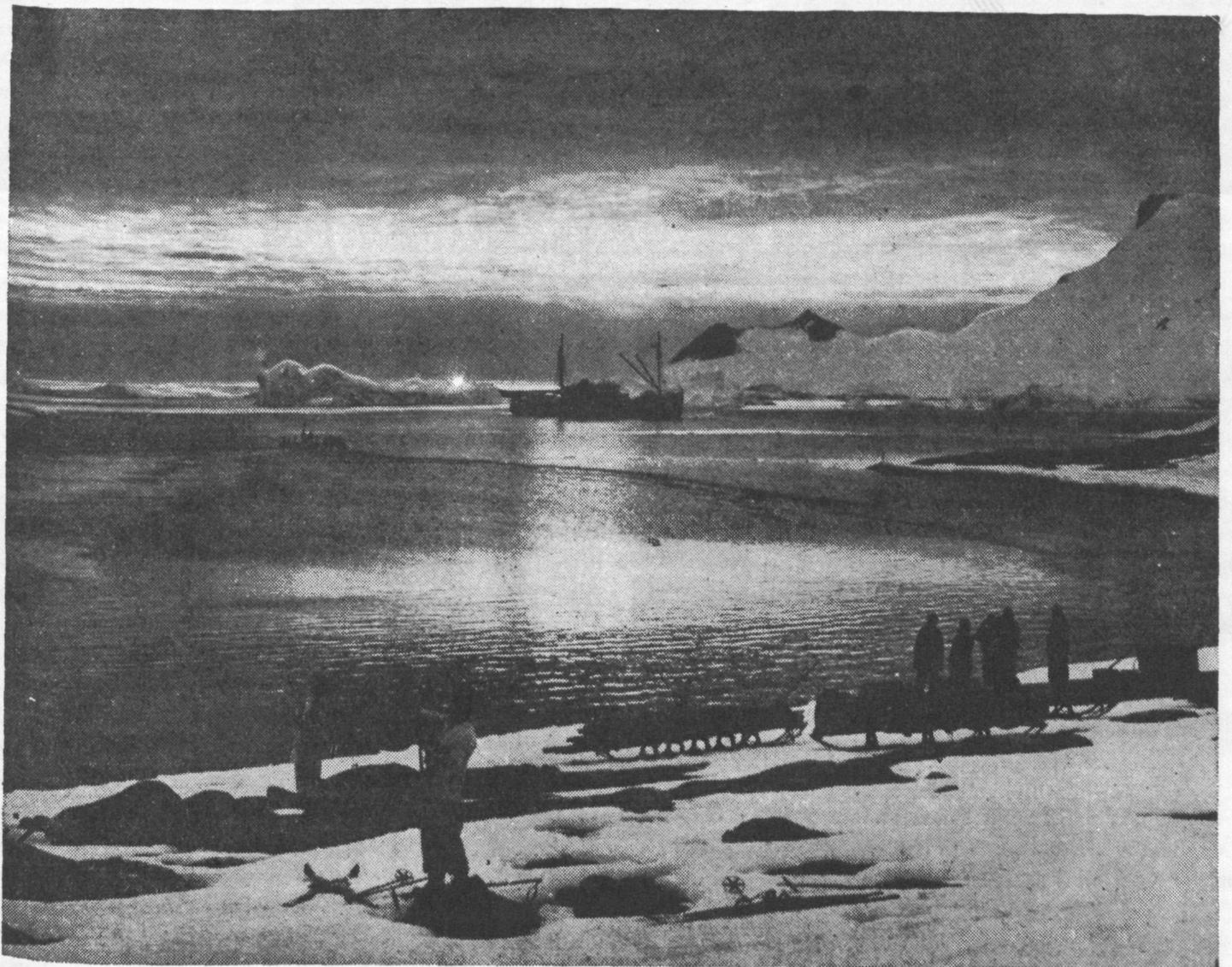


THE POLAR TIMES



National Oceanic and Atmospheric Administration

The Polar Times

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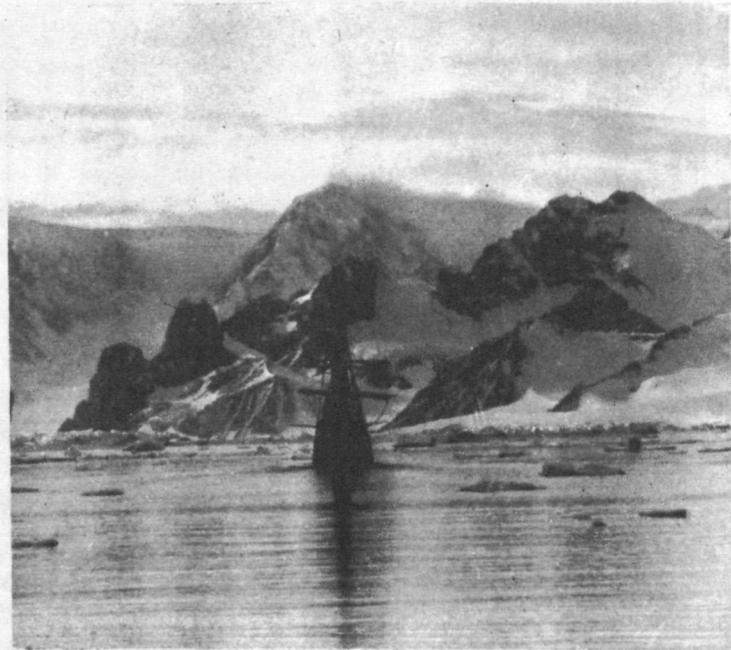
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IN ICE-COVERED MARGUERITE BAY, NIGHT COMES EARLY IN MARCH. THIS PICTURE, SHOWING "NORTH STAR," SUPPLY SHIP FOR THE EXPEDITION, WAS TAKEN IN AFTERNOON



East Base, in Marguerite Bay, was established in early March.



Bear, with Lieutenant Commander Richard Cruzen as captain, searches for base in Marguerite Bay. Many times the ship was in danger from unknown reefs and ice closing in around her.

The Polar Times

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No. 11.

DECEMBER 1940.

Men at Little America Set to Leave for U. S. in Few Weeks

WASHINGTON, Dec. 4 (AP)—Navy officials said today that the men of the United States Antarctic Expedition, to which Congress refused funds for another year's work, would be on their way home from the South Polar regions about March 1.

Lieut. Comdr. R. A. J. English, the Navy's representative on an interdepartmental committee in charge of the expedition, said the exact timetable for the forthcoming evacuation would depend chiefly on the weather and the time required to load the ships.

However, the west base in Little America is to be evacuated first, Commander English said, beginning about Jan. 10. The ships will be there two or three weeks and then go around to the east base on the South American side of the polar area.

Admiral Byrd did not return to the Antarctic for the evacuation.

The North Star is expected to get back to Seattle about April 15 and the Bear is expected to reach Boston about two weeks later.

SEATTLE, Dec. 11 (AP)—The motorship North Star moved southward toward the Antarctic today, with Honolulu the first stop, on a trip to return men of the Byrd Antarctic expedition to America. "We'll be bringing them home with us about April 15," Captain Isak Lystad said.

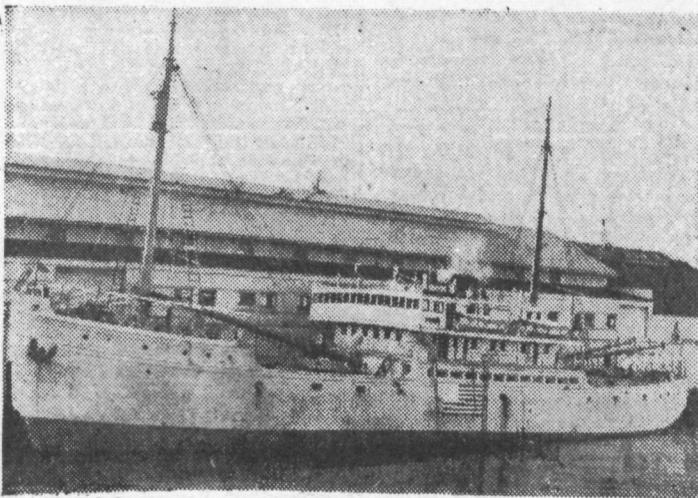
SEATTLE, Wash.,—

Last summer, in January, the North Star carried part of the Byrd Antarctic expedition, including the much talked of snow cruiser, down to Little America. Upon its return to this port it was sent upon its annual trip with supplies to Point Barrow, neighborhood of the North Pole.

Instead of their usual winter rest, the captain, boat and crew are ordered back again to the South Pole to pick up most of the men on the Antarctic expedition. The snow cruiser will be dismantled and its machinery brought back.

Captain Lystad will take with him many feet of news reel to show the inhabitants of Little America, "the strange things which have been going on in the world since they left."

This year a four-months trip is scheduled and North Star is due back in Seattle April 15, 1941. Incidentally, with the exception of the old coast guard cutter Bear, the North Star is about the only vessel afloat that has cruised so far north and so far south. This year she will have visited



Honolulu

BOUND FOR LITTLE AMERICA: The government motorship North Star after arriving from Seattle

both the Arctic and Antarctic within a very few months.

According to Chief Engineer Herman Sanwick, the North Star left with 90,000 gallons of fuel oil, giving the vessel a cruising radius of 12,000 miles. A stop at Honolulu will be made to "top off" fuel and water. And if necessary, a stop for the same purpose will be made at Suva altho such a stop is not now scheduled.

The vessel will refuel and take on further supplies at Dunedin, New Zealand, the jumping off place for Little America. Many of the officers and men have appointments at Dunedin, made last year, to keep. Chief Mate Salenius says he has a date to play golf with a Scotchman down there who has eyebrows more bushy than those of John L. Lewis. Some of the others refuse to detail their dates.

Mercury Hits 76 Below In Little America

Washington, Sept. 12 (U.P.)—The temperature at Little America last week reached 76.2 below zero.

The Antarctic Expedition advised the navy that its west base found the mercury 4.2 degrees below the previous low for the area. The recording was within 6.8 degrees of the 83 below mark reported by Rear Admiral Richard E. Byrd during his second Antarctic exploration in 1934-35.

Dr. Paul A. Siple, base leader, advised that the temperature failed to top 60 below from Aug. 31 to Sept. 6.

SOUTH SEA CHRISTMAS

SEATTLE, Dec. 11

Just for a change, the officers and crew of the motorship North Star are going to celebrate Christmas on Christmas Day this year, they announced firmly this morning as Capt. Isak Lystad and Steward Siegfried Sundt decorated a small tree in the forward cabin. The North Star sails at 9 o'clock tonight for Little America and will be at sea Christmas Day.

"Santa Claus didn't forget us last year," Captain Lystad chuckled, recalling the North Star's first voyage to the Antarctic with supplies for Adm. Richard E. Byrd's South Polar Expedition. "Santa Claus just couldn't come from the North Pole in time—we approached the international date line on December 24; when we crossed it, we skipped a day and it was December 26 then. No Christmas Day!"

And this year, the North Star will be at sea again on Christmas Day—but none of that date-line business for the crew!

"Maybe we'll drag the anchor," Sundt threatened. "When you miss Christmas Day, you feel like the dickens."

The North Star probably will reach the Byrd Expedition's East Base about January 20, Captain Lystad said. And when it does—Christmas again!

"We're taking mail and Christmas packages to the expedition members," Lystad explained, "so they'll have another gift-opening celebration. We're going to bring fifty-eight members of the expedition back to Seattle, but they'll have their Christmas presents first."

As an additional treat, Department of Interior officials today posted a notice informing crew members their relatives may send them radiograms free of charge during the voyage. The Army Amateur Radio System will send the messages; relatives should mail their notes to Edward J. Day, Box No. 1499, Greenville, S. C., for transmittal. Relatives wishing to send letters may mail them to "Antarctic Mail Bag," in care of the General Electric Company, Schenectady, N. Y. The letters are broadcast every two weeks by short wave radio to the expedition's bases.

New Antarctic Area Mapped

150 Miles of Coastline Charted by Byrd Party

Honolulu, Wednesday, Dec. 25.

One hundred and fifty miles of the hitherto inaccessible coastline of the Antarctic continent has just been charted by a party from Little America which flew over the territory between long. 130 W. and long. 125 W., according to a cable received aboard the Antarctic-bound vessel North Star just before she arrived in Honolulu, it was disclosed yesterday.

The cable, signed by Paul A. Siple, the Boy Scout who accompanied Byrd in 1928 and who is now in charge of the West Base (Little America), begins the message simply: "At last we got the break we've been waiting for."

"Waiting" is hardly the word. Since 1776, when Capt. Cook made the first attempt to reach the shores of the southernmost continent, innumerable expeditions have tried and failed to obtain accurate plottings of the coast.

Although Siple's cable gave no details of the trip, apparently the weather had cleared enough to achieve the objective which Byrd has been striving for since 1928.

Success was gained by use of a revolutionary means of polar exploring, which Byrd has pioneered in, it was said.

It is, in brief, simply the use of planes and ships working closely together. The ship pushes in as far as possible, and then the plane takes over and makes the rest of the observations by air.

In the meantime, dog sledging parties are sent out to attempt to take observations from the ground, using the information garnered by the plane flights to aid them. At present, Siple has a sledging party striking northeastward from Little America, aimed at the region just charted.

The latest venture leaves only about 450 miles of the coastline of Antarctica unplotted.

Monday, Dec. 23

American flags were painted on both sides of the hull this morning because the ship will traverse beligerent waters where German raiders have been reported.

