MAGNETIC AND METEOROLOGICAL OBSERVATIONS

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1898–1900,

UNDER THE DIRECTION OF

C. E. BORCHGREVINK,

Kt. St. Olaf, Hon. Mem. & Medallist Roy. Scottish Geograph. Soc., &c.,
Commander of the Expedition.

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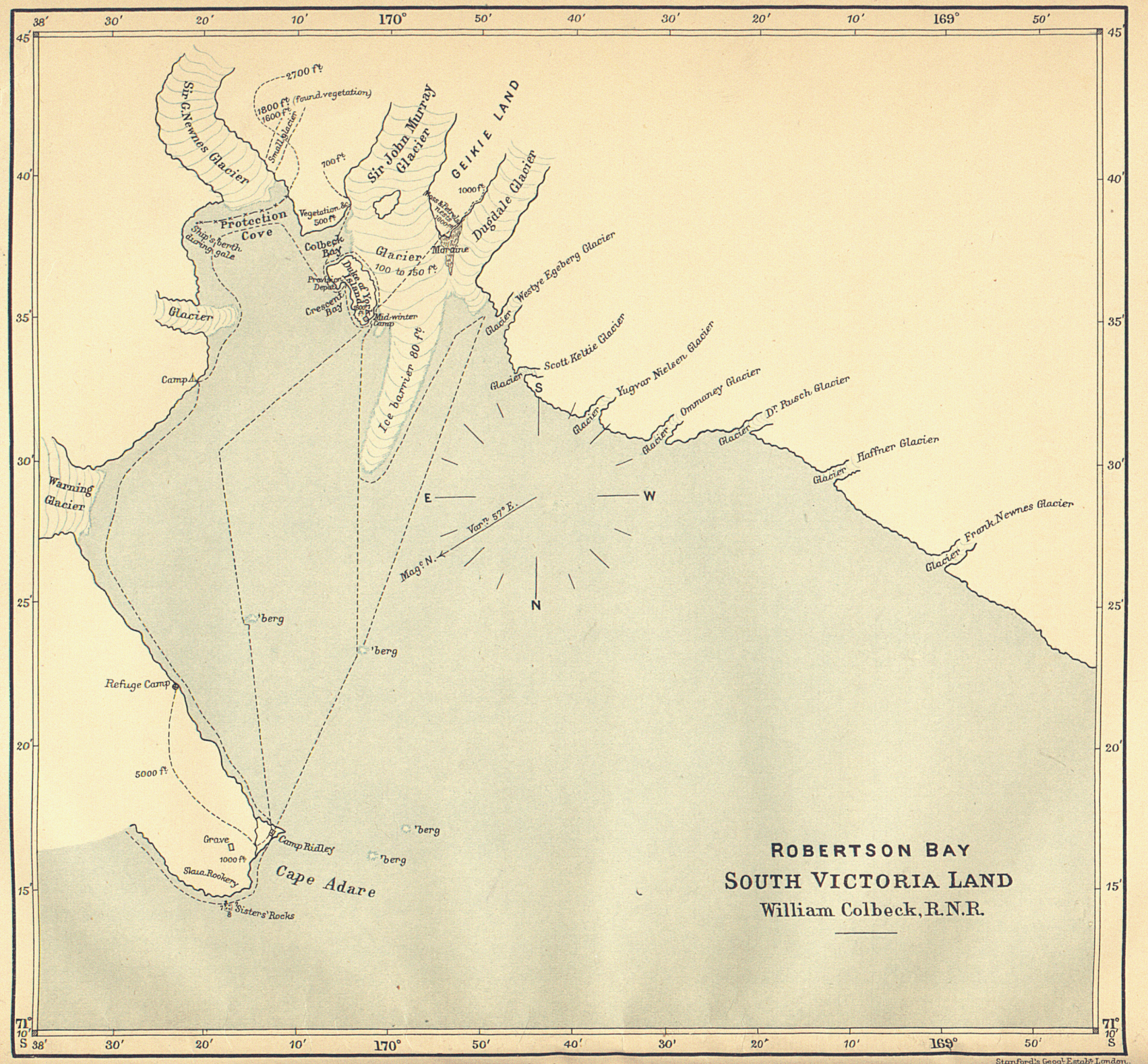

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PART I.

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No.

MAGNETIC OBSERVATIONS,

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WITH THE ASSISTANCE OF

LOUIS BERNACCHI, F.R.G.S.

Reduction of the Magnetic Observations made during the "Southern Cross" Antarctic Expedition, 1899–1900, *mainly at Cape Adare, Lat.* 71° 18′ *S., Long.* 170° 9′ *E.*

By CHARLES CHREE, *LL.D., Sc.D., F.R.S., with the assistance of* LOUIS BERNACCHI, *one of the Magnetic Observers to the Expedition.*

Received November 13, 1901.

(From the National Physical Laboratory.)

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§ 1. The magnetic observations during the Antarctic Expedition fitted out by Sir GEORGE NEWNES, under the command of Mr. C. E. BORCHGREVINK, were made in about equal proportions by Mr. L. BERNACCHI and Lieutenant W. COLBECK, R.N.R. Both observers went through a course of instruction at Kew Observatory (now the National Physical Laboratory) before the expedition started, and Mr. BERNACCHI had had considerable previous experience at the Melbourne Observatory, under Mr. P. BARACCHI.

The instruments consisted of a unifilar magnetometer, No. 138, by DOVER, purchased by Sir G. NEWNES for the expedition, and an inclinometer, No. 24, by

BARROW, lent by the Kew Observatory Committee. Observations made before the expedition left England showed that both instruments were then in good accord with the Observatory standards.

Shortly after observations commenced at Cape Adare it was found that the agate knife edges in the inclinometer had become loose, and the observers were obliged to put this right. No further trouble was experienced at Cape Adare, but during the voyage home the agates again became loose and were refixed by a London optician. Subsequently observations were made at Kew which again were in good agreement with those given by the standard instruments.

As will appear later, § 5, there is strong evidence that the refixing the agates at Cape Adare did not appreciably influence the results, and that the instrument subsequent to this was in thorough good working order during its whole stay in the Antarctic.

In the case of the magnetometer a source of uncertainty has also to be mentioned. At Kew the deflection bar was measured as usual at the divisions 25, 30, 35, and 40 centims.; but at Cape Adare, owing to the small size of the force, the deflection experiments were made at 39 and 52 centims., instead of 30 and 40 centims. as usual. The bar was lost on its way home, and some uncertainty thus exists as to the corrections to be applied to the nominal lengths. This might affect the value of the horizontal force indirectly, as well as directly, through the "P" constant, which allows for the finite lengths of the deflecting and deflected magnets. The measurements obtained at Kew, however, would almost certainly have disclosed any serious irregularity in the scale divisions up to the 40 centim. marks, and if any serious error had existed at the 52 centim. marks it would have shown itself through leading to an exceptional value for "P" in the Cape Adare observations. Whilst some uncertainty necessarily remains, it could hardly, I think, introduce an error that need concern us. Any error that might thus arise would of course influence all the observations taken at Cape Adare to practically an equal extent.

§ 2. The data obtained by the two observers were entered in their note books at the time, and thence copied into the official books of the expedition. All these books have passed through my hands, and no doubt exists as to the accuracy of the copying. All the reductions not already completed when the books came into my hands were carried out by Mr. BERNACCHI under my general supervision. Most were finally checked by myself, including all cases where any apparent abnormality presented itself.

In some few respects the data were not quite complete. Owing to the rapid magnetic changes experienced at Cape Adare, the observers had sometimes found it impossible to measure the torsion of the silk suspension after the vibrations in the horizontal force experiment. In such cases the values used for the torsion coefficient are means derived from observations on other days. Again, no satisfactory data existed for allowing for the possible influence of torsion on the observed declinations.

As, however, a fine suspension was habitually used, no serious error could well have been introduced even into individual results. Monthly means, based on a considerable number of observations, would of course suffer still less.

§ 3. Whilst observations were made at several places visited by the expedition, the data mainly consist of observations at Cape Adare (latitude 71° 18′ S., longitude 170° 9′ E.).

At that station a fixed mark was used for reference in the declination experiments. It consisted of a stake sunk in the ground, stayed and frozen in, situated at about 200 yards from the tripod which supported the instruments in the tent where all the magnetic observations were taken. The azimuth of the mark relative to the geographical meridian was determined in the usual way by solar observations in April and in October, 1899. The value 0° 11′ 4″ E. found in April has been used for the declination observations made in April and May; whilst the value 0° 15′ 42″ E. found in October has been used for the later observations.

The azimuth mark appeared very stable, and the observers were inclined to attribute the difference in the above values either to observational error, or to a slight possible shift in the position of the tripod stand. Under the conditions existing at Cape Adare, an uncertainty of the order of 5′ in the absolute value of the declination need hardly be considered.

The spot selected, though the best available, was hardly an ideal one for magnetic observations. There were basaltic cliffs about a mile away, and in the immediate neighbourhood there were numerous blackish pebbles which appreciably influenced a suspended magnet when brought near to it. Under these conditions, it is not improbable that the values obtained for the magnetic elements were influenced to some extent by purely local causes.

Absolute Declination Observations at Cape Adare.

§ 4. Declination observations were made on about fifty separate days at Cape Adare; on three occasions observations were made at short intervals during periods of from 18½ to 24 consecutive hours. The results obtained on the three special occasions will be treated separately, the others are included in Table I. Equal numbers of readings were taken with the scale erect and inverted, the vertical wire in the telescope being brought into coincidence with the centre of the magnet's scale. Local mean time is used, the hour specified answering to the middle of the observation. The letter "*a*" distinguishes forenoon observations; the great majority were taken in the afternoon.

TABLE I.—Absolute Declination Results at Cape Adare.

Date. 1899.	Hour. h.	m.	Observer.	Declination East. °	′
April 12	4	33	B	56	8·3
13	4	10	C	55	56·1
14	1	35	B	56	2·2
15	0	38	C	55	50·7
17	0	50	C	55	43·1
19	1	18	B	56	33·8
,,	4	36	C	56	3·2
20	4	31	B	56	55·2
21	2	26	C	55	43·1
,,	3	20	B	55	56·9
Mean for April . . .				56	5·3
May 3	2	24	B	55	42·0
,,	4	12	C	55	40·6
8	2	54	C	55	45·6
11	5	34	B	55	40·0
13	5	2	C	55	32·4
16	1	45	B	55	20·8
23	8	29*a*	B	55	48·3
28	2	10	C	56	5·1
29	4	10	B	56	4·5
Mean for May				55	44·4
Oct. 9	2	12	C	54	43·8
,,	3	54	C	54	48·9
10	0	39	B	54	44·8
13	0	27	B	54	39·4
21	2	44	C	54	55·5
23	4	28	B	54	53·2
26	1	26	B	54	50·3
,,	6	48	B	55	25·5
Mean for October . . .				54	52·7
Nov. 1	5	2	B	54	57·5
4	6	41	C	56	26·6
9	5	45	C	55	23·1
10	5	55	B	55	1·0
11	5	8	C	55	13·5
13	1	22	B	54	51·0
,,	7	22	C	55	37·9
14	4	3	C	54	56·0
16	6	13	B	55	20·9
,,	9	29	B	54	51·4
18	1	52	C	55	17·7
20	8	1	C	54	51·3
22	5	1	C	56	28·4
29	5	57	B	56	24·7
30	6	9	C	56	28·8
Mean for November				55	28·7
Dec. 12	4	13	B	57	5·5
,,	5	3	B	57	7·7
13	3	57	C	57	21·7
,,	7	7	C	57	2·7
15	4	57	B	56	19·1
16	6	12	C	57	11·7
20	3	40	B	56	49·0
21	6	18*a*	B	55	13·5
23	11	54*a*	B	55	17·2
30	3	31	B	57	37·9
Jan. (1900) 8	4	30	B	56	52·8
9	5	42	C	56	48·5
Mean for December and January				56	43·9
Mean for whole series				55	49·4

It will be observed that the means for October and November are conspicuously lower (less easterly) than those for April and December. In fact, the greatest value observed in October is less than the lowest observed in April, or than the lowest afternoon value observed in December.

This certainly suggests an exceptionally large *annual* variation—*i.e.*, a variation whose period is a year—but it would be rash to rely on this in view of the variability in the hour of observation and of the evidence to be adduced in § 9 that the declination is subject to diurnal and irregular changes much larger than occur in lower latitudes.

The individual values in Table I. vary from 57° 37′·9 on December 30 to 54° 39′·4 on October 13, a range of slightly under 3°. It should be mentioned, however, that when exceptional disturbances were experienced the observers desisted from the attempt to take the ordinary observations. The range shown in the table is, in fact, probably considerably less than the diurnal range on a number of disturbed days; a range exceeding 3° was experienced on one of the days when observations were taken throughout the 24 hours. As regards the individual months, we have ranges of 1° 12′·1 in April, 0° 44′·3 in May, 0° 46′·1 in October, 1° 37′·8 in November, and 2° 24′·4 in December. As the hours of observation were not less variable in May and October than in April, we should infer that the variability in declination was less in the two former months than in the latter.

Inclination Observations at Cape Adare.

§ 5. The Barrow circle carried by the expedition was supplied with four needles, two being intended for determination of total force by LLOYD'S method. Only pure inclination observations, however, were made, and these all with two of the needles, Nos. 1 and 3. The magnetic meridian was found in the usual way before each day's observations. The observed values of the inclination at Cape Adare appear in Table II. Forenoon observations are distinguished as in Table I., and the hours are the local mean times answering to the middle of the observations. On the single occasion, March 30, when only one needle was used, a mean is obtained by allowing for the average of the differences observed between the two needles.

TABLE II.—Inclination Results at Cape Adare.

Date. 1899.	Hour. needle 1. h.	m.	Hour. needle 3. h.	m.	Observer.	Inclination by needle 1. 86° +	Inclination by needle 3. 86° +	Inclination mean from both needles. 86° +	Inclination mean for month. 86° +
						′	′	′	
March 28	11	32*a*	0	32	B	37·2	34·7	35·9	
29	11	16*a*	0	32	C	34·7	35·0	34·9	35′·0
30	3	55	—		B	34·1	—	34·3	
May 11	1	33	1	51	B	35·3	35·4	35·3	35·1
27	8	42	9	10	C	34·4	35·4	34·9	
Sept. 20	3	12	2	55	B	34·5	35·2	34·9	
28	5	40	5	22	B	36·0	36·6	36·3	35·5
29	0	45	1	14	C	35·6	35·2	35·4	
Oct. 23	2	1	1	48	B	32·5	33·9	33·2	33·8
26	0	0	11	35*a*	B	34·8	34·1	34·4	
Nov. 9	1	56	2	20	C	35·7	34·3	35·0	
10	10	51	10	37	B	36·2	35·8	36·0	
13	0	20	0	3	B	37·7	36·6	37·2	34·3
14	0	10	0	36	C	32·1	33·7	32·9	
20	3	48	4	12	C	32·8	33·3	33·1	
30	1	27	1	52	C	30·7	32·5	31·6	
Dec. 15	1	25	1	10	B	31·2	32·9	32·0	
16	2	6	2	28	C	31·6	33·5	32·5	33·2
23	9	18*a*	8	56*a*	B	33·7	34·5	34·1	
29	3	59	4	24	C	33·3	34·7	34·0	
1900.									
Jan. 8	0	56	0	40	B	33·9	34·5	34·2	
9	11	38*a*	0	0	C	33·4	34·8	34·1	34·6
27	4	24	4	50	C	35·5	35·6	35·5	

Mean from all observations . . . . . 86° 34′·4

The loosening and refixing of the agate edges mentioned in § 1 occurred in April, but the March and May means are in extremely close agreement.

The largest individual difference between the results obtained with needles 1 and 3, viz., 2′·5, occurred on the first day of observation; no subsequent difference exceeded 1′·9, and the mean difference is only 0′·4, needle 3 giving the larger inclination. Only those experienced in magnetic observations will appreciate the testimony afforded by these figures to the care exercised by the observers, and to the satisfactory behaviour of the instrument.

The greatest and least of the means from the two needles, viz., 86° 37′·2 and 86° 31′·6, were both observed in November; their mean is, somewhat curiously, identical with the mean for the whole series of observations, and practically identical

with the mean for the month. The range, or difference between the two extremes, is only 5′·6. It would be far from an extreme range in a year's absolute observations at a station in Central Europe.

Horizontal Force Observations at Cape Adare.

§ 6. A complete determination of horizontal force consists of a vibration experiment giving m X—where X is the horizontal force, m the magnetic moment of the collimator magnet at the time if at 0° C.—and of a deflection experiment giving m/X. Supposing m to remain constant and to be known, X can be deduced from *either* the vibration or deflection experiment. As will presently appear, m varied but little at Cape Adare. It diminished, but the change was so small and gradual that the hypothesis that m was practically constant for the observations of a single month must be very nearly correct. In Table III. the values deduced on this hypothesis for X from the vibration and deflection experiments separately are denoted respectively by X_1 and X_2. Under X is given the value obtained by combining the day's vibration and deflection experiments in the usual way, and m represents the corresponding value found for the magnetic moment.

When two vibration and one deflection experiments were made in a day, two values are found for X_1 and one for X_2; two values are also obtainable for m and for X, but only their mean is given.

On occasions when two vibration and two deflection experiments were made in a day, the vibration and deflection experiments next in time are combined, and two values are given for m and X as well as for X_1 and X_2. Forenoon observations are distinguished as before.

In forming the means, the data on April 20 and May 6—enclosed in brackets—have been omitted, because an examination of the readings recorded in the deflection experiments showed that either there were errors of the order of 1° or 2°, or else there must have been exceptionally large and sudden magnetic storms.

TABLE III.—Horizontal Force Results at Cape Adare.

Date. 1899.	Mean hours of Vibration. h. m.	Mean hours of Deflection. h. m.	Observer.	X (C.G.S.)	m (C.G.S.)	X_1 (C.G.S.)	X_2 (C.G.S.)
April 13	3 37	11 45*a*	C	·04125	813·5	·04110	·04140
14	0 59	0 11	B	138	15·3	132	145
15	0 15	11 15*a*	C	111	17·4	115	106
17	0 5	11 3*a*	C	125	14·0	113	139
,,	1 33		C			112	
19	0 38	11 40*a*	B	105	19·4	120	090
,,	3 27	4 45	C	111	11·9	088	·04134
[20	11 45*a*	2 40	B	032	28·9	124	·03971]
,,	4 16		B			062	
21	1 24	0 25	C	102	20·9	124	·04080
,,	3 6	4 20	B	·04084	820·0	·04101	·04066
Means for April				·04113	816·5		
May 3	1 18	11 55*a*	B	·04078	822·8	·04115	·04045
,,	3 12		B			105	
[6	1 22	0 3	C	050	27·0	103	·03997]
8	1 46	0 29	C	094	22·1	123	·04066
11	5 7	4 5	B	084	20·7	106	062
13	4 48	3 32	C	112	11·0	085	139
16	0 42	11 10*a*	B	061	14·7	021	070
,,	2 42		B			087	
23	7 41*a*	11 15*a*	B	101	19·9	129	083
,,	10 6*a*		B			109	
28	1 50	0 41	C	130	10·3	099	161
29	3 44	2 20	B	146	13·5	132	160
June 1	2 58	2 0	C	·04122	812·1	123	·04144
,,	3 26		C			·04079	
Means for May and June				·04103	816·3		
Oct. 9	1 41	0 26	C	·04146	810·9	·04148	·04144
10	0 25	11 32*a*	B	139	11·1	142	135
13	4 15	5 4	B	152	10·7	153	151
21	2 3	1 16	C	164	11·3	168	160
,,	2 30		C			169	
23	4 58	5 50	B	204	09·6	199	208
25	0 26	11 26*a*	C	150	09·6	146	155
26	7 58	8 47	B	·04182	810·6	·04182	·04182
Means for October				·04162	810·5		

TABLE III.—*continued.*

Date. 1899.	Mean hours of Vibration. h. m.	Mean hours of Deflection. h. m.	Observer.	X (C.G.S.)	*m* (C.G.S.)	X_1 (C.G.S.)	X_2 (C.G.S.)
Nov. 1	5 22	6 4	B	·04174	809·4	·04165	·04182
4	5 52	5 5	C	173	12·4	180	166
9	4 47	6 18	C	140	07·1	119	160
10	6 14	7 11	B	159	08·7	146	171
11	4 30	3 41	C	167	09·8	161	173
13	3 52	4 53	B	187	17·0	218	157
"	7 1	6 5	C	173	10·1	168	179
14	3 23	5 2	C	160	10·5	156	163
16	10 7	10 48	B	144	11·0	143	144
18	1 28	11 58*a*	C	141	12·1	146	136
20	6 43	8 49	C	179	10·9	178	180
22	3 26	4 56	C	236	12·5	243	228
29	5 26	7 25	B	187	12·8	196	178
30	4 50	3 57	C	177	09·8	170	183
"	5 38	7 8	C	·04165	812·3	·04171	·04159
Means for November				·04171	811·1		
Dec. 12	5 18	6 55	B	·04177	807·7	·04172	·04183
13	6 33	8 5	C	154	08·8	154	153
15	5 22	6 15	B	156	10·7	166	146
16	5 44	5 3	C	139	07·7	134	144
1900.							
Jan. 8	4 47	5 55	B	157	08·6	156	158
9	5 11	4 34	C	·04125	808·5	·04124	·04126
Means for December and January. . .				·04151	808·7		
Mean from all observations				·04143			

§ 7. The extreme values of the horizontal force X, and the ranges for the several months, are given in Table IV., April 20 and May 6 being left out of account.

TABLE IV.

	April.	May and June.	October.	November.	December and January.	All.
Maximum ...	·04138	·04146	·04204	·04236	·04177	·04236
Minimum ...	·04084	·04061	·04139	·04140	·04125	·04061
Range.....	·00054	·00085	·00065	·00096	·00052	·00175

It will be observed that the mean values for April and May differ but slightly, and that the same is true of the means for October and November; but the mean values for the two earlier months are very decidedly less than those for the later months.

There may be at present a rapid secular increase of horizontal force at Cape Adare.

This would explain the general character of the phenomena, but not why the means for May and for December should be less respectively than the means for April and November. This might be accounted for by a large *annual* variation. After elimination of a regularly progressive secular variation, an annual variation has been observed at various places. Thus at Kew, on the mean of the five years 1890 to 1894, there appeared a distinct annual variation with a range of 13 γ ($1\gamma \equiv 1 \times 10^{-5}$ C.G.S.), the maximum occurring in June, the minimum about the end of October. These are about the dates which Table III. would suggest for the minimum and maximum respectively at Cape Adare, and an inversion of months is only what we should anticipate when we pass to the southern hemisphere. It is not improbable, see § 15, that the diurnal variation may be partly accountable for the observed facts. In April and May most of the observations were taken before 2 P.M.; whereas during the last three months few observations were taken before 3 P.M. Thus a diurnal variation in which—as in temperate latitudes—the horizontal force increases from 11 A.M. until the late afternoon would so far meet the case. As will appear in § 15, a diurnal variation of the nature indicated does probably exist; but it does not seem so large as to fully explain the difference between May and November. The secular, annual, and diurnal variations combined may account for all the facts, but there may be other equally important causes.

It will be observed that according to Table III. the mean value of the magnetic moment m of the collimator magnet was practically the same for May and April, and again for November and October; whilst between May and October there was an apparent diminution of some 0·7 per cent. Looked at in the light of the apparent rise of horizontal force between May and October, this might rouse a suspicion of some slight change in the apparatus affecting the results of the deflection experiment. The discontinuity in the variation of m is, however, almost certainly exaggerated in Table III., and not unlikely it had no real existence. Under ordinary conditions m is certain to fall off, and the total apparent fall between April and December is certainly not greater but very decidedly less than one would have anticipated from the circumstances of the case. The irregularity in the variation of the monthly means may simply arise from experimental errors.

Another possible explanation of the difference between May and October is a slight alteration in the position or height of the tripod stand, or some alteration in the distribution of basaltic pebbles or other magnetic objects in the immediate neighbourhood of the instruments. On mentioning this idea to Mr. BERNACCHI, I learned that a cairn of pebbles had been erected in May to serve as a fire-place in the magnetic hut, but its disturbing influence on the declination needle had been observed and the pebbles removed. This serves, however, rather to oppose than support the proposed explanation, for the erection and removal of the cairn took place on May 19 and 20, and no clear discontinuity exists between the observations taken before and after that date in May either in declination, inclination, or horizontal force.

Vertical Force and Total Force at Cape Adare.

§ 8. If we combine the mean values of the horizontal force for the several months with the corresponding mean values of the inclination we get the results in Table V.

TABLE V.—Values of Vertical Force and Total Force in C.G.S. units.

	April.	May and June.	October.	November.	December and January.	Whole series.
Vertical Force	·6893	·6876	·6930	·6962	·6892	·6926
Total Force	·6905	·6888	·6943	·6975	·6905	·6938

There being no reliable inclination observations for April, the value employed for that month is a mean from the March and May observations. Even assuming experimental error negligible, we could draw no safe conclusion from Table V. as to annual or secular variation. The observations of horizontal force and inclination were not simultaneous, and no allowance can be made for diurnal variation. This is, moreover, a case where the probability of experimental error cannot be disregarded. Such comparatively small errors as $20\,\gamma$ in the horizontal force, or $1'$ in the inclination, would suffice to produce an error of $340\,\gamma$ in the calculated values of the vertical and total forces. These considerations will show the expediency of employing some direct method of determining either the total or the vertical force in the neighbourhood of the magnetic poles. Supposing, let us say, the vertical force known, the value of the total force would be but little influenced by considerable errors in horizontal force or inclination.

Diurnal Variation of Declination at Cape Adare.

§ 9. The first of the three special series of declination observations referred to in § 4 lasted from 8.30 A.M. on April 10 to 3.5 A.M. on April 11, 1899. The interval between successive readings was alternately 5 and 25 minutes, according to the scheme magnet scale "erect," "inverted," "inverted," "erect." The silk suspension broke at 3.5 P.M. on April 10, and the subsequent readings may have been slightly influenced by residual torsion in the new fibre. The observations were terminated by a violent gale. The second and third special series of observations lasted respectively from 1.45 P.M. on May 30 to 1.45 P.M. on May 31, 1899, and from noon on January 2 to noon on January 3, 1900. On these two occasions readings were taken regularly at 15 minute intervals, the magnet being scale "erect" all the time. On the second occasion the circle was clamped in a fixed position, the readings being taken on the scale of the magnet; on the first and last occasions the vertical wire of the telescope was always brought to the centre of the scale, the circle being read as in the ordinary absolute observations. To obtain absolute values of the declination,

one requires to apply a correction equal to half the difference between readings obtained with the scale erect and inverted. The mean values of this difference for the several months, as deduced from the ordinary absolute observations, are as follows :—

April.	May.	October.	November.	December and January.	All.
21′·0	16′·3	14′·9	16′·4	16′·4	17′·0

The difference in April seems to stand out from that in the other months, and it is considerably in excess of that found from the special observations on April 10 and 11. I have accordingly judged it best to accept in preference the mean value 17′·0 for the April occasion. This leads to the corrections −8′·5 and + 8′·5 respectively to readings taken with scale "erect" and "inverted." On the other two occasions I have accepted the mean differences as found for the individual months.

The observations on the three occasions began at different hours; but to economise space all the columns in Table VI. start with the data observed at 0 h. 0 m. (noon and midnight). The letters C and E indicate the commencing and ending observations respectively. On the first occasion, the data at the foot of the second column on p. 13 were obtained between 8.30 and 11.35 A.M. on April 10, and in point of time they immediately precede the data given in the first column on pp. 12 and 13 which were observed between noon and 11.35 P.M. on August 10th. The data at the top of the second column on pp. 12 and 13 answer to the interval midnight to 3.5 A.M. on April 11th.

The hours and half-hours are specified, there being observations at these times on all three occasions. The intermediate observations correspond to 15 and 45 minutes past the hour on the second and third occasions, but to 5 and 35 minutes past the hour on the first occasion.

There were in reality occasional extra observations at irregular intervals during times of auroral display or special disturbance, but these are omitted in Table VI.

TABLE VI.—Special three days' observations of Declination.

Hour.		April 10 to 11.		May 30 to 31.		January 2 to 3.	
		Afternoon, April 10.	Forenoon, April 11.	Afternoons, May 31 & 30.	Forenoon, May 31.	Afternoon, January 2.	Forenoon, January 3.
h.	m.	° ′	° ′	° ′	° ′	° ′	° ′
C	0	57 30·8	55 27·5	55 53·6	55 57·4	C 55 54·8	56 22·4
		40·5	24·8	56 5·9	56·0	56 7·4	26·3
0	30	23·2	2·0	55 58·3	49·0	14·7	37·7
		20·2	15·2	56 3·1	50·7	26·5	30·3
1	0	30·3	38·2	56 4·4	50·1	10·7	24·4
		40·7	33·2	56 4·4	50·3	20·7	24·4
1	30	25·8	26·8	E 55 58·3	56·4	24·7	31·2
		57 43·2	42·2	C 56 7·8	56·6	14·7	26·2

TABLE VI.—*continued.*

Hour.		April 10 to 11.				May 30 to 31.				January 2 to 3.			
		Afternoon, April 10.		Forenoons, April 11 & 10.		Afternoon, May 30.		Forenoon, May 31.		Afternoon, January 2.		Forenoon, January 3.	
h.	m.	°	′	°	′	°	′	°	′	°	′	°	′
2	0	58	3·2	55	30·5	56	6·5	55	56·2	56	27·0	56	23·7
		58	9·3		33·5		5·0		58·1		29·0		23·7
2	30	57	50·2		47·8		6·7		59·1		19·0		26·0
		58	5·7		51·5		4·6		57·4		32·3		26·0
3	0	58	37·2		32·2		9·5		53·9		36·4		21·0
		—	—	55	33·8 E		6·5		52·2		45·3		21·0
3	30	56	57·2				8·6		45·0		34·0		14·7
		56	59·8				10·3		40·3		41·0		16·5
4	0	58	17·8				6·1		51·7	56	57·7		12·0
		58	22·5				7·4		58·3	57	27·2		11·0
4	30	56	54·8				8·7		56·4		16·0		14·7
			54·2				9·1	55	54·3		22·2		12·3
5	0		23·5				9·1	56	1·2		18·8		18·0
			28·7				9·5	55	56·2		27·4		20·4
5	30	56	37·5				8·6		59·4		24·0		25·7
		57	12·3				10·5		55·3		17·3		25·7
6	0	56	6·8				14·4		58·7		33·0		26·7
		56	2·2				11·8	55	58·5		26·5		23·7
6	30	55	56·8				9·3	56	1·0		16·4		20·0
		56	0·2				9·7	55	47·3		13·5		35·8
7	0		17·2				22·0		55·3		13·5		40·7
			21·2				41·0	55	59·3		4·7		18·0
7	30		16·7				22·0	56	2·3	57	2·5		22·9
		56	8·8				16·9		3·1	56	53·7		30·0
8	0	55	56·5				15·2		6·3	56	54·0		10·7
		55	57·0				17·1	56	3·4	57	4·0		22·5
8	30	56	8·8	55	27·0 C		12·9	55	59·1	57	1·7		24·4
		55	50·8	55	51·2		5·0	56	5·3	56	58·0		25·8
9	0		42·2	56	7·8		3·1		2·3		56·7		28·0
			48·2	55	49·8		2·3		1·9		46·0		26·0
9	30		42·5	56	15·3		2·5		1·7		46·0		26·0
			35·7	56	33·8	56	4·8		2·5		32·0		38·7
0	0		37·0	57	48·0	55	57·9	56	3·8		36·5		30·2
			48·5		29·5	56	1·0	55	57·4		43·7		48·3
10	30		42·2		44·8	55	58·1		50·5		38·9		39·7
			48·5		48·5		58·3	55	55·8		35·3		41·7
11	0		52·3		35·0		56·0	56	8·8		26·7		47·5
			26·2		36·2		57·4	55	55·5		19·7		46·7
11	30		16·2		18·5		55·3	55	53·6		22·0		43·0
		55	17·7	57	54·2	55	54·5	56	1·2	56	23·8	56	47·8 E

§ 10. When changes of declination are as rapid and irregular as those shown by Table VI., individual readings depend so much on the precise minute when they happen to be taken that they afford a better idea of the degree of irregularity of the variation than of its general character. For some purposes a better idea is obtained by grouping consecutive readings. This has been done in constructing the curves 1, 2, 3, fig. 1, which are intended to show the *general* nature of the diurnal variation on the three special occasions. The value ascribed, for example, to 4.30 P.M. on January 2 really represents

$$\tfrac{1}{4}\{\tfrac{1}{2}[4.0] + [4.15] + [4.30] + [4.45] + \tfrac{1}{2}[5.0]\},$$

where [4.0] means the declination observed at 4 P.M.

This method of treatment tends, of course, to reduce all irregularities. The extent of this reduction is illustrated by the data in Table VII.

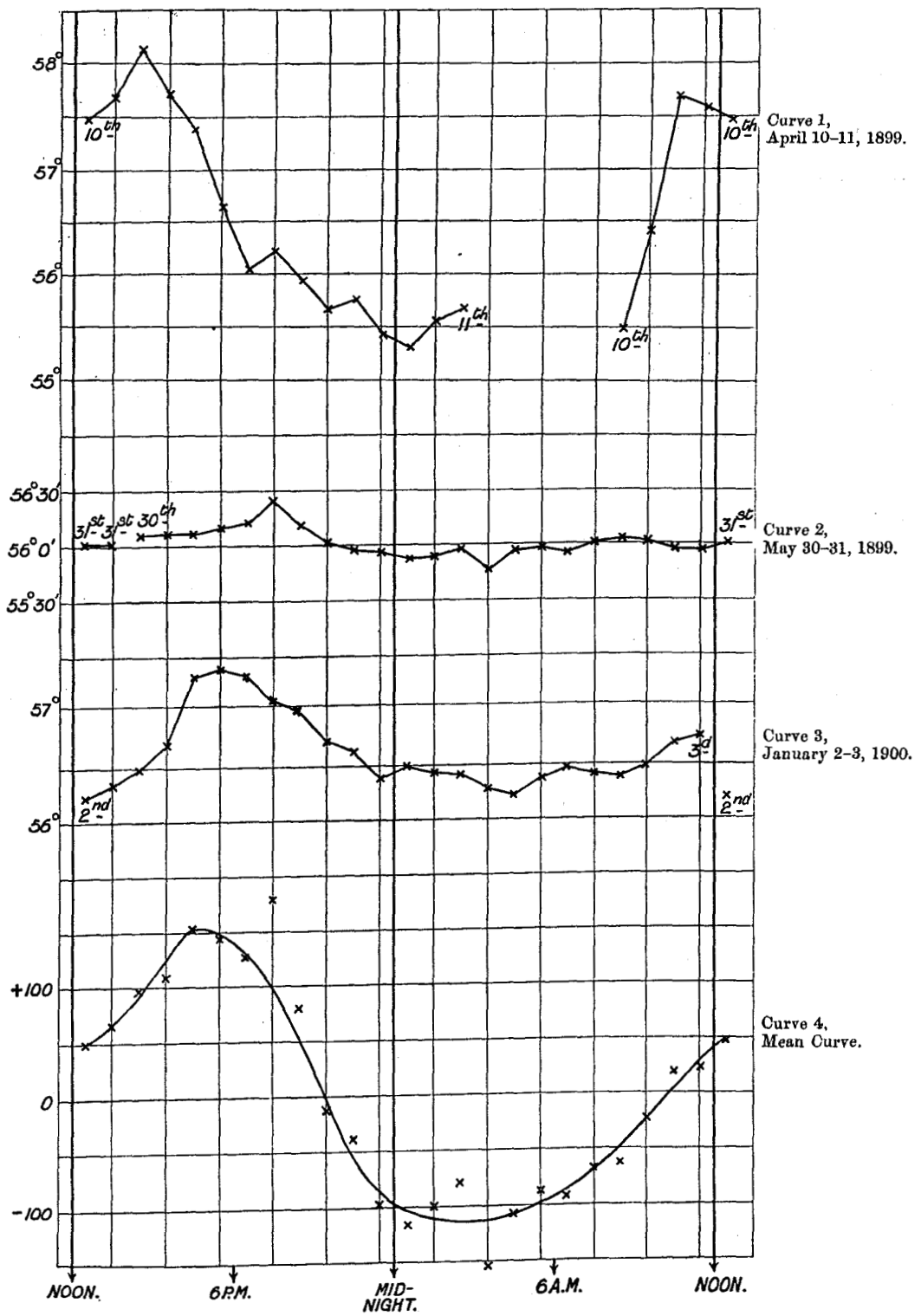
TABLE VII.—Ranges, &c., on Three Special Occasions.

	From individual readings.			From hourly means as in curves.		
Occasion.	Maximum.	Minimum.	Range.	Maximum.	Minimum.	Range.
April 10–11 ...	58° 37′·2	55° 2′·0	3° 35′·2	58° 6′·3	55° 18′·7	2° 47′·6
May 30–31 ...	56 41·0	55 40·3	1 0·7	56 24·6	55 47·6	0 37·0
Jan. 2–3	57 33·0	55 54·8	1 38·2	57 23·7	56 12·8	1 10·9

§ 11. The curves 1, 2, and 3 differ considerably, not merely as regards the amplitude of the diurnal motion, but also as regards the hour when the easterly declination is a maximum. If the regular diurnal variation changes with the season as much as the curves would suggest, a very doubtful significance would attach to a mean diurnal variation derived in the usual way from a complete year's magnetograph records. At some equatorial stations a complete change of type has been observed, as between summer and winter, in the diurnal variation of the declination, but usually the change throughout the year is chiefly confined to the amplitude. In Arctic regions the nature of the diurnal variation seems to depend greatly on whether quiet days only are considered or not. There are thus several independent reasons for regarding with reserve any attempt at combining the data embodied in the three curves. I have, however, made the attempt, and give the results for what they are worth.

On April 10–11 there were no observations between 3.5 A.M. and 8.30 A.M. This gap has been filled by assuming the missing portion of Curve 1 to be a straight line. On May 30–31 and January 2–3 there were sensible non-cyclic changes. Thus, at 1.45 P.M. the declination was 5′·7 less on May 31 than on May 30; and, according to the hourly means, the declination was 4′·5 less at 1.30 P.M. on the second of these two days than at 2.30 P.M. on the first. This latter difference is 3′·9 greater than we should have anticipated, taking account of the changes observed in the hourly

Fig 1.


58°
57°
56°
55°
10th
11th
10th
10th
Curve 1,
April 10–11, 1899.
56°30′
56°0′
55°30′
31st
31st
30th
31st
Curve 2,
May 30–31, 1899.
57°
56°
2nd
3rd
2nd
Curve 3,
January 2–3, 1900.
+100
0
-100
Curve 4,
Mean Curve.
NOON.
6P.M.
MID-
NIGHT.
6A.M.
NOON.

means between 2.30 and 3.30 P.M. on May 30, and between 0.30 and 1.30 P.M. on May 31.

The result from the mean hourly values seems to deserve more weight than that from the single observation at 1.45, and I have accepted 4′·3 as representing the non-cyclic change during the 24 hours. On January 2–3, taking account only of the mean hourly values, I find 38′·3 for the non-cyclic change. These non-cyclic changes have been allowed for in the usual way by assuming them to have taken place uniformly throughout the 24 hours. As the result of these operations, we have three sets of hourly values, each representing a cycle with a 24-hour period. The simplest method of combining the data is to take the arithmetic means of the three declination values for each hour. This, however, would allow comparatively little weight to the occasion when the amplitude was smallest, and irregular movements least conspicuous. I have thus adopted the following plan :—

Taking each set of 24-hours data, corrected for non-cyclic effect, I found the mean declination for the day, and subtracting it from the hourly values obtained twenty-four differences. The next step was to find the ratios borne by each of these differences, treated algebraically, to the arithmetic mean of the differences treated numerically. For instance, on May 30–31 the mean declination is 56° 1′·8. At 6.30 P.M. the uncorrected declination is 56° 12′·2, which becomes 56° 10′·9 on applying the correction for the non-cyclic change. The difference from the mean value for the day is + 9′·1, and this bears to 5′·3—the numerical mean of the twenty-four differences—the ratio 1·71 : 1. The mean of the three ratios thus found for each hour is the quantity representing the mean diurnal variation as deduced from the special three days' observations. To avoid decimals, the ratios have been multiplied by 100. They are given in Table VIII. The means are embodied in Curve 4, fig. 1, crosses showing the individual data.

TABLE VIII.

P.M.	0.30	1.30	2.30	3.30	4.30	5.30	6.30	7.30	8.30	9.30	10.30	11.30
April 10–11	+142	+164	+220	+170	+131	+ 39	− 34	− 12	− 47	−78	−69	−112
May 30–31	+ 32	+ 36	+ 41	+ 68	+ 73	+128	+171	+405	+154	− 2	−71	−118
Jan. 2–3	− 29	− 4	+ 28	+ 85	+249	+266	+241	+146	+132	+44	+12	− 66
Means . . .	+ 48	+ 65	+ 96	+108	+151	+144	+126	+180	+ 80	−12	−43	− 99

A.M.	0.30	1.30	2.30	3.30	4.30	5.30	6.30	7.30	8.30	9.30	10.30	11.30
April 10–11	−125	− 93	−79	− 83	− 87	− 90	−94	− 98	−101	+ 10	+168	+156
May 30–31	−182	−146	−80	−260	− 92	− 65	−93	+ 11	+ 45	+ 34	− 52	− 41
Jan. 2–3	− 41	− 62	−79	−120	−146	−106	−91	−118	−131	−105	− 56	− 46
Means . . .	−116	−100	−79	−154	−108	− 87	−93	− 68	− 62	− 20	+ 20	+ 23

§ 12. Table VIII. and Curve 4, Fig. 1, are intended to give only the general character of the diurnal variation.

The arithmetic means of the twenty-four hourly differences on the three occasions were respectively 48′·7, 5′·3, and 21′·4, their mean being very approximately 25′. If we regarded this as the equivalent of 100, we should deduce from the final means in Table VIII. a diurnal variation whose magnitude might be regarded as that most fairly representative of the three occasions. The range would be 1° 24′ if we retained the figures answering to 7.30 P.M. and 3.30 A.M., which appear, however, somewhat out of harmony with the others.

If we exclude the means answering to 7.30 P.M. and 3.30 A.M., we unquestionably have a wonderfully regular variation. The two exceptional values arise mainly through the data contributed by May 30–31. The abnormal value at 7.30 P.M. on that occasion was presumably associated with an aurora described by the observers at that hour, and in drawing Curve 4 I have left this hour practically out of account.

There is a fair general resemblance between Curve 4 and curves of *westerly* declination in the northern hemisphere in temperate latitudes. The maximum in Curve 4 appears, however, about two hours later than is usual, and the minimum about four hours earlier; the forenoon rise is thus less accentuated.

The method of obtaining a mean diurnal variation adopted above may be original. It is too laborious to apply to ordinary observations treated individually, but if applied to deducing a mean annual variation from monthly means it would possess at least one advantage over the ordinary method, in so far as it secures practically equal weight to the different seasons of the year. It would, however, exaggerate the effect of any accidental irregularity of given size which happened to occur at the season when the regular diurnal variation is least.

§ 13. In addition to the special days' observations, the observation books contained a variety of data which seemed not unlikely to throw light on the question of diurnal variation. Reference to Table I. shows considerable variability in the hours at which absolute observations of declination were taken. When the data are grouped according to the hour at which the observations were taken, we get the mean results shown in Table IX. Afternoon observations only are considered.

TABLE IX.

Observation between	0	2	4	6	8	10
	° ′	° ′	° ′	° ′	° ′	° ′
April	(5) 56 21·1	(2) 55 50·0	(4) 56 15·7	—	—	
May	—	(3) 55 50·6	(4) 55 44·4	—	—	
October	(3) 54 44·8	(3) 54 49·4	—	—	—	
November	(2) 55 4·4	—	(7) 55 29·2	(4) 55 58·5	(2) 54 51·4	
December–January	—	(3) 57 16·2	(5) 56 50·7	(2) 57 7·2	—	

The number of observations in each case is given in brackets; cases where only a single observation existed are not considered.

When hourly groups are considered the irregularities, already sufficiently visible in Table IX., are much increased; and I do not think any safe inference can be drawn except that the regular diurnal variation is swamped by other variations, whether these latter be wholly irregular or not.

Two other classes of data remain to be considered.

The observers had regularly recorded the scale-reading answering to the middle point of the swing of the collimator magnet at both beginning and end of the vibration experiment for the horizontal force. This gives the change of declination during a period of 12·8 minutes, or thereby, on a number of occasions at different hours of the day. Again, each ordinary observation of declination consisted of a series of readings extending over some time. Usually there were two readings with scale "erect," separated by an interval of about 15 minutes, and two readings with scale "inverted," separated by an interval of about 5 minutes. As in the case of the vibration experiment, we have here information as to the change of declination taking place in given intervals of time at known hours of the day.

Arranging the data in groups according to the hour, one finds the total change in declination in a given time, and thence the mean change per hour. The results so obtained are given for the afternoon hours in Table X. In the first line are the mean hourly changes deduced from all the data. In the second line are corresponding figures when all observations are excluded in which the observed change of declination was more than double the mean change for the particular type of observation. The third and fourth lines give the number of minutes over which the observations utilised actually extended. Plus signs denote increase, minus signs decrease of *easterly* declination.

TABLE X.

Hour.	0	1	2	3	4	5	6	7	8
	′	′	′	′	′	′	′	′	′
All data	+2·0	+13·8	−11·9	−9·0	−10·2	−1·2	−25·1	−19·0	
Restricted data	+7·0	+ 2·8	+ 4·2	+1·1	+ 7·9	−4·5	− 1·5	− 1·9	
Time covered: All data	188	235	155	189	276	289	206	89	
Time covered: Restricted data	131	193	123	148	228	277	190	67	

The restricted data show a decided increase of easterly declination up to about 5 P.M., followed by a decrease. This result is in general accord with Curve 4.

The difference between the results from the "restricted data" and from "all data" shows the predominating influence of irregular movements. The method employed in constructing Table X. must very largely eliminate the influence of annual variation, or of any accidental differences between the mean values of the declination on different days.

Diurnal Variation of Inclination at Cape Adare.

§ 14. The only practicable means of investigating the diurnal variation of inclination consisted in arranging the data of Table II. into groups according to the hour of the day. Owing to the restricted number of observations, I have employed only two groups—the one including thirteen cases, in which the mean time of observation preceded 2 P.M., the other ten cases, in which it was subsequent to that hour.

The result is as follows :—

Mean from observations before 2 P.M. . . .	86°	34′·25
,, ,, after ,, . . .	86°	34′·65

In temperate regions the inclination has usually its mean value about 2 P.M., so it is the hour from whose selection as a limit one would expect to obtain the clearest indication of diurnal variation. The difference actually found above is too small to rely on, and the natural inference is that the diurnal variation of inclination is probably small, and is certainly not abnormally large. This might also be inferred from the comparatively narrow range shown by the data in Table II.

Diurnal Variation of Horizontal Force at Cape Adare.

§ 15. The vibration experiment determining mX_1 and the deflection experiment determining m/X_2 were often separated by a considerable interval of time, and unless the entire observation occupies but a short time it is somewhat arbitrary to attribute the result to the hour which is midway between the mean times of the two operations. More light seemed likely to be thrown on the diurnal variation by considering X_1 and X_2 separately. As one of these quantities was sometimes the earlier and sometimes the later to be determined, there was the less reason to apprehend the introduction of an erroneous element through any instrumental defect which tended to influence either X_1 or X_2 in a particular direction.

As already noted in § 7, the value of the force appeared notably higher in the later months, and there seems no altogether satisfactory way of allowing for this. If we combine all the observations as they stand, we can hardly fail to obtain an apparent diurnal variation with a maximum in the later hours of the day, when the observations taken during the last four months greatly predominate in number. If, on the other hand, we apply a correction to each month's observations equal to the difference between the means for the month and the year, we are almost certain to minimise the real extent of the diurnal variation. We may hope, however, by applying both methods, to obtain superior and inferior limits to the diurnal variation. The results of the two methods of treatment are given in Table XI. The quantity recorded is the excess of the force above ·04 C.G.S., in terms of 1 γ as unit.

TABLE XI.—Diurnal Variation of the Horizontal Force.

	Hour	11	Noon	1	2	3	4	5	6	7	8	9
No correction applied.	April	120	117	118	—	100	87	—	—	—	—	
	May and June	66	83	110	128	114	74	106	—	—	—	
	October	145	144	154	168	—	176	180	—	182	182	
	November	136	—	146	—	195	167	173	169	169	180	
	December and January	—	—	—	—	—	141	150	161	—	153	
	Mean	111	115	126	142	144	134	160	166	172	172	
Mean, correcting each month to mean for year		130	136	143	162	153	132	146	146	145	153	

In calculating the final means, equal weight is allowed to each individual observation. The observations at hours not included in the table were too few to deserve consideration.

There are considerable irregularities in the table, which it is safest to suppose accidental. For instance, the means for the hour 4 to 5 in the two last lines are almost certainly unduly depressed.

Except in April, there seems sufficient proof of an appreciable increase in force during the early afternoon hours; but there is a conflict of evidence from the different months as to whether or not the maximum is reached before 9 P.M. The evidence rather points to the conclusion that, apart from irregular changes, the force remains nearly constant for several hours after 5 P.M. As anticipated, the range apparent in the last line of Table XI. is much narrower than that apparent in the line above.

Variability of the Declination at Cape Adare.

§ 16. There were a variety of data from which information might be obtained as to the variability of the declination. In addition to the three special days' records, we have the changes during the absolute observations of declination, and those during the vibration experiments. Table XII. gives some particulars as to the mean "changes per minute." It includes all the data recorded during the regular absolute observations. The time occupied by the vibrations was practically constant and equal to 12·83 minutes; the longer and the shorter intervals in the declination experiments averaged 14·3 and 5·5 minutes respectively. These two latter classes of intervals varied within limits, but not to such an extent as to make their subdivision into groups advisable.

As an example of how the figures are got, take the case of April. Here the times occupied by the vibration experiments were—

	$6 \times 12{\cdot}8_3$, or 77·0	minutes,	with declination increasing,	total change	+ 39′	54″
	$3 \times 12{\cdot}8_3$, or 38·5	,,	,, decreasing,	,,	− 27′	33″
and	12·8	,,	,, not changing			
in all	128·3	,,	total change irrespective of sign . . .		67′	27″

The corresponding mean changes per minute of time are—

$$\overset{+}{(39'\ 54'')/77\cdot0} \equiv 31'' \ , \quad \overset{-}{(27'\ 33'')/38\cdot5} \equiv 43'' \ , \quad \overset{+\ ,\ 0,\ -}{(67'\ 27'')/128\cdot3} \equiv 32''.$$

The results answering to the longer and shorter declination intervals are treated precisely in the same way.

The final means in Table XII. allow equal weight to equal intervals of time, not to individual months.

TABLE XII.—"Changes per minute" of Declination from *all* Absolute Observations.

Month.	Vibrations.			Declination longer intervals.			Declination shorter intervals.			All sources.		
	+	−	(+, 0, −)	+	−	(+, 0, −)	+	−	(+, 0, −)	+	−	(+, 0, −)
April . . .	31″	43″	32″	29″	80″	50″	58″	62″	60″	33″	64″	43″
May and June	58	59	49	13	16	16	38	66	48	49	32	36
October . . .	24	74	46	9	25	16	14	56	31	17	50	31
November . .	34	29	25	20	40	31	26	74	44	24	41	31
December and January	22	27	17	34	10	26	21	18	20	27	19	21
All months .	39	44	35	23	34	29	28	45	35	30	39	32

§ 17. Before commenting on Table XII. it is well to consider more exactly the meaning of what has been called the "change per minute." It is really equivalent to $(\delta_1 D + \delta_2 D + \ldots + \delta_n D)/(t_1 + t_2 + \ldots + t_n)$, where $\delta_1 D$, $\delta_2 D$, &c., are changes of declination, all of one sign, answering to individual intervals of t_1, $t_2 \ldots$ minutes. During the t_1 minutes the declination may or may not have been changing continuously in one direction. The longer t_1, the greater is the chance that the change has not been continuous in one direction. Consequently, when rapid irregular movements are frequent, we may expect to obtain larger values for the "change per minute" when we use short intervals than when we use long ones. The results from the longer and shorter declination intervals in Table XII. differ on the whole in the direction one would anticipate, but less conspicuously than one would have expected.

In comparing different seasons—or different stations—it would be desirable to make use of exactly equal intervals of time of one given specified length. The number of individual observations is, however, in the present case so restricted, that in comparing the different months we should probably find that the data under the heading "all sources" are, notwithstanding their heterogeneousness, the most trustworthy. One would thus conclude that, on the average, the variability of declination

was greater in April, and, to a lesser extent, in May, than in October, November, or December.

