ellis are in a very weak state; the former talked in his sleep one or two nights ago. To give us a variety, the bear meat for the evening meal was fried instead of being boiled. Ralston has been relieved from cooking in Lieutenant Greely's mess, and Frederick has been detailed to replace him. Henry has been paroled for the present, and the limits of the peninsula given him.

Thursday, April 17, 1884.—The weather was clear and calm during the forenoon. In the evening, however, we were visited by a slight snow-storm. All the morning we enjoyed a dazzling sunlight, which cheered somewhat the many hearts that are weary of this interminable gloom and darkness. Temperature at 9 a. m., +16.0 [−8.9° C.], and at 7 p. m., −5.0 [−20.6° C.]. Owing to indications of a storm in the sound, the hunters did not go out to the open water. Frederick hauled the nets for me at both the low and high tides to-day, and brought in forty-two pounds of shrimps. I returned home late last evening in an exhausted condition, and to-day I have been scarcely able to move about.

Whisler placed two more windows in the boat forming our roof, which considerably improves the facilities for light. Almost every one appears to have been benefited by the return of the glorious sunlight which now penetrates our miserable habitation. I overhauled the effects which belonged to Rice and Jewell, and placed them in shape for transportation to their friends. Everything belonging to the former was turned over to Lieutenant Kislingbury and myself as his representatives. In deference to the wish of Dr. Pavy, Lieutenant Greely directed me to take charge of all notes, journals, or writing belonging to Rice, and to carefully seal them. The blubber stripped from the seal shot by Long on Sunday last weighs forty pounds.

Friday, April 18, 1884.—A terrific snow and wind storm has raged about us all day. Temperature at 7 a. m., −1.5 [−18.6° C.]; at 11 a. m., +12.0 [−11.1° C.], and at 7 p. m., −3.0 [−19.4° C.]. I weighed the seal this morning, and found the net weight of the animal to be seventy-eight pounds. This includes the blubber. I caught eighteen pounds of shrimps. Of these animals we now have on hand about one hundred pounds. Jens is making a small sledge to support the screen which he will find necessary to use while hunting the seal. Lieutenant Kislingbury and myself sealed the note books which belonged to Rice, and, by Lieutenant Greely's direction, I assumed charge of them.

The light admitted through the canvas on the boat is not yet sufficient to enable us to read at all hours without the aid of artificial light. The melting of the frost from the roof renders our condition positively wretched. Our bags are covered with ice, and our clothing is thoroughly saturated with the moisture thus produced. The "moonshine," or diluted alcohol, which is still issued, has had a very salutary effect on all the men. Every one appears better to-day except Biederbick and Whisler. The former did not get up on account of weakness; he cannot eat the shrimps* any longer. Whisler is failing rapidly in strength, and he converses but little now. I am feeling very weak, and have been without ambition since the trip to the shrimping grounds this morning. Lieutenant Greely again visited the commissary store-house for a small quantity of pemmican, which his condition justified him in taking. He told me that Ralston was relieved from cooking on account of appropriating to his own use that which belonged to others.

Saturday, April 19, 1884.—Cloudy weather, light winds from the west prevail. A heavy precipitation of frost has done much to obscure the sky to-day; temperature at 12.30 a. m., −17.0 [−27.2° C.]; at 8 a. m., +5.0 [−15.0° C.], and at 3 p. m , +3.5 [−15.8° C.]. The barometer is high and steady. Long did not go out to the open water to-day, but Jens, however, was there as usual. He reports having seen a seal and one dovekie. Gardiner related to me to-day the disgusting details of the "light-fingered" operations of Ralston, while the latter was acting in the capacity of cook a few days ago; also further facts relative to his duplicity while at Conger. In view of the fact that several members of the expedition, myself included, are of the opinion that Lieutenant Greely's strength should be maintained, he again directed that another small issue of pemmican be made him.

* In speaking of the minute crustacea caught in great quantities at this place, I have almost invariably spoken of them as shrimps. This designation, however, is not strictly correct, though in some respects, especially in action, they closely resemble the shrimps in southern waters. The small crustacea mentioned in this journal were from one-eighth to one-half of an inch in length, consisting of about four-fifths shell and one-fifth meat, and about seven hundred of them were required to weigh an ounce. Among the whalers of the arctic regions they are popularly known as "sand-fleas" and "sea-lice."—D. L. B.

Ellis is worse, much worse; he could not eat his breakfast of shrimps owing to nausea which their appearance produced in him. His days of life are doubtless very few. Biederbick, the faithful hospital steward, is better. Whisler broke down utterly to-day. He says he can do nothing more. The fact is, we are all very weak, and it is difficult to find men enough to carry out the necessary routine of daily work. I hauled eighteen pounds of shrimps. The raven had visited the grounds some time during the day, and judging from his tracks and the number of shrimp scattered about on the ice he must have made a hearty meal off the refuse. The issuing of the fresh meat is the greatest difficulty that I have to contend with; it is firmly frozen and has to be cut with a handsaw. My weak state renders this duty both irksome and trying, and I often feel like giving it up in despair; but thoughts of the future, which may yet have something bright in store for us, nerves me to the task, and by sheer force of will alone I continue the work. The frost and ice which during the winter formed in the boat and all other portions of the roof is now thawing rapidly, and almost everything is saturated with the dripping moisture. We are removing this ice by hand as fast as possible. We now have a sufficient quantity of shrimps on hand to admit of everybody having all they may desire. These shrimps possess very little nutriment, and if taken in large quantities they have a tendency to nauseate.

Sunday, April 20, 1884.—The barometer has been falling steadily all day; temperature at 7 a. m., —1.0 [—18.3° C.]; at 11 a. m., +2.0 [—16.7° C.], and at 3 p. m., —0.5 [—18.1° C.]. During the morning the weather was cloudy and stormy, but towards evening the sky cleared beautifully, and the radiant sun appeared At the open water this morning Long and Jens saw nothing but one seal. I caught fifteen pounds of shrimps. Ellis was very weak to-day, and his condition was rendered doubly miserable by an attack of flux.

A breakfast of hard bread and tallow was greatly relished by every one, but the dinner was the chief event of the entire winter. The stew for this meal was composed of the trimmings of the bear and the seal heads; their hearts, lungs, kidneys, &c., and a large quantity of the blood which had flowed from the bear when he fell dying on the floe. Every ounce of this blood had been chopped from the ice and saved for this purpose. It enriched the stew beyond the conception of any one unacquainted with its use; it supplied it with a thick, delicious gravy, and imparted a delicacy of flavor which proclaimed it superior to anything that we have eaten for months. Israel's extra ration of eight ounces of meat was discontinued to-day. Dating from to-morrow morning our regular daily ration will be ten ounces instead of sixteen, as it is at present. Dr. Pavy reported to Lieutenant Greely that the extra meat issued to the hunters was almost wholly without bone. Think of the absurdity of issuing bones to the men who are striving with all their might to put food in our mouths! From this date the midnight sun can be seen from Camp Clay.

Monday, April 21, 1884.—Cloudy and stormy weather, with puffs of wind from the west; temperature at 7 a. m., —1.0 [—18.3° C.]; at 11 a. m., +10.3 [—12.1° C.], and at 5 p. m., —2.0 [—18.9° C.]. I was taken suddenly ill last night, and in consequence of subsequent exposure I was thoroughly chilled. On the recommendation of Dr. Pavy, I did not go to the fishery to-day. Long and Jens also remained in and secured a few hours of much needed rest. Long was the only man strong enough to do the outside work to-day. He is a wonderful fellow, always jolly and good natured; and he is now doing all in his power to improve the condition of those who, in a measure, are dependent on his skill as a hunter. Lieutenant Greely is recovering slowly; he directed that another small issue of bread and pemmican be made him. Schneider was accused of some irregularity in the distribution of food to those in the mess for which he is cook, and was taken to task by Lieutenant Greely, who admonished him that a repetition of this offense would be the signal for the adoption of severe measures. One of our stew-pans has been burned so badly that it is practically useless. Jens, the happy, good-natured little fellow, whom everybody loves, and who is in excellent spirits, and full of hope for the future, says: "Me all same white man." Meaning, I suppose, that he is willing to share and suffer alike with us. He is a noble, faithful fellow.

Tuesday, April 22, 1884.—Cloudy and stormy weather; temperature at 5 a. m., +5.0 [—15.0° C.]; at 11 a. m., +10.0 [—12.2° C.], and at 8 p. m., +15.6 [—9.1° C.]. During the evening the storm increased to a moderate gale. Bender and Whisler tore out the lining of the boat this morning, with the view of using it for fuel. We burned the last of the stearine in cooking the evening meal, and to-morrow the use of wood for fuel will be resumed. Notwithstanding the storm, Long and Jens made their usual tramp to the edge of the ice. The former space of open water has been entirely covered by débris ice since yesterday, and the present opportunities for taking game are thus cut off. The shrimps had completely stripped the nets of bait, and in consequence I caught only six pounds. To-morrow I intend to work the evening tide.

On account of the accusations made against him yesterday, Schneider refused to cook the meal this evening. Lieutenant Greely thereupon insisted on doing it for him, with the view of setting an example, but he was soon relieved by Jens. Seven and one-half ounces of bacon and one ounce of bread made a welcome change for us. Dr. Pavy and Lieutenant Kislingbury recommend that our ration be increased from ten ounces to sixteen ounces daily. Lieutenant Greely objected, on tenable grounds, to this change, but compromised by authorizing an issue of twelve ounces daily. At this rate our provisions will last but twenty days only. With this stormy weather to contend against, and the end of our provisions not far off, the future is certainly dark and cheerless. Dr. Pavy further recommended that my extra allowance should be discontinued, and that all who are strong enough should assist in the shrimping without additional rations, thus saving eight ounces of meat daily. In this, after some discussion, Lieutenant Greely acquiesced. To the credit of my comrades, I will say that several of them offered to make good this amount from their own scanty rations if I would continue to do the shrimping. This of course, in justice to all, I could not accept. While strength remains I will work for the best interests of the party; and when I can do no more, I trust and hope that some one will be found with strength enough to fill my place.

Lieutenant Greely is feeling no better, and he again ordered a slight increase to his ration. All others, except Israel and Gardiner, are as well as usual. I issued to the mess the contents of the stomach of the seal recently shot. This perhaps would be rather trying to persons blessed (?) with fastidious tastes, but we would be more than happy if we could have even all of this that we desire. We have discarded the evening readings for the present, owing to the scarcity of light and want of interest. Our conversation flags for want of topics, and by 7 p. m. all are asleep. Perhaps it is better for us that our troubles are drowned in sleep, so that the full extent of our misery may not at all times be apparent. Lieutenant Greely gave me directions as to the final disposition of his effects in the event of his death. I also asked as a favor that my personal effects be disposed of in accordance with the written direction contained on the fly-leaf of this note-book. I advised that the ration of Long and Jens be increased to twenty-four ounces.

Wednesday, April 23, 1884.—A clear, bright, and beautiful day; light west wind; temperature at 5 a. m., +5.0 [—20.6° C.], and at 7 p. m., +2.0 [—16.7° C.]. In the sun the thermometer indicated +45.0 [+7.2° C.]. Whisler made a trap-door in the roof (boat) above the cooking-lamp, which allows a free exit for the smoke. Bender manufactured another stove, and the use of wood to cook our meals has been resumed. The meat ration of Gardiner and Israel was increased four ounces each. Long and Jens did not see any game to-day. The absence of it may be accounted for from the fact that there is very little open water now. I placed the nets in the water before dinner, and in the evening went down and hauled thirty pounds of shrimps. I staggered over to the point of land west of camp in search of game, but found nothing—not even a track or trace.

This life is growing almost unbearable—it is horrible! I am afraid that we will yet all go mad. What keeps us up? Why do we retain our sanity of mind? I cannot tell. One would suppose that an existence not half so miserable as this would be sufficient to drive one to insanity and suicide. In my case the thoughts of home, a bright future, the many enjoyments of life, and a feeling of responsibility for the poor fellows, who, to a certain extent, look to me to provide them with food, do more to inspire me to work and to fight the end than anything else. Whenever I think of faltering in my duty visions of the faces of my family and friends appear to rise up before me as a reproach to my weakness, and thus all my thoughts of giving up are dispelled.

Thursday, April 24, 1884.—A clear and beautiful day; light westerly winds; temperature at 6 a. m., zero [—17.8° C.]; at 3 p. m., +3.8 [—15.7° C.]. Barometer stationary. Doctor Pavy went down to the fishery at 4 a. m. and put in the nets, in order that the shrimps might collect on the baits. I went down immediately after breakfast, finding that Pavy had fastened the ropes so that as the tide rose the nets were lifted and held suspended, consequently nothing was found in them. The shrimps will attack the baits only when they rest on the bottom. He had also filled the nets with rocks and old discarded baits, and even had they rested on the bottom of the sea there was nothing in them to attract the shrimps. When asked why he had been so careless, he replied, "Oh! I was thinking of something else." Schneider made a trip to the nets at 1 p. m. and did fairly well, having caught eight pounds. He lost two pounds by falling down, and he also lost my large ladle with which I remove the shrimp from the nets. At 5 p. m. I made another trip, returning at 7.30 with twelve pounds. Long and Jens saw an *Oosuk* seal while hunting to-day, but they could not approach sufficiently near to get a shot. They report that three "blow-holes" made by seals were observed during their wanderings about the floe.

Lieutenants Greely and Kislingbury are feeling much worse than usual. The former was again issued a few ounces of pemmican. Israel and Gardiner, poor fellows, with characteristic unselfishness, did not wish to take the extra four ounces of meat which had been ordered for them, but desired, though not permitted, that it be turned over to me so that my strength might be maintained while acting as shrimper. Schneider has been relieved from his duties as cook, and Bender has been detailed in his place. The former will assist me to catch shrimps.

Friday, April 25, 1884.—Stormy and disagreeable weather; a brisk westerly wind caused considerable drift. Temperature at 7 a. m., +9.0 [−12.8 °]; at 9 a. m., +10.5 [−11.9° C.]. The barometer has been falling since morning. In consequence of the wretched weather, the hunters did not venture out. Jens, however, occupied his spare time in the construction of a screen to be used in hunting seals. Schneider caught ten pounds of shrimps this morning. He returned completely exhausted, and at once gave up. He says that his strength is depleted, and that he can do nothing more for the party. I went down shortly afterwards, and discovered that he had left the net suspended midway in the water, consequently I secured only a few stragglers. I went down again after dinner, this time taking sixteen pounds. My legs are very weak, sore, and considerably swollen. The extra eight ounces of meat which I had been receiving, to compensate for my severe labors as shrimper, and which were ordered discontinued a few days ago, have been returned to me again. By making three trips daily to the fishery, I shall endeavor to get all the shrimps necessary for the maintenance of the party. I shot two ptarmigan on Cemetery Ridge this morning.

Gardiner is not feeling nearly so well as he felt yesterday, notwithstanding the recent improvement in his diet. The spring tides have carried out a great deal of ice during last night, and the largest expanse of water since last autumn is now to be seen in Smith Sound. By actual count, it requires thirteen hundred shrimps to fill the half-gill measure. Seven hundred weigh one ounce.

Saturday, April 2[illegible], 1884.—Cloudy weather with light snow at intervals; brisk westerly winds have prevailed, and considerable drift has been experienced in consequence. I took ten pounds of shrimps at 2.30 a. m., and at noon went down again, but owing to the closing of the tidal crack by high water I was too late to haul my nets. Frederick volunteered to go down for me at 6 p. m., and he returned with seven pounds. I am having a new net made which I think will be superior to anything now in use at the fishery. Every one, except Lieutenant Greely, is feeling better to-day. An extra ration was once more ordered for him. Long and Jens saw a large seal drifting with the tide on a pan of ice, but the animal was far beyond the reach of their rifles. They say the wind was much too high to-day, and that few seals were seen. The present indications are that our food will soon be a matter of the past. We dwell almost continually on the subject in our conversation. But it is no wonder that it is so, for this is a matter of vital importance to us just now. Our barometer has been rising rapidly since morning; temperature at 5 a. m., +7.0 [−13.9° C.]; at 11 a. m., +10.0 [−12.2° C.], and at 7 p. m., −2.0 [−18.9° C.].

Sunday, April 27, 1884.—Clear weather; light west winds, and the temperature at 4 a. m., +1.0 [−17.2° C.]; at 11 a. m., +14.5 [−9.7° C.]. The snow thawed perceptibly on the dark surface of the boat affording a southern exposure. The barometer has taken a downward tendency to-day. I went to the fishery at 4 a. m., and by nine o'clock I had caught twenty-two pounds of shrimps. In the evening after four hours' work I brought in fifteen pounds more. I now work both low tides, and remain at the fishery as long as the tidal crack will permit me to haul the nets. The new net and line were completed to-day by Schneider and Salor. The invalids all appear to be improving except Lieutenant Greely. Jens complains of weakness in his legs. Lieutenant Greely has directed that the ration of the hunters be increased four ounces each. The two faithful fellows went out at an early hour this morning and did not return until late to-night. Twelve white whales were seen by them, and Jens shot at a seal, but without effect. Henry made the issue of diluted alcohol without authority to-day, and while doing so he stole enough of the precious fluid to make himself helplessly and disgustingly drunk. He is a born thief; a man without conscience, principle, or heart—in short, a perfect fiend. Doctor Pavy recommends the issue of four ounces of bacon and the same amount of pemmican on alternate days, as the best means of improving certain conditions of the system. Long saw two snow-buntings to-day.

Jens, who is a faithful and indefatigable worker, and who is greatly reduced in strength, said in his honest, pathetic way, "Eskimo no good." We are struggling bravely for life—how bravely the world will probably never know, as none are likely to live to tell the tale of our trials and sufferings. Words written in these journals are inadequate to express or describe the horrors of our situation, and I doubt if any intellect is equal

to a full comprehension of our circumstances unless having passed through a similar experience. At the present time, with the exception of the one who is branded with the title of thief, all are doing their best to prolong life and to live harmoniously together.

Monday, April 28, 1884.—Calm and cloudy weather, and at times very foggy; temperature at 4 a. m., −4.0 [−20.0° C.]; at 7 a. m. +5.3 [−14.8° C.]; at 12 m., +21.0 [−6.1° C.]; at 2 p. m., +8.0 [−13.3° C.], and at 8 p. m. it stood at zero [−17.8° C.]. My tour at the fishery, from 5 a. m. to 9.30 a. m., resulted in taking twenty-five pounds of shrimps. I also caught a large quantity of marine vegetation with the long pole which had been made for that purpose. Frederick went down in the evening and brought back ten pounds of shrimps. The morning's fishing had left me so weak that I was utterly incapable of making the exertion necessary for another trip down there to-day, so Frederick kindly volunteered to take my place.

Biederbick and Israel are feeling much worse than usual; the former fainted away this evening in consequence of a painful and abnormal state of his bowels. The same conditions exist with all, and it is fast reducing our vitality. Lieutenant Greely is suffering with heart trouble. He was provided with a small issue of pemmican in addition to his regular ration. Gardiner is feeling better, and Jens is in excellent spirits. Lieutenant Greely has promised the latter that he will give him a new kayak when we return to Proven; Israel will give him a watch; Lieutenant Kislingbury and Biederbick are to present him with a boat, and many other similar assurances have been made him, and he consequently is in a very happy state of mind. The hunters report that the pack has moved in against the fast ice, and that the water-space about which they hunted is closed. The ration of diluted alcohol or "moonshine," which has been issued daily, has been taken from Henry. He has been detailed to carry out and empty the tub every morning and night, and to perform as a prisoner other menial duties.

Tuesday, April 29, 1884.—A clear, beautiful day; temperature at 7 a. m., +6.0 [−14.4° C.]; at 10 a. m., +9.0 [−12.8° C.], and at 9 p. m., +4.0 [−15.6° C.].

By making two trips to the fishery I succeeded in taking thirty pounds of shrimps. Long returned alone from hunting at 2.30 p. m., with the sad and dispiriting report, "Jens is dead." The faithful fellow had seen a large seal on a drifting pan of ice which was separated from him by several intervening lanes of water. In transporting his kayak over a projecting tongue of ice by pushing it ahead of him, a hole was probably cut through the thin seal-skin covering by the sharp ice with which it came in contact. On re-embarking in the kayak the water probably rushed in through the aperture, and he was soon rendered powerless by its icy coldness. Long says that he saw Jens paddling very rapidly, and that while wondering why this unusual effort was being made, he saw the little fellow spring upright and then fall forward without uttering a single cry for assistance. His body floated for some time, and then sank slowly from sight forever.

While endeavoring to rescue the body of his dead companion Long nearly lost his own life. He then tried to save the kayak which was drifting bottom up, but in this also failed. The Springfield rifle—our best weapon—was lost. This is indeed a sad blow to us, and one I fear that may prove fatal to the safety of the party. Without the aid of the kayak the seals that may be killed cannot be secured unless under very favorable conditions of wind and tide. After this sad occurrence Long saw several seals in the water within easy range, but as he had no means of bringing them to land after they were killed, he returned home without firing a shot. Hereafter, Frederick will hunt during the night, and in the day-time Long will scour the country for game. A terrific gale from the south burst on us at 7 p. m., and will probably be the means of breaking the straits more thoroughly than before.

Wednesday, April 30, 1884.—This has been a truly fine day. The gale subsided at 1. a. m., and by 9 o'clock the sky had cleared to admit the radient face of old Sol. A light breeze from the west did not detract from the enjoyable sun bath which many availed themselves of. Temperature at 7 a. m., +2.0 [−16.7° C.]; at 2 p. m., +12.0 [−11.1° C.]; and at 9 p. m., +7.0 [−13.9° C.].

Long tramped along the edge of the floe at the open water, reaching Payer Harbor. He reports having seen several "blow-holes" in the ice, and bear tracks that were recently made. I have devised and constructed a rake of iron barrel hoops, with which I made quite a successful haul of sea-weed and vegetation at the fishery. If we are not fortunate enough to secure more game, it is quite possible that we may eke out a miserable existence on the shrimps and this vegetation until the arrival of the birds next month. I hauled thirty-two pounds of shrimps by making two trips to the nets to-day. Lieutenant Greely is feeling somewhat better; another slight addition to his rations was made in consideration of his almost depleted strength. He informs me that a letter which he has written and placed between the leaves of his journal

directs me to assume command of the expedition in the event of his death. Lieutenant Kislingbury's mind is in such a feeble state that he is wholly incapacitated to assume the responsibilities of the leadership of this party. In the event of my death, Ralston, Gardiner, Frederick, and Long will follow as commanders in the order named. Every one except Lieutenant Kislingbury appears to be holding firmly to life; he is rapidly losing strength, and his mind also is on the decline. Turf, roots and the leaves of saxifrage are being used quite extensively in connection with our other fuel, and is found to be a great advantage in extending our supply of wood. Last evening I suggested that the bow or stern of the whale-boat, now used as a roof to our hut, be cut off and converted into a skiff for use by the hunters at the open water. The end which was cut could be made water-tight by the heavy painted canvas in our possession. This, however, was deemed impracticable by some, and the matter was allowed to drop. Snow began falling at 6 p. m.

Thursday, May 1, 1884.—Snow has been falling slowly and steadily all day; temperature at 7 a. m., +9.0 [−12.8° C.]; at 1 p. m., +10.0 [−12.2° C.]; and at 11 p. m., +1.0 [−17.2° C.]. With the exception of Lieutenants Greely and Kislingbury, all say that they are feeling better to-day. The last of the lime-juice pemmican was used yesterday; the remainder of the English pemmican was issued to-day, and to-morrow the last crumb of our bread will be given out to the starving party.

This suspense is horrible! We are anxious that the end—either one way or the other—should come soon. Will this last sad blow—the death of Jens—which has robbed us of the means of securing game, prove fatal to us? Something tells me it will not, although I can give no reason for such impressions. After three years of incessant toil and arduous experiences in these regions, how can we die this horrible death by starvation without first telling the world of the results of our really magnificent work, and enjoy for a brief period the fruits of our dearly-bought success?

Provisions for only nine days remain to us. We can scarcely realize that we are so near our end, and all sorts of topics and plans for the future are being discussed. The subject of food, which of all others is nearer the hearts of our men, of course excites the most interest. Were it possible to obtain the shrimps and sea vegetation in large quantities, I have no doubt but that we could live yet for many weeks. But my shrimp bait is nearly exhausted, and my strength is going so fast, that to haul the heavy iron rake much longer for the vegetation will be an impossibility. It does not seem that I could supply these articles to eighteen persons for more than a week longer with my failing strength. As there is but little nutriment in either of these articles, an immense quantity will be required to sustain life.

On returning from hunting to-day, Frederick brought in encouraging reports regarding seal-holes which he found in the ice near Beebe Point. After fishing for six hours this morning, I brought in twenty-three pounds of shrimps, and six pounds of vegetation. I made another trip during the evening, but this time caught only two pounds of shrimps. When I retired at 11.30 p. m., on my return from this last trip, I was so prostrated from my exertions that I feared I could never again make another.