The master was more concerned today about floating-ice than drifting mines. He spent 50 hours in the crow's nest on the forward mast guiding the vessel through the ice floes on the last trip to Little America. This time he has an ice pilot to help him in the presence aboard of Capt. E. L. Bush, who ordinarily skippers the government ship Boxer.

The North Star carries a crew of 32 men, including a doctor from the U. S. public health service.

BYRD'S MEN STUDY AURORA DISPLAYS

Outpost Party in Hut Seeks
Data on Electrical and Radio
Effects of 'Southern Lights'

WASHINGTON, July 15—After many weeks of silence, the Navy Department made public today a radio message from the United States Antarctic Expedition.

The message was from Dr. Paul A. Siple, the West Base leader, who reported that three members of the expedition had taken quarters in a small hut fifteen miles east of Little America, where they would search for new data on the color, intensity and height of the aurora australis, or "Southern Lights."

The message continued:

"The outpost party is comprised of Roy Fitzsimmons, magnetist and navigator, Newark, N. J.; Murray Weiner, observer, Bradley Beach, N. J., and Felix L. Ferranto, radio operator, Brooklyn, N. Y.

"The little observatory was established last Wednesday after a twenty-one-hour tractor trip in almost complete darkness with the temperature at 47 degrees below zero Fahrenheit.

"The tractor crew, comprised of Clyde W. Griffith, Irondale, Ohio, and Charles F. Passel, Indianapolis, turned back immediately after the depot was established in the face of a rising blizzard, but were not expected to encounter difficulty because they were following a trail of flags and reflector beacons. Both parties were well equipped with furs, food and emergency equipment.

"Carrying out a program prepared by Dr. Siple and Dr. F. Alton Wade, senior scientist of the expedition, the observers were to erect photographic equipment in such a manner that, with the aid of a two-way radio set, photographs might be taken of aural displays at the same instant that similar photographs were taken from the main base near Little America.

"The height of Aurora Australis, believed to range from 50 to 300 miles, has never been accurately determined and it is believed that the data will prove valuable in the study of electrical and radio characteristics of the upper atmosphere.

"A second tractor party is scheduled to depart from West Base tomorrow to bring back the three observers. The observatory, a small hut built on runners, will be left at its present location to serve as a food cache for subsequent field parties."

FILMS SOUTHERN LIGHTS

Byrd Party Makes Observations
at 71 Degrees Below Zero

WASHINGTON, July 23—An aural observation party of the Byrd Expedition has returned safely to West Base, Antarctica, after establishing a food and gasoline cache fifteen miles east of Little America,

Byrd Party Is Speeding to Base for Turkey Feast

SCHENECTADY, N. Y., Dec. 24—An exploring party of Admiral Richard E. Byrd's Antarctic expedition raced by dog sled today to reach the Little America base camp in time for Christmas and a turkey dinner.

Dr. Paul A. Siple, base commander, informed the General Electric Company's short-wave station that a four-man party which had been scouting 500 miles from the camp since Oct. 15 was expected to arrive tomorrow.

Dr. Siple said the men had stepped up the usual fifteen-mile-a-day pace of their dogs to twenty miles. He added that the men were "sweltering at 26 degrees above zero after a two-day heat wave which sent the mercury up to 32 degrees."

according to word received today by the executive committee of the United States Antarctic Service. Many photographs of scientific importance were made.

Working in semi-darkness for six days in temperatures ranging downward to 71 degrees below zero, Fahrenheit, the party made twenty-five photographs of Aurora Australis, or Southern Lights.

The cameras were synchronized with similar equipment operated at East Base by Dr. F. Alton Wade, and it is believed that the photographs may prove valuable to scientists interested in electrical and radio characteristics of the upper atmosphere.

Cosmic Ray Finds

[By Science Service]

Swarthmore, Pa., Nov. 14—First observations to determine the effect latitude has on a recently discovered characteristic of cosmic rays that bombard the earth from outer space will be made soon when the U. S. M. S. North Star sails from Seattle on a round trip to Little America to bring back the last of the United States Antarctic expedition.

According to Dr. Serge A. Korff, of the Bartol Research Foundation, of the Franklin Institute, Dana Bailey, of the Harvard College Observatory, will make the observations. These will be of the neutrons, electrically neutral particles, that are produced by the cosmic rays. Discovered in 1932, as produced in the laboratory, their connection with cosmic rays has only lately been noticed.

Designs New Counter

Dr. Korff has designed a new form of counter to measure them, as distinct from the measurements of the other types of cosmic radiation. This consists of a tube containing a gas, boron trifluoride. The neutrons break up the nuclei of the boron atoms, and alpha particles, atomic bullets of another kind, are formed. These are detected in the counter.

Mr. Bailey, whose studies at Oxford University as a Rhodes Scholar were interrupted last spring by the war

Byrd Party Establishes Two Exploration Bases

WASHINGTON, Oct. 21 (AP)—The Antarctic expedition reported today that it had established food and fuel caches for plane, tractor and dog-sled parties exploring east of Little America in the next few months.

Dr. Paul A. Siple, leader at the expedition's west base, sent word to the Navy Department that two trail parties had returned safely after establishing caches 80 and 100 miles east northeast of Little America.

Three of the trail blazers, hauling an eight-ton load behind an army tank, were absent seven days. They were delayed by sled repairs south of Kainan Bay, by temperatures of 30 and 40 degrees below zero (Fahrenheit) and by a gale which blew their tent to shreds.

Despite these difficulties they cached seismological equipment and dog food at the 60-mile depot.

The three men were Adam Asman of Pittsfield, Mass., Clyde W. Griffith of Irondale, Ohio, and Louis P. Colombo of Astoria, N. Y.

The 100-mile depot party returned to the west base Oct. 5 after a 16-day trip to the vicinity of Rockefeller Range. This group was composed of Vernon D. Boyd of Uniontown, Pa., Charles F. Passel of Indianapolis, Lawrence A. Warner of Monroe, Ohio, and Richard S. Moulton of Wonolancet, N. H.

Add Little America Items

MEADVILLE, Pa., June 10 (AP)—Paul Siple became a father yesterday, but he will not see his daughter until next spring. He is in Little America with the Byrd expedition. Mrs. Siple, a resident of Erie, Pa., and her seven-pound-seven-ounce daughter are doing well at Meadville Hospital.

BYRD'S PARTY HAILS NEW ANTARCTIC DAY

Sun Shines Briefly as Trips Are
Planned at 40 Below

WASHINGTON, Aug. 21—A message received today from the United States Antarctic Expedition, told of the dawn of another Antarctic day. The message said that four months of polar darkness ended at noon when the sun's rim appeared briefly above the horizon.

The information was radioed by Dr. Paul A. Siple through the Navy Department to Rear Admiral Richard E. Byrd, commanding officer of the expedition who is in the United States.

Although the sun will be visible for only a short time daily for several weeks and the thermometer remains at 40 or more degrees below zero, field parties already are preparing for sledge, tractor and airplane Spring operations in the direction of Rockefeller Plateau east of the base site, Dr. Siple reported. Trail equipment has been overhauled; tons of pemmican have been weighed and packed, and all parties have been schooled in navigation, radio communications and first aid. Only one of the camp's seventy-two sledge dogs failed to survive the Winter night.

Dr. Siple also reported that a second auroral photographic party had successfully completed a nine-day field trip to Fifteen-Mile Depot, due east of Little America. The observers, who slept in tents with the thermometer at 63 degrees below zero, Fahrenheit, were Felix L. Ferranto, radio operator of Brooklyn; Jack E. Perkins, biologist of Washington, and Murray Wiener, auroral observer of Bradley Beach, N. J.

Synchronized photographs of aurora australis brought back by the party appeared to be "promising," Dr. Siple said.

Mile-High Antarctic Weather Base Planned

WASHINGTON, Oct. 30
The Antarctic Service has dispatched six men by dog sledge to establish a mile-high meteorological observatory on the central plateau of Palmer Peninsula, the Navy Department was notified yesterday.

The base camp will be located 5,300 feet above sea level in a rock cavern and will be the highest fixed station established in the Antarctic. Included in the sledging party is Harry Darlington, 3d, of this city.

Two members of the expedition are expected to remain at the high post two or three months to keep a continuous record of temperatures, barometric pressure and wind velocity.

Byrd Flag Lowered For 4-Month Night

WASHINGTON, May 1 (AP)—A frozen United States flag was lowered April 28 in Little America at the beginning of nightfall that will last four months—until Aug. 28, when the sun will reappear.

A dispatch from the West Base of the Antarctic expedition described the "blackout day" ceremonies, which were topped off with a big turkey dinner.

will sail from Seattle on December 1 and will be back about the end of April, 1941. He will also bring back two cosmic-ray meters of the type devised by Dr. R. A. Millikan, which have been in use at Little America since January, 1940. These he will continue to operate on the return voyage.

Took Meters On Flight

Dr. Korff expressed the opinion that the year's work at Little America will yield important data on cosmic rays. The meters were installed by Dr. Eric Clarke, now of the Massachusetts Institute of Technology, and have been operated by Dr. F. Alton Wade, senior scientist of the Antarctic Expedition. He took the meters on one flight over Antarctica, which reached an altitude of 22,000 feet.

From the results obtained, especially during the Antarctic night, it may be possible to learn whether cosmic ray fluctuations near the South Pole can be correlated with those here; and whether they have any relation to changes in the earth's magnetic field and magnetic storms.

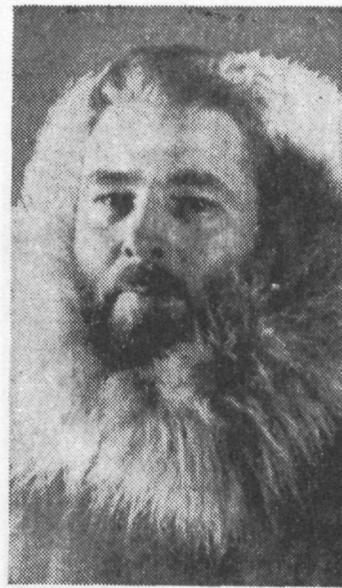
On Admiral Byrd's last expedition, cosmic ray meters were used, but these were of a less sensitive type than those now employed.



Charles C. Shirley, U. S. N., official photographer for expedition.



Dr. Paul A. Siple, of Erie, Pa., who is in command at New Little America



Wide World © U. S. Antarctic Service
Dr. F. Alton Wade, senior scientist and snow cruiser leader of the U. S. Antarctic Service



Clay Wilson Bailey, radio engineer, who supervised the transmission of these pictures.

Radiophotos © U. S. Antarctic Service: transmitted by Times Wide World.

Photographs From Antarctic Are Radioed for First Time

Transmission of Scenes by New Anti-Fading 'Sweep Circuit' Fulfills 11-Year Forecast

July 7

Development of a new anti-fading "sweep circuit" for the transmission and reception of photographs by radio made possible last week the reception by THE NEW YORK TIMES-Wide World Photos of photographs sent across 12,000 miles of space by a tiny 500-watt sending station in the Antarctic. The first photographs so received are published here

Successful linking of New York and Little America in the Antarctic for transmission of photographs by radio fulfills a prophecy made during a broadcast between New York and the first Antarctic expedition of Rear Admiral Richard E. Byrd eleven years ago.

At that time F. E. Meinholz, communications engineer of THE NEW YORK TIMES and technical consultant of the first Byrd expedition, forecast that some day photographs of the work of similar ex-

ploring parties would be flashed to the world a few minutes after the action took place. Research to make that prophecy come true has been in progress since that time.

The principal difficulty of radio transmission of photographs, which the newly developed equipment overcomes, was the selective fading of the carrier frequency. Radio listeners are familiar with this eccentricity of transatlantic broadcasts, even where high-powered sending stations are used. With the low power such as is available at the camp of an exploring party the difficulties are increased.

Research engineers of Press Wireless, Inc., of which THE NEW YORK TIMES is a major stockholder, started work on the problem. They developed the anti-fading "sweep circuit." Inserted between the photo scanning apparatus and the radio transmitter, it evens out the peaks and valleys of the radio transmission and thus eradicates the

streaks which otherwise would appear in the photograph, and which were caused by the change in density of the tone. It is the tone which regulates the light impulses of the photo-scanning apparatus, the blacks and grays and whites of the original photograph being changed first from light density to tone density and then back to light at the receiving end.

The photographs reproduced today were sent from the West Base of the United States Navy Antarctic Expedition over its 500-watt station KTRK to the Press Wireless receiving station at Baldwin, L. I. Thence the signals were transferred automatically to a telephone circuit and passed on to the studios of THE NEW YORK TIMES-Wide World Photos in the Times Annex at 229 West Forty-third Street, where the photo-scanning apparatus transferred the sound signals into light rays and reproduced the pictures.

A regular photograph transmission schedule from the Antarctic is to be followed whenever radio conditions permit. As the expedition is inactive because of the long Antarctic night, only interior views probably will be available for transmission, but after the sun appears, and the scientific parties set out again on their rounds, all the highlights of the work will be photographed and sent to New York.

The transmitting set in the Antarctic is under the supervision of Clyde Bailey, radio engineer of the expedition.

Poll of 56 to 3 for President

SCHENECTADY, N. Y., Nov. 9 (UP)—Members of the United States Little America expedition voted in a poll 56 to 3 in favor of a third term for President Roosevelt, General Electric Company shortwave broadcasting officials reported today after a conversation with the Little America base.

DR. SIPLE HAILS SCOUTS

Sends New Year Greeting From U. S. Base at Little America

A wireless message containing New Year's greetings to the Boy Scouts of America from Dr. Paul A. Siple, commander of the West Base of the United States Antarctic Service at Little America, was made public Dec. 30 by Dr. James E. West, Chief Scout Executive, to whom it was addressed.