§ 18. It may be well to point out explicitly that there is no *necessary* connection between the variability of the declination and the range of its regular diurnal variation. If we may judge by the "restricted data" in Table X., the regular diurnal variation during the ordinary hours of observation did not take place at a greater *average* rate than 5′ per hour. Now this gives only 5″ per minute, which is but a small fraction of the average "change per minute" recorded in Table XII.

Even on relatively quiet occasions the mean "change per minute" is very much larger than would answer to ordinary diurnal variation changes. This may be shown by eliminating all the observations in which the change per minute was more than double the mean for the group the observation comes under, individual months being treated separately. This has been done, and the results appear in Table XIII. Except as regards the restriction of data, Table XIII. is obtained precisely in the same way as Table XII.

TABLE XIII.—"Changes per minute" of Declination during *quiet* times of Ordinary Observations.

Month.	Vibrations.			Declination longer intervals.			Declination shorter intervals.			All sources.		
	+	−	(+, 0, −)	+	−	(+, 0, −)	+	−	(+, 0, −)	+	−	(+, 0, −)
April . . .	18″	20″	16″	29″	8″	25″	52″	27″	38″	26″	18″	22″
May and June	27	13	17	13	11	11	22	44	30	24	13	15
October . . .	24	22	19	9	8	7	14	29	20	17	15	14
November . .	22	16	14	20	20	20	26	21	22	22	19	18
December and January	18	31	16	26	10	19	21	18	20	22	19	19
All months .	22	19	16	21	14	17	24	22	23	22	17	18

Table XIII. shows wonderfully little difference between the different months, though April appears still slightly more variable than the others. A considerable majority of the observations on which Table XIII. depends were taken during hours when Curve 4 and Table X. agree in showing an increasing easterly declination; thus the slight numerical excess of the increasing over the decreasing "changes per minute" in the table is what we should anticipate.

§ 19. To throw further light on the representative character of the three days of special declination observations, I have found "mean changes per minute" in their case also, and give the results in Table XIV. The twenty-four hours have been subdivided, in hopes of obtaining some light as to the time of day when the

variability of declination is greatest. In this case we have uniform intervals of at least two different lengths on the same days, and so get some further insight into the question of the influence of the length of the interval on the "mean change per minute."

TABLE XIV.—"Changes per minute" of Declination, during three days' Special Observations.

Date.	Length of interval in minutes.	Noon to 6 P.M.			6 P.M. to Midnight.			Midnight to 6 A.M.			6 A.M. to Noon.			All day.		
		+	−	(+, 0, −1)	+	−	(+, 0, −)	+	−	(+, 0, −)	+	−	(+, 0, −)	+	−	(+, 0, −)
April 10–11	5	142″	22″	120″	57″	152″	97″	88″	46″	76″	200″	219″	205″	120″	121″	120″
	25	71	94	84	21	18	19	45	36	39	79	44	64	54	48	51
	60	—	—	29	—	—	16	—	—	11	—	—	46	—	—	24
May 30–31	15	12	13	11	17	17	17	15	13	14	19	20	19	16	16	16
	60	—	—	3	—	—	8	—	—	6	—	—	5	—	—	5
Jan. 2–3	15	42	36	40	17	24	21	18	18	14	29	32	29	30	27	26
	60	—	—	16	—	—	12	—	—	6	—	—	9	—	—	10

The results from 5-minute intervals on April 10–11 are less trustworthy than the others, because the successive readings on which they are based were taken, the one with magnet "erect," the other with it "inverted." This would almost certainly tend to increase the apparent variability.

If we compare the results for the six hours Noon–6 P.M. in Table XIV. with the corresponding results in Table XII.—the observations on which Table XII. depends being mainly taken in the afternoon—we infer that April 10–11 was decidedly more disturbed than the average absolute observation day in April. January 2–3 seems also somewhat more disturbed than the average day at that season; but May 30–31 would seem to have been exceptionally quiet. It is rather a curious coincidence that both on May 30–31 and January 2–3 the "mean change per minute" for the twenty-four hours, from the observations at 15-minute intervals, is absolutely identical with the mean change for the corresponding months as given in Table XII. for the longer declination intervals.

As regards the variability throughout the twenty-four hours, Table XIV. shows no decided difference between "day" and "night" in the case of May 30–31; but on the other two occasions the mean "change per minute" seems very decidedly larger between 6 A.M. and 6 P.M. than between 6 P.M. and 6 A.M. The first occasion was about a fortnight after the commencement of the polar night, the sun being below the horizon from the middle of May to the end of July.

As concerns the influence of the length of the interval on the "mean change per minute," the two last occasions in Table XIV.—going to a decimal further than in the table—give for the 15-minute interval values respectively 2·8 and 2·5 times as large as for the 60-minute interval, the mean being 2·7. On the first occasion the mean

from the 5-minute interval is 5 times, and that from the 25-minute interval is 2·1 times, as large as that from the 60-minute interval. If we combined the results from the 5 and 60-minute intervals with those from the 15 and 60-minute intervals, we should conclude that the mean change per minute from a 5-minute interval should be 50/27, or 1·9 times as large as that from a 15-minute interval. This is, however, probably too large an estimate, as the apparent variability in the 5-minute intervals is, as already explained, almost certainly exaggerated; also the ratio of the mean changes per minute from the shorter and longer ordinary declination intervals (averaging 5·5 and 14·3 minutes) should be only slightly less than the ratio from 5 and 15-minute intervals, and the values given for the former ratio by Tables XII. and XIII. are respectively 1·21 and 1·35.

It ought, of course, to be remembered that there is no reason to expect an absolute invariability in the ratio of the "mean changes per minute" from two sets of intervals of given different lengths, even when there are a large number of observations available. For all we know, such a ratio at a given station might vary appreciably according to the hour of the day, and the month, or the position of the year in the sun-spot cycle. These are not improbably questions that would repay investigation.

§ 20. To obtain some idea of how the variability of declination at Cape Adare compares with that in England, I examined all the absolute declination observations made at Kew during 1899. During each absolute declination observation there were three short intervals, whose mean length was fairly similar to that of the shorter intervals at Cape Adare. The following were the "mean changes per minute" found for the whole year, and for the months April, May, October, November, and December combined, these latter being the months during which practically all the observations at Cape Adare were taken. No observations are omitted.

"Mean changes per minute" in Declination at Kew.

All year 1899.			April, May, October, November, December.		
+	−	+, 0, −	+	−	+, 0, −
3″·7	4″·1	3″·0	4″·1	2″·8	2″·7

For both periods the mean length of the interval between successive readings was 4·3 minutes.

As no observations at Kew were omitted, the fairest comparison is between the above data and those answering to the shortest declination interval in Table XII. From this we should infer that the variability of declination at Cape Adare was about ten times as great as the simultaneous variability at Kew.

It should, however, be noticed that the mean change of declination between two successive readings at Kew averaged only about 12″, and that the variability is

consequently most likely somewhat under-estimated, as the magnetometer reads only to 10″. On the other hand, as a partial compensation, the magnetometer used at Cape Adare, though practically of the same pattern as the Kew one, reads only to 20″.

Variability of the Horizontal Force at Cape Adare.

§ 21. On most observation days the values of X_1 and X_2 are the only data from which any estimate can be made of the change of force. The vibration and deflection experiments occupied respectively about 13 and 35 minutes; thus X_1 and X_2 do not answer like individual declination observations to certain definite instants, and the usual assumption that they correspond to the values of the force at the mean times of the two experiments is exposed to some uncertainty. Again, the operations determining X_1 and X_2 are wholly different in character, so that there is no reason why personal errors in observers, or instrumental defects, should tend to be eliminated when we consider the difference $X_1 \sim X_2$. Any error, for instance, in the monthly mean value assigned to m influences X_1 and X_2 in opposite directions.

On a few days more than one vibration was taken, and then we get two changes of force, of which one may be between two values of X_1. As a rule all observations on one day were due to the same observer, but there were a few exceptions.

Table XV. treats of all the observed changes, except those depending on the deflection experiments on April 20 and May 6, already classified as probably affected by error.

The observed change in each case has been divided by the interval in hours between the mean time of the two observations concerned, and the quantity actually tabulated in Table XV. is the mean for each month or group of months of these "mean changes *per hour*." As the existence of possible individual peculiarities was of importance, the data from each of the two observers were in the first instance examined separately.

TABLE XV.—"Mean Changes per hour" of Horizontal Force (Unit = 1 γ).

Months	April.	May and June.	October.	November.	December and January.	All.
Observer B . . .	25	27	5	24	10	20
„ C . . .	21	52*	6	11	6	19
Both observers . . .	20	36*	6	15	8	19

The two observers appear so similar that it seems unnecessary to consider further the source of each individual observation.

* These figures become respectively 41 and 32 if we omit a result based on a very disturbed and incomplete vibration experiment on June 1.

The apparent mean changes in April and May are conspicuously large. One might be disposed to attribute this mainly to experimental errors—as these necessarily contribute something—the observers improving with increased practice and experience. October, however, shows the smallest apparent changes, and as no observations had been taken for 4 months previously, the observers would naturally be less in practice then than during May.

§ 22. Table XV. is affected by several sources of uncertainty. The interval τ between the times of the vibration and deflection experiments varied considerably, and in a few cases we have differences between two values of X_1 or of X_2, and not between an X_1 and an X_2. I have thus included in Table XVI. only instances in which the difference is between an X_1 and an X_2, and have treated separately the cases in which the interval τ was less than an hour, or lay between 1 and 2 hours. The few instances in which τ exceeded 2 hours are excluded.

TABLE XVI.—Changes in Horizontal Force during Absolute Observations.

Month.	Interval τ less than one hour.				τ between one and two hours.			
	Number of cases.	Mean τ in hours.	Mean change per occasion + −.	Mean change per hour + −.	Number of cases.	Mean τ in hours.	Mean change per occasion + −.	Mean change per hour + −.
April	4	0·94	24	26	4	1·29	49	38
May and June . .	1	0·97	21	22	8	1·28	49	38
October.	6	0·86	6	7	1	1·25	3	4
November. . . .	7	0·82	13	16	7	1·52	23	15
December and January	3	0·74	11	14	3	1·44	5	3
All	21	0·85	13	16	23	1·37	33	24

Table XVI. agrees with Table XV. in showing decidedly smaller changes in the later months than in April and May. These 2 months are also singular in that the mean change per hour is larger for the longer intervals than for the shorter. The number of cases is, however, too small to warrant much significance being attached to this.

When the differences between the later and earlier observations on each day are treated algebraically, the conspicuous irregularity in the signs suffices to show that the regular diurnal variation is comparatively unimportant as compared to irregular variations.

§ 23. Table XVII. embodies an attempt to ascertain whether changes of horizontal force were conspicuously large at any particular hour of the day. It was constructed as follows:—Suppose that an observation occupied 2·7 hours, lying between 1 P.M. and 4 P.M., and that the observed difference $X_1 \sim X_2$ was 54 γ. Then the change

was at the mean rate of 20 γ per hour, and accordingly 20 is entered under each of the 3-hour intervals—1 to 2, 2 to 3, 3 to 4. The quantities appearing in the table are the means of the numbers thus entered under each hour interval, each month being treated separately. The final means allow equal weight to each observation, not to each month. The data inside the brackets depend each on only one observation.

TABLE XVII.—"Mean Changes per hour" in Horizontal Force.

Hour interval	11	Noon	1	2	3	4	5	6	7	8	9
Month.											
April	18	17	16	11	20	31	—	—	—	—	
May and June	35	43	38	20	40	43	[43]	—	—	—	
October	9	7	6	[2]	—	[2]	7	—	—	[0]	
November	[7]	[7]	[7]	—	21	19	14	16	11	[1]	
December and January	—	—	—	—	—	3	10	10	[1]	[1]	
All	20	23	19	14	27	20	13	14	9	1	

Between 11 A.M. and 7 P.M. the variability shown in Table XVII. seems fairly uniform. After 7 P.M. the data are too few to possess much weight; but they certainly suggest a reduced variability.

Comparison of Variability in Declination and Horizontal Force.

§ 24. With a horizontal force of ·04143 C.G.S.—the mean value in Table III.—a change of 1° in declination answers to a disturbing force of 72 γ perpendicular to the magnetic meridian. This supplies a basis for comparing the changes in declination and horizontal force. It will be noticed that, so far as concerns the *amplitude* of the horizontal force, changes in the component in the mean magnetic meridian are alone of practical moment, so long as the changes are small.

A source of uncertainty arises from the difference in the lengths of the intervals over which the changes in horizontal force and declination were measured. For the horizontal force the mean intervals in the two groups of Table XVI. are respectively 0·85 and 1·37 hours. If we take the arithmetic mean of the results for the "mean change per hour" given by the two groups, we may regard the data obtained as fairly representative for intervals of 1 hour. In the case of the declination, hourly observations are obtainable only from the special days' results included in Table XIV. We can, however, obtain at least a fair idea of the "mean changes per hour" in declination on the absolute observation days by modifying the data for the longer and shorter intervals in Table XII. in the light of the considerations advanced in § 19. Table XVIII. has been calculated by assuming $\frac{1}{3}$ and $\frac{1}{4}$ as the factors necessary to

reduce "changes per minute" (or "per hour") of declination based respectively on intervals of 14·3 and 5·5 minutes to "changes per minute" (or "per hour") based on hourly intervals.

TABLE XVIII.—"Mean Changes per hour" answering to Observations at hourly Intervals.

	Declination "changes per hour" on absolute observation days.			"Changes per hour" of westerly force.		"Changes per hour" of horizontal force or its component in magnetic meridian.
	From 14·3-minute intervals.	5·5-minute intervals.	Mean.	Absolute observations.	Special 3 days.	
April	17′	15′	16′	19 γ	29 γ	32 γ
May	5	12	9	10 γ	6 γ	30 γ
October	5	8	7	8 γ	—	6 γ
November	10	11	11	13 γ	—	16 γ
December–January	9	5	7	8 γ	12 γ	9 γ
All	10′	9′	9′	11 γ	16 γ	20 γ

Considering the many uncertainties, it would be ridiculous to attach importance to details in Table XVIII. It shows, however, pretty convincingly that, though at first sight the changes in declination at Cape Adare seem quite out of proportion to the changes in the force, this is not really the case; but that, as a matter of fact, the changes in direction and intensity are occasioned by disturbing forces which are of the same order of magnitude. As to whether the disturbing forces affecting the different elements arise from a common source, or from a variety of common sources, there is no evidence.

§ 25. As to the relative size of disturbing forces at Cape Adare and Kew, we see from Table XII. that the "mean change per minute" in the westerly component of force at Cape Adare from the short declination intervals averaged $(35 \times 72 \div 3600)\,\gamma$, *i.e.*, $0{\cdot}70\,\gamma$. During the same months at Kew the short declination intervals supply for the same quantity the value $0{\cdot}24\,\gamma$. Thus, even absolutely considered, the disturbing forces at Cape Adare would seem very decidedly larger than those at Kew. It should be mentioned, however, that the declination observations at Kew were mostly taken at about 1 hour of the day, while those at Cape Adare were scattered over 7 or 8 hours, so that the parallelism between the data is incomplete.

Disturbances and Aurora.

§ 26. The observers' note books mention the following as occasions on which disturbances were observed sufficiently marked to render ordinary observations of declination or horizontal force impossible :—

April,	1899.	5th (8.30 to 10 A.M.); 6th (2 P.M.); 8th (noon); 11th (4 P.M.); 13th (4.30 to 6 P.M.).
May,	,,	22nd (time not stated); 23rd (9.40 P.M.).
October,	,,	25th (morning); 26th (morning, and at 3.30 P.M.).
November,	,,	22nd (most of the day); 23rd (all day, especially about 4 P.M.).; 24th (all day).
December,	,,	20th (4 P.M. to 7 P.M.); 21st (morning, after 6.30 A.M.); 23rd (noon); 30th (most of the day, especially at 4 P.M.).

The disturbances observed during November 23 and 24 seem to have been specially prominent; between 4 h. 10 m. and 4 h. 17 m. (P.M.) on the 23rd the declination changed by 1° 12′⅓.

As observations were seldom attempted throughout more than a limited portion of the day, and were wholly omitted during the coldest months—owing to difficulties from the freezing of moisture on the glass of the instruments—there may have been disturbances much greater than those actually observed.

An examination of the Kew declination and horizontal force magnetograms did not disclose any specially notable disturbances at times corresponding to any of the above dates. There was a good deal of magnetic disturbance during November 21 to 23, and on several other occasions there were moderate disturbances approximately corresponding in time with some of those recorded at Cape Adare. On the other hand, some of the times noted as disturbed at Cape Adare occurred on what were at Kew "quiet" days.

§ 27. There are frequent references to aurora in the observers' note-books during April, May, and early in June. On several occasions aurora was seen on days when magnetic disturbances were prevalent, but the only occasion on which notes appear of simultaneous observations of aurora and magnetic movements was during the special declination observations on May 30–31. There was a moderately bright aurora on the evening of May 30. It was brightest and most in motion between 7 and 7.30 P.M.; after that it became diffused. The movement of the magnet was most conspicuous during the active time of the aurora. During fluctuations of the aurora there were oscillations of the magnet superposed on a drift towards the east. This was followed, after the aurora became diffused, by a more regular and gradual return to the west. The aurora on May 30 was a comparatively tame one, and the movements of the magnet on that occasion were relatively far from big.

The aurora appeared, normally, at least, in the north; but there is no very precise record of the azimuth of the crown of the arches—when these existed—relative to the magnetic meridian.

Miscellaneous Observations.

§ 28. Observations of inclination were taken at several places in the Antarctic besides Cape Adare. Table XIX. gives particulars, including the values at Cape

Adare to facilitate comparison. When observations were taken with only one needle, corrections of + 0′·2 and − 0′·2 are applied to results obtained with needles 1 and 3 respectively (see § 5).

TABLE XIX.

Date.	Latitude South.	Longitude East.	Needle 1.	Needle 3.	Mean.	Circumstances.
1899.	° ′	° ′	° ′	° ′	° ′	
January 2 . .	63 43	160 11	83 18·9	—	83 19·1	On ice pack.
„ 3 . .	63 43	160 37	—	83 7·7	83 7·5	„ „
At Cape Adare .	71 18	170 9	—	—	86 34·4	
1900.						
February 4 . .	73 17	168 31	87 18·4	87 18·5	87 18·5	14 miles west of Coulman Island, on ice attached to barrier.
„ 6 . .	74 23	164 3	88 3·7	88 1·5	88 2·6	On shore, at foot of Mt. Melbourne in Wood Bay.
„ 8 . .	75 18	163 32	—	87 47·1	87 46·9	On ice barrier.
„ „ . .	75 42	163 29	87 34·8	—	87 35·0	„ „
„ 9 . .	76 12	168 20	86 52·9	86 51·6	86 52·2	On pebbly beach, on west side of Franklin Island.

Declination observations were taken on two or three occasions during the return voyage with the magnetometer, but the data are hardly complete enough to justify the acceptance of the results as reliable. In the Antarctic, the declination changes rapidly with the geographical position, and the diurnal variation and irregular movements are likely to be so large that isolated observations can claim but little weight.

The only other observation requiring to be mentioned is a determination of the horizontal force at Hobart on April 22, 1900. The site is described as "in Botanical Garden, about 20 yards from spot where Transit of Venus Expedition took observations." The value obtained was ·20369 C.G.S. unit. The corresponding value obtained for the magnetic moment, viz., 806·8, is slightly less than the values found at Cape Adare three months before; but the diminution is, under the circumstances, by no means excessive.

Comparison with previous Observations.

§ 29. During the memorable voyage of the "Erebus" and "Terror," under Sir JAMES ROSS and Captain CROZIER, numerous observations of inclination, total force, and declination were made in Antarctic regions. SABINE deals with the results in his "Contributions to Terrestrial Magnetism, No. XI."; the inclination data which concern us appear on his pp. 397–8, where he summarises the results obtained

between November, 1840, and April, 1841. He mentions the latitude and longitude to which each result applies, and the number of observations it depends on. Dividing the earth's surface into unit areas, each bounded by consecutive degree lines of latitude and longitude, I have calculated means for each unit area near the localities where observations were taken in 1900, weighting each of SABINE's results according to the number of observations. The results appear in Table XX. The latitudes and longitudes given in the table are means obtained exactly in the same way as the inclinations themselves. In most of the unit areas the individual data were not conspicuously different, but in the first unit area dealt with there was fully 1° between the two data given by SABINE; in this case accordingly the data are given separately. The number of observations is specified, in order to afford some idea of the reliance to be placed on the various means. In the last three columns of Table XX. appear means from the previous columns; these allow equal weight to the data in the previous columns irrespective of the number of observations.

TABLE XX.—Data obtained by "Erebus" and "Terror" in 1840–1841.

South latitude.	East longitude.	Number of observations.	Inclination.	*Means from previous columns.* Latitude.	Longitude.	Inclination.
63° 43′	160° 15′	2	82° 32′	63° 48′	160° 35′	83° 7′
63 52	160 55	6	83 41			
70 23	167 31	20	86 18	71 12	170 4	86 17
71 25	170 50	16	86 9			
71 48	171 52	8	86 24			
72 12	171 48	2	86 30			
73 54	171 21	26	87 25			
74 56	168 55	2	87 58			
74 46	169 7	12	88 20			
74 15	171 20	2	87 27			
75 30	167 47	6	88 26	76 6	168 14	88 22
75 22	168 36	9	88 25			
75 3	169 1	2	88 2			
76 30	165 22	19	88 43			
76 3	166 5	1	88 25			
76 6	168 8	11	88 34			
77 7	169 56	2	88 29			
77 9	170 57	2	87 52			

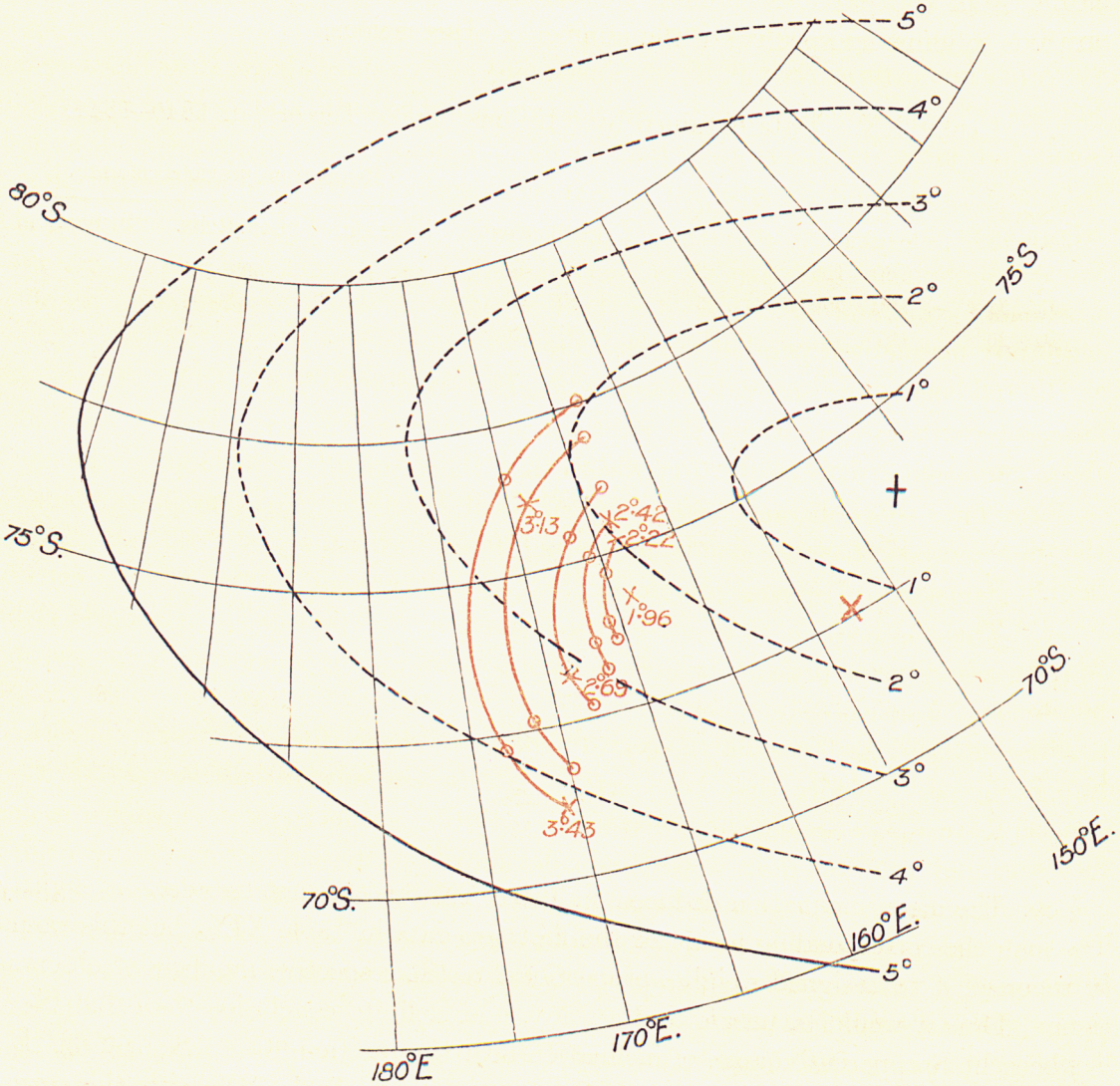
§ 30. The mean inclination deduced in Table XX. for the first two data is slightly less than the corresponding mean for the first two data in Table XIX., but this would be reversed if we assigned weights proportional to the respective numbers of observations. Thus it would be unsafe to draw any more definite conclusion than that there has been little apparent change of inclination near the position 63° 45′ S., 160° 30′ E., during the last 60 years. Comparing the next mean in Table XX. with the corre-

sponding result in Table XIX., we should again infer a very slight secular change of inclination near Cape Adare. If anything, the change would seem to have been an increase.

The last mean in Table XX. answers to a position very close to that answering to the last result in Table XIX. We should here infer a very decided diminution of the inclination; each of the eight separate data on which the final mean in Table XX. is based points in the same direction. There is thus pretty strong evidence of a considerable fall of inclination near 76° S., 168° E.

In 1840–1 there were unfortunately no inclination observations between latitudes 72° S. and 75° S., in longitudes less than 168°, so that no direct comparison is here possible between the two tables.

Fig. 2.



§ 31. Partly with a view to bridging this gap, I give in fig. 2 an enlarged reproduction of part of SABINE'S inclination chart for Antarctic regions. Instead of the inclination I give its complement, as shorter to write, and more suggestive near the magnetic pole. SABINE gives isoclinals for 5° intervals up to 85°, that for 85° being an almost perfect ellipse. A considerable part of it is represented by a broken line to denote the absence of actual observations, and doubtless the regularity of the contour is partly ascribable to the absence of data. Still the chart represents the form considered most probable, as a representation of the general features, by the leading British expert of his time, who, in addition to a most extensive knowledge of observational facts, had considerable familiarity with GAUSS' theoretical work.

The presumptive position of the magnetic pole is shown in SABINE'S declination chart at about 73° 30′ S., 147° 30′ E. In Chart VI. attached to vol. 2 of Professor J. C. ADAMS'S 'Collected Papers,' it is indicated with greater definiteness at about 73° 40′ S., 147° 7′ E. The two positions differ but slightly; the latter seems very nearly the centre of SABINE'S isoclinal for 85°. This isoclinal is marked as 5° in fig. 2, the other isoclinals marked 4°, 3°, &c., answering, as explained above, to inclinations 86°, 87°, &c. These other isoclinals are not given by SABINE, and may be regarded as somewhat more imaginary than that for 85°. I simply drew them freehand, so as to be similar and similarly situated to SABINE'S isoclinal; they are practically ellipses, whose axes diminish in arithmetical progression. The chief reason for assuming this law of diminution was that it is that suggested by the relative size of SABINE'S isoclinals for 85° and 80°; it is also the law that one would encounter in a sphere uniformly magnetised parallel to a diameter.

The red curves are isoclinals based on the last six data in Table XIX. The crosses answer to actual observations, the circles to secondary points arrived at by combining the observational data on the hypothesis that the gradient of inclination change is uniform for a short distance along any specified direction. For example, prolonging the line joining the two points answering to co-inclinations of 1°·96 and 2°·69 to double its length, we come practically to a secondary point on the isoclinal marked 3°·43. This method has to be used with discretion, and perhaps its strongest claim to recognition in the present instance is its success in giving smooth curves presenting no obvious inconsistencies.

These curves are certainly very different in shape from SABINE'S isoclinals. Supposing provisionally that both sets of curves are substantially correct in their general features, we should infer that since 1840 the isoclinals have expanded in one direction and contracted in a perpendicular direction, these directions being nearly coincident with the shorter and longer principal axes respectively of SABINE'S ellipse. The magnetic pole seems to have moved in a north-easterly direction from the position it occupied in 1840–1. The red cross marks the position which the red curves suggest as the most probable in 1900.

Before adopting this graphic method I investigated analytical formulæ for the

isoclinals, assuming them to be concentric, similar and similarly situated conics. The conics proved, however, to be hyperbolas, not ellipses, and the results appeared unsatisfactory on physical grounds.

§ 32. The conclusions derived from the inclinations are supported by the declination results, so far as these go. SABINE's isogonal for 45° E. passes very close to Cape Adare, if anything slightly to the south of it, and lies about 100 miles to the north of his isogonal for 55° E., the present value of the declination at Cape Adare. Again, a compass observation on board ship on February 4, 1900, in 73° 17′ south latitude and 168° 31′ east longitude, made the declination about 96° E. To reach so large an easterly declination in this longitude we should have to go to a considerably higher latitude on SABINE's chart. These data are perhaps of no very great weight by themselves, because the "Erebus" and "Terror" did not observe very close to Cape Adare, and in the neighbourhood of a magnetic pole the rate of change of the declination, especially with the latitude, is very rapid. Still the fact that the declination and inclination data point to the same conclusion should carry considerable weight, especially as those responsible for the data and their reduction had no preconceived opinions on the subject.

[*January* 23, 1902.—SABINE, *loc. cit.*, also gives tables and a chart for the total force, as found with Fox circles on the "Erebus" and "Terror." His chart gives the lines of equal total force 11·00, 12·00, &c., British Units, 15·00 B.U. (or ·6916 C.G.S.) being the largest value for which a curve is drawn. This curve is a figure of 8, Cape Adare lying slightly *inside* the southernmost loop, which is much the larger. Amongst the values of total force on SABINE's p. 408, there are only six answering to places distant from Cape Adare by less than 1° of latitude and 3° of longitude. The mean from these data are as follows, the present values for Cape Adare being given for comparison :—

Data from	Latitude S.	Longitude E.	Total force. B.U	Total force. C.G.S.
"Erebus" and "Terror" in 1840–41 . .	71° 15′	170° 19′	15·11	·6967
Cape Adare, 1899–1900.	71 18	170 9	15·05	·6938

The agreement is rather remarkable. No conclusion can safely be drawn as to the sign even of the secular change.—C. C.]

Concluding Remarks.

§ 33. The observations dealt with in this paper were taken, many of them, under disadvantageous conditions and with a limited instrumental outfit; and various of the conclusions here put forward as probable must be accepted with reserve. The

zeal and care, however, displayed by the observers—often under serious physical discomfort—seemed to merit an attempt to do full justice to their work, and I hope that the efforts which I have made in this direction will prove not to have been thrown away.

The Antarctic expeditions which have recently set out, or are now in contemplation, may, with ampler means of magnetic observation, obtain so rich a store of facts as to throw those here dealt with wholly into the shade. The difficulties and dangers, however, of Antarctic exploration are so great that success, though much to be hoped for, cannot be confidently anticipated for all the expeditions. And, however great the success may be in acquiring observational data, the present paper may not improbably help to direct attention to special points which otherwise might be overlooked.

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PART II.

METEOROLOGICAL OBSERVATIONS,

TAKEN BY

THE STAFF OF THE "SOUTHERN CROSS,"

INCLUDING

THE LATE DR. HERLOF KLOVSTAD, M.A., M.D., THE LATE MR. NICOLAS HANSON, MR. H. EVANS, MR. A. TONGNER, MR. L. BERNACCHI, F.R.G.S., AND SUB.-LIEUT. W. COLBECK.

REDUCED UNDER THE SUPERINTENDENCE OF

W. N. SHAW, F.R.S., Secretary of the Meteorological Council,

WITH AN INTRODUCTION AND NOTES BY

L. BERNACCHI, F.R.G.S.

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METEOROLOGICAL OBSERVATIONS AT CAPE ADARE (LAT. 71° 18′ S.; LONG. 170° 9′ 30″ E.) AND ON BOARD THE "SOUTHERN CROSS."

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PREFACE.

The Meteorological Tables and Notes on pp. 63 to 97 have been prepared under the direction of the Meteorological Council at the request of the Royal Society, from the fair copy of the observations made on board the "Southern Cross," and at Cape Adare by members of the "Southern Cross" Expedition.

The marine observations have been summarized in the Marine Branch of the Meteorological Office, under the superintendence of Commander Campbell Hepworth, C.B., R.N.R., and the observations at Cape Adare have been tabulated and prepared for publication by Mr. J. A. Curtis and the Staff of the Land Branch of the Office.

Mr. Bernacchi has written an introduction, giving particulars of the instruments used and the method of exposure; and he has added, besides some notes on the Aurora Polaris, a paper on the relation between winds and temperature at Cape Adare, which exhibits very remarkable peculiarities. Mr. Bernacchi finds in this relation a confirmation of the hypothesis supported by Sir J. Murray and others, that a region of high barometer exists in the Southern Polar Regions.

W. N. SHAW,

Secretary of the Meteorological Council.

INTRODUCTION.

The meteorological data here reduced are the results of the observations taken within the Antarctic Regions by the "Southern Cross" Expedition during the years 1899–1900.

This expedition was organised at the expense of Sir George Newnes, Bart., M.P., and was commanded by Mr. C. E. Borchgrevink. It left London on August 22nd, 1898, and reached Cape Adare, in longitude 170° 9′ 30″ E., latitude 71° 18′ S., on February 17th, 1899. Here the scientific members of the party landed and made their camp, and remained until the return of the ship on January 28th, 1900. The camp was then broken up, and the instruments and stores, &c., taken on board the ship, which on February 2nd proceeded south, reaching, on February 16th, 78° 35′ S., whence, by a sledge journey, 78° 50′, the farthest known south, was reached by Mr. Borchgrevink and Lieut. Colbeck, R.N.R., on the same day.

The Cape Adare observations cover a period of eleven months, namely, from the 3rd March, 1899, to the 28th January, 1900.

In addition, observations were taken on board the "Southern Cross" while anchored off Cape Adare from February 18th to 28th, 1899. These observations will be found printed on p. 63.

Cape Adare, the winter quarters of the expedition, is the extremity of a peninsula about 20 miles long, forming the north-eastern shore of a large bay (Robertson Bay, *see* frontispiece map). The figures given for the latitude of the station are the mean of a series of meridian and circum-meridian observations of the sun taken with a sextant and an artificial mercury horizon, and the longitude is that derived from an occultation of the planet Saturn by the moon on November 6th, 1899, observed through a 3½-inch telescope by Ross, London.

The meteorological observations, both at Cape Adare and on board ship, were made under my personal direction and supervision. The duty of reading of the instruments, &c., was divided among the following members of the scientific staff:—

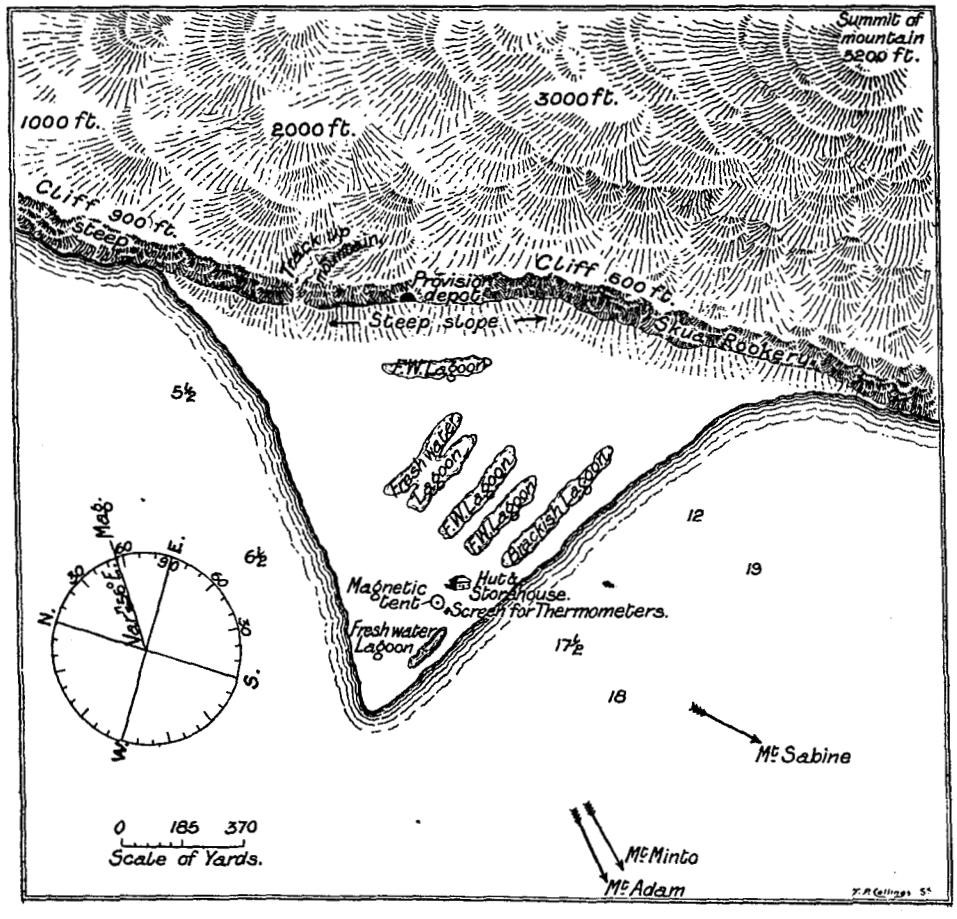
Messrs. Bernacchi, Colbeck, Evans, Hanson, and Tongner,

all of whom had a thorough knowledge of the instruments and methods employed, and could be relied upon for accuracy, regularity, and honesty.

On board ship, observations were taken every two hours throughout the day and night. During ten months at Cape Adare observations were taken every two hours from 9 a.m. to 9 p.m., but from June 13 to July 31 observations were made every two hours night and day.

The meteorological station was situated on a pebbly bank facing the open sea on the N. and W., and Robertson Bay on the S. and SW. Behind, to the E. and SE., was a range of mountains averaging 3,000 feet in height, the base of which was 1,000 yards from the meteorological screen.

The height of the station above mean sea-level was 19 feet, as determined on the 4th January, 1900, by a series of simultaneous barometric observations on the ice in Robertson Bay and at the hut. Appended is a sketch map of the locality :—



SKETCH MAP, CAPE ADARE CAMP.

The instruments employed were as follows: –

Barometer.

A Kew pattern marine barometer, by Adie, London, with attached thermometer to register as low as – 10° Fahr.

This instrument was compared with the standard instrument at the Kew Observatory, before the departure of the expedition in August, 1898, and again in April, 1901, after its return.

The following is a copy of the corrections :—

No. of Instrument and Maker's Name.	Corrections at							Where and when compared.
	27·5	28·0	28·5	29·0	29·5	30·0	30·5	
No. 2,429 by Adie, London	–0·005	–0·004	–0·004	–0·003	–0·002	–0·002	–0·001	Kew Observatory, August, 1898.
No. 2,429 by Adie, London	–0·009	–0·007	–0·006	–0·004	–0·002	–0·000	+0·001	Kew Observatory, April, 1901.

At Cape Adare the instrument was suspended in a perfectly free and vertical position in a small shed attached to the hut.

The height of the cistern above the mean sea level was 21 feet.

The instrument rarely suffered from sudden changes in temperature, and gave entire satisfaction during its suspension.

Thermometers.

All the thermometers used were constructed by Messrs. Negretti and Zambra, London, and were compared with the standard instruments at the Kew Observatory.

The following is a copy of the corrections :—

Maker's Name.	Corrections at							Date of Comparison at Kew.
Negretti and Zambra.	Freezing point of mercury.	2°	12°	22°	32°	42°	52°	
Dry bulb, No. 90060 ..	Not graduated below 10° F.			−0·3	0·0	0·0	0·0	August, 1898.
				−0·3	0·0	0·0	0·0	April, 1901.
Wet bulb, No. 90059 ..				−0·2	0·0	0·0	0·0	August, 1898.
				−0·3	−0·1	−0·1	0·0	April, 1901.
Dry bulb, No. 90151	—	−0·4	−0·3	−0·3	−0·1	−0·1	−0·1	August, 1898.
Wet bulb, No. 90149	−37·3	−0·4	−0·3	−0·2	0·0	0·0	0·0	August, 1898.
Maximum, No. 90071 .	−38·7	−0·3	−0·3	−0·2	0·0	−0·2	−0·2	August, 1898.
	−38·7	−0·3	−0·2	−0·2	−0·1	−0·3	−0·3	April, 1901.
Minimum, No. 90072 ..	−37·5	−0·3	0·0	+0·1	0·0	0·0	0·0	August, 1898.
	−37·5	−0·3	−0·1	0·0	−0·1	−0·1	−0·1	April, 1901.
Solar radiation, No. 90018 ..		Correct from 32° to 152°						August, 1898.
Spirit thermometer, No. 90152	−37·0	−0·2	−0·1	0·0	0·0	0·0	0·0	August, 1898.
Spirit thermometer, No. 90153	−37·0	−0·2	−0·1	0·0	0·0	0·0	0·0	August, 1898.

The thermometers were placed in a Stevenson screen 4 feet above the ground and 200 yards from the huts.

The hygrometer employed was Mason's dry-bulb and wet-bulb hygrometer. Every care was taken to ensure that the wet-bulb gave the true temperature of evaporation, but it was not easy to secure this with such low temperatures as were experienced, and the results, therefore, must be accepted with some reserve.

Glaisher's tables (5th Edition, London, 1869) have been employed for the hygrometrical deductions shown on p. 86.

The maximum thermometer was of the Negretti and Zambra type, and the minimum was of the Rutherford pattern.

Both instruments gave entire satisfaction and no defect was noticed in the minimum thermometer through the volatilizing of the spirit. The observations were entered to the day and hour on which they were read.

The Maximum Solar Radiation Thermometer (blackened bulb *in vacuo*) was exposed on the north side of the thermometer screen, about 4 ft. 6 in. above the ground, and with the bulb towards the west. This instrument was broken in April, 1899, by a shower of small stones during a heavy south-easterly gale.

The temperatures throughout are expressed in degrees of Fahrenheit's scale.

Wind.

The *true* direction of the wind was invariably recorded at Cape Adare. At first this was obtained by means of a wind-vane, correctly placed in the meridian, and, when that was demolished by the ESE gales, by a diagram drawn on the top of the thermometer screen, indicating by means of pointers the true direction of the compass.

The velocity of the wind was estimated by the Beaufort Scale, 0–12, and was also obtained by two strong Robinson anemometers, fixed on the roof of the hut.

These anemometers were made by Ross, London, Nos. 360 and 361, and were found to give results within 4 per cent. of the Kew standard instruments.

Both anemometers were completely demolished by the strong ESE gales, one in May and the other in November of 1899, when the record of nominal velocity of the wind exceeded 90 miles an hour.

Miscellaneous Instruments.

Snow Gauge.—This instrument was of the Snowden pattern, and was made by Ross Ltd., London, No. 540. It was circular, and 5 inches in diameter.

The gauge was placed in an exposed position about 1 foot above the ground, and 18 feet above sea-level. The amounts measured were entered to the day and hour on which they were read. The gauge, however, collected little on account of the very small amount of snowfall near sea-level, precipitation taking place during most of the year in the form of very fine hard ice crystals, and in too small quantities to be measured by an ordinary snow gauge.

Sunshine Recorder.—An instrument of the Campbell-Stokes type, made by Ross Ltd., London, was employed. It was compared with the standard instrument at Kew Observatory, and found to record bright sunshine satisfactorily. The time scale was also examined and found correct.

This instrument was accurately placed in the meridian and fixed on to the top of the thermometer screen.

The instrument did not record the amount of sunshine when the sun was below the pole. For this purpose, either two instruments would have been necessary, or an instrument specially constructed to keep a continuous record.

A Thermograph and Barograph, constructed by Hicks, London, after the Richard pattern, were included in the equipment.

The Barograph was especially made to record low barometric pressure, and, excepting when the pressures were high, gave satisfaction. The rate of the driving clock, however, was frequently irregular. On an average, the rate was a gaining one of about 1 hour 30 min. per week.

The Thermograph recorded temperatures as low as − 45° Fahr. The curves, on the whole, are not satisfactory. Those taken during the cold winter months, and during heavy south-easterly winds when the sky was obscured by drifting snow, are fairly trustworthy, but those of the summer months are unsatisfactory, on account of the instrument not being so well exposed as the thermometers in the screen. The best exposure available was that afforded by a wooden packing case, about 3 feet long, 1 foot 6 inches wide, and 2 feet deep, perforated with a number of small holes. The instrument was placed on a box or stand about 4 feet high, and was covered with a small wooden box, which also had holes bored in its sides and top. The large case was then placed in an inverted position over all. The driving clock of this instrument also had a large gaining rate of nearly two hours per week.

REDUCTION OF THE OBSERVATIONS.

The reduction of the observations has been executed at the Meteorological Office under the superintendence of Mr. J. A. Curtis. The tabulated results are given in pages 64 to 85, one month's observations being exhibited at each opening.

The tables are arranged as follows :—(1) Pressure and Remarks. (2) Clouds, Bright Sunshine, and Precipitation. (3) Air Temperature, Depression of Wet Bulb, and Wind Direction and Force.

Pressure.—The barometer readings have been corrected for instrumental error, the corrections employed being the means of those determined at Kew in 1898 and 1901. They have also been reduced to the temperature of 32° Fahr., but no correction for height above mean sea level has been applied.

The correction to reduce to the gravity of lat. 45°, as stated at the head of the table on page 86, is + ·060 in., but this correction has not been applied to the readings.

Temperatures.—The dry-bulb and wet-bulb thermometer readings have all been corrected for instrumental errors, the corrections employed being those determined at Kew in 1898. During a part of the summer a different pair of

thermometers was in use, and these instruments were re-compared in 1901. The errors then determined were almost identical with those found in 1898. The mean corrections have been employed for the readings taken with these instruments.

The dry-bulb and wet-bulb thermometers employed during the winter were left on board the ship "Southern Cross," and could not therefore be re-tested in 1901.

In those cases where the wet-bulb reading, when corrected, was higher than the dry-bulb, saturation was assumed, and the reading of the wet-bulb brought down to agree with that of the dry-bulb. The readings of the wet-bulb thermometer have not been printed in full, but the differences between them and the indications of the dry-bulb thermometer (depression of wet-bulb) are shown side by side with the air temperature.

Maxima and Minima.—The readings of the maximum and minimum thermometers have all been corrected for instrumental errors, the corrections employed being the means of those found on comparison at Kew in 1898 and in 1901. (It may be noted that the errors of the four thermometers that were re-tested in 1901 were all within $\pm 0^{\circ}\cdot 1$ of those determined in 1898.) The readings of the maximum and minimum thermometers were taken each day at 9 a.m., and they have been entered in the tables to the days on which they were read. The entries, therefore, as printed, must be taken as referring to the 24 hours ending at 9 a.m. on the day against which they appear.

It occasionally happened that the extreme temperatures were inconsistent to a slight extent with one or more of the dry-bulb readings over the same period. These inconsistencies have been held to be due to the superior sensitiveness of the dry-bulb thermometer, and in consequence the reading of the dry-bulb has been accepted as the extreme in these cases.

The *Solar Radiation* thermometer (black bulb *in vacuo*) was found to be correct at all points of the scale from 32° to 152°, when tested at Kew in 1898. Its readings, therefore, have been printed as entered in the note book. Unfortunately this instrument was broken in 1899; there was no reserve instrument, and from that time onwards the only information as to solar radiation was that obtained by means of an ordinary thermometer, with blackened bulb, which was freely exposed 4 feet 6 inches above the ground, and which was read at each observing hour. The extremes of temperature in the sun's rays cannot therefore be shown.

It is obvious that with observations beginning at 9 a.m. and closing at 9 p.m. each day, the true daily means of temperature and pressure cannot be shown. For the latter part of June, however, and for the whole of July, observations were taken from 1 a.m. to 11 p.m., and for these periods the true means have been inserted.

For the whole series of tables the means of the readings at 9 a.m. and 9 p.m. of air temperature have been inserted as an approximation to the true daily mean, while on pp. 86–87 will be found a summary of all the observations at 9 a.m. and at 9 p.m. on the International Form B, the form in general use for the representation of climatological data at stations with a normal equipment.

Clouds.—The entries of cloud form are according to Howard's classification, but in some instances it was found difficult to assign the cloud to any one or more of the accepted forms, and consequently other terms have been employed. Those most frequently used are Drift, to indicate the presence of drifting snow, rendering observations of cloud impossible, and Fracto-Nim. (usually printed "Fr. Nim.") to indicate small broken clouds, like disintegrated nimbus.

The amount of cloud has been estimated by the scale 0–10, where 0 = quite clear, and 10 = entirely overcast.

Winds.—As previously stated, the entries of the wind-direction are according to true bearings, while the wind-force was, estimated according to Beaufort's scale, 0–12.

Sunshine.—The values of bright sunshine entered are the amounts registered by the Campbell-Stokes recorder on the days against which they appear.

Rainfall.—The amounts of precipitation shown in the tables are those referring to the 24 hours ending at 9 a.m. on the days against which they appear.

Summaries.—On pages 86, 87 are tables of monthly summaries giving the normal climatological data, based on the observations taken at 9 a.m. and at 9 p.m., while statistics of the number of observations of the wind from the several directions, arranged according to the hours of observation, will be found on pp. 88, 89; the form of cloud, pp. 90, 91; the air temperature, p. 92; the depression of the wet-bulb, p. 93; the pressure, p. 94; the wind-force, p. 95; and the amount of cloud, p. 96. Wind-roses to show the frequency of winds of different strengths from different points of the compass are given on p. 97.

Observations on Board Ship.

On pages 99–107 is given a summary of the observations made on board the ship "Southern Cross" during the voyage, prepared by the Marine Department of the Meteorological Office under the superintendence of Commander Campbell Hepworth, C.B., R.N.R.

The geographical area over which the observations were taken was between the parallels 47° 41′ S. and 78° 35′ S. of latitude, and meridians 150° 22′ E. and 164° 10′ W. of longitude. The screen containing the thermometers on board ship

was fastened to the stern post so as to be as far away as possible from the influence of the engines and sails.

Figures printed in italic type are interpolations prepared in the Meteorological Office.

Appended is a paper dealing principally with the relation of winds and temperatures. Finally, on p. 108, there are some notes of the Aurora Polaris observed at Cape Adare. In the detailed tables, pp. 63–97, those days on which aurora was observed are indicated by an asterisk against the day of the month in the table containing the barometer readings. The number of such days is 76.

The observations taken at Cape Adare are possibly affected to a certain degree by local accidents, such as the contour of the country and proximity to the sea. They were taken almost at the centre of the area of lowest mean barometric pressure in the globe, and are the first systematic observations ever taken on land in so high a southern latitude and covering so long a period. It is therefore hoped they may prove a valuable contribution to our knowledge of the meteorology of the Antarctic Regions.

On the Relation between Winds and Temperature at Cape Adare.

The following Tables (pp. 50–53) show the principal characteristics of the winds observed at Cape Adare :—

Table I. shows the number of winds observed each month under their respective directions.

Table II.—The mean force under each point shown in percentage.

Table III.—Thermal wind-roses for each month.

Table IV.—The mean pressures during the prevalence of the winds under each point.

TABLE I.—NUMBER OF OBSERVATION—HOURS IN EACH MONTH WHEN WIND BLEW AS FOLLOWS :—

Month.	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Calms	Totals
						Prevailing Winds												
1899.																		
March ..	1	2	26	5	11	31	16	6	18	2	10	3	8	0	14	0	48	201
April ..	15	0	16	1	2	29	15	9	18	1	5	3	5	0	8	10	72	209
May.. ..	12	2	3	0	1	31	15	14	18	1	0	0	3	0	1	3	112	216
June ..	4	0	2	0	1	48	30	12	26	3	11	2	3	0	3	0	156	301
July.. ..	7	0	5	0	13	37	44	37	22	0	5	1	5	3	9	1	181	370
August ..	7	0	3	0	2	17	31	21	38	3	2	0	2	0	6	4	84	220
September ..	4	1	2	0	1	27	36	14	25	3	4	2	1	1	4	1	84	210
October ..	1	0	0	0	0	43	12	6	20	10	4	1	11	1	6	2	99	216
November ..	2	0	0	0	0	13	31	15	23	7	12	0	5	0	1	0	101	210
December ..	3	1	0	0	10	53	9	12	23	6	11	7	5	3	1	4	69	217
1900.																		
January ..	7	0	1	0	4	73	12	6	20	1	4	2	8	4	10	2	46	200
TOTALS ..	63	6	58	6	45	402	251	152	251	37	68	21	56	12	63	27	1,052	2,570
						1,056												

TABLE II.—FORCE OF WINDS UNDER EACH POINT SHOWN IN PERCENTAGES (SEE WIND-ROSES).