Lieutenant Kislingbury's mind is almost completely gone. Poor fellow! it is only a few days ago that he spoke so hopefully of the future, and the happiness he anticipated in meeting his young sons on his return. Yesterday I saw him lying on the small sledge outside weeping like a child; turning to me he said with a half-smothered groan: "It is hopeless; I cannot fight this starvation longer; I am doomed to die here!" Lieutenant Greely asked the individual opinion of every man with reference to the extension of our provisions beyond the date already agreed upon. The majority were in favor of reducing them to the minimum.

Friday, May 2, 1884.—Snow fell all last night and until 2 p. m. to-day. After the sky had cleared sufficiently to allow the hunters to discern game at a distance, Frederick went out towards the open water. Long was out for a short time early this morning, but he saw nothing. Temperature at 6 a. m., +2.0 [−16.7° C.], and at 11 a. m., +9.0 [−12.8° C.]. Salor has relieved Bender from the duties of cook in our mess. The latter is again quite ill from the effects of lung trouble. I caught twenty-four pounds of shrimps and seven of kelp. In dragging for the latter, I found that my rake was much too heavy for my strength, so making a few slight alterations, I was pleased to note that it could be managed with much less exertion and with greater success than before. In the stew last evening there was an excess of salt water, which so nauseated me that I could eat no breakfast this morning.

The future looks anything but promising, but I think that all are resigned to their impending fate, and that they look forward to death as a welcome relief from their terrible sufferings. The wan, emaciated faces and the skeleton limbs of our poor fellows are truly a pitiable sight. A remark which one of the men made this afternoon conveys a very good idea of our actual condition: "Our frames," he said, "are much too

thin and weak to make even a substantial hat-rack." Our rations have been reduced to eight ounces per man, except for the hunters, the shrimper, Elison and Israel, who receive something extra. I discovered to-day that some one had been tampering with the lock on the commissary store-house.

Saturday, May 3, 1884.—Clear weather, light west winds; temperature at 6 a. m., zero [−17.8° C.]; at 11 a. m., +12.0 [−11.1° C.]; and at 3 p. m., +6.0 [−14.4° C.]. The temperature is doubtless very low for this season of the year, and we are therefore impelled to believe that even nature is conspiring against us in our trials and acute sufferings. Will these days of misery and wretchedness never end? With thieving men totally devoid of honor among us, can we endure this life much longer? It seems impossible, for their dastardly acts not only take nourishment from our bodies, but add trouble to our minds.

Long went to Rice Straits in search of game. He did his work thoroughly, having been absent from the hut for over fifteen hours. He killed a small seal in one of the open-water spaces of the strait, but before it could be reached it sank. Frederick came in at 1 a. m. and went out again at 8 o'clock. During the day he saw a flock of dovekies and no less than six seals. He broke through the ice once, wetting his feet. The floe about Beebe Point looks as if it would break up in a short time. Of shrimps to-day I took twenty-five pounds, and of kelp six pounds. I am now using the bear's liver for bait, and am fairly successful with it. During the next spring tides I confidently expect to get enough kelp to last us for ten or fifteen days. I shot a brace of ptarmigan on Cemetery Ridge this morning. Lieutenant Greely is very ill; he has eaten nothing to-day but three or four spoonfuls of stew, and we fear for the worst. He remarked, "I think that I am near my end." The saxifrage is doing good work for us as fuel. A large quantity of it was gathered to-day by Henry, who is much stronger than any other person in the party. He is still a prisoner. Whisler was detected by Bender this morning in the commissary store-house. I was away at the shrimp fishery at the time, but immediately upon my return I was told about how Whisler had forced the lock on the door, and when found he was eating ravenously of the bacon. A large piece (about two pounds) was also found in the breast of his coat. Naturally enough, he is now penitent; but, in the performance of such an act at this critical period, little or no sympathy is felt for him. Several have openly denounced him as the most abject and cowardly monster that ever disgraced mankind with his presence. I know that it is uncharitable to give way to such bitter expressions, but when the circumstances are so aggravating it is impossible to conceal our true feelings, and we would act a lie were we to express ourselves differently. With the exception of Lieutenant Greely all have been improving slightly, but this action of Whisler's will probably now cause a depression of spirits. I don't think any one will ever be able to wholly decipher these notes. They, being rapidly written in semi-darkness and under very trying circumstances, I fear are illegible, disconnected, and poorly constructed.

Sunday, May 4, 1884.—A clear, beautiful day, with light westerly winds prevailing; temperature at 7 a. m., +6.0 [−14.4° C.]; at 11 a. m., +11.0 [−11.7° C.]; and at 3 p. m., +6.0 [−14.4° C.]. For the first time this year icicles formed on the rocks which have a southern exposure. I caught thirty pounds of shrimps and two pounds of sea-weed. I am steadily adding to the collection of natural history specimens which are being preserved in alcohol. To the relief and satisfaction of all, Lieutenant Greely is feeling much better to-day. This morning, while hunting in the vicinity of Cape Sabine, Frederick saw a large walrus, but he could not get within range on account of intervening lanes of water. Long started out at 4 p. m. on his night tour of hunting.

Monday, May 5, 1884.—Cloudy and windy weather. At midnight the temperature stood at zero [−17.8° C.]; at 11 a. m., +15.5 [−9.2° C.]; and at 5 p. m. +10.0 [−12.2° C.]. Light snow began falling at about 6 p. m. Long returned from hunting soon after midnight, reporting that he had seen nothing. The hunting tour of Frederick terminated with a like result. I caught twenty-eight pounds of shrimps and raked up three pounds of kelp. Henry and Biederbick collected a considerable quantity of saxifrage for fuel. Lieutenant Greely gave me full and explicit instructions for future action in the event of his death, as well as several verbal messages to his wife, to General Hazen and others, all of which I have noted that nothing may be omitted nor forgotten. Doctor Pavy tells me that my strength is failing fast, and that he detects the existence of heart trouble, which is probably the result of my arduous labors.

Tuesday, May 6, 1884.—A southeast gale rose at 3.30 a. m. and continued to blow with great violence until 1 p. m; temperature at 1 p. m., +14.0 [−10.0° C.], and at 6 p. m., +20.0 [−6.7° C.]. The tunnel or passage leading into the hut was drifted full of snow during the progress of the storm and the door completely blockaded. The men are feeling wretchedly. Half a lemon was used this morning to flavor the

diluted alcohol. Only one and a half lemons remain of the large number found in the cache last autumn; these few constitute the only luxury in Ellesmere Land. In conformity with his order, I issued Lieutenant Greely one pound of lime-juice pemmican for his use for four days. Four ounces of Elison's extra ration have been discontinued for the present. I repaired to the shrimp fishery after dinner, and during the three hours' work which followed I caught twelve pounds of shrimps and two pounds of kelp. A heavy snow-storm was in progress at the time.

For a long time Dr. Pavy has been objecting to certain arrangements made by Lieutenant Greely, and particularly with reference to the distribution of provision has he made himself very obnoxious. To-day he had a stormy discussion with Lieutenant Greely, during which the latter several times ordered him to "shut up." Notwithstanding this order Pavy continued to pour out a stream of abuse which so exasperated Lieutenant Greely that he excitedly exclaimed, "If you were not the surgeon of this expedition I would shoot you!" At this point Bender, who was a strong adherent of Pavy's, interfered, but he was informed that he must preserve silence if he did not wish to receive the same treatment with which Dr. Pavy had been threatened. Bender ignored this admonition and continued to regale those present with opinions, &c., when Lieutenant Greely seized Long's rifle and was about to raise it, when I, in response to the entreaties of Connell to "prevent a tragedy," interfered, and removed the weapon from his hand. Bender was now made to get into his sleeping-bag, and in a few minutes order was restored and this episode forgotten, in the earnest consideration of an imaginary bill of fare to which we had turned our attention.

Wednesday, May 7, 1884.—A brisk westerly wind created considerable heavy drifting; temperature at 6 a. m., +14.0 [−10.0° C.]; at 11 a. m., +32.5 [+0.3° C.]; and at 3 p. m., +15.0 [−9.4° C.]. Many, including myself, spent the greater portion of the day in inditing farewell letters to friends and relatives. I also addressed one to the officer commanding the relief party, in order that he might find everything of value without loss of time. Gardiner, Lieutenant Kislingbury, and Ellis are worse to-day. Owing to the stormy weather the hunters did not venture out. A large section was cut from the side of the boat and the opening thus made was covered with canvas to keep out the flying snow. The wood taken from the boat is needed for fuel. At 2.30 p. m. the wind veered to the east and increased in violence to a gale. I started for the fishery at 3 o'clock this afternoon, but being too weak to face the terrific velocity of the wind I was forced to return to the hut. I was blown back several times from the crest of Cemetery Ridge, and had finally to crawl upon my hands and knees to gain it.

Tuesday, May 8, 1884.—The wind subsided at 11 a. m.; a short time previous to this snow began to fall heavily. This however ceased at 2 p. m., and the sun shone brightly through a cloudless sky. Temperature at 7 a. m., +16.0 [−8.9° C.], and at 9 p. m., +6.0 [−14.4° C.]. At 7 a. m. I hauled the nets at the shrimping place and fished steadily for five hours, taking in all during that time twelve pounds. After dinner I caught twenty-two pounds more and about five pounds of sea vegetation. I felt very tired on my return this evening to the hut in consequence of my unusual exertions to-day. The heavy rake with which I haul the vegetation from the bottom of the sea is fast reducing my strength, and I feel that this work must be discontinued in a few more days. The sound now appears to be entirely open, and the observer is at once impressed with the opinion that a vessel could navigate its waters with perfect safety. Frederick went out hunting at 4 a. m.

Friday, May 9, 1884.—Temperature at 7 a. m., +14.0 [−10.0° C.]; at 11 a. m., +13.0 [−10.6° C.] and at 4 p. m., +10.0 [−12.2° C.]. Cloudy weather, with westerly winds prevailing. Frederick returned at 1.30 a. m., reporting that he had killed no game, but that he had seen several seals enjoying a sun-bath on the drifting ice-floes. He also saw several gulls, and a bird with a long beak, which he could not identify. A school of fish which he saw in the immediate vicinity of Cape Sabine was probably white whales.

The doctor thinks it highly probable that we can live on the shrimps and vegetation alone for some time after the last of our provisions has been issued. In view of the enervated systems of the weaker members of the party, however, I cannot believe they will survive many days after the reduction in food takes place. Ellis prepared several baits for my use at shrimping by covering small stones with bear-skin. Dr. Pavy is doing wonderfully well at the present time. He cuts all the ice for the cooks, attends assiduously to the sick, gives lectures, and bustles about the hut and camp in the interests of all. I issued another pound of pemmican to Lieutenant Greely to-day for his personal use. The daily issue of "moonshine" is having a very wholesome and beneficial effect on the spirits and general tone of the party. Notwithstanding the inclement weather, Long went early this morning in quest of game. He saw no birds, but a few seals were observed in the water some distance away from the edge of the ice. Israel's extra ration of four

ounces of meat was discontinued to-day; Elison's ration has been reduced to four ounces per day. The hunters receive twelve ounces extra on days when they work, and only eight ounces when they do not work. The shrimper (myself) receives eight ounces daily. I took thirty pounds of shrimps to-day, after having fished steadily for more than five hours. I lost my kelp-rake by the breaking of the rope with which I dragged it along the bottom. A quantity of the vegetation, however, was secured with a long pole which had previously been used by Rice for this purpose. Salor and Whisler made their wills to-day.

Saturday, May 10, 1884.—Clear, beautiful weather; light west winds, and temperature at 2 a. m. standing at zero [−17.8° C.]; at 3 p. m., +6.0 [−14.4° C.], and at 9 p. m., +3.0 [−16.1° C.]. Frederick having gone out last evening for the purpose of hunting, returned at 2 a. m. He had seen two seals and one white whale, but none of which he had the slightest chance of shooting. After dinner he went out again for a few hours. Long, who had hunted during the day, met with no better success than Frederick. I caught thirty-six pounds of shrimps, and dragged up ten pounds of sea vegetation. This required over six hours of painful toil, and, on returning to the hut greatly exhausted, the exertion of climbing the ice-foot caused the blood to gush in a stream from my nostrils. Sitting down for a few moments to recover from the faintness which had suddenly seized me, the blood soon ceased to flow. Dr. Pavy tells me that this hemorrhage was probably the result of too much exertion. I made a new rake to-day, which is a decided improvement over the old one.

The Greenland coast looms up very plainly and distinctly to-night, and Smith Sound is open to Littleton Island, and perfectly free of ice. Long said that, standing on the high ground back of Cape Sabine, and looking to the north and to the south, no ice appeared in sight within the range of his vision. This state of the sound is a very favorable indication for the arrival of relief vessels, or the party which I believe is at Littleton Island.

Sunday, May 11, 1884.—A clear, beautiful day, and only the suspicion of a light breeze from the west; temperature at 2 a. m., −2.0 [−18.9° C.]; at 3 p. m., +7.5 [−13.6° C.]; and at 6 p. m., +1.0 [−17.2°C.]. Frederick returned at 2 a. m. from hunting, and reported having shot a large seal which sank before it drifted to the margin of the ice where he was waiting to receive it. This is indeed a sad loss to us—almost a fatal blow. After dinner we went out again. Long went to the open water after breakfast, returning at 4 p. m. He had seen several seals, one of which he endeavored to shoot, but without success. Newly-formed ice in great fields has been crowding down from the north all day, drifting with the current to the southward. The remainder of the pemmican was issued this morning, also the last of the fresh meat, except ten pounds, which Lieutenant Greely directed me to keep for the present. Gardiner is looking somewhat better; Lieutenant Kislingbury and Private Ellis are worse. Biederbick made me a rake for the sea vegetation, which is not so heavy as my own, and which works exceedingly well. I caught twenty-six pounds of shrimps and ten of kelp.

Monday, May 12, 1884.—Calm and cloudy weather; temperature at 1 a. m., +6.0 [−14.4° C.]; at 6 a. m., +9.0° [−12.8° C.], and at 8 p. m., +3.0° [−16.1° C.]. Frederick returned at 1 a. m., having seen one seal and a gull. He also saw a ptarmigan on Cemetry Ridge, but having to return to the house for the shot-gun the bird was lost. I issued the last of our provisions to-day. The issue consisted of twelve and one-half ounces of tallow and bacon to each man. This is supposed to last for two days, but if desired it can be eaten at once; each man having full control of his food now. In addition to the issue mentioned above, six ounces of tallow for each man have been reserved for use in our shrimp stews during the next six meals. The extra rations for the hunters and shrimper extend only to to-morrow. Heaven only knows what we will do now. The present circumstances indicate that we can do nothing but die.

Israel is feeling greatly depressed in spirits to-day, and has made a verbal will or request, that in the event of his death the effects on his person will be disposed of according to his wishes. We speak freely of death, but it is more in a spirit of a business matter than with dread of its approach. I think that all feel resigned to the inevitable, and I am sure that none fear death, even in its worst forms. Another large section of the boat was removed to-day and canvas substituted to keep out the snow. The canvas door at the outer end of the first passage or tunnel was taken off to-day. This leaves only the short passage next to the house, and this we hope to do away with in a few days more. Long saw nothing to-day except two seals. He appeared very much exhausted on returning from his long tramp, and expressed some concern regarding his strength. Frederick did not go out this evening owing to a severe storm which rose just after dinner. I caught twenty-five pounds of shrimp and five pounds of kelp.

Tuesday, May 13, 1884.—A clear and beautiful day; no wind except previous to 9 a. m., when it was very light; temperature at 10 a. m., +14.0 [−10.0° C.], and at 10 p. m., +5.0 [−15.0° C.]. All of us, excepting Elison, were out to-day to enjoy the warmth and brightness of the sun. This is the only privilege that we are permitted to enjoy—all others being denied us by the neglect of our countrymen to provide suitable measures for our relief. Ellis will probably go in a few days; he fell helplessly in the passage-way this morning, because of his inability to use his limbs. We all stagger and reel about like drunken men when we walk, and it is only by a supreme effort of the will that we can persuade ourselves to walk at all.

Long is quite ill to-day, consequently he did not go out. Frederick, however, made his customary visit to the open water. He reported that nothing but a raven and seal was seen. Marks or scratches were observed on the margin of the ice, which indicate that a seal had recently made an effort to crawl up on the floe. Schneider had to be released from cooking this morning on account of faintness. Henry officiated in his stead during the remainder of the day. Some of the men have already consumed their last issue of food, and they will now have to depend on the shrimps. I had Bender construct a dredge from a large bacon can, with which I endeavored to secure a few mollusks by hauling it along the bottom of the sea. The apparatus is either too rudely constructed, or else there is nothing to be secured; at least I got nothing for my labors but a handful of sand. I caught twenty-two pounds of shrimps and four pounds of vegetation. I convey the shrimp in two large tin buckets which are swung over the shoulders by a broad leathern strap. It is very exhausting to carry for a mile these heavy buckets of shrimps. I do not think my strength can hold out for many more days. Frederick narrowly escaped being carried away to sea by the detaching from the main floe of that portion of ice on which he was standing.

Wednesday, May 14, 1884.—Clear weather until noon, when light snow began falling; temperature at 5 a. m., +7.0 [−13.9° C.]; at 8 a. m., +12.0 [−11.1° C.], and at 4 p. m., +15.0 [−9.4° C.]. The hunters went out together this morning, returning at 4 p. m. They saw a seal and two dovekies. The former they could have shot without difficulty, but without a boat or kayak it could not be saved. Bender made a screen for the hunters, which they will carry before them in approaching game. Schneider is feeling somewhat better; as a matter of precaution and business, he made his will to-day. Israel was very ill during the morning, but towards evening he felt much better. Poor fellow! How bravely he faces the grim destroyer, and how manly will be his end! But we are all going quickly, and there is nothing to do but to die without a murmur, like men and soldiers, at the appointed time. Lieutenants Greely and Kislingbury, and Private Ellis, very much weaker than yesterday. During the early morning we all went outside to bask like seals in the sunshine; lying meanwhile at full length on a discarded sleeping-bag. These sun-baths are good for both body and mind; but on our wretched and shrunken bodies there is but little surface for the sun to act.

After five hours of hard labor this evening I succeeded in taking only about two pounds of vegetation and twenty pounds of shrimps. My baits are now very poor, but I am utilizing every ounce so as to bring the largest returns possible.

Thursday, May 15, 1884.—To-day the weather has been clear and cloudless, and light winds from the west have prevailed; temperature at 7 a. m., +9.0 [−12.8° C.]; at 11 a. m., +16.0 [−8.9 C.]; at 3 p.m., +22.0 [−5.6° C.], and at 10 p. m., +10.0 [−12.2° C.]. In many places, on the dark surface of the rocks the snow melted under the influence of the sun, and trickling down the sides formed in pools at their base. Long endeavored to reach the open water this morning, but was attacked by vertigo, which necessitated his immediate return to our wretched den. All are weaker; even the remarkable energy which Lieutenant Greely, as a conversationalist, has exhibited during the winter is deserting him, and he has but faint hopes for the future. Frederick returned at 3 p. m. from his hunting trip with the discouraging report that he had seen nothing. Dr. Pavy says that Schneider has evident symptoms of scurvy. The last solid food will to-night be eaten in a shrimp stew. It consists of one ounce of tallow to each man. All the future stews will be simply shrimps and water. We surely cannot live long on these.

After working constantly for six hours I caught twenty-one pounds of shrimps and three pounds of kelp. I am fearfully weakened and reduced from the exertion and fatigue incident to work of this kind. A few more days, probably four or five, of this severe strain and all my energies will be exhausted.

Friday, May 16, 1884.—Clear weather; light west winds, and the temperature at 7 a. m., + 11.0 [−11.7 C.]; at 12 m., + 15.0 [−9.4° C.], and at 5 p. m., + 11.0 [−11.7° C.].

During the last week snow-birds have been seen in great numbers in the immediate vicinity of the house. To-day the hunters saw only one seal, and he was so far beyond the reach of their rifles that he escaped. The baits which I use in my shrimp nets are so poor and so much riddled that I took only 9 pounds of shrimps to-day. Of kelp I secured 2 pounds. My strength is scarcely sufficient to drag the heavy iron rake along the bottom for this vegetation. When I fail I hope some one will assume my duties. I have changed to the morning tide in order to secure sunlight and better hours for working. Connell went to the westward along the coast on the lookout for game, but after a brief absence he returned fatigued and disappointed.

The large wall-tent was hauled to Cemetery Ridge, and, with the assistance of some of the strongest men, it was finally pitched. The extreme dampness of the hut makes this more necessary; in a few days the party will have to abandon the house for the tent, where they will probably remain until the crisis is reached. Lieutenants Greely and Kislingbury, Sergeant Gardiner, and Private Ellis are much worse. Salor is too unwell to cook longer. Whisler broke down completely this evening. He was not able to cut enough wood to cook breakfast with. Schneider is the only one who says he thinks himself improving. Bender, who was very disagreeable at different times last winter, is now doing fairly well; he came bravely to the front to-day, and offered to cut the wood for fuel when Whisler failed to perform this work, which had been assigned him. Smith Sound was to-day a rolling, billowy sea; it was entirely free from drifting ice, and there was apparently nothing to prevent small boats from crossing the sound to this place.

Saturday, May 17, 1884.—A clear, beautiful day; a light precipitation of frost did not to any extent detract from the clearness of the atmosphere; light winds from the west. Temperature at 7 a. m., + 12.0 [− 11.1° C.]; at 1 p. m., + 25.5 [−3.6° C.], and at 5 p. m., + 13.0 [− 10.6° C.]. At noon a thermometer exposed in the sun indicated + 40 0 [+ 4.4° C.]. Every time a bright day visits us we go outside and lie down on a pile of old clothing, sleeping-bags, &c., to secure the benefits arising from sun-baths. I caught sixteen pounds of shrimps and four pounds of vegetation. To say that after this exertion I was tired and weak, will but feebly express my real condition. The hunters and the shrimper (the latter myself) will hereafter receive a double allowance of the thin shrimp stew to preserve their strength as long as possible.

A portion of a can of lard which had been retained as ointment for poor Elison's wounds, was to-day issued in equal proportions to the party. The remainder of the diluted alcohol was also issued. Saxifrage is now occupying a prominent place in our diet, but I cannot say that it will preserve our strength very long. It does not distress the stomach, and it appears to possess nutritive qualities. The hunters now go out alternately. Long, who went out to-day, saw one seal in the water, but he failed to get a shot at him. Ellis is much weaker. Lieutenant Greely seems somewhat better than yesterday. We talk very little now, owing to lack of interest in anything except that which pertains to food. All our subjects are threadbare, but imaginary bills of fare always possess much of interest to us. The snow thawed rapidly to-day on the rocks above camp. Schneider has recovered sufficiently from his illness to be able to resume his duties as cook.

Sunday, May 18, 1884.—Stormy weather; a southeast gale, accompanied by snow, has been in progress since early this morning. Temperature at 3 a. m., + 10.0 [− 12.2° C.], and at 11 a. m., + 18.0 [−7.8° C.]. Long shot a large raven at 5 a. m. I had attempted to secure this bird only two hours earlier, but it unfortunately escaped me. It will be used for shrimp bait. Notwithstanding the inclement weather I fished for shrimps all the forenoon, taking ten pounds. I also caught two pounds of vegetation. The hunters did not venture out in the merciless storm to-day. The water has encroached considerably this side of Cape Sabine, and it is rapidly working in towards Buchanan Straits. A vessel could have sailed to-day in an iceless sea between this and the Greenland coast. To the excessive joy of all, three more issues of alcohol were found in a rubber bag which had been mislaid in the boat. Ellis is much weaker.

Monday, May 19, 1884.—The gale which was in progress yesterday continued all night and until noon to-day, when it abated to a fresh breeze. The snow has been swept from the floe in many places, and the drifts which have accumulated along the shore are as firm and unyielding as marble. Temperature at 7 a. m., + 21.0 [−6.1° C.]. Frederick who had been dispatched at 4 a. m. to cut ice for breakfast returned in a moment greatly excited, but with the welcome information that he had seen a bear outside. In the twinkling of an eye he disappeared through the door, followed closely by Long, both bearing their rifles. Loading the shotgun with ball cartridges I followed the hunters in a few minutes. After tramping for an hour without seeing anything either of the hunters or the bear, I turned back to camp, not wishing to break down my strength and thus compromise our only means of sustaining life—the shrimp fishery. Frederick

came in from the pursuit at 10 a. m., and Long returned about an hour later. Neither had been able to get within range of the animal, although he was followed closely for hours. Becoming exhausted by their arduous labors in the rough ice and the deep snow, the hunters turned back while they yet possessed sufficient strength to enable them to return to Camp Clay. When the bear was first seen by Frederick this morning he was standing but a few feet from the rear of the hut.

After fishing steadily for several hours, I returned with fifteen pounds of shrimps and one pound of kelp. I do not feel that I can continue this work much longer. Everything I do now is through sheer force of will. Israel and Gardiner are worse; the former was not able to eat his shrimps this morning, and the latter is very much weaker than usual. The large English sledge was to-day broken up for fuel. We hope to extend this fuel for some days, and the saxifrage, of which Connell and Dr. Pavy have collected a considerable quantity, will be used in conjunction with it. Ellis, who has been very weak and sick for several days, quietly breathed his last at 10.30 a. m. No symptoms of scurvy were apparent, but his death was due solely to starvation. Frederick saw dozens of dovekies at the open water this morning, but he possessed no means of securing them, even had they been within range of his gun. The last issue of diluted alcohol was made this morning. Whisler broke down to-day from excessive weakness and lack of will power.