"For a sixth time in thirteen years," the message read, "it is my pleasure to send you the season's greetings from the Antarctic. Please extend my best wishes to your family for a pleasant New Year and remember me to my many friends at National Headquarters. We have had good fortune with our exploration program and will soon be starting home."

In 1928, when Dr. Siple was 19 years old, he was chosen to represent the Scouts on Rear Admiral Richard E. Byrd's first Antarctic expedition. He was chief biologist on the second Byrd expedition of 1933-1935.

The Polar Times

AMERICAN POLAR SOCIETY, Care American Museum of Natural History, Central Park West at 77th Street, New York, N. Y.

AUGUST HOROWITZ, Editor.
HERBERT R. LOGES, Art Editor.

THE POLAR TIMES highly recommends "The Polar Record," published January and July by the Scott Polar Research Institute, Cambridge, England.

The American Polar Society was founded Nov. 29, 1934, to band together all persons interested in polar exploration. Membership dues are one dollar a year, which entitles members to receive THE POLAR TIMES twice a year.

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Weather Makes The World Kin

FAIRBANKS, Alaska, May 18

(AP)—When natural scientists establish communication virtually between North Pole and South Pole what do they talk about?

Why, even as you and I—the weather.

Stanton D. Bennett, operator of amateur radio station K7BUB, established contact yesterday with station KC4USA at the west base of Little America in the Antarctic where members of the Byrd Expedition are encamped.

Speaking over a telephone line from his home three miles from

Mr. Bennett's station, Dr. Ervin H. Bramhall, member of Byrd's 1933 Antarctic Expedition and now Professor of Physics at the University of Alaska, talked with Dr. Alton Wade, in charge of the west base, and his fellow explorers. The conversation went something like this:

Dr. Bramhall: "It's springtime in the Arctic. Trees are green, flowers are blooming, and the temperature is around 60 above."

Dr. Wade: "Winter's approaching rapidly. During the current cold spell the temperature has been hovering around 70 below."

First U. S. Expedition To Antarctic Was in 1829, Scientists Told

Long-Forgotten Story Reconstructed From An Old Notebook

WASHINGTON, May 11

Turning from thoughts of the New World's responsibilities as keeper of civilization, outlined graphically for them last night by President Roosevelt, the American Science Congress today heard the long-forgotten story of the first American scientific expedition into the Antarctic.

Reconstructed from an old log book found in the Library of Congress, the tale was told by Dr. Lawrence Martin, chief of the Division of Geography at the Library.

The expedition sailed in two ships from Stonington, Conn., and New York in 1829, nine years after the mainland of the Antarctic Continent had been discovered by Capt. Nathaniel Palmer, a Yankee whaler. The object was specifically scientific research. Capt. Palmer himself commanded one of the ships.

The party included, Dr. Martin said, five scientists, of whom the most distinguished was Dr. James Eights of Albany. Dr. Eights made extensive natural history collections in the South Shetland Islands, most of which long since have disappeared, and anticipated Charles Darwin by nearly 10 years in observing glacial boulders left by floating icebergs and deducing from them the geology of unvisited lands closer to the South Pole.

Notebooks Lost.

By extensive observations of wind directions, fog, sea ice and marine life, Dr. Eights deduced, said Dr. Martin, that there was a long stretch of unseen land to the southward. He thought it was a long chain of islands. Not until more than a century later was it demonstrated by Admiral Richard E. Byrd that it was actually a part of the Antarctic mainland. It remained unknown until it was mapped by airplane flights taken by Admiral Byrd during the last three months.

Altogether the expedition brought back 13 chests of scientific materials, Dr. Martin said. The collections were broken up and the field notebooks of the party never have been located.

Musk Oxen Breed Slowly

In 1930 the Biological Survey placed an order with an experienced collector in Greenland for delivery in the United States of an initial herd of musk oxen for transportation to Alaska. In 1931, fifteen males and nineteen females from this purchase were introduced into Alaska. They were confined in a pasture near Fairbanks and careful study was made of them until 1936 when four were transferred to Nunivak Island. The following year the balance of the herd, twenty-seven animals, was also placed on Nunivak Island. As a result of this effort to re-establish musk oxen in Alaska, the Survey reports that the herd has increased to fifty.

Head of U. S. Territories



Rupert Emerson

WASHINGTON, May 2 (AP)—Harold L. Ickes, Secretary of the Interior, appointed Rupert Emerson, of Harvard University, today as director of the Division of Territories and Island Possessions.

Mr. Emerson is forty-one, a native of Rye, N. Y., and has been an associate professor of government at Harvard for the last thirteen years. He will come here in mid-June, succeeding Mrs. Ruth Hampton, who has been acting director since the resignation of Dr. Ernest Gruening in 1939 to become Governor of Alaska.

Officials described Mr. Emerson as an authority on colonial government and social and economic life. He has been engaged in studies of territorial problems for the Institute of Pacific Relations, and in 1932-'33 conducted research in colonial administration in British Malaya and the Netherlands East Indies.

Mr. Emerson, under Mr. Ickes's supervision, will develop policy and co-ordinate Federal activities in Alaska, Hawaii, Puerto Rico and the Virgin Islands. Various activities relating to the Philippines also will come under his jurisdiction.

WILL RETURN BYRD'S MEN

The Bear Sails From New Zealand for Little America

DUNEDIN, New Zealand, Dec. 27 (AP)—Rear Admiral Richard E. Byrd's Polar ship, the Bear, will sail tomorrow for Little America to bring home the men of the Antarctic expedition, recalled when Congress refused funds for another year's work.

The Coast Guard cutter North Star, which sailed from Seattle, Wash., early this month, is due here Jan. 12 and will join the Bear at the Antarctic base to help in the removal. The ships are expected to call first at the west base and then at the east, on the South American side of the Polar area.

The crew of the Bear celebrated Christmas in American fashion, with roast turkey the main item on their menu.

STOP 'WHALE MEDICINES'

Nazis Have Halted Derivation of Drugs From That Source

WASHINGTON, July 13—German efforts to develop an important industry through the utilization of whales' organs for the manufacture of medicinal preparations, hormones, vitamins, and the like, have been halted by the war, the Interior Department reports.

German scientists, it said, had been working extensively on the problem up to the outbreak of the war, while the industrial possibilities were felt enhanced by the great amounts of medicinals and like products obtainable from whale organs, formerly of little value.

An average size whale liver, for example, it was pointed out, contains about 1,800,000 international units of vitamin A or the equivalent of the quantity contained in 6,600 pounds of cod liver oil or 13,200 pounds of cod livers. Other organs yield other valuable medicinals on a comparable basis.

In the 1938-39 season, the report said, the German Antarctic whaling fleet comprised seven factory, or cooking, ships and fifty-six catcher, or killer, boats and brought home 83,286 metric tons of whale oil.

EXPLORERS WELCOME ANTARCTIC NIGHT

Siple Says Expedition Is Comfortable Amid Snows

The coming of the long Antarctic night is welcomed by the members of the United States Antarctic Expedition because it will mean the end of preparation of the camp and the beginning of scientific research. Dr. Paul A. Siple, in command of the camp, said April 13 in a short-wave broadcast from Little America. The broadcast was carried over an NBC network.

"We are comfortably housed in a modern city and in the very midst of drifts of snow our quarters are heated to a comfortable shirt-sleeve temperature and are lighted by electricity," he said. "In the Winter night weather we can laugh at the storms and carry on our various studies. We cannot spring into existence without a strenuous effort and exposure to bitter cold, but the old era of polar exposure which caused suffering might reasonably be considered nearly past."

Dr. Siple told of transporting supplies for a month by tractor and dogged a mile and a half inland and of building the camp, the outside work on which was finished this week. On Easter Sunday they visited the old camp, where they found roofs had collapsed under pressure of snow. They were able to retrieve equipment, however.

MUSEUM GETS SKUAS

Smithsonian Has Specimens of Only Polar Bird.

Specimens of the antarctic skua, a bird described as the only higher animal except man and his dogs, that goes close to the south pole, have been added to the Smithsonian Institution's collection, it was announced Nov. 15.

The skuas and the antarctic tern that has been added to the collection were collected by the Byrd expedition.

WAR IS ENDANGERING SUPPLY OF WHALE OIL

Europe's Activities Leave Japan Free in Antarctic

WASHINGTON (Science Service)—Whaling in the Antarctic has been completely disorganized by the war. Even information about it has suffered an almost total blackout, partly because whaleoil products can be used in munitions, partly because the firms that normally produce harpoon guns and the explosive-headed missiles that they fire have apparently been drafted into war service.

Only a few facts have leaked through the wall of censorship and the fog of ignorance caused by disrupted communications. Some of these facts, however, are causing grave concern among scientists here who are interested in the conservation of the world's largest mammals, the whales.

Most serious element in the entire situation is the fact that the Japanese, notorious as the worst game hogs among whale-killers, have the whole Antarctic whaling ground to themselves this season. The biggest European whaling fleet, the Norwegian, had not got home last Spring when Norway was overrun by the Nazis; their ships are scattered and tied up in neutral ports. The German whalers, of course, are still in Hamburg harbor—if British bombs have not ruined them.

British whalers have not gone south this year. There was a two-year reserve supply of whaleoil in Britain when the war broke out and there are large quantities of oil in the United States at present for which there is no immediate market. It is waiting, in bonded storage. Whale ships of other nations are negligible in number and their present whereabouts is unknown.

All this sums up to one probability: That the Japanese whaling fleet, consisting of six factory ships and forty-eight attendant killer boats, will simply run amok in Antarctic waters, recklessly killing every whale they can catch, in complete disregard of international conservation rules—to which the Japanese Government has consistently refused to adhere, anyway. The larger part of their catch will go to Germany, via the Trans-Siberian Railway, unless Balkan events cool off Soviet willingness to help Hitler.

EXPLOSIVES FROM WHALES—

A good deal of the glycerine used to make nitroglycerine comes from whale oil. What with the war and the closed season for whale hunting Professor Trevor Kincaid thought he would look around for another source. He found it in the minute shrimplike animals which are called plankton and on which whales feed. About 10 per cent of dried plankton (by weight) turns out to be glycerine.

FAT WHALES—According to Karl Brandt (Whale Oil: An Economic Analysis) a young blue whale puts on weight at the average rate of 220 pounds a day. He has to for the simple reason that in about two years he reaches sexual maturity and a length of 75 feet, with the probability that he will increase this to 100 feet. A good healthy 100-footer will weigh 150 tons and yield about 27 tons of oil.

Chile Claims Vast Quadrant in Antarctic; Site of Present Byrd Camp Within Area

SANTIAGO, Chile, Nov. 6 (AP)—The Government of Chile laid claim by decree tonight to all Antarctic territory between 53 and 90 degrees West Longitude.

This includes the site of the Eastern base established by the present Antarctic expedition of Admiral Richard E. Byrd of the United States.

The Chilean Foreign Ministry declared, however, that the United States was not claiming any of the territory within Chilean Antarctica and that Admiral Byrd's expeditions into that area were purely scientific. The Ministry added that Argentina also had made no claim on the territory in question.

This embraces most of the Weddell Quadrant, including within the Antarctic Circle Graham Land, Charcot Land, Fallières Land, Loubel Land and Alexander and Adelaide Islands.

Just outside the Antarctic Circle north of this quadrant are the South Shetland Islands, Elephant Island, Brabant, Antwerp and Victor Hugo Islands, King Oscar II Land and Danco Land.

Most of Admiral Byrd's explorations have been to the west, in the Ross Quadrant, but Admoral Byrd's current expedition to the Antarctic chose an additional base 1,200 miles to the east on Marguerite Bay within the Weddell Quadrant.

In July, 1939, the Government of Argentina laid claim to a quadrant, within the Antarctic region, embracing everything from the twentieth meridian, west Longitude, to the sixty-eighth meridian, west Longitude. At that time Argentina opposed the application of the Monroe Doctrine to any part of the Antarctic, but stated that no claims were being made as against the United States.

The Argentine quadrant obviously would overlap the newly-declared Chilean quadrant from the fifty-third to the sixty-eighth meridian.

WASHINGTON, Nov. 7.—The State Department maintained an attitude of caution today concerning Santiago reports that the Chilean Government has laid claim to sovereignty to Antarctic territory, including regions surveyed by Admiral Richard E. Byrd.

Secretary of State Cordell Hull said that no official report has been received from Santiago. Therefore he was not prepared to make any comment.

United States explorers have made their own claims when they have discovered territory. For its part, the United States Government has reserved all rights and has never recognized any foreign claims, but that is as far as these Antarctic questions have been pressed thus far.

SANTIAGO, Chile, Nov. 7 (AP)—Foreign Minister Marcial Mora today handed United States Ambassador Claude Bowers the text of the government decree that officially laid claim to Antarctic territory for Chile.

After the meeting, Señor Mora said the Ambassador had expressed pleasure over Chile's action and quoted him as saying "That will make us neighbors."

SANTIAGO, Chile, Nov. 8.—Taking it for granted that the United States will make no objection to

Chile's sudden decision to incorporate thirty-seven degrees of longitude in the Antarctic in her national territory, the press today publishes reports from abroad revealing reaction.

It was announced that the United States Ambassador and Argentine diplomatic representatives had visited the Foreign Ministry here as soon as the announcement was made public, but details of the conferences have not been disclosed.

Explanations of the decision to establish Chilean sovereignty in the South Polar regions have been transmitted to diplomatic and consular representatives abroad, but no further explanation was given here today.