1 to 3 = Light. 4 to 7 = Fresh and Strong. 8 to 12 = Storm.

Month.	N and NNE			NE and ENE			E			ESE			SE			SSE			S			SSW and SW			WSW and W			WNW, NW, and NNW			Calms.
	1–3	4–7	8–12	1–3	4–7	8–12	1–3	4–7	8–12	1–3	4–7	8–12	1–3	4–7	8–12	1–3	4–7	8–12	1–3	4–7	8–12	1–3	4–7	8–12	1–3	4–7	8–12	1–3	4–7	8–12	
1899.	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
March ..	1·5			13·4	2·0		2·5	1·5	1·5	2·5	5·5	7·5	3·5	2·0	2·5		3·0		6·0	3·0		6·0			5·0	0·5		7·0			24·0
April ..	6·7	0·5		8·2			1·0				3·3	10·5	5·7	1·4		3·3	1·0		6·7	1·9		2·9			3·8			8·1	0·5		34·4
May ..	6·5			1·4			0·5			2·3	5·6	6·5	6·9			5·6	0·9		8·3			0·5			1·4			1·9			51·9
June ..	1·3			0·7			0·3			3·7	6·3	6·0	6·6	3·3		3·3	0·7		7·6	1·0		4·7			1·7			1·0			51·8
July ..	1·9			1·4			2·2	0·8	0·5	4·1	2·7	3·2	6·2	5·4	0·3	6·2	2·7	1·1	5·1	0·8		1·4			1·7			3·5			48·9
August ..	3·2			0·9	0·5		0·9			2·3	3·2	2·3	11·8	2·3		8·2	1·4		14·5	2·7		1·9	0·5		0·9			3·2	1·4		38·2
September	1·9			1·0			0·5			2·4	4·8	5·7	15·7	1·0	0·5	6·7			11·9			3·3			1·5			2·9			40·0
October ..	0·5									1·9	14·4	3·7	4·2	1·4		2·3	0·5		9·3			6·5			5·6			4·2			45·8
November	1·0										4·8	1·4	5·7	8·6	0·5	1·9	5·2		9·5	1·4		8·6	0·5		2·4			0·5			48·1
December	1·4									4·1	10·1	10·1	3·2		0·9	1·8	3·7		10·1	0·5		7·9			5·5			3·7			31·8
1900.																															
January ..	3·5			0·5			0·5	3·7	0·5	4·5	16·5	15·5	6·0			3·0			10·0			2·5			5·0			8·0			23·0
Mean Percentage																															
Total Percentage																															

TABLE III.—THERMAL WIND-ROSES FOR EACH MONTH.

Month.	N and NNE	NE and ENE	E	ESE	SE	SSE	S	SSW and SW	WSW and W	WNW NW and NNW
1899.	°	°	°	°	°	°	°	°	°	°
March	17·3	17·5	15·0	19·2	11·9	23·7	22·2	21·9	21·2	19·9
April	9·7	7·6		18·0	14·4	6·5	9·5	5·5	11·0	12·9
May	− 3·3			5·6	2·3	− 0·3	− 5·7			
June				−0·1	− 3·7	− 6·8	−14·4	−15·2		
July	− 6·8		− 5·1	+7·6	+ 3·8	− 5·4	−14·1		− 6·1	− 5·8
August	−20·0	−10·9	−36·9	+1·7	−11·4	− 7·3	− 8·2	−12·8		+ 0·8
September	− 2·7			−1·8	− 7·9	−14·1	−17·2	−15·7		− 8·1
October				+8·4	+ 3·8	− 4·7	− 2·9	− 6·6	4·5	5·1
November				24·9	20·9	23·6	20·3	22·6		
December			30·6	34·0	31·7	33·5	31·1	31·6	32·2	34·0
1900.										
January	32·4			35·8	31·4	33·1	32·0		33·5	33·6
MEANS	3·8	4·7	0·9	13·9	8·8	7·4	4·8	3·9	16·0	11·5

NOTE.—Where the observations are insufficient, a blank space has been left.

TABLE IV.—MEAN PRESSURE DURING THE PREVALENCE OF WINDS FROM EACH OF DIFFERENT POINTS OF THE COMPASS.

Month.	N and NNE	NE and ENE	E	ESE	SE	SSE	S	SSW and SW	WSW and W	WNW NW and NNW
1899.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.
March	29·335	28·995	29·042	29·084	29·159	29·001	29·042	29·054	29·006	28·991
April	29·238	29·421		29·077	29·261	29·133	29·349	29·404	29·585	29·324
May	29·103			28·646	29·152	28·996	29·122			
June				28·593	28·808	28·760	28·920	28·914		
July	29·253		29·160	29·327	29·504	29·438	29·309		29·523	29·066
August	29·058	29·086	29·260	28·972	28·982	28·900	28·952	29·270		28·870
September	28·670			28·507	28·501	28·682	28·654	28·633		28·546
October				28·766	28·926	28·840	28·976	28·904	28·792	28·793
November				29·282	29·335	29·428	29·330	29·486		
December			29·158	29·065	29·146	29·023	29·397	29·406	29·367	29·242
1900.										
January	29·203			29·159	29·179	29·433	29·173		29·178	29·114
MEANS	29·123	29·167	29·155	28·953	29·087	29·058	29·111	29·134	29·242	28 993

NOTE.—Where the observations are insufficient, a blank space has been left.

Examining Table I., we see at once the immense preponderance of what we will call the anticyclonic winds, viz., from ESE to S, over all other winds. Of the 2,570 observations taken during 11 months, 41·1 per cent. are S and SE winds, 41 per cent. calms, and the balance, 17·9 per cent., winds from other directions.

The strongest winds (Table II.), and also the most frequent, were from the ESE. Gales were experienced on 72 days, or on 22 per cent. of the total number of days.

The great violence of these south-easterly winds, blowing at times with a velocity above 90 miles an hour (as determined by Robinson anemometers, subsequently demolished by the force of the wind), indicates a very steep barometric gradient.

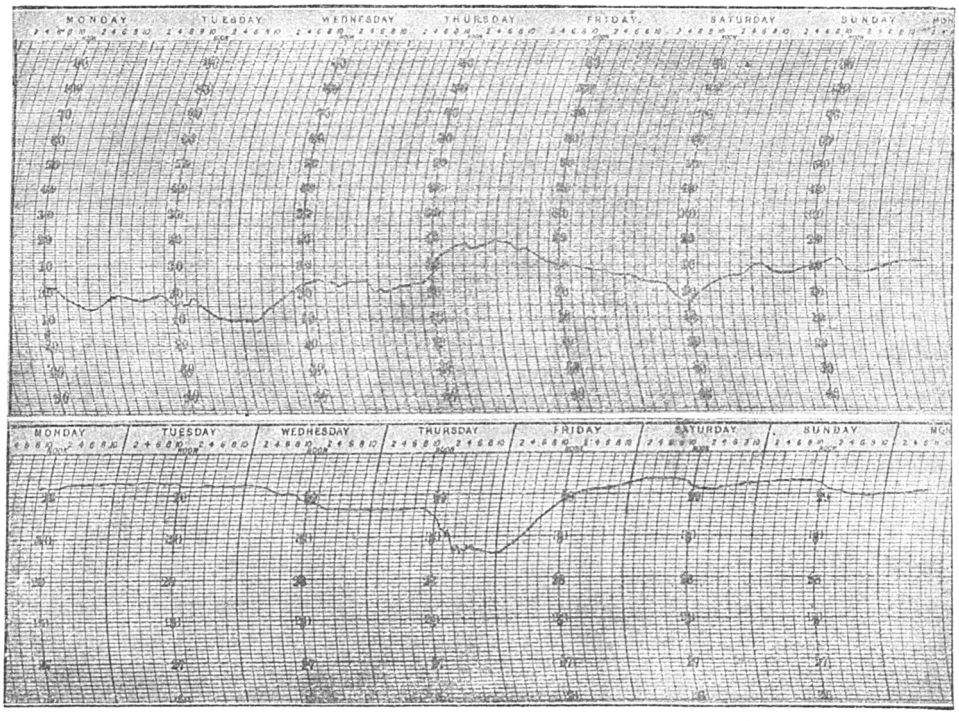
Looking now at the thermal windroses which show the mean temperatures of the winds, we find that the strongest and most frequent wind has also the highest temperature. The mean temperature of the air for the 11 months being + 5°·2, the amount this ESE wind raises the mean temperature is 8°·7. This power of raising the temperature is more conspicuous in the winter time than in the summer. Thus the mean temperature for the month of July is − 9°·0, while the mean temperature of the ESE winds for that month is + 7°·6, a difference of 16°·6. Such a contrast is very striking. The power that this wind has in raising the temperature is perhaps better shown in the following table of single storms:—

Date.	Minimum Temperature previous 24 hours.	Maximum Temperature during Subsequent Gale.	Difference.
1899	°	°	°
March 17	16·5	30·1	13·6
April 23–24	5·1	30·0	24·9
May 18–19	−21·1	13·8	34·9
June 20..	−19·4	11·4	30·8
July 25–26	−35·8	7·8	43·6
August 15–16	−25·4	18·7	44·1
September 6–7	−23·2	11·3	34·5
October 14–16..	− 5·1	19·4	24·5
November 26–28	8·6	45·6	37·0
December 4–6	27·1	41·8	14·7
1900.			
January 19–24..	25·6	48·7	23·1

The coldest weather prevailed during calm clear days and also with light SW winds. In Table IV., we see the mean pressures for each wind—that with the lowest pressure being the one with the highest temperature, viz., ESE. The deviation of the mean pressure during the ESE winds (28·953 in.), from the mean pressure for the year (29·075 in.) is 0·122 in. In the month of June the pressure during this wind was 0·344 in. lower than the mean pressure for that month.

It will be noticed that the pressure rises as the wind moves round from ESE to SE, and falls again when the wind is from the SSE, and then rises towards the south. This is shown in a very marked degree in some of the monthly means. The low mean pressure for the NW winds is due to the wind generally blowing from that direction just prior to a south-easterly gale.

The following diagrams show in a graphic manner the effect of south-easterly storms in raising the temperature simultaneously with the fall of the barometer.

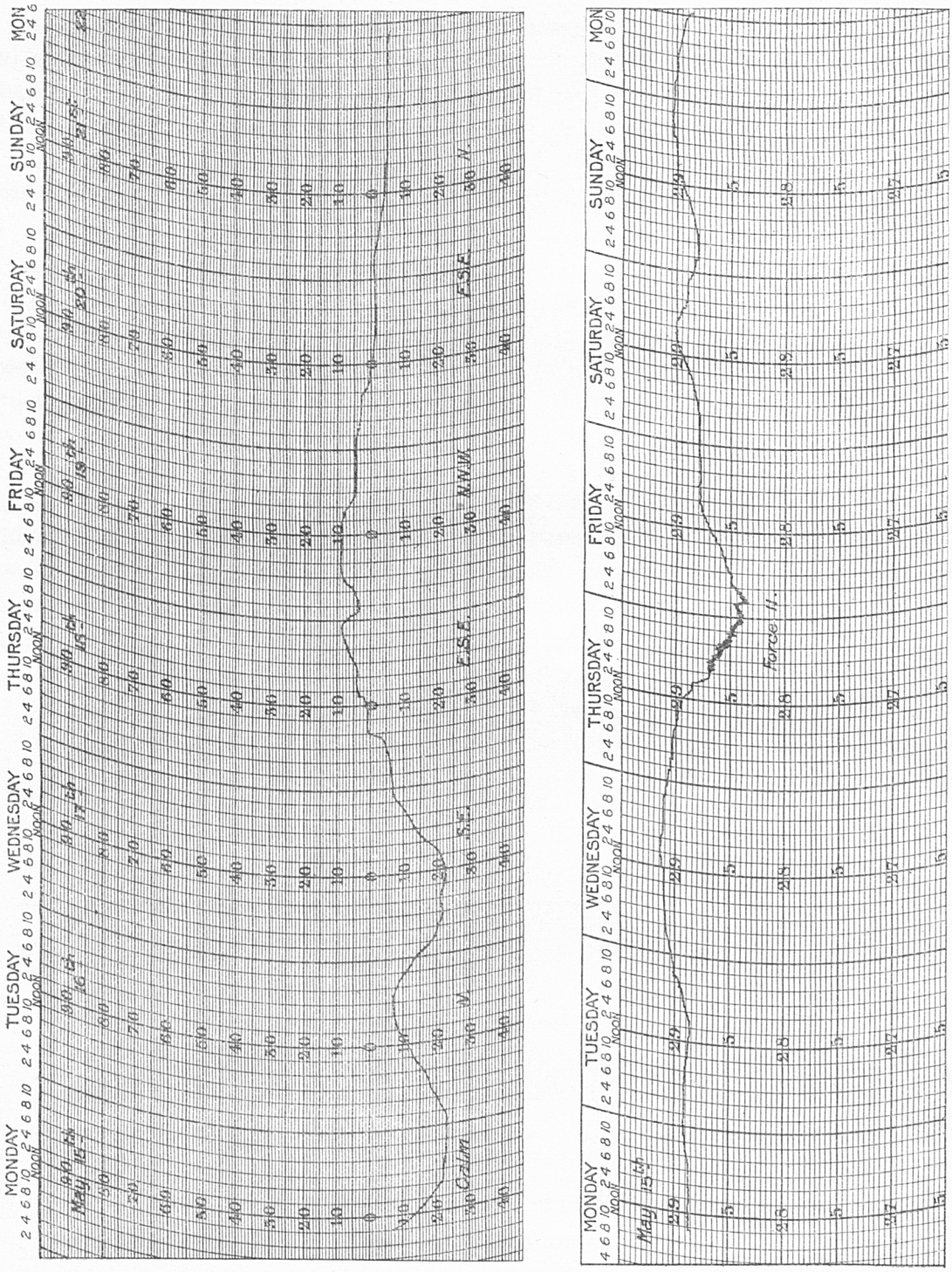


SLIPS FROM THERMOGRAPH AND BAROGRAPH SHOWING RELATIVE RISE IN TEMPERATURE WITH FALL OF BAROMETER.*

THERMOGRAPH AND BAROGRAPH CURVES FROM MAY 1ST TO 8TH, 1899.

For Correcting Curves	Mercury Barometer at 11 a.m. on 1st				=	29·278 inches.
	,, ,, 9	,,	8th		=	29·214 ,,
	Thermometer in shade at 11	,,	1st		=	0°·6 F.
	,, ,, 9	,,	8th		=	16°·7.

* The block for this illustration has been kindly supplied by Messrs. George Newnes, Limited.



THERMOGRAPH AND BAROGRAPH CURVES FROM MAY 15TH TO 22ND, 1899.

Thermometer at 11 a.m. on 15th = −11°·1.
" 9 a.m. " 22nd = −10°·3.

Mercury Barometer at 11 a.m. on 15th = 29·020.
" " 9 a.m. " 22nd = 28·942

Although the above curves do not give correctly the absolute temperature and pressure, being slightly in error, they show very plainly the great variations in pressure and temperature which take place during a south-easterly gale. The blurred appearance of that part of the curve during a gale is due to the strong puffs of wind and the vibration of the hut.

The prognostics of an approaching storm from a south-easterly direction were as follows:—Generally, a gradual and simultaneous rise of temperature and fall of the barometer some hours previous; frequently, however, only a rise in temperature, with little warning from the barometer. A very rapid fall of the barometer about 30 minutes before the bursting of the storm, with light, variable winds, and occasionally, strong whirlwinds, loaded with drift-snow, then a dead calm for a few minutes, followed by a great rush of wind from the ESE, having a velocity of about 60 miles an hour, and bringing with it for the first few hours masses of drift-snow from the mountains. The sky above, however, was usually clear.

During the course of the storm the wind frequently dropped quite suddenly and a perfect calm ensued which lasted a few seconds, then the rush of wind would come again with redoubled fury. During the winter months most of the storms ended as abruptly as they had commenced, and sometimes the minimum pressure occurred just as the storm ended, but the barometer would take nearly 24 hours to recover. The summer storms were less severe, but were of much longer duration, lasting on one occasion a whole week.

The following are particulars of winter and summer storms:—

WINTER.

August.

Date.	Pressure.	Temperature.	Depression of Wet Bulb.	Direction of Wind.	Force of Wind.
	in.	°	°		
August 7. 9 a.m.	29·149	− 14·2	0·2	Calm	Calm
„ 11 „	·136	− 12·1	0·1	„	„
„ 1 p.m.	·097	− 7·3	0·1	„	„
„ 3 „	·088	− 4·3	0·1	W	0·5
„ 5 „	·077	− 5·3	0·1	Calm	Calm
„ 7 „	28·993	+ 4·6	1·0	ESE	10
„ 9 „	29·134	+ 11·7	2·0	„	1

AUGUST—*continued.*

Date.	Pressure.	Temperature.	Depression of Wet Bulb.	Direction of Wind.	Force of Wind.
	in.	°	°		
August 8. 9 a.m.	29·203	+ 3·6	0·8	ESE	4
„ 11 „	·148	+ 3·6	0·8	„	6
„ 1 p.m.	·083	+ 1·5	0·9	„	8
„ 3 „	·058	+ 3·6	0·8	„	8
„ 5 „	·044	+ 4·6	0·7	„	9
„ 7 „	28·997	+ 4·1	0·5	„	10
„ 9 „	29·035	+ 0·8	0·2	„	7
August 9. 9 a.m.	29·095	− 6·7	0·1	Calm	Calm

SEPTEMBER.

Date.	Pressure.	Temperature.	Depression of Wet Bulb.	Direction of Wind.	Force of Wind.
	in.	°	°		
September 9th. 9 a.m. ..	28·631	−19·2	0·2	Calm	Calm
„ 11 „ ..	·547	−13·1	0·1	„	„
„ 1 p.m. ..	·473	−11·6	0·1	„	„
„ 3 „ ..	·403	−10·8	0·1	„	„
„ 5 „ ..	·343	−12·3	0·1	„	„
„ 7 „ ..	·240	− 9·8	0·1	„	„
„ 9 „ ..	·005	+ 4·6	0·0	ESE	10 to 11
September 10th. 9 a.m. ..	27·983	− 4·6	0·6	„	2
„ 11 „ ..	28·062	−10·3	0·1	SSE	2
„ 1 p.m. ..	·082	−10·3	0·1	SE	1
„ 3 „ ..	·124	−12·3	0·1	„	2
„ 5 „ ..	·157	−13·3	0·1	„	1
„ 7 „ ..	·258	−11·1	0·1	S	0·5
„ 9 „ ..	28·275	−11·3	0·1	Calm	Calm

The above was the strongest gale experienced, but the only observations available are those at the beginning and ending. The wind blew with fearful violence from 9 p.m. on the 9th to about 5 a.m. on the following morning, and hurled huge rocks down the side of the mountain. The barometer reached a minimum of 27·913 inches and the temperature rose to +5°·9.

SUMMER.

DECEMBER.

Date.	Pressure.	Temperature.	Depression of Wet Bulb.	Direction of Wind.	Force of Wind.
	in.	°	°		
December 4th, 9 a.m.	29·398	33·6	1·7	S	0·5
„ 11 „	·347	35·8	2·6	SE	1
„ 1 p.m.	·236	40·5	1·4	S	6
„ 3 „	·192	35·5	3·0	ESE	8
„ 5 „	·213	34·2	2·0	SE	8
„ 7 „	·120	37·9	3·8	ESE	8
„ 9 „	·159	36·9	4·8	„	5
„ 5th, 9 a.m.	·050	37·0	5·0	„	10
„ 11 „	·035	39·2	4·2	„	10
„ 1 p.m.	·048	39·2	4·2	„	10
„ 3 „	·029	39·5	4·5	„	5
„ 5 „	28·989	40·5	2·5	„	7
„ 7 „	·962	40·5	2·0	„	8
„ 9 „	·946	42·0	1·7	„	10
„ 6th, 9 a.m.	29·032	39·0	5·0	„	4
		Blowing until 10th.			
„ 10th, 9 a.m.	29·415	29·1	0·2	SW	1

(The reader should notice at 5 p.m., on December 4th, how the barometer rose when the wind turned to SE, and the temperature immediately fell.)

The diurnal variation of the barometer at Cape Adare is almost invisible. These results furnish additional evidence that the diurnal range disappears in high latitudes. The diurnal range of temperature is also almost entirely absent during the long winter. The annual variation of the barometer is comparatively large and somewhat irregular.

The maximum pressure observed occurred at 9 a.m. on July 22nd, viz., 30·156 inches, the barometer remaining above 30 inches for nearly 48 consecutive hours.

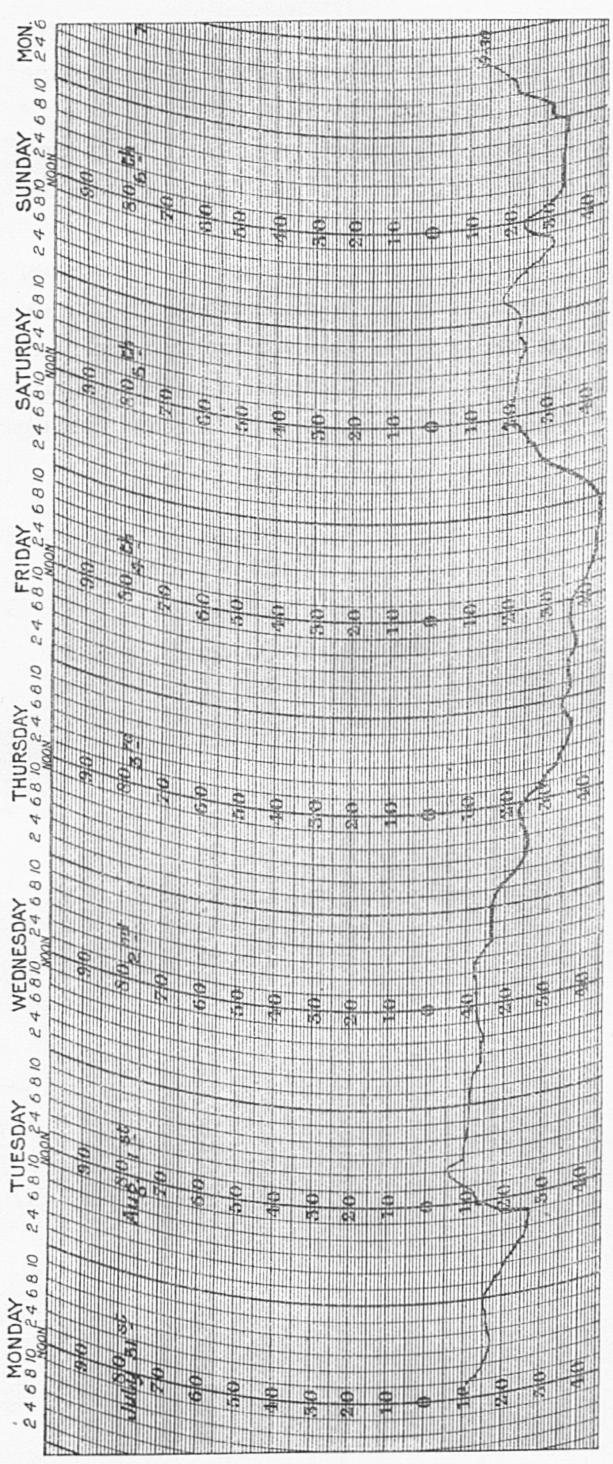
The minimum pressure, 27·913, occurred during the night of September 9th. The extreme range is therefore 2·243 inches. The largest monthly range was in June, viz., 1·633 inches.

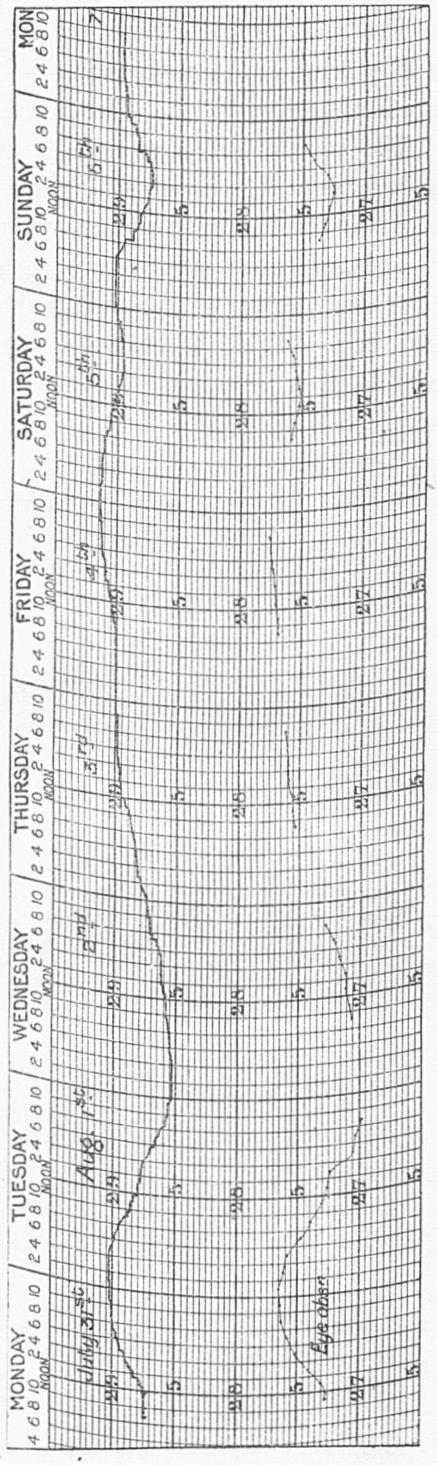
High southern latitudes had long been regarded as having a higher mean temperature than corresponding north latitudes. Recent observations have, however, proved that this idea was not quite correct, being founded, like many other generalisations, on insufficient data.

Although the extreme temperatures observed at Cape Adare are not great, the mean summer temperature is the lowest recorded at any station, and the mean temperature for the year, + 5°·2, or, more correctly, for eleven months of the year, is the lowest mean temperature observed for the latitude of 71° North or South. An extensive land area must be necessary to cause such a low temperature.

The relatively high mean temperature for July is due to the large number of gales from the ESE, bringing with them a considerable rise in temperature.

The following diagrams show the barograph and thermograph curves during the week of minimum temperature at Cape Adare, July 31st to August 7 :—





August 1st, at 9 a.m., Thermometer in shade = −25°·2.
,, 9 a.m., Mercury Barometer = 28·945.

The maximum temperature for the year was 48°·7 on the 24th January, 1900, and the minimum temperature —43°·5 on August the 5th and 6th. The extreme range is therefore 92°·2. The largest monthly range, 63°·0, was in July.

The months of August and November were the finest, with clear skies and calm weather; the number of gales being a minimum, and in the latter month the amount of bright sunshine a maximum.

It is, of course, premature to attempt to give a truly satisfactory description of the prevailing winds and temperature conditions in high southern latitudes. Until one year's observations at numerous stations on the Antarctic Lands are available, it is impossible to form an accurate idea of the climate. The Cape Adare observations will, it is hoped, make our knowledge of a less hypothetical nature than heretofore.

LOUIS BERNACCHI.

CAPE ADARE.

LONGITUDE 170° 9′ 30″ E. LATITUDE 71° 18′ S.

The "Southern Cross" arrived at Cape Adare at 11 p.m. on February 17th, 1899, as shown on page 103. The work of landing stores, erecting the huts, and preparing generally for the winter encampment, was immediately proceeded with, but it was not until 1 p.m. on March 3rd, 1899, that the regular series of observations were begun at the land station.

In the interval the register kept on board the ship was continued, though with some omissions, owing to the press of other duties. A certain number of these observations (those namely, made at 9 a.m. and at 9 p.m. each day) are appended.

No barometer readings are available.

OBSERVATIONS MADE ON BOARD SHIP.

Feb.	9 A.M.							9 P.M.							Mean.	Extremes.	
	Temp.		Wind.		Cloud.		Sea Temp.	Temp.		Wind.		Cloud.		Sea Temp.	$\frac{9a. + 9p.}{2}$	Min.	Max.
18	28·5	0·5	SE	3·5	Str.	10	30·3	26·5	0·7	Calm	0	Str.	10	29·2	27·5	26·5	29·8
19	29·0	0·5	ENE	4	Str.	9	29·9	26·0	0·5	SSW	3	Str.	10	30·0	27·5	25·0	29·3
20	25·4	0·0	SSW	2	Nim.	10	30·4	—	—	—		—		—	—	23·0	28·7
21	28·2	0·3	SSW	2·5	Str.	10	30·2	27·3	0·5	Calm	0	Str.	10	30·8	27·8	26·9	30·2
22	28·5	0·5	SW	3·5	Cir.-Str.	3	30·2	27·3	0·9	SE	4	Str.	10	30·0	27·9	25·4	28·9
23	26·4	1·0	Calm	0	Str.	8	30·0	23·3	0·0	Calm	0	Nim.	10	29·8	24·9	21·5	26·8
24	26·5	0·5	NNE	1	Str.	5	29·0	—	—	—		—		—	—	—	—
25	—	—	—		—		—	22·0	1·0	SE	4	Str.	1	29·0	—	20·0	29·3
26	25·0	0·7	SE	5	Cir.-Str.	4	29·2	24·3	1·3	SE	5	Str.	10	29·1	24·7	21·5	25·2
27	21·5	1·2	ENE	4	Str.	2	28·8	21·4	1·1	ESE	3	Str.	1	29·4	21·5	—	—

Remarks.—20th, snowing at 3 a.m. Heavy squalls, 5 p.m. 23rd, snowing at 9 p.m.

Detailed tables of the observations at the land station at Cape Adare follow.

BAROMETER READINGS (see p. 46).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Remarks.
1	—	—	—	—	—	—	—	
2	—	—	—	—	—	—	—	
3	—	—	28·960	28·942	28·926	28·924	28·916	
4	28·909	28·915	·905	·881	·876	·869	·869	Bay almost full of ice-pack, 7 p.
5	·825	·811	·809	·805	·790	·804	·789	Slight snow, 7 p.
6	28·790	28·828	28·855	28·877	28·917	28·952	28·985	Bay almost clear of ice, 1 p.
7	29·147	29·166	29·169	29·169	29·167	29·161	29·152	Bay perfectly free of ice, 9 a. Ice commencing to move in, 1 p.
8	28·931	28·958	28·956	28·952	28·965	28·980	28·997	Ice sweeping out of Bay at about 2 knots per hour, 11 a. Slight snow, 3 p.
9	28·991	28·993	28·999	29·017	29·033	29·035	29·053	
10	29·119	29·130	29·147	29·154	29·160	29·159	29·156	Low water, 1 p.
11	28·910	28·874	28·806	28·771	28·737	28·736	28·727	Slight snow, 1 p.
12	28·844	28·880	28·917	28·925	28·940	28·931	28·952	Strong current taking ice out of Bay, 1 p.
13	29·009	29·011	29·016	29·014	29·054	29·058	29·074	Heavy sea on shore, 3 p.
14	·169	·195	·220	·221	·216	·224	·234	
15*	·228	·238	·233	·220	·213	·237	·214	High water, 11 a. Ice moving rapidly out of Bay, 3 p. Cir-s moving from W, 9 p.
16	·124	·160	·161	·167	·137	·139	·159	Snow drift from 3 p. [Aurora, 9·30 p. Streamers SE—SW, rapid movement.
17*	·247	·258	·264	·286	29·307	29·358	29·376	Snow drift till 11 a. Aurora forming arc W—E, 9 p.
18	29·217	29·176	29·116	29·006	28·988	28·925	28·889	Ice moving rapidly out of Robertson Bay, 3 p. Cir. from NNW, 7 p.
19	28·799	28·797	28·781	28·764	·752	·750	·709	Snow, 1 p.
20	·730	·783	·860	·862	·890	·921	·935	Snow drift from mountains, 11 a. Anemometer destroyed by force of wind at [about midnight.
21	28·726	28·698	28·738	28·775	28·870	·965	·967	
22*	29·065	29·059	29·047	29·019	29·013	·998	·983	Bay clear of ice, 9 a. Faint aurora N and NE, 9 p.
23	28·881	28·882	23·885	28·384	28·873	·867	·873	Cir. and Cir.-s moving rapidly from NW, 1 p.
24	·817	·602	·544	·504	28·460	·482	·479	Snow drift, 3 p.
25*	·903	·942	·953	·979	29·005	·987	·977	New Anemometer set up, 1 p. Ice moving out of Bay, 9 p. Faint aurora in NE, 8 p.
26	·522	·457	·440	28·450	28·476	28·503	28·561	
27	28·908	28·950	28·992	29·051	29·166	29·266	29·366	
28	29·621	29·650	29·670	·684	·717	·739	·742	
29	·652	·614	·592	·535	·508	·460	·463	Cir.-s. moving from N by W, 9 a. Snow drift from mountains, 3 p.
30	·420	·412	·421	·418	·427	·447	·470	Blew hard all past night. Lunar corona 7 p., radius 58.
31	29·672	29·710	29·749	29·752	29·763	29·839	29·814	Cir. moving from WNW, 11 a., and from NW, 3 p. Lunar corona, 9 p.
Mean	29·042	29·041	29·045	29·041	29·051	29·064	29·069	(The Means are for 28 days only.)

AIR TEMPERATURE, DEPRESSION OF WET BULB,

Day.	9 A.M.				11 A.M.				1 P.M.				3 P.M.			
	Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		Temp.		Wind.	
1	—	—	—		—	—	—		—	—	—		—	—	—	
2	—	—	—		—	—	—		—	—	—		—	—	—	
3	—	—	—		—	—	—		27·1	1·1	SW	3	24·7	1·7	SW	3
4	25·8	3·0	S	2·5	25·8	2·1	S by W	2·5	26·2	1·1	S	2·5	27·9	1·2	W	3
5	31·1	3·0	Calm	0	27·0	1·5	W	0·5	24·8	2·0	N by W	0·5	24·8	1·6	Calm	0
6	24·8	2·9	SSE	3·5	26·9	1·2	S by E	3	25·5	1·5	S	4	24·4	2·8	S	3
7	24·5	1·7	S	3	25·0	1·4	S	0·5	25·5	1·1	Calm	0	28·0	2·1	Calm	0
8	22·7	0·5	Calm	0	22·6	0·5	NE	2	22·7	0·4	NE	1	23·1	0·6	NNE	1
9	24·0	0·0	NE	1	24·2	1·2	NE	3	24·3	0·7	NE by E	3	24·8	0·3	NE by E	3
10	23·9	1·1	ENE	3	24·6	1·3	ENE	3	24·8	1·2	WSW	1	24·8	1·1	NW	1
11	25·4	2·3	NW	3	26·3	2·3	NW	3	26·5	1·6	NW	1	25·8	0·9	Calm	0
12	21·0	1·2	NW	1	22·5	0·7	NW	1	20·7	0·7	NE	3	19·2	0·2	NE by N	3
13	23·1	2·1	S by E	5	24·8	2·9	S by E	5	24·8	2·7	SSE	5	25·9	2·0	SSE	4
14	22·8	0·5	WSW	4	20·2	0·4	Calm	0	21·7	0·8	SSW	1	21·5	1·2	SW	1
15	19·5	0·7	Calm	0	19·7	0·7	Calm	0	21·2	0·9	Calm	0	20·7	0·9	Calm	0
16	20·7	0·9	E by S	8	22·5	1·1	E by S	7	23·8	0·8	ESE	7	24·3	0·9	ESE	7
17	28·4	0·5	ESE	8	27·9	0·5	ESE	7	28·8	0·9	ESE	7	29·6	2·6	ESE	7
18	25·6	1·8	Calm	0	23·6	1·4	Calm	0	23·5	1·0	Calm	0	24·4	1·4	SW	1
19	21·3	1·0	NE	1	21·7	1·3	W	1	21·2	0·6	Calm	0	20·3	0·4	Calm	0
20	15·2	0·0	ESE	9	15·2	0·0	ESE	10	14·2	0·0	ESE	10	14·5	0·1	ESE	10
21	13·6	0·0	ESE	9	19·5	0·0	ESE	10	19·5	0·0	ESE	9·5	19·4	0·0	ESE	9
22	12·3	0·7	NE	1	13·5	0·4	NE	1	13·0	0·6	NE	3·5	15·2	1·0	NE	2
23	7·8	0·9	NE	1·5	9·5	0·9	NE	1	10·8	1·1	Calm	0	10·7	1·1	E	1
24	9·7	1·0	NW	1	9·2	0·2	SE	7	8·7	0·1	SE	8	13·7	0·5	SE	10
25	8·6	0·0	NE	2	7·8	0·0	NE	1	7·0	0·1	NE	3	5·8	0·0	NE	3
26	4·2	0·8	NE by N	1	6·4	0·7	Calm	0	7·7	1·0	Calm	0	7·7	0·9	Calm	0
27	9·5	0·9	Calm	0	10·5	1·0	S	1	11·5	0·9	W	1	12·7	1·2	Calm	0
28	8·7	1·0	SE	1	11·0	1·0	SE	1	12·5	1·5	Calm	0	17·4	2·5	Calm	0
29	13·7	0·8	S by E	1	14·4	1·7	SE	2	14·4	1·7	SE	2	13·5	0·9	SE	3
30	11·5	0·6	E by S	3	12·4	0·9	ESE	3	13·4	1·7	ESE	1	12·0	1·1	ESE	2
31	12·9	1·2	Calm	0	15·8	1·9	SE	1	15·7	1·2	Calm	0	16·7	1·3	NW	0·5
Mean (28 days)	18·5	1·1		2·6	18·9	1·0		2·7	19·1	1·0		2·6	19·6	1·1		2·7

CLOUD OBSERVATIONS (see p. 48).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Bright Sunshine.	Precipitation.	Day.
1	—	—	—	—	—	—	—			1
2	—	—	—	—	—	—	—			2
3	—	—	Str., Cum. 9	Str., Cum. 9	Str., Cum. 9	Str., Cum. 9	Str. 9	—	—	3
4	Str., Cum. 3	Str., Cum. 5	Str., Cum. 6	Str., Cum. 4	Str., Cum. 5	Str., Cum. 1	Str., Cum. 1	—	—	4
5	Str., Cum. 2	Str., Cum. 5	Str., Cum. 7	Str., Cum. 8	Str., Cum. 9	St.,Cm.,Nm. 9	St.,Cm.,Nm. 10	—	—	5
6	Str., Cum. 3	Str., Cum. 1	Str., Cum. 1	Str., Cum. 2	Str., Cum. 2	Str., Cum. 3	Str., Cum. 1	—	—	6
7	Str., Cum. 9	Str., Cum. 8	Cum.-s. 8	Cum.-s. 8	Cum.-s., Cir. 3	Cum.-s.,Cir. 6	Nim. 10	9·0	—	7
8	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	5·0	—	8
9	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	9
10	Nim. 10	Nim. 10	Nim., Cir.-s. 9	Nim., Cir.-s. 9	Str., Cir. 7	Str., Cir. 7	Str., Cir. 8	0·8	—	10
11	Str., Cir. 3	Str., Cir. 7	Nim. 10	Nim. 10	Cum.-s. 7	Str. 10	Str. 9	1·5	—	11
12	Str. 4	Str. 6	Str. 8	Str. 10	Cum.-s. 7	Nim. 9	Nim. 9	4·0	—	12
13	Nim. 9	Nim. 9	Cum.-s. 5	Cum.-s. 7	Cum.-s. 9	Cum.-s. 9	Nim. 7	2·0	—	13
14	Nim. 10	Nim. 10	Nim. 9	Nim. 10	St.,Cm.,Nm. 10	St.,Cm.,Nm. 10	Nim. 10	2·2	—	14
15	Nim. 9	Cum.-s. 10	Cum.-s. 9	Cum.-s. 3	Cir. 2	Cir., Str. 5	Cir., Str. 2	0·1	—	15
16	Cir., Str. 7	Nim.,Cir.-s. 10	Nim.,Cir.-s. 10	Drift 10	Drift 10	Drift 10	Drift 10	3·5	—	16
17	Drift 10	Drift 10	Cir.-s.,Nim. 10	Cir. 7	Cir., Cir.-s. 7	Cir.-s. 9	Cir.-s. 2	—	—	17
18	Cum.-s. 9	Cum.-s. 10	Cum.-s. 10	Cum.-s. 10	Cir. 8	Cir., Cir.-s. 7	Cir.-s. 8	4·0	—	18
19	Str. 10	Str. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	0·2	—	19
20	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	—	—	20
21	Drift 10	Drift 10	Drift 10	Nim. 10	Drift 10	Drift 10	Drift 10	—	—	21
22	Drift 10	Nim. 10	Nim. 10	Nim. 10	Fr. Nim. 3	Fr. Nim. 1	Fr. Nim. 1	—	·002	22
23	Cum.-s.,Cir. 5	Cir.-s. 7	Cir.-s., Nim. 9	Cir.-s., Nim. 9	Nim. 9	Nim. 9	Nim. 10	2·0	—	23
24	Nim. 9	Drift 10	Nim. 10	Drift 10	Drift 10	Drift 10	Drift 10	—	—	24
25	Nim. 10	Nim. 10	Drift 10	Drift 10	Nim.,Cir.-s. 10	Nim. 9	Nim. 9	—	·070	25
26	Str. 10	Str. 4	Str. 5	Str. 6	Nim. 7	Fr. Nim. 3	Nim. 5	3·0	—	26
27	Fr. Str. 1	Fr. Str. 1	Fr. Str. 1	Cir.-s. 3	Cir.-s. 2	— 0	— 0	—	—	27
28	— 0	— 0	— 0	— 0	Str. 7	Str. 10	Cir.-s. 10	8·0	—	28
29	Cir.-s., Str. 10	Str., Cir. 10	Cir.-s.,Nim. 10	Cir.-s.,Nim. 10	Cir.-s.,Nim. 10	Cir.-s.,Nim. 10	Cir.-s.,Nim. 10	8·0	—	29
30	Cir.-s.,Nim. 10	Cir.-s., Nim. 9	Cir.-s.,Nim. 10	Cir.-s.,Nim. 10	Cir.-s.,Nim. 10	Cir.-s.,Nim. 9	Cir.-s.,Nim. 10	—	—	30
31	Cir.-c., Cir. 6	Cir.-s. 7	Cir.-s. 10	Cir.-s. 8	Cir.-s. 8	Cir.-s. 10	Cir.-s. 10	—	—	31
Mean (28 days)	7.5	7·8	8·1	8·0	7·6	7·7	7·6	53·3	0·072	Total.

and WIND DIRECTION AND FORCE (see p. 45).

5 P.M.				7 P.M.				9 P.M.				Means.	Extremes.			Day.
Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		9a. + 9p. / 2	Min.	Max.	Solar Max.	
—	—	—		—	—	—		—	—	—		—	—	—	—	1
—	—	—		—	—	—		—	—	—		—	—	—	—	2
23·8	1·0	SW	3	23·8	1·1	SW	3	24·3	1·0	SW	3	—	—	—	—	3
26·9	1·8	W	2·5	22·9	1·0	WSW	1	21·8	0·9	Calm	0	23·8	19·2	27·1	—	4
24·3	0·8	SW	1	23·8	0·2	Calm	0	24·8	0·9	Calm	0	28·0	18·0	31·1	88·0	5
22·8	0·9	S	4·5	22·1	0·5	S	5	22·2	0·7	S	5	23·5	21·3	31·1	85·1	6
24·8	0·9	Calm	0	22·6	0·9	Calm	0	21·7	0·8	Calm	0	23·1	17·5	27·8	83·1	7
22·0	0·2	S	1·5	20·6	0·0	S	1	20·7	0·0	Calm	0	21·7	20·6	28·0	92·0	8
24·3	0·5	NE by E	3	22·7	0·4	ENE	4	22·7	0·7	E by N	4	23·4	19·5	24·0	50·9	9
22·9	1·0	NW	1	22·1	0·9	NE	1	20·9	0·8	NE	1	22·4	21·6	24·8	43·3	10
23·8	1·0	Calm	0	22·8	0·0	NW	3	21·5	0·1	NW	2	23·5	19·9	26·8	55·8	11
20·4	0·8	ENE	1	20·2	1·1	E	4·5	21·3	2·3	ENE	4	21·2	18·4	26·8	84·2	12
23·8	0·5	SSE	6	22·2	0·9	SSE	6	21·5	1·0	SSE	6	22·3	18·7	24·1	79·9	13
20·6	1·3	Calm	0	17·5	0·7	Calm	0	17·8	0·6	NW	1	20·3	20·3	27·0	84·1	14
19·5	0·7	Calm	0	16·6	0·7	Calm	0	16·1	1·1	E by S	1	17·8	17·5	23·3	49·0	15
22·7	0·1	ESE	6	24·0	0·3	ESE	8	22·4	0·1	ESE	8	21·6	14·1	21·8	88·3	16
28·6	3·9	ESE	7	25·8	2·0	ESE	6	23·7	1·7	ESE	1	26·1	21·1	28·4	39·0	17
23·8	1·2	W by N	1	21·7	0·9	Calm	0	21·6	1·0	NE	1	23·6	16·5	30·1	92·2	18
19·7	0·6	Calm	0	19·2	0·1	W by N	0·5	17·7	0·1	ESE	6	19·5	19·9	25·0	78·9	19
13·0	0·0	ESE	10	11·7	0·0	ESE	10·5	14·8	0·0	ESE	10·5	15·0	14·2	22·9	30·4	20
13·6	0·0	ESE	9	12·2	0·0	E by S	8·5	10·1	0·0	E by S	8	14·4	11·0	22·8	29·5	21
11·8	0·7	Calm	0	11·0	0·9	Calm	0	10·8	1·1	W by N	1	11·6	9·4	21·8	29·8	22
9·8	1·1	E	1	9·7	1·0	E	0·5	10·8	1·1	SW	1	9·3	5·0	14·0	59·7	23
13·8	0·2	SE	10	8·6	0·1	SE	10	8·2	0·5	SE	9	9·0	5·7	11·7	73·9	24
5·8	0·7	NE	3	6·1	1·3	NE	4	2·1	1·1	NW	2	5·4	7·9	15·7	—	25
6·7	0·7	Calm	0	6·3	0·5	SW	1·5	6·9	0·9	Calm	0	5·6	−2·8	9·9	57·3	26
11·9	1·2	Calm	0	10·6	1·4	Calm	0	10·8	1·1	Calm	0	10·2	2·9	8·7	76·7	27
11·5	0·8	NNE	1	11·4	0·7	Calm	0	13·7	1·0	S by E	1	11·2	4·0	13·9	104·2	28
12·4	0·7	SE	5	11·4	0·4	SE	6	11·3	0·4	SE	6	12·5	3·9	18·6	76·0	29
12·1	1·0	ESE	3	11·2	0·9	ESE	4	12·2	0·8	ESE	4	11·9	9·9	14·9	47·0	30
15·2	1·0	NW	1	14·9	0·8	SE	0·5	15·3	0·8	SSW	0·5	14·1	10·5	13·8	31·0	31
18·2	0·9		2·8	16·9	0·7		3·1	16·6	0·8		3·0	17·6	13·8	22·0	—	Mean.