Tuesday, May 20, 1884.—Fresh southerly winds have prevailed all day, and slight drifting was in consequence experienced. These winds have raised the temperature to +31.0 [−0.6° C.], and the snow is becoming soft. Weather cloudy. Ellis was buried at noon on Cemetery Ridge. So weak have the men become that we could scarcely find a sufficient number with enough strength to haul the remains of the dead on the hill to their last resting-place.

Israel is much worse. Lieutenant Greely directed me to issue Israel four ounces of the raven which had been kept for shrimp bait. Biederbick was unable to eat his shrimps this morning. They are not palatable to any of us, and it is only with the greatest effort that we can persuade ourselves that they must be forced down if we wish to prolong our lives. A small quantity of Medford rum, which we were keeping for an emergency, was to-day issued to the party. Bender and Henry gathered a large sackful of saxifrage which will be used to eke out the slender supply of fuel. The green shoots of this plant are used largely in the shrimp stews by several of the men. This vegetation has no unpleasant flavor, and it materially assists to fill the void in our stomachs, but I doubt if it possesses any particular nutritive value.

The late storm has broken for a long distance into the ice this side of Cape Sabine. There is so little ice in Smith Sound now that a vessel could steam anywhere between Cape Sabine and Littleton Island. As the gale was southerly we had expected that Smith Sound would be choked by the ice driven northward from the north water. But the absence of ice in the sound is positive proof that the North water was and is also free from ice. If our Government neglects to send a relief vessel with the whalers when they pass Melville Bay in the early days of June, it will either be an act of criminal negligence, or else it will be because of inexcusable ignorance on its part. We are striving hard to survive on the shrimps and kelp, but as I catch but small quantities of these now, we cannot hope to live much longer. To-day I caught twelve pounds of shrimps and two of kelp. Another bear or a large seal would save us all from a fate identical with that which befell Franklin's expedition.

Wednesday, May 21, 1884.—Calm and cloudy weather; temperature at 7 a. m., +29.0 [−1.7° C.], and 3 p. m., +36.0 [+2.2° C.]. In the sun the thermometer indicated +42.0 [+5.6° C.]. Snow-drifts have become very soft, and in the immediate vicinity of any dark surface they thaw quickly. Light snow has been falling steadily since this morning. The hunters made their customary visit to the open water to-day; their efforts, as usual, being rewarded by nothing. In consequence of the excessive dampness of the interior of our house, we will probably move on the hill to-morrow. The tent was pitched there some time ago, but it was blown down during the recent gale.

Dr. Pavy says that our food must be something more substantial than these shrimps, or none of us can live long. I caught twelve pounds of these animals to-day, and one pound of marine vegetation. Returned very much exhausted from this trip. Cannot last much longer. Medford rum was again issued. The snow is being removed from the roof of our miserable hovel, in order that the boat may be used for fuel.

I had a long conversation with Lieutenant Greely this morning. He is anything but hopeful of the future. Some of his papers have been committed to my care, and in the event of his death I will place them (if I survive) in the hands of the Chief Signal Officer.

To-day Dr. Pavy circulated a paper, written by himself, which certified to his medical skill, and to his devotion to his professional duties. He solicited the signatures to this paper of several men, of the party, myself included.

Thursday, May 22, 1884.—Cloudy weather; light westerly winds and a high temperature. No reading of the thermometer was made in the shade; in the sun, however, it registered +48.0 [+8.9° C.]. The snow, which is heaped in a huge drift about the house, thawed considerably to-day, and the dripping of the dampness from the roof inside warned us that it was time to move if we wished to escape being drowned out. Accordingly the tent was placed in position on a small plateau near Cemetery Ridge, and five of the party will sleep in it to-night. Owing to extreme weakness, the hunters did not venture out to the open water. Long is quite ill from the effects of overwork on his recent hunting trips. Lieutenant Kislingbury, Connell, Israel, and Biederbick are much weaker. Ralston is delirious and is most likely dying now (4 p. m.). He drank some rum only two hours ago, and during the forenoon he ate large quantities of saxifrage, and at one time he sang a song. Less than an hour ago, Lieutenant Greely, in whose bag he is, fed him a portion of his shrimp stew. I thought I heard the howl of a wolf to-day, and Henry fancied that he heard the peculiar cry of a skua.

Dr. Pavy requested that the remainder of our stock of rum be issued only to those who are working (himself excepted), but to this Lieutenant Greely would not accede. The latter stated that no issue would be made unless all shared alike.

Friday, May 23, 1884.—Cloudy weather, light westerly winds, and high temperature. Light snow fell during the afternoon and evening. With the exception of five men the entire party has moved on the hill where the tent was pitched. This, together with a small shelter in front, accommodates all except the five mentioned; they sleep in the old house where we spent the winter. Elison was moved on his mattress, not without difficulty, but without injury or pain to him. Israel was so weak that it became necessary to haul him part of the way. Lieutenant Kislingbury and Private Whisler barely managed to drag themselves to the summit of the ridge where the tent is located. They surely cannot long survive the horrors of this scene of indescribable desolation and misery. I caught only ten pounds of shrimps. My strength was not equal to managing the kelp-rake to-day. Long saw a skua at the open water, and heard the hoarse bellowing of several walrus. Frederick has labored faithfully all day to erect the shelter in front of the tent, and in making the sick comfortable. Ralston died at 1 a. m. His end to all appearances was painless. The remains were not buried to-day owing to the extreme weakness of some of our strongest men.

Saturday, May 24, 1884.—A slight fall of snow occurred this afternoon and evening; temperature at 12.30 a. m., +19.0 [−7.2° C.], and at 6 a. m., +24.0 [−4.4° C.]. Dr. Pavy, Salor, Long, and myself slept in the old shanty last night. It is damp, cheerless, and pretty well dismantled, being almost without a roof. Frederick and Long worked faithfully all day at this place to get sufficient canvas to complete the annexed shelter to the tent. I overhauled the effects, including wills, final statements, &c., of those of our comrades who have died, and placed them in condition for transportation home. Later in the day I caught thirteen pounds of shrimps and one pound of kelp. The water has broken into the floe for a considerable distance this side of the first rocky point south of the shrimping grounds, and Smith Sound is now an open sea with scarcely a fragment of drifting ice in sight. Ralston's remains were committed to the frozen earth this morning before breakfast. Whisler died at noon. Dr. Pavy asserts that his death was premature, and that it was hastened through fear and dread of being carried off by starvation. Could he have had an ample supply of nutritious food throughout the winter, no cause for fear would have existed. Schneider's face is quite badly swollen. This is probably the result of eating saxifrage, which now enters largely into our diet as a substitute for the sea vegetation which I am no longer able to obtain. Owing to a great diminution of strength I have caught only a small quantity of kelp in the last week. Israel, Connell, Biederbick, and Lieutenant Kislingbury are much weaker than yesterday. Israel cannot long survive the horrors of this hated place, and the others will follow quickly if game is not soon taken. A skua was heard in the rocks near the tent to-day. The doctor works like a Trojan in assisting the sick, and in doing various little offices to improve the condition of those about him. Caterpillars are now quite numerous on the bare spots in the vicinity of Cemetery Ridge. Yesterday Bender saw one of these animals crawling over a rock near the tent, and after watching it intently for a moment he hastily transferred it to his mouth, remarking as he did so, "This is too much meat to lose."

Sunday, May 25, 1884.—A southeast wind began blowing at 10 a. m., and during the entire day it continued with great velocity from the same direction. In the evening it had increased to a moderate gale, and with the heavy cloud of blinding drift, and the thickly falling flakes of snow, I was prevented from making my daily journey to the shrimping grounds, though the demand and necessity for it was great. We buried Whisler after dinner, when the storm was at its height.

Four of us still sleep in the dismantled and abandoned winter house, which now affords but little protection against these severe storms. But there is no remedy for the matter, as our strength is not equal to the task of getting out the canvas necessary for the construction of a shelter large enough to accommodate our entire party. My God, this life is horrible! it is burdensome, and it plunges one into the lowest depths of despair. Will this continual scene of suffering and death never change? Will assistance never arrive? But I will not succumb at this hour; while strength remains I will do everything that is possible to assist the sick, and those who are less fortunate than I.

Seal-skin thongs cut into small pieces were introduced in the shrimp stew this morning. A small quantity of this skin was also burned to a cinder on the fire and then ravenously devoured by the hungry party.

Monday, May 26, 1884.—Soon after midnight the gale abated to a fresh wind, and throughout the forenoon the weather was particularly enjoyable. The temperature this evening was +26.0 [−3.3° C.]; in the sun the thermometer registered +46.5 [+8.1° C.]. With the exception of Dr. Pavy and myself, every one appears in better condition than yesterday.

Schneider was detected in the act of stealing food (shrimps and tea), and he was also accused of making unfair divisions in the issue of these articles. He was relieved from the duties of cook, and Bender, who volunteered for the duty, has been given the place. The two messes were consolidated some time ago, and one cook now does the work for both. For the first time this year, sufficient fresh water to prepare a meal was collected from the pools among the rocks.

Slopes having a southern exposure are in many places entirely devoid of snow. The sun is making sad havoc with the drifts near by. The sea has again encroached, and is now within a short distance of the shrimping ground. Smith Sound is entirely open. I caught eight pounds of shrimps and two pounds of vegetation before breakfast this morning. Under ordinary physical conditions, I could have obtained a much greater quantity, but owing to excessive weakness, and a dull throbbing in my head, which produced a feeling of faintness, I was forced to desist. In the evening, however, feeling somewhat better, I went down again, returning at about midnight with twelve pounds more. The few inferior shrimp baits now in use I will endeavor to extend until June 1, but after that date, unless we get game, our only resource will be kelp, saxifrage, and the small rock lichen (*tripe de roche*) which grows here in abundance on the rocks. A few garments of seal-skin, boots of the same material, together with our oil-tanned sleeping-bag covers, will have to be used by us as a substitute for meat. To-day the soles from an old pair of seal-skin boots, with a few shrimps, provided us with a breakfast and dinner. Long saw several king-ducks at the open water this morning, but they were so exceedingly timid that it was impossible for him to get a shot. He, however, succeeded in killing two dovekies, both of which were drifted away by the ebbing tide. A thermometer lying on the ground inside the tent registered +33.0 [+0.6° C.], and one suspended four feet [1.2^{m}] above the ground, +52.0 [+11.1° C.].

Tuesday, May 27, 1884.—In the morning the sky was clear and cloudless; in the afternoon a southerly gale set in, which continued until after 7 o'clock; temperature at 8 a. m., +24.0 [−4.4° C.]—the same thermometer exposed in the sun soon afterwards, +55.0 [+12.8° C.]. Israel, the youngest member of our party, passed away just after midnight, dying very easily. After losing consciousness—about eleven hours before his death—he talked of food, restaurants, &c. Every one was his friend. He had no enemies. His frankness, his honesty, and his noble generosity of nature had won the hearts of all his companions. His unswerving integrity during these months of agony has been a shining example; and, although his sacrifices were lost to a few, still the effect has produced good fruit. For lack of strength we could not bury him to-day.

The greater portion of the day was spent in erecting a shelter immediately in front of the tent, and to-night we will all sleep together for the first time. After working on this structure for some time, I was too much exhausted to go shrimping; so, weak and sore, I retired with the others to sleep away fatigue and care. Long saw myriads of king-ducks on the floe's edge at the open water, but to secure them was an utter impossibility, owing to their shyness. Water sufficient for supper and nearly enough for breakfast was obtained from the pools among the rocks near our tent. A heated discussion regarding the medical supplies took place between Lieutenant Greely and Doctor Pavy this evening. I have not the strength, interest, nor inclination to record the details of this quarrel. The latter's mind is evidently somewhat clouded.

Wednesday, May 28, 1884.—A cold, disagreeable day; light easterly winds and cloudy weather; temperature at 2 p. m., +24.0 [−4.4° C.]. I caught nine pounds of shrimps, and Long returned from the open

water with a dovekie. He had killed another, but it drifted away from him to the open sea. Many king and eider ducks were observed. The dovekie, by general acclamation, was ordered to be reserved for Long and myself, that our strength might be maintained.

A large portion of the floe near the shrimping grounds was again broken off last night. The sound is now as open and as free from ice as it was in August, 1881, when we steamed northward in the *Proteus*. If there is a party at Littleton Island why does it not come to our rescue while there is yet time to save a few lives? There are now no obstacles to be encountered in crossing this expanse of water. At noon to-day Israel was buried on Cemetery Ridge. The invalids are in about the same condition as yesterday. Doctor Pavy thinks that a few have symptoms of scurvy. I shall never forget the delicacy of flavor of the dovekie stew which I ate this evening. Delmonico's tempting dishes—of which we have frequent visions—were forgotten in the enjoyment of the moment.

Thursday, May 29, 1884.—Clear and calm weather in the forenoon, but at 1 p. m. the sky clouded, and almost immediately afterwards a southeast gale burst upon us, causing a furious drift and defying all our efforts at protection in this rude shelter. Inside the tent, however, they are screened from the full fury of the blast, but still their lot is far from being a pleasant one. The shelter in which several of us were lying was first blown full of snow and gravel, and then the whole structure was blown down; the poles which had supported the canvas fell in such a position as to lie across our bodies. Long was driven from the edge of the ice by the approach of the storm, and joining me at the shrimping grounds, we returned together to the camp, which we reached only after a desperate struggle. I had taken eight pounds of shrimps and Long brought in one dovekie. I went to the old hut for wood; the storm meanwhile increased in violence and I was confined within the walls of that dreary prison for two long and weary hours. On returning to the tent Doctor Pavy and Salor refused to admit me to their sleeping-bag, in which I occupied a place. Physically I could not enforce my rights in this matter, my condition bordering on utter exhaustion, and wishing to avoid any unpleasantness I crawled into one of the abandoned bags lying outside as the only alternative. This bag was frozen and filled with snow. Can my sufferings be imagined? They certainly cannot be described.

Owing to the severity of the gale we were unable to cook our scanty supper of shrimps, and in consequence nothing was eaten this evening.

Notwithstanding that I gave directions to the cooks yesterday that all scraps and pieces of seal-skin were to be considered public property, Bender was found eating some to-day. He freely confessed his guilt, but said in explanation that, owing to hunger, he could not resist the temptation. I told Frederick to collect everything in the line of seal-skin that is eatable, so that I could lock it up until it is wanted. Temperature at 9 a. m., + 27.0 [−2.8° C.].

Friday, May 30, 1884.—Light westerly winds accompanied by snow have prevailed all day; temperature at 10 a. m., + 29.0 [−1.7° C.]; and at 3 p. m., + 27.0 [−2.8° C.]. The gale of yesterday, to which I was exposed in one of the sleeping-bags outside, did not subside until after midnight. I passed a wretched and awful night, unprotected as I was from the pitiless storm which howled about in all its wild fury. A large snow-drift accumulated inside and about my sleeping-bag, and my hands, feet, and face were terribly swollen in consequence of this unusual and unnecessary exposure. Suffering with rheumatism, and smarting under the sense of wrong done me by my sleeping-bag companions, mental agony was added to physical torture.

Our breakfast of shrimps was eaten at 10 a. m.; we had fasted for twenty-six hours. To-day I caught six pounds of shrimps. The last piece of bait which I possess was placed in the net, but it will last for a few days yet. I saw three brant geese, two dovekies, and hundreds of king and eider ducks, but they are all, except the dovekies, beyond our reach. I cannot understand how we manage to survive on six to ten pounds of shrimps per day, but I suppose the vegetables and seal-skin possess more nutriment than we imagine. Those who are too weak to work seem to retain wonderfully well the little vitality they have left. Doctor Pavy, Long, Frederick, and myself, are failing and weakening fast. A few days more and this struggle for existence will be forever over. Our shelter was repaired to-day, and it is now much more substantial than ever. A northwest gale began at 9. p. m.

Saturday, May 31, 1884.—A heavy snow-storm joined the gale of last evening, and both continued all day with undiminished fury. Not only were we held close prisoners in our poor shelter, but we were also confined to our sleeping-bags on account of the driving drift, which covered us to a depth of over a foot. We were unable to cook anything, and as no solid food had been prepared in advance, nothing has passed our lips to-day—not even a swallow of water. Of all the days of misery and suffering in my life that I can recall to memory, there are none which will compare with the tortures which I have borne during the last few hours. If, possessing the gift of divining the future, I should discover that I had yet another month of

this terrible existence before me, I would at once end everything. When I shall have attained the age of three score and ten years, if fifty years from the best portion of my life were offered me as an inducement to endure again the agony of the past month, I would reject it as an insufficient reward.

In my daily journeyings across Cemetery Ridge, it was but natural at first that my reflections should be sad and gloomy. There lie my departed comrades, and to their left is the vacant space, where, in a few days, my remains will be deposited, if sufficient strength remains to those who may survive me. The brass buttons on Lieutenant Lockwood's blouse, scoured bright by the flying gravel, protrude through the scanty covering of earth which our depleted strength barely enabled us to place over him. At first these dazzling buttons would awaken thoughts of those bright days so joyously spent with him at Fort Conger, and of the half-forgotten scene of his death and the universal sorrow that was felt at his departure; but later my own wretched condition served to counteract these feelings, and I can now pass and repass the place without emotion and almost with indifference.

Sunday, June 1, 1884.—The gale abated at 1 a. m., and immediately afterwards we turned out of our comfortless quarters to remove the snow which had accumulated to a considerable depth over us. The snow had also penetrated to the interior of our sleeping-bags, and they were necessarily subjected to a thorough process of beating and shaking. Breakfast consisted of only three ounces of shrimps and a cup of tea to each man. This, however, is a fair sample of our daily fare. Just how we manage to exist on this meager and almost worthless food, is a subject worthy of careful study. But we have no conception of what the human frame is capable of enduring until put to the test. All are very weak and much depressed; this especially is the condition of those who were exposed last night to the fury of the storm in that wretched shelter, and who, like the others, have fasted for thirty-six hours.

Lieutenant Kislingbury became unconscious at 8 a. m., and at 3 p. m. he breathed his last. The beautiful Episcopal service was read after his death, in accordance with the custom established by Lieutenant Greely upon the occasion of our first funeral. He begged piteously for a drink of water just before he became unconscious, but this the doctor denied him on the grounds of its injurious tendency. He then sang the doxology in a weak but clear voice, and sinking back in his bag he was soon in the cold embrace of death.

The sky cleared at 8 a. m., and the sun came out bright and clear. The weather remained in this way until 3 p. m., when the sky again clouded and light snow began falling. Temperature at 10 a. m., +35.0 [+1.7° C.]. Pools of water are forming among the rocks and in depressions of the ground near the tent. A sufficient supply of water for two days' use was collected by the cooks this morning. It is very fortunate that we are enabled to secure water without melting ice, as our fuel is fast disappearing. Frederick relieved Bender from the duties of cook, owing to the illness of the latter. Long shot a dovekie to-day. By the recoil of his gun one of his eyes was seriously injured, and it became necessary for me to lead him home. I caught eight pounds of shrimps. The snow is so very deep and soft that of the seven hours which we were absent five were spent in walking to the open water and in returning to the tent, leaving only two for fishing. We were weak and faint from exhaustion when we returned to the tent. My knees and joints are so stiff and so much swollen and inflamed that I am incapable of bending the knee, and while in the act of walking it is necessary for me to swing my feet outward instead of lifting them directly from the ground. Flocks of king, eider, and long-tailed ducks were seen by Long to-day. He also saw several dovekies and a few gulls.

Monday, June 2, 1884.—A clear and beautiful day; a southeast wind sprang up at 8 p. m. The temperature at the time was +35.0 [+1.7° C.]. The snow, which is already very damp and soft, is disappearing rapidly under the influence of the sun. The ice-foot was also perceptibly diminished to-day. Water in abundance can now be obtained from pools among the rocks. After an absence of over seven hours I returned with only five pounds of shrimps. My baits are almost useless for further fishing. Lieutenant Kislingbury was buried this morning. Schneider is no longer able to work; Bender is but little better off, and Lieutenant Greely and Gardiner are very weak. Salor became delirious at 7 p. m. Long shot a dovekie. He saw very few ducks to-day. The large numbers seen yesterday were probably due to the southeast gale, which drove them to this side from their favorite haunts about Littleton Island. Vast fields of ice are now moving down the sound. If these were to choke in the narrow part of the sound it might have the effect of driving the birds and seals to this side of the channel.

Tuesday, June 3, 1884.—Fair weather; a moderate wind blew steadily all day from the southeast, and the snow thawed considerably. Water trickled from the heavy drifts on the hillside and formed near the tent in large pools, from which we draw ample quantities for cooking purposes. Temperature at 8 p. m.,

+31.0 [−0.6° C.]. Owing to windy weather Long did not go out to-day. I caught only six pounds of shrimps. While absent this morning I heard a walrus bellowing near "Disappointment Berg." Salor died at 3 a. m. We were lying together in the same bag at the time, and having neither the strength to remove the remains nor the inclination to get up myself I slept quietly until 9 o'clock, when breakfast was announced. There has been no material change since yesterday in the condition of the invalids. The three or four dovekies which have been killed were divided between Long and myself, and we find that they have perceptibly added to our strength, thus enabling us to pursue with fair success our respective functions as hunter and shrimper.

Doctor Pavy talked rather incoherently this evening, and he also made some rather absurd prescriptions. His mind is evidently somewhat obscured. For several days past he has eaten very little; in fact at meals he has taken nothing except tea. For weeks past I have noticed that Linn's feet were protruding from the gravel heaped over his frozen form. Day by day the elements have reduced this scanty covering of earth, until his lower extremities were exposed to the furious gales which sweep over the dreary solitudes of Cemetery Ridge. I have often thought that I would replace that which had blown away, but my waning strength impelled me to defer this from time to time, and now I am too weak to attempt it.

Wednesday June 4, 1884.—A beautiful day; temperature at 11 a. m., +32.0 [0.0° C.]. In the sun, however, it rose to +62.0 [+16.7° C.]. The high wind of yesterday abated at 6 a. m., but it again sprang up in the evening. The invalids are about the same as they were yesterday, except Doctor Pavy, who is rapidly losing both his mental and physical vigor. I caught seven pounds of shrimps and Long shot a dovekie. He also killed a king-duck and an auk, but both were lost. Frederick, assisted occasionally by Henry, is doing all the work about the camp, which includes cooking, gathering saxifrage for fuel, and cutting wood from the boat. Schneider manages to bring the salt water used in shrimp stews, but he can do nothing more. Owing to their inability to move about, Bender and Connell are doing very little work to assist the others. During the last few days I have eaten a great many of the dark-colored rock lichens (*tripe de roche*) which abound here, and I have invariably found them quite palatable and not in the least injurious to the stomach, the experiences of Franklin and Hayes to the contrary notwithstanding. Lieutenant Greely and several others, including myself, are of the opinion that they possess considerable nutriment, and we seriously contemplate using them as an article of diet in the near future.

Smith Sound is a beautiful sheet of water to-day; there is not a piece of ice in sight, and its surface is as smooth as glass and as clear as a polished mirror. How easily we could be reached by a relief vessel, or by a boat party from Littleton Island. Not feeling strong enough to make a grave for Salor in the gravelly soil on Cemetery Ridge, we placed his remains where they will be inaccessible to the wild animals—in the tidal crack. I was very weak and faint this morning, but the feeling in a measure passed away before night, and I was enabled as usual to go shrimping.

Thursday, June 5, 1884.—Fair weather; light westerly winds, and temperature at 4 p. m., +34.0 [+1.1° C.]. Doctor Pavy is very much reduced in strength; he refuses to partake of the shrimp stew, and is kept alive by weak tea alone. I caught five pounds of shrimps. Long was not successful in his hunting operations to-day. Reindeer moss, in small quantities, has been found in the immediate vicinity of the tent, and was at once used to augment our stews. The vegetation of this place, comprising poppies, saxifrage, grasses, &c., are looking quite green, and the patches of moss situated in damp places are growing rapidly.

The thievish propensity of Henry has again manifested itself, and to insure the safety of the few survivors Lieutenant Greely has deemed it necessary to issue to Long, Frederick, and myself an imperative order to shoot him without delay if he is again detected in the act of appropriating to his exclusive use any article of food belonging to the public stores. The following is a true copy of the order:

"NEAR CAPE SABINE, *June* 5, 1884.

"To Sergeants BRAINARD, FREDERICK, and LONG:

"Private Henry having been repeatedly guilty of stealing the provisions of this party, which is now perishing slowly by starvation, has so far been condoned and pardoned.

"It is however *imperatively ordered*, that if this man be detected either eating food of any kind not issued him regularly, or making caches, or appropriating any article of provision, you will at once shoot him and report the matter to me. Any other course would be a fatal leniency, the man being able to overpower any two of our present force.