Conflicts With Prior Claims

The Chilean government's claim conflicts with prior claims by Great Britain and Argentina, as well as unofficial claims by Admiral Byrd and Lincoln Ellsworth.

In 1908 Britain set up the Falkland Islands Dependency, which included all the lands and islands in Antarctica between 20 and 80 degrees west longitude. This includes Palmer Land, Graham Land and the Weddell Sea.

In 1939 Argentina disputed the British claims to the South Orkneys, the South Shetland Islands, Graham Land and all other lands and islands in the vicinity of the Weddell Sea, and advanced its own claim to everything in Antarctica between 20 and 80 degrees west longitude. It has steadily disputed Britain's claim to the Falklands.

While Byrd and Ellsworth have laid claim to several hundred thousand square miles of Antarctic territory for the United States, this country does not recognize those claims as official, nor does it allow the claims of Britain, France, Germany, Norway and Japan, all of which have staked out domains around the South Pole. The State Department in 1924 ruled that settlement, not merely discovery, was necessary to establish sovereignty there.

Argentina and Chile Plan To Fix Antarctic Border

SANTIAGO, Chile, Dec. 20.—Argentina and Chile will commence to delimit their frontiers in the Antarctic regions early next year, it was announced today. Argentina agreed to send a technical commission to meet the Chileans and take up territorial problems derived from a decree issued here on Oct. 6 by which Chile assumed sovereign rights over an important section of the Antarctic.

The opinion prevails in well-informed quarters that Chile will not modify her rights, but is ready to collaborate with Argentina in determining the territorial rights of that country in the Antarctic, where Argentina weather stations have existed for years.

SCOUT FLAG CARRIED AFAR

Antarctic Party Plants It 500 Miles South of Little America

SCHENECTADY, Dec. 25.—The Boy Scout flag has been planted 500 miles south of Little America and as close to the South Pole as any of the United States Antarctic Service expedition's parties have penetrated on this trip, Dr. Paul A. Siple, leader at Little America, told General Electric's short-wave "radio mailman" during a two-way radio conversation last night over WGeo.

The Scout flag was carried to its most southern post by H. H. Richardson of Beaver, Pa., a member of the biological dog-team party which returned to Little America today after an absence of three months.

A letter of appreciation from Daniel C. Beard, National Scout Commissioner, was read to the Antarctic party. It said:

"Planting the Scout flag the farthest south is a wonderful peace achievement that thrills me to the core and will be an inspiration to all the Boy Scouts of America. Good luck and success and God bless you all."

ANTARCTICA 'BATTLE' AWAITS END OF WAR

Many Powers Seeking Slices of South Pole Continent

WASHINGTON (Science Service)—It begins to look as though Antarctica and its penguins will have to be parceled out at last to nations of the earth when surviving powers reshuffle territorial possessions after this war.

No less than ten countries, including now Chile and Argentina, have put in claims for pie-shaped wedges or other areas of Antarctica. Claims overlap and clash, as in the case of Nazi Germany mapping and planting flags in 230,000 square miles of the Far South in 1939, in the same region where Norway not long before had proclaimed sovereignty and given the name Crown Princess Martha Land.

Despite first reports that Chile has laid claim to a sector including Little America, the area between 53 and 90 degrees West Longitude is actually east of Little America, mainly in the Falkland sector of the Antarctic pie. This brings Chile into conflict with claims of Great Britain and Chile's own neighbor, Argentina.

Parts of the vast Antarctic continent, seemingly so remote from world conflicts, are claimed by Norway, Germany, France, Great Britain, the United States, Japan, Chile, Argentina, Australia and New Zealand. It is generally expected that eventually an international commission will gather to decide the knotty problem of cutting the continent into pie wedges, or breaking it into irregular chunks and awarding the pieces.

Countries that border the South Polar continent lean to the argument that the continent should be divided like a pie, and sectors awarded to the nearest nations, if such nations claim them. Chile and Argentina are pressing this point, though as rivals.

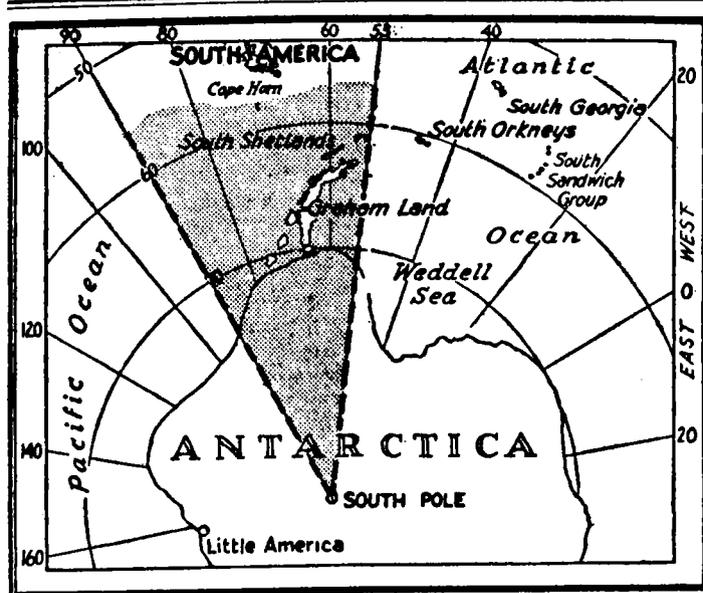
Countries that have engaged in discovery and scientific exploration on the Antarctic continent argue that the land should be parceled out to countries that have discovered, mapped and explored it, as other continents have been.

Nations claiming Antarctica are running true to form in making grand gestures, as discovering nations always have done. Chile's claim of a sector of Antarctica on the grounds that the Chilean Andes Mountains submerge and then rise again as part of the Antarctic continent—and therefore even in Antarctica these mountains are part of Chile—reminds Americans that mountain ranges in the United States extend into Canada and Mexico, though this would hardly warrant politically blending these countries.

Antarctic claimants have not as yet matched the greatest "claimer" of them all, Balboa, who waded into the Pacific, waved his sword and claimed for Spain every shore washed by that ocean.

Penguin Downs Eight Men

Penguins are natural born sluggers, says Natural History. The champion of them all, however, is the emperor penguin. Often equal in weight to a timber wolf, he is a formidable opponent on the slippery ice of his home grounds. One ship's record asserts that eight men who tried to capture one alive got penguin punches until all eight were flat on the ice.



Chile has asserted she has a right to all Antarctic lands within the shaded zone.

ROOSEVELT STUDIES GREENLAND STATUS

Alert to Relief for Its People, Cut From Denmark, but Red Cross Finds No Urgency

WASHINGTON, April 10—Problems growing out of German military occupation of Denmark, including the status of Greenland, Danish colony in the Western Hemisphere, and of Iceland, were discussed today in a White House conference by President Roosevelt and the Danish Minister, Henrik de Kauffmann.

"We agreed, of course, that Greenland belonged to the American continent," the Minister said as he left the Executive Mansion.

As a result of the establishment of a German "protectorate" over Denmark, Germany for the first time in history has at least a technical claim to authority over territory in this hemisphere. In official circles the opinion was expressed today that the Monroe Doctrine would be invoked with regard to Greenland should this eventually become necessary but that no declaration to this effect would be made at the moment.

Greenland, which lies well within the Western Hemisphere on all standard maps, and Iceland, which lies partly within this hemisphere, are on the northern route between Europe and the United States and are regarded in military and naval circles as potential air bases.

The problem of Greenland, the largest island in the world, may become acute this Spring. Denmark supplies the 16,000 Eskimo inhabitants with all their staple foods and clothing, since these are not produced in Greenland. It was doubted that the Allies would allow Danish ships to visit Greenland, not only through a desire to hamper trade with a German protectorate, but also to make certain that Germans could not use the Danish supply fleet to transport Germans to the colony.

WASHINGTON, April 12—Germany's occupation of Denmark had further repercussions here today when President Roosevelt took steps to aid inhabitants of the Danish colony of Greenland.

Turning a deaf ear to suggestions that this country might apply the Monroe Doctrine to Greenland if Germany attempted to occupy the island, Mr. Roosevelt said the consideration was entirely of relief for Greenland's 17,000 inhabitants if Danish food ships were unable to bring supplies after the ice had broken.

The President told his press conference that all questions bearing on application of the Monroe Doctrine to Greenland were hypothetical and premature.

The subject of United States aid to Greenland came up when the

Danes Hail Greenlanders By Radio, Only Means Left

COPENHAGEN, German-occupied Denmark, Dec. 22—By radio, the only means of communication left here, greetings were sent tonight from Denmark to Greenland and the British-occupied Faeroe Islands.

A choir composed of Eskimo residents here sang and Premier and War Minister Thorvald Stauning spoke, conveying to distant Greenlanders his sincere assurance that they still lived in Danish thoughts.

"We live in the hope that peaceful times may again permit us to exercise our recognized duties and rights toward Greenland," he said.

President was asked about his conversation this week with Henrik de Kauffmann, the Danish Minister, who left the White House with the prediction that Mr. Roosevelt would continue to recognize him as the properly accredited representative of his government despite the occupation of his country by Germany.

Part of American Continent

Referring to the conversation, the President said he was entirely satisfied from a scientific standpoint that Greenland belonged more to the American continent than to the European. He told of studying the encyclopedia and other works on Greenland, of having talked with geologists and geographers. From earliest history and from the character of its flora and fauna, it appeared that the island belonged to the American continent, Mr. Roosevelt said.

He had been looking at the problem constituted by the Eskimos and Caucasians left stranded on the island from a purely humanitarian viewpoint, as distinguished from a

political point of view, the President explained.

It was all a question of seeing to it that the inhabitants of the island did not starve in the event the ships that usually brought supplies from Denmark in the Spring or Summer should be cut off. The President said he thought the American people would be very glad to chip in for so worthy a cause involving so small an amount of money.

Accordingly, the President said, he had asked the American Red Cross to investigate the needs of the people of Greenland should the urgency of assisting them arise. He conferred later with Norman H. Davis, head of the Red Cross, who reported there was no urgency apparent.

The idea of getting aid to Greenland's inhabitants was one of his own invention, according to the President, and no one had to bring it to his attention. He had first thought of the possibilities when Mrs. Ruth Bryan Owen, then Minister to Denmark, returned here on a vacation after stopping off in Greenland to make a few pictures.

Canada Is Concerned

OTTAWA, April 10—The German invasion of Denmark has produced a problem on this side of the world that may become of special interest to the United States. The problem is Greenland, part of the Western Hemisphere, heretofore utterly dependent on Denmark, its mother country.

The capitulation of Denmark to Germany creates a problem, at present economic, but which may become military. Greenland is Canada's nearest northern neighbor, so close that it can be plainly seen from Ellesmereland, where the Canadian Mounted Police maintain a post.

Establishment of a German air base there, from which to attack Canada, is well within the realms of possibility. As Greenland is definitely a part of the American Continent, however, any such action would come under the ban of the

Monroe Doctrine and would concern the United States.

More immediate, however, is the economic problem. For all their supplies, including food, the 17,000 inhabitants of Greenland have been wholly dependent on Denmark. Now the German invasion has cut that tie and the Danes will be no longer able to help the Greenlanders, especially in the matter of food. Germany will take all that.

Not Seeking Responsibility

Canada has her hands full just now and is not anxious to incur new responsibilities. Moreover, if Canada were to take over Greenland while Denmark is in straits the Dominion would not only incur the enmity of the Danes but would bring the Greenlanders into a war against which they have no defenses.

The hope is therefore being expressed here that in the interest of peace the United States will step in, under the Monroe Doctrine, and act as Greenland's protector until Denmark is in a position to resume her control.

So far as government is concerned, Greenland is in a class by itself. For two centuries Denmark has been conducting a social experiment in the territory, which in only two years out of the two hundred has paid its way. Denmark has normally paid a deficit of about \$100,000 a year out of Danish funds, besides having spent around \$1,500,000 annually in scientific explorations on the island.

All business in Greenland, and virtually everything else, is a Danish Government monopoly—even the church, whose missionaries are Danish civil servants. The stores, run by the government, sell only what officials believe to be good for the natives to buy, or rather to barter for.

The late Director—he died a few months ago—had been absolute czar for a quarter of a century. As he did not consider the natives fit to be trusted with gasoline, all the power boats on the island use crude oil for fuel. Because he feared that modern firearms would soon extinguish the wild animal life, only old-fashioned muzzle-loaders are sold. Danish hunters make their own bullets and load their own shells.

To discourage trapping, no steel traps are carried in government stores and there are no other stores. Sealing and fishing are encouraged in preference to trapping.

Settlement Has Prospered

But under Danish rule the settlement has prospered. While the Eskimos elsewhere are dying off, the Eskimo population of Greenland has steadily increased. The standard of education among the natives is as high as in any part of rural Canada. A health service is maintained, which keeps a trained native nurse in even the smallest village and a chain of Danish-operated hospitals all along the coast.

The present Danish officials can probably carry on indefinitely if another power can be found to take Greenland goods in barter and to make good the deficit of running a model colony. But Canada is not anxious to assume this burden and Great Britain cannot under the Monroe Doctrine. Germany must not be allowed to do so, so the only alternative is the United States.

However, in marching into Denmark Germany did herself one material injury. She has cut herself off from supplies of cryolite, a rare mineral used in the manufacture of aluminum and mined only in Greenland.



Thomas in The Detroit News

"Remember, Chief, you are in the Western Hemisphere."