BAROMETER READINGS (see p. 46).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Remarks.
1	29·802	29·782	29·742	29·708	29·668	29·632	29·571	Lunar corona, 9 p.
2	·169	·036	28·891	28·889	28·851	28·851	28·889	
3	·180	·262	29·296	29·334	29·350	29·405	29·446	Blowing from ESE all last night.
4	·497	·496	·475	29·450	29·426	29·391	29·358	
5	29·127	29·083	29·038	28·981	28·941	28·893	28·852	Snow, 7 p. and 9 p.
6	28·767	28·875	28·929	28·997	29·063	29·140	29·182	Depth of snow at 9 a. = 8 ins.; very light nature. Slight snow, 7 p.
7*	29·043	29·008	29·046	29·136	·193	·310	·422	Brilliant aurora, 8.30 p.
8	·702	·701	·684	·641	·645	·602	·621	
9	·496	·439	·418	·391	·363	·350	·360	Nim. moving from SE, 5 p.
10	·403	·402	·395	·379	·369	·357	·341	
11	·267	·286	·292	·308	·308	·318	·302	
12	·302	·292	·286	·272	·258	·242	·233	Slight snow, 5 p. and 7 p.
13	·166	·128	·117	·110	·114	·088	·081	
14	·109	·110	·124	·124	·182	·195	·238	
15*	·320	·323	·305	·289	·288	·272	·258	Diffused aurora, NE, 8·30 p.—9 p.
16*	·266	·257	·234	·215	·184	·176	·143	Cir. moving from N and NW, 1 p. Slight aurora in N, 7 p.
17*	·084	·079	·071	·082	·112	·117	·119	Faint aurora in NE, 7 p.
18	·304	·333	·359	·384	·423	·439	·461	
19*	·456	·440	·430	·431	·419	·419	·418	Brilliant aurora in N and NW, 7 p. Faint aurora in NW, 9 p.
20	·332	·312	·288	·278	·263	·203	·114	
21*	·110	·089	·079	·083	·094	·088	·125	Brilliant aurora, 2 a.
22	29·210	29·215	29·212	29·200	29·178	29·166	·124	
23	28·767	28·790	28·858	28·918	28·960	28·949	·025	Ice broke up in Bay, 11 a. Very heavy sea on shore, 1 p. Ice pack driven out seawards (W), 3 p.
24	29·247	29·318	29·389	29·440	29·484	29·538	·582	
25	·678	·676	·692	·697	·694	·676	·679	
26	·459	·404	·310	·305	·259	·203	·180	Snow, 1 p.
27	·217	·259	·284	·296	·237	·282	·264	Solar Max. broken by shower of stones during gale. Blowing from ESE all past night.
28	·203	·205	·186	·173	·145	·132	·107	Lunar corona, 9 p.
29	·058	·069	·087	·103	·116	·148	·162	
30	29·237	29·287	29·274	29·287	29·294	29·296	29·297	Slight snow, 1 p., not sufficient to measure.
Mean.	29·266	29·265	29·260	29·263	29·263	29·263	29·265	

AIR TEMPERATURE, DEPRESSION OF WET BULB,

Day.	9 A.M.				11 A.M.				1 P.M.				3 P.M.			
	Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		Temp.		Wind.	
1	15·4	1·0	S	0·5	14·9	0·4	SSW	1	14·1	0·4	W	1	13·5	0·6	WSW	1
2	16·7	0·5	Whirlwind	8	22·3	0·2	ESE	9	23·7	0·0	ESE	10	26·7	0·2	ESE	10
3	19·2	0·4	S	5	20·4	2·4	S	5	20·2	1·6	S	5	18·9	1·2	S	4
4	12·2	1·9	E by S	3	11·7	1·4	W	1	11·5	1·2	NE by E	1·5	9·4	0·7	NE by E	3
5	7·2	0·5	NE	2	8·2	0·2	SE	0·5	8·9	0·3	Calm	0	9·3	0·3	Calm	0
6	13·7	0·0	Calm	0	10·7	0·2	NNW	0·5	10·9	0·2	SE	0·5	9·7	0·3	Calm	0
7	12·7	1·0	ESE	9	8·9	0·9	ESE	10	9·7	0·4	ESE	10	9·7	1·0	ESE	8
8	4·7	0·0	Calm	0	4·0	0·5	NE	1	3·6	0·5	NE	2·5	1·6	0·2	NE	2·5
9	3·8	0·5	Calm	0	5·1	1·5	S	0·5	5·6	1·2	Calm	0	5·0	0·9	SSE	0·5
10	13·7	0·2	S by W	2	13·2	0·3	S by W	1	12·8	0·2	S by W	1	12·2	0·5	S by E	3
11	18·7	0·9	SE	4	17·3	1·6	SE	4·5	17·4	1·7	SE	3	17·0	2·5	SE	3
12	7·8	0·0	Calm	0	7·9	0·2	Calm	0	8·1	0·3	Calm	0	6·9	0·0	Calm	0
13	7·5	0·3	Calm	0	6·9	0·4	Calm	0	10·7	0·9	Calm	0	10·5	1·0	E	0·5
14	13·5	0·8	SE	0·5	13·0	1·3	Calm	0	12·8	1·3	Calm	0	12·7	1·0	Calm	0
15	2·9	0·5	Calm	0	3·9	0·3	Calm	0	4·8	0·2	Calm	0	3·6	0·3	Calm	0
16	3·1	0·5	Calm	0	5·6	0·0	Calm	0	7·7	0·5	Calm	0	8·2	0·5	Calm	0
17	12·7	0·9	Calm	0	10·8	1·1	Calm	0	10·9	0·8	Calm	0	9·7	0·9	Calm	0
18	5·7	0·6	N	1	9·2	0·5	Calm	0	9·1	0·5	Calm	0	3·2	0·0	Calm	0
19	1·1	0·4	Calm	0	0·7	0·2	Calm	0	0·8	0·2	N by W	0·5	0·0	0·6	S	0·5
20	−7 2	0·0	Calm	0	−4·5	0·1	Calm	0	−2·1	0·3	SW	1·5	−2·4	0·7	SW	0·5
21	6·7	0·3	N	5	5·8	0·2	Calm	0	8·4	0·5	NNW	0·5	6·9	0·2	NNW	0·5
22	5·1	0·5	Calm	0	6·3	0·7	N	0·5	7·0	0·3	Calm	0	6·9	1·2	NW by N	1
23	16·7	0·0	ESE	9	19·4	0·0	ESE	10	22·9	0·0	ESE	10	21·2	0·0	ESE	10
24	26·8	0·0	ESE	7	27·8	0·1	ESE	5	25·0	1·0	NNW	3	24·4	2·3	NNW	3
25	19·5	0·0	NW	1	19·5	0·0	NW	1	19·4	1·3	Calm	0	18·7	0·9	NW	0·5
26	14·5	0·0	Calm	0	13·1	0·2	NE	0·5	12·7	0·0	Calm	0	11·9	0·0	Calm	0
27	9·7	0·0	ESE	9	9·9	0·0	ESE	9–10	10·0	0·3	ESE	9	11·7	0·0	ESE	9
28	10·7	0·0	N by W	1	9·9	0·7	N	0·5	10·0	0·8	S by E	1	8·8	0·7	SW	1·5
29	5·6	0·0	SSE	4	7·2	0·0	SSE	4	5·6	0·0	SSE	2	5·6	0·0	SSE	2·5
30	1·4	0·0	SW	0·5	0·4	0·5	Calm	0	0·8	0·0	NW	0·5	0·6	0·3	Calm	0
Mean.	10·1	0·4		2·4	10·3	0·5		2·2	10·8	0·6		2·1	10·1	0·6		2·2

CLOUD OBSERVATIONS (see p. 48).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Bright Sunshine.	Precipitation.	Day.
1	Str. 10	Str. 8	Nim. 8	Nim. 9	Nim. 9	Nim. 9	Nim. 8	0·5	—	1
2	Nim. 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	—	—	2
3	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Nim. 10	Cir.-s., Nim. 10	Cir.-s., Nim. 10	Cir.-s., Nim. 10	—	—	3
4	Cir.-s., Nim. 10	Cir.-s., Nim. 9	Cir.-s., Nim. 9	Str. 9	Str. 8	Str. 9	Str. 9	—	—	4
5	Str. 10	Str. 10	Str., Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	5
6	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	·190	6
7	Cir., Str. 9	Cir., Str. 7	Cir., Str. 8	Cir., Str. 9	Cir., Str. 9	Cir., Str. 5	Cir. 3	—	—	7
8	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	8
9	Nim. 10	Str. 5	Str., Cir. 3	Str. 10	Str., Nim. 10	Nim. 10	Nim. 10	—	—	9
10	Nim. 10	Nim. 9	Nim. 9	Nim. 9	Nim. 9	Nim. 7	Nim. 8	2·0	—	10
11	Cir.-s., Str. 10	Cir.-s. 10	Cir.-s. 9	Cir.-s. 9	Cir.-s. 10	Cir.-s. 2	Nim. 7	—	—	11
12	Nim. 10	Nim., Cir.-s. 8	Nim., Cir.-s. 9	Nim. 10	Nim. 10	Nim. 10	Cir.-s., Str. 10	—	—	12
13	Cir.-s., Str. 10	Cir.-s., Str. 9	Cir.-s., Str. 9	Cir.-s., Str. 9	Cir.-s., Str. 8	Str. 9	Str. 9	—	·060	13
14	Cir.-s. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 9	0·5	—	14
15	Cir., Str. 7	Cir., Str. 8	Cir., Str. 8	Cir., Str. 8	Cir., Str. 10	Cir., Str. 2	Cir., Str. 2	—	—	15
16	Cir. 2	Cir. 2	Cir. 1	Cir. 1	Cir. 2	Cir., Str. 3	Cir., Str. 2	—	—	16
17	Cir., Str. 7	Cir. 5	Cir. 2	Cir. 4	Cir. 5	Cir. 2	Cir. 3	7·0	—	17
18	Cir. 4	Cir. 3	Cir. 2	Cir. 3	Cir. 2	Cir. 2	Cir. 2	3·0	—	18
19	Nim. 8	Str. 7	Str. 7	Nim., Str. 6	Nim., Str. 7	Str. 6	Str. 2	3·0	—	19
20	Str. 2	Cir., Cir.-s. 4	Cir., Cir.-s. 9	Cir., Str. 9	Cir., Str. 10	Cir., Str. 10	Cir., Str. 10	2·0	—	20
21	Cir., Str. 9	Cir., Str. 9	Cir., Str. 10	Cir., Str. 8	Cir., Str. 9	Cir., Str. 9	Cir., Str. 10	2·0	—	21
22	Cir., Str. 7	Cir., Str. 5	Cir., Str. 4	Cir., Str. 4	Str. 8	Str. 9	Str. 9	2·0	—	22
23	Str. 10	Drift 10	Drift 9	Drift 10	Drift 9	Drift 9	Drift 8	3·0	—	23
24	Drift 9	Drift 9	Str. 9	Str. 9	Str. 7	Str. 8	Str. 8	—	—	24
25	Nim. 8	Nim. 9	Nim. 8	Nim. 8	Nim. 10	Nim. 10	Nim. 8	—	—	25
26	Nim. 8	Nim. 9	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	26
27	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	27
28	Nim. 8	Nim. 7	Nim. 7	Nim. 4	Nim. 4	Nim. 3	Nim. 3	—	—	28
29	Nim. 9	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	29
30	Nim. 9	Nim. 9	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	30
Mean	8·5	8·0	8·0	8·3	8·5	7·8	7·7	25·0	0·250	Total.

and WIND DIRECTION AND FORCE (see p. 45).

5 P.M.				7 P.M.				9 P.M.				Means.	Extremes.			Day.
Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		$\frac{9a. + 9p.}{2}$	Min.	Max.	Solar Max.	
12·7	0·1	SW	1	12·1	0·4	W	1	11·9	0	W	1	13·7	10·4	17·3	57·7	1
24·0	0·2	ESE	11	25·1	0·4	ESE	10	27·3	0·3	ESE	10	22·0	11·1	20·2	29·2	2
18·9	1·2	N by E	0·5	18·9	0·7	SE	2	17·2	0·4	SE	1	18·2	18·6	31·5	—	3
8·2	0·5	NE	2	9·0	0·3	NE	3	8·3	0·5	NE	2	10·3	11·0	20·6	29·5	4
9·7	0·2	Calm	0	10·5	0·3	Calm	0	10·9	0·2	Calm	0	9·1	6·0	12·4	37·5	5
7·7	0·8	ENE	1	7·7	0·9	Calm	0	7·2	0·5	SE	0·5	10·5	6·7	14·0	17·9	6
12·1	0·4	ESE	7	12·2	0·5	ESE	6	14·7	0·0	ESE	5	13·7	2·7	13·8	25·0	7
2·6	0·8	NE	1·5	2·6	0·6	NE	1·5	4·6	0·4	NE	0·5	4·7	4·6	19·8	—	8
2·6	0·2	WSW	1	7·7	0·2	WSW	1	10·0	0·3	S	0·5	6·9	0·7	5·1	20·3	9
13·7	0·0	N by W	1	13·7	0·0	N by W	1	10·7	0·0	N by W	0·5	12·2	2·7	14·4	55·5	10
16·7	2·0	SE	3·5	16·6	1·9	SE	1	12·7	0·2	SE	0·5	15·7	9·4	18·9	30·0	11
7·3	0·3	Calm	0	6·7	0·0	Calm	0	7·7	0·2	Calm	0	7·8	7·7	18·8	29·8	12
10·9	1·2	NNW	1	12·7	1·2	NNW	1	11·0	2·2	S by W	2	9·3	6·0	8·5	23·0	13
14·3	2·1	SE	1	12·5	1·3	NE	0·5	12·9	1·2	N	0·5	13·2	6·2	15·9	72·5	14
3·9	0·3	SSE	0·5	3·8	0·2	Calm	0	3·7	0·1	Calm	0	3·3	1·5	15·3	23·0	15
4·1	0·5	Calm	0	2·6	0·0	NW	0·5	4·1	0·5	Calm	0	3·6	−3·2	5·7	36·3	16
7·7	0·0	N	0·5	7·7	0·7	N	0·5	9·1	0·5	N	0·5	10·9	−3·3	12·7	52·0	17
−0·2	0·0	Calm	0	0·2	0·4	Calm	0	2·6	0·0	Calm	0	4·2	5·3	15·8	41·5	18
−1·4	0·5	S	1	−1·4	0·5	S	1	−1·4	1·0	S	2·5	−0·1	−0·8	9·4	56·0	19
−2·6	1·3	Calm	0	−2·3	0·1	Calm	0	0·6	0·2	Calm	0	−3·3	−10·3	0·8	18·0	20
10·5	0·4	SSE	1	9·9	0·2	SSE	2·5	10·7	0·2	N	0·5	8·7	−7·3	13·6	25·0	21
7·2	1·1	NW by N	1	9·0	0·3	Calm	0	11·2	0·7	Calm	0	8·2	3·2	11·7	29·9	22
27·5	0·0	ESE	10	24·8	0·0	ESE	11	25·8	0·0	ESE	11	21·3	5·1	25·1	55·0	23
21·7	1·1	NNW	3·5	19·2	1·4	NNW	2	17·7	0·9	NNW	0·5	22·3	19·6	30·0	49·5	24
16·9	0·1	Calm	0	16·7	0·2	Calm	0	15·7	0·5	Calm	0	17·6	15·3	28·5	49·5	25
11·2	0·0	Calm	0	11·7	0·2	NE	0·5	12·0	0·3	NE	0·5	13·3	12·8	20·0	24·0	26
12·7	0·3	ESE	9	13·7	0·8	ESE	6	12·9	0·2	ESE	7	11·3	6·6	14·8	—	27
8·1	0·4	SE	0·5	4·6	0·2	Calm	0	4·6	0·5	Calm	0	7·7	7·2	15·4	—	28
4·6	0·0	S	2	5·6	0·0	SSE	2	3·9	0·0	W	0·5	4·8	2·0	11·8	—	29
0·0	0·2	NW	0·5	0·4	0·3	Calm	0	−0·2	0·2	Calm	0	0·6	−0·3	7·2	—	30
9·8	0·5		2·0	9·8	0·5		1·8	10·0	0·4		1·6	10·1	5·2	15·6	—	Mean.

BAROMETER READINGS (see p. 46).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Remarks.
1	29·265	29·278	29·281	29·298	29·319	29·309	29·308	
2*	·254	29·325	29·239	29·227	29·231	29·201	29·212	Fine aurora from 5 p.
3	29·009	28·949	28·918	28·896	28·874	28·874	28·879	Slight snow, 1 p.
4	28·766	28·663	28·356	28·273	28·318	28·270	28·227	Snow drift, 1 p. Blowing too hard to read anemometer, 5 p.—9 p.
5	29·045	29·162	29·147	29·186	29·179	29·197	29·235	Snow, 1 p.
6*	·177	·164	·154	·194	·212	·256	·263	Very fine aurora, 6 p.—7·30 p.
7*	·186	·135	·097	·055	·037	·061	·066	Snow, 11 a. Faint aurora in NE, 7 p.
8	29·214	29·203	29·212	29·196	·192	·189	·113	
9	28·966	28·936	28·928	28·985	·021	·045	·103	Blowing nearly all past night. Ordinary thermometer with blackened bulb set up [exposed to sun, 1 p. Slight snow, 9 p.
10	29·248	29·260	29·259	29·208	·207	·187	·189	
11*	·323	·348	·377	·429	·428	·434	·506	Not possible to read off anemometer, 11 a. Case filled with snow. Very faint [aurora p.
12*	·442	·379	·293	·313	·311	·332	·359	Slight snow, 11 a.—5 p. Brilliant aurora, N and NE, 9 p.
13	·420	·438	·467	·478	·457	·454	·431	Sun out clear, 1 p.
14*	·261	·273	·305	·295	·255	·239	·221	Faint aurora, NNE, 10 p.
15*	29·033	29·020	29·024	·027	·033	·051	·070	Sun disappeared below the horizon. Aurora in NE, 7 p.—8 p.
16	28·946	28·999	28·992	·033	·070	·118	·179	
17	29·319	29·323	29·329	29·299	29·294	29·292	29·266	
18	29·097	29·013	28·886	28·724	28·640	28·574	28·474	Commenced to blow hard at 4 a. Anemometer demolished by force of wind, 3 p.
19	28·784	28·822	28·890	28·905	28·902	28·910	·897	Slight snow, 1 p.
20	29·108	29·134	29·151	29·146	29·061	29·029	28·987	
21	29·105	29·136	29·160	29·163	29·177	29·186	29·181	
22	28·942	28·917	28·919	28·911	28·908	28·892	28·916	
23*	29·070	29·113	29·110	29·074	29·038	28·991	28·918	Bright aurora, ESE to NW, across zenith, 6·30 a. Slight snow, 1 p.
24	28·823	28·830	28·851	28·898	28·977	29·053	29·112	Slight snow, 9 p.
25	29·176	29·093	29·018	·773	·641	28·563	28·468	Snow drift, 3 p.
26	28·367	28·388	28·365	·399	·428	·516	·583	
27	·728	·696	·704	·685	·670	·653	·635	
28*	·346	·318	·281	·256	·227	·190	·169	Faint aurora in N, NE, and NW, 9 p. Lunar corona, 9 p.
29*	·333	28·403	28·442	28·491	28·518	28·580	28·634	Faint aurora in N, 8 p.
30*	·962	29·003	29·086	29·108	29·094	29·072	29·027	Faint aurora in N, from 6 p.
31*	28·694	28·675	28·652	28·638	28·632	28·637	28·631	Dark cloud of vapour in N, 9 a. Faint aurora in SW and zenith, 5 p. Faint [aurora E, N, and NE, 9 p.
Mean.	29·013	29·013	28·997	28·986	28·979	28·979	28·976	

AIR TEMPERATURE, DEPRESSION OF WET BULB,

Day.	9 A.M.				11 A.M.				1 P.M.				3 P.M.			
	Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		Temp.		Wind.	
1	0·4	0·3	S	0·5	0·6	0·2	W	0·5	−1·8	0·3	SSE	2	−2·2	0·2	S by W	0·5
2	−3·2	0·2	S	0·5	−6·3	0·1	W	0·5	−6·3	0·1	Calm	0	−4·4	0·2	E	0·5
3	5·3	0·2	Calm	0	5·8	0·2	Calm	0	6·1	0·3	Calm	0	5·8	0·0	Calm	0
4	6·9	0·1	Calm	0	9·7	0·0	Whirlwind	3	11·0	0·0	ESE	10–11	17·2	0·4	ESE	10
5	7·5	0·0	S by E	2	6·8	0·0	Calm	0	6·3	0·0	Calm	0	5·6	0·0	Calm	0
6	−3·3	0·1	SE	1	1·6	0·4	SE	1	7·7	1·3	SE	1	10·7	1·4	SE	0·5
7	13·8	0·1	Calm	0	14·2	0·1	SSE	0·5	14·2	0·0	SSE	1	7·7	0·0	Calm	0
8	16·7	0·0	Calm	0	16·9	0·4	Calm	0	17·9	1·1	Calm	0	17·7	0·9	Calm	0
9	9·7	0·2	ESE	8	8·7	0·2	NE	1	8·9	0·0	Calm	0	7·7	0·5	N	0·5
10	−1·4	0·0	NNW	0·5	−1·4	0·2	S	1	−2·2	0·2	SE	0·5	−2·7	0·5	Calm	0
11	−11·3	0·1	Calm	0	−11·3	0·1	Calm	0	−12·2	0·1	Calm	0	−13·5	0·2	Calm	0
12	−11·3	0·1	Calm	0	−11·3	0·1	N	0·5	−8·1	0·1	SSE	2·5	−7·5	0·1	Calm	0
13	−11·3	0·1	Calm	0	−11·3	0·1	Calm	0	−13·1	0·1	Calm	0	−10·3	0·3	SSE	0·5
14	−24·9	0·4	S	0·5	−25·9	0·5	Calm	0	−25·1	0·4	Calm	0	−19·2	0·2	Calm	0
15	−8·2	0·1	Calm	0	−11·1	0·1	Calm	0	−16·2	0·2	Calm	0	−17·7	0·2	Calm	0
16	−9·1	0·3	Calm	0	−8·3	0·1	Calm	0	−8·2	0·2	N	1	−6·2	0·2	N	0·5
17	−20·2	0·2	Calm	0	−17·3	0·2	Calm	0	−18·0	0·2	Calm	0	−11·3	0·4	SE	1
18	0·4	0·0	ESE	6	3·8	0·0	ESE	6	4·6	0·0	ESE	7	4·0	0·0	ESE	10
19	9·8	0·9	S by W	2	9·7	0·5	S by E	2	6·1	0·3	Calm	0	4·6	0·7	NNW	0·5
20	−0·3	0·0	ESE	5	−1·3	0·0	ESE	4	−1·6	0·0	ESE	3	−2·2	0·0	ESE	2
21	−5·3	0·1	N	1	−5·8	0·1	N	1	−4·3	0·1	N	0·5	−4·3	0·1	N by E	1
22	−10·3	0·1	NNE	1	−12·2	0·1	NNE	1	−13·2	0·4	Calm	0	−17·2	0·2	Calm	0
23	−15·2	0·4	Calm	0	−2·4	0·7	ESE	1	1·2	0·7	ESE	0·5	6·3	1·4	Calm	0
24	5·6	0·0	Calm	0	5·6	0·0	NE	0·5	5·6	0·0	Calm	0	3·6	0·0	Calm	0
25	−1·4	0·0	S	0·5	−2·7	0·0	Calm	0	−1·2	0·2	Calm	0	0·6	0·0	ESE	10
26	1·7	0·0	ESE	5	2·7	0·0	ESE	4	1·9	0·0	ESE	5	4·6	1·1	ESE	3
27	−2·2	0·2	S	0·5	−3·1	0·0	Calm	0	−4·5	0·1	SSE	0·5	−7·3	0·1	Calm	0
28	−19·0	0·2	Calm	0	−17·2	0·2	SSE	0·5	−18·4	0·2	Calm	0	−13·2	0·2	Calm	0
29	−12·3	0·2	SE	0·5	−14·2	0·2	Calm	0	−14·5	0·2	Calm	0	−20·2	0·2	Calm	0
30	−22·9	0·3	S	0·5	−21·1	0·3	Calm	0	−10.3	0·1	Calm	0	−10·8	0·1	S	0·5
31	−19·2	0·2	NE	0·5	−20·9	0·3	Calm	0	−26·0	0·5	Calm	0	−26·0	0·5	Calm	0
Mean (28 days)	−4·3	0·2		1·1	−3·3	0·2		0·9	−3·7	0·2		1·1	−3·2	0·3		1·3

CLOUD OBSERVATIONS (see p. 48).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Bright Sunshine.	Precipitation.	Day.
1	Cir.-s., Str. 10	Cir.-s., Str. 7	Cir.-s., Str. 4	Cir.-s., Str. 2	Cir.-s., Str. 3	Cir.-s., Str. 8	Str. 9	—	—	1
2	Str. 3	Str. 3	Str. 2	Str. 2	Str. 3	Str. 1	Str. 1	—	—	2
3	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	4·0	—	3
4	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 4	Nim. 9	—	—	4
5	Nim. 10	Nim. 3	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	5
6	Str., Cir. 1	Cir. 1	Cir. 1	Cir. 1	Cir. 1	Cir. 1	Cir. 1	—	—	6
7	Nim. 10	Nim. 10	Nim. 10	Str. 4	Str. 4	Str. 1	Str. 10	3·9	—	7
8	Nim. 7	Cir.-s., Str. 5	Cir.-s., Str. 7	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	—	·205	8
9	Cir.-s., Str. 10	Str., Nim. 10	Str., Nim. 10	Str., Nim. 10	Str., Nim. 10	Str., Nim. 10	Str., Nim. 10	—	—	9
10	Nim. 10	Nim. 9	Nim. 9	Nim. 8	Nim. 2	Nim. 2	Nim. 1	—	—	10
11	Nim. 10	Nim. 9	Nim. 10	Nim. 4	Nim. 5	Nim. 7	Nim. 7	—	—	11
12	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Str., Cir. 5	Str., Cir. 3	Cir.-s., Str. 6	—	—	12
13	Cir.-s., Str. 9	Cir.-s., Str. 7	Cir.-s., Str. 2	Cir.-s., Str. 2	— 0	Cir.-s., Str. 2	Cir.-s., Str. 2	—	—	13
14	Cir.-s., Str. 7	Cir.-s., Str. 4	Cir.-s., Str. 2	Cir.-s., Str. 4	Cir.-s., Str. 3	Cir.-s., Str. 7	Cir.-s., Str. 9	—	—	14
15	Cir.-s., Str. 8	Cir.-s., Str. 3	Cir.-s. 3	Cir. s. 3	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	—	—	15
16	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 2	Nim. 1	—	—	16
17	Cir.-s 6	Nim., Str. 7	Nim., Str. 9	Nim., Str. 10	Nim., Str. 9	Nim., Str. 10	Nim., Str. 10	—	—	17
18	Nim., Str. 10	Nim., Str. 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	—	—	18
19	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	19
20	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	20
21	Nim. 10	Nim. 10	Nim. 10	Nim. 9	Nim. 10	Nim. 10	Nim. 10	—	—	21
22	Nim. 1	Nim. 2	Str. 3	Str., Cir.-s. 2	Str., Cir.-s 2	— 0	Str., Cir.-s. 2	—	—	22
23	Str., Cir.-s 7	Str., Cir.-s. 7	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	23
24	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim., Cir. 7	Nim. 10	—	—	24
25	Nim. 10	Nim. 9	Nim. 10	Drift 10	Drift 10	Drift 10	Drift 10	—	—	25
26	Drift 10	Cir.-s., Nim. 9	Cir.-s., Nim. 10	Cir.-s., Nim. 8	Cir.-s., Nim. 8	Cir.-s., Nim. 9	Cir.-s., Nim. 10	—	—	26
27	Cir.-s., Nim. 9	Cir.-s., Nim. 8	Cir.-s., Nim. 9	Cir.-s., Nim. 8	Cir.-s., Nim. 9	Cir.-s., Nim. 9	Cir.-s., Nim. 7	—	—	27
28	Cir.-s., Nim. 3	Cir.-s., Nim. 3	Cir.-s., Nim. 3	Cir.-s., Nim. 4	Cir.-s., Nim. 2	Cir.-s., Nim. 2	Str., Cir.-s. 5	—	—	28
29	Str., Cir.-s. 6	Str., Cir.-s. 6	Str., Cir. 8	Str., Cir. 6	Str., Cir. 3	Str., Cir. 3	Str., Cir. 2	—	—	29
30	Str., Cir. 3	Str., Cir. 9	Str., Cir. 9	Str., Cir. 8	Cir. 1	Cir. 1	Cir. 1	—	—	30
31	Fr. Str 1	Cir. 2	Cir., Str. 2	Cir., Str. 2	Cir., Str. 2	Cir., Str. 1	— 0	—	—	31
Mean.	7·8	7·2	7·5	7·0	6·2	5·8	6·6	7·0	0·205	Total.

and WIND DIRECTION AND FORCE (see p. 45).

5 P.M.				7 P.M.				9 P.M.				Means.	Extremes.			Day.
Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		$\frac{9a. + 9p.}{2}$	Min.	Max.	Solar Max.	
−3·3	0·5	Calm	0	−2·7	0·2	Calm	0	−2·4	0·2	S	0·5	−1·0	−0·8	2·3	—	1
−6·8	0·1	Calm	0	−9·8	0·1	Calm	0	−7·6	0·1	Calm	0	−5·4	−4·8	1·7	—	2
6·7	0·3	Calm	0	6·7	0·0	Calm	0	4·6	0·0	Calm	0	5·0	−11·3	5·4	—	3
16·2	0·5	ESE	10	20·3	0·4	ESE	10	19·5	0·2	ESE	9	13·2	1·5	6·9	—	4
5·9	0·0	Calm	0	4·8	0·0	Calm	0	4·8	0·2	Calm	0	6·2	6·9	23·0	—	5
14·0	1·3	SE	0·5	11·7	1·2	SE	0·5	18·7	2·8	SSW	1	7·7	−7·2	10·8	—	6
10·2	0·0	Calm	0	8·7	0·0	Calm	0	9·5	0·0	Calm	0	11·7	−4·3	20·8	—	7
11·7	0·4	Calm	0	11·1	0·2	ESE	5	20·7	0·0	N	1·5	13·7	5·3	16·8	—	8
6·9	0·2	SE	1	6·7	0·9	SE	1	3·4	0·0	SE	0·5	6·6	8·9	22·7	—	9
−7·3	0·1	Calm	0	−5·3	0·4	SSE	1	−6·0	0·4	SSE	0·5	−3·7	−2·3	9·8	10·0	10
−12·6	0·1	Calm	0	−13·1	0·1	Calm	0	−14·2	0·2	Calm	0	−12·7	−11·8	−1·2	−1·0	11
−8·3	0·1	NW	0·5	−10·5	0·1	Calm	0	−8·1	0·1	Calm	0	−9·7	−16·3	−10·9	−11·0	12
−13·3	0·1	W	0·5	−16·7	0·2	N by E	0·5	−20·0	0·2	S	0·5	−15·6	−12·5	−7·0	−6·8	13
−15·3	0·2	Calm	0	−18·8	0·2	Calm	0	−12·9	0·1	Calm	0	−18·9	−31·5	−10·1	−11·0	14
−15·0	0·2	Calm	0	−14·0	0·2	Calm	0	−16·6	0·2	Calm	0	−12·4	−27·4	−6·0	−13·5	15
−5·9	0·1	Calm	0	−7·3	0·1	Calm	0	−8·9	0·1	Calm	0	−9·0	−19·7	−7·7	−12·5	16
−9·8	0·1	SE	0·5	−6·6	0·5	SE	0·5	−4·6	0·5	SE	0·5	−12·4	−20·4	−5·2	—	17
5·6	0·0	ESE	10	7·5	0·0	ESE	10	7·7	0·0	ESE	11	4·1	−21·1	4·3	—	18
6·9	1·4	SSE	3	7·6	1·8	SSE	3	7·7	1·8	SSE	4	8·8	0·2	13·8	—	19
−0·9	0·0	ESE	5	−0·6	0·0	ESE	5	0·5	0·0	N	2	0·1	−0·8	9·8	—	20
−3·3	0·1	N by E	0·5	−3·3	0·1	S	0.5	−3·7	0·1	SSE	0·5	−4·5	−5·8	1·8	—	21
−17·2	0·2	Calm	0	−20·2	0·2	Calm	0	−22·1	0·3	Calm	0	−16·2	−10·8	−2·5	—	22
4·6	0·5	Calm	0	5·1	0·2	Calm	0	6·0	0·0	Calm	0	−4·6	−24·8	−11·2	—	23
2·6	0·0	Calm	0	0·8	0·0	S	0·5	−0·2	0·0	NNW	0·5	2·7	−14·3	8·5	—	24
1·6	0·0	ESE	10	2·6	0·0	ESE	10	2·2	0·0	ESE	11	0·4	−3·3	6·9	—	25
2·9	0·1	ESE	7	1·9	0·3	Calm	0	1·7	0·2	SSE	6	1·7	−2·8	2·9	—	26
−8·3	0·1	Calm	0	−7·1	0·1	Calm	0	−7·5	0·6	Calm	0	−4·8	−5·3	5·8	—	27
−15·2	0·2	Calm	0	−14·7	0·2	Calm	0	−13·3	0·2	Calm	0	−16·1	−20·3	−1·2	—	28
−22·0	0·3	Calm	0	−26·8	0·4	Calm	0	−26·0	0·4	Calm	0	−19·1	−20·4	−9·9	—	29
−10·3	0·1	S	0·5	−16·7	0·2	Calm	0	−19·7	0·2	S	0·5	−21·3	−27·8	−10·7	—	30
−24·1	0·4	Calm	0	−22·1	0·3	Calm	0	−18·2	0·2	Calm	0	−18·7	−22·9	−10·0	—	31
−3·3	0·2		1·6	−3·9	0·3		1·5	−3·4	0·3		1·6	−3·8	−10.6	2·6	—	Mean.

BAROMETER READINGS (see p. 46).

Day.	1 A.M.	3 A.M.	5 A.M.	7 A.M.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	11 P.M.	Remarks.
1*	—	—	—	—	28·753	28·746	28·741	28·727	28·658	28·668	28·665	—	Aurora in N and NE, from 8 p.
2*	—	—	—	—	·910	·996	29·004	29·033	29·048	29·057	29·019	—	Brilliant aurora from 7·30 p.
3*	—	—	—	—	·875	·869	28·833	28·811	28·778	28·758	28·735	—	Magnificent aurora from 10 p.
4*	—	—	—	—	·676	·597	·606	28·624	28·614	28·613	28·641	—	Faint aurora in N and E, 8 p.
5	—	—	—	—	28·896	28·965	28·982	29·050	29·107	29·128	29·151	—	
6*	—	—	—	—	29·049	29·062	29·069	·052	·030	·006	·000	—	Aurora in N and NE, 9 p.
7	—	—	—	—	·258	·281	·317	·326	·410	·362	·358	—	Vapour cloud in N, 9 a. Open water indicated.
8	—	—	—	—	·321	·327	·336	·326	·327	·330	·329	—	
9*	—	—	—	—	·376	·379	·391	·398	·405	·412	·450	—	Faint aurora in WSW, 7 p.
10	—	—	—	—	·686	·738	·766	·773	29·778	29·783	29·763	—	
11	—	—	—	—	29·279	29·232	29·110	29·024	28·918	28·832	28·748	—	Snow, 9 a. Snow nearly 1 in. deep, very light, 11 a. Snow, 3 p. and 7 p.
12	—	—	—	—	28·811	28·830	28·837	28·806	·753	·721	·693	28·662	Snow, 9 a. Snow 5½ ins. deep, 11 a. Stopped snowing, 1 p. Light snow, 3 p. and 5 p. Stopped snowing, 7 p.
13*	28·628	28·538	28·544	28·492	·460	·404	·361	·378	·447	·485	·530	·569	Faint aurora in S and SW, 1 a. Aurora stretching from ESE—WNW, very slow movement, not strong, beams converging towards zenith, 5 a.
14	·613	·658	·692	·718	·743	·751	·741	·733	·717	·681	·653	·617	Snow, 3 a. [Snow drift, 3 p.—7 p.
15	·594	·570	·525	·473	·301	·296	·253	·187	·150	·281	·196	·207	Snow, 3 a. Snow drift, 9 a. Attempt made to read off thermometers. Impossible, too dangerous. Blowing with appalling force, quite 100 [miles an hour.
16	·170	·235	·245	·341	·368	·352	·370	·384	·386	·418	·428	·431	Faint aurora near zenith, 5 a. and 7 a. Wind variable in force, 11 p.
17*	·429	·425	·423	·418	·406	·416	·381	·390	·400	·393	·280	·372	
18	·369	·383	·401	·401	·410	·413	·418	·474	·552	·637	·653	·697	
19	·719	·746	·739	·766	·763	·653	·734	·732	·718	28·695	28·679	28·676	
20	28·706	28·735	28·755	·797	·798	·873	·923	·946	28·984	29·008	29·049	29·076	Lunar corona, 11 p., 6° radius.
21*	29·069	29·075	29·004	28·957	28·890	28·901	28·901	28·944	29·037	·058	·120	·165	Faint aurora in zenith, 7 a. Hoar frost, 5 p.—9 p. Vapour cloud in W, 11 p.
22	·205	·222	·242	29·252	29·285	29·277	29·269	29·240	·205	·181	·155	·132	Hoar frost, 3 a. Misty, 9 a.
23	·116	·081	·083	·111	·165	·179	·183	·187	·189	·182	·172	·149	Lunar corona, 1 a., 7° radius. Squalls of force 7, 5 a. Lunar corona, 5 p. Hoar frost, 9 p.
24	·151	29·106	·092	·082	·035	·031	·020	·025	·044	·045	·052	·045	
25	·042	28·989	·011	·029	·092	·078	·076	·069	·085	·101	·112	·119	Squalls from ESE, at intervals, 1 a. Snow drift, 5 a.
26	·137	29·144	29·165	29·147	29·155	29·157	29·168	29·156	29·146	29·129	29·109	29·050	
27	29·027	28·987	28·924	28·888	28·887	28·862	28·865	28·871	28·874	28·887	28·898	28·912	
28*	28·940	28·962	28·996	29·007	29·022	29·045	29·072	29·072	29·032	29·055	29·041	29·067	Snow, 7 a. Strong aurora NW—N 5 p. Aurora near zenith, 11 p. [15° above horizon, 9 p.
29*	29·054	29·038	29·020	·010	·023	·027	·035	·058	·095	·100	·110	·130	Faint aur. E—NW, 1 a. Bright aur. SE—NW, 3 a. Lunar corona, 7 a. Faint aur. NE and ENE, 5 p.; in NNE, 7 p. Aur. arc N and NNE,
30*	29·134	29·150	29·172	29·200	29·222	29·240	29·284	29·296	29·310	29·412	29·464	29·539	Faint aur. NE, 3 a.; in NW., 5 a. Magnificent aur. near zenith, and above Cape Adare, 9 a. Fine aur. between 7 p. and 9 p.
Mean (whole month)	—	—	—	—	28·931	28·933	28·935	28·936	28·941	28·947	28·942	—	
For 18 days	28·839	28·836	28·835	23·838	28·835	28·831	28·836	28·841	28·856	28·875	28·872	28·886	

AIR TEMPERATURE, DEPRESSION OF WET BULB,

Day.	1 A.M.			3 A.M.			5 A.M.			7 A.M.			9 A.M.			11 A.M.			1 P.M.		
	Temp.		Wind.	Temp.		Wind.	Temp.		Wind.	Temp.		Wind.	Temp.		Wind.	Temp.		Wind.	Temp.		Wind.
1	—	—	—	—	—	—	—	—	—	—	—	—	−15·4	0·2	Calm 0	−15·2	0·2	Calm 0	−12·6	0·1	Calm 0
2	—	—	—	—	—	—	—	—	—	—	—	—	−10·8	0·1	S 0·5	−12·3	0·1	WSW 0·5	−14·0	0·2	Calm 0
3	—	—	—	—	—	—	—	—	—	—	—	—	−31·0	0·5	S 0·5	−32·0	0·5	S 0·5	−31·3	0·5	Calm 0
4	—	—	—	—	—	—	—	—	—	—	—	—	−31·8	0·5	E 0·5	−7·2	0·2	ESE 6	−5·3	0·1	ESE 7
5	—	—	—	—	—	—	—	—	—	—	—	—	−15·7	0·2	Calm 0	−15·2	0·2	Calm 0	−14·2	0·2	Calm 0
6	—	—	—	—	—	—	—	—	—	—	—	—	−25·0	0·4	SW 0·5	−23·1	0·4	Calm 0	−21·1	0·3	Calm 0
7	—	—	—	—	—	—	—	—	—	—	—	—	−27·5	0·5	S 0·5	−27·1	0·5	Calm 0	−26·0	0·5	Calm 0
8	—	—	—	—	—	—	—	—	—	—	—	—	−29·2	0·5	SW 0·5	−27·7	0·5	Calm 0	−30·2	0·5	SE 0·5
9	—	—	—	—	—	—	—	—	—	—	—	—	−25·8	0·5	SE 0·5	−21·4	0·3	SE 0·5	−21·1	0·3	Calm 0
10	—	—	—	—	—	—	—	—	—	—	—	—	−15·2	0·2	S 0·5	−15·4	0·2	Calm 0	−19·2	0·2	Calm 0
11	—	—	—	—	—	—	—	—	—	—	—	—	7·7	0·0	Calm 0	8·7	0·0	Calm 0	9·4	0·0	Calm 0
12	—	—	—	—	—	—	—	—	—	—	—	—	10·6	0·0	ESE 2	10·5	0·5	SSE 1	9·4	0·0	SSE 0·5
13	−2·4	0·0	S by W 1	0·5	0·0	Calm 0	−5·3	0·3	Calm 0	−4·6	0·2	Calm 0	−3·1	0·0	Calm 0	0·8	0·2	ESE 3	4·8	0·0	ESE 5
14	−5·2	0·2	N 0·5	−7·0	0·4	NW 1	−7·3	0·1	NW 1	−7·7	0·2	NW 0·5	−8·4	0·1	S 0·5	−11·3	0·1	Calm 0	−12·3	0·1	Calm 0
15	−16·0	0·2	Calm 0	−15·2	0·2	Calm 0	−15·3	0·2	Calm 0	−12·4	0·1	NE 2·5	—	—	ESE 9-10	—	—	ESE 9-10	—	—	ESE 10
16	—	—	ESE 11	—	—	ESE 11-12	—	—	ESE 11-12	—	—	ESE 10-11	−3·8	0·1	ESE 10	−4·3	0·1	ESE 9	−2·4	0·1	ESE 8·5
17	−0·4	0·0	ESE 7	0·6	0·0	ESE 7	−2·9	0·0	ESE 5	−1·4	0·0	SE 5	−2·4	0·0	SE 5	0·6	0·0	SE 4·5	0·1	0·0	SE 5
18	−1·4	0·9	ESE 7	−1·1	0·8	ESE 6·5	−0·4	0·7	SSE 5	−0·1	0·9	SE 5·5	2·6	0·0	SE 2·5	2·8	0·1	SE 4	2·9	0·3	SE 5
19	−8·5	0·1	Calm 0	−13·4	0·2	Calm 0	−12·7	0·1	ESE 0·5	−16·2	0·2	Calm 0	−18·2	0·2	SW 0·5	−15·9	0·2	SE 0·5	−13·2	0·1	Calm 0
20	−8·9	0·1	SW 0·5	−0·4	1·1	SSE 1	6·9	1·3	ESE 3	9·2	1·5	ESE 6	9·2	1·4	ESE 6	−2·2	0·4	ESE 3	−6·4	0·3	ESE 2
21	−7·0	0·3	Calm 0	−12·0	0·1	Calm 0	−14·2	0·2	Calm 0	−14·4	0·2	N 0·5	−15·4	0·2	SSE 0·5	−16·2	0·2	SSE 0·5	−16·2	0·2	SW 0·5
22	−10·1	0·1	Calm 0	−14·4	0·2	Calm 0	−16·1	0·2	S 0·5	−16·5	0·2	Calm 0	−20·2	0·2	Calm 0	−16·3	0·2	Calm 0	−9·3	0·4	Calm 0
23	−8·5	0·1	Calm 0	−9·0	0·1	SE 3	−1·4	0·0	ESE 4	−1·4	0·8	SE 3	−5·3	0·7	ESE 1	−6·6	0·4	SSW 0·5	−8·2	0·2	Calm 0
24	−11·1	0·1	Calm 0	−13·4	0·0	Calm 0	−13·5	0·2	Calm 0	−15·8	0·2	Calm 0	−22·1	0·3	Calm 0	−21·3	0·3	SE 0·5	−18·7	0·2	SE 0·5
25	−7·3	0·1	W 0·5	−5·1	0·1	ESE 5	−5·3	0·1	ESE 7	−6·6	0·1	ESE 6	−7·9	0·5	ESE 0·5	−11·5	0·1	Calm 0	−14·2	0·2	Calm 0
26	−14·2	0·2	SSW 2	−13·2	0·2	S 2	−11·9	0·1	SE 3	−10·6	0·1	SE 3	−9·5	0·1	SE 4	−7·0	0·1	SE 5	−6·3	0·6	SE 2
27	−6·3	0·3	SSE 0·5	−5·3	0·1	S 0·5	−4·3	0·1	SW 0·5	−12·1	0·1	S 0·5	−10·9	0·1	SW 0·5	−11·3	0·2	S by E 1	−11·3	0·1	Calm 0
28	−7·8	0·2	Calm 0	−7·1	0·1	Calm 0	−10·9	0·1	Calm 0	−11·3	0·1	Calm 0	−14·5	0·2	Calm 0	−13·9	0·2	Calm 0	−15·7	0·2	Calm 0
29	−17·1	0·3	Calm 0	−19·6	0·2	Calm 0	−20·7	0·3	Calm 0	−19·0	0·2	Calm 0	−19·4	0·2	Calm 0	−21·8	0·3	Calm 0	−23·1	0·4	Calm 0
30	−21·1	0·3	Calm 0	−24·1	0·4	Calm 0	−23·1	0·3	Calm 0	−24·1	0·4	Calm 0	−22·3	0·3	Calm 0	−24·7	0·4	Calm 0	−18·1	0·2	Calm 0
Mean	—	—	—	—	—	—	—	—	—	—	—	—	−13·1	0·3	1·6	−12·3	0·2	1·7	−11·9	0·2	1·6
For 17 days	−9·0	0·2	1·7	−9·4	0·2	2·1	−9·2	0·3	2·3	−9·7	0·3	2·4	−10·1	0·3	2·3	−10·6	0·2	2·3	−9·9	0·2	2·1

CLOUD OBSERVATIONS (see page 48).

Day.	1 A.M.	3 A.M.	5 A.M.	7 A.M.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	11 P.M.	Bright Sunshine.	Precipitation.	Day.
1	—	—	—	—	Cir., Str. 10	Cir., Str. 10	Cir.-s. 10	Cir.-s. 10	Cir.-s. 6	Cir.-s. 10	Cir.-s. 8	—	—	—	1
2	—	—	—	—	Cir.-s. 9	Cir.-s. 10	Cir.-s. 9	Str. 5	Str. 1	Str., Cir.-s. 1	Str., Cir.-s. 2	—	—	—	2
3	—	—	—	—	— 0	Cir.-s. 1	Cir.-s. 1	— 0	— 0	— 0	— 0	—	—	—	3
4	—	—	—	—	Str., Cir.-s. 3	Str., Cir.-s. 9	Str., Cir.-s. 8	Str., Cir.-s. 9	Str., Cir.-s. 7	Str., Cir.-s. 2	Str., Cir.-s. 1	—	—	—	4
5	—	—	—	—	Str., Cir.-s. 10	Str., Cir.-s. 10	Str., Cir.-s. 9	Str., Cir.-s. 6	Str., Cir.-s. 1	Str., Cir.-s. 1	Str., Cir.-s. 1	—	—	—	5
6	—	—	—	—	Str., Cir.-s. 2	Str., Cir.-s. 3	Str., Cir.-s. 4	Str., Cir.-s. 3	Str., Cir.-s. 2	Str., Cir.-s. 1	— 0	—	—	—	6
7	—	—	—	—	Str. 2	Str. 8	Str. 8	Str. 2	Str. 3	Str. 2	Str. 2	—	—	—	7
8	—	—	—	—	— 0	— 0	— 0	— 0	— 0	— 0	— 0	—	—	—	8
9	—	—	—	—	— 0	— 0	— 0	— 0	— 0	Str. 1	— 0	—	—	—	9
10	—	—	—	—	Str. 3	Cir.-s. 3	Cir.-s. 6	Cir.-s. 2	Cir.-s. 3	Cir.-s. 6	Cir.-s. 3	—	—	—	10
11	—	—	—	—	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	—	11
12	—	—	—	—	Nim. 10	Nim. 10	Nim. 9	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	12
13	Nim. 4	Nim. 9	Nim. 2	Nim. 4	Nim. 5	Nim. 9	Nim. 6	Nim. 7	Nim. 5	Nim. 8	Nim. 6	Nim. 8	—	—	13
14	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 6	Nim. 7	Nim. 9	Nim. 10	—	—	14
15	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	—	—	15
16	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	—	—	16
17	Drift 10	Drift 10	Str. 5	Str. 5	Str. 7	Str. 8	Str. 8	Str. 10	Str., Cir.-s. 5	Str., Cir.-s. 4	Str., Cir.-s. 4	Str., Cir.-s. 4	—	—	17
18	Str., Cir.-s. 10	Str., Cir.-s. 10	Str.-Cir.-s. 10	Str., Cir.-s. 10	Str., Cir.-s. 8	Str., Cir.-s. 10	Str., Cir.-s. 10	Str., Cir.-s. 10	Str., Cir.-s. 10	Str., Cir.-s. 7	Str., Cir.-s. 5	Str., Cir.-s. 3	—	—	18
19	Cir. 2	Cir. 1	Cir. 1	Cir. 1	Cir. 9	Str. 8	Str. 9	Str. 8	Str. 8	Str. 9	Str. 9	Str. 9	—	—	19
20	Str. 10	Str. 9	Str. 10	Str. 10	Str. 10	Str. 10	Str. 10	Str. 10	Str. 10	Str. 10	Str. 10	Cir.-s., Str. 7	—	—	20
21	Cir.-s., Str. 5	Cir.-s., Str. 2	— 0	Cir.-s., Str. 4	Cir., Str. 4	Cir., Str. 6	Cir., Str. 4	Cir., Str. 2	Str. 1	Str. 2	Str. 2	Str. 2	—	—	21
22	— 0	— 0	— 0	— 0	Str. 4	Str. 3	Str. 8	Str. 9	Str. 10	Str. 10	Str. 10	Str. 8	—	—	22
23	Str. 9	Str. 10	Str. 10	Str. 10	Str. 10	Cir.-s., Str. 9	Cir.-s., Str. 10	Cir.-s., Str. 7	Cir.-s., Str. 8	Cir.-s., Str. 7	Cir.-s., Str. 4	Cir.-s., Str. 7	—	—	23
24	Cir.-s., Str. 6	Cir.-s., Str. 4	Cir.-s., Str. 10	Cir.-s., Str. 2	Cir.-s., Str. 2	Cir.-s., Str. 4	Str. 8	Str. 6	Str. 8	Str. 6	Str. 8	Str. 8	—	—	24
25	Cir.-s., Str. 5	Cir.-s., Str. 4	Cir.-s., Str. 1	Cir.-s., Str. 1	Cir.-s., Str. 4	Cir.-s., Str. 5	Cir.-s., Str. 4	Cir.-s., Str. 2	Cir.-s., Str. 5	Cir.-s., Str. 9	Cir.-s., Str. 10	Cir.-s., Str. 7	—	—	25
26	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Str. 10	Str. 10	Str. 10	—	—	26
27	Str. 10	Str. 10	Str. 10	Str. 10	Str. 9	Str. 9	Str. 9	Str. 9	Str. 8	Str. 7	Str. 8	—	—	—	27
28	Str. 10	Str. 9	Str. 10	Nim. 10	Nim. 8	Nim. 9	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	—	—	28
29	Cir.-s., Str. 4	Cir.-s., Str. 3	Cir.-s., Str. 7	Cir.-s., Str. 7	Cir.-s., Str. 7	Cir.-s., Str. 7	Str., Cir.-s. 4	Str. 3	Str. 1	Str. 1	Str. 1	Str. 1	—	—	29
30	Str. 1	Str. 1	— 0	— 0	Str. 5	Str. 9	Str. 2	Str. 3	Str. 1	Str. 4	Misty 3	Misty 2	—	—	30
Mean (whole month)	—	—	—	—	6·4	7·3	6·9	6·1	5·4	5·6	5·2	—	—	Mean (whole month).	
Mean (18 days).	7·0	6·8	6·4	6·3	7·3	8·1	7·4	7·1	6·6	6·8	6·6	6·4	—	Mean (18 days).	

and WIND DIRECTION AND FORCE (see p. 45).

3 P.M. Temp.		3 P.M. Wind.		5 P.M. Temp.		5 P.M. Wind.		7 P.M. Temp.		7 P.M. Wind.		9 P.M. Temp.		9 P.M. Wind.		11 P.M. Temp.		11 P.M. Wind.		Means. 9a. + 9 p. / 2	Means. 1a. ... 11p. / 12	Extremes. Min.	Extremes. Max.	Day.
−12·3	0·1	Calm	0	−10·3	0·1	Calm	0	−9·3	0·4	Calm	0	−5·3	0·4	Calm	0	—	—	—		−10·3	—	−27·3	−12·8	1
−14·2	0·2	Calm	0	−13·3	0·2	Calm	0	−14·2	0·2	Calm	0	−16·2	0·2	SE	0·5	—	—	—		−13·5	—	−16·2	−5·1	2
−34·4	0·7	S	0·5	−33·9	0·7	Calm	0	−33·7	0·7	Calm	0	−34·4	0·7	SW	0·5	—	—	—		−32·7	—	−31·5	−10·0	3
−11·3	0·1	Calm	0	−9·6	0·1	Calm	0	−13·2	0·5	Calm	0	−14·2	0·2	Calm	0	—	—	—		−23·0	—	−36·4	−28·6	4
−13·4	0·2	S3E	0·5	−11·1	0·1	Calm	0	−17·7	0·2	SW	0·5	−19·7	0·2	S	0·5	—	—	—		−17·7	—	−30·9	−4·2	5
−23·1	0·4	S	0·5	−25·1	0·4	S	0·5	−26·8	0·5	Calm	0	−24·1	0·4	S	0·5	—	—	—		−24·5	—	−26·8	−7·2	6
−25·7	0·5	Calm	0	−24·1	0·4	Calm	0	−22·2	0·3	Calm	0	−25·4	0·4	Calm	0	—	—	—		−26·4	—	−29·3	−14·9	7
−31·0	0·5	Calm	0	−23·1	0·4	Calm	0	−30·5	0·5	Calm	0	−30·0	0·5	Calm	0	—	—	—		−29·6	—	−30·0	−21·7	8
−22·4	0·3	Calm	0	−23·8	0·4	Calm	0	−25·1	0·4	Calm	0	−26·0	0·5	Calm	0	—	—	—		−25·9	—	−31·6	−22·5	9
−11·2	0·2	S by W	0·5	−13·2	0·2	Calm	0	−9·3	0·1	Calm	0	−9·7	0·1	Calm	0	—	—	—		−12·4	—	−26·8	−14·7	10
9·7	0·0	Calm	0	9·7	0·0	Calm	0	10·4	0·0	Calm	0	13·7	0·0	Calm	0	—	—	—		10·7	—	−19·5	8·7	11
8·7	0·0	Calm	0	8·9	0·0	SE	0·5	8·4	0·0	W	1	5·9	0·0	SW	0·5	3·6	0·0	W	0·5	8·3	—	7·9	13·9	12
4·6	0·0	ESE	5	4·1	1·3	ESE	4	2·8	1·1	ESE	1·5	0·0	0·7	Calm	0	−2·7	0·7	Calm	0	−1·5	0·0	−5·6	10·6	13
−13·2	0·2	SSE	0·5	−19·2	0·2	Calm	0	−20·0	0·2	SSE	0·5	−16·2	0·2	SSE	0·5	−15·2	0·2	Calm	0	−12·3	−11·9	−8·5	6·9	14
—	—	ESE	11	—	—	ESE	11	—	—	ESE	11	—	—	ESE	11	—	—	ESE	11	—	—	−20·1	−8·2	15
−1·2	0·0	ESE	9	0·1	0·0	ESE	9·5	0·2	0·0	ESE	7	−0·1	0·0	ESE	6	1·6	0·0	ESE	7·5	−1·9	—	−5·0	−0·7	16
0·9	0·0	SE	5	−3·2	0·0	S	4	−2·4	0·0	S by E	3·5	−2·4	0·8	S by E	3·5	0·1	0·9	SSE	5	−2·4	−1·1	−2·3	2·8	17
2·5	1·2	ESE	5	4·0	1·4	S	2	5·6	0·0	Calm	0	−2·4	0·3	Calm	0	−1·3	0·4	Calm	0	0·1	1·1	−4·8	2·9	18
−15·3	0·2	S	0·5	−15·0	0·2	Calm	0	−13·2	0·2	SW	0·5	−10·4	0·1	S	0·5	−9·8	0·1	SSW	0·5	−14·3	−13·5	−18·3	5·6	19
−4·3	1·1	ESE	3	−1·3	0·6	ESE	2	−0·7	0·7	NE	1	−3·3	0·6	N by E	0·5	−6·3	0·4	Calm	0	3·0	−0·7	−19·4	11·4	20
−17·2	0·2	WSW	0·5	−13·2	0·2	Calm	0	−10·1	0·1	Calm	0	−12·8	0·1	Calm	0	−11·3	0·1	Calm	0	−14·1	−13·3	−17·5	2·9	21
−10·1	0·3	Calm	0	−11·0	0·1	Calm	0	−6·3	2·1	Calm	0	−6·3	1·4	Calm	0	−5·3	0·1	Calm	0	−13·2	−11·8	−21·8	−7·7	22
−8·3	0·1	Calm	0	−9·7	0·1	Calm	0	−10·3	0·1	Calm	0	−11·4	0·1	Calm	0	−10·9	0·1	Calm	0	−8·3	−7·6	−20·3	−0·7	23
−19·8	0·2	Calm	0	−18·1	0·2	Calm	0	−18·2	0·2	Calm	0	−17·4	0·2	S	1	−10·3	0·1	Calm	0	−19·7	−16·6	−22·4	−5·0	24
−13·6	0·5	Calm	0	−16·0	0·2	Calm	0	−14·2	0·2	N	0·5	−14·2	0·2	Calm	0	−11·3	0·1	SE	1	−11·0	−10·6	−21·5	−1·7	25
−5·2	0·5	SE	2	−4·8	0·6	SE	1·5	−3·3	0·6	SE	0·5	−2·5	0·8	SE	1	−6·3	0·5	SE	0·5	−6·0	−7·9	−16·4	−6·1	26
−9·0	0·2	Calm	0	−8·5	0·1	Calm	0	−8·3	0·1	Calm	0	−9·9	0·3	Calm	0	−6·0	0·2	S	0·5	−10·4	−8·6	−15·5	−2·5	27
−17·7	0·2	Calm	0	−20·2	0·2	Calm	0	−21·1	0·3	Calm	0	−21·1	0·3	Calm	0	−19·2	0·2	Calm	0	−17·8	−15·0	−14·7	−3·1	28
−23·3	0·4	Calm	0	−21·1	0·3	Calm	0	−22·6	0·3	Calm	0	−23·3	0·4	Calm	0	−21·1	0·3	Calm	0	−21·3	−21·0	−22·1	−13·9	29
−28·9	0·6	Calm	0	−31·0	0·5	Calm	0	−29·5	0·5	Calm	0	−28·7	0·5	Calm	0	−28·0	0·5	Calm	0	−25·5	−25·1	−24·2	−18·1	30
−12·4	0·3		1·5	−12·2	0·3		1·2	−12·2	0·4		0·9	−12·7	0·4		0·9	—	—	—		−12·9	—	−19·3	−4·8	Mean.
−10·5	0·3		2·3	−10·8	0·4		1·9	−10·1	0·4		1·4	−10·7	0·4		1·3	−9·6	0·3		1·4	—	—	—	—	17 Days.