"A. W. GREELY,

"*Lieutenant, Fifth Cavalry, A. S. O. and Assistant,*

"*Commanding Lady Franklin Bay Expedition.*"

Henry, who was acting as assistant to Frederick the cook, had taken advantage of the absence of the latter, and twice stole the greater portion of the dovekie intended for the hunter and shrimper. He was also seen eating seal-skin lashings and seal-skin boots, both of which were stolen from the public stock.

Friday, June 6, 1884. Clear weather; light westerly winds; temperature at 3 p. m., +34.0 [+1.1° C.], and at 6 p. m., +30.0 [−1.1° C.]. I fished for the tantalizing shrimps for more than seven hours, catching only two and one-half pounds. My baits are almost worthless now. What am I to do in order to continue this, our only food supply? I have tried everything at hand, but with no favorable result. I would again drag for the sea vegetation, but my failing strength is not equal to the task; I can do nothing more than stagger down to the shrimping place and return.

In view of the fact that Henry has again made a bold and boastful admission of his guilty crimes (and crimes they are) and was this morning detected in the act of perpetrating another, Lieutenant Greely has caused the following order to be issued:

"NEAR CAPE SABINE, *June* 6, 1884.

"Sergeants BRAINARD, LONG, and FREDERICK:

"Notwithstanding promises given by Private C. B. Henry yesterday, he has since, as acknowledged to me, tampered with seal-thongs if not other food at the old camp. This pertinacity and audacity is the destruction of this party if not at once ended. Private Henry will be shot to-day, all care being taken to prevent his injuring any one, as his physical strength is greater than that of any two men. Decide the manner of death by two ball and one blank cartridge. This order is *imperative* and *absolutely necessary* for *any chance* of life.

"A. W. GREELY,
"*First Lieutenant, Fifth Cavalry, A. S. O. and Assistant,*
"*Commanding Lady Franklin Bay Expedition.*"

Further explanation of this is unnecessary. The order was duly executed at 2 p. m., and later it was read aloud to the assembled party. Although deploring the necessity for measures of such extreme severity, all were unanimous in the opinion that no other course could have been pursued.

Bender died at 5.45 p. m., and Doctor Pavy who had been weakening rapidly for several days passed away at 6 o'clock.

Among Henry's effects were found seal-skin boots and thongs, and several large pieces of seal-skin clothing, knives, &c., all of which he had stolen from the general stores.

Considerable ice was observed to drift southerly to-day along the Greenland coast; near Cape Sabine however, and in fact all along the Ellesmere Land coast, the water is perfectly free from ice. Flies, large and very numerous, are very troublesome about the tent during the warmest days.

Saturday, June 7, 1884.—Clear weather and light westerly winds; temperature at 7 a. m., +31.0 [−0.6° C.].

In addition to his duties as cook, Frederick is doing all in his power for those who are ill. He certainly is a wonderful fellow. Long shot nothing to-day, and I took only two pounds of shrimps. The long walks which we take daily are fast reducing our little remaining strength.

I gathered together all the seal-skin which we intend using for food. The oil-tanned skin (that from which the hair has been removed) will be used in stews; the clothing on which the hair still remains will necessarily be burned or roasted. I do not find as much of seal-skin as I had anticipated.

Schneider now confesses that Henry and Bender, in whose bag he was, ate large quantities of this clothing at night, they having secretly burned it during the day. Biederbick and Connell collected a few lichens and gathered a quantity of reindeer moss.

This evening dinner consisted of a stew composed of two boot-soles, a handful of reindeer moss, and a few rock lichens. The small quantity of shrimps which I furnish daily are sufficient only for the morning meal.

A small silver chronograph which was found on Henry's person was abandoned by Lieutenant Greely at Fort Conger. Henry must have stolen it at the last moment before leaving the station. We dressed the bodies of Doctor Pavy and Bender for burial, but for the lack of strength were unable to convey them to their last resting-place.

Sunday, June 8, 1884.—This has been the clearest, the brightest, and the most enjoyable day that we have yet spent on these inhospitable shores; temperature at 1 a. m., +31.0 [−0.6° C.]; at 11 a. m., +38.0 [+3.3° C.]; at 3 p. m., +38.0 [+3.3° C.]; at 4 p. m., +40.0 [+4.4° C.]; and at 6 p. m., +35.0 [+1.7° C.].

A stew of less than three ounces of shrimps per man was issued for breakfast, and a thin, unpalatable dish of seal-skin thongs was served for dinner. Schneider worked for a long time to-day burning the hair from seal-skin clothing, so that it could be eaten. A portion of the garments so burned were divided and eaten with the soup at dinner.

Lieutenant Greely worked for five hours to-day, and in that time he collected about two quarts of lichens. Connell gathered a quantity of saxifrage, which is now in full blossom. These flowers are very sweet and palatable, and will in the future be largely used as an article of diet. Biederbick and Lieutenant Greely collected about equal quantities of lichens. Biederbick is quite ill this evening, having vomited copiously. He made a discovery to-day which adds to the many contemptible acts of Henry—that of a small cache of bear meat. Henry doubtless stole this more than a month ago, and concealed it in the rocks above camp for future use. Long and I went down to the winter house and brought up a quantity of wood for fuel. Our strength is fast diminishing. Even were we to kill large game, it would be impossible to bring it in intact, on account of our weakness. I wonder how much longer we can hold out on this meager diet of shrimps and seal-skin? Not many days, I am sure. If we are saved at all, the vessel which is to effect the rescue must hasten—we have but few days to live.

Connell's gums are quite sore. This will verify Doctor Pavy's predictions, made a few days before his own death, that Connell had symptoms of scurvy. Schneider's limbs are quite badly swollen, presumably from the same cause.

Monday, June 9, 1884.—Calm and cloudy weather; temperature at 9 a. m., +39.0 [+3.9° C.]; at 3 p. m., +38.0 [+3.3° C.]; and at 6 p. m., +38.5 [+3.6° C.]. Our breakfast consisted of nothing more than a few shrimps and the usual cup of tea; for dinner, a few raw lichens, a piece of burned seal-skin, and a cup of tea were served. Lieutenant Greely is indefatigable in his efforts to collect lichens for the general mess. Connell appears quite strong, but he doubtless has incipient scurvy. He gathered a quantity of saxifrage for fuel. Biederbick picked lichens. Schneider burned the hair from the seal-skin garments which were eaten at dinner. Long shot a dovekie and a Brant goose; the latter drifted away by the tide and was lost. I caught only one-half pound of shrimps. One of my nets was lost by the breaking of the rope by which it was suspended.

Bender was buried in the tidal crack this morning, and during the evening the remains of Doctor Pavy were lowered into a similar grave. The greater part of the snow has disappeared from about our camp, and I now frequently observe traces of hares, and yesterday I found a bunch of musk-ox wool. The former, however, were not recently made. I also discovered a few fragments of bone and wood, the latter bearing evidence of having been worked by the Eskimo. All these relics recently found tend to strengthen my former opinion on this subject, viz, that the Eskimo inhabited these regions previous to their migration northward to Lady Franklin Bay. Among the other very interesting things found here is a piece of drift-wood, which I found lying among the rocks fifteen feet [4.5^{m}] above the level of the sea. Long's thirty-second birthday; he received a spoonful of rum in honor of the occasion.

Tuesday, June 10, 1884.—Weather cloudy until 4 p. m., when the sky cleared and the sun came out beautifully; temperature at 1 a. m., +34.0 [+1.1° C.]; at 8 a. m., +32.8 [+0.4° C.], and at 12 m., +40.0 [+4.4° C.]. Gardiner is a great deal worse; the others, however, are not visibly changed. Long and myself felt greatly refreshed and strengthened by the portion of dovekie stew which was accorded us by the party in consideration of the severe strain which we undergo in hunting and shrimping. For dinner the lichens were prepared in the form of a stew, and I think they were generally well liked. After boiling them for a few minutes they became greatly swollen and the water soon assumed the color of tar and the consistency of thick sirup. These will now become our staple article of food until the supply is exhausted. "Disappointment Berg" is now connected with the open water by wide lanes. Disintegration of the floe in Buchanan Strait is likely to occur at any moment. The snow on this low point has entirely disappeared from the rocks and from exposed places; in the ravines and depressions, where the sun cannot penetrate readily, it has become soft and slushy. Saxifrage is now in blossom and ready for pressing. The scanty tufts of grass are looking quite green.

To day I saw a bumble-bee flitting about among the saxifrage blossoms and was reminded that summer had come at last. Its approach has been so gradual that we can scarcely realize that it is here. After fishing for several hours, I gave up in despair, having caught only two pounds of shrimps.

Wednesday, June 11, 1884.—A clear, cloudless and beautiful day; light west winds; temperature at 3 p. m., +40.0 [+4.4° C.], and at 8 p. m., +38.0 [+3.3° C.]. In the sun the thermometer indicated a temperature

of +62.0 [+16.7° C.]. Long returned at 1.30 a. m. from the open water, bringing with him two fine guillemots which he had killed. One of these was given to the general mess and the two other will be divided among those who are doing the heavy work for their weaker companions. This evening a great misfortune befell me. The spring tides have broken out the ice at the shrimping place, and my nets have been carried away and lost; my baits, poor and miserable as they were, are gone also. It is anything but pleasant to reflect that to-morrow morning we will have no breakfast except a cup of tea. It was quite late when I returned this evening from shrimping, and everybody had retired. I did not have the heart to awaken the poor fellows, but I let them sleep on quietly under the delusion that breakfast would await them at the usual hour in the morning. How I pity them!

I made a flag, or distress signal, as it might be more properly termed, which I intend placing on the high, rocky point just north of our tent, where it may be seen by any vessel passing Cape Sabine. Schneider is not able to go out of doors to-day, and Gardiner is much worse than he was yesterday. Lieutenant Greely is suffering with dysentery and could not go out as usual for lichens. Biederbick climbed the hill to gather lichens from the rocks for our evening stew. He complained of faintness, but his indomitable will would not succumb to physical weakness. We began using the compressed English tea this evening.

There is scarcely a fragment of ice in Smith Sound. Why do not the whalers arrive soon to rescue from their perilous situation the few survivors who so anxiously await their coming?

Thursday, June 12, 1884.—The day opened clear and fine, with light winds from the west; temperature at 11 a. m., +36.0 [+2.2° C.], and at 6 p. m., +36.0 [+2.2° C.]. We had nothing for breakfast except a cup of tea.

I found a new shrimping place this morning not far from the tent. After working it thoroughly for several hours I was forced to return with only two pounds. For dinner we had a few boiled lichens and a cup of tea. Schneider is worse; Lieutenant Greely is better, and the others are about the same as they were yesterday. Connell's face is full, and he has the appearance of a man in excellent health, but the delusion is due to bloat. To-day he surprised us all by expressing a wish to work, cook, and live by himself. This request Lieutenant Greely refused to grant. Long, Frederick, Lieutenant Greely, and myself have a slight attack of diarrhea, which we attribute to the use of lichens.

Gardiner died at 5 p. m., starvation being the primary cause of his death, but it was doubtless hastened by inflammation of the bowels. Patience and fortitude have characterized his sufferings during the last few months. He clung to life with a wonderful pertinacity, and only succumbed when physical weakness had crushed his iron will. At 2 a. m. he became unconscious, but for hours prior to this he had held the portraits of his wife and of his mother in his hand, gazing fondly at their beloved faces, and when his spirit had passed into another world the skeleton fingers still clutched the pictures of those whom he had loved.

From this date I shall expect a relief vessel to arrive at any moment. The water has broken the floe to the rocky point near our winter house. I placed the signal flag in position on the rocky point facing the sea. It can be seen for a long distance, owing to the combination of colors composing it.

Friday, June 13.—A southeast wind, brisk and damp, prevailed all day and prevented the lichen gatherers from pursuing their customary labors. Our supper in consequence was necessarily the simplest that could well be imagined—a seal-skin *temiak* (Eskimo coat) which had been roasted or burned over a saxifrage fire. We fared somewhat better for breakfast, however, having the results of last evening's shrimping, together with a few lichens.

The physical condition of the little remnant of our party remains unchanged; mental vigor, however, is fast ebbing away. Biederbick was discharged from the army to-day, his term of service having expired. I caught only about one pound of shrimps this evening. I have nothing but the two guillemot's skins for bait, and they are nearly consumed by the repeated assaults of the voracious shrimps. Notwithstanding the high wind and the disagreeable weather, Frederick, the never-tiring cook, has been bustling about camp all day. Owing to the unfavorable state of the weather Gardiner was not buried. My signal-flag has been blown down by the wind; temperature at 8 a. m., +32.0 [0.0° C.], and at 9 p. m., +31.5 [−0.3° C.].

Saturday, June 14, 1884.—High wind abated at 4 a. m.; the weather remained cloudy all day; temperature at 11 a. m., +41.0 [+5.0° C.], and at 5 p. m., +42.0 [+5.6° C.]. Our breakfast, with its few ounces of shrimps, was but a poor apology for a meal. When we went out this morning to begin the day's labors, we were all very weak. Lieutenant Greely, Connell, and Biederbick gathered lichens for supper to-day and breakfast to-morrow. Frederick performed the usual camp work. Gardiner was buried in the tidal crack.

I caught only one pound of shrimps. Long complains of indisposition, but this did not deter him from going out to the open water, which is now quite near our camp. The floe ice is fast breaking away from the shore. "Disappointment Berg" is already free from restraint; the ice, which had kept it a close prisoner for so many months, has all disappeared. Connell saw a small seal and a dovekie in a pool not far from the ice-foot. Neither was secured. I replaced the distress signal-flag, which was blown down by the wind yesterday. The lichens are now called—for sake of variety—"the arctic mushrooms."

Sunday, June 15, 1884.—Cloudy, stormy, and generally disagreeable weather. There are also indications of a very high wind on the sound; temperature, 7 a. m., +30.0 [−1.1° C.]; 11 a. m., +34.0 [+1.1° C.], and at 7 p. m., +39.0 [+3.9° C.]. Light snow fell during the forenoon. Long saw five walrus sporting in a small pool near the ice-foot, and in adjacent pools he saw many others. They were all too far away to be reached by the hunter. No game was killed to-day. The invalids remain about the same.

A small shrimp and lichen stew was prepared for breakfast, and for dinner we regaled ourselves on plain raw lichens. The oil-tanned seal-skin cover to Lieutenant Greely's sleeping-bag has been removed and divided equally between Connell, Biederbick, Schneider, and Elison. To the remaining members of the party will be issued the cover of Long's bag, which is identical with the one used to-day. Some distance out on the floe Long saw a fox, which was traveling northward. The little fellow was evidently in search of food.

Schneider begged and implored that some one would give him opium pills in order that he could die quickly and easily. It is needless to say they were refused.

All sense of the feeling of hunger appears to have left us. We eat simply because we think it necessary to do so to insure the prolonging of our lives, and not from the inclination which a healthy hunger would produce. All fastidiousness of taste has also departed. Crumbs of bread which are occasionally exposed at our winter quarters through the melting snow are picked from heaps of the vilest filth and are eaten with avidity and without repugnance. Henry at one time ate ptarmigan droppings; Bender ate caterpillars, worms, &c.; saxifrage, lichens, and other vegetables, together with the intestines of birds and other animals are considered epicurean dishes of the highest order. I worked for several hours in the raw, chilling winds, but my efforts were not rewarded by any great degree of success, having caught but little more than a pound of shrimps.

Monday, June 16, 1884.—Temperature at 7 a. m., +37.0 [+2.8° C.]; at 11 a. m., +40.0 [+4.4° C.], and at 3 p. m., +38.0 [+3.3° C.]. The lichen gatherers were prevented from going out to-day in consequence of a high wind. Owing to this unfortunate state of the weather we had a very meager breakfast of shrimps and lichens, and for supper we had nothing at all. Our condition is indeed wretched and full of distress; we are calmly waiting succor or the alternative—death. One or the other must visit us soon.

The minimum thermometer (No. 590) lost last winter in the storm was found to-day by me near the winter hut, quite uninjured. No lemmings have been seen by our party on this coast, but to-day I found the skeleton and head of one in the rocks near the *Proteus* wreck cache. The bones when discovered were intact, but being extremely friable from great age they at once crumbled to dust on coming in contact with my fingers. The shrimp fishery—our last resource, except the lichens—has failed for want of bait. For full five hours I worked as faithfully and persistently as my remaining strength would permit, and during that time took only two or three ounces of these crustaceans. Even these I did not carry to the tent, being barely able to crawl there myself without incumbrances. Walrus in countless numbers were seen in the pools some distance out, but none appeared on the ice or in the water-spaces near land. "Disappointment Berg," being relieved from its environment of ice, has moved silently away from the position which it occupied for so long a time. The last of our tea was used for breakfast.

Tuesday, June 17, 1884.—It has been a clear, beautiful day; a gentle breeze from the west tempered the warmth of the sun during the forenoon. Temperatures: Minimum, +30.5 [−0.8° C.] at 7 a. m.; maximum, +38.0 [+3.3° C.] at 11 a. m. As a substitute for the English tea a decoction of saxifrage was served us for breakfast. It was very bitter, unpalatable, and slightly nauseating, and despite my earnest efforts to swallow this vile compound I was forced to give up in disgust. With the exception of a few mouthfuls of roasted seal-skin left over from better days, this tea was all we had with which to break our fast. For dinner a lichen stew was prepared. It was very small, however, and did not go far towards satisfying the feelings of our starving men. I brought up an armful of wood for fuel from the boat which formed the roof to our abandoned hut. Being too weak to prepare it for burning this duty fell to Frederick. He is also nearly broken down, but his iron will sustains him. Schneider is almost entirely helpless, and his words evince great mental weakness as well. Many walrus are bellowing and tumbling about in the

water not far to the northward of the extreme northern point of this island, but unfortunately we cannot reach them without a boat. The sleeping-bags of Long and myself were stripped of their seal-skin covering and the pieces equally divided for consumption. This is the last and only material in camp which we can use for food. When it is gone the party will not long survive; we are already standing on the brink of the grave, and when the last mouthful of food has been used death will quickly claim us for his own. We will probably all die at about the same time, and none of those now surviving can expect to be accorded the burial which our departed comrades have received.

This evening I repaired as usual to the shrimping grounds, but my labors meeting with about the same result as yesterday, I concluded to abandon this work for the present and turn my attention to the collection of lichens. Not a piece of ice was to be seen in the channel this evening, and its surface was as clear and smooth as glass.

Wednesday, June 18, 1884.—With the exception of a few hours in the morning the sky was cloudy all day; minimum temperature, +30.0 [−1.1° C.]; maximum, +42.0° [+5.6° C.], occurring at 3 p. m. Saxifrage tea and boiled seal-skin comprised our breakfast. Having nothing to cook in the evening—the saxifrage tea being voted a nuisance—no fire was made. A few mouthfuls of boiled seal-skin which we providently saved from the morning meal was eaten for supper. Frederick says he is too weak to cook more than one meal each day. What would seem very remarkable in our case is that we long for certain articles of food, but at the same time the sense of hunger is not felt. The fearful gnawing of hunger at our stomachs which was experienced last autumn and winter has some time since disappeared. There has been a perceptible diminution of strength in the party to-day. I was unable to go out until 4 p. m., when I crawled and staggered—I scarcely know how—to the rocks a dozen yards away to scrape off a few lichens. Soon after eating his breakfast Schneider became unconscious, and at 6 p. m. he died. It is just three years to-day since he was detailed for duty with this expedition. On his return from collecting lichens this evening Connell complained of dimness of vision and inability to manage his limbs as he desired. Biederbick very inconsiderately changed underclothing entire this morning. It now occurs to us that we have neither changed clothing nor bathed since we left Fort Conger in August last, nearly eleven months ago. Long shot two dovekies last night, but they drifted out with the tide and he got neither. He will now change his hours for hunting from night to the daytime, the tide being more favorable at that time.

Thursday, June 19, 1884.—The weather was clear during the morning, and westerly winds prevailed. In the afternoon, however, the wind veered to southeast, and attained a high velocity; temperature at 7 a. m., +34.5 [+1.4°]; at 11 a. m., +37.5 [+3.1° C.], and at 3 p. m., +37.8 [+3.2° C.]. Long went out during the night in search of game, and did not return until a late hour this morning—while Frederick was preparing breakfast. Two dovekies and two eider ducks had been killed by him, but all were carried seaward by the ebbing tide, before they could be secured by the long pole which he carried for fishing game from the water.

I discovered a small piece of driftwood on the land thirty feet [9^{m}] above the tide level. It bears marks of having received rough usage in the ice-pack, and its appearance also denotes great antiquity. A few days ago, on another part of the island, I found a similar piece which was not as far above the water as this one by fifteen feet [4 5^{m}]. These facts alone would seem to be indisputable evidence of the gradual rising of this land from the sea. The water is rapidly eating its way through the floe into Buchanan Strait.

The party is now yielding slowly but surely to the inevitable approach of death; a brief respite only awaits them. The lichens are very scarce, and the absence of bait has rendered the discontinuance of shrimps a necessity. What we will next do is a matter of conjecture. The lichens appear to possess considerable nutriment, and had my recommendations regarding them been adopted others of this party would probably have been living now. I ate a quantity several weeks ago, and finding them palatable and not at all injurious to the stomach, I earnestly urged Lieutenant Greely to authorize them to be used in the mess as a regular article of diet, and he probably would have done so but for the very emphatic and tenacious professional opinion advanced by Doctor Pavy, who pronounced them not only injurious, but also extremely dangerous to the system and directed, or rather advised, that they be not resorted to except in the last extremity. Connell doubtless has symptoms of scurvy. I attribute my abnormally swollen face and limbs to the same disease.

Our breakfast consisted of a few pieces of charred seal-skin and a thin lichen stew. I found and gathered a fine bed of reindeer moss, but was too ill to collect many lichens. Owing to the greatly enervated state of the party to-day, Schneider was not buried as contemplated, but was moved a little nearer the ice-foot.

Friday, June 20, 1884.—A clear, beautiful morning, with light westerly winds; temperature at 7 a. m., +29.0 [−1.7° C]; at 11 a. m., +33.0 [+0.6° C.], and at 3 p. m., +38.0 [+3.3° C.]; minimum, +26.8 [−2.9° C.]. Long went to his hunting grounds at 3 a. m., but saw no game. A high southeast wind, which rose at 11 a. m., continued all day. Biederbick and Connell are much enfeebled. The former, although showing scorbutic symptoms, went out with Lieutenant Greely to gather lichens. Connell's mouth is very sore, and decidedly worse than it was a few days ago. His badly swollen face and limbs, together with the condition of his mouth, impresses us with the belief that he has the scurvy. He was incapable of leaving the tent to-day. I brought some wood and salt water for Frederick, and collected a little reindeer moss.

While removing Schneider's remains from the tent on the day he died, it was noticed that his mouth emitted an offensive odor which pervaded both the tent and the outside shelter. We are of the opinion that it was produced by scurvy, of which he exhibited symptoms.

Saturday, June 21, 1884.—Our summer solstice! The wind continues blowing a gale from the south; temperature at 7 a. m., +31.0 [−c.6° C.]; at 11 a. m., +34.0 [+1.1° C.], and at 7 p. m., +31.0 [−0.6° C.]; minimum, +28.0 [−2.2° C.]. Tent in dilapidated condition; shelter barely habitable for Long and myself. It is nearly down now, and if the storm does not abate soon it will be blown over. Snow squalls at intervals. The water has worked into the ice of Buchanan Strait for a long distance, and the sea is running very high. A meager lichen stew for breakfast, and a few pieces of boiled seal-skin for supper.

Connell is worse; he says his legs are useless below the knees. Since day before yesterday Elison has transferred his food to his mouth by a spoon which is tied to the stump of his frozen arm.

APPENDIX No. 125.—*Portion of diary of Private Roderick R. Schneider, found on bank of Mississippi River in Missouri, and correspondence relating thereto with Mr. J. A. Ockerson.*

OFFICE OF MISSISSIPPI RIVER COMMISSION,
2828 *Washington Avenue, Saint Louis, September* 28, 1885.

DEAR SIR: Yours of the 23d instant is received. I take pleasure in sending you the diary inclosed herewith. I have taken great interest in it, and should like very much to have the leaves returned to me after their contents have been duly noted. I retain a copy of them duly certified by Capt. Thos. Tuttle, Corps of Engineers, to guard against loss in transit or otherwise.

I am investigating the details of the finding so as, if possible, to get a clue to the question of how the diary came where it was found, and if you desire I will be pleased to inform you of the facts.

It was found some four or five miles below Point Pleasant, Mo., on the right bank of the Mississippi. It was found by C. Brainard, then in our employ. He is in no way related to the man in your party of the same name.

If not too much of a tax on your time I should be very glad to hear from you further in this matter, and I would also solicit a copy of your report when published.

Hoping that the document may be of service to you, I am,

Very respectfully,

J. A. OCKERSON,
U. S. Assistant Engineer.

Lieut. A. W. GREELY,
Pittsfield, Mass.

NEWBURYPORT, MASS., *October* 17, 1885.