DENMARK ASSERTS GREENLAND RIGHTS

Premier Tells Parliament the War Cannot Alter Claim to the Island

COPENHAGEN, German-Occupied Denmark, July 4—Premier Thorvald Stauning, at the beginning of the final budget debate in the Danish Parliament today, spoke on the problems facing Denmark after the occupation and for the first time gave Parliament a full statement of events concerning the British occupation of the Faeroe Islands and Denmark's confederate State, Iceland.

The Premier also reported on what had happened concerning Greenland, concluding this part of his speech with an emphatic statement of the Danish position that the European war could not affect Denmark's rights to Greenland.

Regarding Greenland, Mr. Stauning said that communications had also been scarce. The Greenland Governing Board in Copenhagen had in April sent some instructions to the Sheriffs. Greenland generally had supplies for a long period, but was now lacking in some commodities, the Premier stated.

Says Mission Here Was Given Up

By agreement with the Legation at Washington a Greenland committee was formed in the United States to provide the population of the island with needed supplies. The committee was comprised of three Danes resident in the United States who are in touch with American advisers, Mr. Stauning went on; and as the government believed it should have expert assistance, it had planned to send the director of the Greenland Board, K. Oldendow, and two other authorities on Greenland to the United States. The Danish Minister in Washington, acting on the basis of American opinion in respect to Greenland, had advised against the move, Premier Stauning stated.

"We do not understand how such sentiments could arise against this expert assistance," said Mr. Stauning, "but a misunderstanding must have occurred in Washington. Anyhow, the visas given were withdrawn and the mission had to be given up.

"The local Administrative Councils in Greenland gathered on May 3 and adopted a resolution, which states that this legal representation of the population has taken over the powers of the Danish Government, which the Danish Government, because of prevailing conditions, is unable to exercise.

"At the same time the meeting adopted an inviolable oath of fidelity to King Christian X. The Councils of Greenland further directed special thanks to the President of the United States for his sympathy and respect for Greenland's independence."

President Roosevelt had made a public statement to the effect that Greenland belonged to the Western Hemisphere, thus apparently applying the Monroe Doctrine, Mr. Stauning continued. A United States Consulate had been established in Greenland—a step motivated, ac-

First American Consul to Greenland



Consul James K. Penfield (second from left) aboard the Comanche with aids and commander. Left to right, Vice-Consul George L. West, Mr. Penfield, Lt. Cmdr. Frank M. Mcals and Maurice Reddy, assistant director of distribution for the American Red Cross

ording to statements by the American Secretary of State, by the refusal of the United States to tolerate European interference in territorial issues in the Western Hemisphere.

Denmark must assume, Mr. Stauning concluded, that her right to Greenland would in no way be disputed as a consequence of the European war. He added a denial of all rumors about plans or negotiations concerning the sale of Greenland, saying it was the government's obvious task to preserve Greenland for Denmark.

King at Meeting at Which Hope for Possession Is Expressed

COPENHAGEN, Oct. 17 — The Danish Greenland Society held a meeting tonight that was attended by King Christian and Queen Alexandrine and many prominent Danes. Knud Oldendow, chief of the Greenland Board, gave a talk on the situation in Greenland after the connection between Denmark and Greenland was broken.

He said Denmark had given Greenlanders a unique status among colonized nations—christened them, civilized them and secured their future, so that they wished to remain with Denmark.

"We dare hope to be able to pass on to coming generations their entire Danish inheritance in Greenland," he said.

Doubts U.S. Bases in Greenland

COPENHAGEN (Via Berlin), Nov. 15 (UP).—Premier T. A. M. Stauning, during a budget debate in Parliament today, said that "the Danish government has received no information that the United States has built air bases in Greenland, as rumors have alleged."

Penfield Off to Greenland To Set Up U.S. Consulate

Sails With Aid and Red Cross Relief Representative

James K. Penfield, the first United States Consul for Greenland, and George L. West jr., vice-consul, sailed May 10 on the Coast Guard cutter Comanche, from Coast Guard Base 2, Stapleton, S. I. With the two diplomats went Maurice R. Reddy, assistant director of relief for the American Red Cross, who said that he would make a survey of the need for relief among the inhabitants of the island. The destination of the cutter, the departure of which was witnessed by a group of relatives and friends of the crew and the officials on Pier 18, is Godthaab, a settlement of 1,300 inhabitants on the Davis Strait, 2,300 miles from New York.

Mr. Penfield, who is thirty-two years old, was formerly stationed at Yunnafu, China.

Among those at the pier was H. C. Sonne, chairman of the American Greenland Committee, appointed by the Danish Ministry in Washington. Comdr. Frank M. Neals, of the 165-foot cutter, which has a crew of fifty-five men, estimated that the voyage would take between ten and fifteen days.

WASHINGTON, May 1—American interest in Greenland as a region that falls under the Monroe Doctrine was signified today by the announcement that a United States Consulate would be established provisionally at Godthaab.

In making the announcement the State Department said that, "since communication between Copenhagen and Greenland has been interrupt-

U. S., CANADA ASSURE GREENLAND'S NEEDS

New Trade Channels Will Fill Gap Left by Denmark

Greenland's material needs, cut off abruptly when Denmark, her principal source of supply, was occupied by Germany, have been assured for the next year as the result of new trade channels established by Greenland with the United States and Canada, it was disclosed Sept. 20 by Governor Eske Brun of North Greenland, who heads a trade delegation here.

Governor Brun was guest of honor at a dinner given by Miss Helen L. Hultz, charter member of the American Polar Society, in The New York Times Annex, 229 West Forty-third Street. Russell J. Warrath, president of the society, presided.

Governor Brun, who emphasized that Greenland was not seeking charity and that its people "will be perfectly able to carry on with what they can pay for," said that the trade delegation had made arrangements for more than \$1,000,000 worth of supplies during the current visit.

A part of this money, he said, will be realized by the shipments of cryolite, used in making aluminum, furs, salt fish and whale oil. Supplies to be sent to Greenland include lumber, food, clothing, iron and ammunition.

Miss Hultz reported that many members of the society had responded to her appeal to help the people of Greenland by sending boxes of old coats, mittens, stockings, shoes, rubbers, dress materials and knitting yarns.

ed, direct consulate representation has been deemed advisable by the United States and by the Greenland authorities."

The announcement was regarded as indicating that questions involved in the status of Greenland had been discussed not only with Denmark but also with Great Britain and Canada. At the same time arrangements have been made for the United States to aid Greenland by supplying foodstuffs and materials that ordinarily have been furnished at periodical intervals by Denmark. This task is centering in an organization formed in New York by interested citizens.

The establishment of the consulate presumably means that no more direct issue is foreseen at present through any claim to its occupation by Germany or by Canada. That would mean that Greenland's status would remain unchanged and that no occasion existed for a decision now as to whether the United States, because of the Monroe Doctrine, should throw a protecting arm around her.

Greenland Awaits Release

Arctic Bishop Says Colony Hopes for Danish Rule Again

TORONTO, Nov. 1 (CP).—The Rt. Rev. A. L. Fleming, Church of England bishop of the Arctic, said today on his return after a visit to Greenland that the people of that Danish colony were confident that German-dominated Denmark would be free again.

Mr. Fleming said that Greenlanders were looking forward to the end of the war when, they hope, the country, again will be under the Danish national flag.

Peary, in 1916, Foresaw Trouble If Enemy Occupied Greenland

Explorer Pointed Out Value of Deep Fjords In Naval Operations and Island as Air Base

Marie Peary Stafford, daughter of the late Admiral Robert E. Peary, discoverer of the North Pole, is a resident of Washington and was born in Greenland. She spent the greater part of her childhood there and returned in 1932 for the summer. She is thoroughly familiar with this vast territory, its problems and its possibilities.

By MARIE PEARY STAFFORD.

In view of Germany's complete absorption of Denmark, various questions arise regarding the Danish colony of Greenland.

First of all, what effect on the United States and the rest of the world would a possible Nazi occupation of Greenland have? Second, did the United States overlook an opportunity when, in 1916, we traded to Denmark our rights in Greenland, plus \$25,000,000, for the Danish West Indies? And, lastly, what effect would German rule and the breaking of relations with a benevolent Danish government have on the sturdy race of Eskimos which has so long and so peaceably inhabited this vast island?

The first two of these questions are partly answered by an article written by Rear Admiral Robert E. Peary in 1916, before the negotiations had been completed. Although the claims of the United States to the northern part of Greenland were based on the explorations and discoveries of a series of American explorers, among them Kane, Hall, Hayes and Greely, Peary's work was by far the most extensive. He twice transected the northern part of Greenland and by his journeys along the northern shore determined its insularity. Therefore, it may be supposed that he wrote with knowledge and authority.

The following is a quotation from his article:

"Greenland is the largest island in the world. Its total length from Cape Farewell, its southern extremity, in 60° N. Lat., to Cape Morris Jesup, its northern extremity, in 83° N. Lat., is in round numbers, 1,500 miles, almost exactly the same length as the United States on the ninety-seventh meridian, from the mouth of the Rio Grande to where our northern boundary crosses the Red River of the North.

Large as Eastern U. S.

"The greatest width of Greenland is about the same distance as from New York to St. Louis. In regard to its area, the figures of various authorities vary widely. It may be sufficient to say that as regards area it can be grouped in size with the United States east of the Mississippi, Alaska, Mexico, Colombia, Persia or Portuguese West Africa. Its interior is covered with a great sheet of ice rising to elevations of probably 10,000 feet in places and several thousand feet in thickness. The available ice-free land is a strip of varying width along the coast, intersected by numerous deep fjords.

"When one turns the pages of American Arctic exploration, Greenland is found more or less intimately

associated during over 60 years with all American expeditions except the Jeannette expedition. Americans have lifted nearly all its northern and northwestern coasts out of the Arctic night and fog and have twice crossed its northern part. American names stud its coasts and the name of an American marks its northern extremity, the most northern known land in the world.

"Geographically Greenland belongs to North America and the Western Hemisphere, over which we have formally declared a sphere of influence by our Monroe Doctrine. Its possession by us will be in line with the Monroe Doctrine and will eliminate one more possible source of future complications for us from European possession of territory in the Western Hemisphere. Will turning Greenland over to Denmark now mean our repurchase of it later, or will obtaining it now mean closing the incident and placing Greenland where it must ultimately belong?

"Greenland is comparatively near to us. For years American ships have conveyed cryolite from the Ivigtut mines to Philadelphia. There is coal and cryolite, probably graphite and mica, possibly gold, in its rocks. With our unlimited means it may, like Alaska, prove a sound and most valuable business investment. The abundance of native coal and the numerous glacial streams which come tumbling into the southern fjords from the great interior ice sheet represent enormous potential energy which might be translated into nitrate and electrical energy, to make Greenland a powerhouse for the United States. Greenland represents ice, coal and power in inexhaustible quantities.

"And stranger things have happened than that Greenland, in our hands, might furnish an important North Atlantic naval and aeronautical base. A North Pacific naval base for the United States in the Aleutian Archipelago is a recognized possibility. Why not a similar base in the North Atlantic? Cape Farewell in Greenland is but little north of Sitka. It is in the same latitude as St. Petersburg; Christiania; Great Britain's naval base in the Orkneys; and the northern entrance to the North Sea, which Great Britain has patrolled with her war ships, incessantly now, summer and winter, for two years.

"There are fjords in Southern Greenland which would hold the entire Navy, with deep, narrow, impregnable entrances. Thirty hours steaming due south from Cape Farewell by 35-knot war craft would put them in the trans-Atlantic lanes midway between New York and the British channel. With the rapid shrinking of distance in this age of speed and invention, Greenland may be of crucial importance to us in the future.

"The present war has shown most strikingly how far flung may be the regions having a bearing on the struggle. Great Britain's coaling station in the Falklands spelled destruction for Germany's squadron

of commerce destroyers. Russia's port of Archangel has been an invaluable gateway for her. Greenland in our hands may be a valuable piece of our defensive armor. In the hands of a hostile interest it could be a serious menace."

Today, 25 years after the above article was written, the points made in it seem so farsighted as to be almost prophetic. By a wise and kindly system of government, Denmark has developed a fur and ivory trade with Greenland, which has been immensely valuable. Her chief source of income from this colony, however, has been in the working of the cryolite mines. Although cryolite occurs, to a limited extent in the Ilmen Mountains, at Pikes Peak and in the Yellowstone, it is in such small quantities that it might almost be said to be found exclusively at Ivigtut. It is of great economic importance and among its many uses is that of a flux for aluminum.

But it is not the potential wealth which we inadvertently let slip through our fingers which concerns us most at the present time. Lindbergh, when he landed in Greenland, commented on the fact that the inland ice made an ideal landing field for planes. With a German air base established in Greenland, what of Canada, and, as far as that goes, what of the United States, since neutrals apparently are not respected except when convenient? It is being demonstrated every day that the fjords of Norway make ideal hiding places for destroyers and battleships. The fjords of Greenland are very similar to those of Norway. With a German submarine base in Greenland, what of shipping, and the seacoast towns of Canada and the United States?

Problem of White Inhabitants.

Looking at a possible Nazi occupation of Greenland from a slightly less personal and selfish point of view, what is to happen to the people of Greenland? Germany is notoriously cruel and unsuccessful in her dealings with primitive people. Are the Eskimos, who have survived privations, hunger and the rigors of the climate to go down before a ruthless invasion of "civilization?"