BAROMETER READINGS (see p. 46).

Day.	1 A.M.	3 A.M.	5 A.M.	7 A.M.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	11 P.M.	Remarks.
1*	29·598	29·633	29·657	29·691	29·715	29·717	29·690	29·668	29·646	29·654	29·559	29·514	Faint aurora in N, 1 a, in N and NW, 3 a. Vapour cloud in N, 1 to 5 p. Faint aurora E—SW, 7 p. Brilliant aurora SE—NW (mauve colour), [9 p.
2*	·444	·394	·318	·279	·193	·134	·074	·038	·015	·021	·036	·082	Faint aurora N, 1 a. Slight snow, 5 p and 11 p.
3	·119	·156	29·196	29·230	29·284	29·296	29·298	29·297	·238	·246	·200	·155	Slight snow, 7 a to 1 p. Light variable airs, 3 p.
4*	·105	·005	28·907	28·905	28·914	28·940	28·953	28·965	29·008	·042	·082	·138	Squally, 3 a to 7 a. Aurora in zenith, 5 a. Snow squalls, 9 a. Snow, 3 p.
5	·171	·185	29·197	29·224	29·263	29·182	29·103	29·061	28·986	·010	·008	·010	Snow, 3 a. Squalls of force, 7, at intervals, 9 a.
6*	·127	·178	·202	·215	·254	·243	·211	·161	29·155	·176	·212	·174	Faint aurora in SE, 3 a; in NNW, 5 a. Dense vapour cloud in 9 a. Heavy screwing of ice pack on shore, 5 p. Slight snow, 9 p.
7	·098	·136	·143	·153	·180	·207	·196	·237	·278	·296	·321	·337	Deposit of hard ice crystals, 5 p to 11 p.
8*	·336	·301	·270	·232	·181	·145	·104	·063	·036	·007	·003	·008	Mist, stars visible through it, 1 a. Aurora E—W, 1 a. Brilliant aurora in Northern sky, 5 a. Vapour cloud near horizon. N & NE, 9 a. Squalls [of force 7 at intervals, 7 p. Misty, 11 p.
9*	·019	·031	·024	·027	·104	·121	·136	·145	·156	·170	·151	·186	Faint aurora near zenith, 3 a; in N, 5 to 7 a. Aurora in N, 11 p.
10*	·175	·179	·185	·193	·212	·209	·224	·235	·228	·239	·265	·278	Faint aurora SSE through zenith to NNW, 1 a; in SSE and zenith, 3 a. Aurora arc in N & NE 10° above horizon, 5 a. Faint aurora in N, 7 p.; [in NNW, 11 p.
11*	·250	·228	·180	·148	·130	·116	·173	·234	·251	·275	·321	·330	Faint aurora NNW, 1 a; in NNW and zenith, 3 a; in N, 5 a; in NW and W, 7 a. Dense bank of vapour cloud in N, 11 a. Aurora arc in N, 15° above horizon, 7 p. Faint aurora in N, 11 p.
12*	·347	·338	·317	·285	·242	·214	·172	·153	·120	·140	·161	·174	Faint aur. N—E, 1 a; NW—NE, 3 a. Slight snow, 5 a. Very little Nim. 1 p. Aurora SE—NW moving slowly southwards, lat. mot. fairly rapid, [5 p.
13*	·062	·153	·239	·239	·250	·271	·332	·349	·362	·366	·345	·347	Brilliant aurora above Cape Adare (NE), 1 a. Very fine aurora ESE through zenith to WNW, 9 p. Diffused aur. light in N & NW, 11 p.
14*	·334	·344	·368	·382	·416	·454	·419	·417	·407	·399	·413	·417	Diffused aurora in E & N, 3 a. ESE—NW, 5 a—7 a. Misty, 9 a.
15*	·451	·473	·497	·497	·528	·526	·538	·564	·569	·589	·625	·594	Faint aurora ESE and zenith, 3 a to 5 a. Ruddy glow in Western horizon, 1 p. Great noise from ice pressure E of Cape Adare, 11 p.
16*	·603	·564	·517	·455	·423	·391	·360	·307	·269	·260	·270	·225	Faint aurora in E, 3 a. Slight snow, 11 a. Squall from SE force 4, 11.30 a.
17	·315	·297	·373	·356	·400	·400	·391	·396	·404	·396	·405	·429	Snow drift, 1 a–11 a.
18	·442	·447	·474	·454	·528	·542	·553	·580	·615	·628	·644	·653	Snow drift, 1 a. Heavy snow drift, 3 a. Snow, 11 a. Wind varying in force, 1 p. Lull at instant of observ. Heavy squalls with snow drift, 7 p.
19	·679	·677	·675	·643	·655	·641	·619	·616	·599	·606	·604	·594	Snow drift, 3 a. Heavy gusts, 7 a.
20	·593	·631	·654	·673	29·718	29·745	29·775	29·805	29·834	29·858	29·895	29·920	
21*	29·931	29·950	29·978	29·982	30·014	30·032	30·038	30·048	30·070	30·070	30·080	30·113	Faint aurora SE by E, 3 a. Summit of Cape Adare enveloped in mist from 9 p.
22	30·120	30·144	30·143	30·149	30·156	30·139	30·146	30·121	30·117	30·090	30·081	30·061	Summit of Cape Adare enveloped in mist, 1 a. Misty, 3 to 5 a—5 p.
23	30·055	30·047	30·035	30·025	29·972	29·969	29·924	29·892	29·859	29·857	29·809	29·774	Snow, 1 a.
24	29·711	29·669	29·608	29·574	·572	·571	·569	·571	·558	·545	·530	·508	Deposit of fine hard ice crystals, 1 a. Misty, 3 p.
25*	·491	·451	·449	·418	·331	·319	·338	·327	·310	·289	·256	·267	Misty, 1 a. Deposit of fine hard ice crystals, 5 a. Slight mist; faint aurora near zenith, 5 p. Squalls of force 4, with snow drift, 9 p.
26*	·300	·299	·305	·322	·324	·330	·345	·352	·306	·297	·306	·290	Faint aurora near zenith, 5 a. Snow drift, 5 p.
27*	·279	·320	·316	·336	·345	·344	·326	·289	·263	·227	·185	·147	Heavy snow drift during squalls, 5 a. Faint aurora NNE, 5 p.
28	·139	·102	·096	·108	·114	·115	·128	·122	·127	·133	·147	·151	Slight snow, 5 a and 9 p.
29*	·173	·199	·225	·263	·291	·339	·378	·410	·440	·415	·463	·446	Upper limb of sun visible 11 a. Aurora in E, 7 p.
30*	·421	29·378	29·346	29·243	29·185	29·155	29·147	29·091	·070	·105	·099	·056	Snow, 5 a to 9 a. Diffused aurora N and NE, 9 p.
31*	29·015	28·971	28·815	28·811	28·800	28·771	28·851	28·960	29·061	29·129	29·177	29·186	Snow drift, 5 a to 11 a. Faint aurora in N, 11 p.
Mean	29·384	29·383	29·378	29·371	29·378	29·374	29·371	29·370	29·368	29·372	29·377	29·373	

AIR TEMPERATURE, DEPRESSION OF WET BULB,

Day.	1 A.M.				3 A.M.				5 A.M.				7 A.M.			
	Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		Temp.		Wind.	
1	−25·1	0·4	Calm	0	−28·2	0·5	SSE	0·5	−25·1	0·1	SSE	0·5	−25·1	0·4	SSE	0·5
2	−8·3	0·1	Calm	0	−7·6	0·1	Calm	0	−6·0	0·1	Calm	0	−6·0	0·1	Calm	0
3	−4·7	0·1	ESE	0·5	−5·8	0·1	Calm	0	−7·3	0·1	Calm	0	−7·9	0·1	Calm	0
4	−6·0	0·1	Calm	0	−5·3	0·1	E	4	−0·4	0·0	E	4	−0·4	0·0	E	5
5	−0·7	0·7	Calm	0	−0·7	0·3	S	0·5	0·6	0·3	NE	1	3·8	0·2	E	2
6	5·4	0·8	SSE	6	3·8	1·2	SSE	4·5	9·7	1·0	SSE	4·5	9·5	0·8	SSE	2
7	−1·3	0·0	S	5	−3·3	0·1	SSE	5	−3·2	0·0	S	2·5	−2·4	0·0	SSE	3
8	−8·0	0·1	Calm	0	−14·1	0·2	Calm	0	−12·1	0·1	Calm	0	−17·0	0·2	Calm	0
9	−5·3	0·3	Calm	0	−13·2	0·1	Calm	0	−12·1	0·1	S	0·5	−12·6	0·1	Calm	0
10	−27·0	0·5	Calm	0	−35·4	0·7	Calm	0	−37·4	0·7	Calm	0	−37·2	0·7	Calm	0
11	−35·1	0·7	SSE	0·5	−35·9	0·7	SSE	0·5	−35·9	0·7	Calm	0	−32·8	0·5	Calm	0
12	−20·2	0·2	Calm	0	−9·3	0·1	Calm	0	−8·3	0·1	Calm	0	−8·9	0·1	Calm	0
13	−6·3	0·1	Calm	0	−2·4	0·0	SE	0·5	−7·3	0·1	SE	1	−7·8	0·1	Calm	0
14	−21·6	0·3	N	1	−22·8	0·3	Calm	0	−23·3	0·4	Calm	0	−23·9	0·4	Calm	0
15	−24·4	0·4	S	0·5	−25·2	0·4	S	1·5	−24·0	0·4	Calm	0	−21·0	0·3	Calm	0
16	−17·2	0·2	SSE	0·5	−13·2	0·2	SSE	0·5	−6·1	0·1	SSE	0·5	−13·2	0·2	Calm	0
17	7·0	0·2	SSE	4	8·7	0·0	SSE	8	8·7	0·0	SSE	9	8·0	0·0	SSE	9
18	12·1	0·0	ESE	4	10·3	0·0	ESE	4	7·4	0·0	SE	4	13·2	0·0	SE	3
19	22·9	0·0	SE by E	2·5	20·6	0·0	SE by E	3·5	18·8	0·0	SE by E	6	18·4	0·0	SSE	6
20	14·7	0·7	SE	5	11·3	0·0	SE	4	10·6	0·0	SE	4	9·9	0·0	SE	4
21	3·6	0·2	SE	3	1·6	0·1	SE	4	−0·7	0·3	SE	0·5	−2·6	0·8	Calm	0
22	−8·3	0·1	SSE	0·5	−10·2	0·1	Calm	0	−14·6	0·2	Calm	0	−10·2	0·1	Calm	0
23	−9·3	0·1	Calm	0	−9·5	0·1	Calm	0	−11·3	0·1	Calm	0	−13·3	0·2	Calm	0
24	−24·9	0·4	Calm	0	−25·1	0·4	Calm	0	−25·6	0·5	Calm	0	−25·9	0·5	W	0·5
25	−19·1	0·2	SW	0·5	−20·7	0·3	SW	0·5	−23·9	0·4	Calm	0	−27·0	0·5	SW	1
26	−6·3	0·1	Calm	0	−6·8	0·1	Calm	0	−7·3	0·1	SE	0·5	−6·8	0·1	Calm	0
27	−7·6	0·1	ESE	10	−8·3	0·1	ESE	10	−9·3	0·1	E by S	9	−9·8	0·1	E by S	9
28	−17·1	0·2	Calm	0	−15·4	0·2	NE	0·5	−14·9	0·2	Calm	0	−13·5	0·2	Calm	0
29	−10·3	0·1	Calm	0	−10·3	0·1	Calm	0	−9·3	0·2	Calm	0	−9·3	0·2	Calm	0
30	−19·2	0·2	Calm	0	−17·3	0·2	Calm	0	−16·5	0·2	Calm	0	−15·2	0·2	NE	0·5
31	−7·3	0·1	NW	1	−2·4	0·5	NW	1	4·6	0·0	ESE	8	5·6	0·0	ESE	10
Mean	−8·9	0·2		1·4	−9·4	0·2		1·7	−9·1	0·2		1·8	−9·1	0·2		1·8

Day.	9 A.M.				11 A.M.				1 P.M.			
	Temp.		Wind.		Temp.		Wind.		Temp.		Wind.	
1	−24·7	0·4	S	0·5	−21·9	0·3	SSE	0·5	−17·2	0·2	Calm	1
2	−6·4	0·0	Calm	0	−6·2	0·1	Calm	0	−5·5	0·1	Calm	0
3	−7·3	0·1	Calm	0	−8·6	0·1	N	0·5	−8·5	0·1	SW	0·5
4	−0·4	0·0	E	2	−0·4	0·4	Calm	0	−0·6	0·5	Calm	0
5	6·7	0·0	E	0·5	7·0	0·0	E	3	10·1	0·1	ESE	8
6	2·8	0·2	W	0·5	2·0	0·4	NW	0·5	3·8	0·3	NNW	1
7	−2·4	0·2	SSE	3	−1·4	0·5	S by W	3	−2·8	0·6	ESE	2·5
8	−22·1	1·1	S	0·5	−19·2	0·2	Calm	0	−17·2	0·2	Calm	0
9	−25·8	0·5	Calm	0	−27·8	0·5	Calm	0	−29·7	0·5	Calm	0
10	−38·9	0·7	S	0·5	−36·9	0·7	S	0·5	−36·8	0·7	S	0·5
11	−29·2	0·5	Calm	0	−31·0	0·5	Calm	0	−27·1	0·5	Calm	0
12	−5·3	0·1	Calm	0	−1·6	0·0	Calm	0	−4·1	0·1	Calm	0
13	3·4	0·6	SE	4·5	3·7	1·0	SE	4	−1·2	0·8	SE	2
14	−15·2	0·2	Calm	0	−13·2	0·1	Calm	0	−15·8	0·2	Calm	0
15	−18·2	0·2	Calm	0	−20·6	0·2	Calm	0	−19·1	0·2	Calm	0
16	−16·3	0·2	Calm	0	−13·9	0·2	Calm	0	−14·1	0·2	SE	0·5
17	8·5	0·0	SSE	8	8·3	0·0	SSE	5·5	8·4	0·0	SSE	5
18	10·8	0·0	SE	2·5	14·7	0·0	SE	4·5	15·1	0·0	SE	2
19	17·7	0·0	SSE	6	18·7	0·7	SSE	2	17·9	0·3	SSE	3
20	8·9	0·0	SE	4·5	8·7	0·4	SE	4	8·2	0·3	ESE	2·5
21	−7·3	0·1	Calm	0	−9·5	0·1	Calm	0	−6·6	0·1	Calm	0
22	−6·3	0·1	SE by E	1	−8·1	0·1	Calm	0	−10·3	0·1	Calm	0
23	−11·2	0·1	Calm	0	−15·6	0·2	SW	1·5	−10·9	0·1	S	1·5
24	−35·1	0·7	Calm	0	−34·4	0·7	Calm	0	−34·7	0·7	Calm	0
25	−27·1	0·5	E	0·5	−30·0	0·5	Calm	0	−28·0	0·5	Calm	0
26	−8·3	0·1	Calm	0	−10·5	0·1	SE by E	1	−8·3	0·9	N	2
27	−10·5	0·1	E by S	1	−14·2	0·2	ESE	0·5	−16·2	0·2	Calm	0
28	−13·2	0·1	Calm	0	−12·4	0·1	Calm	0	−12·5	0·1	Calm	0
29	−9·2	0·1	SSE	1	−10·3	0·1	Calm	0	−12·4	0·1	Calm	0
30	−13·4	0·2	Calm	0	−12·3	0·1	E by S	0·5	−12·1	0·1	Calm	0
31	6·7	0·0	ESE	10	3·8	0·0	ESE	10	5·1	1·3	SE by E	9
Mean	−9·3	0·2		1·5	−9·5	0·3		1·3	−9·1	0·3		1·3

CLOUD OBSERVATIONS (see p. 48).

Day.	1 A.M.	3 A.M.	5 A.M.	7 A.M.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	11 P.M.	Bright Sunshine	Precipitation.	Day.
1	Str. 1	Str. 1	Sir. 3	Cir.-s. 4	Cir.-s., Str. 8	Cir.-s., Str. 8	Cir.-s., Str. 8	Cir.-s., Str. 8	Cir.-s., Str. 10	Cir.-s., Str. 4	Cir.-s., Str. 10	Cir.-s., Str. 9	—	—	1
2	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	2
3	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	3
4	Nim. 10	Nim. 5	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 9	Nim. 8	Nim. 5	Nim. 5	Nim. 10	Nim. 10	—	—	4
5	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	5
6	Nim. 10	Nim. 10	Cir.-s., Str. 2	Cir.-s., Str. 2	Cir.-s., Str. 2	Cir.-s., Str. 6	Str., Cir.-s. 7	Str., Cir.-s. 8	Str., Cir.-s. 9	Str., Cir.-s. 9	Nim. 10	Nim. 10	—	—	6
7	Nim. 8	Nim. 4	Nim. 5	Nim. 6	Str. 10	Str. 10	Str. 10	Str. 7	Nim. 10	Nim. 10	Nim. 10	Nim. 5	—	—	7
8	Mist 0	— 0	— 0	— 0	— 0	Cir.-s. 1	Cir., Cir.-s. 3	Str. 9	Str. 4	Str. 5	Str. 3	Mist 1	—	—	8
9	Mist 3	Mist 1	— 0	Mist 2	Cir.-s., Str. 4	Cir.-s., Str. 3	Cir.-s., Str. 1	Cir.-s., Str. 2	Cir.-s., Str. 1	Cir.-s., Str. 1	Cir.-s., Str. 1	Cir.-s., Str. 1	—	—	9
10	— 0	— 0	— 0	— 0	— 0	— 0	— 0	— 0	Cir.-s. 1	Cir.-s. 1	Cir.-s. 2	— 0	—	—	10
11	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	Cir.-s. 2	Cir.-s. 2	— 0	— 0	— 0	—	—	11
12	Cir.-s. 2	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Cir.-s., Nim. 10	Nim. 10	Cir.-s., Nim. 8	Nim. 9	Fr. Nim. 2	— 0	—	—	12
13	— 0	— 0	— 0	— 0	Str. 10	Str. 9	Str. 9	Str. 1	Str. 1	Str. 1	— 0	— 0	—	—	13
14	— 0	— 0	— 0	— 0	Str. 10	Str. 7	Str. 7	Str. 6	— 0	— 0	— 0	— 0	—	—	14
15	— 0	— 0	— 0	— 0	— 0	Nim., Str. 3	Nim., Str. 3	Str., Cir.-s. 7	Str., Cir.-s. 6	Str., Cir.-s. 7	Str., Cir.-s. 3	Cir.-s. 2	—	—	15
16	Cir.-s. 2	Cir.-s., Str. 9	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 9	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	16
17	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	Nim., Cir.-s. 10	Nim., Cir.-s. 10	Nim. 9	Cir.-s. 8	Cir.-s. 10	Cir.-s. 10	—	—	17
18	Drift 10	Drift 10	Drift 10	Drift 10	Drift 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 7	—	—	18
19	Nim. 9	Nim. 9	Nim., Str. 10	Nim., Str. 10	Nim., Str. 10	Nim., Str. 9	Nim., Str. 9	Nim., Str. 10	Nim., Str. 9	Cir.-s., Str. 8	Str. 10	Str. 10	—	—	19
20	Str. 10	Str. 10	Str. 10	Str. 10	Str. 9	Str. 9	Str. 9	Str. 10	Str. 9	Str. 7	Str. 4	Str. 9	—	—	20
21	Str. 10	Str. 4	Str. 3	Str. 5	Str. 5	Str. 5	Str. 7	Str. 6	Str. 8	Cir.-s., Str. 9	Cir.-s., Str. 9	Cir.-s., Str. 9	—	—	21
22	Str. 10	— 0	Str. 1	Str. 10	Str. 10	Str. 7	Str., Nim. 10	Str., Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	22
23	Nim. 9	Cir.-s., Str. 6	Cir.-s., Str. 6	Cir.-s., Str. 5	Cir.-s., Str. 4	Cir.-s., Str. 4	Cir.-s., Str. 6	Cir.-s., Str. 5	Cir.-s., Str. 8	Cir.-s., Str. 2	Cir.-s., Str. 1	— 0	—	—	23
24	— 0	— 0	— 0	— 0	Cir.-s. 1	Cir.-s., Str. 5	Cir.-s., Str. 5	Mist 10	Str. 1	Str. 1	Str. 2	Cir.-s., Str. 4	—	—	24
25	Str. 10	Cir.-s. 1	Cir.-s. 5	Cir.-s. 2	Str. 3	Str. 3	Str. 5	Str. 7	Str. 7	Str. 2	Str. 2	Str. 2	—	—	25
26	Str. 1	Str. 1	Str. 1	Str. 1	Str. 1	— 0	Fr. Str. 2	Fr. Str. 3	Drift 10	Drift 9	Drift 1	Drift 1	—	—	26
27	— 0	— 0	— 0	— 0	Cir.-s., Str. 7	Cir.-s., Str. 4	Cir.-s., Str. 4	Cir.-s., Str. 2	Cir.-s., Str. 1	Cir.-s., Str. 1	Str. 7	Str. 10	—	—	27
28	Str. 10	Str. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 9	Nim. 6	Nim. 9	Nim. 9	—	—	28
29	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 9	Nim. 7	Nim. 7	Nim. 4	Nim. 3	Nim. 10	—	—	29
30	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 8	Nim. 3	— 0	Haze 0	Str. 10	—	—	30
31	Str. 10	Str. 10	Drift 10	Drift 10	Drift 10	Drift 10	Cir.-s., Str. 10	Cir.-s., Str. 8	Cir.-s., Str. 4	Cir.-s., Str. 3	Nim. 3	Nim. 3	—	—	31
Mean	6·0	5·2	5·4	5·7	6·9	6·9	7·2	7·2	6·5	5·5	5·5	5·9	—	—	Total.

and WIND DIRECTION AND FORCE (see p. 45).

3 P.M.				5 P.M.				7 P.M.				9 P.M.				11 P.M.				Means.		Extremes.		Day.
Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		9 a. + 9 p. / 2	1 a....11 p. / 12	Min.	Max.	
−10·3	0·1	Calm	0	−11·3	0·1	Calm	0	−11·8	0·1	Calm	0	−10·1	0.1	Calm	0	−8·4	0·1	SSE	0·5	−17·4	−18·3	−31·9	−16·3	1
−5·1	0·1	Calm	0	−4·2	0·1	NW	0·5	−4·3	0·1	Calm	0	−4·7	0·1	NW	0·5	−5·3	0·1	Calm	0	−5·5	−5·8	−22·3	−5·7	2
−8·3	0·1	Calm	0	−8·1	0·1	Calm	0	−8·7	0·1	Calm	0	−7·8	0·1	Calm	0	−7·8	0·1	Calm	0	−7·5	−7·6	−8·7	−3·9	3
−4·1	0·1	Calm	0	−3·3	0·1	WNW	0·5	−3·3	0·1	WNW	0·5	−2·2	0·2	Calm	0	−1·2	0·2	Calm	0	−1·3	−2·3	−9·3	0·5	4
11·1	0·0	ESE	8	11·7	0·0	ESE	8	18·2	1·9	ESE	6	15·9	1·2	ESE	6	16·0	1·3	ESE	7	11·3	8·3	−4·4	6·8	5
5·5	0·9	W	1	4·5	0·9	ESE	0·5	5·0	0·3	SE	4	−1·3	0·1	S	4	−1·4	0·0	S	4	0·8	4·1	2·5	19·5	6
−6·3	0·2	S	0·5	−5·5	0·1	S	0·5	−4·3	0·1	N	0·5	−4·7	0·1	Calm	0	−5·2	0·1	Calm	0	−3·5	−3·6	−4·1	5·9	7
−12·8	0·2	Calm	0	−7·5	0·2	S	1	−3·8	0·4	SE	3	−1·4	0·5	SE	3	−4·0	0·3	Calm	0	−11·7	−11·6	−22·5	−1·0	8
−30·4	0·5	Calm	0	−32·9	0·7	Calm	0	−31·0	0·5	Calm	0	−25·8	0·5	NE	0·5	−24·1	0·4	Calm	0	−25·8	−22·6	−26·2	−1·4	9
−36·5	0·7	Calm	0	−36·4	0·7	Calm	0	−34·9	0·7	Calm	0	−33·9	0·7	Calm	0	−32·3	0·5	Calm	0	−36·4	−35·3	**−39·4**	−24·0	10
−27·0	0·5	Calm	0	−27·2	0·5	S	0·5	−28·0	0·5	Calm	0	−25·6	0·5	Calm	0	−17·3	0·2	S	0·5	−27·4	−29·3	−37·7	−28·6	11
−6·3	0·1	N	0·5	−5·2	0·1	Calm	0	−5·3	0·1	NE	0·5	−9·5	0·1	E	0·5	−10·3	0·1	Calm	0	−7·4	−7·9	−33·9	−5·1	12
−4·0	0·4	SSE	0·5	−12·3	0·1	SSE	1	−17·6	0·2	SSE	0·5	−20·8	0·3	Calm	0	−21·5	0·3	Calm	0	−8·7	−7·8	−12·0	3·5	13
−21·1	0·3	SSE	1	−22·3	0·3	Calm	0	−20·4	0·2	Calm	0	−22·1	0·3	SSE	0·5	−23·1	0·4	Calm	0	−18·6	−20·4	−25·3	4·5	14
−21·1	0·3	Calm	0	−15·9	0·2	Calm	0	−17·2	0·2	Calm	0	−21·2	0·3	Calm	0	−4·3	0·9	Calm	0	−19·7	−19·4	−26·8	−13·0	15
−15·3	0·2	SE	0·5	−16·2	0·2	SE	0·5	−16·3	0·2	SE	0·5	−7·3	0·1	SE	1	7·7	0·0	ESE	6	−11·8	−11·8	−22·3	1·3	16
7·9	0·0	SE	5	10·0	0·0	S	3	12·9	1·1	ESE	3	12·7	0·6	SE	4	13·8	0·6	ESE	3	10·6	9·6	−18·2	9·8	17
15·6	0·0	W	1·5	16·9	0·0	ESE	2	18·2	0·0	SE	3	19·1	0·0	SE by E	4	22·0	0·0	ESE	6	15·0	14·6	7·4	14·2	18
16·7	0·7	SSE	5	14·5	0·0	SE	6	14·7	0·0	ESE	5	14·9	0·2	SE	5	13·7	0·0	SE	5	16·3	17 5	10·1	**23·6**	19
7·2	0·0	ESE	3	6·7	0·0	ESE	3	4·6	0·0	ESE	3	3·6	0·0	ESE	4	4·6	0·0	ESE	2	6·3	8·3	7·2	19·3	20
−6·4	0·1	Calm	0	−5·2	0·1	Calm	0	−4·6	0·1	Calm	0	−5·3	0·1	ESE	0·5	−7·3	0·1	Calm	0	−6·3	−4·2	−7·3	9·5	21
−8·2	0·1	SE	0·5	−8·8	0·1	SE by S	0·5	−9·2	0·1	Calm	0	−7·3	0·1	SE	1	−8·5	0·1	W	2	−6·8	−9·2	−16·1	−3·9	22
−12·7	0·1	S	1·5	−10·1	0·1	Calm	0	−15·9	0·2	Calm	0	−14·2	0·2	Calm	0	−11·6	0·1	Calm	0	−12·7	−12·1	−14·4	−6·3	23
−29·5	0·5	Calm	0	−29·5	0·5	SSE	0·5	−29·2	0·5	Calm	0	−30·8	0·5	Calm	0	−31·0	0·5	WSW	0·5	−32·9	−29·6	−35·8	−8·2	24
−24·2	0·1	Calm	0	−19·8	0·2	ESE	0·5	−11·9	0·1	N	1	2·0	0·0	Whirlwind	4	5·6	1·5	ESE	3	−12·5	−18·7	−35·8	−19·0	25
−7·3	0·1	Whirlwind	3	−4·6	0·1	ESE	7	−2·0	0·0	ESE	8·5	−1·2	0·0	ESE	8	−5·1	0 1	ESE	8	−4·7	−6·2	−30·5	7·3	26
−18·2	0·2	Calm	0	−20·2	0·2	Calm	0	−20·2	0·2	Calm	0	−25·1	0·4	Calm	0	−20·2	0·2	Calm	0	−17·8	−15·0	−11·6	−1·2	27
−12·3	0·1	Calm	0	−12·3	0·1	Calm	0	−12·3	0·1	Calm	0	−12·3	0·1	Calm	0	−11·4	0·1	Calm	0	−12·7	−13·3	−25·0	−10·3	28
−14·1	0·2	Calm	0	−14·0	0·0	Calm	0	−17·2	0·2	Calm	0	−20·9	0·3	Calm	0	−21·1	0·3	Calm	0	−15·0	−13·2	−13·3	−8·9	29
−12·3	0·1	WNW	1	−13 7	0·2	Calm	0	−12·4	0·1	NW	2	−10·4	0·1	NW	3	−10·5	0·1	N	1	−11·9	−13·8	−24·5	−9·0	30
−8·1	0·1	NW	0·5	−13·2	0·1	NW	0·5	−14·0	0·2	Calm	0	−14·2	0·2	Calm	0	−14·2	0·2	Calm	0	−3·7	−4·0	−13·7	7·1	31
−9·6	0·2		1·1	−9·5	0·2		1·2	−9·1	0·3		1·3	−8·8	0·3		1·6	−7·2	0·3		1·6	−9·0	−9·1	−17·6	−1·0	Mean.

BAROMETER READINGS (see p. 46).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Remarks.
1*	28·945	28·850	28·811	28·785	28·593	28·581	28·538	Faint curtain of aurora NW—SE, 5 a. Cir.-s. moving from NW, 11 a.
2*	28·605	28·624	28·650	28·660	28·716	28·751	28·822	Slight snow, 5 p. Hazy diffused aurora N and NE, 5 p.
3*	29·081	29·101	29·117	29·130	29·149	29·155	29·165	Brilliant aurora in Northern sky, 7 p.
4*	·238	·256	·264	·284	·298	·319	·328	Mist rising from surface, 3 p. Faint aurora in N, 5 p.—9 p.
5*	29·161	29·140	29·101	29·101	29·115	29·138	·173	Diffused band of aur. in N, 4° high, 9 p.
6*	28·946	28·899	28·848	28·819	28·876	28·984	·055	Snow drift on sum. of Cape Adare, 1 p. Gorg. sunset, 3 p. Brilliant aurora, 7 p. Faint [aur. in NE, 9 p.
7*	29·149	29·136	29·097	29·088	29·077	·993	·134	Vapour bank in N, 9 a. Slight snow, 1 p. Squalls of force 4, and faint aurora in N, 9 p.
8	·203	·148	·033	·058	·044	28·997	·035	Snow drifting occasionally, 5 p.
9	·095	·156	·175	·205	·213	29·218	·218	Cir.-s. moving from NW, 11 a. and 1 p.
10*	·145	·145	·121	·124	·100	·096	29·095	Deposit of hard ice crystals, 1 p. and 3 p. Faint aurora N and NE, 5 p.
11	29·106	29·098	29·091	29·078	·044	29·006	28·962	Deposit of ice crystals, 3 p. Mist, 9 p.
12*	28·878	28·881	28·915	28·933	·071	28·971	28·973	Screwing of ice pack, 3 p. Faint aurora in N, 9 p.
13*	29·050	29·094	29·167	29·236	·290	29·386	29·470	Mirage in the W, 9 a. Aurora arc in NE, 30° above horizon, 7·30 p.
14*	·567	·581	·537	·473	·440	29·368	29·287	Aurora arc in NE. Centre of arc NE true, alt. 30°, 5 p. Diffused aurora in N, [alt. 5°, 7 p.
15	·233	29·198	·148	·087	·023	28·980	28·941	Bright sunshine, 1 p. Deposit of ice crystals, 5 p. Slight snow, 7 p.—9 p.
16	29·000	28·983	29·052	29·028	29·129	29·169	29·207	Clouds moving from NW, 11 a. Snow drift, 3 p.
17	28·825	·770	28·741	28·764	28·823	28·858	28·885	Slight snow, 9 a. Long stretch of open water 2 miles to the N., 1 p. Snow drift on [summit of Cape Adare, 5 p.
18	·917	·914	·888	·876	·856	·839	·836	Alto-cum, 11 a.
19	·823	·809	·789	·757	·749	·748	28·742	Dense vapour on N and NW horizon, 7 p.
20	·831	·837	·844	·856	·908	·943	29·003	Dense vapour cloud rising from open water in N and NW, 9 a. Commenced to blow [4·15 p. Snow, 7 p. Wind, ESE 4, 10 30 p.
21	·925	·913	·875	·853	·854	·869	28·845	Small alto-cum, 7 p., travelling towards N and NW.
22	28·907	28·875	28·858	28·874	28·906	28·930	·967	Brilliant sunset, 3 p.
23	29·021	29·021	29·064	29·045	29·064	29·048	·993	
24	28·983	28·974	28·943	28·948	23·986	28·962	·947	Snow drift in Robertson Bay, 9 a.
25*	·962	·876	·898	·920	·863	·845	·768	Faint aurora NE of zenith, 9 p.
26	·645	·670	·676	·690	28·705	28·731	28·758	Small quantities of Cir. to SE, 11 a.
27*	28·868	28·888	28·933	28·979	29·015	29·073	29·126	Dense vapour cloud in N, 9 a.—11 a. Faint aurora NNE, 9 p.
28*	29·183	29·177	29·162	29·127	29·134	29·106	29·070	Bright, 9 a. Vap. cloud from open water in N, 1 p.—5 p. Diffused aur. arc in N. [5° above horizon, 7 p.
29*	29·021	29·040	29·020	28·984	28·979	28·946	28·939	Cir. NE-SW, 9 a. Vap. bk. NW, 1 p. Cir. conv. from SW, 5 p. Aur. curtain E-SW, 7 p.
30*	28·976	28·974	28·910	·899	·857	·793	·793	Dense water mist W and NW, 9 a. Cir. conv. from SW, 1 p. Misty W and S, 5 p.,
31	28·589	28·578	28·554	28·537	28·546	28·539	28·592	Slight snow, 9a.—11a. Snow drift, 3 p.—7 p. [hoar-frost 5 p. Aur. N, 7 p. F. aur. NW, 9 p.
Mean	28·996	28·987	28·978	28·974	28·981	28·979	28·989	

AIR TEMPERATURE, DEPRESSION OF WET BULB,

Day.	9 A.M.				11 A.M.				1 P.M.				3 P.M.			
	Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		Temp.		Wind.	
1	−25·2	0·4	Calm	0	−25·2	0·4	SE by E	1	−10·9	0·1	SE	2	−10·3	0·1	SE	1
2	−12·9	0·1	Calm	0	−12·3	0·1	Calm	0	−11·8	0·1	Calm	0	−11·7	0·1	N	0·5
3	−22·0	0·3	Calm	0	−21·1	0·3	Calm	0	−23·3	0·4	Calm	0	−32·3	0·5	Calm	0
4	−33·1	0·7	S	0·5	−37·9	0·7	E	0·5	−35·9	0·7	E	0·5	−40·9	0·0	N	0·5
5	−25·4	0·4	Calm	0	−21·0	0·3	ESE	1	−19·6	0·2	ESE	1	−19·1	0·2	NE	0·5
6	−29·2	0·5	Calm	0	−25·2	0·4	Calm	0	−25·7	0·5	N	0·5	−32·3	0·5	Calm	0
7	−14·2	0·2	Calm	0	−12·1	0·1	Calm	0	−7·3	0·1	Calm	0	−4·3	0·1	W	0·5
8	3·6	0·8	ESE	4	3·6	0·0	ESE	6	1·5	0·9	ESE	8	3·6	0·8	ESE	8
9	−6·7	0·1	Calm	0	−9·0	0·1	N	1	−11·5	0·1	NW	1·5	−10·3	0·1	N	1
10	−20·5	0·2	Calm	0	−22·1	0·3	Calm	0	−17·2	0·2	Calm	0	−18·2	0·2	Calm	0
11	−25·1	0·4	Calm	0	−24·1	0·4	Calm	0	−27·0	0·5	Calm	0	−26·5	0·5	Calm	0
12	−25·8	0·5	Calm	0	−31·0	0·5	Calm	0	−22·9	0·3	SE	0·5	−25·6	0·5	SSE	0·5
13	−18·4	0·2	SE	1	−20·2	0·2	SE	0·5	−18·2	0·2	SE	0·5	−20·3	0·2	Calm	0
14	−23·4	0·4	SE	0·5	−22·3	0·3	SE	1	−21·3	0·3	S	1	−20·5	0·2	SSW	1
15	−18·6	0·2	SSE	0·5	−17·5	0·2	Calm	0	−10·4	0·1	S by E	3	−11·5	0·1	SSE	4
16	12·7	0·2	NW	3·5	16·7	0·0	NW	5	17·2	0·1	NW	4	11·5	0·2	ESE	7
17	1·6	0·0	Calm	0	−0·7	0·0	SSE	1	−3·4	0·1	SSE	1	−4·0	0·1	NNW	2
18	−17·5	0·2	SSE	1	−13·2	0·2	Calm	0	−13·6	0·2	Calm	0	−20·7	0·3	Calm	0
19	−13·6	0·2	SSE	1	−12·0	0·1	SSE	0·5	−21·7	0·3	SSE	0·5	−26·3	0·5	SSE	0·5
20	−15·5	0·2	Calm	0	−15·3	0·2	Calm	0	−15·2	0·2	SSE	0·5	−14·5	0·2	Calm	0
21	−0·7	0·0	SE	1	4·6	0·0	SSE	4	4·8	0·0	SSE	4	2·8	0·0	SSE	3
22	−4·5	0·1	S by W	2·5	−5·1	0·1	S by W	2	−5·5	0·1	S	0·5	−7·8	0·1	S	0·5
23	−3·3	0·1	Calm	0	−3·3	0·1	Calm	0	−0·4	0·0	Calm	0	2·1	0·0	S	0·5
24	6·7	0·6	NE	4	7·2	0·5	S	5	7·7	0·5	S	5	7·7	0·5	S	5
25	−0·9	0·0	S	1	−1·4	0·0	S	0·5	−1·4	0·0	S	0·5	−0·4	0·0	Calm	0
26	−10·6	0·0	S	0·5	−10·0	0·1	S	0·5	−9·3	0·1	S	0·5	−8·9	0·1	Calm	0
27	−21·9	0·3	Calm	0	−21·1	0·3	S by E	1	−22·3	0·3	S by E	1	−23·1	0·4	S by E	1
28	−21·6	0·3	ESE	0·5	−17·4	0·2	S	0·5	−18·2	0·2	SE	1	−18·9	0·2	S	0·5
29	−18·1	0·2	Calm	0	−8·2	0·1	Calm	0	−11·2	0·1	Calm	0	−18·2	0·2	SE	0·5
30	−19·3	0·2	SE	1	−13·2	0·1	SE	0·5	−15·1	0·2	SE	1	−13·4	0·2	SE	2
31	−0·1	0·0	Calm	0	1·5	0·0	NW	2	4·7	0·0	SE	4·5	5·6	0·0	ESE	7
Mean	−13·7	0·3		0·7	−12·5	0·2		1·1	−11·8	0·2		1·4	−13·1	0·2		1·5

CLOUD OBSERVATIONS (see p. 48).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Bright Sunshine.	Precipitation.	Day.
1	Cir.-s. 4	Cir.-s. 7	Cir.-s., Nim. 8	Cir.-s., Nim. 9	Cir.-s., Nim. 9	Cir.-s., Nim. 7	Cir.-s.,Nim. 10	—	—	1
2	Cir.-s., Nim. 9	Cir.-s.,Nim. 10	Nim. 10	Nim. 9	Nim. 10	— 0	— 0	—	—	2
3	Str. 10	Str. 4	Str. 2	Str., Cir.-s. 2	Str.,Cir.-s. 1	Str., Cir.-s. 1	Str.,Cir.-s. 1	—	—	3
4	Str., Cir.-s. 1	Str., Cir.-s. 2	Str., Cir.-s. 2	Str., Cir.-s. 3	Str., Cir.-s. 2	Str., Cir.-s. 2	Str., Cir.-s. 1	—	—	4
5	Str. 10	Str. 10	Cir.-s., Str. 9	Cir.-s. 10	Cir.-s. 2	— 0	— 0	—	—	5
6	Str. 1	Cir.-s., Str. 1	Cir.-s., Str. 1	Cir.-s., Str. 1	Cir.-s., Str. 1	Str. 1	Str. 1	—	—	6
7	Str. 10	Str. 10	Str., Nim. 10	Str., Nim. 10	Cir.-s., Str. 7	Cir.-s., Str., 7	Cir.-s., Str. 1	—	—	7
8	Str. 8	Str. 7	Str. 7	Str. 8	Str. 9	Cir.-s. 6	— 0	—	—	8
9	Cir.-s 6	Cir.-s.,, Str. 3	Cir. 5	Cir., Nim. 8	Cir., Nim. 9	— 0	— 0	—	—	9
10	Str. 1	Str. 7	Str. 6	Str., Cir.-s. 4	— 0	— 0	— 0	—	—	10
11	Cir.-s., Str. 4	Cir.-s., Str. 4	Cir.-s., Str. 6	Cir.-s., Str. 9	Cir.-s., Str.	— 0	— 0	—	—	11
12	Str. 4	Str. 3	Cir.-s., Str. 3	Cir.-s., Str. 6	Cir.-s., Str. 6	Cir.-s., Str. 3	Cir.-s., Str. 2	—	—	12
13	Nim. 9	Nim. 9	Nim. 9	Nim. 8	Nim. 4	— 0	— 0	—	—	13
14	Cir.-s., Nim. 5	Cir.-s., Nim. 7	Cir.-s., Str. 5	Cir.-s., Str. 6	Str. 7	Str. 7	Str., Cir.-s. 7	—	—	14
15	Str., Cir.-s. 7	Str., Cir.-s. 7	Cir.-s., Str. 6	Str. 9	Str. 10	Nim. 10	Nim. 10	—	—	15
16	Cir.-s. 2	Cir.-c., Cir. 3	Cir.-c., Cir. 3	Cir.-s., Str. 3	Cir.-s., Str. 4	Str. 10	Str. 10	—	—	16
17	Nim. 10	Nim., Str. 10	Nim., Cir.-s. 9	Str., Cir.-s. 10	Str., Cir.-s. 10	Str. 10	Str. 10	—	—	17
18	Cir.-s.cum.-s.2	Cir.-s., Alt.-c.5	Cir.-s.,Alt.-c.4	Str., Cir.-s. 2	Str., Cir.-s. 3	Cir.-s. 1	Cir.-s. 1	—	—	18
19	— 0	— 0	— 0	— 0	— 0	— 0	Cir.-s. 2	—	—	19
20	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Str., Nim. 10	Str., Nim. 10	Nim. 10	Nim. 10	—	—	20
21	Cir.-s., Str. 9	Cir.-s., Str. 9	Cir.-s., Str. 8	Cir.-s. 1	Cir.-s. 1	Cir.-s.,Alt.-c.1	— 0	—	—	21
22	Cir., Cir.-s. 4	Cir.-s. 3	Cir.-s. 3	Cir.-s. 3	Cir.-s. 4	Cir.-s. 5	Cir.-s. 8	—	—	22
23	Cir.-s. 10	Cir.-s. 10	Cir.-s. 5	Cir.-s. 6	Cir.-s. 3	Cir.-s. 7	Cir.-s. 6	—	—	23
24	Cir.-s. 6	Cir.-s. 7	Cir.-s. 6	Cir.-s. 5	Cir.-s. 4	Cir.-s. 7	Cir.-s. 8	—	—	24
25	Cir.-s. 3	Cir.-s. 4	*Cir.-s.* 2	— 0	Cir.-s. 3	Cir.-s. 5	— 0	—	—	25
26	Str., Cir.-s. 8	Cir., Cir.-s. 6	Cir.-s. 7	Cir.-s. 6	Cir.-s. 3	Cir.-s. 1	— 0	—	—	26
27	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	Str., Cir.-s. 2	Cm.-s.,Cir.-s.3	Str. 1	Str. 1	—	—	27
28	— 0	— 0	— 0	Cir. 1	Cir. 1	— 0	— 0	6·5	—	28
29	Cir. 4	Cir. 1	Cir. 2	Cir. 5	Cir. 5	Cir. 1	— 0	7·0	—	29
30	Cir. 2	Cir. 2	Cir. 6	Mist 10	Mist 6	— 0	— 0	7·0	—	30
31	Nim. 10	Nim. 10	Nim. 10	Drift *10*	Drift *10*	Drift *10*	Cir.-s. 9	6·0	—	31
Mean.	5·5	5·5	5·3	5·7	4·9	3·6	3·2	26·5	—	Total.

and WIND DIRECTION AND FORCE (see p. 45).

5 P.M.				7 P.M.				9 P.M.				Means.	Extremes.			Day
Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		$\frac{9a. + 9p.}{2}$	Min.	Max.	Solar Max.	
−3·3	0·1	SE	2	−8·2	0·1	NW	1	−11·1	0·1	Calm	0	−18·1	−25·5	5·9	—	1
−10·6	0·1	Calm	0	−12·5	0·1	Calm	0	−15·3	0·2	Calm	0	−14·1	−26·3	−2·4	—	2
−33·0	0·7	Calm	0	−36·2	0·7	Calm	0	−40·0	0·0	Calm	0	−31·0	−25·5	−10·6	—	3
−42·4	*0·0*	Calm	0	−42·9	*0·0*	Calm	0	−44·1	*0·0*	Calm	0	−38·6	−40·0	−20·7	—	4
−21·0	0·3	N	0·5	−21·1	0·3	N	0·5	−20·2	0·2	NE	0·5	−22·8	−43·5	−25·3	—	5
−31·3	0·5	Calm	0	−32·9	0·5	S	1	−32·3	0·5	Calm	0	−30·7	−43·5	−14·3	—	6
−5·3	0·1	Calm	0	4·6	1·0	ESE	10	11·7	2·0	ESE	1	−1·2	−35·4	−13·6	—	7
4·6	0·7	ESE	9	4·1	0·5	ESE	10	0·8	0·2	ESE	7	2·2	−14·1	13·9	—	8
−11·2	0·1	Calm	0	−14·4	0·2	Calm	0	−14·5	0·2	Calm	0	−10·6	−7·4	4·8	—	9
−20·2	0·2	S	0·5	−25·4	0·4	S	0·5	−29·4	0·5	Calm	0	−24·9	−23·9	−5·9	—	10
−25·1	0·4	Calm	0	−26·0	0·5	Calm	0	−23·9	0·4	SSE	0·5	−24·5	−29·8	−16·5	—	11
−24·2	0·4	Calm	0	−25·8	0·5	Calm	0	−29·0	0·5	Calm	0	−27·4	−33·3	−23·3	—	12
−23·1	0·4	Calm	0	−25·0	0·4	ESE	1	−28·1	0·5	Calm	0	−23·2	−31·4	−12·4	—	13
−20·0	0·2	SSW	0·5	−16·1	0·2	SSW	0·5	−17·5	0·2	Calm	0	−20·4	−29·7	−17·9	—	14
9·0	0·2	SE by E	2	13·2	0·0	SSE	1·5	13·7	0·0	SSE	1·5	−2·4	−25·4	−13·1	—	15
8·7	0·0	Calm	0	7·4	0·1	Calm	0	4·4	0·0	SSE	0·5	8·6	−19·5	18·7	—	16
−4·3	0·1	NNW	1·5	−5·8	0·1	NNW	1	−6·2	0·1	NNW	0·5	−2·3	−0·7	17·6	—	17
−20·9	0·3	Calm	0	−16·7	0·2	Calm	0	−15·4	0·2	SSE	1	−16·4	−17·5	0·4	—	18
−26·5	0·5	SSE	1	−25·2	0·4	S	1·5	−28·8	0·5	Calm	0	−21·2	−26·7	−12·0	14·9	19
−2·1	0·0	SE	7	−2·2	0·0	SE by S	7	−2·4	0·0	SW by S	3·5	−8·9	−31·6	−11·9	8·5	20
3·2	0·0	SE	4	−2·1	0·0	SE	3	3·2	0·0	SE	4·5	1·3	−17·1	0·0	—	21
−8·1	0·1	Calm	0	−6·8	0·1	Calm	0	−3·3	0·1	S	0·5	−3·9	−11·0	6·8	—	22
−0·4	0·0	S	0·5	−3·3	0·1	S	0·5	−2·4	0·0	S	0·5	−2·8	−9·3	−2·2	−2·0	23
7·2	0·0	S	5	6·1	0·0	S	6	6·1	0·0	S	7	6·4	−3·8	7·8	3·0	24
−3·3	0·1	S	0·5	−3·8	0·1	S	0·5	−3·1	0·2	SSE	0·5	−2·0	−1·3	9·8	—	25
−10·2	0·1	S	0·5	−9·5	0·1	S	0·5	−13·1	0·1	Calm	0	−11·8	−10·7	11·9	—	26
−22·5	0·3	Calm	0	−21·1	0·3	Calm	0	−20·8	0·3	Calm	0	−21·3	−23·1	−7·4	3·7	27
−21·1	0·3	SE	1	−22·2	0·3	SE	1	−26·1	0·5	SE	2	−23·8	−25·0	−9·9	9·0	28
−20·4	0·2	Calm	0	−21·9	0·3	SE	1	−22·3	0·3	Calm	0	−20·2	−27·3	−10·2	6·1	29
−7·6	0·1	SE	1	−7·0	0·1	SE	1	−8·0	0·1	W	3	−13·6	−25·0	−2·1	26·1	30
5·4	0·0	ESE	4	4·5	0·0	ESE	6	3·6	1·0	Variable	2	1·8	−19·9	0·0	12·1	31
−12·3	0·2		1·3	−12·7	0·2		1·8	−13·3	0·3		1·2	−13·5	−22·7	−4·3	—	Mean.