CHIEF SIGNAL OFFICER OF THE ARMY,
Washington, D. C.:

SIR: I have the honor to transmit herewith a portion of the original diary of the late Roderick R. Schneider, of the Lady Franklin Bay Expedition, together with a letter from Mr. J. A. Ockerson, U. S. Assistant Engineer, of Saint Louis, which explains how it came into my possession. I have to state that I at first thought, with Captain Schley, that this diary, with other similar notes of Private Schneider's, were accidentally thrown overboard with my sleeping-bag immediately after my rescue at Cape Sabine. Later,

however, I had reason to believe that the diary had been appropriated by some one of the seamen of the relieving squadron. Captain Schley and Lieutenant Emory, while not concurring in my suspicion that the diary had been taken, made every effort to secure the safe return of these and other articles, which were also undoubtedly appropriated by the seamen of the squadron. The impossibility of preventing such misconduct on the part of the seamen is obvious to any one at all familiar with the excitement and confusion incident to the rescue. I have the honor to request that this remnant of Schneider's diary and the accompanying letters be attached to my report.

Mr. Ockerson has expressed a desire that the sheets should be finally returned to him, but I have advised him that, in my opinion, the original should revert to Private Schneider's family.

I am, respectfully yours,

A. W. GREELY,
First Lieutenant, Fifth Cav., Acting Signal Officer and Assistant.

OFFICE OF THE MISSISSIPPI RIVER COMMISSION,
2828 *Washington Avenue, Saint Louis, November* 3, 1885.

SIR: On September 28, 1885, I sent to Lieut. A. W. Greely, Pittsfield, Mass., a portion of the diary pertaining to the "Greely Expedition."

On the supposition that it may be of some interest, I beg leave to submit the following account of the time and place at which it was found:

It was found March 2, 1885, about three miles below Point Pleasant, Mo., on the right bank of the Mississippi River, by C. Brainard, then assistant engineer in the employ of the Mississippi River Commission. The leaves were separated and scattered along the bank for a distance of two or three hundred feet. They had apparently been left there by the water, at a stage some three feet higher than when found. An examination of the gauge records fixes the date when they lodged there as about February 22, 1885.

Besides the record proper (which covers a period from June 6 to June 17, 1884, and begins "3 of us, an order was published to-day that he should be shot"), there were three pages of mess account, giving the amount of game, shrimp, &c., which had been caught, six blank leaves, and the leaves which were attached to the cover, with a portion of the cover.

A search was made for some distance above and below for other portions, but without success. The outside leaves being intact, and the ragged edges of the other leaves, gave the impression that the missing part had been torn out.

It came into my possession early in August last, and after carefully reviewing the published accounts of the expedition and its survivors I became satisfied that it was Schneider's diary.

Before reporting the matter I attempted to solve the mystery as to how a diary, which was thrown overboard in Greely's sleeping-bag off Cape Sabine, could have reached the place where it was found. I have not arrived at a satisfactory solution of the matter.

About September 20 I wrote to Lieutenant Greely with regard to it, and he informed me that Schneider's diary was missing and that he believed that it was stolen by some member of the relief squadron.

He also requested that it be sent to him at once, which was subsequently done. I retained the blank leaves and also a copy of the diary in order to guard against possible loss in transit.

On its receipt Lieutenant Greely informed me that the diary was genuine, and that it had been sent to your office to be entered on the official records of the expedition.

I had hoped to trace the movements of some ex-members of the relief party who were on exhibition in this section in the fall of 1884, thinking that I might in that way get a clue to the former possessor of the diary, and possibly learn whether it was lost or whether an attempt was made to destroy it. As yet I can only say that their names as given here are Burke, Clarke, and Smith.

Hoping that the above statements, if not of any real value, may still be of some interest, I have the honor to be,

Very respectfully, your obedient servant,

J. A. OCKERSON,
Assistant United States Engineer.

Gen. W. B. HAZEN,
Chief Signal Officer U. S. A., Washington, D. C.

Diary of Private R. R. Schneider, at Camp Clay, June 6–17, 1884.

[Game.]				Shrimps.	
[Date.]	[Description.]	[Weight.]	[Collector.]	[Date.]	[Weight.]
1884.		*Lbs.* *Oz.*		1884.	*Lbs.*
Mar. 14	3 ptarmigan	3 10	Brainard.	Mar. 19 to 25	17
Mar. 16	4 dovekies	4 0	Long and Jens.	Mar. 27	12
Mar. 17	1 ptarmigan	1 4	Eskimo Jens.	Mar. 28	51
Mar. 24	1 fox	5 2	Brainard.	Mar. 29	12
Mar. 27	33 dovekies	33 0	Long and Jens.		
Mar. 28	1 ptarmigan	1 0	Frederik (Eskimo).		
Do	14 dovekies	14 0	Long and Jens.		
Mar. 29	1 ptarmigan	1 0	Rice.		
Apr. 1	11 dovekies	11 0	Long and Jens.		
Apr. 3	2 ptarmigan	2 0	Brainard.		
Apr. 7	----do	2 0	Jens.		
Apr. 11	1 ice bear	400 0	Long and Jens.		
Apr. 13	1 seal	78 0	Long.		
Apr. 25	2 ptarmigan	2 0	Brainard.		
May. 3	----do	2 0	Do.		
May. 28	1 dovekie	1 0	Long.		
May. 29	----do	1 0	Do.		
June 1	----do	1 0	Do.		
June 2	----do	1 0	Do.		
June 4	----do	1 0	Do.		
June 6	----do	1 0	Do.		

—— three of us, an order was published to-day that he should be shot.

Although this is a most terrible day every one is in very good spirits this evening, and Brainard and Long are both at their respective work—the former shrimping and the latter hunting. Our only food now consists of three ounces of shrimps daily per man.

Lichens and saxifrage and reindeer moss are eaten in the stew by those who like it. The stew and tea both were reduced to one pot.

Among other things there were found some tea in Henry's effects, and he also took some shrimps out of the stew pot this morning by Shorty [Frederick].

Brainard returned 10.45 p. m. with only 2½ pounds of shrimps, yet he had been gone since 4.30 p. m., but the baits are giving out. Long returned 10.20 p. m., very much fatigued; he had been able to succeed in getting the dovekie which he had shot.

Brainard slept in the bag with me.

During last night Henry was eating burned seal-skin and I asked him for some, yet he refused me it positively.

Saturday, June 7, 1884.—Clear, yet little wind from the west; Shorty [Frederick] is up cooking. Brainard said that he spent very pleasant night and rested better than he has for many weeks.

Burial service was read over the dead before breakfast. After breakfast the bodies were tied up by Brainard, Long, and Frederick.

Upon searching the pockets of the dead lots of burned and unburned seal-skin and thongs were found on the doctor and Bender both, which showed how dishonest they was.

I was too weak to do anything to-day and received a dose of medicine from Biederbick. The evening dinner consisted of seal-skin soles entirely, no shrimps being on hand, and the stew was enjoyed by all and gave great satisfaction. I had a good stool in the evening.

Brainard and Long left camp at 8 p. m. It is found that only little seal-skin remains on hand to cook, and that Henry evidently must have made a cache somewhere.

Although Henry has told before his death that I had eaten a lot of seal-skin, yet, although I am a dying man, I deny the assertion he made against me. I only eat my own boots and a part of an old pair of pants which I received from Lieutenant Kislingbury. Bender did not smell very well upon removal this morning.

Brainard and Long returned at ——* p. m.

* Omission in original.—A. W. G., *Lieut.*

Frederick done the cooking to-day. Biederbick and Connell were picking lichens and reindeer moss for dinner. We are all getting very weak and Frederick says he cannot stand it much longer. As far as I can see we cannot exist but very little longer now. No more bait for shrimp catching, no chances to get game, and only seal-skin enough for a few stews more. I feel myself going fast, but I wished that it would go yet faster.

I moved into the tent to-day, and the commanding officer moved into Bender's single bag.

Although I stand accused of doing dishonest things here lately, I herewith, as a dying man, can say that the only dishonest thing which I have done is to have eaten my own seal-skin boots and the part of my pants.

Sunday, June 8, 1884.—Clear and warm. Brainard and Long returned at 1 a. m., the former bringing in about two pounds of shrimps, but Long had not seen any game. Both men completely exhausted. We had shrimp stew for breakfast and seal-skin stew for dinner, together with roasted pieces of *temiak*, which I prepared during the day. Although it proved very bitter food, yet it was eaten by every one of us.

Biederbick found a cache consisting of one pound of bear meat in a stocking and evidently stolen by Henry; it was cooked in the evening stew and relished very much. After dinner I wrote up account of Elison's trip of last fall after the English meat. Biederbick taken sick at dinner time. Iron was issued after dinner and afforded great relief. Brainard went to the shrimping grounds after dinner. Doctor's body removed to the ice-foot by Brainard, Long, and Frederick. The latter of these men does the cooking daily, but the poor fellow is getting very weak. Long tried to go hunting, but had to give it up on account of the work done by him during the day. Gardiner unable to do anything. Commanding officer gathers lichens and Connell gets saxifrage. Biederbick got lichens. Every one completely exhausted to-night; I and Connell are suffering from scurvy. My knees are much swollen and I am unable to walk any more.

Monday, June 9, 1884.—Clear and warm. Brainard returned 1.15 a. m. with two pounds of shrimps. I roasted all the seal-skin after breakfast. Unable to walk, but crawled to the fire. Gardiner is very weak. Commanding officer and Biederbick picking lichens for dinner.

Frederick cooks; had shrimp stew and remaining roasted seal-skin for breakfast. Connell picking saxifrage to burn. We are on the point of starvation now, and every one is meeting their fate like men. Bender's body was removed to a tidal crack. Long's birthday to-day. Every one of us much used up. The commanding officer about the strongest of us. Nothing except roasted hide and a cup of tea for dinner. Frederick hardly able to arise and get breakfast. Dinner at 4 p. m., and Brainard and Long leave camp [after] dinner and returned 11 p. m. Brainard did not get any shrimps on account of ice having given way, and Long had not seen only few ducks.

Tuesday, June 10, 1884.— Cloudy and cold, with wind from the west. Elison expressed a wish that his bones should go to the United States to some museum. Gardiner was taken sick with inflammation of the bowels. Biederbick, commanding officer, and myself picked lichens for the evening stew, which consisted only of lichens and a cup of tea.

Long and Brainard left camp after dinner. The latter returned 11.30 p. m., with two pounds of shrimps.

Connell is picking saxifrage to burn. Tea leaves are boiled second time for tea. Every one is getting weaker, especially myself. I am hardly able to crawl. Frederick is doing the cooking and work around the camp, but he says he is falling fast. Biederbick does remarkable work.

Long returned 1 a. m. with Brainard; the former had killed a goose and a dovekie, but had been unable to get only the dovekie, which was issued to them extra. Brainard only was able to get one pound of shrimps.

Wednesday, June 11, 1884.—Clear, yet the light west wind goes through one. I had a stool, which weakened me so that I was unable to pick even lichens. The commanding officer unable to pick any.

Long returned at 1.30 a. m. with 2 black guillemots; one was ordered in to-night's stew, and the other as extra ration for the hunters and cook. Biederbick alone is picking lichens. Connell got saxifrage. Long and Brainard leave camp after dinner. The condition of Gardiner is very bad; he cannot pass his bowels, and Biederbick says he must surely die soon, and I feel that I must. Frederick is doing the cooking.

Brainard and Long left camp after dinner.

Thursday, June 12, 1884.—Clear and warm. Long and Brainard returned at 12.45 a. m.; the latter had the bad fortune to lose his net by the floe moving out. Therefore we had only tea for breakfast and nothing else. A flag was put up by Brainard on the hill. Connell and commanding officer in dispute over lichens this morning; [Connell] showed disposition to gather food for himself.

Poor Gardiner died at 11 a. m. from inflammation of the bowels and starvation; he will be buried in the ice-foot, as it is seen that the rest of the bodies are uncovering with every light wind, and are thus laid bare to animals.

Long did not get any game last night. I sewed on a shrimp-net to-day, but I had to be helped up in the bed. I feel myself going rapidly. The commanding officer, Biederbick, and Connell are gathering lichens; also, Long and Brainard. Frederick is doing the cooking. Brainard and Long went out after dinner, but they returned before 12 p. m., the former with only a few shrimps. He had to make a new shrimp pole. Long did not get any game. The lichens begin to give diarrhea to most.

Friday, June 13, 1884.—Great wind storm from the southward continued to blow all day. Biederbick was discharged to-day and received a certificate of the discharge owing to no blanks for finals [final statements] and discharges are on hand. No one was able to go out to work. Frederick done the cooking; the last *temiak* was cut to pieces, roasted, and divided. Long and Brainard suffering from diarrhea. Brainard left camp after dinner in spite of the storm, in order to haul his nets, and returned 10 p. m. with about 2 pounds of shrimps. Long did not go out at all. I am getting very weak and can only move in my bag under the greatest difficulty.

The flag-pole which poor Biederbick erected blew down during the storm.

Only little tea remains on hand now.

Saturday, June 14, 1884.—Cloudy, but warm. Commanding officer, Biederbick, and Connell are picking lichens. Biederbick was re-enlisted to-day, and Gardiner was buried in the ice-foot by Brainard, Long, and Frederick. The latter is cooking and sawing the wood. The flag was erected again by Brainard. Elison's feet and hands were dressed by Biederbick. I am unable to get out to-day, and am hardly able to write my log-book up. A raven was heard around the camp, and a seal and walrus were seen by Connell, but Long seems unable to go out on account of weakness. Brainard was very much used up last night, yet he is in good spirits and expects a ship every day now. The gale subsided about 3 a. m. this morning. Elison was able to make water by himself. Brainard and Long left camp after dinner; the former got 1 pound of shrimps, the latter nothing, but had seen plenty walrus near the shore. Both of them returned at 1 a. m.

Sunday, June 15, 1884.—Fair, but cold; temperature 7 a. m., +30.0 [−1.1° C.], and some snow had fallen during the night. Brainard and Long returned 1 a. m. Connell made a remark this morning about each one for himself now, which caused the commanding officer some uneasiness. Two of us, Elison and myself, are unable to do anything. We are living on only a few lichens and shrimps now, and only tea enough for two meals more. Brainard and Long pick and turn their lichens into the general mess. The guns are put out of reach of Connell, for he is very strong yet. The commanding officer, Biederbick, and Connell are all out after lichens. Frederick is doing the cooking. Many walrus and seals were seen by Long near the shore; the ice-foot is going fast and he expects to kill one of them on the beach. The sun was shining quite bright at 1 p. m., but the temperature remained low; only rose to +34.0 [+1.1° C.]. Brainard went out after dinner and got one pound of shrimps, but Long did not kill any game.

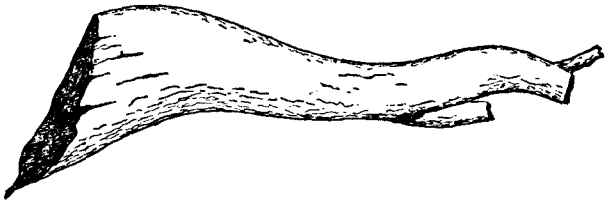
Monday, June 16, 1884.—Wind blowing from the N. The last of the tea for breakfast. Nobody able to get up except Frederick, who cooks. Minimum thermometer No. 590 found by Brainard to-day and again exposed. Sleeping-bag cover roasted and boiled for supper to suit each one. No fluid for supper to-night, not even hot water. Iron was issued. Brainard left camp, but did not get any shrimps, there being no more baits, and the shrimps will not bite on tanned seal-skin. He returned 12 p. m. Connell is suffering from sore gums. I am only able to sew on boots and keep up the diary. Had to make my stool in the tent by assistance of Brainard and Long. Every one is getting weaker. I had my [seal] skin boiled; so did Connell and Elison. Frederick's strength is failing fast, too. Long is suffering from his bowels, yet he went out, but could not get at the birds on account of the bad ice; he returned a few minutes after 12 p. m.

Tuesday, June 17, 1884.—Fair, but cool, yet the commanding officer, Biederbick, and Connell are out picking lichens for six hours. Biederbick also dressed Elison's feet and hands. I am unable to use my legs, but after being helped up I sewed a patch on Brainard's boots. He will haul his nets once more, and if unsuccessful, give it up after to-day and begin picking lichens with the others. Saxifrage tea was tried for breakfast, but only appreciated by Connell, Biederbick, Elison, and myself. Frederick is doing the cooking again to-day and Brainard went to the hut after wood. The commanding officer picked two cans

of lichens to-day. The last of the skin was divided to-day. The weather cleared up and it was very warm in the afternoon. Connell is off a good ways picking lichens; he is very strong yet in his legs. Only one meal is cooked a day now, as Frederick is getting so weak; yet it is remarkable how he keeps up at all on this food with the work which he does.

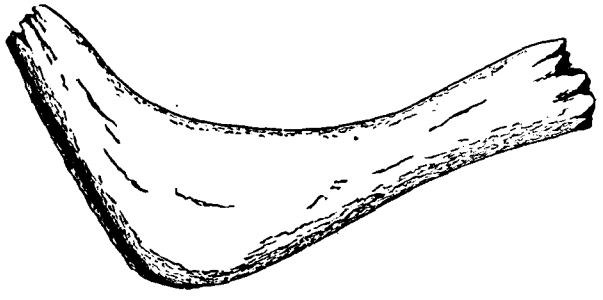
APPENDIX No. 126.—*Driftwood.*

No. 1. Cedar; evidently limb from tree, with bark:



	Ft.	*Ins.*	*mm.*
Greatest circumference, main limb		22½	571
Least circumference, main limb		10½	267
Extreme length, main limb	2	8½	825

No. 2. Evidently resinous wood, possibly pine; either branch or the extreme lower part of tree growing in rocky soil on hill:



Split surface		21	533
Extreme length	2	11	886
Circumference, top	1	5	432
Circumference, bottom	1	3	381
Circumference, largest part	2	1	635

No. 3. Poplar? Bark and wood inodorous and tasteless; frequent with heart split out or gone:

Length	3		914
Greatest diameter		5⅛	130

No. 4. Pine? Dug out of sand about 200 yards [183m] above high water level; altitude 20 to 30 feet [6 to 9 meters]; very much worn:

Circumference (not whole tree)		18¼	462
Length	2	4½	724

No. 5. Pine? Fragment of tree or limb, with probably a diameter of 4 to 6 inches [102mm to 152mm]:

Length		18	457
Width		2½	64

No. 6. Cedar limb:

Length	1	10	559
Largest diameter		4¾	120
Smallest diameter		3	76

No. 7. Pine; fragment from tree at least 5 or 6 inches [127mm or 152mm] in diameter:

Length		11	279
Width		1	25

No. 8. Pine; fragment from limb about 2½ to 3½ inches [64mm to 89mm] in diameter:

Length		11	279
Circumference		4⅛	105

No. 9. Pine; fragment from limb or tree at least 6 inches [152mm] in diameter:

Length		10½	267
Width		3¼	81¼

No. 10. Had large tufts of grass growing in alluvium which had collected therein; main trunk of tree (cedar?):

Length	2	9	838
Greatest diameter		17¼	437
Diameter below first limb		16¾	414
Diameter of top		6⅛	155

No. 11. Only piece which has been worked; surface eaten into by worms:

	Ft.	Ins.	mm.
Length	2	6	762
Circumference (uniform)		14⅞	378

APPENDIX No. 127.—*List of photographs and description of Eskimo relics in photographic plates.*

	Page.
1. Our House at Conger (west side), March, 1882. (Frontispiece.)	
2. Godhavn, Greenland, July 19, 1881	2
3. Ritenbenk, Greenland, July 21, 1881	2
4. Proven, North Greenland, July, 1881	4
5. Danish Eskimo at Proven, North Greenland	4
6. Site of Polaris House, Life-boat Cove (occupied in 1872), July, 1881	6
7. Proteus in ice, entrance to Discovery Harbor, August 12, 1881	6
8. Musk-cattle killed on Mt. Cartmel, near Conger, August 12, 1881	8
9. Head of musk-ox killed near Conger	8
10. Coal mine, Water-course Ravine, with reflected image	12
11. View of ice from Cape Murchison, looking towards Thank God Harbor, June, 1882	29
12. Musk calves, October, 1882. Captured near Conger, June, 1882. Sergeant Frederick	30
13. Floeberg in St. Patrick Bay, June, 1882	44
14. Pressed up Floeberg. Breakwater Point, Lady Franklin Bay, June, 1882	44
15. Chandler Fiord, looking westward. Ida Bay to extreme left	236
16. Paleocrystic ice in Robeson Channel	246
17. Tide-gauge at Cape Baird	268
18. Eskimo relics found in vicinity of Conger. Pl. I	536
19. Eskimo relics found at junction Lake Hazen and Ruggles River, June, 1882. Pl. II	536
20. Eskimo relics from Basil Norris and Sun Bays. Pl. III	536
21. Eskimo relics. Greater number found south side of Lake Hazen, June, 1882. Pl. IV	536
22. Eskimo relics found at Cape Baird. Pl. V	536
23. Modern Greenland and ancient Eskimo sledge. Pl. VI	536
24. Arctic Highlander from Cape York	536
25. Arctic Highlanders from North Star Settlement, Saunders' Island	536
26. Trout caught in Lake Alexandra, about 8 miles from Conger	(vol. 2, face page 55.)

DESCRIPTION OF ESKIMO RELICS IN PHOTOGRAPHIC PLATES.

PLATE NO. 1 (*beginning at left upper corner, and going across*).

1. Dog-harness toggle—appears to be of walrus-ivory, with two rounded slots.
2. Piece of a "long" bone or antler beam, cut off square on ends and slightly curved with a lanyard hole through upper end; perhaps a knife handle.
3. Body of toggle-head of harpoon, point downwards. Of the pattern common at Smith Sound, with the blade slit at right angles to the plane of the barb.
4. Cylindrical rod of bone slightly expanded at lower end and at the other tapered to a rounded tang, with a couple of little lugs on it, not opposite. The foreshaft of an arrow (?) or dart (?).

5*a*. Small flat oblong piece of bone.

5*b*. Fragment (the bottom) of a stone lamp, which appears to have been nearly circular—an unusual shape.

6. Bow drill, made of a single tapering piece of bone, largest near the butt, which is tapered away to fit the mouth-piece. Tip worked down to a slender drill point.
7. Stout tapering rod of bone, with one end sharp-pointed—looks like an ice-pick.
8. Curved fragment of bone, apparently the tip of a rib.
9. Irregular broad long piece of coarse bone, perhaps part of a sled.
10. Second row: Long flat piece of bone, with an oblong slot in one end, and the other worked into a small knob. Probably part of a spliced bone bow.

11*a*. Irregular long fragment of bone.

11*b*. Flat oblong piece of bone, with a round hole through each end and a transverse furrow across one end. A "strap" for splicing together two pieces of wood, or mending a broken article.

12. Oblong piece of bone, apparently a wedge.

13*a*. Epiphysis of whale's vertebra, perhaps used as a dish.

13*b*. Wooden sheath for lance-head, in two parts lashed together with thong or sinew.

14. Small wedge-shaped piece of bone, which looks as if it might be a bone adz-blade.

15*a*. A square block of wood.

15*b*. Small wedge-shaped piece of bone.

15*c*. Piece of birch bark (?).

16. Stout bone "loose shaft" of harpoon.
17. Lengthwise across bottom of sheet: Long slender pointed rod of bone, perhaps a seal detector.
18. Piece of a bone sled-runner, with rivet-holes.

PLATE NO. 2.

1. Canine tusk of walrus-calf, old and weathered.
2. Stick of wood apparently chamfered off at one end.
3. Rough bone bodkin.
4. Bone or ivory marline-spike for sinew-working.
5. Tapering rod of bone, sharp-pointed at lower end, with a rough knob on upper, perhaps also a marline-spike.
6. Short rod of bone, pointed at each end.
7. Rough slender rod of bone, with about one-fifth of its length bent at right angles to the rest. Looks like the handle of a small blubber-hook.

8. Blade of a snow-knife, of bone, broad and pointed.
9. Implement like No. 5.
10. Marline-spike, flat, four-sided, and rather broad for about one-third of its length, then rounded and tapering to a blunt point; bone.
11. Blade of small, straight, pointed bone knife, with a broad tang pierced with a rivet-hole.
12. Short rod of coarse bone.
13. Third row: Short piece of sled-runner with rivet-holes; bone.
14. Piece of reindeer skin from belly or flank, with long, coarse, white hair.
15. Short fragment of sled-runner of bone, with rivet-holes.
16. Fourth row: Short cylindrical tube of bone. Cap for sled upstander.
17. Bone tool, precisely the shape of the stone adzes from Point Barrow.
18, 19. Hair combs, essentially of the common Eskimo pattern.
20. *Ulu* or woman's knife, with iron blade and bone handle. Of the shape used by the western Eskimos and not of the Greenland pattern.
21. Fragment of comb like 20 and 21.
22. Small spade-shaped implement, which may be an unfinished comb.
23, 24. Dog-harness and toggles, apparently of ivory.
25. Fifth row: Haft and part of blade of wooden snow-knife. Smith Sound pattern.
26. Fragment of sled-runner, with rivet-holes.
27. Long piece of bone, with a deep groove along middle, from one end about ¾ of length. Perhaps a spear-socket split in two.
28. Across bottom: Long piece of narwhal "horn;" ends broken off. Probably part of a spear-shaft.