There is still another point to consider. Suppose the Germans are prevented from making any strategic use of Greenland? How much better off will her people be? It would probably be only a short time before the Eskimos themselves would learn to do without the luxuries and delicacies to which they have become accustomed through years of contact with the white man. Tea, sugar, ship's biscuit, even tobacco can be foregone if necessary and the Eskimos would revert to the simple, healthy carefree lives which they led before they knew of a world beyond their own snow-covered domain. But there are white people living in Greenland, not just explorers—although there is at least one Danish expedition in the field at present—but Danes who make their homes there, as teachers, missionaries, doctors, governors and nurses. They are more or less dependent on supplies and medicines from the outside world.

If Germany allows no ships to leave Denmark, who is to take care of these people? Outside of the Danes themselves, and the Dundee whalers, long extinct in Arctic waters, and a rapidly diminishing

CLIFFS OF GREENLAND MAY BE DEFENSE AID

Geologist Traces Hypothetical Origin of Heights

LONDON (Science Service)—

Greenland's towering cliffs, possible factors in strategy in later phases of this war, were prepared many ages ago by a geological revolution deep within the body of the earth, according to a hypothesis proposed in the science journal, *Nature*, by Professor L. R. Wager of the University of Reading.

The great and abrupt lift of the land and the depression of the adjacent Denmark strait, Professor Wager suggests, were caused by a downward flow of the deepest parts of the rock material involved. About it an intermediate layer also flowed, becoming greatly thickened in one place and lifting the mass that has since become Greenland. Alongside this area it became correspondingly thinned, permitting the subsidence that is now the strait.

At the "hinge" between land and sea the layers nearer the surface cracked under the strain and the plastic magma from deep within flowed up to form a swarm of wall-like "dikes" that have long been a puzzle to geologists who have studied Greenland's structure.

The total uplift, through the ages, amounted to more than ten miles, Professor Wager calculates. Of course, the island never actually became that high, for erosion was constantly at work on the top as the mass was pushed up from the bottom. The present plateau of Greenland, which is still very high, represents today's balance between uplift and erosion.

handful of navigators, few people know the waters and ice conditions surrounding Greenland well enough to take a ship there.

Perhaps airplanes will be the answer, and perhaps the answer will be that history can and does repeat itself. In the 14th century, what had been a fairly prosperous Scandinavian colony in Greenland disappeared completely and the manner of its disappearance is still one of the mysteries of the Arctic upon which learned men ponder and write articles. Some say it was due to a breakdown of commerce with Europe and the consequent impossibility of obtaining what, for Europeans, would have been the essentials of life. Others maintain that the colonists, no longer having behind them the moral support of contact with the outside world, were murdered by the Eskimos. There are several other theories, but no one knows what actually happened, except that the colony, men, women and children, disappeared completely and forever. Is it possible that this could happen again?

After giving these various matters careful consideration, it may be borne in upon us that Peary spoke truly when, in the same article already quoted, he said:

"Would it not be better if the treaty provisions as to Greenland were reversed and the bargain should take the form of Denmark transferring to us her rights in Greenland and giving us the Danish West Indies and Greenland for \$25,000,000?"

Bases for Warplanes And Subs in Greenland Proposed for U. S.

Island But 1,200 Miles
Away Is Rich in Striking
Power, Scientists Told

PHILADELPHIA, Dec. 31.—A new path for war planes across the North Atlantic by way of Greenland and establishment of American air fields and submarine bases in that land of perpetual ice were proposed before the American Association for the Advancement of Science here today by Dr. William H. Hobbs of the University of Michigan, veteran Arctic explorer.

With one or more landing fields on the southwest coast and another in Jamieson Land, on the east coast, he said, there would be no stretch of open water between the United States and England greater than 900 miles in width. With these fields in operation, he explained, fighters and bombers heavily loaded could be delivered to the British Isles in five hops. The first would be from the factory to Labrador, then to Southwest Greenland, to Jamieson Land, to Reykjavik, which is under the control of Canadian troops, to England.

Jamieson Land, about halfway up the east coast, Prof. Hobbs said, is the only possible site for a landing field. Since 1930 it has been a German meteorological station. It is the part of Greenland best known to Germany.

The United States, Dr. Hobbs revealed, now has four revenue cutters off Godthaab, Danish capital of South Greenland. He painted a weird picture of the military potentialities of this land, only 1,200 miles from the United States, in the hands of an enemy power. Along the west coast there is a relatively level strip of barren soil which extends inland from a few miles to a hundred miles. Beyond are ice-covered mountains, some 5,000 feet high, which completely surround the island.

Beyond the mountains is the great ice cap whose dome-like top, smoothed by the winds of centuries, is 2,000 feet above sea level. It is hidden in the circle of mountains. To the observer, he said, it appears perfectly level, although the surface is slightly curved. There is no reason, he believes, why it would not make an excellent airfield. All supplies, of course, would have to be brought in by air. There is not a living thing within a radius of hundreds of miles. The Eskimo settlements stop with the mountains.

Once an airbase was established there, he believes, it would be completely hidden from the world and able to dispatch surprise fleets of bombers over Canada and the United States. Another possibility is Peary Land, a relatively level stretch of coast in the extreme northeast about which almost nothing is known. The United States once had a tentative claim to it, but gave up all rights to Denmark when the Virgin Islands were ceded.

Most of the southwest coast, he said, can be reached by open water



The Western Hemisphere Defined

Just what is included in the Western Hemisphere? A noted geographer, Col. Lawrence Martin, Chief of the Division of Maps of the Library of Congress, has presented a "geographer's view" of the problem for the American Geographical Society. The black line on the map indicates the generally accepted political limits of the hemisphere, according to Colonel Martin. Shaded areas pertain to European Powers: French (F), Dutch (D), Norwegian (N) are identified by initial letters; the remainder, except Greenland (Danish), are British; Canton Island and neighboring Endersbury enjoy a status of equality of use by the United States and Great Britain pending political allocation. Political claims in the southern tip of the hemisphere and in Antarctica are overlapping and none has been recognized by the United States.

from May to October. Among the spots he proposed for United States air bases was Cape Farewell, the southern tip of the island. Another favorable site would be Arsukfjord, where the Danish cryolite mines are located, with good docks and a semi-permanent colony of trained workmen.

Another base, he pointed out, might be set up at Julianshaab, also in the southwest, where there is a large colony of friendly Eskimo and a powerful long-wave radio station. Perhaps the most favorable site for either an air or submarine base, Dr. Hobbs said, would be the little settlement of Sangmissok, a bit north of Cape Farewell, which is located "in the center of a star of intersecting fjords."

He urged study of the possibility of submarines from such a base being able to operate under the ice about eight months of the year, ready to leap into the open North Atlantic at any moment to intercept enemy raiders.

The central plateau of Greenland, Dr. Hobbs said, is swept in winter by some of the most terrible storms known to man. This would be an aviation hazard were it not for the fact that a study of the prevailing winds shows that a pilot always could keep a favorable tailwind, especially when flying east. Even westward flying pilots, by orienting themselves in respect to the winds, could gain greatly by tailwinds.

Once an airbase was established in Greenland, it was pointed out, it would be difficult to dislodge during most of the year.

Greenlander in Capital For Trade Negotiations

WASHINGTON, Nov. 13 (AP).—Askel Svane, Governor of Southern Greenland, began today a series of conferences with American officials concerning the economic and political status of Denmark's orphan colony.

The Governor, accompanied by James K. Penfield, the American Consul, and George L. West, Vice-Consul, arrived yesterday from Godthaab and, with Henrik de Kauffmann, the Danish Minister, paid preliminary calls on State Department officials.

During the next few days Governor Svane will carry forward negotiations started by Eske Brun, Governor of Northern Greenland, in the summer. Since Greenland, as a result of the war, has been completely cut off from Denmark it has turned to the United States and Canada for imports and exports, and many of the questions under discussion revolve around those subjects.

At the present time American and Canadian imports of cryolite, a mineral used principally in the manufacture of aluminum, provides Greenland with its major "cash crop." The only known commercial deposit of cryolite in the world is located at Ivigtut, in southwest Greenland, where it is now mined by a semi-official corporation controlled by the government of Greenland.

Danish Envoy Forms Board to Aid Greenland

NEW YORK, June 27—Information of the American-Danish Greenland Commission to act in an advisory capacity to the Greenland Government, which has taken over the management of its own affairs as a result of the subjugation of Denmark by Germany, was announced by Hans Christian Sonne, Chairman, here today.

"The Commission here will cooperate in running the affairs of Greenland for the duration of the emergency in conjunction with the Governors, and under the general direction of the Danish Minister in Washington, who represents Greenland in the United States," Mr. Sonne said in an interview with newspapermen at the Commission's offices at 96 Wall Street.

Mr. Sonne said the Commission would act as a clearing house for exports and imports of Greenland. He stressed that it would make no appeals for relief funds to aid the 17,000 population of Greenland, holding that the export trade of the island would pay for supplies sent from this country and Canada to take the place of those formerly shipped from Denmark.

Members of the Commission are Mr. Sonne, Leonard T. Beale, Philadelphia; Norvin H. Green, New York, brother of Princess Viggo of Denmark; Mrs. Ruth Bryan Rohde, formerly American Minister to Denmark; Dr. Henry Goddard Leach, Editor of the Forum; Mrs. Marie Peary Stafford, daughter of Admiral Robert E. Peary, discoverer of the North Pole; Dr. John Dyneley Prince, New York, Professor Emeritus of Columbia University; Capt. Bob Martlett, explorer; Dr. Paul Bentzen, Copenhagen, now in New York; and Neilson Abeel, formerly Executive Secretary of the American-Scandinavian Foundation, Secretary of the Commission.

GO 1,000 MILES TO SCHOOL

Eskimos and Loucheux Indians
Are Educated at Aklavik

WINNIPEG (AP)—Eskimo and Loucheux Indian children come as far as 1,000 miles to attend All Saints' Anglican School at Aklavik, Northwest Territories, says Miss Hazel Keyes, who has taught at the school for the last four years.

"They come from such places as King William's Land," she relates. "Most of them can't speak any English when they arrive but soon learn. From 5 to 15 years of age they all enter Grade I. The education they receive encourages them to fuller use of their native arts and talents."

Sewing is one of the chief delights of the girls, and the boys are quite good mechanics. There are about 100 children in the school.

Asiatic Link of Eskimo And Indian Advanced

By Herbert B. Nichols

Natural Science Editor of The Christian Science Monitor

WASHINGTON, April 22—Another missing link in the chain of evidence seeking to connect the American Indian and Eskimo with an Asiatic homeland from which they wandered to North America some 3,000 years ago by way of the Aleutian Islands and Alaska, was offered to the National Academy of Sciences today by Dr. Ales Hrdlicka, veteran anthropologist of the Smithsonian Institution.

In Siberia Dr. Hrdlicka examined group after group of ancient human remains native to the region which were identical in all their important characters to early American types. "The resemblance," he said, "is with the Shoshonean-Algonquin and Piman-Aztec American types."

Dr. Hrdlicka told the Academy he was able to make his studies through the courtesy of the Soviet

Government and with the wholehearted assistance of Russian men of research. During the past year he examined important anthropological and archeological collections in Leningrad, Moscow and Irkutsk, little known to scholars outside Russia, and participated in field work carried on by Russian investigators in the Irkutsk region. This area is now known to have been a center of a large Neolithic population, which, as it is becoming better known, is attracting the attention of those interested in prehistoric Siberian-American connections.

Difficult to Distinguish

Commenting on the new finds now being made in the Angara River section of Siberia, Dr. Hrdlicka said that if the Angara human remains were to be mixed with the remains of the Shoshonean-Algonquin and Pitman-Aztec

American types, they could not be told apart.

"This Neolithic population," he said, "lived in the Irkutsk region up to about 3,000 years ago, perhaps even later, then vanished. But along the northern Yenisei, of which the Angara is a tributary, there are to this day among the natives many individuals whose features resemble the American Indian."

Reporting on the cultural and anthropological collections in Leningrad and Moscow, he said that fortunately, during the World War and the troubled times thereafter, they had escaped damage and are now being brought into order again. These collections include certain unique materials from the Russian territories in America, particularly from the Aleutian Islands, essential for studies on Siberian-American relations.

Dr. Hrdlicka has spent many years of study on this particular problem of where the American Indian came from and how, and has led many expeditions into the northwest. All this work indicates, he asserts, that the American Indian and Eskimo migrated from

Asia through Alaska in comparatively recent times, geologically speaking, perhaps in several waves.

Single Race Represented

He is patient with scholars who attribute a much greater age to human occupancy of North America, but insists all present evidence indicates first, that all the native people in America without exception belong to one and the same basic race, the Indian-Eskimo; second, that it is neither physically nor culturally a very ancient race, and third, that the race could only have come from Asia.

For many years evidence has been sought for proof of an American race earlier than the Indian, but in vain, says Dr. Hrdlicka. Referring to finds of weapons and tools often attributed to ancient men of from 10,000 to 20,000 years ago, because they are found in association with the bones of animals now extinct, he implied that one great pitfall for the searchers is the assumption that all the ancient animals lived only in well defined geological periods when as a matter of fact some may have lived as late as 3,000 years ago.

Plane Helps Save Eskimos in Alaska Reindeer Emergency

By A. A. Hoehling.

The airplane is not particularly noted today as an aid in the perpetuation of life.

And yet there probably escaped the general public attention recently the fact that an airplane, dispatched from Alaska by Uncle Sam, was in large measure responsible for saving the reindeer herds of the vast bleak section of that country inhabited by Eskimos and indirectly the Eskimos themselves.

During the last few years the chief food and livelihood of the 18,000 Eskimos who live in an Alaskan area larger than the State of Texas was threatened. The reindeer herds had been split up, and no one knew which animals the white men owned and which the Eskimos owned. As a result many reindeer were left untended to die of starvation, to be frozen, or be killed by marauding wolves.