BAROMETER READINGS (see p. 46).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Remarks.
1	28·648	28·573	28·450	28·369	28·277	28·212	28·261	Snow drift, 3 p.
2	·509	·519	·509	·500	·492	·477	·443	Blowing from SE all past night. Slight snow, 11 a.
3*	·337	·326	·310	·299	·295	·316	·313	Becoming misty, 1 p. Misty, 7 p. and 9 p. Aurora arc in NE, 9 p.
4	·396	·418	·431	·451	·486	·498	·502	
5*	·563	·565	·589	·592	·602	·619	·624	Water blink in N, 11 a. Slight snow, 1 p. Aurora, due N and S.
6	·508	·473	·426	·412	·374	·294	·359	Bright sunshine, 9 a. Snow drift, 5 p.
7	·589	·631	·674	·720	·766	·796	·831	
8	·850	·832	·792	·784	·768	·759	·756	Water blink in N, 9 a.
9	28·631	·547	·473	·403	·343	·240	·005	
10	27·983	·062	·082	·124	·157	·258	·275	Blowing all past night; barometer fell to 27·913 in.
11*	28·403	·404	·398	·391	·380	·368	·352	Water blink in N, 1 p. Faint aurora N and NE, 9 p.
12*	·385	·414	·472	·511	·545	·576	·628	Faint aurora N and NE, 9 p.
13	·709	·691	·639	·611	·586	·581	·569	
14	·759	·792	·793	·788	·804	·807	·800	Slight snow, 3 p.
15	·746	·714	·678	·590	·580	·526	·504	
16	·626	·630	·669	·684	·721	·731	·739	Heavy gale from ESE during past night (7 hrs.). Slight snow, 1 p.
17	·660	·636	·591	·541	·487	·447	·376	Slight snow, 9 a.
18	·460	·463	·479	·462	·484	·513	·533	
19	·636	·644	·644	·639	·629	·636	·657	Slight snow, 9 a.
20	·636	·626	·625	·622	·614	·617	·548	Deposit of fine snow crystals, 9 a.—11 a. Snow drift, 9 p.
21	·573	·635	·654	·638	·611	·629	·648	Blowing from ESE all past night. Very little snow drift, 1 p.
22	·734	·714	·697	·684	·696	·727	·721	Blowing all past night from ESE.
23	·730	·735	·742	·742	·753	·766	·769	
24	·782	·810	·823	·833	·844	·870	·906	
25	·861	·857	·840	·838	·832	·834	·848	Vapour cloud in N, 9 a.
26	·942	·944	·925	·903	·913	·908	·911	
27*	·915	·399	·386	·886	·865	·858	·842	Cir.-s. moving from NNW, 9 a. Faint aurora NW—SSE, 9 p.
28	·729	·676	·607	·609	·601	·632	·670	Slight snow, 3 p.
29	·751	·739	·728	·732	·739	·745	·758	Snow 1 in. deep, 9 a.
30	28·697	28·698	28·700	28·705	28·710	28·740	28·736	
Mean	28·625	28·622	28·611	28·602	28·598	28·599	28·596	

AIR TEMPERATURE, DEPRESSION OF WET BULB,

Day.	9 A.M.				11 A.M.				1 P.M.				3 P.M.			
	Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		Temp.		Wind.	
1	0·7	1·7	ESE	4	−0·2	0·0	ESE	6	2·5	0·0	ESE	8	1·6	0·0	ESE	9–10
2	−5·2	0·1	SE	4	−6·4	0·1	SE by S	3	−5·7	0·1	SE	2	−7·5	0·1	SE by S	2
3	−16·2	0·2	ESE	1	−16·4	0·2	ESE	1	−16·8	0·2	ESE	1	−17·1	0·2	S	1
4	−22·2	0·3	S	0·5	−20·7	0·2	SE	1	−21·9	0·3	NW	1	−22·5	0·3	NW	1
5	−22·1	0·3	SE	2	−22·1	0·3	SE	0·5	−19·5	0·2	S	0·5	−17·8	0·2	SE	0·5
6	−4·3	0·3	Calm	0	−0·4	0·0	Calm	0	0·3	0·0	Calm	0	−0·4	0·0	WNW	1·5
7	−1·7	0·3	N	1	−1·5	0·2	N	0·5	−3·3	0·1	N	0·5	−3·5	0·1	N by E	1
8	−6·2	0·1	Calm	0	−8·1	0·1	Calm	0	−9·4	0·1	NE	0·5	−12·2	0·1	E by S	0·5
9	−19·2	0·2	Calm	0	−13·1	0·1	Calm	0	−11·6	0·1	Calm	0	−10·8	0·1	Calm	0
10	−4·6	0·6	ESE	2	−10·3	0·1	SSE	2	−10·3	0·1	SE	1	−12·3	0·1	SE	2
11	−21·1	0·3	SSE	0·5	−21·1	0·3	Calm	0	−21·1	0·3	SSE	0·5	−22·1	0·3	Calm	0
12	−18·2	0·2	SE	0·5	−15·3	0·2	SE	0·5	−5·1	0·4	SSE	0·5	−0·4	0·0	SSE	0·5
13	−27·0	0·5	Calm	0	−23·9	0·4	Calm	0	−17·0	0·2	Calm	0	−16·4	0·2	Calm	0
14	−28·6	0·5	SW	0·5	−22·3	0·3	Calm	0	−19·0	0·2	SE	0·5	−14·4	0·2	Calm	0
15	−7·1	0·1	Calm	0	−1·2	0·0	Calm	0	−5·1	0·1	Calm	0	−4·9	0·1	Calm	0
16	−0·6	0·5	S	0·5	−0·7	0·5	NW	1	−1·2	0·2	NNW	1	−1·7	0·4	NW	2
17	−6·3	0·1	Calm	0	−5·5	0·1	Calm	0	−6·1	0·1	Calm	0	−7·1	0·1	Calm	0
18	−10·1	0·1	SE	1	−8·7	0·1	SE	0·5	−7·9	0·1	SE	0·5	−7·1	0·1	SE	0·5
19	−8·6	0·1	Calm	0	−8·4	0·1	SE	0·5	−6·8	0·1	SE	0·5	−7·3	0·1	Calm	0
20	−8·0	0·1	Calm	0	−6·3	0·3	Calm	0	−5·3	0·1	SSE	0·5	−5·4	0·1	S	0·5
21	−2·4	0·0	ESE	9	−1·3	0·0	ESE	9	−0·7	0·0	ESE	8	−0·5	0·0	ESE	9
22	0·2	0·2	ESE	7	0·8	0·2	ESE	6	0·6	1·1	ESE	7	−0·6	0·0	ESE	7
23	−3·7	0·4	Calm	0	−3·6	0·3	NNE	0·5	−3·3	0·2	Calm	0	−3·3	0·4	Calm	0
24	−18·5	0·2	Calm	0	−16·8	0·2	S	0·5	−20·7	0·2	SSW	0·5	−22·6	0·3	S	0·5
25	−22·1	0·3	SE	0·5	−19·0	0·2	S	0·5	−14·3	0·2	SSE	0·5	−11·0	0·1	Calm	0
26	−15·7	0·2	SSE	0·5	−10·5	0·1	S	0·5	−10·3	0·1	ESE	1	−10·3	0·3	SSW	0·5
27	−23·1	0·4	SSE	0·5	−17·0	0·2	SSE	0·5	−16·8	0·2	SSE	0·5	−14·4	0·2	SSE	0·5
28	−12·2	0·1	Calm	0	−9·6	0·1	Calm	0	−8·1	0·1	Calm	0	−5·5	0·1	Calm	0
29	−9·6	0·1	S	1	−5·1	0·1	Calm	0	−9·5	0·1	Calm	0	−10·4	0·1	SE	0·5
30	−27·3	0·5	S	0·5	−23·3	0·4	S	0·5	−19·2	0·6	S	0·5	−20·3	0·2	S	0·5
Mean.	−12·4	0·3		1·2	−10·6	0·2		1·2	−9.8	0·2		1·2	−9·6	0·2		1·4

CLOUD OBSERVATIONS (see p. 48).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Bright Sunshine.	Precipitation.	Day.
1	Cir.-s. 9	Str., Cir.-s. 10	Str. 10	Str. 10	Str. 10	Drift 10	Nim. 10	—	—	1
2	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 8	—	—	2
3	Cir., Cir.-s. 7	Cir.-s. 2	Cir.-s., Str. 4	Cir.-s. 6	Str. 9	Str. 8	Str. 4	—	—	3
4	Str. 8	Str. 8	Str. 7	Str. 7	Str. 8	Str. 9	Str. 10	—	—	4
5	Str. 9	Str. 8	Nim. 9	Nim. 9	Nim. 9	Nim. 9	Cir.-s., Str. 7	—	—	5
6	— 0	— 0	— 0	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	—	—	6
7	Fr. Nim. 1	Fr. Nim. 1	Nim. 7	Nim. 9	Nim. 7	Nim. 6	Nim. 7	—	—	7
8	Str. 9	Cir.-s., Str. 8	Cir.-s, Str. 6	Cir.-s., Str. 8	Cir.-s., Str. 9	Cir.-s., Str. 8	Cir.-s., Str. 8	3·3	—	8
9	Cir.-s., Str. 2	Str. 4	Str. 4	Str. 6	Str., Cir.-s. 5	Str., Cir.-s. 4	*Nim. 10*	0·5	—	9
10	Str., Cir.-s. 9	Str., Cir.-s. 8	Str. 8	Str. 7	Str. 7	Str. 6	Cir.-s., Str. 4	3·4	—	10
11	— 0	— 0	Cir.-s., Str. 2	Cir.-s., Str. 2	Cir.-s., Str. 3	Cir.-s., Str. 2	Cir.-s., Str. 3	—	—	11
12	Str. 8	Str. 7	Cir.-s., Str. 7	*Cir.-s., Str. 5*	Cir.-s., Str. 4	Str. 3	Str. 2	6·0	—	12
13	Str. 1	Str. 3	Str. 2	Str. 1	Str. 1	Str. 3	Str. 2	—	—	13
14	Str. 4	Str. 8	Str. 9	Nim. 8	Nim. 9	Str. 9	Cir.-s., Str. 9	6·4	—	14
15	Cir.-s., Str. 10	Cir.-s., Str. 10	Str. 10	Str., Cir.-s. 10	Str., Cir.-s 10	Nim. 10	Nim. 10	—	—	15
16	Nim. 10	Nim. 10	Nim., Str. 10	Nim., Str. 10	Cir.-s., Str. 5	Cir.-s., Str. 4	Cir.-s , Str. 10	—	—	16
17	Str., Nim. 10	Str., Nim. 10	Str., Nim. 8	Str., Nim. 9	Str., Nim. 10	Str., Nim. 10	Str., Nim. 7	—	—	17
18	Cir.-s. 7	Cir.-s. 6	Cir.-s., Str. 6	Cir.-s., Str. 7	Cir.-s., Str. 5	Cir.-s., Str. 3	Cir.-s., Str. 4	1·9	—	18
19	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 5	Nim. 7	Cir.-s., Nim. 8	1·5	—	19
20	Cir.-s., Nim. 10	Cir.-s , Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	20
21	Nim. 10	Nim. 10	Cir.-s., Str. 9	Cir.-s., Str. 9	Str. 10	Str. 10	Str. 10	—	—	21
22	Str. 10	Str. 10	Str. 10	Str. 10	Str. 10	Str. 10	Str. 9	—	—	22
23	Cir.-s. 6	Cir.-s., Cir. 4	Cir.-s., Cir. 4	Cir.-s., Cir. 3	Cir.-s., Cir. 3	Cir.-s., Cir 3	Str. 1	—	—	23
24	Cir.-s. 5	Cir.-s. 5	Cir.-s. 4	Cir.-s. 3	Cir.-s. 3	Cir.-s. 2	Str. 1	5·0	—	24
25	— 0	— 0	— 0	— 0	Cir. 2	Cir. 2	— 0	4·5	—	25
26	Cir. 6	Cir.-s., Str. 8	Cir.-s., Alt.-c. 4	Cir.-s., Alt.-c. 4	Str. 8	Str., Fr. Str. 5	Str. 1	7·4	—	26
27	Cir.-s. 5	Cir.-s. 5	Cir.-s. 8	Cir.-s. 9	Cir.-s. 9	Cir.-s. 3	Cir.-s. 1	6·0	—	27
28	Cir.-s., Str. 8	Cir.-s., Str. 7	Nim. 9	Nim. 9	Nim. 7	Nim. 10	Nim. 9	2·4	—	28
29	Nim. 10	Nim. 9	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	29
30	— 0	Cum. 1	Cum. 1	Cum. 1	Cum. 1	— 0	— 0	—	—	30
Mean.	6·5	6·4	6·6	6·8	6·7	6·2	5·9	43·3	—	Total.

and WIND DIRECTION AND FORCE (see p. 45).

5 P.M.				7 P.M.				9 P.M.				Means.	Extremes.			Day.
Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		9a. + 9p. / 2	Min.	Max.	Solar Max.	
3·5	0·0	ESE	10·5	6·1	0·0	ESE	7	5·5	0·0	SE	3	3·1	−4·4	6·9	7·0	1
−8·2	0·1	SE by S	1	−8·5	0·1	Calm	0	−10·1	0·1	SE by S	1	−7·6	−8·1	9·9	4·0	2
−16·1	0·2	SE by S	1	−17·0	0·2	SW	1	−18·4	0·2	S	1	−17·3	−16·8	−5·1	−4·0	3
−23·9	0·4	SSW	1·5	−24·3	0·4	WSW	2	−24·7	0·4	W	1	−23·4	−23·4	−14·1	10·2	4
−13·2	0·2	Calm	0	−9·6	0·1	SE	1	−7·4	0·1	SE	0·5	−14·7	−25·2	−20·1	−4·0	5
10·7	1·0	SE	5	9·4	0·0	SE	10	8·7	1·0	ESE	9	2·2	−23·2	7·8	7·1	6
−6·2	0·1	Calm	0	−7·4	0·1	Calm	0	−7·5	0·1	Calm	0	−4·6	−6·7	**11·3**	**29·0**	7
−11·4	0·1	Calm	0	−13·1	0·1	Calm	0	−13·7	0·2	Calm	0	−9·9	−10·3	−0·6	23·0	8
−12·3	0·1	Calm	0	−9·8	0·1	Calm	0	*4·6*	*0·0*	ESE	10−11	−7·3	−24·2	−5·8	15·0	9
−13·3	0·2	SE	1	−11·1	0·1	S	0·5	−11·3	0·1	Calm	0	−7·9	−19·3	5·9	—	10
−25·8	0·5	Calm	0	−25·1	0·2	Calm	0	−28·0	0·5	SE	0·5	−24·5	−24·2	−4·9	−4·0	11
−16·7	0·2	Calm	0	−21·1	0·3	S	0·5	−25·3	0·4	S	0·5	−21·7	−28·9	−17·8	0·0	12
−24·6	0·4	Calm	0	−26·8	0·5	Calm	0	−28·0	0·5	Calm	0	−27·5	**−31·9**	−0·7	2·1	13
−14·1	0·2	Calm	0	−13·8	0·2	Calm	0	−13·2	0·1	SE	0·5	−20·9	−31·4	−13·6	0·0	14
−5·3	0·1	Calm	0	−4·8	0·1	SW	0·5	−4·4	0·1	SE by E	0·5	−5·7	−28·9	−6·8	1·8	15
−1·6	0·2	Calm	0	−8·0	0·1	Calm	0	−6·6	0·1	Calm	0	−3·6	−7·4	7·1	10·0	16
−7·5	0·1	Calm	0	−8·3	0·1	Calm	0	−8·3	0·1	Calm	0	−7·3	−10·3	−0·6	−1·0	17
−7·1	0·1	Calm	0	−10·9	0·1	Calm	0	−13·1	0·1	Calm	0	−11·6	−11·8	−5·5	15·0	18
−11·6	0·1	SE by S	0·5	−14·0	0·2	Calm	0	−14·3	0·2	SE by S	0·5	−11·4	−15·6	−6·8	4·0	19
−5·4	0·1	Calm	0	−4·9	0·1	SW	0·5	−1·8	0·0	ESE	5	−4·9	−17·6	−6·8	3·0	20
−1·4	0·0	ESE	9	−2·2	0·0	ESE	9	−2·4	0·0	ESE	8	−2·4	−7·5	−0·3	3·7	21
−1·6	0·8	ESE	6	−1·7	0·7	ESE	4	−4·8	0·4	NE	0·5	−2·3	−3·1	0·4	2·0	22
−8 1	0·1	Calm	0	−10·4	0·1	S	0·5	−10·6	0 1	S	0·5	−7·1	−5·6	2·9	2·9	23
−25·1	0·4	WSW	0·5	−26·4	0·5	Calm	0	−25·7	0·5	Calm	0	−22·1	−23·0	−3·0	17·0	24
−18·9	0·2	Calm	0	−19·9	·2	SE by E	0·5	−19·4	0·2	Calm	0	−20·7	−29·4	−14·1	5·0	25
−14·5	0·2	Calm	0	−17·1	0·2	Calm	0	−21·0	0·3	Calm	0	−18·3	−24·9	−10·8	21·0	26
−13·2	0·2	SSE	0·5	−16·0	0·4	Calm	0	−19·4	0·2	SSE	0·5	−21·2	−30·4	−9·2	7·8	27
−7·0	0·1	S	0·5	−7·3	0·1	Calm	0	−8·1	0·1	Calm	0	−10·1	−27·4	−11·8	10·0	28
−11·5	0·1	Calm	0	−13·2	0·2	S	0·5	−17·1	0·2	Calm	0	−13·3	−14·2	−5·5	3·1	29
−20·6	0·2	S	0·5	−28·3	0·5	S	0·5	−30·7	0·5	S	0·5	−29·0	−29·9	−5·1	14·9	30
−11·1	0·2		1·3	−12·2	0·2		1·3	−12·6	0·2		1·5	−12·5	−18·8	−3·9	—	Mean.

BAROMETER READINGS (see p. 46).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Remarks.
1	28·871	28·879	28·888	28·910	28·906	28·907	28·898	Misty, 7 p.
2	28·768	28·753	28·781	28·813	28·838	28·853	28·884	
3	29·083	29·132	29·164	29·173	29·117	29·109	29·141	Vapour cloud in N, 11 a. Cir. E and W moving from W by N, 1 p. Snow drift, 7 p.
4	·240	·235	·214	·197	29·1[illegible]3	29·147	29·131	Blowing nearly all past night.
5	29·067	29·059	29·043	29·008	28·947	28·884	28·828	
6*	28·775	28·838	28·772	28·912	23·936	28·948	28·928	Faint aurora N and NE, 7 p.
7	28·931	29·004	29·072	29·133	29·201	29·237	29·265	Vapour in N, 9 a.
8	29·335	29·330	29·296	29·277	29·261	29·236	29·218	
9	29·003	28·948	28·913	28·847	28·816	28·763	28·719	
10	28·734	·763	·801	·831	·848	·854	·866	
11	·787	·756	·739	·666	·627	·572	·605	
12	·658	·717	·763	·795	·821	·881	·926	Blowing from ESE all past night, 42 miles an hour.
13	·943	·895	·856	·846	·842	·839	·852	Cir. converging to SSW, 1 p.
14	·910	·950	·978	·989	·985	·987	·932	Dense water cloud in N, 9 a.
15	28·926	28·904	28·880	*28·871*	28·858	28·904	28·914	Blowing from ESE all past night.
16	29·053	29·053	29·037	*29·030*	29·022	29·021	29·025	
17	29·100	29·117	29·114	29·109	29·094	29·082	29·069	
18	28·853	28·838	28·806	28·765	28·714	28·687	28·636	
19	·418	·384	·346	·346	·335	·347	·348	Slight snow, 5 p.
20	·423	*·460*	*·460*	·473	·486	·507	·516	
21	·691	·713	*·741*	·755	·756	·755	·719	
22	·775	·803	·852	28·877	28·908	28·954	28·970	Slight snow, 9 p.
23	28·981	28·953	28·949	29·004	29·060	29·088	29·111	
24	29·182	29·165	29·144	29·115	29·087	29·022	28·967	
25	28·678	*28·656*	28·641	28·646	28·689	28·686	·709	
26	·796	·791	·790	·788	·788	·789	·790	
27	·688	·683	·675	·[illegible]64	·704	·708	·725	Snow drift, 11 a.
28	·894	·914	·834	·828	·836	·940	·830	Blowing all past night from ESE.
29	·833	·813	·796	·762	·753	·740	·737	
30	·621	·580	·549	·420	·505	·509	·515	Blowing all past night from ESE.
31	28·685	28·703	28·736	28·755	28·798	28·827	28·763	
Mean.	28·861	28·865	28·859	28·858	28·862	28·864	28·856	

AIR TEMPERATURE, DEPRESSION OF WET BULB,

Day.	9 A.M.				11 A.M.				1 P.M.				3 P.M.			
	Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		Temp.		Wind.	
1	−26·6	0·5	S	0·5	−24·5	0·4	SSE	0·5	−15·5	0·7	Calm	0	−18·0	0·2	Calm	0
2	−16·2	0·2	Calm	0	−15·3	0·2	W	1	−13·3	0·9	Calm	0	−14·1	0·6	Calm	0
3	−24·0	0·4	Calm	0	−20·2	0·2	Calm	0	−18·3	0·2	Calm	0	−17·0	0·2	Calm	0
4	−15·5	0·2	S by E	1	−14·9	0·2	SSE	1	−14·8	0·2	Calm	0	−15·6	0·2	Calm	0
5	−23·3	0·4	SSW	0·5	−22·1	0·3	SSW	0·5	−20·0	0·2	SSW	0·5	−16·4	0·2	S	0·5
6	−19·1	0·2	Calm	0	−13·3	0·2	Calm	0	−9·0	0·1	Calm	0	−10·3	0·1	Calm	0
7	−10·3	0·1	SE	0·5	−7·5	0·1	S by E	0·5	−3·6	0·1	SE by E	0·5	−3·2	0·4	Calm	0
8	−4·2	0·4	Calm	0	−3·9	0·1	Calm	0	−3·3	0·1	Calm	0	−2·3	0·0	Calm	0
9	−9·0	0·1	Calm	0	−10·6	0·1	SSW	0·5	−9·3	0·1	S	0·5	−4·3	0·9	Calm	0
10	−3·3	0·2	Calm	0	1·0	0·5	Calm	0	3·4	0·9	Calm	0	5·5	1·4	Calm	0
11	−7·9	0·1	Calm	0	−2·2	0·3	Variable	1-2	2·6	1·1	WNW	3	8·8	2·6	ESE	6
12	12·7	0·9	ESE	7	12·7	0·9	ESE	7	14·4	1·0	ESE	6	14·7	1·0	ESE	6
13	1·1	0·3	Calm	0	2·2	0·6	S	0·5	1·7	0·5	SW	1	0·1	0·4	SW	1
14	−5·0	0·1	Calm	0	−5·1	0·3	Calm	0	−3·3	0·2	SE	0·5	0·7	0·4	Calm	0
15	14·7	1·5	ESE	6	15·8	1·1	ESE	7	17·7	1·6	ESE	7	*18·5*	*1·2*	ESE	7
16	8·6	0·9	Calm	0	8·2	1·9	Calm	0	9·2	1·2	Calm	0	*8·5*	*1·0*	Calm	0
17	10·7	1·3	Calm	0	4·6	1·0	Calm	0	6·7	1·8	Calm	0	5·6	1·0	Calm	0
18	1·5	0·4	ESE	0·5	3·4	0·4	WSW	0·5	3·6	0·6	W	0·5	2·0	0·4	W	3
19	2·4	0·5	Calm	0	4·6	0·8	Calm	0	6·5	0·9	Calm	0	7·7	0·9	Calm	0
20	5·1	0·0	Calm	0	*11·7*	*0·5*	*Calm*	*0*	*16·7*	*1·5*	*Calm*	*0*	9·2	1·1	Calm	0
21	12·7	0·0	S	0·5	12·7	0·0	W	0·5	*14·2*	*0·5*	W	0·5	11·7	1·0	SE	0·5
22	0·4	0·0	Calm	0	3·6	0·1	SSE	0·5	5·6	0·1	Calm	0	6·7	0·3	Calm	0
23	6·8	1·0	ESE	1	6·7	0·0	W by N	1	7·8	0·0	W by N	0·5	10·9	0·7	Calm	0
24	7·7	0·6	S	0·5	7·4	0·6	S	0·5	7·5	0·7	S	0·5	7·0	0·6	Calm	0
25	4·6	0·0	W	1	*6·1*	*0·5*	W	1	6·4	1·0	W by N	1	3·5	0·8	NW	1
26	5·8	0·2	SW	1	7·0	1·1	SW	0·5	8·0	1·3	SSW	0·5	8·2	1·5	Calm	0
27	13·7	0·0	ESE	7	13·7	0·0	ESE	8	13·9	0·0	ESE	8-9	12·5	0·0	ESE	10
28	9·7	0·0	SE	6	9·7	1·5	SE	5	10·7	0·2	SE	2	8·7	0·0	SE	4
29	4·4	0·0	ESE	4	5·6	1·0	ESE	4	5·6	0·5	ESE	4	5·6	0·5	ESE	4
30	0·7	1·1	ESE	7	1·3	1·6	ESE	7	2·2	0·6	ESE	7	2·9	0·3	ESE	7
31	0·8	0·0	SSE	4	3·0	1·2	SSE	2	3·6	1·2	SSE	1	3·6	0·8	S	0·5
Mean.	−1·3	0·4		1·5	0·0	0·6		1·6	1·9	0·6		1·5	2·0	0·7		1·6

CLOUD OBSERVATIONS (see p. 48).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Bright Sunshine.	Precipitation.	Day.
1	Cir.-s. 4	Cir.-s. 4	Cir.-s. 3	Cir.-s. 3	Cir.-s. 3	Cir.-s. 5	Cir.-s. 5	8·5	—	1
2	Cir.-s. 4	Cir.-s. 3	Cir.-s. 4	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	7·3	—	2
3	Fr. Str. 1	Fr. Str. 1	Cir. 5	Cir. 7	Cir. 8	Drift 8	Drift 8	8·3	—	3
4	Fr. Str. 2	Cir., Cir.-s. 3	— 0	— 0	— 0	Cum. 1	Cum., Cir.-s. 2	7·8	—	4
5	— 0	Cir.-s. 1	Cir.-s. 1	Cir.-s. 2	Cir.-s. 2	Cir.-s. 2	Cir.-s. 1	8·4	—	5
6	Fr. Str. 1	Str. 1	— 0	— 0	— 0	— 0	— 0	8·6	—	6
7	— 0	— 0	— 0	— 0	— 0	— 0	— 0	8·6	—	7
8	— 0	— 0	— 0	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	9·4	—	8
9	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	Cir.-s. 1	Cir.-s., Str. 4	Cir.-s., Str. 6	11·4	—	9
10	Cir.-s., Str. 8	Cir.-s., Str. 6	Cir.-s., Str. 4	Cir.-s., Str. 2	Cir.-s., Str. 1	— 0	— 0	9·7	—	10
11	Cir., Str. 7	Cir., Str. 7	Str. 6	Cir. 2	Cir. 3	Str., Nim. 8	Str. 10	8·6	—	11
12	Str. 10	Str. 10	Cum.-s. 9	Cir-s, Cum-s. 9	Cir-s, Cum-s. 9	Cir-s, Cum-s. 1	— 0	16·4	—	12
13	Cir.-s., Str. 4	Cir. 2	Cir. 4	Cir. 5	Cir. 2	Cir. 2	— 0	—	—	13
14	Cir.-s. 1	Cir.-s. 2	Cir.-s. 4	Cir.-s. 6	Cir.-s. 2	Cir.-s. 3	Cir.-s. 3	9·8	—	14
15	Cir. 2	Cir. 1	Cir. 1	Cir. 2	Cir. 3	Cir. 2	Cir. 1	12·0	—	15
16	— 0	— 0	— 0	— 0	— 0	— 0	— 0	—	—	16
17	Str. 1	Str. 1	Str. 1	— 0	Cir.-s., Str. 3	Cir.-s., Str. 4	Str. 9	11·2	—	17
18	Str. 2	Str. 2	Cum. 3	Cum., Str. 7	Cum., Str. 3	Cum., Str. 3	Cum., Str. 2	12·0	—	18
19	Nim. 10	Nim., Str. 10	Cir. 8	Cir., Nim. 8	Nim. 10	Nim. 10	Nim. 9	12·8	—	19
20	Nim. 9	Nim. 7	Cir.-c. 5	Cir., Cir.-c. 3	Cum., Str. 9	Str., Cum. 10	Str., Cum. 9	1·3	—	20
21	Cir.-s., Str. 4	Cir.-s., Str. 8	Cir.-s., Str. 8	Cir.-s., Str. 9	Str., Nim. 10	Str. 7	Str. 3	7·0	—	21
22	Cum., Str. 8	Cum., Str. 9	Str., Nim. 9	Str., Nim. 8	Str., Nim. 8	Str., Nim. 7	Nim. 9	4·3	—	22
23	Nim. 10	Nim. 10	Nim. 10	Nim., Cir. 8	Str., Cir. 7	Str., Cir. 6	Str., Cir. 9	2·0	—	23
24	Cir., Cir.-s, St. 7	Str., Cum.-s. 9	Cir.-s. 10	Cir.-s. 10	Cir.-s. 10	Cir.-s. 10	Cir.-s. 10	1·5	—	24
25	Cir.-s. 10	Cir.-s. 10	Cir.-s., Nim. 6	Nim. 8	Nim. 9	Nim. 10	Nim. 10	1·7	—	25
26	Nim. 10	Nim. 10	Nim. 10	Nim. 6	Nim. 9	Nim. 9	Nim. 10	2·3	—	26
27	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	2·0	—	27
28	Cir.-s., Str. 9	Cir.-s., Str. 10	Cir.-s, Str. 10	Cir.-s, Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	—	—	28
29	Cir.-s., Str. 9	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 7	Cir.-s., Str. 7	Cir.-s., Str. 7	Cir.-s., Str. 7	—	—	29
30	Cir. 7	Cir. 8	Cir., Cir.-s. 9	Cir., Cir.-s. 9	Cir., Cir.-s. 10	Cir., Cir.-s. 10	Cir., Cir.-s. 10	—	—	30
31	Cir., Cir.-s. 10	Cir., Cir.-s. 10	Cir., Cir.-s. 10	Cir., Cir.-s. 10	Cir., Cir.-s. 7	Cir., Cir.-s. 7	Cir., Cir.-s. 7	0·8	—	31
Mean.	5·2	5·4	5·2	5·0	5·1	5·1	5·2	193·7	—	Total.

and WIND DIRECTION AND FORCE (see p. 45).

5 P.M.				7 P.M.				9 P.M.				Means.	Extremes.			Day.
Temp.		Wind.		Temp.		Wind.		Temp.		Wind		$\frac{9a. + 9p.}{2}$	Min.	Max.	Solar Max.	
−19·5	0·2	Calm	0	−22·3	0·3	Calm	0	−25·1	0·4	Calm	0	−25·8	−36·5	−18·9	25·3	1
−18·6	0·2	Calm	0	−21·2	0·3	Calm	0	−20·8	0·3	Calm	0	−18·5	−30·6	−13·6	23·0	2
−9·7	0·1	ESE	6	−9·3	0·1	ESE	8-9	−9·1	0·1	ESE	7	−16·5	−35·9	−12·1	3·0	3
−18·2	0·2	S by E	0·5	−17·2	0·5	S by E	1·5	−17·1	0·2	SSW	2·5	−16·3	−22·7	−7·0	10·5	4
−17·8	0·2	SSW	0·5	−20·2	0·2	Calm	0	−18·2	0·2	Calm	0	−20·7	−26·3	−11·2	3·7	5
−4·2	0·1	Calm	0	−13·9	0·2	SE	0·5	−11·3	0·1	Calm	0	−15·2	−29·4	−15·1	2·1	6
−4·2	0·1	Calm	0	−9·5	0·1	Calm	0	−12·1	0·1	Calm	0	−11·2	−23·7	−2·9	6·5	7
−6·7	0·2	Calm	0	−9·2	0·1	Calm	0	−10·7	0·1	Calm	0	−7·4	−22·0	−0·8	18·7	8
−10·3	0·1	Calm	0	−14·0	0·2	Calm	0	−16·2	0·2	Calm	0	−12·6	−23·4	−1·4	18·8	9
6·4	1·4	Calm	0	−4·6	0·3	Calm	0	−9·3	0·1	Calm	0	−6·3	−17·6	−3·1	8·2	10
8·7	2·4	ESE	7	7·0	2·0	ESE	8	8·7	1·8	ESE	7	0·4	−17·1	6·8	21·0	11
15·0	1·1	ESE	6	8·5	0·8	NW	3	2·6	0·8	N	0·5	7·7	−9·3	12·8	12·0	12
−3·3	0·2	S by W	0·5	−4·7	0·2	S by W	0·5	−8·7	0·1	Calm	0	−3·8	−8·7	16·6	22·0	13
−2·0	0·4	Calm	0	2·5	0·9	W	0·5	8·8	1·1	ESE	7	1·9	−13·2	2·5	22·1	14
19·3	1·0	ESE	7	15·7	1·0	ESE	7	15·4	1·1	ESE	6	15·1	−5·1	14·8	19·5	15
7·8	0·8	Calm	0	2·4	0·2	Calm	0	−2·4	0·0	Calm	0	3·1	0·2	19·4	26·5	16
4·6	0·8	Calm	0	−0·1	0·3	Calm	0	−0·4	0·0	Calm	0	5·2	−8·7	10·6	26·2	17
−0·2	0·2	SSW	1	−3·3	0·1	SSW	1	−6·1	0·1	Calm	0	−2·3	−1·9	10·3	29·0	18
6·1	0·4	Calm	0	5·5	0·1	Calm	0	2·7	0·0	Calm	0	2·6	−12·8	4·3	14·9	19
8·2	0·5	Calm	0	6·4	0·2	Calm	0	6·7	0·3	NNW	2	5·9	0·9	7·9	21·3	20
10·7	0·8	SE	0·5	8·7	0·3	Calm	0	4·8	0·2	Calm	0	8·8	4·8	17·0	30·6	21
5·8	0·2	Calm	0	3·6	0·1	Calm	0	4·6	0·5	Calm	0	2·5	−6·0	14·3	18·8	22
7·5	0·8	NNW	0·5	4·6	0·5	SE	1	3·3	0·5	SE	0·5	5·1	0·2	7·6	16·5	23
6·7	0·4	S	0·5	5·6	0·2	S	1	5·3	0·3	S	1	6·5	0·1	12·6	23·6	24
0·8	0·1	NW	0·5	0·0	0·3	NW	0·5	−0·4	0·0	Calm	0	2·1	4·3	9·1	16·0	25
6·4	1·0	Calm	0	5·6	0·7	SSW	0·5	5·1	0·4	Calm	0	5·5	−0·8	6·5	14·0	26
12·8	0·0	ESE	8	12·4	0·0	ESE	8	11·7	0·0	ESE	9	12·7	4·8	15·4	31·0	27
7·7	0·0	NW	1	6·8	0·1	NW	1	5·8	1·0	ESE	2	7·8	6·0	15·6	15·6	28
4·1	0·0	ESE	5	1·8	0·0	ESE	6	0·6	0·0	ESE	6	2·5	1·7	12·0	14·0	29
4·1	0·5	ESE	5	4·6	0·5	Calm	0	1·6	0·3	ESE	2	1·2	−1·0	7·0	11·2	30
3·6	0·8	S	0·5	−0·2	0·4	Calm	0	−0·4	1·0	S	0·5	0·2	−3·1	4·9	5·3	31
1·0	0·5		1·6	−1·5	0·4		1·6	−2·6	0·4		1·7	−1·9	−10·7	4·6	—	Mean.

BAROMETER READINGS (see p. 46).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Remarks.
1	29·078	29·094	29·135	29·158	29·176	29·207	29·222	Slight snow, 3 p.
2	29·188	29·180	29·177	29·140	29·114	29·063	29·012	Vapour cloud in N, 5 p.
3	28·745	28·734	28·708	28·729	28·704	28·739	28·764	Blowing from ESE all past night. Anemometer demolished during night, wind [force about 11.
4	28·967	28·979	29·019	29·096	29·139	29·179	29·230	Blowing all past night.
5	29·296	29·351	·378	·313	·311	·330	·371	
6	·335	·333	·337	·329	·333	·311	·313	
7	·232	29·219	29·210	29·215	29·225	29·205	29·188	
8	29·036	28·965	28·965	28·965	28·930	28·920	28·920	Open patches of water in NNE; slack ice towards the N, 5 p.
9	28·897	28·892	28·857	28·845	28·848	28·860	28·864	
10	29·030	29·062	29·093	29·139	29·125	29·145	29·164	
11	·170	·173	·181	·175	·190	·198	·217	Dark vapour cloud in N, 5 p.
12	·293	·302	·381	·342	·347	·323	·368	Vapour cloud in N, 5 p.
13	·301	·281	·251	·218	·195	·176	·167	
14	·104	·139	·176	·236	·276	·309	·378	Vapour cloud in N, 1 p.
15	·633	·597	·679	·662	·624	·575	·536	
16	·409	·410	·424	·311	·430	·410	·410	Slight snow, 11 a. and 1 p. Dense mist over the surface of the Bay about 10 feet [high; quite clear above this height, 9 p.
17	·289	·262	·238	·200	·175	·170	·189	
18	·232	·254	·273	·291	·302	·304	·325	Slight snow, 5 p.
19	·302	·315	·326	·328	·347	·354	·369	
20	·365	·356	·345	·339	·341	·333	·349	Snow squalls, 3 p. Dense mist over the surface of the Bay about 20 feet high, 9 p.
21	·367	·374	·379	·376	·370	·374	·368	
22	·290	·282	·274	·279	·274	·269	·379	
23	·323	·334	·366	·385	·444	·462	·514	Vapour cloud in N, 11 a.
24	·647	·663	·626	·669	·671	·684	·665	
25	·571	·591	·637	·656	·707	·735	·691	Low mist in S, 9 a. Vapour cloud in N, 11 a. Clouds moving swiftly from SE, 5 p.
26	·751	·748	·698	·666	·641	·653	·675	Blowing all past night from ESE.
27	·681	·693	·694	·681	·677	·663	·660	Blowing all past night from SE by S.
28	·653	·588	·446	·392	·486	·476	·448	Blowing all past night from SE—S.
29	·579	·586	·586	·582	·573	·579	·585	Blowing nearly all past night from ESE. Dense mist on summit of Cape Adare, 5 p.
30	29·635	29·656	29·657	29·654	29·652	29·666	29·662	Mists over mountain ranges, 3 p.
Mean.	29·313	29·314	29·317	29·312	29·321	29·322	29·333	

AIR TEMPERATURE, DEPRESSION OF WET BULB,

Day.	9 A.M.				11 A.M.				1 P.M.				3 P.M.			
	Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		Temp.		Wind.	
1	4·1	0·1	Calm	0	6·7	0·9	S	0·5	7·3	0·6	S	0·5	8·7	0·8	Calm	0
2	0·7	0·3	Calm	0	2·1	0·5	Calm	0	3·9	0·7	Calm	0	6·3	1·1	Calm	0
3	20·9	1·1	SE	6–7	22·7	0·2	SE	6–7	22·7	0·3	SE	8	21·7	1·5	SE	6–7
4	24·5	1·1	SE	4	20·8	1·0	ESE	6	21·7	0·0	ESE	4	21·3	3·5	S	0·5
5	17·2	0·7	Calm	0	16·2	2·7	Calm	0	16·2	1·7	S by E	0·5	16·2	2·3	S by E	0·5
6	20·7	2·3	ESE	5	21·4	3·8	ESE	6	20·5	2·7	ESE	5	19·3	1·5	SE	4
7	16·5	0·4	SE	4	14·3	2·4	SE	5	14·5	1·8	SE	7	13·8	1·0	SE	5
8	10·2	0·0	Calm	0	11·7	0·0	Calm	0	11·5	0·3	Calm	0	11·2	0·0	S	0·5
9	6·2	1·1	SE	0·5	9·8	0·3	Calm	0	12·2	0·7	Calm	0	12·7	0·5	Calm	0
10	14·4	0·5	Calm	0	12·3	1·3	Calm	0	14·1	0·9	Calm	0	15·7	1·6	Calm	0
11	7·2	0·5	SE	0·5	9·6	0·9	Calm	0	13·7	1·4	Calm	0	15·7	1·9	Calm	
12	18·7	0·6	Calm	0	16·7	1·0	Calm	0	18·7	0·1	Calm	0	19·7	0·7	Calm	0
13	20·9	1·1	Calm	0	22·2	1·7	Calm	0	25·4	2·9	Calm	0	24·7	2·1	Calm	0
14	25·3	1·1	N by E	1	23·7	1·9	N	1·5	22·0	1·2	Calm	0	21·9	1·0	Calm	0
15	24·3	0·5	Calm	0	25·1	2·1	Calm	0	24·8	2·0	SE	0·5	24·3	2·2	SE	0·5
16	20·2	0·6	Calm	0	20·5	0·3	Calm	0	22·4	0·6	Calm	0	24·0	1·2	Calm	0
17	19·2	1·3	Calm	0	21·2	1·7	Calm	0	21·9	1·8	SSW	0·5	21·5	1·7	SSW	0·5
18	24·8	2·0	W	1	22·3	1·4	S	0·5	21·8	1·0	Calm	0	21·0	0·9	Calm	0
19	19·5	0·1	ESE	4	21·2	0·4	ESE	4	23·9	1·3	SE	0·5	23·0	0·9	W by S	1
20	18·2	0·0	Calm	0	19·9	0·7	SSE	0·5	19·0	0·4	SSE	0·5	21·7	0·1	S	0·5
21	19·6	0·8	Calm	0	21·4	2·4	SW	0·5	21·7	1·6	SW	0·5	21·2	1·2	W	0·5
22	14·7	0·9	S	1	16·3	1·8	Calm	0	18·4	1·4	Calm	0	18·7	1·0	Calm	0
23	9·9	1.2	S	1	13·1	1·3	Calm	0	15·9	1·2	Calm	0	17·1	1·3	Calm	0
24	14·9	0·8	S by W	1	20·4	0·9	SW	0·5	22·5	1·7	S	0·5	24·2	2·0	SW	0·5
25	8·6	0·5	Calm	0	11·9	0·5	SE	1	13·7	1·6	SE	1	16·7	0·9	SE	1
26	24·0	0·2	SE	4	23·0	1·8	SSW	4	24·3	2·3	S	4	24·0	0·9	SSE	6
27	31·9	0·0	SE by S	6	31·7	0·8	SSE	5	31·7	0·8	SSE	4	30·9	0·0	SSE	4
28	37·0	4·8	S by E	5	42·8	7·8	SE	6	45·5	8·5	ESE	8	45·6	8·2	ESE	9
29	32·6	0·8	NW.	1	32·0	2·5	Calm	0	31·5	2·3	SW	1	30·5	1·5	SW	0·5
30	28·6	0·7	S	0·5	28·7	0·7	SSE	0 5	30·1	1·2	S	0·5	30·1	1·2	S	0·5
Mean.	18·5	0·9		1·5	19·4	1·5		1·6	20·5	1·5		1·6	20·8	1·5		1·4

CLOUD OBSERVATIONS (see p. 48).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Bright Sunshine.	Precipitation.	Day.
1	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Cir.-s., Nim. 9	—	—	1
2	Cir. 1	Cir. 2	Cir.-s., Cir. 3	Cir., Cum. 1	Cir. 1	Cir. 2	Cir., Cir.-s. 7	—	—	2
3	Cir.-s., Str. 9	Cir.-s., Str. 9	Cir.-s., Str. 7	Cir.-s., Str. 5	Cir.-s., Str. 4	Cir,-s., Str. 4	Cir.-s., Str. 3	12·4	—	3
4	Cir., Cum. 2	Cir. 1	Cum. 1	— 0	— 0	— 0	— 0	4·0	—	4
5	— 0	— 0	— 0	— 0	Cir. 1	Cir. 4	Cir. 3	12·0	—	5
6	— 0	— 0	— 0	— 0	Str. 1	Str. 1	Str. 1	13·0	—	6
7	Cir., Cum. 3	Cir.-s., Str. 7	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Str. 10	Str. 10	13·2	—	7
8	Nim. 10	Nim. 10	Nim. 9	Nim. 8	Nim. 6	Nim. 3	Nim. 3	4·7	—	8
9	Cir., Nim. 7	Cir., Nim. 8	Cir. 7	Cir., Nim. 7	Cir., Nim. 8	Cir., Nim. 8	Cir., Nim. 9	—	—	9
10	Cir., Cir.-s. 1	Cir., Cir.-s. 2	Cir., Cir.-s. 7	Cir., Cir.-s. 5	Cir., Cir.-s. 7	Cum.-s. 9	Cir.-s., Str. 8	8·2	—	10
11	— 0	— 0	— 0	— 0	— 0	Str. 1	Str. 1	6·6	—	11
12	— 0	Str., Cir.-s. 7	Str., Cir.-s. 7	Cum. 5	Cum. 5	Cum. 5	Cum. 5	16·4	—	12
13	Cir.,Fr. Nm. 5	Cir.-s., Cum. 7	Cir., Cir.-s. 5	Cir., Cir.-s. 4	Cir. 3	Cir. 2	Cir. 3	4·6	—	13
14	Cir.-s., Nim. 2	Cir.-s., Nim. 2	Vapour Cld. 2	Fr. Nim. 4	Fr. Nim. 2	Fr. Nim. 3	Nim. 6	11·0	—	14
15	Nim. 7	Nim. 8	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	12·4	—	15
16	Nim. 10	Nim. 10	Nim. 10	Str., Nim. 9	Cum.-s.,Nm. 7	Cr.Cr-s.Cm-s 5	Cir., Cum.-s. 3	—	—	16
17	— 0	— 0	— 0	— 0	— 0	— 0	Fr. Nim. 1	—	—	17
18	Cum.-s., Nm. 9	Cum.-s.,Nm. 9	Cum.-s.,Nm. 9	Nim. 9	Nim. 9	Nim. 10	Nim. 9	15·3	—	18
19	Cum.-s. 10	Cum.-s. 9	Cum.-s.,Str. 10	Cum.-s., Str. 9	Cum.-s.,Str. 9	Cm-s.Alt.-cm 8	Cm.-s.,Cir.-s. 7	2·0	—	19
20	Str., Cir.-s. 9	Str. 9	Nim., Str. 9	Nim., Str. 8	Nim., Str. 7	Nim., Str. 7	Nim., Str. 7	—	—	20
21	Cir.-s., Nim. 6	Cir.-s., Nim. 5	Cir.-s., Nim. 5	Cir.-s., Nim. 4	Cir.-s., Nim. 9	Cir.-s., Nim. 7	Cir.-s. 2	4·0	—	21
22	Cir. 1	— 0	— 0	— 0	— 0	— 0	— 0	8·5	—	22
23	— 0	Cir.-s., Str. 1	Cum.-s. 1	Cum.-s. 1	Cum.-s. 1	Cum.-s. 1	Cir.-s. 1	15·2	—	23
24	Fr., Nim. 1	— 0	— 0	— 0	— 0	— 0	— 0	15·1	—	24
25	Cir. 1	Vapour Cld. 1	Nim. 3	Nim. 4	Nim. 4	Nim. 3	Nim. 2	15·0	—	25
26	Str., Nim. 8	Nim.,Cm.-s. 8	Cm.-s.,Cr.-s. 8	Str. 9	Str. 10	Cum.-s. 8	Cum.-s. 9	14·4	—	26
27	Cum.-s. 9	Cum.-s. 10	Cum.-s. 10	Cum.-s. 10	Cum.-s. 10	Cum.-s. 10	Cum.-s. 10	—	—	27
28	Cir. 7	Cir., Cir.-c. 6	Cir., Cir.-c. 8	Cum.-s.,Cir. 9	Cum.-s. 10	Cum.-s.,Cir. 10	Cir., Cir.-s. 10	8·6	—	28
29	Str., Cir.-s. 9	Str., Cir,-s. 10	Cum.-s., Str. 9	Cum.-s.,Str. 10	Cir.-s.,Nim. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	—	—	29
30	Nim. 9	Nim. 8	Nim. 8	Nim. 8	Cum.-s.,Nm. 9	Cir. 3	Cir.-s., Str. 5	0·8	—	30
Mean.	4·9	5·3	5·6	5·3	5·4	5·1	5·1	212·4	—	Total.

and WIND DIRECTION AND FORCE (see p. 45).

5 P.M.				7 P.M.				9 P.M.				Means.	Extremes.			Day.
Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		$\frac{9a. + 9p.}{2}$	Min.	Max.	Solar Max.	
7·7	0·2	Calm	0	4·1	0·3	Calm	0	1·6	0·0	Calm	0	2·9	−2·8	6·5	18·5	1
6·7	1·1	Calm	0	10·8	2·1	ESE	5	10·9	2·2	ESE	8	5·8	−4·3	9·8	20·3	2
22·2	1·9	SSE	5	19·7	0·9	SSE	6-7	18·7	0·1	S	3	19·8	1·1	21·4	25·0	3
21·7	2·9	S by E	1·5	19·1	3·1	S by E	2	14·4	0·8	Calm	0	19·5	11·7	26·0	29·8	4
14·8	0·9	SSW	0·5	13·9	1·0	SSW	0·5	9·8	0·3	Calm	0	13·5	6·1	28·1	35·9	5
18·0	1·0	SE	3	14·9	1·2	SE	6	13·7	1·1	S by E	5	17·2	3·8	20·8	38·0	6
11·4	0·9	SSE	5	10·9	0·9	SSE	4	11·8	1·0	SE by S	4	14·2	12·2	21·6	26·2	7
9·5	0·0	Calm	0	9·2	0·0	Calm	0	7·7	0·0	Calm	0	9·0	8·6	17·4	24·0	8
11·9	0·5	Calm	0	8·7	0·2	Calm	0	8·8	0·1	Calm	0	7·5	−1·3	13·3	30·0	9
12·0	0·7	Calm	0	11·0	0·5	Calm	0	7·2	0·3	Calm	0	10·8	6·5	14·6	34·5	10
15·2	1·0	Calm	0	14·7	1·0	SE	0·5	14·5	1·0	Calm	0	10·9	−1·5	15·8	30·1	11
19·7	1·7	Calm	0	20·7	0·4	Calm	0	19·7	0·9	Calm	0	19·2	6·3	21·3	37·1	12
23·6	1·4	Calm	0	20·7	1·1	Calm	0	19·9	1·1	Calm	0	20·4	13·8	23·4	34·4	13
22·2	0·9	Calm	0	21·9	0·9	Calm	0	20·7	0·9	Calm	0	23·0	13·0	25·9	45·6	14
22·2	0·9	W	0·5	20·7	0·4	W	0·5	19·7	0·0	Calm	0	22·0	5·6	27·4	37·0	15
23·1	1·1	Calm	0	23·0	0·9	Calm	0	18·9	0·0	Calm	0	19·6	17·4	27·5	39·0	16
21·8	2·0	Calm	0	21·3	1·4	Calm	0	17·5	0·7	Calm	0	18·4	8·9	24·0	40·0	17
20·3	0·5	Calm	0	19·1	0·0	S	0·5	19·1	0·8	Calm	0	22·0	9·7	25·0	40·1	18
20·3	0·6	Calm	0	19·5	0·2	Calm	0	16·7	0·5	SW	1	18·1	14·9	25·9	29·7	19
19·9	0·6	SW	0·5	15·1	0·4	SSE	0·5	13·5	0·0	Calm	0	15·9	14·5	29·1	37·5	20
20·5	0·7	SW	0·5	18·8	0·5	Calm	0	17·7	0·1	Calm	0	18·7	5·4	29·1	47·3	21
22·0	1·6	Calm	0	21·0	0·8	Calm	0	19·7	1·4	Calm	0	17·2	−0·2	23·3	35·2	22
15·9	1·0	Calm	0	13·5	1·0	Calm	0	6·9	0·5	Calm	0	8·4	2·2	22·1	42·1	23
22·5	1·5	SW	0·5	19·7	0·9	SW	0·5	17·1	1·0	Calm	0	16·0	3·9	20·6	49·5	24
20·7	0·9	SE	2	21·7	0·8	SSE	2	22·7	0·5	ESE	7	15·7	3·8	24·7	50·0	25
23·5	1·1	SSE	6	22·8	0·7	SE by S	7	21·0	0·2	SE by S	7	22·5	8·6	25·3	43·9	26
32·9	2·9	SSE	4	31·9	0·9	S	1	36·9	1·9	SSE	4	34·4	21·1	32·0	34·0	27
42·9	7·7	SE by E	4	41·4	6·5	SE by E	6	41·9	6·4	ESE	5	39·5	28·1	41·8	46·3	28
30·2	1·4	SW	1	28·8	1·5	SSW	0·5	28·1	0·0	SSW	1	30·4	27·5	45·6	48·1	29
30·1	1·1	Calm	0	31·9	1·8	Calm	0	29·0	0·3	Calm	0	28·8	26·6	33·2	44·6	30
20·2	1·4		1·1	19·0	1·1		1·4	17·5	0·8		1·5	18·0	9·0	24·1	—	Mean.