PLATE NO. 3.

1. Short, sharp blade of bone, with broad flat tang. Perhaps an ice-pick.
2. Bone "loose-shaft" of harpoon.
3. Second row: Wedge-shaped piece of bone.
4. Piece of bone resembling a whale-harpoon toggle-head body.
5. Appears to be a bone snow-knife.
6. 2-barbed body of harpoon toggle-head.
7. Bone beluga (?) dart-head.
8. Oblong flat piece of bone, perforated for a rivet. Perhaps fragment of sled-runner.
9. Tip of walrus-tusk, sawed off and perforated in base.
10. Tip of walrus-tusk, sawed off and perforated in base.
11. Wedge-shaped fragment of bone.
12. Third row: Angular fragment of bone.
13. Fragment of bone with a groove across it.
14. Perhaps a seal club.
15. Bone knob for staff (?).
16. Foreshaft of harpoon.
17. Fourth row: Irregular long fragment of bone, with a notch in one edge.
18. Oblong flat piece of bone with a groove across each end. Part of a sled (?).
19. Bit of bone sled-runner, with rivet-holes.
20. Large fragment of sled-runner (?).

PLATE NO. 4.

1. Unfinished sled-runner, whale's jaw.
2, 3. Bone sled-runners.
4, 5. Bone snow-knives.
6. Piece of bone narrow at tip and spreading out at base where it is perforated for rivets or lashings.
7. Piece of sled-runner.
8. Bone snow-knife.
9. Flat stick, capped with bone at one end.
10. Snow-knife of bone with handle wedged into groove in butt.
11, 12. Bone sled-runners.

PLATE NO. 5.

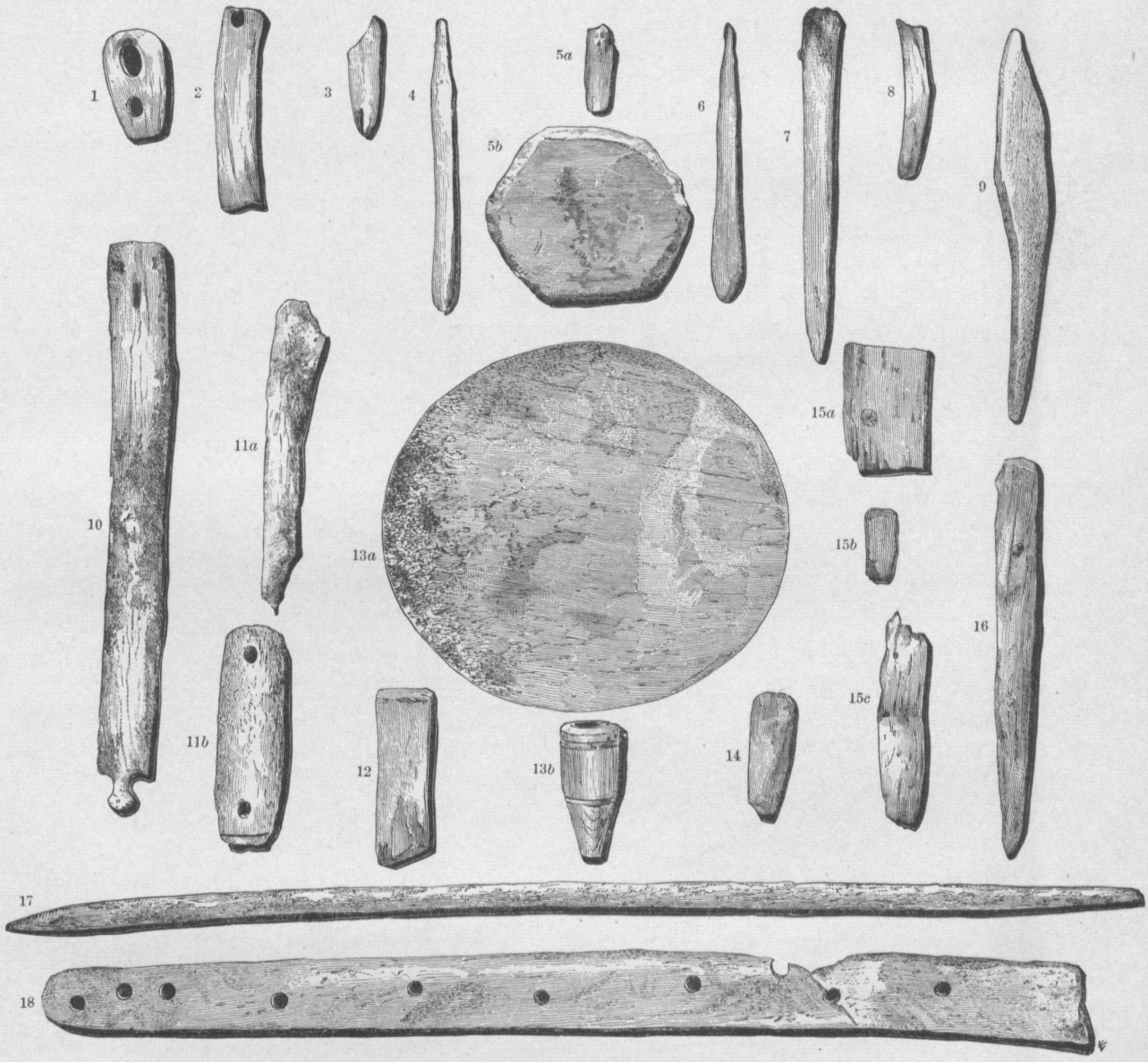
1. Piece of shoe to sled-runner.
2. Piece of bone; use unknown.
3. Eskimo lamp of steatite.
4. Probably point of a lance.
5. Probe to detect the presence of a seal at the breathing-hole. (?)
6. Probably fragment of probe; use same as No. 5.
7. Piece of bone; use unknown.
8. Probably butt of a bird-dart prong.
9, 10. Pieces of bone; use unknown.
11–16. Pieces of shoe to sled-runner.
17. Probably part of bucket handle.
18. Probably point of a lance.

PLATE NO. 6.

1. Sled of modern Greenland pattern, made of pine and lashed with seal-thong.
2. Sled of ancient Greenland pattern, somewhat dilapidated. Runners of driftwood, shod with bone. See Nos. 11–16, Plate No. 5. Three cross-pieces of wood and upstanders of whale-rib, lashed on with thong.

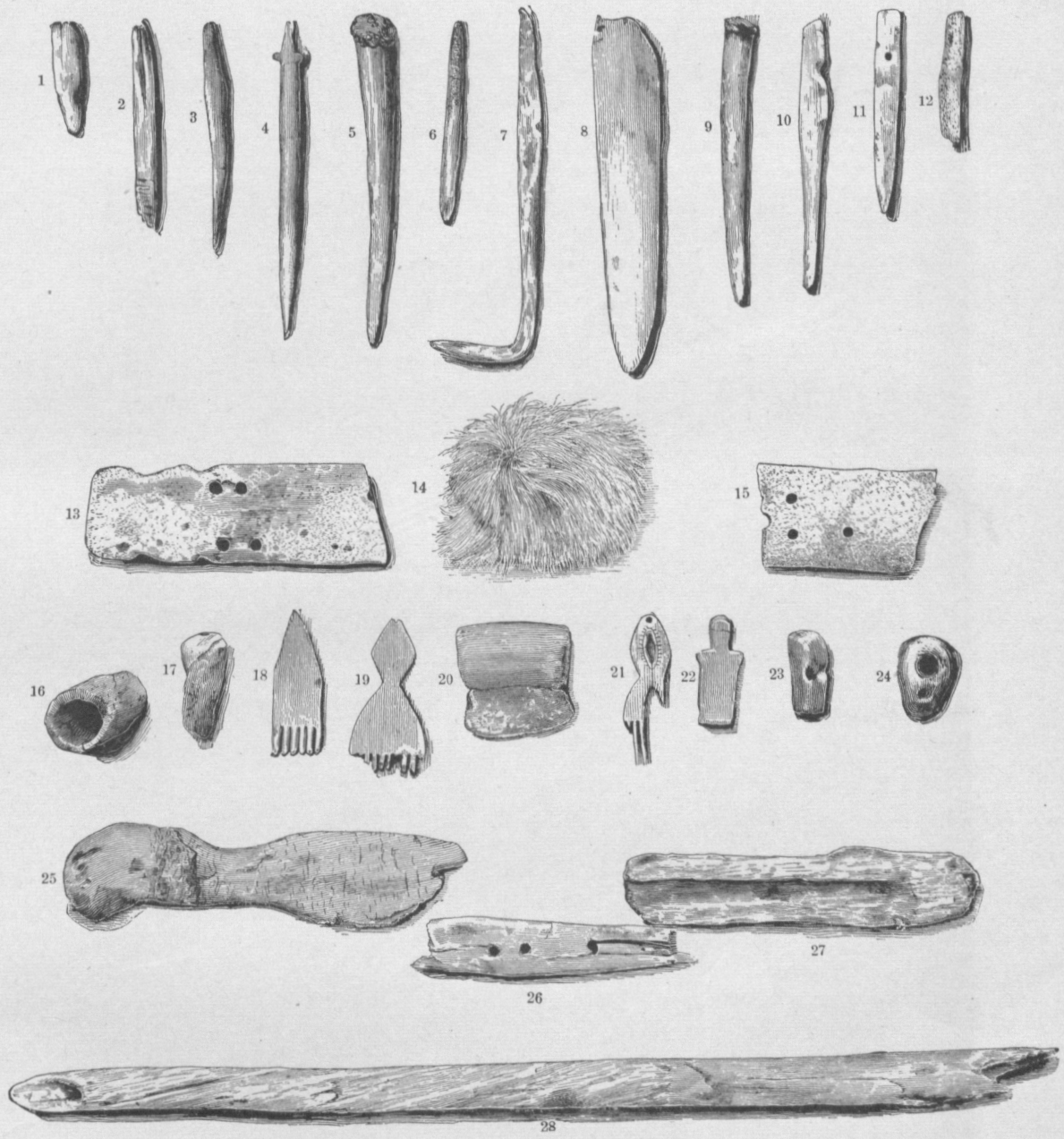
APPENDIX NO. 128.—*List of maps and charts.*

	Page.
1. Fort Conger, Grinnell Land	10
2. Map showing drift, travel, and discoveries on retreat	58
3. Chart of North Greenland Coast	186
4. Chart showing excursion of steam launch *Lady Greely*	236
5. Chart showing route of sledge expedition, 1883	252
6. Map of Grinnell Land	At end of volume.



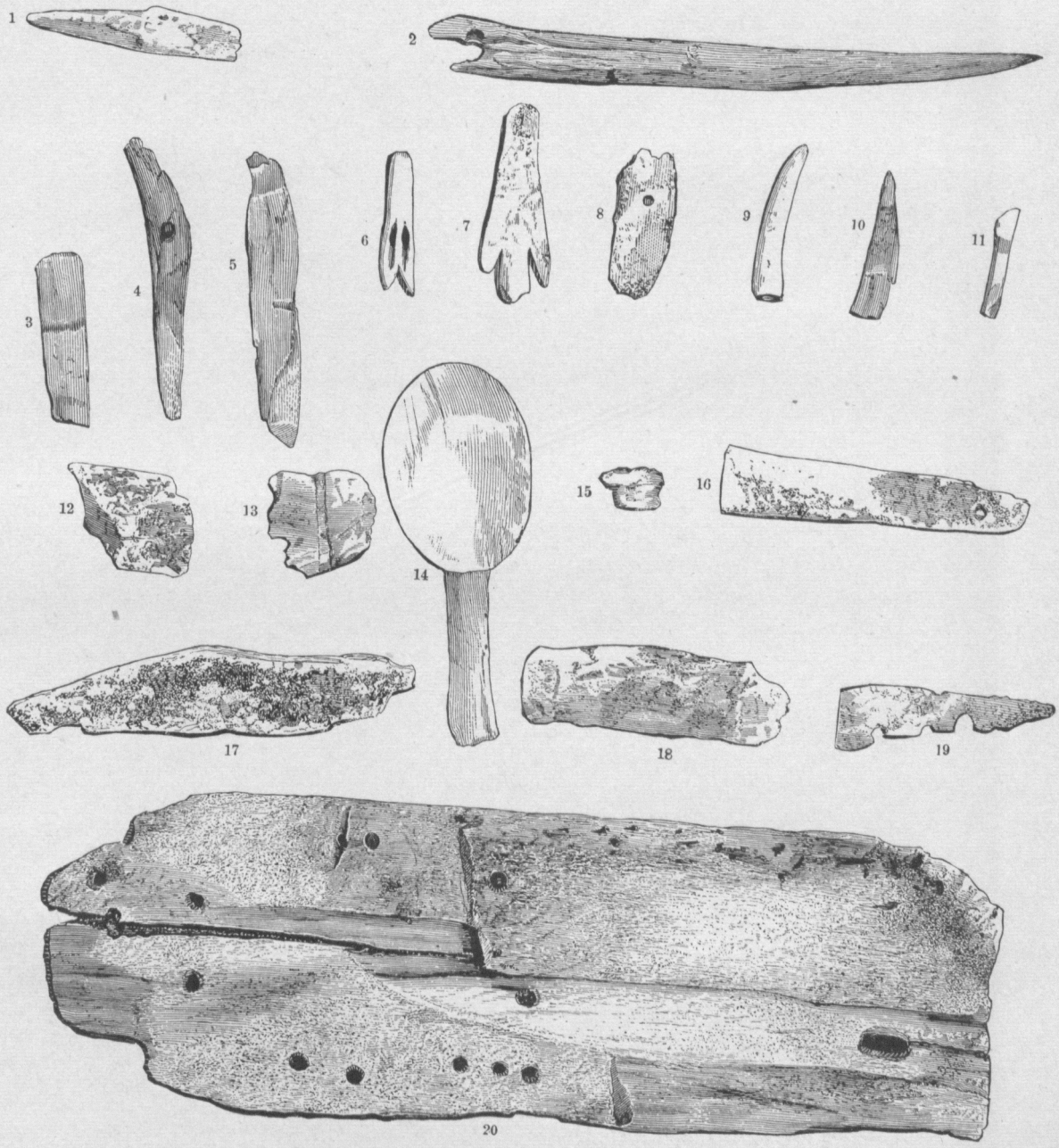
ESKIMO RELICS FOUND IN VICINITY OF FORT CONGER.

(From a photograph.)



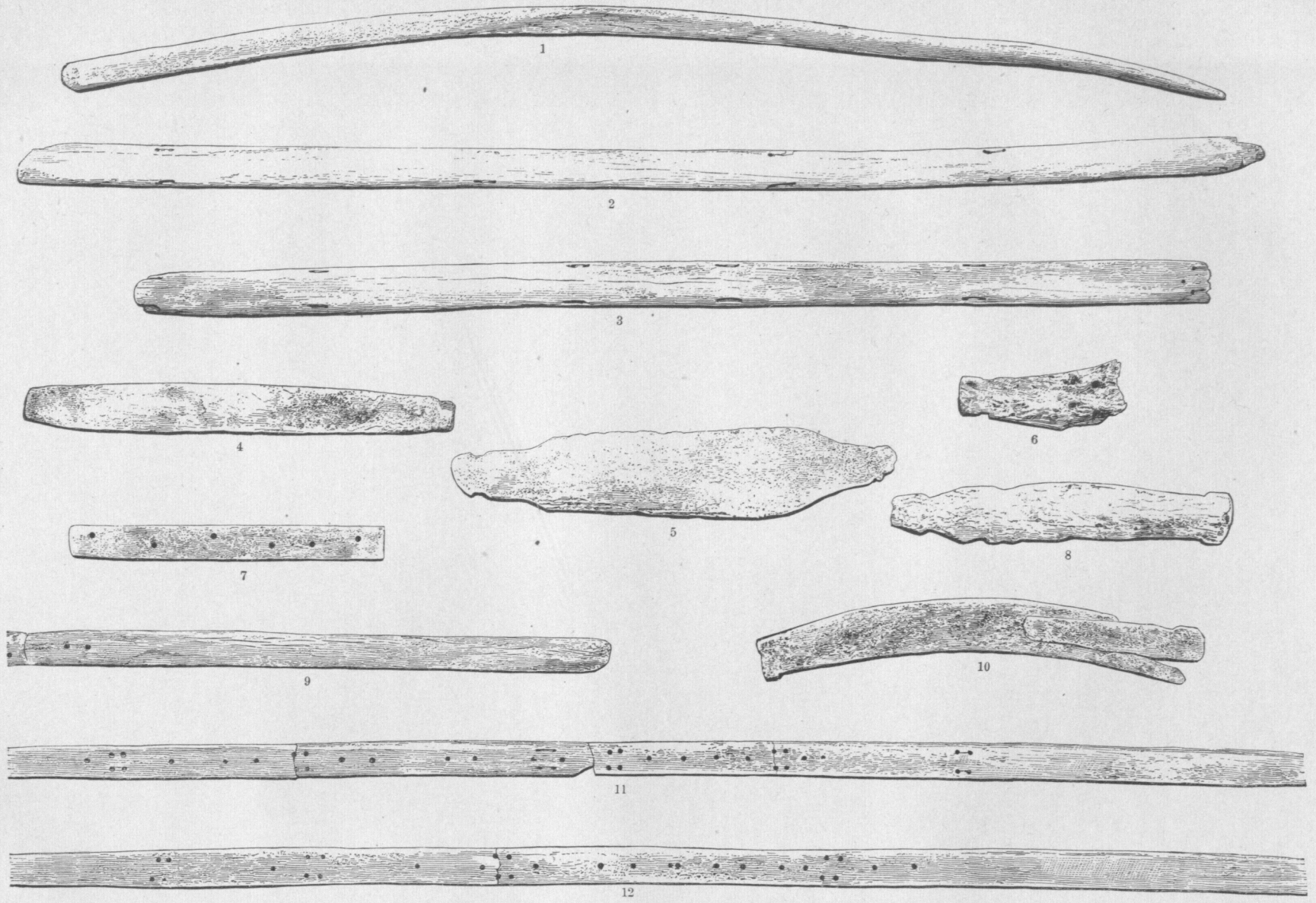
ESKIMO RELICS FOUND AT JUNCTION OF LAKE HAZEN AND RUGGLES RIVER, JUNE, 1882.

(From a photograph.)



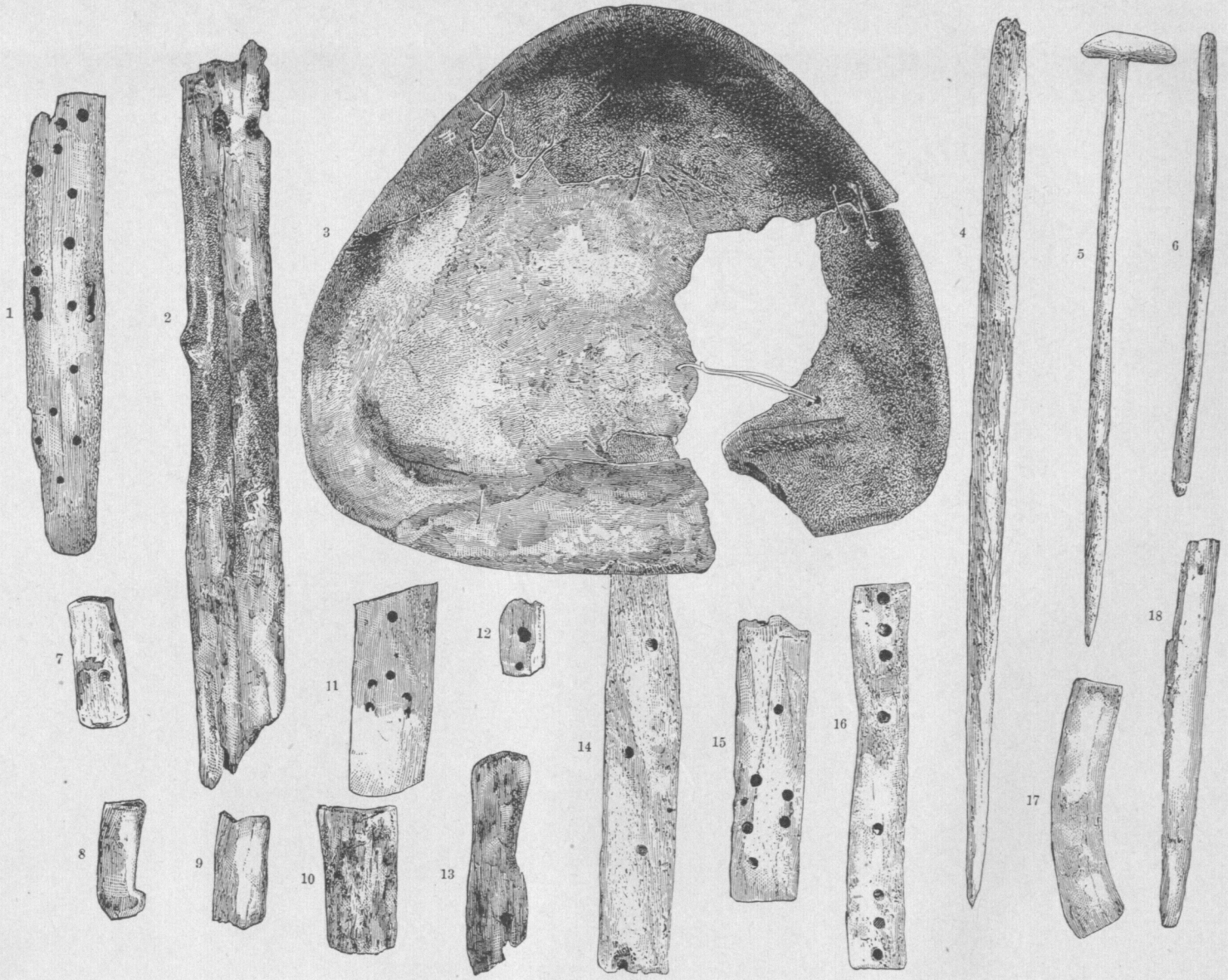
ESKIMO RELICS FOUND AT AND IN VICINITY OF BASIL NORRIS AND SUN BAYS.

(From a photograph.)



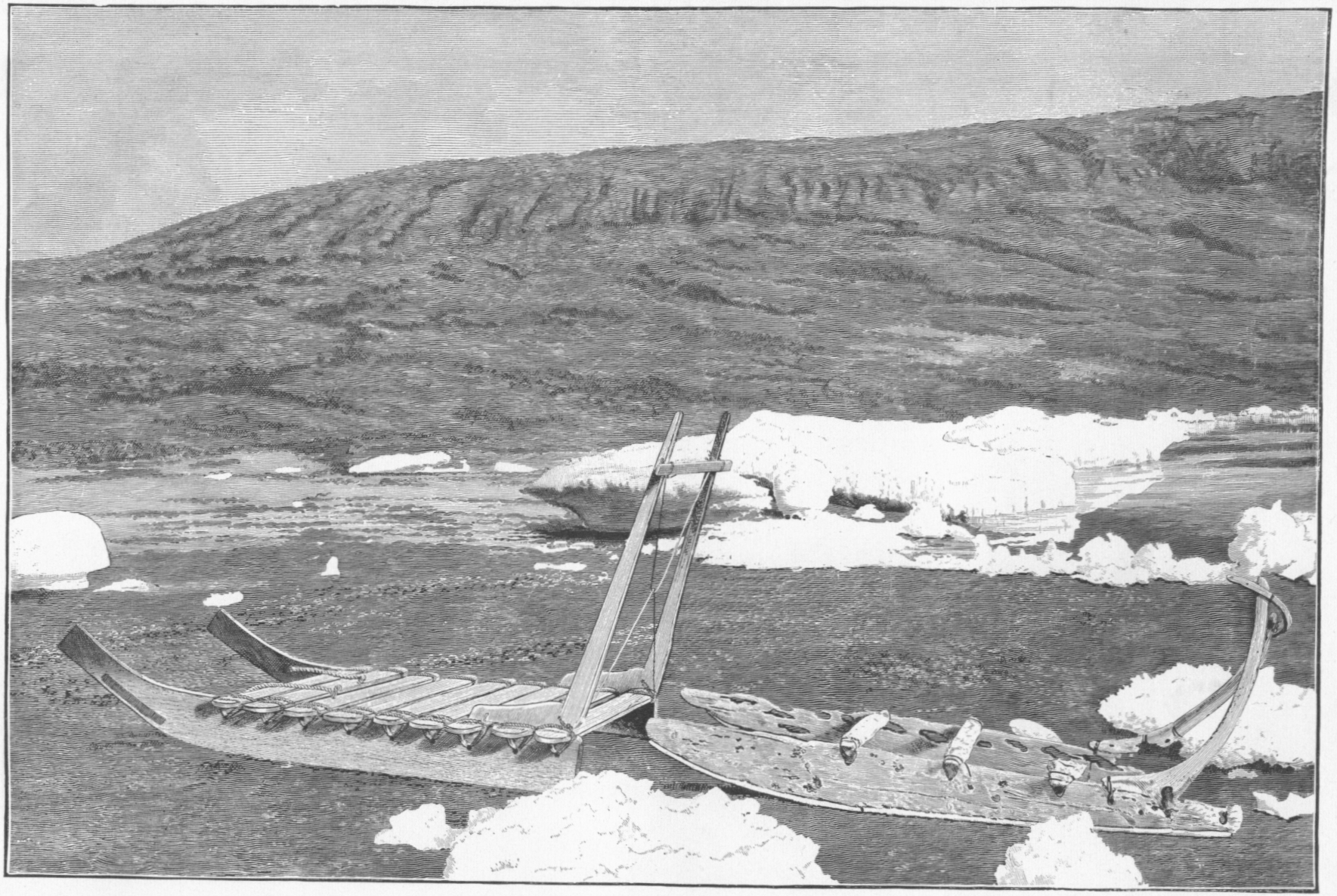
ESKIMO RELICS; GREATER NUMBER FOUND SOUTH SIDE OF LAKE HAZEN, JUNE, 1882.