Some of the herds decreased as much as 80 per cent. The vast Kivalina herd, which numbered 42,000 animals in 1932, had dwindled to 5,000 last winter.

It looked as though the Eskimos, the traditional tenders of the reindeer herds, would either face gradual starvation or relief jobs back in civilization, if they could be induced to come to civilization.

Then Congress appropriated \$795,000 and told the Department of the Interior to do something about the serious situation. It did, by sending Charles G. Burdick, formerly connected with the Forest Service, and a tri-motor, 10-passenger plane up to the cold tundras of the Eskimo country.

Cruises Over Herds.

Aided by scouting crews on foot and in dog teams on the ground, Mr. Burdick spent the winter and spring of this year cruising in the big plane over the reindeer herds, covering thousands of miles as he counted the animals and transmitted the information to the ground crews who proceeded to

corral and mark the valuable 'deer.

The craft was equipped with skis and radio, but the work was hazardous just the same, because of lack of landing fields, the wild character of the terrain, and the necessity for working during the long Arctic winter. Altogether he covered more than 50 additional round-ups of the animals over the tremendous reindeer ranges.

Keeping him company in the plane usually were J. Sidney Rood, general supervisor of the United States Reindeer Service; one or two

Eskimo chief herders, and the various white men owners of reindeer from whom the Government was buying the animals in order to return them to the Eskimos.

When he had finished his task, Mr. Burdick announced that he had counted 82,500 reindeer. What's more, he had conducted his count so efficiently and bargained so well with the former owners that he saved the Federal Treasury \$274,000, which he turned back to the United States.

Thanks to Mr. Burdick and the

Government, the Eskimos of Northern Alaska can look forward to a winter of security and work. And the young boys, especially, should be happy over the roundup, for it is upon them that the work of tending the herds largely falls.

For 12 months of the year the boys who choose to become herders must guard the lives of the animals. They must follow them over the tundras through the long winters, keeping the wolves away, hunting food when blizzards and bitter winds freeze over the vegetation.

In the humid, damp summers the boys must see that the black swarms of gnats, flies and mosquitoes do not all but devour the nervous animals. The young herders must be practical veterinarians and be able to cure a sick reindeer. When the herds are on the increase they must know how to slaughter the animals for food and cut up the hides for clothing.

The life of these dwellers of the Far North is not a lively one as compared to the standards set by civilization. In the winter the children who are not old enough to herd reindeer stay with their families in the small scattered towns of Northern Alaska and study in the Government schools, while for the older people who are not working with the herds or making clothes there is little at all to do.

In April the families migrate en masse from the towns for the annual fishing and "ratting" season, which lasts anywhere from six weeks, the only other diversion from the life of reindeer herding. The "ratting" is for muskrats, most of which are killed by the Eskimo boys, using .22-caliber rifles.

But the fishing and the "ratting" could not alone have saved the Eskimos if the reindeer herds had died from the face of the Alaskan tundras.

It took an airplane to save them—and to insure the life they understood.



Eskimo boys "bulldogging" reindeer at the roundup or "handling." This is an exceedingly important part of reindeer work and of Eskimo life in general.—U. S. Indian Service Photo.

Strange City, 2,000 Years Old, Dug From Arctic Beach Sands

Anthropologists Hear of Mysterious Site
Where Thousands Lived in Log-Sod Houses

PHILADELPHIA, Nov. 28.—Discovery of a 2,000-year-old city buried under the drifting sands of an Arctic beach in Northwestern Alaska was announced to anthropologists of the American Association for the Advancement of Science meeting here today by Dr. F. H. Rainey of the American Museum of Natural History.

It was a metropolis of at least 800 log and sod houses and several thousand people, with five broad avenues. The extent of the settlement was revealed by the curious fact that when the snow melts in spring, the grass grows green along the avenues and cross streets while it remains brown over the house sites. It forms a sort of ghost photograph of one of the strangest ruins ever found by an archeologist.

In two summers, Dr. Rainey said, 26 house sites have been excavated. The homes themselves long since have disappeared and only fragments of logs indicate what they may have looked like. Apparently each consisted of one large square room with a fireplace and an entry.

On the house sites themselves few relics were found, but Dr. Rainey and his associates dug up many strange artifacts in a graveyard about a mile away. The main cemetery of the city has not been found, although a crew of 40 Eskimos was kept busy digging test holes over the entire neighborhood.

Mammoth Tusks Used.

Most of the artifacts are of ivory, some of it from the tusks of the walrus but much of it from the tusks of mammoths that must have been extinct long before the founders of this city. Some were harpoon heads used to kill sea mammals. A larger percentage were arrow points for land hunting. The ivory was inset with sharp

blades and points of flint—a practice hitherto not found in the Arctic. There were many objects of religious ceremonial—some of them beautifully engraved with designs characteristic of the old Bering Sea culture found a few years ago by Dr. Henry A. Collins of the United States National Museum.

But the kinship, Dr. Rainey said, apparently was only artistic. Otherwise the citizens of this long vanished Ipiutak, as the city has been named, apparently had an entirely different way of life. They were in some way related to the Eskimo but, the discoverer believes, came to the New World centuries before the earliest hitherto known Eskimo migrants. It may be possible eventually, he thinks, to trace them back to Siberia or North China. Some of their artifacts are quite similar to New Stone Age implements of Manchuria and Japan.

The city—more than a mile long—apparently was short-lived. Hardly more than a couple of generations could have lived there because in no case has one house been found built over another. Choice building sites usually are used over and over again as houses grow old and collapse or are demolished.

Probably no other large town ever was built in so strange a place. It now is one of the most desolate spots on earth. The climate could not have been much different 2,000 years ago. There was hardly any possibility of agriculture. Life there today depends almost entirely on killing whale, walrus and seal, yet this seems to have been only one of the enterprises of the ancient people. Present-day Eskimos and Indians are able to survive only in small villages and wandering families, where everybody contributes directly to the slender livelihood.

Summer Habitation Possible.

Two thousand years ago such a large settlement must have required a considerable number working on unproductive jobs. How such an aggregation of people ever was fed through an Arctic winter is a mystery. One possibility, Dr. Rainey says, is that the town was inhabited only in the summer. During the long, black winter the population

may have scattered in family groups into the interior and lived by hunting moose and smaller game. With the first signs of spring, Dr. Rainey believes, there may have been a great trek from all over the country to this empty city where the entire summer would be spent hunting sea mammals and making clothes, weapons, etc., for the next winter.

The city probably antedates the great Maya cities in Central America and probably was the largest inhabited site on the continent at the time. An extensive political structure would have been necessary to keep it functioning.

Even in the summer life there would have been desolate. Heat for the houses, Dr. Rainey found, was supplied from open fireplaces in which logs and whale or seal oil were burned together. The people had not yet made the great Eskimo discovery of the oil lamp.

The work was undertaken in association with the Danish National Museum. The entire collection made during the summer of 1939, Dr. Rainey said, was sent to Copenhagen and has been lost.

Seward's Deal For Alaska Not Just Blind Luck

Historian Finds Secretary
of State Knew Russia's
'Icebox' Was Good Buy

EVANSTON, Ill., July 4 (AP).—A Northwestern University scholar made public today a research report which he said scotched a seventy-three-year-old accusation that William H. Seward, Civil War era Secretary of State, contrived the purchase of Alaska to advance his own political fortunes.

Citing recently uncovered journals of an explorer as conclusive authority, James Alton James, dean emeritus of the university's graduate school and formerly chairman of the history department, said the purchase of "Seward's Icebox" from Russia in 1867 was not merely a lucky deal for the United States arranged "unwittingly" through a politician's self-interest, as some historians have contended.

The dean's investigations were assisted by the finding of five journals of Dr. Henry M. Bannister, one of the explorers, in the home of his daughter, Miss Ruth Bannister, of Evanston.

Dr. Bannister, who became the second curator of Northwestern's museum, was in charge of one section of the later Kennicott expedition, and made valuable observations of climatic and economic conditions.

It was after Dr. Bannister had told his story, Dean James said, that the Senate, with only two dissenting votes, decided to purchase Alaska for \$7,200,000.

Alaska's People

Of Alaska's population of approximately 72,000 people, about 31,000 are descendants of the aboriginal Eskimo, Aleut, and Indian races.

Equipment of New Weather Post In Alaska Awees the Eskimo

BARROW, Alaska, Sept. 27 (AP).—Balloons and helium tanks have the Eskimos open-mouthed around this northernmost community on the North American continent.

It's because the United States Weather Bureau, in its ever-widening attempt to plot storms before they blow and snows before they fall, has extended its observation here.

So John Jones of Chanute, Kan., will be as surprised as the Eskimos to know that the balloons and

helium tanks are helping the Government tell him whether the time is ripe for a picnic or whether he'd better buy some antifreeze for his car.

The Eskimos are currently watching construction of a huge tower from which radio-controlled six-foot balloons carrying weather registering devices will be released.

The tower dominates the Barrow skyline—which otherwise is composed chiefly of the sheet-iron roofs of trading stores and the rough tops of native houses against a barren background of rolling tundra.

The balloons will be released over the top of the Arctic ice field, and the findings of the instruments will be transmitted southward from this weather-breeding area so United States citizens can get the jump on the elements.

Barrow will be remembered as the village of 111 families, four of them white, which is tucked away on Point Barrow, at the top of one's Alaska map.

It was a short distance from Barrow where Will Rogers and Wiley Post crashed their plane in 1935, and a monument to the pair was dedicated by a party of Oklahomans a couple of years ago.

It was at Barrow, too, that Sir George Hubert Wilkins, submarine and aerial explorer, made his base while searching unsuccessfully for the lost Russian airman—Sigmund Levaneffsky, and his transpolar flying companions from Russia, the winter of 1937-38.

The balloons and tanks were brought here during the summer by ships which thread through the softened summer ice, and overland by airplane.

Colonize Alaska, Stefansson Urges

NEW YORK, Dec. 3 — The United States should continue to send colonies of Americans—especially food-producing persons—to Alaska as an aid to defense of that territory and the United States, according to Dr. Vilhjalmur Stefansson, commander of many expeditions to the Arctic.

Dr. Stefansson voiced this view in an interview here yesterday, a day after his return to New York from a month's trip to Alaska. Admitting that the Matanuska settlement, sponsored by the Federal Government, had many faults, he held that the Government could profit by the mistakes and bring to the north country farmers and other food producers who would keep the Army fed that will be required to guard Alaska, the United States northernmost defense post. This would permit an army in Alaska to be self-supporting as regards food supplies should an enemy cut communications be-

tween the States and Alaska, he said.

Dr. Stefansson, who will make a lecture tour this winter, is adviser on northern operations for Pan American Airways and was in Alaska to get acquainted with the line's facilities there. While there he studied Alaskan military defense from the standpoint of clothing, camp equipment, methods of travel and protection against exposure, and said he would confer in Washington soon with the Quartermaster's Department of the Army and perhaps with the Air Corps in connection with these phases of Alaskan defense.

The people of Alaska, who have long had friendly relations with the Russians, hold that the United States should pursue a good-neighbor policy with the Soviet Union as well as with the nations of this hemisphere and "deplore" the press campaign in the States against the Communist State, Dr. Stefansson.

THREAT TO ALASKA SEEN IN RED FORCE

Chain of Army, Navy and Air Bases Is Created by Russia in Bering Sea Area

By HALLETT ABEND

Special Correspondence, THE NEW YORK TIMES.

SHANGHAI, China, July 5—When on June 14 Alaska's delegate to Congress, Anthony J. Dimond, announced to the press in Washington that thousands of Russians, supposedly colonists, were being settled on Big Diomed Island in Bering Strait, only five miles from Little Diomed, an American island, he sounded an alarm for the American position in Alaska.

"The mass influx of Soviet Russians into that region is alarming the Eskimos," Mr. Dimond said. But from confidential information, and an official Soviet war map, it appears that the United States Army and Navy should take alarm, too, and hasten the existing plans for the safeguarding of Alaska.

Working in secrecy, the Soviet Government during the last six years had deported all the natives from the Bering district and has sent tens of thousands of trained young Soviet soldiers and workmen into this far northern area.

Simultaneously a string of nearly a dozen "Soviet bases of culture," which include army and navy contingents, have been established in this region, fortresses have been built, coast defense guns have been mounted, submarine bases are being built, airfields have been completed, and all foreigners are rigorously excluded from the whole area.

The United States does not threaten Russia's position in the north-eastern part of Asia, and the region is far from Japan's plans for Asiatic mainland expansion. In the opinion of military and naval men here, this vast and secret military development can mean only a Soviet design against sparsely populated and poorly defended Alaska, which was Russian territory before the United States bought it.

Cross Campaigns for Alaska

Soviet newspapers and magazines have been devoting much space to Alaska and its riches while articles extol the deeds of Czarist generals and admirals of a century ago. There is an intensification of the campaign for "recovery of rich lands that once belonged to Russia but do not belong to the U.S.S.R. because they were ineptly lost or corruptly sold later when the dynasty became decadent."

Since the only territory that Czarist Russia ever sold outright was Alaska, the implications are plain.

The thousands of young Russian men and women who are being settled in Northeast Siberia are all representatives of the "younger generation" that has matured entirely under Soviet control. They are said to be carried away with the idea that they are to be the glorious conquerors of the world, that they must sow the seeds of revolution everywhere, and that, to quote from a Vladivostok newspaper, their mission "first of all is to get their hands on Alaska which so idiotically was sold to capitalist America by the Czarist Government."