BAROMETER READINGS (see p. 46).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Remarks.
1	29·647	29·633	29·621	29·608	29·597	29·589	29·587	
2	·606	·648	·672	·683	·696	·724	·753	
3	·756	·747	·716	·702	·675	·646	·606	
4	·398	·347	·236	·192	29·213	29·120	29·159	Tops of mountain ranges enveloped in mist, 9 a. Snow drift, 3 p.—5 p.
5	·050	·035	·048	·029	28·989	28·962	28·946	Blowing all past night from ESE. Blackened bulb (ord.) therm. broken during night by
6	·032	·059	·066	·075	29·072	29·077	29·094	Blowing all past night from ESE. [shower of stones. Snow drift during squalls, 3 p.
7	·104	·129	·134	·125	·136	·161	·162	Blowing all past night from ESE.
8	·245	·267	·310	·323	·398	·434	·450	Blowing all past night from ESE.
9	·513	·530	·503	·490	·482	·478	·469	Blowing all past night from ESE. Heavy gusts at intervals.
10	·415	·407	·385	·378	·378	·386	·390	
11	·397	·395	·392	·387	·384	·384	·393	
12	·378	·373	·362	·344	·348	·347	·340	
13	·271	·267	·256	·244	·245	·254	·256	
14	·233	·248	·261	·263	·288	·293	·304	Slight snow, 5 p.
15	·357	·357	·355	·356	·360	·368	·370	
16	·357	·354	·364	·347	29·360	29·367	29·342	Slight snow, 9 a.
17	·153	·106	·061	·002	28·975	28·990	28·978	Snow drift, 9 a.—5 p.
18	·141	·156	·219	·229	29·235	29·253	29·192	
19	·018	·049	·151	·227	·288	·345	·384	
20	·531	·513	·493	·463	·438	·392	·353	
21	·160	·156	·170	·160	·150	·161	·164	Dense mist in N and NW, 7 p.
22	·198	·228	·246	·272	·299	·304	·312	
23	·370	29·376	29·342	29·328	29·310	29·301	29·275	
24	·041	28·968	28·887	28·770	28·741	28·705	28·669	Snow drift 3 p.—5 p., then heavy snow drift.
25	29·040	29·074	29·084	29·080	29·083	29·074	29·049	Heavy snow drift, 9a. Snow drift in Robertson Bay, 1 p.
26	28·946	28·925	28·950	28·951	28·957	28·966	28·984	Blowing all past night from ESE.
27	28·960	28·974	28·988	28·982	28·994	29·007	29·011	Blowing all past night from SSE. Slight snow from 9 p.
28	29·074	29·098	29·098	29·114	29·122	·120	·154	Slight snow till 11a.
29	29·065	29·054	29·051	29·041	29·033	29·036	29·027	
30	28·972	28·965	28·964	28·944	28·946	28·956	28·956	
31	28·893	28·872	28·831	28·817	28·832	28·843	28·851	Slight snow, 9 a. Squalls of force 10 at intervals, 9 p.
Mean.	29·236	29·236	29·233	29·223	29·227	29·227	29·225	

AIR TEMPERATURE, DEPRESSION OF WET BULB,

Day.	9 A.M.				11 A.M.				1 P.M.				3 P.M.			
	Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		Temp.		Wind.	
1	29·0	0·4	Calm	0	29·9	2·2	S	0·5	30·5	1·7	S	1	31·5	2·0	S	0·5
2	33·7	2·7	NW	2-3	30·9	1·8	Calm	0	31·0	1·8	Calm	0	31·3	2·0	SW	0·5
3	27·9	1·0	S	0·5	28·9	1·0	S	0·5	28·8	1·2	Calm	0	29·0	1·2	Calm	0
4	33·6	1·7	S	0·5	35·8	2·6	SE	1	40·5	1·4	S	6	35·5	3·0	ESE	8
5	37·0	5·0	ESE	10	39·2	4·2	ESE	10	39·2	4·2	ESE	10	39·5	4·5	ESE	5
6	39·0	5·0	ESE	4	38·6	6·8	ESE	4	39·4	1·6	ESE	2-3	38·0	0·3	ESE	2-4
7	30·7	1·9	E by S	6	31·1	2·2	E by S	6	31·0	0·7	E by S	5-6	30·2	1·7	E	6
8	31·3	2·6	ESE	7	30·7	2·0	E by S	7-8	29·2	1·2	ESE	6	29·9	1·2	ESE	6-7
9	31·0	0·0	ESE	3	33·7	3·2	SE	2	33·8	2·9	S	1	34·5	1·5	E	0·5
10	29·1	0·2	SW	0·5	30·5	2·4	WSW	0·5	32·3	2·5	WSW	0·5	31·7	1·5	WSW	0·5
11	29·9	2·2	Calm	0	30·1	3·0	SW	0·5	30·2	3·2	SW	0·5	31·4	3·2	SW	1
12	29·7	2·8	Calm	0	29·9	2·8	S	0·5	31·0	2·6	S	0·5	32·0	3·0	Calm	0
13	28·9	2·2	Calm	0	29·4	2·5	Calm	0	31·4	2·5	WSW	0·5	31·0	2·1	Calm	0
14	30·5	1·0	N	0·5	32·3	2·8	N	0·5	32·3	2·5	W	0·5	31·2	1·7	SSW	0·5
15	28·4	1·3	Calm	0	30·5	2·1	Calm	0	30·9	2·2	S	0·5	30·4	2·2	Calm	0
16	29·9	1·3	Calm	0	30·6	1·7	Calm	0	34·8	4·2	Calm	0	30·9	2·0	Calm	0
17	32·5	1·0	ESE	9	32·5	1·0	ESE	9	31·5	2·0	ESE	9	30·5	1·0	ESE	10
18	34·1	0·1	Calm	0	37·9	0·4	W	0·5	37·0	4·2	WNW	1	35·0	3·1	S by E	1
19	36·2	2·7	ESE	5	37·5	1·5	ESE	5	36·1	3·1	Calm	0	34·4	2·6	SE	0·5
20	31·2	2·2	WSW	0·5	33·3	2·2	S	0·5	34·3	3·3	SSW	0·5	34·1	2·2	Calm	0
21	30·9	0·7	ESE	0·5	34·5	2.8	Calm	0	36·9	3·2	WNW	0·5	38·3	2·7	NNE	0·5
22	32·7	1·9	Calm	0	34·5	2·2	Calm	0	35·8	3·1	SW	0·1	35·5	3·2	Calm	0
23	32·5	2·5	Calm	0	32·3	2·1	SSW	0·5	32·3	2·3	WSW	0·5	31·8	2·2	SSW	0·5
24	30·8	1·9	Calm	0	34·6	4·1	ESE	2	34·0	2·7	ESE	4	33·0	1·0	ESE	6
25	33·9	1·2	Calm	0	37·8	5·3	ESE	4	37·3	2·5	ESE	4	36·3	2·1	ESE	5
26	40·5	1·0	ESE	4	36·7	5·0	SSE	5	31·7	1·5	SSE	5	33·7	1·0	SSE	4
27	32·8	1·3	SSE	3-4	33·2	1·6	SSE	3-4	36·0	1·7	SSE	3	35·0	1·5	SSE	
28	29·9	0·0	Calm	0	30·4	0·0	Calm	0	30·6	0·0	Calm	0	28·8	0·0	Calm	0
29	29·0	0·1	Calm	0	30·5	1·6	S by E	0·5	29·9	1·9	SE	0·5	29·9	1·7	S by E	0·5
30	31·2	0·7	Calm	0	32·4	2·7	Calm	0	34·0	4·0	Calm	0	35·4	4·7	N	0·5
31	32·2	0·5	NNW	1	34·0	3·8	E by S	8	34·6	1·1	ESE	8	34·4	0·9	ESE	9
Mean.	31·9	1·6		1·9	33·0	2·6		2·3	33·5	2·4		·2·3	33·0	2·0		2·3

CLOUD OBSERVATIONS (see p. 48).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Bright Sunshine.	Precipitation.	Day.
1	Nim. 10	Nim, 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	2·7	—	1
2	Cum.-s 7	Cm.-s.,Nm. 10	Cm.-s.,Nm. 10	Cm.-s.,Nm. 10	Cm.-s.,Nm. 10	Cm.-s..Nm. 10	Cm.-s.,Nm. 10	—	—	2
3	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Cm.-s., Nm. 9	1·2	—	3
4	Cm.-s., Nm. 9	Cm. s.,Nm. 9	Cm.-s.,Nim. 9	Cm.-s., Nim. 9	Cm.-s.,Nm. 10	Cm.-s.,Nm. 9	Cm.-s., Nm. 8	—	—	4
5	Cm.-s.,Nm. 10	Cm.-s.,Nm. 10	Cm.-s.,Nm. 10	Cm.-s.,Nm. 10	Cm.-s.,Nm. 10	Cm.-s.,Nm. 10	Cm.-s.,Nm. 10	—	—	5
6	Cm.-s.,Nm. 10	Cm.-s.,Nm. 10	Cm.-s.,Nm. 10	Cm.-s., Nim. 9	Cm.-s..Nm. 9	Cm.-s., Nm. 9	Cm.-s.,Nm. 10	—	—	6
7	Cr.Cr-c.Cr.-s 5	Cr.Cr-c.Cr.-s 3	Cr.Cr-c.Cr.-s 3	Cr.Cr-c.Cr.-s 3	Cr.Cr-c.Cr.-s 5	Cr.Cr-c.Cr.-s 7	Cr.Cr-c.Cr-s 10	—	—	7
8	Cir., Cir.-s. 9	Cir., Cir.-s. 9	Cir., Cir.-s. 10	Cir., Cir.-s. 10	Nim. 10	Nim. 10	Nim., Cir. 10	3·4	—	8
9	Cum., Cir.-c. 3	Cum., Cir.-c. 3	Cr., Fr. Str. 2	Cir., Fr. Str. 2	Cir., Fr. Str. 2	Cir., Fr. Str. 2	Cum., Str. 2	—	—	9
10	Str. 3	Str. 2	Str. 3	Str. 3	Cir.-c. 3	Cir.-c. 2	Cir.-c. 1	8·5	—	10
11	Cir.-c. 1	Cum. 1	Cum.,Cir.-s. 1	Cm., Cm.-s 1	Cm., Cm.-s. 1	Cm., Cm.-s. 1	Cm.Alt.-Cm.2	—	—	11
12	Cir. 1	Cir. 1	Cir. 1	Fr. Str. 1	Fr. Str. 1	Cum.-s. 1	— 0	19·2	—	12
13	Str., Fr. Str 1	Str., Fr. Str. 2	Str., Cir. 1	Str., Cir. 1	Cir., Cir-c. 3	Cum.-s. 7	Cum.-s.,Cir. 7	11·6	—	13
14	Str. 10	Str. 10	Str. 10	Str. 10	Str., Nim. 10	Str., Nim. 10	Str., Nim. 6	11·4	—	14
15	Cum.-s.,Str. 6	Cum.-s.,Str. 6	Cm.-s.,Cr.-s. 8	Cm.-s., Cr.-s 9	Cm.-s.,Cr.-s. 9	Cm.-s.Cr.-s. 10	Nim., Str. 10	—	—	15
16	Nim. 5	St. Cm. Nm. 5	Cir., Cir.-c. 6	Cm.-s.,Nim. 8	Cm.-s.,Nm. 10	Nim. 10	Cm.-s.,Nm. 10	1·4	—	16
17	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	4·8	—	17
18	Str. 9	Cir.-c., Str. 4	Cir.-c., Str. 4	Cir.-c., Str. 3	Cir.-c., Str. 3	Alt.-cum. 7	Cr.Cr.-c.Str. 8	—	—	18
19	Cir.-s.,Nim. 10	Cir.-s. Nim. 10	Cir.-s. 10	Cir.-s. 10	Cir.-s. 10	Cir.-s. 10	Cir.-s. 10	6·7	—	19
20	Str., Nim. 10	Str.Nim.Cir. 6	Cir., Str. 3	Cir., Str. 3	Cir., Str. 4	Cum.-s.,Cir. 4	Cm-s.Cr.Str. 3	—	—	2
21	Cr.,Cr.-s.St. 2	Cr.Cr.-s.Str. 5	Cr.Cr.-s.Str. 6	Cr.,Cr-s.,Str.7	Str. 8	Str. 9	Str. 9	8·8	—	21
22	Cum.-s. 10	Cum.-s. 10	Cir.-s., Str. 10	Cir.-s., Str. 10	Cir.-s., Str. 9	Cir.-s., Str. 9	Cum.-s. 9	9·3	—	22
23	Cum.-s. 10	Cum.-s. 10	Str., Nim. 10	Str., Nim. 10	Str., Nim. 10	Str., Nim. 10	Cm.-s.,Nm. 10	—	—	2
24	Cm.-s.,Nm. 10	Cm.-s.,Nm. 10	Cm.-s.,Nm. 10	Cm.-s.,Nm. 10	Drift 10	Drift 10	Drift 10	—	—	2
25	Drift 9	Nim. 7	Cir., Cir.-s. 7	Cir., Cir.-s. 8	Cir.-s., Nim. 8	Cir.-s., Nim. 8	Cir.-s.,Nim. 8	—	—	2
26	Cir.-s.,Nim. 10	Cir.-s ,Nim. 10	Cir.-s.,Nim. 10	Cir.-s.Nim. 10	Cir.-s.,Nim. 10	Cir.-s.,Nim. 10	Cir.-s.,Nim. 10	—	—	2
27	Cir.-s.,Nim. 10	Cir.-s.,Nim. 10	Cm.-s.,Nim. 9	Cm.-s.,Nm. 10	Cum -s. 9	Cum.-s. 9	Nim. 10	—	—	
28	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 9	Nim. 10	Nim. 10	1·4	—	
29	Nm.,Str.Cm. 8	Nm.,Str.Cm. 8	Nim., Cm.-s. 8	Nm., Cm.-s. 8	Nm., Cm.-s. 9	Nm., Cm.-s. 8	Nm., Cm.-s. 8	—	—	29
30	Cir.-s., Str. 10	Cir.-s., Str. 10	Cum.-s 6	Cum.-s. 4	Nim. 3	Nim. 2	Nim. 3	0·6	—	30
31	Nim. 10	Nim., Str. 10	Nim., Str. 10	Nim., Str. 10	Nim., Str. 10	Nim., Str. 10	Nim., Str. 10	7·3	—	31
Mean.	7·7	7·5	7·3	7·4	7·6	7·9	7·8	98·3	—	Total.

and WIND DIRECTION AND FORCE (see p. 45).

5 P.M.				7 P.M.				9 P.M.				Means.	Extremes.			Day.
Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		$\frac{9a+9p}{2}$	Min.	Max.	Solar Max.	
30·7	1·6	S	0·5	30·5	1·0	S	0·5	29·7	0·8	SSW	0·5	29·4	28·5	32·1	43·2	1
30·9	1·3	SSW	0·5	30·4	0·9	Calm	0	29·7	1·0	Calm	0	31·7	24·2	34·7	41·8	2
28·9	1·2	Calm	0	29·4	1·0	Calm	0	28·9	1·0	Calm	0	28·4	27·1	34·1	40·2	3
34·2	2·0	SE	8	37·9	3·8	ESE	8	36·9	4·8	ESE	5	35·3	27·8	33·8	43·0	4
40·5	2·5	ESE	7	40·5	2·0	ESE	8	42·0	1·7	ESE	10	39·5	33·5	40·5	41·9	5
36·7	6·7	ESE	2	33·9	3·8	ESE	4	33·0	0·8	ESE	5	36·0	37·0	41·8	—	6
29·5	1·4	E	6	27·8	1·1	E	6–7	27·1	0·9	E by S	6	28·9	29·1	39·4	—	7
28·6	0·0	ESE	7	27·9	0·2	ESE	6	28·9	1·0	ESE	6	30·1	27·0	32·2	—	8
33·8	1·6	W	0·5	34·4	1·7	W	0·5	28·6	1·2	W	0·5	29·8	27·5	33·9	—	9
32·7	1·7	SW	0·5	34·5	3·0	SW	0·5	30·4	0·9	Calm	0	29·8	23·9	34·5	—	10
31·5	1·7	SW	0·5	32·3	1·8	Calm	0	30·7	2·3	NNW	0·5	30·3	24·9	34·5	—	11
32·4	2·4	Calm	0	32·5	2·1	WNW	0·5	30·7	1·0	Calm	0	30·2	**20·5**	32·4	51·7	12
32·3	1·3	Calm	0	30·1	1·3	WSW	0·5	28·9	1·0	Calm	0	28·9	21·5	33·4	57·2	13
29·4	2·0	SSE	0·5	28·6	1·5	S	0·5	27·9	1·0	SW	0·5	29·2	25·5	32·8	51·5	14
30·2	1·7	Calm		29·2	2·3	Calm	0	28·4	2·1	Calm	0	28·4	25·7	33·7	45·8	15
30·5	1·6	S	0·5	29·7	1·0	SE	0·5	29·4	1·5	Calm	0	29·7	21·8	31·0	62·7	16
33·4	1·4	ESE	10	34·5	1·0	ESE	10	34·2	0·7	ESE	10	33·4	27·8	35·4	**69·8**	17
35·8	3·7	ESE	0·5	33·1	2·7	ESE	0·5	35·0	5·0	ESE	3	34·6	30·5	36·9	45·0	18
32·9	3·1	S	1	32·2	2·4	S	0·5	31·5	1·3	Calm	0	33·9	29·0	38·0	49·8	19
32·9	1·7	Calm	0	31·1	0·6	Calm	0	33·7	1·4	SSE	1	32·5	29·0	39·9	40·2	20
34·9	1·9	NNW	0·5	34·5	1·5	WNW	0·5	33·0	0·6	SW	0·5	32·0	26·2	34·5	61·4	21
34·4	3·4	Calm	0	34·0	3·2	Calm	0	31·5	2·9	Calm	0	32·1	30·5	39·6	54·7	22
31·2	2·0	Calm	0	30·0	1·1	Calm	0	29·4	0·8	Calm	0	31·0	30·2	38·2	45·2	23
28·9	0·0	ESE	8	29·4	0·0	SE by S	8	28·9	0·0	SE by S	2	29·9	26·3	33·0	42·0	24
35·7	2·2	ESE	7	34·5	0·5	ESE	8	37·9	1·0	ESE	8	35·9	28·5	35·5	41·8	25
33·0	0·8	SSE	6	33·8	0·3	SSE	6	33·2	0·5	SSE	4	36·9	32·4	**42·0**	42·0	26
32·8	0·3	Calm	0	32·1	1·9	Calm	0	30·1	0·0	Calm	0	31·5	29·1	41·4	39·2	27
27·7	0·1	S by E	0·5	26·9	0·0	Calm	0	26·5	0·0	Calm	0	28·2	28·1	36·0	47·7	28
30·8	1·6	S by E	0·5	30·0	1·1	Calm	0	29·7	0·8	SE	0·5	29·4	25·1	30·7	54·3	29
35·0	3·5	Calm	0	34·8	3·6	Calm	0	32·2	1·0	Calm	0	31·7	28·0	31·7	46·9	30
33·8	0·3	ESE	9	34·3	0·4	ESE	9	32·3	0·1	ESE	8	32·3	27·1	36·7	42·5	31
32·5	1·8		2·5	32·1	1·6		2·5	31·3	1·3		2·3	31·6	27·5	35·6	—	Mean.

BAROMETER READINGS (see p. 46).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Remarks.
1	28·984	28·988	29·011	29·022	29·043	29·060	29·084	
2	29·177	29·189	·202	·198	·202	·215	·206	
3	·222	·240	·246	·224	·216	·206	·194	
4	·208	·221	·255	·316	·380	·455	·494	Squalls from ESE at intervals, force 4–5, 9 a.
5	·643	·647	·651	·638	·625	29·561	29·500	
6	29·190	29·151	29·114	29·060	29·008	28·953	28·917	Slight snow, 11 a.—5 p.
7	28·719	28·729	28·711	28·715	28·740	·782	·823	Blowing all past night from ESE.
8	28·935	28·936	28·933	28·944	28·966	28·969	28·984	
9	29·089	29·108	29·112	29·119	29·121	29·129	29·157	
10	29·211	29·225	29·219	29·205	29·207	29·179	29·145	
11	28·667	28·615	28·726	28·752	28·803	28·860	28·891	Commenced to blow at 4 a. Ice pack in Bay breaking up, 7 p.
12	29·072	29·078	29·079	29·080	29·072	29·043	29·039	Blowing all past night from ESE. Ice in Bay driven out to sea, 1 p. Open sea, 3 p.
13	·151	·163	·191	·180	·175	·177	·114	
14	·117	·116	·111	·110	·099	·104	·120	Snow, 9 a.
15	·136	·147	·156	·154	·171	·174	·177	
16	·185	·186	·177	·144	·136	·121	·135	
17	·141	·142	·142	·134	·146	·150	·134	
18	29·136	29·150	29·158	29·153	29·158	29·157	29·146	Heavy mist over mountain ranges, 9 a. Slight snow, 7 p. Commenced to blow at [10 p. from ESE squalls of force, 8.
19	28·881	28·813	28·762	28·736	28·786	28·818	28·902	Snow drift, 3 p. [3 p.—9 p.
20	29·138	29·185	29·224	29·209	29·218	29·220	29·195	Blowing all past night from ESE. Slight snow, 11 a. Sleet, 1 p. Heavy snow drift,
21	·325	·337	·326	·326	·341	·351	·378	Blowing all past night from ESE. Snow drift, 11 a. Snow, 5 p. Snow ceased [and no drift, 7 p.
22	·476	·493	·519	·511	·503	·424	·481	Blowing all past night from ESE. Rain, 9 a.—5 p.
23	·563	·567	·630	·618	·620	·620	·604	Squalls of force, 9, 9 a. Rain, 7 p.—9 p.
24	·521	·495	·492	·495	·496	·484	·471	Blowing all past night from ESE. Rain and snowfall for last 6 days=0·76 in.
25	·365	·366	·362	·417	·318	·292	·276	Blowing all past night from ESE. Sleet, 11 a. Snow, 1 p.—9 p., 1·6 ins. deep.
26	·213	·211	·200	·188	·192	·200	·201	
27	·268	·272	·276	·269	·274	·269	·273	
28	·191	·170	·151	·136	*29·120*	*29·100*	*29·090*	"Southern Cross" returned, 9 a. All members on board "Southern Cross," 7 p.
29	29·088	29·111	29·137	29·291	—	—	—	Snow during past night, 1 ft. 5 ins deep. Snow, 3 p.
30	—	—	—	—	—	—	—	All instruments taken on board ship, 11 a.
31	—	—	—	—	—	—	—	
Mean.	29·176	29·177	29·183	29·180	29·183	29·181	29·183	(The means are for 28 days only.)

AIR TEMPERATURE, DEPRESSION OF WET BULB,

Day.	9 A.M.				11 A.M.				1 P.M.				3 P.M.			
	Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		Temp.		Wind.	
1	38·0	4·8	Calm	0	37·8	4·6	Calm	0	38·7	6·0	SW	0·5	39·4	6·2	WSW	0·5
2	33·1	1·7	Calm	0	33·9	1·9	SE	0·5	33·9	1·9	S	0·5	33·9	1·9	S	0·5
3	33·3	1·6	Calm	0	33·3	1·6	W	0·5	33·3	1·6	W	0·5	33·5	1·6	W	0·5
4	32·8	1·2	NE	0·5	36·0	3·1	ESE	0·5	34·0	2·7	ESE	4	35·3	4·0	E by S	4
5	31·6	1·4	Calm	0	32·5	2·3	SSE	0·5	33·1	2·1	SSE	0·5	34·5	2·9	SSE	0·5
6	28·9	0·0	SE	0·5	29·4	1·0	S	0·5	29·7	1·0	W	0·5	31·3	1·3	SE	0·5
7	32·0	2·0	ESE	10	31·2	2·1	ESE	9	30·7	1·2	ESE	9	31·2	1·0	ESE	9
8	32·3	1·1	Calm	0	32·7	1·5	N	0·5	34·7	3·4	SSW	0·5	35·6	3·7	NW	1
9	29·9	1·0	SE	0·5	31·2	1·4	SE	0·5	31·1	1·3	SE	0·5	31·5	1·5	Calm	0
10	32·1	1·1	S	0·5	34·0	2·8	S	0·5	35·4	3·5	W	0·5	34·1	2·1	NW	0·5
11	33·0	0·8	ESE	11	32·0	0·0	ESE	11	33·0	0·0	ESE	11	34·5	0·0	ESE	10
12	34·7	6·8	ESE	6	35·2	6·9	ESE	5	35·0	3·2	ESE	5	33·0	1.5	ESE	5–6
13	34·0	1·9	Calm	0	34·6	3·8	S	1·5	35·5	3·5	NW	0·5	34·2	2·1	Calm	0
14	29·7	0·6	N	0·5	30·5	0·8	Calm	0	31·8	1·7	N by W	0·5	32·2	1·1	NNW	0·5
15	32·0	0·7	Calm	0	33·2	2·2	Calm	0	32·9	2·9	WNW	1	32·5	2·3	WNW	0·5
16	34·3	2·3	NW	2	34·0	4·1	WNW	2·5	35·7	3·6	ESE	4	35·3	2·5	ESE	5
17	32·9	0·9	SE	1	33·2	1·8	SE	1	33·6	1·9	S by E	1	31·8	1·0	S	0·5
18	30·8	1·9	Calm	0	32·1	1·8	S by W	0·5	33·1	2·2	N	0·5	32·7	1·9	N	0·5
19	26·9	1·0	ESE	5	26·3	0·4	ESE	7	27·4	0·5	ESE	9	28·9	1·0	ESE	8
20	33·5	1·5	ESE	4	31·4	0·7	ESE	5	31·3	0·3	ESE	4	31·6	0·7	ESE	6
21	32·0	1·0	ESE	8	32·5	1·5	ESE	7	35·5	2·5	ESE	6	35·5	1·9	ESE	6
22	37·9	0·7	ESE	3	38·1	2·1	ESE	3	38·1	2·7	ESE	3	40·1	3·5	ESE	3
23	46·7	5·5	ESE	7	47·0	6·2	ESE	8	47·0	6·2	ESE	5	46·8	6·5	ESE	4
24	46·3	1·6	ESE	8	47·4	1·6	ESE	9	45·6	1·8	ESE	9	45·3	3·6	ESE	9
25	32·5	0·7	ESE	8	32·9	0·0	ESE	5	35·0	0·6	SW	1	32·0	0·4	Calm	0
26	29·9	0·0	S	0·5	30·8	0·8	S	0·5	31·1	0·5	SSE	0·5	31·0	0·1	SW	0·5
27	31·0	0·8	Calm	0	32·5	1·0	Calm	0	33·0	1·2	Calm	0	32·8	2·0	Calm	0
28	35·0	3·7	Calm	0	35·1	2·9	Calm	0	34·7	2·5	Calm	0	34·9	1·9	NW	0·5
29	31·0	0·9	S	2	31·0	1·7	S	2	31·4	1·9	S	1·5	28·6	0·7	SE	0·5
30	—	—	—		—	—	—		—	—	—		—	—	—	
31	—	—	—		—	—	—		—	—	—		—	—	—	
Mean (28 days).	33·5	1·7		2·7	34·0	2·2		2·8	34·4	2·2		2·8	34·5	2·2		2·7

CLOUD OBSERVATIONS (see p. 48).

Day.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	Bright Sunshine.	Precipitation.	Day.
1	Cum.-s., Cir. 7	Cum.-s., Cir. 3	Cum.-s., Cir. 3	Cir. 2	Cir. 6	Cir. 7	Cir., Cir.-s. 9	—	—	1
2	Cm.-s., Nim. 8	Cm.-s., Nim. 8	Cm.-s., Nim. 8	Cm.-s., Nim. 8	Cm.-s., Nim. 8	Cm.-s., Nim. 7	Cm.-s., Nim. 8	—	—	2
3	Str. 10	Str. 10	Str. 10	Str. 10	Str. 10	Str. 10	Str. 10	—	—	3
4	Str. 10	Str. 7	Str. 10	Cum.-s. 8	Cum.-s. 6	Cum.-s. 6	Cum.-s. 6	—	—	4
5	Cir., Cir.-s. 9	Cir.-s. 10	Cir.-s. 10	Cir.-s. 10	Cir.-s. 10	Cir.-s. 10	Cir.-s., Nim. 10	1·8	—	
6	Cir.-s., Nim. 9	Nim. 9	Nim. 9	Nim. 9	Nim. 9	Nim. 8	Nim. 8	1·5	—	6
7	Str., Nim. 10	Str., Nim. 10	Str., Nim. 10	Str., Nim. 9	Str., Nim. 9	Cm.-s., Nim. 9	Cm.-s., Nim. 9	—	—	7
8	Cm.-s., Nim. 10	Cm.-s., Nim. 9	Cir.-s., Str. 4	Cum.-s. 4	Cm.-s., Nim. 10	Cm.-s., Nim. 9	Cir.-s., Cm.-s. 3	—	—	8
9	Cum. 2	Cum.-s. 9	Cm.-s., Nim. 10	Cm.-s., Nim. 10	Cm.-s., Nim. 10	Cm.-s., Nim. 10	Cm.-s., Nim. 10	3·0	—	9
10	Cm.-s., Nim. 8	Cm.-s., Nim. 8	Cm.-s., Nim. 7	Cm.-s., Nim. 8	Cm.-s., Nim. 8	Cm.-s., Nim. 7	Cm.-s., Nim. 8	—	—	10
11	Cm.-s., Nim. 10	Cm.-s., Nim. 10	Cm.-s., Nim. 10	Cm.-s., Nim. 10	Cm.-s., Nim. 10	Cm.-s., Nim. 9	Cm.-s., Nim. 8	0·3	—	11
12	Cm.-s., Cir.-c. 7	Cm.-s. Cir.-c. 8	Cm.-s., Cr.-c. 6	Cm.-s., Cir.-c. 8	Cm.-s., Cir.-c. 8	Cum.-s. 10	Cm.-s., Nim. 10	—	—	12
13	Cm.-s., Cir.-s. 9	Cm.-s., Cir.-s. 8	Cm.-s., Cr.-s. 7	Cm.-s., Cir.-s. 9	Cm.-s., Cir.-s. 9	Cm.-s Cm., Cr 9	Cm.-s Cr. Nm. 9	—	—	13
14	Nim. 10	Nim. 9	Nim. 8	Nim. 8	Cm.-s., Nim. 3	Cir.-c., Nim. 3	Cir.-c., Nim. 4	4·4	—	14
15	Alt.-cm. Nm. 7	Alt.-cm. Nm. 8	St. Cm. Nm. 10	St., Cm., Nm. 9	St., Cm., Nm. 9	St., Cm., Nm. 8	Str., Cum. 2	4·8	—	15
16	Cum.-s. 8	Cum.-s. 7	Cum.-s. 4	Cum.-s., Cir. 4	Cum.-s., Cir. 3	Cum.-s., Cir. 3	Cum.-s., Cir. 4	—	—	16
17	Cum.-s. 10	Cum.-s. 10	Cum.-s. 10	Cum.-s. 10	Cum.-s. 10	Cum.-s. 10	Cum.-s. 10	10·6	—	17
18	Cm.-s., Nim. 8	Cm.-s., Nim. 8	Cm.-s., Nim. 7	Cm., s., Nim. 8	Cm.-s., Nim. 8	Cm.-s., Nim. 8	Nim. 10	0·8	—	18
19	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	2·0		19
20	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	1·0		20
21	Nim. 10	Nim. 10	Nim. 10	Nim. 10	St., Cm. Nm. 10	St., Cm. Nm. 10	St., Cm. Nm. 10	—		21
22	Nim. 10	Nim. 10	Nim. 10	Nim. 9	St., Cm. Nm. 8	St., Cm. Nm. 8	St., Cm. Nm. 8	—	·760	22
23	Str., Cm., Cir. 5	Str., Cm., Cir. 5	St. Cm. Nm. 7	St., Cm. Nm. 8	St., Cm. Nm. 9	St., Cm. Nm. 10	Nim. 10	—		23
24	Cir., Str. 8	Cir., Str. 7	Cir., Str. 9	Cir., Str. 10	Cm.-s., Nim. 10	Cm.-s., Nim. 10	Cm.-s., Nim. 10	5·0		24
25	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	Nim. 10	—	—	25
26	Cm.-s., Nim. 9	Cm.-s., Nim. 8	Cm.-s., Nim. 8	Cm.-s., Nim. 8	Cm.-s., Nim. 8	Cm.-s., Nim. 7	Cm.-s., Nim. 7	—	·150	26
27	Cir., Cum.-s. 6	Cir.-c., Cir.-s. 7	Cir.-c., Cir.-s. 8	Cir.-c., Cir.-s. 9	Cir.-c., Cir.-s. 9	Cir.-c., Cir.-s. 9	Cir.-c., Cir.-s. 9	—	—	2
28	Cir.-c., Str. 2	Cir.-c., Str. 3	Cir.-c., Str. 3	Cir.-c., Str. 4	Cir.-c., Str. 4	Cir.-c., Str. 4	Cir.-c., Str. 4	—	—	
29	Cum.-s. 10	Cum.-s. 10	Cum.-s. 10	Nim. 10	—	—	—	—	—	29
30	—	—	—	—	—	—	—	—	—	
31	—	—	—	—	—	—	—	—	—	
Mean.	8·3	8·3	8·1	8·3	8·4	8·3	8·1	35·2	0·910	Total.

and WIND DIRECTION AND FORCE (see p. 45).

5 P.M.				7 P.M.				9 P.M.				Means.	Extremes.			Day.
Temp.		Wind.		Temp.		Wind.		Temp.		Wind.		$\frac{9a.+9p.}{2}$	Min.	Max.	Solar Max.	
38·3	6·2	Calm	0	36·8	5·8	NW	1	33·4	4·1	NW	0·5	35·7	32·3	38·5	47·3	1
33·8	1·8	S	0·5	32·8	0·9	S	0·5	32·3	0·5	S by W	0·5	32·7	31·0	39·4	49·0	2
33·8	1·8	W	1	32·8	1·0	W	1	32·5	1·0	WSW	1	32·9	31·2	34·5	58·3	3
34·5	2·5	E by S	3	34·3	2·3	N	0·5	32·6	1·1	N	0·5	32·7	30·7	34·2	44·2	4
33·8	2·3	SSE	0·5	31·0	0·5	Calm	0	32·5	1·7	SE	0·5	32·1	28·9	37·5	52·5	5
34·0	3·1	ESE	3	32·7	1·5	ESE	5	33·2	1·4	ESE	7	31·1	28·6	35·0	48·5	
32·2	1·2	ESE	8	31·2	1·2	ESE	7	33·5	1·3	SSE	1	32·8	29·0	36·1	38·5	7
32·3	1·3	NW	1	32·0	1·1	NW	1	31·2	1·2	Calm	0	31·8	28·5	31·0	39·8	8
32·0	1·5	Calm	0	31·5	0·9	Calm	0	30·6	0·8	Calm	0	30·3	25·2	35·7	52·2	9
33·1	1·8	NW	0·5	32·5	0·8	SE	0·5	30·7	0·7	SE	0·5	31·4	28·7	32·1	41·2	10
33·8	1·8	ESE	9	33·5	0·5	ESE	8	34·5	0·0	ESE	6	33·8	27·6	35·9	43·0	11
33·9	2·1	ESE	5-6	32·0	1·2	E by S	5	30·6	0·3	E	7	32·7	32·0	35·7	37·5	12
33·2	2·2	Calm	0	34·5	2·8	Calm	0	29·4	0·0	Calm	0	31·7	30·0	36·5	43·2	13
33·0	1·1	NNW	0·5	31·8	1·7	W	0·5	28·9	0·2	Calm	0	29·3	28·4	36·9	45·6	14
32·	2·0	WNW	0·5	33·5	2·7	Calm	0	33·2	2·4	Calm	0	32·6	26·1	34·3	36·2	15
35·4	2·7	ESE	5-6	34·6	1·6	ESE	6	33·5	0·8	ESE	5	33·9	28·2	34·3	44·5	16
31·4	1·4	Calm	0	31·0	1·0	Calm	0	31·1	1·0	Calm	0	32·0	31·4	36·9	43·7	17
30·7	1·0	S	0·5	30·5	0·9	S	0·5	28·9	0·3	SW	0·5	29·9	29·0	31·0	42·2	18
34·0	3·0	ESE	4	34·0	3·2	ESE	3	33·5	3·0	ESE	3	30·2	25·6	34·5	52·8	19
30·6	0·6	ESE	8	29·6	0·7	ESE	10	29·6	0·6	ESE	10	31·6	25·8	34·7	36·2	20
39·5	4·7	ESE	5-4	39·2	4·5	ESE	6	38·0	3·3	ESE	6	35·0	29·0	36·1	34·2	21
40·3	3·9	ESE	6	40·7	3·7	ESE	8	41·1	3·3	ESE	8	39·5	32·1	41·3	40·0	22
45·0	6·3	ESE	8	45·8	5·6	ESE	8	44·2	4·2	ESE	8	45·5	35·0	46·6	52·0	23
42·1	2·1	ESE	9	41·3	1·5	ESE	9	40·0	0·9	ESE	9	43·2	39·5	48·7	53·2	24
31·4	0·0	Calm	0	31·2	0·0	Calm	0	30·1	0·0	Calm	0	31·3	30·1	48·0	50·5	25
30·5	0·3	S	0·5	30·0	0·0	Calm	0	30·1	0·2	ESE	0·5	30·0	29·1	35·2	36·4	26
32·0	1·2	Calm	0	32·0	1·8	Calm	0	31·2	1·0	Calm	0	31·1	28·0	32·5	52·2	27
35·0	2·0	Calm	0	34·0	2·0	Calm	0	32·0	1·5	Calm	0	33·5	29·2	36·1	74·8	28
—	—	—		—	—	—		—	—	—		—	29·1	35·6	45·6	29
—	—	—		—	—	—		—	—	—		—	25·3	31·4	34·2	3
—	—	—		—	—	—		—	—	—		—	—	—	—	31
34·4	2·2		2·8	33·8	1·8		2·9	32·9	1·3		2·7	33·2	29·7	37·0	—	Mean.

NORMAL CLIMATOLOGICAL DATA

Longitude 170° 9′ 30″ E., Latitude 71° 18′ S. Height above Mean Sea Level 19 feet. Gravity Correction + ·060 in..

1899–1900.	Mean Pressure at 32° Fahrenheit.	Air Temperature.									Humidity.								
		9 a.m.	9 p.m.	Mean.	Means of		Absolute Min. and Max.				Depression of Wet Bulb.			Tension of Vapour.			Percentage.		
					Min.	Max.	Min.	Day.	Max.	Day.	9 a.m.	9 p.m.	Mean.	9 a.m.	9 p.m.	Mean.	9 a.m.	9 p.m.	Mean.
	ins.	deg.	deg.	deg.	deg.	deg.	deg.		deg.		deg.	deg.	deg.	in.	in.	in.	per cent.	per cent.	per cent.
March (28 days)	29·056	18·5	16·6	17·6	13·8	22·0	−2·8	26th	31·1	5th, 6th	1·1	0·8	1·0	·066	·068	·067	67	75	71
April	29·266	10·1	10·0	10·1	5·2	15·6	−10·3	20th	31·5	3rd	0·4	0·4	0·4	·059	·058	·059	86	85	86
May	28·995	−4·3	−3·4	−3·8	−10·6	2·6	−31·5	14th	23·0	5th	0·2	0·3	0·3	·033	·033	·033	93	90	92
June	28·937	−13·1	−12·7	−12·9	−19·3	−4·8	−36·4	4th	13·9	12th	0·3	0·4	0·4	·020	·019	·020	84	79	82
July..	29·378	−9·3	−8.8	−9·0	−17·6	−1·0	−39·4	10th	23·6	15th	0·2	0·3	0·3	·026	·025	·026	92	87	90
August	28·993	−13·7	−13·3	−13·5	−22·7	−4·3	−43·5	5th, 6th	18·7	16th	0·3	0·3	0·3	·019	·019	·019	84	84	84
September	·611	−12·4	−12·6	−12·5	−18·8	−3·9	−31·9	13th	11·3	7th	0·3	0·2	0·3	·020	·021	·021	84	90	87
October	28·859	−1·3	−2·6	−1·9	−10·7	4·6	−36·5	1st	19·4	16th	0·4	0·4	0·4	·036	·033	·035	87	86	87
November	29·323	18·5	17·5	18·0	9·0	24·1	−4·3	2nd	45·5	29th	0·9	0·8	0·9	·072	·072	·072	72	76	74
December	·231	31·9	31·3	31·6	27·5	35·6	20·5	12th	42·0	26th	1·6	1·3	1·5	·144	·145	·145	79	82	81
January (28 days).. ..	29·180	33·5	32·9	33·2	29·7	37·0	25·2	9th	48·7	24th	1·7	1·3	1·5	·158	·160	·159	82	85	84
WHOLE PERIOD ..	29·075	5·3	5·0	5·2	−1·3	11·6	− 43·5, Aug. 5, 6		48·7, Jan. 24th		0·7	0·6	0·7	·059	·059	·059	82·7	83·5	83·1

NORMAL CLIMATOLOGICAL DATA.

Heights above Ground:—Barometer, 2 feet; Thermometers, 4 feet; Rain-gauge, 1 foot..

1899–1900.	Amount of Cloud.			Rainfall.			§Weather, No. of Days of							§Wind, No. of Observations of								
	9 a.m.	9 p.m.	Mean.	Total.	Max.	Day.	Rain.	Snow.	Hail.	Thunder Storm.	Clear sky.	Over-cast.	Gale.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
				ins.	ins.																	
March (28 days)	7·5	7·6	7·6	0·072	·070	25th	1	4	..	..	1	14	5	0	8	10	8	8	2	2	6	12
April	8·5	7·7	8·1	0·250	·190	6th	2	5	..	..	0	20	5	8*	4	5	9	7	1	2	1	22
May	7·7	6·6	7·2	0·205	·205	8th	1	8	..	..	3	16	5	5	2	3	10	13	1	0	0	28
June	6·4	5·2	5·8	..	..	..	..	5	..	..	4	9	7	1	0	5	10	12	6	0	0	26
July	6·9	5·5	6·2	..	..	..	..	11	..	..	6	12	6	0*	1	7	15	7	0	1	2	28
August	5·5	3·1	4·3	..	..	..	..	6	..	..	9	4	6	1†	2	2	11	12	1	1	1	30
September	6·5	5·9	6·2	..	..	..	..	9	..	..	5	13	6	1	1	4	18	11	1	1	0	23
October	5·2	5·2	5·2	..	..	..	..	2	..	..	6	12	7	2	0	7	11	7	3	1	0	31
November	4·9	5·1	5·0	..	..	..	..	4	..	..	9	8	6	1	0	2	12	8	2	1	1	33
December	7·7	7·8	7·8	..	..	..	..	5	..	..	2	18	8	3	0	10	11	4	4	2	1	27
January (28 days)	8·3	8·1	8·2	0·910	?	?	7	7	..	..	0	15	11	2	1	11	15	4	1	1	2	19
WHOLE PERIOD	6·8	6·2	6·5	1·437	..	..	11	66	..	..	45	141	72	24	19	66	130	93	22	12	14	279

* One observation of whirlwind. † One observation of variable.

§ NOTE.—The entries under "Days of Rain" indicate the numbers of days when the melted snow amounted to 0·005 inch and upwards. Very little *rain* was observed at Cape Adare.
The days of "Clear Sky" and "Overcast" are those days when the average cloud-amount (Scale 0–10), as observed at 9 a.m. and at 9 p.m., was less than 2 and more than 8, respectively.
The days of "Gale" are those days when Force 7, or upwards (Beaufort's Scale), was recorded at any time during the day.
In preparing the Wind Summary, the observations under intermediate points, SSE, ESE, etc., have been alternately thrown forward and backward.
In this Table no account is taken of the strength of the wind, but a summary of all the observations of wind-force will be found on page 95.

Long. 170° 9′ 30″ E. Lat. 71° 18′ S.] **DIRECTION OF**

Months.	1 A.M.									3 A.M.								
	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
1899. March																		
April																		
May																		
June	1	0	1	2	2	2	1	0	9	0	0	2	3	3	0	0	1	9
July	1	0	1	7	5	1	0	1	15	0	1	2	8	5	1	0	1	13
Aug.																		
Sept.																		
Oct.																		
Nov.																		
Dec.																		
1900. Jan.																		
Totals ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

	5 A.M.									7 A.M.								
1899. March																		
April																		
May																		
June	0	0	2	4	2	1	0	1	7	1	1	1	6	1	0	0	1	7
July	0	1	3	9	4	0	0	0	15	0	1	3	5	3	1	1	0	17
Aug.																		
Sept.																		
Oct.																		
Nov.																		
Dec.																		
1900. Jan.																		
Totals ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

	9 A.M.									11 A.M.								
1899. March	0	6	4	3	5	1	1	3	6	0	5	4	6	5	1	2	2	4
April	3	1	3	4	4	1	0	1	12	3	2	2	5	4	1	1	1	11
May	2	2	2	4	8	0	0	0	13	2	3	2	4	3	0	2	0	14
June	0	0	4	7	6	4	0	0	9	0	0	2	10	3	1	1	0	13
July	0	0	4	7	5	0	1	0	14	1	0	3	6	4	1	0	1	15
Aug.	0	1	1	6	6	0	0	1	16	1	0	2	6	8	0	0	2	12
Sept.	1	0	2	9	6	1	0	0	11	1	1	2	9	5	0	0	1	11
Oct.	0	0	3	6	5	2	1	0	14	0	0	2	6	6	2	5	0	9
Nov.	1	0	1	8	5	0	1	1	13	1	0	1	7	4	3	0	0	14
Dec.	2	0	5	4	3	1	1	1	14	1	0	6	6	6	2	2	0	8
1900. Jan.	1	1	5	8	2	0	0	1	9	1	0	5	9	6	0	1	1	4
Totals ..	10	11	34	66	55	10	5	8	131	11	11	31	74	54	11	14	8	115

NOTE.—In seven instances the direction of the wind could not be classified. These cases are: April 1, 9 a.m., whirlwind; May 4, 11 a.m., whirlwind; July

THE WIND. [Wind directions by *true* bearings.

1 P.M.									3 P.M.									Months.
N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.	
1	5	2	5	3	2	2	1	8	0	5	3	5	2	3	1	2	8	March 1899.
2	2	2	4	4	1	1	2	12	1	2	3	4	4	2	1	3	10	April.
2	0	2	7	2	0	0	0	18	4	0	3	5	3	0	0	0	16	May.
0	0	2	8	1	1	0	0	18	0	0	2	6	5	0	1	0	16	June.
2	0	1	7	3	1	0	0	17	1	0	1	5	4	0	2	2	15	July.
1	0	2	9	9	0	0	2	8	4	1	1	7	7	1	1	0	9	Aug.
2	1	2	10	5	1	0	1	8	1	0	2	8	5	1	0	3	10	Sept.
0	0	2	6	4	2	4	1	12	0	0	3	5	2	1	1	1	18	Oct.
0	0	1	8	6	3	0	0	12	0	0	0	7	6	3	2	0	12	Nov.
0	0	4	6	6	4	4	1	6	1	1	6	6	5	3	1	0	8	Dec.
2	0	5	8	3	3	3	2	1	2	0	6	6	3	1	2	3	4	Jan. 1900.
12	8	25	78	46	18	14	10	120	14	9	30	64	46	15	12	14	126	Totals.
5 P.M.									7 P.M.									
0	3	4	5	3	2	2	2	8	0	2	6	5	3	2	2	1	8	March 1899.
4	2	3	6	3	1	1	3	7	3	4	2	5	2	0	2	2	10	April
1	0	2	6	2	0	1	1	18	1	0	2	7	3	0	0	0	18	May
0	0	2	4	3	0	0	0	21	1	1	1	3	2	2	1	0	19	June
0	0	3	7	5	0	0	3	13	2	1	2	7	1	0	0	2	16	July
2	0	1	7	6	1	0	0	14	2	0	2	7	8	1	0	1	10	Aug.
0	0	1	7	3	1	1	0	17	0	0	1	5	5	3	1	0	15	Sept.
1	0	3	5	5	1	0	2	14	0	0	2	5	4	1	1	3	15	Oct.
0	0	0	4	3	5	1	0	16	0	0	0	7	6	2	1	0	14	Nov.
1	0	5	6	6	3	1	0	9	1	0	5	6	4	1	2	1	11	Dec.
1	0	6	6	4	0	1	3	6	1	0	6	6	2	0	2	2	8	Jan. 1900.
10	5	30	63	43	14	8	14	143	11	8	29	63	40	12	12	12	144	Totals.
9 P.M.									11 P.M.									
0	2	6	5	3	3	1	3	6										March, 1899.
5	3	2	5	3	0	2	0	10										April.
3	0	1	6	5	1	0	0	15										May.
1	0	1	3	6	2	0	0	17	0	0	1	3	2	1	1	0	11	June.
0	1	3	8	2	0	0	2	14	1	0	3	5	3	0	2	0	17	July.
1	1	1	5	6	1	1	0	14										Aug.
0	1	2	9	5	0	1	0	12										Sept.
2	0	4	5	2	1	0	0	17										Oct.
0	0	1	4	3	2	0	0	20										Nov.
1	0	5	7	1	3	1	0	13										Dec.
1	0	6	7	2	1	1	1	8										Jan. 1900.
14	8	32	64	38	14	7	6	146	..	..	..	..	..	..	..	..	..	Totals.

9 p.m., whirlwind, force 4; July 26, 3 p.m. whirlwind; August 31, 9 p.m., variable, force 2; October 11, 11 a.m. variable, force 1–2; November 25, 5 p.m. *variable*.

Long. 170° 9′ 30″ E. Lat. 71° 18′ S.]

CLOUD

Months.	1 A.M.									3 A.M.								
	Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	Drift.	Clear.	Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	Drift.	Clear.
1899. March																		
April																		
May																		
June	1	0	6	0	0	11	3	2	1	1	0	6	0	0	11	3	2	1
July	0	0	4	0	0	9	9	2	7	0	0	5	0	0	9	9	2	8
Aug.																		
Sept.																		
Oct.																		
Nov.																		
Dec.																		
1900. Jan.																		
Totals ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

	5 A.M.									7 A.M.								
1899. March																		
April																		
May																		
June	1	0	5	0	0	10	3	1	3	1	0	6	0	0	10	4	1	2
July	0	0	6	0	0	10	9	3	8	0	0	7	0	0	9	9	3	7
Aug.																		
Sept.																		
Oct.																		
Nov.																		
Dec.																		
1900. Jan.																		
Totals.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

	9 A.M.									11 A.M.								
1899. March	4	1	2	4	2	11	9	4	1	2	0	4	4	2	10	9	4	1
April	7	0	5	0	0	12	14	1	0	8	0	7	0	0	11	11	3	0
May	2	0	10	0	0	12	18	1	0	3	0	10	0	0	12	20	0	0
June	3	0	9	0	0	18	5	2	3	2	0	12	0	0	18	5	2	2
July	0	0	9	0	0	16	8	3	3	0	0	9	0	0	16	11	2	2
Aug.	3	0	17	0	1	13	5	0	2	4	1	17	1	0	14	5	0	2
Sept.	2	0	11	0	0	12	8	0	4	1	0	12	1	0	14	8	0	3
Oct.	5	0	12	1	0	14	5	0	4	6	0	12	1	1	13	5	0	3
Nov.	10	0	6	2	3	4	12	0	6	5	1	10	1	3	6	10	0	6
Dec.	4	3	7	2	8	10	15	1	0	5	3	8	4	7	12	17	0	0
1900. Jan.	5	2	4	3	14	5	15	0	0	3	3	4	2	14	5	15	0	0
Totals ..	45	6	92	12	28	127	114	12	23	39	8	105	14	27	131	116	11	19

FORM.

1 P.M.									3 P.M.									Months.
Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	Drift.	Clear.	Cir.	Cir.-c.	Cir.-s.	Cum.	Cum.-s.	Str.	Nim.	Drift.	Clear.	
0	0	7	4	4	7	13	3	1	1	0	6	5	3	6	11	4	1	March 1899.
9	0	7	0	0	11	13	2	0	8	0	4	0	0	11	14	2	0	April
4	0	8	0	0	11	19	1	0	4	0	9	0	0	12	17	2	0	May
1	0	13	0	0	17	4	2	2	1	0	10	0	0	18	4	2	3	June
1	0	12	0	0	18	13	0	1	0	0	9	0	0	17	13	0	1	July
4	1	18	1	0	13	6	0	2	3	0	18	0	0	15	6	1	2	Aug.
1	0	10	2	0	16	9	0	2	1	0	12	2	0	14	10	0	1	Sept.
6	1	13	1	1	7	5	0	5	9	1	14	1	1	6	6	0	5	Oct.
5	1	8	1	6	6	9	0	6	5	0	5	2	5	7	11	0	7	Nov.
9	3	10	1	8	10	14	0	0	7	2	8	1	11	11	15	0	0	Dec.
2	3	5	2	13	7	16	0	0	2	3	5	3	12	5	17	0	0	Jan. 1900.
42	9	111	12	32	123	121	8	19	41	6	100	14	32	122	124	11	20	Totals.
5 P.M.									7 P.M.									
5	0	6	5	4	7	10	4	0	4	0	5	5	2	9	12	4	1	March 1899.
7	0	4	0	0	11	15	2	0	7	0	3	0	0	11	14	2	0	April
5	0	8	0	0	11	16	2	1	6	0	8	0	0	11	16	2	1	May
0	0	11	0	0	18	4	2	3	0	0	11	0	0	19	4	2	2	June
0	0	10	0	0	14	14	1	1	0	0	11	0	0	14	11	1	3	July
3	0	18	0	1	13	5	1	2	1	0	13	1	0	9	3	1	9	Aug.
2	0	11	1	0	16	9	0	0	2	0	9	0	0	15	9	1	1	Sept.
7	0	14	2	1	9	6	0	4	5	1	12	3	1	10	6	1	4	Oct.
5	0	7	1	4	6	12	0	5	7	0	4	2	7	6	9	0	4	Nov.
4	4	6	1	9	9	17	1	0	3	2	6	2	11	6	17	1	0	Dec.
3	3	2	5	14	6	18	0	0	3	3	2	5	14	6	18	0	0	Jan. 1900
41	7	97	15	33	120	126	13	16	38	6	84	18	35	116	119	15	25	Totals.
9 P.M.									11 P.M.									
2	0	6	3	0	7	14	4	1										March 1899.
7	0	3	0	0	11	14	2	0										April
3	0	9	0	0	12	15	2	1										May
0	0	10	0	0	16	4	2	4	0	0	6	0	0	12	3	2	0	June
0	0	7	0	0	11	13	1	3	0	0	6	0	0	9	13	1	6	July
0	0	12	0	0	9	3	0	13										Aug.
0	0	10	0	0	17	10	0	2										Sept.
4	0	12	3	0	9	5	1	6										Oct.
6	0	10	1	4	8	9	0	3										Nov.
5	3	4	3	12	7	19	1	1										Dec.
3	4	3	3	13	5	19	0	0										Jan. 1900.
30	7	86	13	29	112	125	13	34	..	..	..	..	..	..	..	..	..	Totals.