(From a photograph.)



ESKIMO RELICS FOUND AT CAPE BAIRD.

(From a photograph.)

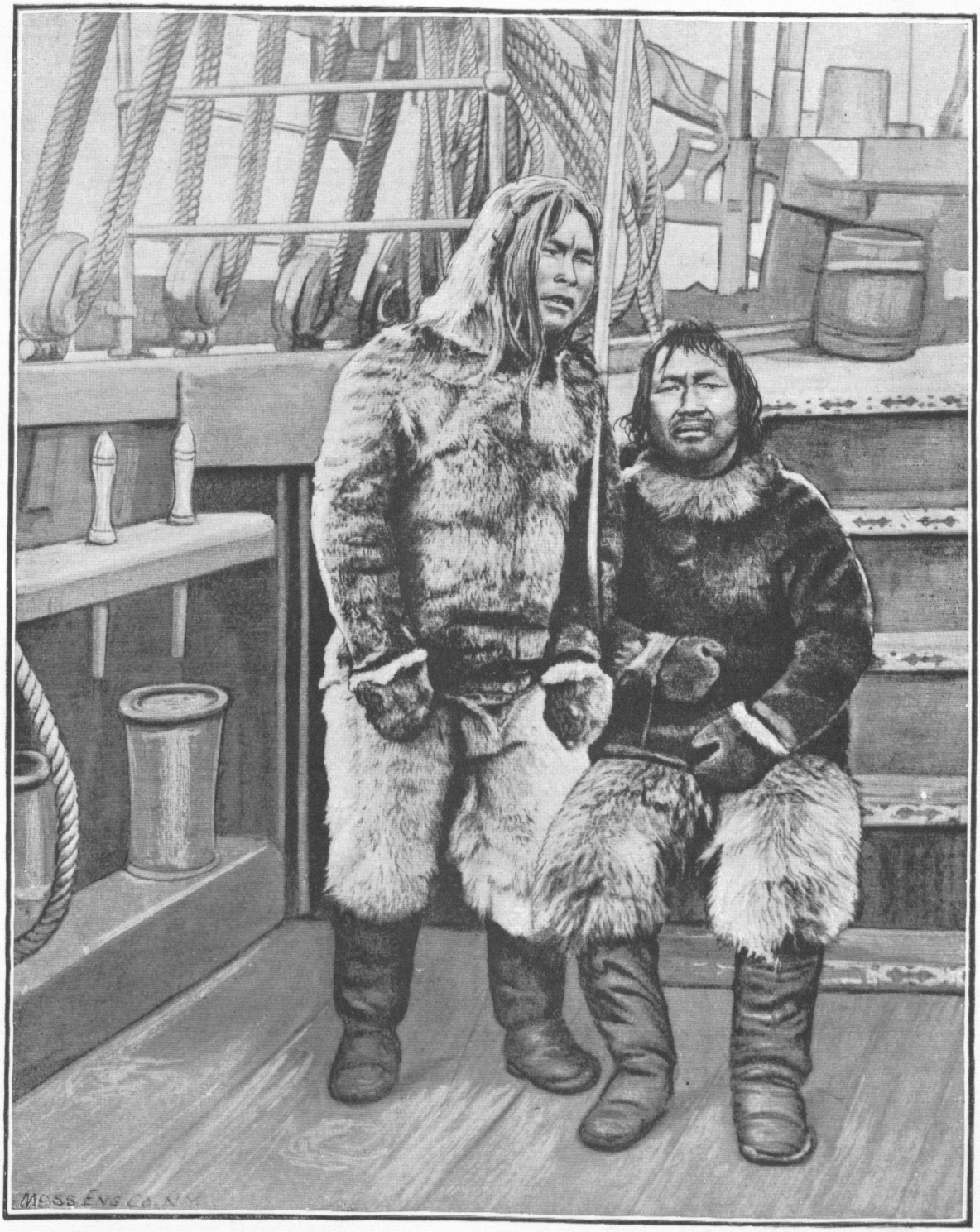


MODERN GREENLAND AND ANCIENT ESKIMO SLED.

(From a photograph.)

ARCTIC HIGHLANDER FROM CAPE YORK.

(From a photograph by the Relief Expedition.)



ARCTIC HIGHLANDERS FROM NORTH STAR SETTLEMENT, SAUNDERS ISLAND.

(From a photograph by Relief Expedition.)

INDEX.

Air, collection of samples, 13, 103.
Alcohol, value as food, 85–86, 349.
Alcohol fumes, asphyxiation by, 81, 338, 433, 496–497.
Aldrich, Lieutenant, cache at View Point, 173.
cited on coast of Grinnell Land, 126.
Alert, records obtained at Thank God Harbor, 149–155.
traces and cairn at Floeberg Beach, 172–173.
Alexandra Fiord, 358.
Alexandra Harbor, trip to, 79–80, 430–431, 491–493.
Alfred Newton Glacier, location of quarters, 65.
Allman Bay, 58, 374–380.
Altitudes, Grinnell Land, 295.
Ames, Dr., skill and attention, 91.
Amusements, 335, 344.
Anemometers, instructions, 102.
Annelida, list of collections, 310.
Apparatus, memorandum of outfit, 107.
Appendices, list, 95–96.
Appropriation, amount available after charter of vessel, 2.
Archer, Lieutenant, cache at Hillock Depot, 29, 180.
cited on topography of Grinnell Land, 126.
copy of records left at Thank God Harbor, 149–155.
Archer Fiord, 9, 10, 29, 32, 126–127.
report of trip into, and depot at, 23, 179–180.
report of launch trip, 35, 234–235.
Arms and ammunition, furnished by Chief of Ordnance, 2.
Arthur Land, 45, 290.
Astronomical apparatus, list, 107.
Astronomical observations, instructions, 100–101.
Cape Baird, 266–267.
Aurora, connection with magnetic disturbances, 38, 39.
instructions for observations, 103, 104.

Bache Island, geography, 61, 80, 358.
Baird Inlet, report of trip to, 82, 358–361.
Barometer, Garlington's abandoned, use and breakage, 71, 88.
instructions for comparison, 102.
Bears, 4, 36–37, 83, 88, 504–505.
most northern point reached by, 163, 167.
Beatrix Bay, 45, 275, 283, 293.
Beaumont, Lieutenant, caches and records left by, 27, 42, 43, 186, 198, 211, 212.
copy of records left at Stanton Gorge and Repulse Harbor, 225–228.
Beaumont Island, 187 pl. i.
Beebe, W. M., relief-expedition caches and records, 66, 68, 457–458.
copy of records left at Brevoort Island by, 352–354.
Beechey Valley, 131, 139.
Belcher, Sir E., cited on coast of Grinnell Land, 126.
Bellot Island, 29, 34.
"Bellows," report on trip to, 10, 23, 124–125, 181–182.
position and magnetic bearings, 181–182.
Bench-mark, establishment, 8.
Bender, Private, 15, 19, 22, 29, 71.
insubordination, 76, 78, 86–87, 376, 483, 486, 487, 490, 514.
death and statement of services, 90, 524, 525.
Biederbick, Private, 23, 28, 30, 31, 33, 39, 47, 51, 90, 91.
report of trip up Black Rock Vale, 28, 233.
value of services, 79.
recommendation of appointment on retired list, 93.
medical report as steward, 334–339.
promotion to hospital steward, 493.
Birds, flight to be observed, 104.
lists of collections, 299, 305–307.
Black Cape, 20, 21, 169, 171.
Black Cliffs, 131.
Black Horn Cliffs, 43, 188, 197, 212, 250–251.
tidal observations, 256.
Black Rock Valley, 28, 29, 33, 36.
magnetic bearings, 181–182, 233–234.
Bleak Cape, location and description, 124.
Blubber, value as fuel, 411.
Blue Cape, 203.
Boats, left near Cape Camperdown, 61.
Books, list of outfit, 107.
Botany, orders and report of Dr. Pavy, 45–46, 297, 299–300.
lists of collections, 299–300, 302–304.
Brainard, Sergeant, 11, 29, 34, 40, 48, 53, 54, 55, 61, 62, 64, 72–73, 75, 79, 86, 91.
report on establishing depot at Cape Beechey, 8, 115–117.
report on attempted trip towards United States Mountains, 10–11.
orders and report on trip to Greenland coast, 17, 158–162.
value of services and recommendation for promotion, 28, 45, 47, 49, 87.
report on trip to Carl Ritter Bay, 37, 38, 239–242.

Brainard, Sergeant, report on trip to Cape Cracroft, 44–45, 270–272.
report on Lieutenant Lockwood's trip towards the United States Mountains, 48, 317–319.
advice for retreat from Victoria Head, 60, 377.
illness, 77.
instructions to, in case of death of commanding officer, 85, 86.
journal from August 26, 1883, 92, 441–529.
letter and abstract of sledge journal on North Greenland coast, 215–224.
report on trip to Carl Ritter Bay, 239.
report on fossils found at Greely Fiord, 296.
transfer to Signal Corps, 505.
Brainard Island, 25, 206–207, 208.
Brenta Bay, 215.
Brevoort Island, copy of relief-expedition records from, 351–354.
Nares' record and *Discovery* depot, 353.
Brevoort Peninsula, route across, 186.
Buchanan Strait, 60.
Buys-Ballot Glacier, 209.

Cape Albert, position, 61.
Cape Baird, establishment of depot at, 12, 39–40.
topography, 35, 270–271.
astronomical observations, 44, 266–267.
tidal and ice observations, 44, 265, 268.
cairn and record left, 51, 350–351.
Cape Beaufort, 119.
Cape Beechey, report on establishment of Depot B, 8, 115–118.
reports of trips to, 127–130, 142–143, 156–157.
position, 44, 270.
orders and report on tidal observations, 44, 264–265, 269–270.
list of provisions at Depot B, 142.
Cape Benét, 25, 204, 209.
Cape Brainard, 45, 289.
Cape Britannia, 24–25, 187, 188 pl. i, 203.
cairn and record left, 202, 232.
coast north from, description and sketch, 202–203.
Cape Bryant, Beaumont's cache, 27, 211, 212.
failure of tidal observations, 26.
ice foot, 27.
coast north from, 188.
cairn and record left, 198–199, 232.
list of stores cached, 232.
Cape Camperdown, position, and abandonment of boats, 61, 379–380.
copy of record left in boats, 351.
Cape Christiansen, rocks and vegetation, 189.
sketch and position, 207–208.
Cape Collinson, Nares' cache, 54–55, 371–372.
Cape Constitution, 122.
Cape Defosse, 35, 238, 239–240.
Cape Cracroft, reports on tidal observations and fossils, 270–273.
Cape Frazer, 55.
Cape Frederick, 25, 122, 188.
Cape Fulford, cairn and record left, 224.
Cape Hawks, English cache, 5, 57–58, 374, 441.
Cape Hecla, 20, 175.
Cape Hoffmeyer, 25, 205, 209.
cairn and record left, 209.
Cape Isabella, English cache, 69, 70–71, 72, 354–356, 393, 396–397, 460, 462, 465–467.
copy of record left, 438.
Cape Israel, 80.
Cape Joseph Henry, orders and report on trip north of, 17, 18–19, 20–21, 165–178.
Cape Kane, 25, 26, 206, 207, 208.
Cape Lawrence, 53, 370–371.
Cape Lieber, 6, 238.
Cape Lockwood, 45, 290.
Cape Long, 80, 492.
Cape Lupton, 145.
Cape McClintock, 55.
Cape Mohn, 25, 205.
cairn and record, 209.
Cape Murchison, report of trips to, 9, 119–120.
Cape Napoleon, 57.
Cape Norton Shaw, 55.
Cape Payer, 209.
Cape Ralston, 209.
Cape Ramsay, 187 pl. ii, 205, 208.
Cape Rawson, 172.
Cape Rutherford, 357.
Cape Sabine, plan for reaching, 60, 64, 67, 446, 449.
caches, 66, 68, 69, 351–352, 387–392, 457–458.
removal from Eskimo Point to, 68–69, 458–461.
quarters, description and cuts, 354, 394–395.
storehouse, 394, 464.
Cape Sheridan, 21, 172.
Cape Stephens, 358.
Cape Sumner, 41, 146–147, 191, 249.
tidal observations, 257–258.
Cape Surprise, 25.
Cape Union, coast northward from, 168, 169, 170.
Cape Viele, 357–358.
Cape Washington, 26, 205, 208.
Cape Wijkander, 205, 209.
Carl Ritter Bay, depot, 6, 51.
orders and reports on trips to, 35, 37, 38, 237–238, 239–242.
record left, 238, 240.
Cary Islands, Nares' cache, 4.
plan of retreat to, 67.
record left, 109.
Chandler Fiord, 21, 31, 32.
report of launch trip up, 35, 236, pl.
Chief of Engineers, scientific instruments furnished by, 2.
Chief of Ordnance, arms and ammunition furnished by, 2.
Chipp Inlet, 187 pl. ii.
Christiansen, F. T., Eskimo. *See* Frederik Thorlip Christiansen.
Christmas, 14, 39, 74, 408–409, 475.
Clay, H., employment and subsequent relief, 3, 7.
recommendations for relief expedition, 462.
camp at Cape Sabine named for, 462.
Clothing, furnished by Quartermaster-General, 2, 98.
purchased at Upernivik and Proven, 3.
list for North Greenland exploration, 230.
report of commanding officer on, 335, 340.
louds, instructions for observations, 102.

Coal, traces and seams found, 10, 12, 31, 49, 51, 122, 125, 181, 233.
amount on hand for retreat, 51, 58.
report on Watercourse Bay, 111.
Coast and Geodetic Survey, scientific instruments furnished by, 2.
pendulum, tidal, and magnetic observations reduced by, 14–15, 44, 50.
instructions for magnetic observations, 105–106.
Cobb River, 34.
Cocked Hat Island, attempt to reach, 61–64, 380–383.
Commissary-General, stores furnished by, 2, 98, 108–109.
Conical Hill, search for pemmican left by Markham, 173.
Conger, O. D., station named in honor of, 7.
Conger Inlet, 207, 208.
Conger Mountains, 32.
Connell, Sergeant, 11, 18, 22, 23, 29, 47, 54, 60.
reduction, 387, 457.
Constant weights, 24, 41, 186, 193, 199, 254, 317.
Conybeare, Lieutenant, search for depot left in Sun Bay by, 9.
Conybeare Bay, 21.
Cooking at Cape Sabine, 71–72.
Cross, Private, 15, 19, 34, 49.
intoxication, and relief from duty, 51–52, 369, 388, 454, 458.
death and burial, 75, 416, 454, 458, 480.
Crozier Island, 20.
Crustacea, list of collections, 309.
Currents, southeast, off Cape Dudley Digges, 4.
observations to be made, 104.
report on Cape Beechey, 118.

Daly Peninsula, 35, 239.
Deaths, list, with date and cause, 338, 365.
report of commanding officer on cause, 348.
Decoration day, observance, 23, 46.
De Long Fiord, 205.
Depot Crossing Bay, English record, 225.
Depot Point, search for English cache, 235.
Devil's Head, 124, 125.
Diaries, order to Dr. Pavy, refusal to comply, arrest and charges, 48–49, 319, 321–322.
instructions relative to, 101.
copy of Lieutenant Lockwood's, 366–440.
copy of Sergeant Brainard's, 441–529.
extract from Private Schneider's, with letters on finding, 529–534.
Dip-circle, error in forwarding, 30.
Discovery, records from, 6, 111, 149–155, 353.
articles abandoned, 9, 119.
decoration of head-stones of dead, 23.
cache near Brevoort Island, 353.
Discovery Harbor, location of station, 6.
Distant Cape, 118, 127, 129, 138, 203.
Dobbin Bay, 57.
Dog food, amount consumed on Greenland trip, 254.
Dogs, purchased at Godhavn and Ritenbenk, 3.
loss from contagion with those purchased at Upernivik, 4.
puppy team, 19.
harness eaten by, 41, 170, 246.
speed, with light and loaded sledges, 42.
Dogs, abandoned at Fort Conger, 49.
Dragon Point, English cairn and record, 226.
Drift Point, 212–213, 222, 252.
Drift-wood, 9, 10, 11, 33, 55, 124, 128–129, 189, 195, 235, 525, 528.
instructions for observations, 104.
list of collections, 313–314.
list, description, and cuts of specimens, 534–535.

Earth currents, instructions for observations, 104.
Edward, Jens, Eskimo. *See* Jens Edward.
Eggs, list of specimens, 316–317.
Eggs of knot, description, 47.
Elberg, Mr., diseased dogs purchased from, 4.
Electricity, atmospheric, observations to be made, 104.
Elison, Corporal, 15, 22, 28, 30, 41, 46, 71, 77, 78.
report of trip to Carl Ritter Bay, 35, 237–238.
value of services, 47, 92.
rescue and subsequent illness, 72–76, 355–356, 396–397, 465–467.
death, 92, 338.
Elison Island, 187 pl. i, 203.
Ella Bay, 45, 235, 274–275, 278, 280–281.
Ellis, Private, 17, 30, 47.
death, 88, 518.
Emory, Lieutenant, 91.
Envall, Dr., cited on use of liquors in Arctic regions, 349.
Eric, record found at Littleton Island, 5.
Eskimo Point, stay at, during retreat, 65–68, 386–388, 454–458.
Eskimo relics, 28–29, 31, 33, 34, 47, 55, 65, 235, 236, 240, 499, 500, 501, 525.
list of collections, 311–312.
list and description of photographs, 535–536, pl. i–vi.
Eskimos, character and treatment, 14.
value in extended sledge journeys, 168.
Evaporation, instructions for observations, 104.
Exercise, 327, 335, 344, 346.

"Farthest North," 25–26.
description, sketch, and determination of position, 187 pl. ii, 207–208.
copy of record left, 232.
Fire, in officers' quarters at Fort Conger, 39.
Fires, allowed to die down during night, 43.
Fishes, list of collections, 308.
Floeberg Beach, visit to English cairn and deposit of record, 21, 172–173.
Foehn, 39.
Fog, delay caused by, 4, 51, 53, 54.
Food, weekly allowance for second winter, 36.
amount on hand for return trip, 51, 58, 59.
amount on hand on reaching Sabine Island, 65.
arrangements for division, 71, 84.
thefts of, 92–93.
list of subsistence stores taken, with remarks, 108–109.
report of commanding officer on, 342–349.
bill of fare November 8–15, 1883, 396.
See, also, Ration.
Fort Conger, abandonment, 49, 50–51, 322–323, 366–369.
copy of order for abandonment, 322.

Fort Conger, list of stores left, 323, 440.
Fossils, 35, 45, 47, 290.
report on Cape Cracroft, 272–273.
report on Greely Fiord, 296.
list of collections, 314–315.
Foxes, wintering in Grinnell Land, 42.
Frankfield Bay, coast north from, 198.
Frederick, Private, 15, 22, 28, 29, 46, 52, 56, 76, 77, 79.
value of services, 71–72, 83.
report on trip to Cape Isabella and rescue of Elison, 72, 354–356.
promotion and transfer to Signal Corps, 83, 89, 489–490.
report of trip to Baird Inlet, 83, 358–361.
recommendation of appointment on retired list, 93.
Frederik Thorlip Christiansen, Eskimo, 3, 10, 14, 18, 20, 29, 40, 48, 53, 65, 68, 69, 72, 79–80.
illness, death, and statement of services, 81, 82, 83, 437, 502.

Game, near Fort Conger, 34.
west of Grinnell Land Divide, 278.
Gap Valley, 188, 213, 221, 250.
tidal observations, 257.
Garden, failure, 23.
Gardiner, Sergeant, 10, 13, 35, 47.
report on trip to Cape Murchison and routes in St. Patrick Bay, 9, 119.
orders and report on tidal and ice observations at Cape Baird, 44, 265, 268.
report on fossils collected at Cape Cracroft, 44–45, 272–273.
death and statement of services, 91, 526, 533.
Gardiner Bay, 209.
Garfield Mountains, 22, 32, 275.
Garlington, Lieutenant, 58, 457–458, 475, 493.
record and cache left at Cape Sabine, 66, 68, 69.
copy of record left at Brevoort Island, 351–352.
Geographical work, summary, 50, 438.
instructions, 99.
Glacier, description and cut, 278 pl. i–iii, 281–282,
Godhavn, purchase of dogs and stores at, 2–3.
Gorge Creek, 213.
Greely, Lieutenant, commanding officer, report, 1–93.
trip to Sun Bay, 9.
attempted trip to United States Mountains, 10.
exploration of interior of Grinnell Land, 19, 21–22, 29, 31–34.
illness, 86, 506–510, 513.
order assigning to command, 97, 99.
report on hygiene of expedition, 339–349.
extract from journal showing discoveries in Hayes Sound, 357–358.
certificate to Dr. Pavy, and letter to Chief Signal Officer on same, 362–363.
report to Secretary of War on execution of Private Henry, 363–364.
letter to Chief Signal Officer, transmitting diary of Private Schneider, 529–530.
Greely Fiord, 45, 277 pl. iii–iv, 289–290, 296.
Green, Dr., skill and attention, 91.
Greenland coast, orders and reports on preliminary trips in 1882, 15, 17, 142–143, 144–148, 156–162.
orders and reports on exploration in 1882, 18, 22, 23–28, 182–232 pl. i–ii, map.
orders and report on preliminary trip in 1883, 40, 41, 243–245.
orders and report on exploration in 1883, 41, 43, 247, 249–255 ch.
plans for retreat to, 60, 63, 77, 78, 356–357, 382, 422–423.
vegetation, 189.
list of distances traveled, 230, 254.
report on tidal and meteorological observations, 255–259.
Grimm, Corporal, desertion, 2.
Grinnell Land, exploration of interior, 19, 21–22, 29, 31–34, 50.
orders, report, and journal of trip across, 43, 45, 48, 274–296 pl. i–iv, 317–319.
argument for sea west of, 126.
table of distances and altitudes across, 294–295.
Grinnell Land Divide, 35, 276–277, 287–288, 291, 293, 317–318.

Hall, Captain, visit to grave, 16, 145, 260, 262.
Hall Basin, condition of ice in summer of 1882, 34.
Hand, J., visit to grave, 16, 145, 260–262.
Hand Bay, 212, 223.
Harley's Spit, 172, 173.
Hawkins, Major, supervision of commissary stores, 2.
Hayes Sound, 80, 357–358.
Hazen Coast, 23–28.
Health, monthly report of commanding officer, 8, 11, 12, 13, 14, 15, 16, 23, 30, 34, 38, 39, 40, 42, 43, 46, 48, 49, 59, 74, 76, 82.
order restricting use of beds, 37.
hygiene at Fort Conger, 16.
letter of Dr. Pavy on early spring field-work, with reply, 40–41, 242–243.
first signs of weakness, 75.
medical report on trip to Thank God Harbor, 264.
medical reports of Dr. Pavy, 324–334.
medical report of Steward Biederbick, 334–339.
report of commanding officer on hygiene, 339–349.
Henrietta Nesmith Glacier, 22, 32.
Henry, Private, thefts of food, 72, 81–82, 86, 90, 434, 497, 498, 510, 513, 524, 531.
insubordination, 76.
execution, 90, 92–93, 363–365, 523–524.
report of commanding officer on execution, with letter from Secretary of War, 363–364.
Hillock Depot, English cache, 29, 180.
Hoar frost, instructions for observations, 103.
Hooker, J. D., cited on vegetation of Grinnell Land, 126.
Howgate, Captain, pemmican furnished by, 3.
Humidity observations, instructions, 102.
Hunt Fiord, 26, 208.
Hygiene, report of commanding officer, 339–349.
See, also, Health.

Ice, Greenland coast to Fort Conger, 1881, 2, 5, 6.
thickness at end of month, 8, 11, 12, 13, 14, 15, 16, 23, 30, 31, 38, 39, 40, 42, 48, 74.