Long. 170° 9′ 30″ E. Lat. 71° 18′ S.

AIR TEMPERATURE.

Instruments exposed in a Stevenson screen, 4 feet above the ground. Readings corrected for instrumental errors.

Months.	1 A.M.	3 A.M.	5 A.M.	7 A.M.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	11 P.M.	Mean $\frac{9a.+9p.}{2}$	Extremes. Min.	Day.	Max.	Day.	Solar Radiation. Max.	Day.
1899. March	..	..	..	..	18·5	18·9	19·1	19·6	18·2	16·9	16·6	..	17·6	— 2·8	26th	31·1	5th, 6th	104·2	28th
April	..	..	..	..	10·1	10·3	10·8	10·1	9·8	9·8	10·0	..	10·1	— 10·3	20th	31·5	3rd	72·5	14th
May	..	..	..	..	— 4·3	— 3·8	— 3·7	— 3·2	— 3·3	— 3·9	— 3·4	..	— 3·8	— 31·5	14th	23·0	5th	..	..
June	..	..	..	..	— 13·1	— 12·3	— 11·9	— 12·4	— 12·2	— 12·2	— 12·7	..	— 12·9	— 36·4	4th	13·9	12th	..	..
June, 17 days ..	*— 9·0*	*— 9·4*	*— 9·2*	*— 9·7*	*— 10·1*	*— 10·6*	*— 9·9*	*— 10·5*	*— 10·8*	*— 10·1*	*— 10·7*	*— 9·6*	*— 10·4*	..	..	..	..	..	..
July	— 8·9	— 9·4	— 9·1	— 9·1	— 9·3	— 9·5	— 9·1	— 9·6	— 9·5	— 9·1	— 8·8	— 7·2	— 9·0	— 39·4	10th	23·6	19th	..	..
August	..	..	..	..	— 13·7	— 12·5	— 11·8	— 13·1	— 12·3	— 12·7	— 13·3	..	— 13·5	— 43·5	5th, 6th	18·7	16th	..	..
September	..	..	..	..	— 12·4	— 10·6	— 9·8	— 9·6	— 11·1	— 12·2	— 12·6	..	— 12·5	— 31·9	13th	11·3	7th	29·0	7th
October	..	..	..	..	— 1·3	0·0	1·9	2·0	1·0	— 1·5	— 2·6	..	— 1·9	— 36·5	1st	19·4	16th	31·0	27th
November	..	..	..	..	18·5	19·4	20·5	20·8	20·2	19·0	17·5	..	18·0	— 4·3	2nd	45·5	29th	50·0	25th
December	..	..	..	..	31·9	33·0	33·5	33·0	32·5	32·1	31·3	..	31·6	20·5	12th	42·0	26th	69·8	17th
1900. January	..	..	..	..	33·5	34·0	34·4	34·5	34·4	33·8	32·9	..	33·2	25·2	9th	48·7	24th	74·8	28th
June 13–July 31	— 8·9	— 9·4	— 9·1	— 9·3	— 9·6	— 9·9	— 9·4	— 9·9	— 10·0	— 9·5	— 9·5	— 8·1	— 9·6	..	..	..	..	..	..
Whole Period	..	..	..	..	5·3	6·1	6·7	6·6	6·2	5·5	5·0	..	5·2	— 43·5	Aug. 5, 6	48·7	Jan. 24th	104·2	Mar. 28th

Long. 170° 9′ 30″ E. Lat. 71° 18′ S.

DEPRESSION OF WET-BULB.

Instrument exposed in a Stevenson Screen, 4 feet above ground. Readings corrected for instrumental error.

Months.	1 A.M.	3 A.M.	5 A.M.	7 A.M.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	11 P.M.	$\frac{9a. + 9p.}{2}$	Extremes. Max.	Extremes. Day.
1899 March..	..	..	..	..	1·1	1·0	1·0	1·1	0·9	0·7	0·8	..	1·0	3·9	17th
April..	..	..	..	..	0·4	0·5	0·6	0·6	0·5	0·5	0·4	..	0·4	2·5	11th
May	..	..	..	..	0·2	0·2	0·2	0·3	0·2	0·3	0·3	..	0·3	2·8	6th
June	..	..	..	.	0·3	0·2	0·2	0·3	0·3	0·4	0·4	..	0·4	2·1	22nd
June, 17 days	*0·2*	*0·2*	*0·3*	*0·3*	*0·3*	*0·2*	*0·2*	*0.3*	*0·4*	*0·4*	*0·4*	*0·3*	*0·4*	..	..
July	0·2	0·2	0·2	0·2	0·2	0·3	0·3	0·2	0·2	0·3	0·3	0·3	0·3	1·9	5th
August	..	..	..	..	0·3	0·2	0·2	0·2	0·2	0·2	0·3	..	0·3	2·0	7th
September	..	..	..	..	0·3	0·2	0·2	0·2	0·2	0·2	0·2	..	0·3	1·7	1st
October	..	..	..	..	0·4	0·6	0·6	0·7	0·5	0·4	0·4	..	0·4	2·6	11th
November	..	..	..	..	0·9	1·5	1·5	1·5	1·4	1·1	0·8	..	0·9	8·5	28th
December	..	.	..	..	1·6	2·6	2·4	2·0	1·8	1·6	1·3	..	1·5	6·8	6th
1900. January	..	..	..	..	1·7	2·2	2·2	2·2	2·2	1·8	1·3	..	1·5	6·9	12th
June 13—July 31	0·2	0·2	0·2	0·3	0·2	0·3	0·3	0·3	0·3	0·3	0·3	0·3	0·3	..	..
Whole Period	..	..	..	..	0·7	0·9	0·9	0·8	0·8	0·7	0·6	..	0·7	8·5	Nov. 28th

Long. 170° 9′ 30″ E. Lat. 71° 18′ S.

PRESSURE.

Barometer 21 feet above sea-level. Readings corrected for instrumental error, and reduced to 32° F. No corrections have been applied for height, or to reduce to gravity of 45°.

Months.	1 A.M.	3 A.M.	5 A.M.	7 A.M.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	11 P.M.	$\frac{9a+9p}{2}$	Extremes Observed. Highest.	Day.	Lowest.	Day.
1899. March (28 days) ..	..	..	..	..	29·042	29·041	29·045	29·041	29·051	29·064	29·069	..	29·056	29·839	31st	28·440	26th
April	..	..	..	..	·266	·265	29·260	29·263	29·263	29·263	29·265	..	29·266	·802	1st	·767	6th, 23rd
May	..	..	..	..	29·013	29·013	28·997	28·986	28·979	28·979	28·976	..	28·995	·506	11th	·169	28th
June	..	..	..	..	28·931	28·933	28·935	28·936	28·941	28·947	·942	..	·937	29·783	10th	·150	15th
June (18 days) ..	*28·839*	*28·836*	*28·835*	*28·838*	*28·835*	*28·834*	*28·836*	*28·841*	*28·856*	*28·875*	*28·872*	*28·886*	*28·854*	..	..	..	..
July	29·384	29·383	29·378	29·371	29·378	29·374	29·371	29·370	29·368	29·372	29·377	29·373	29·378	30·156	22nd	·771	31st
August	..	..	..	..	28·996	28·987	28·978	28·974	28·981	28·979	28·989	..	28·993	29·581	14th	28·537	31st
September	..	..	..	..	·625	·622	·611	·602	·598	·599	·596	..	·611	28·944	26th	27·913	10th
October	..	..	..	..	28·861	28·865	28·859	28·858	28·862	28·864	28·856	..	28·859	29·335	8th	28·335	19th
November	..	..	..	..	29·313	29·314	29·317	29·312	29·321	29·322	29·333	..	29·323	·751	26th	·704	3rd
December	..	..	..	..	·236	·236	·233	·223	·227	·227	225	..	·231	·756	3rd	·669	24th
1900. January (28 days) ..	..	..	..	..	29·176	29·177	29·183	29·180	29·183	29·181	29·183	..	29·180	29·651	5th	28·615	11th
June 13—July 31 ..	29·184	29·182	29·178	29·176	29·179	29·175	29·175	29·176	29·180	29·189	29·192	29·194	29·186	..	..	..	..
Whole Period ..	..	..	..	..	29·076	29·075	29·072	29·068	29·070	29·072	29·074	..	29·075	30·156	July 22	27·913	Sept. 10

Long. 170° 9′ 30″ E. Lat. 71° 18′ S.

WIND—FORCE.

Observations by Beaufort Scale, 0—12.

Months.	1 A.M.	3 A.M.	5 A.M.	7 A.M.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	11 P.M.	$\frac{9a. + 9p.}{2}$	Extremes. Max.	Day.	Calms.	Per Cent.
1899. March	..	..	..	..	2·6	2·7	2·6	2·7	2·8	3·1	3·0	..	2·8	10·5	20th	48	24
April	..	..	..	..	2·4	2·2	2·1	2·2	2·0	1·8	1·6	..	2·0	11	2nd, 23rd	72	34
May	..	..	..	..	1·1	0·9	1·1	1·3	1·6	1·5	1·6	..	1·4	11	18th, 25th	112	51
June	..	..	..	..	1·6	1·7	1·6	1·5	1·2	0·9	0·9	..	1·3	11-12	16th	156	52
June, 18 days ..	*1·7*	*2·1*	*2·3*	*2·4*	*2·3*	*2·3*	*2·1*	*2·3*	*1·9*	*1·4*	*1·3*	*1·4*	*1·8*	..	..	*102*	*46*
July	1·4	1·7	1·8	1·8	1·5	1·3	1·3	1·1	1·2	1·3	1·6	1·6	1·6	10	27th, 31st	181	49
August	..	..	..	..	0·7	1·1	1·4	1·5	1·3	1·8	1·2	..	1·0	10	7th, 8th	84	38
September.. ..	..	..	..	..	1·2	1·2	1·2	1·4	1·3	1·3	1·5	..	1·4	10-11	9th	84	40
October	..	..	..	..	1·5	1·6	1·5	1·6	1·6	1·6	1·7	..	1·6	10	27th	99	46
November.. ..	..	..	..	..	1·5	1·6	1·6	1·4	1·1	1·4	1·5	..	1·5	9	28th	101	48
December.. ..	..	..	..	..	1·9	2·3	2·3	2·3	2·5	2·5	2·3	..	2·1	10	5th, 17th	69	32
1900. January	..	..	..	..	2·7	2·8	2·8	2·7	2·8	2·9	2·7	..	2·7	11	11th	46	23
June 13—July 31..	1·5	1·8	2·0	2·0	1·8	1·7	1·6	1·5	1·4	1·4	1·5	1·5	1·7	..	..	283	48
Whole Period (Mean)	..	..	..	..	1·7	1·8	1·8	1·8	1·8	1·8	1·8	..	1·8	11-12	June 16th	96	41

Long. 170° 9′ 30″ E. Lat. 71° 18′ S.

AMOUNT OF CLOUD.

Scale: 0 = clear sky; 10 = overcast.

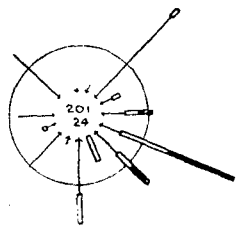
Months.	1 A.M.	3 A.M.	5 A.M.	7 A.M.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	11 P.M.	$\frac{9a.+9p.}{2}$
1899. March	..	..	..	..	7·5	7·8	8·1	8·0	7·6	7·7	7·6	..	7·6
April	..	..	..	..	8·5	8·0	8·0	8·3	8·5	7·8	7·7	..	8·1
May	..	..	..	..	7·7	7·2	7·5	7·0	6·2	5·8	6·6	..	7·2
June	..	..	..	..	6·4	7·3	6·9	6·1	5·4	5·6	5·2	..	5·8
June (18 days) ..	*7·0*	*6·8*	*6·4*	*6·3*	*7·3*	*8·4*	*7·4*	*7·4*	*6·6*	*6·8*	*6·6*	*6·4*	*7·0*
July	6·0	5·2	5·4	5·7	6·9	6·9	7·2	7·2	6·5	5·5	5·5	5·9	6·2
August	..	..	..	..	5·5	5·5	5·3	5·7	4·8	3·6	3·1	..	4·3
September ..	..	..	..	..	6·5	6·4	6·6	6·8	6·7	6·2	5·9	..	6·2
October	..	..	..	..	5·2	5·4	5·2	5·0	5·1	5·1	5·2	..	5·2
November ..	..	..	..	..	4·9	5·3	5·6	5·3	5·4	5·1	5·1	..	5·0
December	..	..	..	..	7·7	7·5	7·3	7·4	7·6	7·9	7·8	..	7·8
1900. January	..	..	..	..	8·3	8·3	8·1	8·3	8·4	8·3	8·1	..	8·2
June 13—July 31.. ..	6·4	5·8	5·8	6·0	7·0	7·4	7·3	7·2	6·5	6·0	5·9	6·1	6·5
Whole Period	..	..	..	..	6·8	6·9	6·9	6·8	6·6	6·2	6·2	..	6·5

MONTHLY WIND-ROSES.

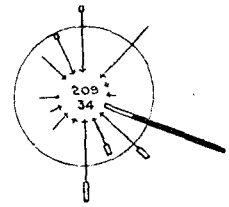
March, 1899—January, 1900.

[For explanation, *see* page 99.]

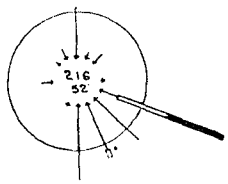
MARCH, 1899.



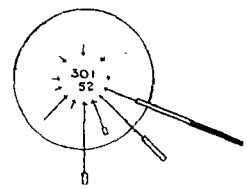
APRIL, 1899.



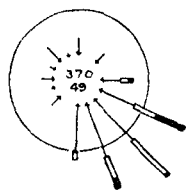
MAY, 1899.



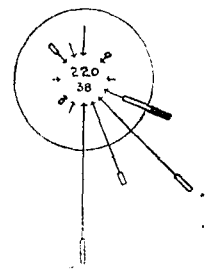
JUNE, 1899.



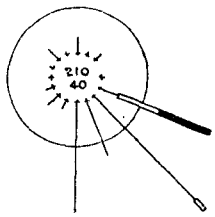
JULY, 1899.



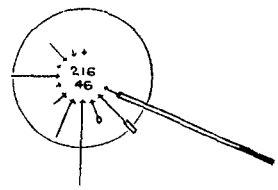
AUGUST, 1899.



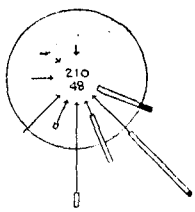
SEPTEMBER, 1899.



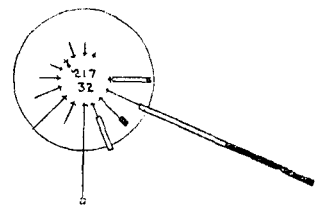
OCTOBER, 1899.



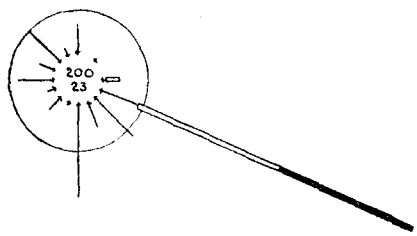
NOVEMBER, 1899.



DECEMBER, 1899.



JANUARY, 1900.



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SUMMARY OF OBSERVATIONS CONTAINED IN THE METEOROLOGICAL LOG OF THE STEAM YACHT "SOUTHERN CROSS," DECEMBER, 1898, TO MARCH, 1900.

A Summary, attached, has been made of the observations given when the vessel was at sea.

The position of the vessel at noon is given for each day.

Barometer.—The mean of the readings for the day is given, and the highest and lowest readings. The observations are corrected and reduced to 32° Fahrenheit.

Air Temperature.—The mean of the readings for the day is given, and the highest and lowest readings.

Temperature of Sea Surface.—The mean of the readings for the day is given, and the highest and lowest readings.

The error of the thermometers is too small to require attention.

Specific Gravity of Sea Surface.—The reading is given at noon for each day when practicable. The observations are corrected for temperature, but it has not been possible to obtain the error of the hydrometer.

Wind.—The direction is true, having been corrected in the Office for Magnetic Variation, as given on the Admiralty Variation Chart for 1895. The general direction is given, and the changes of wind are shown as far as possible. The mean force for the day is shown, two or more forces being given when there is any material change.

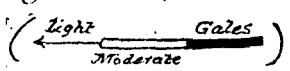
Amount of Cloud.—The mean amount of cloud is given for each day. 0 represents a clear sky, and 10 represents overcast.

Weather.—The weather is given according to Beaufort Notation.

Remarks of importance are given.

Mean Results.—When observations are made near the same position for several days the mean results are given, and a wind-rose has been drawn.

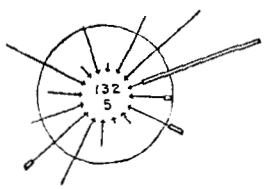
Explanation of Wind-rose.—The arrows, which fly with the wind, show, by their length, the frequency of the winds, and, by their thickness, the various forces; light winds, forces from 1 to 3; moderate winds, 4 to 7; and gales, 8 to 12.



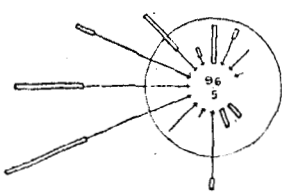
The circle supplies a scale for estimating the frequency of winds in any direction. From the heads of the arrows to the circumference represents 5 per cent. of the whole number of observed winds (100 per cent. = 5 inches). The upper figures in the centre of the wind-rose are the total number of observations, the percentage of calms being given underneath.

Date.	Lat.	Long.	Barometer.			Air Temperature.			Sea Temperature.			Specific Gravity.
			Mean.	Highest.	Lowest.	Mean.	Highest.	Lowest.	Mean.	Highest.	Lowest.	
	° ′ S.	° ′ E.	ins.	ins.	ins.	°	°	°	°	°	°	
1898. Dec. 22 ..	47 41	150 22	30·091	30·108	30·065	50	51	46	52	..	..	1·029
23 ..	49 46	150 45	29·864	29·984	29·720	47	51	46	49	49	48	1·027
24 ..	51 47	152 13	·543	·621	·480	46	49	43	47	50	46	1·027
25 ..	53 13	155 23	·786	·801	·761	45	48	43	46	47	45	1·027
26 ..	53 26	156 20	·832	·838	·831	44	45	44	46	47	45	1·029
27 ..	55 23	156 44	·488	·682	·421	44	45	41	44	45	43	1·029
28 ..	58 27	158 20	29·288	29·293	29·286	40	43	34	41	44	39	1·028
29 ..	60 24	158 48	28·904	28·997	28·812	35	37	34	37	38	35	1·030
30 ..	61 56	158 53	29·249	29·291	29·220	35	36	32	33	35	30	1·030
1898. Dec. 31 ..	62 41	159 25	29·244	29·315	29·192	32	34	28	30	32	30	1·025
1899. Jan. 1 ..	63 38	160 6	·561	·619	·502	28	32	23	30	31	30	1·025
2 ..	63 41	160 16	·730	·743	·712	30	34	23	30	30	29	1·025
3 ..	63 40	160 36	·566	·594	·546	32	33	27	30	30	29	1·025
4 ..	63 45	160 31	·681	·712	·642	30	31	30	30	30	29	1·025
5 ..	64 8	160 52	·674	·703	·634	30	32	28	30	30	30	1·025
6 ..	63 34	160 58	·419	·463	·372	31	34	28	30	31	29	1·025
7 ..	63 43	161 6	·335	·443	·281	30	31	28	30	30	29	1·025
8 ..	63 43	161 6	·600	·639	·568	30	32	29	30	30	29	1·025
9 ..	63 43	161 6	·727	·758	·670	32	33	29	30	30	30	1·025
10 ..	63 57	161 30	29·346	29·447	29·261	33	33	32	30	30	29	1·025
			Mean results—Dec., 31, 1898, to Jan. 10, 1899. From Lat. 62° 41′ to 64° 8′ S, and									
			29·535	29·758	29·192	30·7	34	23	30·0	32	29	1·025
1899. Jan. 11 ..	64 46	161 50	29·339	29·395	29·310	33	34	30	30	30	30	1·025
12 ..	65 3	161 42	·678	·689	·663	33	36	29	32	34	29	..
13 ..	65 52	162 32	·286	·293	·275	30	32	29	31	31	30	1·025
14 ..	65 48	163 16	·718	·782	·625	31	33	29	30	30	30	1·025
15 ..	65 55	164 7	·884	·891	·882	32	33	31	30	31	30	1·024
16 ..	65 43	164 9	·645	·676	·633	31	34	28	29	29	29	1·024
17 ..	65 43	164 9	·344	·467	·193	31	33	29	30	30	29	1·024
18 ..	65 43	164 9	29·102	29·267	29·022	31	32	26	30	30	29	1·025
			Mean results—Jan. 11 to 18, 1899. From Lat. 64° 46′ to 65° 55′ S, and									
			29·499	29·891	29·022	31·5	36	26	30·2	34	29	1·025

Wind. Direction.	Wind. Force.	Amount of Cloud.	Weather.	Remarks.
S by W veering to W by S ..	2	10	og	
N by E veering to NE by E ..	4	10	o	Bright patches of light in sea. Luminous appearance in sky between S and SE.
NNE backing to NNW, to S ..	7	10	p	
S by W veering to SW by W ..	5	10	odf	
SW by S	3	10	o	
SW by S veering to NNW, and backing to W by N	3–7	10	rm	Whales seen.
WNW backing to SW	7–4	10	f	
SW veering to NNW, NE to SW..	5-1-4	10	rs	
SW veering to W	4–2	10	fd	First piece of ice. Beset with ice.
NNE veering to NE, ESE backing to NE	2	10	f	Shot first seal. Fin whale. Ice becoming very heavy.
E, ESE veering to S	1	3	be	
Calm, SSW veering to WNW ..	0–3	8	e	
WNW backing to WSW	3–1	10	s	Deep-sea temperatures at { 500 metres 35·2; 300 ,, 33·8; 150 ,, 32·0; 50 ,, 29·3
SSW, SW, S by W, SSW	2	9	e	
SW backing to S	1	10	s	
SSW veering to WSW, WNW, W, Calm, ENE to E	1	10	s	
ENE to E, back to ENE	4–7	10	s	
ENE..	6–1	10	o	Long swell from NNE.
NE backing to NNE and N ..	1	10	o	,, ,,
NNW veering to NNE, and WSW	2	10	sdf	Swell almost subsided.
Long. 159° 25′ to 161° 30′ E.	..	9·0		
WSW, W, WSW to S	2	10	md	
S, Calm, NE, NNE..	0–2	0–7	s	Land sighted at 12.30 p.m. Much open water.
NNE, N, Calm	2–5–0	10	s	
WSW, SW to W	3	9	e	
W, NW, Calm, WNW	2–0–5	10	rf	
WSW, WNW, backing to W ..	6–2 6	10	o	
WNW, NW..	3	9	dfh	
NW backing to WSW, then S ..	4	10	hr	Six icebergs in sight.
Long. 161° 42′ to 164° 9′ E.	..	9 0		



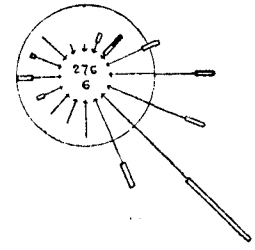
Using Admiralty Variation.

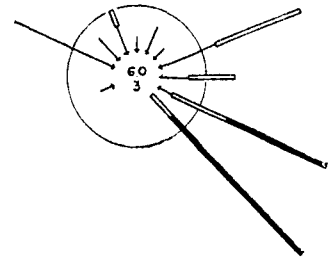


Using Admiralty Variation.

Date.	Lat.	Long.	Barometer.			Air Temperature.			Sea Temperature.			Specific Gravity.
			Mean.	Highest.	Lowest.	Mean.	Highest.	Lowest.	Mean.	Highest.	Lowest.	
	° ′ S.	° ′ E.	ins.	ins.	ins.	°	°	°	°	°	°	
1899. Jan. 19 ..	65 43	165 47	29·778	29·787	29·767	27	32	22	30	30	29	1·026
20 ..	66 4	166 51	·736	·750	·710	26	31	20	30	31	29	1·026
21 ..	66 16	166 56	·573	·610	·545	30	31	28	29	30	29	1·026
22 ..	66 16	166 16	·437	·453	·433	30	32	28	29	29	29	1·026
23 ..	No observation		·533	·605	·491	30	32	29	29	29	29	1·026
24 ..	,,	,,	·703	·716	·700	32	33	30	30	30	30	1·026
25 ..	,,	,,	·726	·752	·715	32	35	29	30	31	29	1·025
26 ..	66 34	166 5	·739	·773	·697	30	31	28	30	30	29	1·025
27 ..	66 35	166 8	·563	·615	·534	29	30	27	29	30	29	1·025
28 ..	66 35	165 54	·546	·587	·526	29	32	26	29	29	29	1·026
29 ..	66 45	165 40	·689	·719	·665	27	33	17	29	30	28	1·026
30 ..	66 45	165 25	·786	·787	·785	25	31	17	29	30	28	1·025
31 ..	66 46	165 29	·669	·722	·622	26	31	21	29	29	28	1·026
Feb. 1 ..	66 41	165 40	·391	·462	·351	26	31	21	29	29	29	1·026
2 ..	66 37	165 49	·433	·444	·408	28	31	24	29	30	29	1·026
3 ..	66 37	165 48	·354	·433	·329	29	31	26	29	30	29	1·026
4 ..	66 40	No observation	·134	·241	·051	28	30	27	29	29	29	1·026
5 ..	No observation		·043	·079	·021	28	31	24	29	29	29	1·026
6 ..	66 37	164 49	·163	·219	·138	27	30	24	29	30	29	1·026
7 ..	66 20	164 37	·495	·602	·387	27	31	22	29	30	29	1·026
8 ..	66 7	164 37	·544	·645	29·420	27	31	22	29	30	29	1·026
9 ..	65 52	165 7	·057	·166	28·950	32	33	31	29	30	29	1·026
10 ..	65 33	165 48	29·575	29·578	29·520	31	33	27	29	31	29	1·026
							Mean results—Jan. 19 to Feb. 10, 1899.					From
			29·512	29·787	28·950	28·5	35	17	29·2	31	28	1·026
1899. Feb. 11 ..	66 1	169 8	29·541	29·598	29·445	29	32	27	30	31	30	1·022
12 ..	65 4	173 53	28·844	28·996	28·756	31	32	31	31	31	31	1·025
1899. Feb. 13 ..	67 13	173 7	28·746	28·822	28·709	31	32	30	30	32	30	1·024
14 ..	69 13	173 0	29·148	29·213	29·059	30	32	23	30	32	30	1·023
15 ..	70 43	172 51	·246	·275	·233	28	29	23	30	31	30	1·024
16 ..	71 8	172 29	·312	·317	·279	27	28	26	29	30	29	..
17 ..	70 50	171 46	29·148	29·199	29·110	27	28	25	30	31	30	..
								Mean results—Feb. 13 to 17, 1899.				From
			29·120	29·317	28·709	28·6	32	23	29·8	32	29	1·024

Wind.		Amount of Cloud.	Weather.	Remarks.
Direction.	Force.			
SSE, S, SW, NNW..	1	1	b	
NW changing to SSE, calm, ENE, then SSE	0-1	2-10	m	
ESE to SSW, backing to ESE ..	0-3	10	fs	No open water.
SE	3-5	10	s	
SE	5	10	sm	Severe screwing of ice.
SE backing to ENE, veering to E.	3-1	10	ms	,, ,, ,,
NE.	0-1	10	m	
E to ENE, veering to SSE, then backing to E	1	10	o	
E to ENE	1-4	10	o	Ruddy sky in SE.
NE to E	4-2	10	o	Deep-sea temperature at 500 fms. 33°·1.
ESE backing to ENE, then veering to ESE	3-1	9-2	c, b	
SE to S	0-1	2	bc	
SSE veering to WNW	1-0-2	9-0	c, b	
WNW, WSW, W	4-2-7	2-9	c	
W backing to E	6-1	10-2-8	c	
E veering to ESE	1-3	5-10	c, o	
ESE veering to SSE	1-7	9	s	Using Admiralty Variation.
SSE veering to SSW, backing to SE	7-2	10	s	Large patch of open water.
SE to SSE, backing E, then veering to SE	0-3	10	s	Moored to large iceberg.
SE to SSE, changing to NNW ..	3-0-1	10-3	o, bc	
WSW veering to NE, backing to NNE	1-6	3-10	f	Hoar-frost.
NE backing to WNW, NW to WNW	10-2	10	s	
WNW backing to SSW, calm, SW	1	10-2-7	o, c	Colour of sea-water, blue. Large open patches of water.
Lat. 65° 33′ to 66° 46′ S., Long. 164° 37′ to 166° 56′ E.				
.. .. ..		77		
SW veering to N	1-3	7-10	f	Swell from NE. Hoar frost. Much fresh water at surface.
N to NNE, backing to NNW ..	4-8-2	10	s	Icebergs in sight.
NNW veering to ENE	5-0-3	10	f	
E backing to WNW	5-2	10	s	Many icebergs. In sight of ice pack.
WNW veering to NNW, back to WNW, changing to ESE	1-10	10	s	In the pack. Land sighted, Cape Adare.
SE	10	10	s	
ESE	9-0	10	s	Anchored at Cape Adare in 11 fms. water.
Lat. 67° 13′ to 71° 8′ S, and Long. 171° 46′ to 173° 7′ E.				
.. .. ..		10·0		

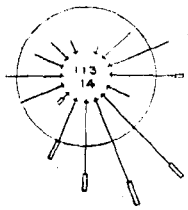




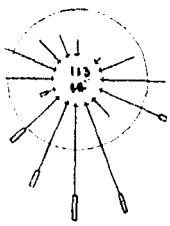
Using Admiralty Variation.

Date.	Lat.	Long.	Barometer.			Air Temperature.			Sea Temperature.			Specific Gravity.
			Mean.	Highest.	Lowest.	Mean.	Highest.	Lowest.	Mean.	Highest.	Lowest.	
	S. ° ′	E. ° ′	ins.	ins.	ins.	°	°	°	°	°	°	
1900. Feb. 3 ..	Possessio	n Island.	29·195	29·269	29·070	29	31	28	31	31	31	..
4 ..	73 28	170 58	·079	·140	·030	27	30	24	30	30	30	..
5 ..	73 49	171 52	·248	·376	·110	29	31	28	30	32	29	..
6 ..	74 32	168 2	·197	·375	·031	30	33	27	31	32	30	..
7 ..	74 43	166 41	·203	·276	·050	29	32	25	29	30	29	..
8 ..	Not ob	served.	·369	·428	·310	23	28	17	29	29	28	..
9 ..	,,	,,	·353	·402	29·245	27	29	25	30	31	29	..
10 ..	77 17	168 15	·045	·210	28·950	24	27	15	30	31	30	..
11 ..	Not ob	served.	·048	·172	28·951	1	4	−6	28	29	27	..
12 ..	78 4	168 15	29·292	29·390	29·175	8	20	−4	28	29	28	..
						Mean re	sults.	Feb. 3 to 1	2, 1900.	From La	t. 72° to	78° 4′ S.
			29·203	29·428	28·950	22·7	33	−6	29·6	32	27	..
1900. Feb. 13 ..	Not ob	served.	29·194	29·405	28·868	22	23	20	29	29	28	1·018
14 ..	77 53	W. 178 9	·436	·520	29·272	18	23	14	29	29	28	1·019
15 ..	No obser-vation.	172 59	29·096	29·253	29·014	27	28	26	29	30	29	..
1900. Feb. 16 ..	78 35	164 10	29·031	29·097	28·928	14	23	6	29	30	29	..
17 ..	78 35	164 10	28·883	28·908	·830	8	11	5	28	29	27	..
18 ..	78 35	164 10	29·015	29·038	28·982	1	9	−7	29	29	28	..
19 ..	78 35	164 10	·195	·410	29·040	2	15	−12·5	28	29	28	..
20 ..	78 8	168 35	29·222	29 340	29·118	27	30	23	29	29	29	..
					Mean re	sults — F	eb. 16 to	20, 1900.	From	Lat. 78°	8′ to 78°	35′ S. and
			29·069	29·410	28·830	10·4	30	−12·5	28·6	30	27	..
1900. Feb. 21 ..	77 21	176 5	29·271	29·325	29·172	22	28	18	29	30	29	..
1900. Feb. 22 ..	76 7	E. 174 19	29·165	29·277	28·973	19	20	17	29	30	29	..
23 ..	75 34	171 31	28·896	28·930	·878	19	21	16	29	30	29	..
24 ..	76 7	174 19	·850	·908	·748	16	18	14	29	29	29	..
25 ..	74 33	174 1	·676	·720	·633	20	22	19	29	29	29	..
26 ..	71 35	174 13	28·627	28·680	28·568	22	26	19	30	30	29	..
					Mean re	sults — F	eb. 22 to	26, 1900.	From	Lat. 71°	35′ to 76°	7′ S, and
			28·843	29·277	28·568	19·2	26	14	29·2	30	29	..

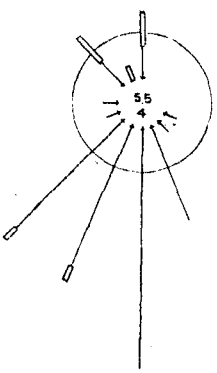
Wind. Direction.	Wind. Force.	Amount of Cloud.	Weather.	Remarks.
SSW backing to SSE, changing to WNW	3-1	10-1	s	
SSE veering to SSW, then calm ..	2-0	2-0	b	Fast to ice-foot near Cape Constance. Varn. of comp. 94° E. (By Admty. chart, 60° E.)
SSE backing to NE, ENE, changing to NW, then SW to calm	2-0	0-9-1	b, c	Heavy swell from SE by E.
Variable	2-0	10-2	o, bc	Light south-easterly swell.
S to SW, changing to ENE, then SSE	0-5	2	bc	
SW veering to WNW, WSW to ENE	4-0	9	s	Close in to barrier near Cape Gauss.
Calm, NW backing to WSW, then NW changing to S	1	9	s	Off Franklin Island.
E backing to NE, then veering to SE	1-4	10-6-8	o, c	Varn. of compass 130° E. (By Admty chart, 120° E.)
SE to SSE, back to SE	1-6-2	2	f	Vapour in state of congelation. Clear 80 feet above ship's deck.
SSE backing to NNE	4-1	2-9	f	
and Long. 166° 41′ to 171° 52′ E.				
.. ..	..	5·4		
NNE veering to ESE	2-10	10	s	
E veering to SSW, backing to ESE	8-2	8	s	Many large icebergs in sight.
N veering to NE, backing to S ..	8-3	10	o	Very heavy swell.
SSE veering to SW, backing to SE	2	10	sf	Steaming through belt of pancake ice.
Calm, SSW, S to SW	0-1	10	sf	Fast to Great Ice Barrier.
SW backing to SSE, veering to SSW	1	10	sm	Sea freezing.
SSW changing to N, back to W ..	5-1	1-10	f	Sea frozen in vicinity of Ice Barrier to a depth 4 inches
NW veering to N, backing to SW	3 6-1	10	s	Heavy swell from E.
Long. 164° 10′ to 168° 35′ W.				
.. ..	..	9·2		
WSW backing to SSE	1-6	10	m	
SE veering to NW, backing to SW	7-1-7	10-4	o, c	
SSW veering to NW, back to S ..	7-3	4-9	c	
S veering to SW, changing to NE, then SW veering to NW	3-1-5	10-3-9	s	
W backing to S, then veering to SSW	5-3-7	10	s	Heavy squall.
SW veering to NNE	7-2	10	o	
Long. 171° 31′ to 174° 19′ E.				
.. ..	..	8·2		



Using Admiralty Variation.



Using error given by "Southern Cross."



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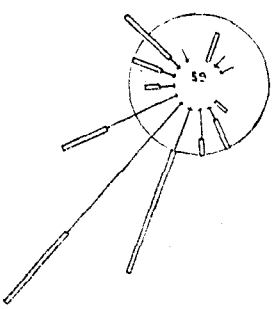
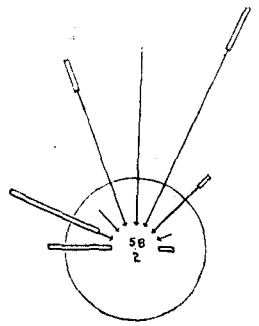


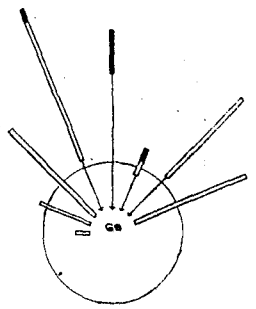
Using Admiralty Variation

Date.	Lat.	Long.	Barometer.			Air Temperature.			Sea Temperature.			Specific Gravity.
			Mean.	Highest.	Lowest.	Mean.	Highest	Lowest.	Mean.	Highest.	Lowest.	
	S. ° ′	E. ° ′	ins.	ins.	ins.	°	°	°	°	°	°	
1900. Feb. 27 ..	70 34	174 23	28·468	28·550	28·400	26	28	24	29	29	29	..
28 ..	69 22	174 8	·807	28·964	·664	25	28	23	30	30	29	..
March 1 ..	68 12	175 50	·779	29·014	519	30	33	26	31	32	30	..
2 ..	67 13	174 15	28·696	28·978	28·542	32	33	31	32	33	32	..
3 ..	65 36	171 34	29·318	29·440	29·171	31	34	28	33	34	32	..
							Mean	results—	Feb. 27	to March	3, 1900.	From
			28·814	29·440	28·400	28·8	34	23	31·0	34	29	..
1900. March 4 ..	64 29	169 30	29·222	29·236	29·168	34	36	32	34	34	34	..
5 ..	63 28	165 19	·423	·593	·238	36	37	35	35	36	34	..
6 ..	62 41	166 14	29·397	·580	29·230	38	39	36	36	36	36	..
7 ..	62 32	164 42	28·797	·060	28·700	37	40	35	36	37	36	..
8 ..	62 18	165 47	28·875	·102	·690	36	37	35	37	37	36	..
9 ..	61 23	167 3	29·066	29·252	28·925	36	37	34	38	39	36	..
								Mean re	sults—M	arch 4 to	9, 1900.	From
			29·130	29·593	28·690	36·2	40	32	36·0	39	34	..
1900. March 10 ..	59 58	166 34	29·483	29·555	29·438	37	39	35	39	40	38	..
11 ..	58 19	165 8	·740	·822	·585	42	44	39	41	42	41	..
12 ..	57 4	163 31	·648	·753	·570	41	44	38	41	42	40	..
13 ..	57 15	161 36	·626	·755	·492	40	41	38	41	41	40	..
14 ..	55 55	163 8	·465	·620	29·325	44	47	41	42	44	40	..
15 ..	55 3	164 39	29·058	29·240	28·875	47	49	45	45	46	45	..
								Mean re	sults—M	arch 10 t	o 15, 1900.	From
			29·503	29·822	28·875	41·8	49	35	41·5	46	38	..
1900. Mar. 16 ..	54 17	165 50	29·313	29·610	29·150	45	46	44	47	47	47	..
17 ..	53 13	166 53	·472	·605	·290	47	50	44	48	48	47	..
18 ..	52 37	167 7	·183	·333	·040	49	49	47	49	49	48	..
19 ..	51 30	167 18	·599	·760	·415	49	50	47	49	49	49	..
20 ..	50 51	166 56	29·867	29·932	29·789	50	51	50	49	49	49	..
							Mean re	sults—M	arch 16	to 20, 19	00. Fre	m Lat.
			29·487	29·932	29·040	48·0	51	44	48·4	49	47	..

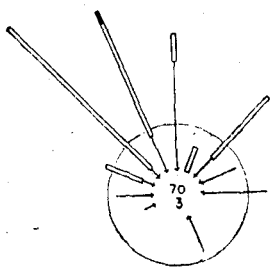
Wind. Direction.	Wind. Force.	Amount of Cloud.	Weather.	Remarks.
NE backing to N	4-0-2	10-5-9	o, c	Many icebergs in sight.
NNE backing to NNW, veering to ENE	2	9	c	
NNW veering to ENE, backing to N.	2	10	sqrm	
NNE backing to WNW, veering to NNW	1-7	10	r	Heavy swell.
WNW veering to NNE	6-1-4	10-3-10	s m	
Lat. 65° 36′ to 70° 34′ S., and Long.	171° 34′	to 175° 50′ E.		
.. ..	..	9·0		
NE to ENE	5	10	smd	Large iceberg in sight.
NNW to N	2	10-4-10	r	Iceberg in sight.
N veering to NE, back to N, then NE.	2-5	10	r	
NE backing to NNW	5-9-6	9	r	Brilliant aurora polaris in zenith. Aurora from ESE to WNW across zenith, slow movement.
NNW backing to NW	7-4	9 4	c	Aurora from WNW to ESE across zenith, and in the WSW and SSE 40° above horizon, very brilliant.
NNW backing to WSW	3-6	3-10-5	s	Squall of fine hard snow.
Lat. 61° 23′ to 64′ 29′ S., and Long.	164° 42′	to 169° 30′ E.		
.. ..	..	8·3		
WSW backing to E	1	10	o	
ENE to E, backing to NE	1-5	10	o	
NE backing to N	6-1	10	rf	
NNW backing to WNW, veering N	0-6-4	10	m	Heavy swell from NNE.
NNW backing to NW	6-3-7	10	r	Heavy downpour of rain.
NW veering to NNW, backing to WNW	6-8-5	10	r	Heavy sea.
Lat. 55° 3′ to 59° 58° S., and Long.	161° 36′ to 166° 34′ E.			
.. ..	..	10·0		
WNW to NW, backing to WSW ..	5-3	10-3-8	o, c, h	Heavy swell. Hail squall.
WSW veering to NW	5-3-8	10	r	
W veering to NW, backing to WSW	6-0-7	10	o	
WSW veering to N, backing to W	7-4	5-10-5	c, o, c	
W veering to NW	4-1	3-10	c, o	
50° 15′ to 54° 17′ S, and Long.	165° 50′ to 167° 18′ E.			
.. ..	..	8·0		



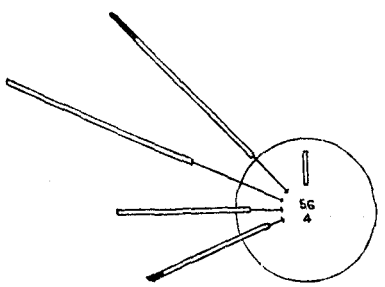
Using Admiralty Variation.



Using Admiralty Variation.



Using Admiralty Variation.



Using Admiralty Variation.

ADDITIONAL NOTES ON THE AURORA POLARIS, OBSERVED AT CAPE ADARE DURING 1899.

In the Tables on pp. 64–85 the occurrence of aurora is always mentioned in the Remarks, and the days on which the phenomenon was observed are indicated by an asterisk against the day of the month in the Table of Barometer Readings.

On certain occasions, however, fuller notes were made than could be inserted in the Remarks. These are given below.

March 15th.—At 9.30 p.m. a brilliant aurora polaris manifested itself. The light first emanated in a waving curtain from the SE and went round to the SW. The motion of the arrow-like beams constituting the curtain was very rapid. These beams at times would move along with an undulatory motion, then suddenly shoot downwards towards the earth. Colour of a nebulous whiteness, with, at times, a greenish tint in it of varying intensity. At times the display would almost fade away, then would be renewed from behind Cape Adare (E). Cirrus-stratus cloud moving from the W, amount 2, temp. of air, 16° F. Phenomenon faded away at 10.30 p.m., and, soon afterwards, a dark cirrus-stratus cloud covered the whole sky. (Blowing a heavy gale from ESE a few hours afterwards, average velocity of wind 52 miles an hour.)

March 17th.—Faint appearance of an aurora in magnetic N at 9 p.m. Very strong light in NE at 9.15 p.m. Soon afterwards an arc formed, the extremities bearing NE and SW. As the arc rose towards the zenith the light increased in intensity. Very little movement in the light itself, thus greatly differing from the former. Cirrus-stratus cloud, amount 2, temp. of air, 24° F. Faded away at 9.45.

April 7th—Very brilliant aurora first manifested itself at 8.30 p.m. Bright beams of light shot up from behind Cape (due E) towards the constellations of the Centaur and Crux. Crossed meridian at about 3° N of zenith, and moved down in the N towards Canis major and Orion. Movement very rapid and beams bright, the brighter possessing a reddish tint. Diffused aurora in the whole of the northern sky. Phenomenon reached its greatest intensity at 8.50 p.m., and disappeared at 9.10 p.m. No clouds. Temp., 20° F. Blowing fresh from ESE.

April 19*th.*—Brilliant aurora witnessed. Temp. –1° F. Calm and clear sky. Very rapid movement. First visible at 7 p.m., and had almost disappeared at 7.30 p.m. Corona formed in zenith. Curtains of aurora in whole of northern sky. Southern limits as follows :—Crux, Centaur, about 10° N of Sirius and 5° N of Rigel of Orion. Blowing from ESE on following day.

May 2*nd.*—A fine aurora first visible at 5 p.m. and lasted for a number of hours. It formed a luminous arc about 5° above horizon in the N and NE. A great display of colour at centre of arc. Amber and red shifting rapidly, pale shafts shooting up from outer edge towards zenith. Intensity very variable, continually being renewed from NE. Temp., –5° F.

May 6*th.*—A very fine aurora polaris was first visible at 6 p.m. in the form of an arc of light in the N. The centre of the arc was about 3° above the horizon and bore about N by E. The arc was of very large radius, and the inner part was of much greater intensity than the outer. Much yellow and red visible in the inner part. Curtains of vertical beams of light, always parallel to the original arc, commenced to move slowly and bodily towards the S. The movement of the light itself was rapid and always E to W, the bottom of the beams being always denser and redder than the top. The curtains advanced no further than 15° N of zenith ; the limit in the E being the planet Jupiter, and Sirius in the W. As the curtain of light moved bodily southwards the original arc in the N became diffused but stationary, and had very little movement. The phenomenon ended at 7.30 p.m. It attained its greatest intensity at 6.15 p.m. A kind of diffused afterglow remained in the N for many hours after. Temp. of air, 12° F. Cirrus cloud, 1.

May 12*th.*—Brilliant aurora visible at 9 p.m. in N and NE, strongest to magnetic N (NE), manifested itself in much the same manner as on May 6th. Cir.-s. cloud, 5. Temp., –8° F.

May 23*rd.*—Bright aurora at 6.30 a.m., stretching from ESE to NW across zenith.

May 30*th.*—Faint aurora to N, first visible at 6 p.m., and lasted some hours. Temp., –12° F. Cirrus cloud, 1. *See* magnetic book for effect of this aurora on magnets.

June 2*nd.*—An aurora polaris manifested itself at 7.30 p.m. and lasted for many hours, it being still visible and brilliant at midnight. It first started with the usual

aurora arc in the N and NE (true), then curtains of light moved towards the zenith, and aurora in N became diffused. Also diffused light where curtains of beams had passed. When aurora reached the zenith it became nearly stationary, as far as its bodily motion S was concerned, but the lateral motion from E to W was very rapid. General direction of curtains from ESE to WNW (true). Coronæ were formed at the zenith, directly under the constellation Crux. Although the light was strong there was at no time much red in it. Sometimes it would grow brighter in parts, and accompanied by rapid flashes, and then would fade away and leave a glow in the sky like the dying embers of a great fire. Cir.-s. cloud, 2. Temp., -16° F. Much cirrus-stratus cloud was observed during the day, and a very thin mist appeared over the sky about an hour before the phenomenon, and which slightly obscured the light of the stars.

June 3rd.—At about 10 p.m. an exceedingly grand aurora was visible. It was a dazzling and incomparable spectacle. It first manifested itself by a luminous display in the N. Soon the colouration became brighter and commenced to develop shafts and waves of light, which moved rapidly towards the zenith. At first it was of a fleece-like nebulous whiteness, but became redder as it advanced. When at the zenith, and almost due E and W, the aurora was at its maximum intensity. Great curtains of light would shake themselves across the sky with undulatory motion from E to W in a specially striking manner. Huge shafts of pink and red light would shoot down towards the earth with a rapidity impossible for the eye to follow. Once the streamers collected at a spot near the zenith and formed a luminous ring of a deep red colour, and turned round with great rapidity. No sound whatever was perceptible. This last was only a transient phenomenon. The glow of streamers gradually faded away, and the whole display lost its brilliancy and rapidity of motion in about an hour's time, although small curtains of light were visible for some hours after, moving bodily towards the S. No cloud. Temp. of air, -35° F. Blowing gale from ESE following morning.

June 28th.—Aurora appeared at 5 p.m., fairly strong. Manifestation much similar to previous ones, commencing in the form of an arc in the N and moving bodily towards the S, right across the zenith, leaving diffused aurora in its path. Strongest at 7.15 p.m., when altitude of arc was nearly 14° above horizon and stretched from NE to NNW. Base of curtains and beams red, and rapid in movement. Cir.-s. cloud, 1. Temp., -21° F.

June 30th.—At 9 a.m. Magnificent aurora near zenith and above Cape Adare.

Fine aurora visible from 7 p.m. to about 9 p.m. Rapid movement from E to W across zenith, and formed corona there. Red at base of shafts. Commenced in N and NE. Cir.-s. cloud, misty. Temp., –30° F.

July 1st.—At 7 p.m. an aurora observed from E to SW. Cir.-s. cloud, 4. Temp., –12° F. 9 p.m., aurora brilliant, from SE to NW, mauve colour. 1 a.m. (2nd), aurora faint in N. Blowing a gale shortly afterwards.

July 9th.—Aurora in N. Amount of cloud 1. Cir.-s. Temp. –24° F. at 11 p.m.

July 10th.—At 1 p.m., faint aurora from SSE through zenith to NNW. At 3 a.m., faint aurora to SSE and zenith. At 5 a.m., aurora arc in N and NE, 10° above the horizon. No cloud.

July 12th.—At 5 p.m., aurora from SE to NW moving slowly southwards; lateral motion fairly rapid. Diffused aurora light in N. Cir.-s. cloud, 8. Temp., –4° F. At 1 a.m. (13th), brilliant aurora above Cape Adare (NE). No cloud.

July 13th.—At 9 p.m., very fine aurora from ESE, through zenith to WNW. No cloud. Temp., –21° F. At 3 a.m. (14th), diffused aurora in E and N, and at 5 a m., diffused aurora from ESE to NW.

August 3rd.—At 7 p.m., brilliant aurora in northern sky. Cir.-s. cloud, 1. Temp. –37° F.

August 4th.—An aurora appeared at a little before 6 p.m. in the form of a double luminous arc in the N. The arcs were separated from one another by about 2°, the inner one being about 8° above the horizon. The W extremity of the arc bore about NNW. The E extremity was invisible, being hidden behind the Cape. The arcs lay in the same plane, and had a common centre. Winding curtains of aurora afterwards manifested themselves in the usual way, moving towards the zenith and forming coronæ there. Amount of cloud 2, Cir.-s. Temp. of air, –41·5° F.

August 6th.—At about 5.30 p.m. a beautiful aurora swept across the sky from the E and NE. The phenomenon manifested itself in much the same way as usual, commencing with an arc in the N, and followed by curtains of aurora moving laterally from E to W, and bodily to the S. Cir.-s. cloud, 2. Temp. –20° F. At 7 p.m. brilliant display (maximum). At 9 p.m. faint aurora in NE.

August 13*th.*—At 7.30 p.m. luminous arc appeared in NE. Centre of arc NE (true), 30° above the horizon. Extremities of arc N and E by S. Movement of beams not rapid. No cloud.

September 5*th.*—An aurora was seen for the first time, due N and S, passing through zenith. Not strong. The aurora displays are now very poor compared to those seen in the autumn and beginning of winter. Then they were brilliant and rapid, and always manifested themselves in the same manner, and from the same direction. The gales, it is interesting to note, were then stronger, and always blew from exactly the same point of the compass. Now the gales are not so strong and are more versatile in direction, as also the auroræ in intensity and direction.