Ice, time of opening, 29, 30, 31.
Hall Basin and Kennedy Channel, summer of 1882, 34–35, 36, 38.
Kane Basin, August, 1883, 58.
Smith Sound, 1884, 78, 79–80, 87, 486–488.
report on paleocrystic, 44, 163, 268–269.
stratification of floebergs, 44, 268.
mer de glace in interior of Grinnell Land, 45, 276, 277–278 pl. ii, 281–282.
difficulty of crossing after new ice forms, 54, 66–67.
instructions for observations, 104.
character of Polar Ocean, 173–174, 174–177.
character of North Greenland coast, 188–189.
Icebergs, 240, 278.
Ice-boat, left at Thank God Harbor by Lieutenant Beaumont, 42, 43.
Insects, list of collections, 308.
Instructions, general conduct of the expedition, 99–100.
scientific observations, 100–107.
Instruments, scientific, furnished by Chief of Engineers and Coast and Geodetic Survey, 2.
International polar conference, instructions for observations, instruments and time, 101–104.
International polar stations, origin and number, 1.
Israel, Sergeant, 14, 36, 61, 88.
report on trip into the Bellows, 23, 181–182.
illness, death, and character, 88, 89, 516–521.
orders and report on astronomical observations at Cape Baird, 266–267.
"Issue-day," 71.

Jeannette, search for traces, 8, 10, 11, 17, 20, 120, 122, 130, 166, 167, 183.
loss learned by expedition, 390.
Jens Edward, Eskimo, 3, 15, 17, 18–19, 39, 76–77.
disappearance and rescue, 13.
drowning, 86, 511.
Jewell, Sergeant, 20, 22, 28, 54, 55, 56, 57.
reports on trips to Lincoln Bay, 17–18, 41, 163–165, 246–247.
report on tidal and meteorological observations in North Greenland, 43, 255–259.
orders and report on tidal observations at Cape Beechey, 44, 264–265.
report on paleocrystic ice, 44, 268–269.
report on tidal observations at Cape Beechey, 44, 269–270.
death and statement of services, 83, 505.
meteorological report on trip to Cape Beechey, 117–118.
report on trip from Cape Beechey to Greenland coast, 231.
Jewell Inlet, 205.
Joiner Bay, 55.
July 4, celebration, 30.

Kane Basin, retreat beset by ice in, 59–65, 372–385, 442–451.
plans and advice for retreat from, 63, 383, 439, 450.
Kennedy Channel, condition of ice in summers of 1882 and 1883, 34, 35, 38, 48.
Kislingbury, Lieutenant, 1, 52, 55, 62, 71, 81, 86.
Kislingbury, Lieutenant, report of trip to Life Boat Cove, 5, 110.
relief and subsequent connection with expedition, 7.
collection of lichens, 49.
advice for retreat from Victoria Head, 60, 377.
insubordination, 60, 377, 387.
letter recommending division of party, 78, 356–357, 427.
ordered to duty, 83, 503.
recommendation of increase of ration, 84, 85, 361.
request for certificate, and discussion resulting, 87.
illness and death, 89, 512, 514, 522.
letters, statement, and orders in connection with relief, 112–114.
Kislingbury Valley, 52.
Knot, description of egg, 47.

Lady Franklin Bay, order for location of station, 97.
Lake Appleby, 31.
Lake Hazen, description, 22, 31, 32, 33.
route to, 29, 36, 233–234.
vegetation, 33.
Lake Heintzelman, 28.
Lake Rogers, 31.
Lectures, 16, 37, 73, 335.
Lichens, collection abandoned, 49.
value as food, 90, 348, 523, 528, 533.
Life Boat Cove, report of trip to, 5, 110.
Lime-juice, issue, 11, 16, 324–334, 344.
Lincoln Bay, orders and reports on trips to, 9–10, 17–18, 120–123, 163–165, 167–170, 246–247.
report on trip to Fort Conger from, 178–179.
Linn, Sergeant, 8, 17, 22, 28, 31, 33, 72–73.
report on moving depot to Cape Murchison, 9, 119–120.
report on trip into Black Rock Vale, 29, 233.
reduction and subsequent reappointment, 36, 457.
death and statement of services, 82, 83, 437, 502, 503.
Little Bay, cairn built, 205.
Littleton Island, 4.
reply to criticism relative to withdrawal to, 58–59.
attempted trip to, 76–77, 483–487.
plan for reaching, 78, 356–357, 374–376.
Lockwood, Lieutenant, 1, 4, 5, 8, 39, 62, 63, 64, 72–73.
report on Water Course Bay, 6, 111.
report on St. Patrick Bay, 7–8, 114–115.
report on trip to the Bellows, 10, 124–125.
report on sledge journey to Cape Beechey, 11, 127–129.
report on St. Patrick Valley, 12, 133–134.
orders and report on attempted crossing of Robeson Channel, 12–13, 134–138.
orders and report on preliminary trip to Cape Beechey, 15, 142–143.
orders and report on trip to Thank God Harbor, 16–17, 144–148.
orders and sledge journal on exploration of north coast of Greenland, 18, 22, 23–28, 182–215 pl. i–ii, map.
value of geographical work, 27–28.
trip up Archer Fiord, 29.
report of launch trip up Archer Fiord, 35, 234–235.
report of launch trip up Chandler Fiord, 35, 236.

Lockwood, Lieutenant, orders and report on preliminary trip on North Greenland coast in 1883, 40, 41, 243–245.
orders and report on exploration of Greenland in 1883, 41, 43, 247, 249–255, ch.
orders and report on crossing of Grinnell Land, 43, 45, 274–291.
orders to relieve Dr. Pavy as naturalist, 46, 298.
letter, report, and inventory of natural history collections, 47, 298–317.
trip into the interior of Grinnell Land, 48, 317–319.
advice for retreat from Victoria Head, 60, 377.
illness and death, 75, 76, 82, 83, 417–418, 481–482, 503, 504.
character, 82.
journal from August 3, 1883, 92, 366–440.
orders to receive medical stores from Dr. Pavy, 319.
list of articles left at Fort Conger, 440.
Lockwood Island, description, 25–26, 206–208.
cairn and record, 26, 207–208.
nature of interior, 188.
sketch of "Farthest" and next point beyond, 207, 208.
copy of record left, 232.
Long, Private, 16, 29, 30, 35, 40, 46, 49, 69, 79, 82, 83, 86.
report on trip into Archer Fiord, 23, 179–180.
value of services, 71–72, 83.
trip to Alexandra Harbor for game, 79–80, 430–431.
assignment to Signal Service, 89.
trip into Hayes Sound, 357–358.
Longitude, special instructions on determination, 103.
Low Point, 204–205.

Magnetic apparatus, list, 107.
Magnetic declination at Cape Camperdown, 61.
Magnetic observations, 11, 30.
instructions, 39, 100, 101, 102–103, 104, 105–106.
transmitted to Coast Survey, 50.
Magnetic storm, 38.
Magnetometer, breakage, 39.
Mammalia, list of collections, 308.
Maps, instructions for, 101.
list, 536.
Markham, A. H., search for pemmican left at Conical Hill by, 173.
Markham Island, 203.
Mary Murray Island, 25, 26, 187 pl. ii, 205–206.
record left, 208, 232.
Mascart Inlet, 204, 209.
Medical reports of the expedition, 324–349.
See, also, Health.
Medical stores, furnished by Surgeon-General, 2, 98.
order transferring from Dr. Pavy to Lieutenant Lockwood, 319.
character and quality of outfit, 323, 330, 339–340.
Medicine, allowance at Cape Sabine, 70.
Medusa, list of collections, 310.
Melville, Chief Engineer, 91.
Melville Bay, remarkably favorable passage, 4.
Merry, Lieutenant, inspection of *Proteus*, 1.
Meteorological apparatus, list, 107.
Meteorological forms, list, 107.
Meteorological observations, summary for month, at Fort Conger, 8, 11, 12, 13, 14, 15, 16, 18, 20, 23, 30, 34, 35, 36, 37, 38, 39, 40, 42, 44, 46, 48, 50, 71, 74, 75, 76, 78.
instructions, 39, 100–102, 103–104.
trips in Grinnell Land, 119–120, 125, 130, 134, 138, 141, 164–165, 181–182, 233, 234, 247, 279–294.
Greenland coast, 148, 162, 187, 228–229, 255, 258–259.
trip over Polar Ocean, 166–177.
results for 1881–'83, at Fort Conger, 350.
Eskimo Point and Cape Sabine, 390–437, 457–529.
Meteors, blue, 38.
instructions for observations, 104.
Mineralogy, list of specimens, 314–315.
Molloy, Consul, assistance rendered by, 2.
Mollusca, list of collections, 309.
Moonlight, determination of intensity, 38.
Morley, E., instructions for air samples furnished by, 13.
Mount Arthur, ascent, elevation, and position, 32, 33–34.
Mount Arthur Eugene, 319.
Mount Augur, 32.
Mount Beaufort, 8, 12, 122.
ascent, elevation, position, and deposit of record, 116, 118.
Mount Biederbick, 32.
Mount Campbell, exposure of self-registering instruments on, 12.
Mount Carey, 80, 358.
Mount Cartmel, 114, 120.
Mount Easy, ascent, 284.
Mount Gardiner, 205.
Mount Linn, record and cairn left, 32.
Mount Neville, 32, 126.
Mount Parry, cache, 140, 141.
Musk-calves, captured and tamed, 29, 37.
Musk-meat, value as food, 243.
Musk-ox Valley, 275–276, 277, 284–286, 292.

Nares' expedition, cache at Cary Island, 4.
cairn at Littleton Island, 5.
record and cache at Washington Irving Island, 5, 57–58.
articles abandoned, 23, 30, 260.
decoration of graves of dead, 46.
cache at Cape Collinson, 54–55, 371–372.
cache at Cape Sabine, 66.
cache at Cape Isabella, 68, 69, 70–71, 72, 354.
list of stores left at Lincoln Bay, 122, 123.
copy of records left on Greenland coast, 225–228.
visit to graves of, at Thank God Harbor, 260.
record on Brevoort Island, 353.
Natural history, orders relative to, 45–46, 297.
formation and packing of collection, 47.
instructions for observations and collections, 99, 104.
report and inventory of collections, 300–317.
Neptune, copy of records left at Brevoort Island, 352–354.
cache at Cape Sabine, 387–392, 457–458.
Newman Bay, 145, 146, 188, 249–250.
Newspaper "Arctic Moon," 13, 335.
Nordenskiöld Inlet, 209.
North Cape, 188.
North Valley, 318.

Occultation, δ *Piscium*, 37.
Ockerson, J. A., letters transmitting diary of Private Schneider, and account of finding, 529–530.
Organization of expedition, 1.
War Department orders, 97–99.
list of officers and men, 98–99.
instructions from the Signal Office, 98–107.
Osborn, Admiral S., cited on crossing young ice, 67.

Parhelia, cut, 210.
Paul, C. W., visit to grave, 16, 260, 262.
Pavy, Dr., reported at Godhavn, 1, 3.
collection of supplies at Ritenbenk, 3.
proposal to leave expedition, 7.
orders and reports on trips towards Cape Joseph Henry, 8, 9–10, 11, 130–133, 141–142.
orders and report on trip to Lincoln Bay, 9–10, 120–123.
orders and report on trip down Archer Fiord, 10, 126–127.
orders and report on trip to Wrangel Bay, 13, 139–142.
orders and report on trip northward over Polar Ocean, 17, 18–19, 20–21, 165–178.
orders and report on trip to Greenland coast, 17, 156–158.
visit to *Polaris* boat camp and Thank God Harbor, 22–23.
renewed contract, 34.
trip to Carl Ritter Bay, 35, 37, 38, 237.
letter on early spring field-work, with reply, 40–41, 242–243.
general health reports ordered, 42.
orders and medical report on trip to Thank God Harbor, 42, 43, 248, 264.
orders relative to natural history data and botanical specimens, 45–46, 297.
search for fossils at Cape Baird, 46.
relieved as naturalist, 46, 298.
refusal to renew contract, and orders to turn over property, 48, 319–321.
refusal to turn over diary, arrest and charges, 48–49, 321–322.
advice for retreat from Victoria Head, 60, 377.
recommendation of increase of ration, 70, 84–85, 86, 361–362.
theft of food and medicine, 74, 83, 84, 85, 87, 89–90, 363, 411, 499, 531.
recommendation of issue of alcohol, 85.
insubordination, 86, 381, 387, 514, 521.
certificates to, with letters from commanding officer to Chief Signal Officer, 87, 362–363, 518.
illness and death, 90, 523, 524, 525.
character and services, 90, 514, 519.
instructions for contract with, 99.
failure to report promptly, 140, 166, 178.
list of natural history specimens, 299–300.
request for detail of Steward Biederbick, with reply, 320.
medical reports, 324–334.
Pavy River, 35, 237.
Payer Harbor, English cache, 390, 391, 464.
Peirce, C., pendulum instructions furnished by, 15.
Pemmican, obtained at Godhavn, 3.
Pemmican, value as food, 345.
Pendulum, arrangement for return trip, 50, 61.
Pendulum apparatus, memorandum, 107.
Pendulum observations, 14–15, 104.
Petersen, N. C., tomb, 172.
Petrifactions, 271, 296.
list of specimens, 314–315.
Photographs, list, 535.
Plants, time of flowering, 29, 47.
report of Dr. Pavy, and lists of specimens, 45–46, 297, 299–300, 302–304.
Pocket Bay, 205.
Point of Rocks, 128.
Polar Ocean, orders and report on trip over, 17, 18–19, 20–21, 165–178.
Polaris, report on winter quarters at Life Boat Cove, 5, 145.
records, observatory, and stores at Thank God Harbor, 16.
Polaris boat camp, 146, 188, 191.
cairn and record, 214, 217–218.
list of stores cached, 232.
record left, 232.
list of supplies taken from English caches, 254.
Precipitation, instructions for observations, 102.
Pressure, lowest recorded at station, 40.
fluctuations, 42.
instructions for observations, 101–102.
Princess Marie Bay, 358.
Promontory Point, location, 145.
Proteus, inspection and contract, 1, 98.
delay for repairs, 5.
discharge and departure from Fort Conger, 7.
caches left by, and loss on relief expedition, 351–352, 387–392, 457–458, 460.
Pyramid Mountain, 282.

Quartermaster General, clothing and camp equipage furnished by, 2, 98.
Quarters, Fort Conger, 7, 335, 340–342.
Eskimo Point, 65, 393, 455–456.
Cape Sabine, 69, 74, 337, 345–346, 354 (cut), 393, 394–395 (cut), 460.
report of commanding officer on, 340–342, 345–346.

Radiation, solar, observations to be made, 104.
Radmore Harbor, 53.
Rae, Dr., cited on crossing young ice, 67.
Ralston, Sergeant, 22, 28, 84, 507.
death and value of services, 88, 519.
meteorological report on sledge journey to Greenland coast, 162.
Ration, Cape Sabine, 65, 69, 70, 71, 75, 76, 77, 79, 81, 84, 337–338, 346, 347, 361–362, 463.
sledging, 135, 183–184, 199, 243–244, 255, 295, 325, 345.
Fort Conger, 343.
Eskimo Point, 391, 392.
Rawlings Bay, 53, 370–371.
Record Point, Archer's record, 235.
record left, 235, 283.
Records, preparation of scientific, 36.

Records, arrangement for return trip, 50.
orders for deposit, 99.
expedition, copies, 110–111, 232, 350, 351.
English, copies, 149–155, 225–228.
relief expedition, copies, 351–354.
Records left by expedition, location:
Cape Baird, 51, 350.
Cape Britannia, 202, 232.
Cape Bryant, 198–199, 232.
Cape Camperdown, with boats near, 61, 62, 351.
Cape Fulford, 224.
Cape Hoffmeyer, 209.
Cape Isabella, 438.
Cape Mohn, 209.
Carl Ritter Bay, 238, 240.
Cary Islands, 109.
Floeberg Beach, 173.
Greely Fiord, 290, 319.
Lockwood Island, 26, 207, 208, 232.
Mary Murray Island, 208, 232.
Mount Beaufort, 116, 118.
Mount Linn, 32.
Polaris boat camp, 214, 217–218.
Record Point, 235, 283.
St. Patrick Bay, 120.
Stanton Gorge, 197.
Thank God Harbor, 262.
View Point, 177.
Washington Irving Island, 5, 57, 110–111, 441.
Red Bluff, 236.
Reef Island, English cairn and record, 226.
Refraction, observations to be made, 104.
Reindeer, most northerly point, 53.
Reindeer horns, found on Lake Hazen, 31.
Relief expeditions, 34, 58.
caches at Cape Sabine, 66, 68, 69, 351–352, 387–392, 457–458, 460.
rescue by, 91.
instructions relative to, 100.
copy of records left at Brevoort Island, 351–354.
Repulse Harbor, visit to Beaumont's cairn, 27, 188, 213, 250, 252.
copy of English records from, 226–228.
record left, 252.
Rescue, 91–92.
Results of expedition, 92–93.
Return, order for abandonment of Fort Conger, 50, 322.
general conduct during, 92–93.
instructions for, 100.
Rice, Sergeant, 1, 4, 5, 14, 17, 18–19, 23, 35, 54, 57, 59, 62, 63, 64, 65, 78, 79, 80.
trip towards Cape Joseph Henry, illness and rescue, 8, 9, 10.
report on sledge journey to Cape Beechey, 11, 129.
trip to Thank God Harbor, orders, report, and sledge journal, 42, 43, 248, 259–263.
visit to English cache at Cape Isabella, 68, 69, 70–71, 72.
attempt to reach Littleton Island, 76–77.
trip to Baird Inlet for English meat, 82, 83.
death, 83, 84, 359–360, 505–506.
character and services, 84.
report on sleeping bag and sledge, 134.
Rice, Sergeant, report on trip from Lincoln Bay to Fort Conger, 178–179.
Rice Strait, 80, 458.
Richardson, John, cited on crossing young ice, 66–67.
Richardson Bay, 54.
Ritenbenk, purchase of dogs and supplies at, 3.
Robeson Channel, 9–10, 12–13, 139, 141, 246.
attempted crossing, 12–13, 15, 134–138, 142–143.
Ross, Captain J., cited on crossing young ice, 67.
Rosse Bay, 68, 388, 389.
Rum, issue, 59, 78, 344.
value in Arctic regions, 348–349.
Ryan, Private, relieved from expedition, 7.

Saint George Fiord, 224.
St. John's, assembling point of party, 1, 98.
St. Patrick Bay, 7, 9, 117, 118, 119, 121.
reports on exploration, 8, 12, 114–115, 133–134.
record left on cliffs, 120.
Salor, Corporal, 9, 22, 28, 40, 65, 82.
death and services, 89, 523.
Saxifrage, value as food, 88, 347, 517, 518, 519.
use as fuel, 513.
Schley, Captain, rescue by, 91.
Schley Land, 80.
Schneider, Private, 2, 19, 21, 41, 47, 64, 71, 72, 78, 85, 88, 509, 520.
theft of food, 72, 395, 465, 520.
death and services, 91, 528.
extract from diary, 531–534.
School, 13.
Scoresby Bay, 55.
Scurvy, 15, 75, 82, 324–334, 348, 525, 528, 529.
report of commanding officer on causes and prevention, 349.
Seal blood, value as food, 443.
Seal skin, use as food, 89, 90, 348, 520, 524–525.
Sea-water, specimens to be preserved, 104.
Secretary of the Navy, steam-launch furnished by, 1.
Secretary of War, letter approving execution of Private Henry, 364.
Shells, list of specimens, 314–315.
Shift Rudder Bay, 131, 138.
Shoe Island. *See* Mary Murray Island.
Shrimps, value as food, 434.
method of catching, 495–496, 503.
Signal apparatus, list, 107.
Signal of distress, erection, 59, 60, 91.
Signal Office, instructions to the expedition, 98–107.
Signaling, use, 135, 137.
Simmonds Bay, 277, 293.
Sledges, 12, 15, 18–19, 192, 193, 198.
report on Hudson Bay, 134.
Sledging outfit, 295–296.
Sleeping-bag, suggestion of improvement, 134.
Smith, Krarup, assistance rendered at Godhavn and Upernivik, 2–3.
Smith Sound, retreat, 64–65.
navigable in November, 1884, 67.
why impassable for boats in October, 66–67.
preparations for crossing in 1884, 77, 78.
condition of ice in 1884, 87, 486, 515, 517, 518, 520, 523, 526.

Snow, peculiar phenomenon of, 211.
Snow-crystals, instructions for observations, 103.
Snow-house, description, 136.
necessity for ventilation, 231.
Sound, experiments on velocity, 15, 37.
Soundings, 27, 201, 211, 270, 271.
instructions, 104.
Spirituous liquors, value in Arctic regions, 348–349.
Stalknecht Island, 64.
Stanton Gorge, Beaumont cache, 24, 186, 197, 212.
record left, 197.
copy of record left by Beaumont, 225.
Star-fish, list of collections, 310.
Starr, Private, relieved from expedition, 7.
Steam-launch, furnished by the Secretary of the Navy, 1.
boiler replaced at St. John's, 2.
Stearine, eating forbidden, 77.
value as fuel, 450.
Stephenson Island, 25, 188 pl. 1, 200–201.
sketch of fiord, 202.
Stony Cape, 127.
Store house at Cape Sabine, 394–395, 464.
Stores, furnished by Commissary-General, 2, 98.
abandoned at Fort Conger, with list, 49, 323.
list, on hand at Cape Sabine, 70.
list of expedition, with remarks, 108–109.
list, at Thank God Harbor, 147–148.
Storm Cape, 25.
Storms, 14, 42, 46.
Sugar Loaf Mountain, height, 29.
Sun Bay, search for Conybeare's depot, 9.
Surgeon-General, field supplies and medical stores furnished by, 2, 98.

Tea, smoking forbidden, 75, 420, 478, 479.
Tea-leaves, eating forbidden, 76.
Temperature, winter of 1880–'81, in Greenland, 2, 3.
remarkable means and extremes, 13, 16, 30, 34–35, 38, 52, 63.
period of extreme cold, 15.
earliest date of frozen mercury, 38.
instructions for observations, 101.
Temperature of surface sea-water, 12, 37.
Terrace formations, 285, 286.
Thank God Harbor, orders and reports on trip to, 16–17, 42, 43, 144–148, 248, 259–263, 264.
articles from English Arctic expedition, 23.
list of stores, 147–148.
description of observatory, 148, 260, 262.
English records from, 149–155.
record left, 262.
Thanksgiving Day, 13, 38, 74, 401.
copy of order establishing, 242.
Thefts of food, 92–93.
See, also, Henry; Pavy; Schneider; Whisler.
Thermometers, instructions for use, shelter, and testing, 101, 104–105.
Tidal crack from Cape May to Lockwood Island, 27, 187, 188, 207.
Tidal observations, 11, 30, 37, 44.
failure at Cape Bryant, 26.
Tidal observations, Black Horn Cliffs, Repulse Harbor, and Cape Sumner, 43, 256–258.
Cape Beechey, orders and report, 44, 264–265, 269–270.
Cape Baird, orders and report, 44, 265, 268.
Cape Cracroft, orders and report, 44, 270–271.
transmitted to Coast Survey, 44.
instructions, 100, 101.
North Greenland coast, 189, 255–258.
methods, 252–253, 255, 264, 268, 269, 270.
Tide-gauge, erection at Fort Conger, 8.
self-registering, 38.
Tides, heavy, 53, 54, 55.
Tobacco, use in Arctic regions, 348.
Tringa canutus, description of egg, 47.
Twin Glacier Valley, 358.

United States Mountains, 22, 32, 275, 318–319.
Upernivik, clothing obtained at, 3.
departure from, 4.

Very River, 31, 33.
Very Valley, vegetation and description, 33.
Victoria Head, 58, 60.
plan for retreat from, 60, 377–378, 444.
Victoria Inlet, 27, 187 pl. 1.
View Point, 21, 173, 177.
record left, 177.

Walrus, seen off Distant Cape, 34.
War Department, orders assigning Lieutenant Greely to command, and organizing expedition, 97–99.
Washington Irving Island, Nares' record, 5.
record left, 5, 57, 110–111, 441.
Washington's birthday, celebration, 15, 40.
Water, samples from paleocrystic ice, 29.
Water Course Bay, report on, 6, 111, 138.
Weyprecht, Lieutenant, international stations proposed by, 1.
plan for magnetic observations, 103.
Weyprecht Inlet, 25, 206, 208.
Whale, bone found, 235.
Whisler, Private, 14, 18, 22, 23, 34, 60.
theft of food, 86, 513.
death, 88, 519.
Wild Fiord, 26, 208.
Wind, instructions for observations, 102.
direction indicated by *sastrugi*, 22.
high velocity, 14, 34, 48, 217–218.
Winchester observatory of Yale College, special instructions for standard thermometers, 104–105.
Wrangel Bay, 9, 122, 167, 170, 246.
sledge journey to, 11, 131–133.
orders and report on trip to, 13, 138–142.
cache at, 140, 141.
Xanthus, drift-wood from, 4.

Yantic, 66, 67, 69, 352, 458.
Young, Allen, return of Arctic mail left at Littleton Island by, 4–5.

Zoology, list of collections, 299–300, 305–310, 315.