These far northern outposts of

Soviet Sets Up Station Near U. S. Isle Off Alaska

MOSCOW, June 6—A Soviet Arctic station within one mile of United States territory will shortly be completed, it is announced here. The station will be situated on Big Diomed Island in Bering Strait near Alaska; the island lies less than a mile from Little Diomed Island, owned by the United States.

Last Autumn a steamer left for the island from Vladivostok, but storms and ice prevented the landing of her cargo of materials and equipment. Now being transported from the mainland to the island are four scientists who will work at the new station.

Soviet empire are not isolated and inaccessible. They have good sources of supplies and are rapidly developing more supply lines for civilian needs and for military necessities.

On June 23 most Soviet radio stations broadcast about the eighth anniversary of the founding of the city of Komsomolsk. The Khabarovsk radio announced that work had been begun by 14,000 laborers in the new Komsomolsk shipbuilding yards.

Steel Works Meets Demands

It also announced that the Amur Stal, the Amur steel works, was producing all the heavy industry and military supplies formerly obtained from the factories in the Ural region, and particularly emphasized that 4,000 persons were employed in the great plant produc-

ing guns for fortification of the Soviet Pacific Coast and for the islands and coast of the Bering region.

The accompanying map shows a military base on the shore of Chukotka, just opposite the American island of St. Lawrence. On Bering Island is the new Nikolsk fort, where already there is a population of more than 10,000.

Komandorsky Island is marked as a "forbidden zone" for all except Soviet Army and Navy planes and ships, although German naval officers continue to visit there with great frequency, which deepens the suspicion that a German submarine base is being prepared there.

From time to time during the last two years there have appeared relatively obscure news items about trips of Soviet warships, submarines and merchantmen from Murmansk and Archangel on the White Sea to Vladivostok. Soviet newspapers now corroborate the news that a far northern route has been developed that is feasible despite ice floes.

A branch of the warm Japan current appears to be deflected along the coast of North Kamchatka, and then pushes through the Bering Strait before turning westward. This warm ocean flow makes navigation possible in regions far north of portions of the Siberian coast which are icebound half the year.

The creation of the city of Komsomolsk was a remarkable achievement, as was the building of the railway from Khabarovsk to Komsomolsk. The latter, from a mere village of log houses, has now grown to a city of more than 200,000 population. Another railway, "The Great Siberian Route," will run from Lake Baikal to Anadyrsk.

Along this little known coast the Soviet navy has nothing larger than medium-sized submarines. But along this rugged seaboard, with

thousands of inlets and river mouths, Russia has more than 400 small seagoing torpedo launches.

These craft carry a crew of only three persons each and cost little. They are armed with one torpedo each, one three-barrel hand machine gun and one small rapid-fire gun. They have an average speed of 28 knots and are so small and so swift that they are elusive targets and are therefore considered a menace to larger naval craft.

The Soviet monthly review, Economy and Industry, announces that in this vast region near Alaska Moscow has more than 6,000 "research parties" in operation, their activities running all the way from looking for gold, coal, iron and other mineral deposits, to organizing "punitive expeditions" for the extermination of "illegal settlements" of Russian peasants and native tribesmen. No "outsiders" may live in this area. At least 80,000 Chinese and Koreans have been deported westward to work on railway projects.

BERING SEA AIR BASE OF SOVIET CONFIRMED

Eskimos From U. S. Island Mile Away Saw Hangars Built

SEATTLE, Wash., July 23 (AP)—Reports that a Russian air base is being developed on Soviet-owned Big Diomed Island in the Bering Sea, only a mile from American-owned Little Diomed Island, were confirmed by the crew of the United States Coast Guard cutter Perseus on a visit to the far north.

This was learned when the cutter arrived here on the way to her base at San Diego.

Only ten days ago officers of the cutter talked to the four whites and leaders of the native population of Little Diomed, learning definitely of the presence of a small detachment of Russian soldiers and construction of a large airplane hangar and field on the Soviet island.

American Eskimos, who formerly paddled across the channel separating the two islands to trade ivory, now are barred from the Russian island, it was learned.

With the aid of binoculars those on the American island have been able to follow activity on Big Diomed. The Eskimos said a detachment of Russian soldiers, probably about twenty, has been stationed on the island for some time. Before they were barred from Big Diomed, the Eskimos saw several Russian submarines berthed along the rocky shore, officers of the Perseus were informed.

Soviet Plan to Get Alaska Denied

MOSCOW, Aug. 15 (AP)—A Soviet campaign to regain Alaska is "non-existent," Pravda, Communist party organ, said today with regard to reports in America that the northernmost possession of the United States was menaced by attack from Siberia.

Alaska's Population Up 21%

JUNEAU, Alaska, Nov. 7 (AP)—A preliminary census computation put Alaska's population at 71,911, as compared with 59,278 ten years ago, J. P. Anderson, census supervisor, said today.



THE SOVIET PREPARES NEAR ALASKA

Possible danger for that United States possession is seen in the Russians' construction of a chain of twelve "bases of culture," including army and navy establishments, in the Bering region. Thousands of settlers have been placed on Big Diomed Island (1), close to American territory. A military base has been established at Chukotka (2), also opposite an American island. On Bering Island (3) a new fort has been erected, and Komandorski Island has been declared a forbidden zone, but is being visited frequently by officers of the German Navy.



Wide World

Moscow Takes Observations in Strategic Spot

Pictured above is the village of Nikolskoye in the Commander Islands, in which group the Soviet Union recently established a base in order to chart weather conditions. The weather station is of particular importance because it enables Russia to obtain accurate information for airplane transport over the Bering Sea. Russia has denied reports which filtered into the United States that it was fortifying the islands. It is believed, however, that the Russians have a submarine base at Petropavlovsk, not far from the southwest corner of the Commander Islands. This is the area which has been the center of a dispute over fishing rights between Russia and Japan.

Photos passed by Russian censor.

Russian Move Turns Eyes of U. S. to North

Right to Wrangel Island, in Newly Vital Section, Claimed by 3 Nations

By James G. Simonds

WASHINGTON, July 27.—Reports of Russia's activity in the vicinity of Alaska and Soviet fortification of one of the islands in the Bering Sea, Big Diomed, only a mile from the American outpost on Little Diomed, have focused attention on Soviet-American relations in the Far North.

Though the American government may feel uncomfortable about the Soviet fortifications on Big Diomed, there has never been any American claim to that island. However, far to the north and east lies the little known but much disputed Wrangel Island. Periodically, Senator Robert R. Reynolds, Democrat, of North Carolina, has introduced in Congress bills to support the American claim to this rocky, barren and icebound island across the Bering Sea and a portion of Siberia from Alaska.

The United States, as well as Great Britain, at one time claimed the island, and those who recommend its return to the United States point out that it is almost on a Great Circle air route between Washington and Tokio. The island is, they say, "the world's principal breeding ground of polar bear," as well as a breeding ground for walrus, white fox and fur seals.

Link in Soviet Arctic Service

Despite the various animals that may or may not inhabit the interior, and the rather doubtful possibility of any pilot flying a hundred miles further into the uninhabited regions near the North Pole to reach Tokio from Washington, the island has proved itself of considerable value.

It has become an important link in the great Arctic service which the Soviet Union has built up. This service, created without regard for human effort or money has devel-

oped some of the most important data that has just been brought to light on weather conditions in the Far North.

As these workers in the Arctic service of the Soviets have passed month after month on the island, the claim to it by Americans has become weaker, though it has a historical basis.

According to the treaty of 1867 between Russia and the United States, the line of Alaska and the island possessions ceded to the American government by the Czarist regime included Little Diomed, and stretched north indefinitely into the frozen sea. According to this, Wrangel Island would be outside the line of demarcation. The United States, however, has a claim by reason of voyages made to it by American whaling vessels and warships.

First Reported By Wrangel

Wrangel Island itself, which is about sixty-eight miles long and twenty miles wide, according to the Soviet encyclopedia, was first reported by Baron Wrangel, a Russian. In April, 1824, the baron heard from natives that from the shores they could distinguish snow-covered mountains at a great distance. The explorer was never able to see it himself, however.

More than fifty years later, Thomas Long, an American captain of a whaling vessel, sailed along the southern shores of the island and named it Wrangel Island. In 1879, it was visited by Comdr. De Long, of United States ship Jeannette, which drifted to the north of the island and was crushed in the ice pack.

Two years elapsed before another American crew, sent out in search of the Jeannette, made a landing on the island. Capt. Calvin L. Hooper, commanding, took possession of the island in the name of the American government. The same year another American warship put

in at the island and its commander, Lieut. R. M. Berry, mapped it.

The history of Wrangel Island then lapses for thirty years, though it is supposed that before the whales died out American whalers must have landed on the island occasionally.

The first real landing by Russians came in 1911, when an ice-breaker put in to the island. Its crew erected a beacon and corrected Berry's map for the portion of the island visited. The island was also ascertained to be only eighty-five miles from the mainland, not 100 as previously estimated.

Bartlett and Men Land

Three years later the Karluk, one of the three vessels of the Stefansson Arctic expedition of 1913-'18, was crushed in the ice near Wrangel Island, and Capt. Robert A. Bartlett and his party crossed the ice to the island. After establishing his men in camp, Capt. Bartlett took one man and crossed to the Siberian mainland, where he sent out a wireless call for help. The party remained on the island for six months until they were finally rescued. During this time they claimed the island for Great Britain.

The Russian government made an inferential claim to the island in 1916, but the first attempt at occupation was made in 1921, when a party of four Canadians were put on the island to claim it for Great Britain. One relief ship failed to reach them; a second, two years later, found that all four men had died.

In 1923, the Soviet government protested the raising of the Canadian flag, and a year later Carl Lomen and associates, of Nome, Alaska, bought out the interests of Stefansson in the island.

However, Mr. Lomen was never able to make good his claim. The following year the Soviet government sent an expedition and took over the island. On Nov. 4, 1924, the Soviet regime notified all governments that the Soviet Union would take "necessary steps" to pre-

vent violation of the sovereignty of the island.

Continuous Occupation

In recent years the Soviet grip on the island has been steadily tightened. A colony of sixty-four Eskimos and nine Russians was landed in 1926, and since then there has been continuous Russian occupation.

Though the Russians have been unable to reach the colony by ship for periods of from a year to five years, the polar station there has maintained radio contact with the Soviet mainland, according to occasional reports in the Russian papers. The press states that forty-four Russian colonists who had been ice-bound on the island for five years were finally reached in 1934 by a party of Soviet scientists, but the colony remained on the island. Thus for the time being the Russians remain in control of Wrangel and there appears little likelihood of any formal American demand for possession of it, despite the increasing American interest in the northern region around Alaska as an outlying line of defense.

ICE BRINGS ESKIMO FEAST

Hunters Get Bear and Seal at Point Barrow as Floes Return

POINT BARROW, Alaska, Dec. 15 (AP)—There'll be Christmas feasting up here, after all, because the ice came back.

Even yesterday it looked like a thin Christmas for the Eskimos who inhabit this village at the northernmost tip of Alaska. It had been the warmest Winter on record—so warm that a mere 20 degrees below zero Friday night seemed not particularly cool.

Then the ice—last year's ice floe, to be exact—came back on the north wind. Hardy Eskimo hunters, who know what the old ice floes carry, paddled out. They returned with eleven polar bears, many seals and a few walrus.

U. S. Charts Mountains Submerged Off Alaska

By The Associated Press.

JUNEAU, Alaska.—Discovery of a submarine mountain range, 3,000 feet in altitude but 8,000 feet below the ocean's surface, was reported here by Lt. Comdr. R. D. Horne on return from a charting cruise off the Aleutian Islands.

He said coast and geodetic survey vessels have completed about 20 per cent of a new study of the Aleutian area started in 1934. Previously the only charts available were those made by Russians in the 1860s.

Air Corps Chief And Strategists Fly to Alaska

By Ansel E. Talbert

TACOMA, Wash., July 9.—Word from Washington tonight that Maj. Gen. H. H. Arnold, chief of the Army Air Corps, will speed by plane tomorrow to Alaska, accompanied by a group of crack Air Corps defense strategists, has switched floodlights on the powerful chain of Alaskan air bases which the Army and the Navy are rushing to completion.

Although the announced purpose of the flight is to inspect the work at the Army's Alaskan bases and to seek out sites for auxiliary flying fields, it is certain that one of the matters which the Army officers will investigate "unofficially" is the meaning of recent Russian activities across Bering Strait from Alaska. There it is only about sixty miles between the mainlands of the two nations, and there are known to be Russian military establishments and auxiliary air bases of unknown strength at East Cape, Cape Unikik and Whalen, a point between.

Governor Ernest H. Gruening of Alaska told the writer in Juneau less than two weeks ago that persistent reports had reached him of sudden and inexplicable Russian activities on Big Diomed Island. This bleak spot of Russian-owned land is almost exactly in the middle of Bering Strait, where the easternmost tip of Soviet territory is closest to the westernmost point of Alaska. It is less than three miles from Little Diomed Island, belonging to the United States.

Russia's greatest Arctic explorer, Vitus Bering, came on the two rocky islands Aug. 16, 1728, as he sailed through a fog, and gave them their present names because it was St. Diomed's Day. Since that date only a few white men have seen them, and until recently their only inhabitants have been Eskimos, except for a few missionaries and traders. Although the Russian island is by far the largest and most abundantly stocked with Arctic birds, most of the Diomed Eskimos prefer to live on the American island because of dislike of Bolshevik rule.

Governor Gruening suggested that a visit northward might be informative about what was transpiring, and the writer flew to Nome, less than 200 miles from the Diomed group. There Eskimos from the Diomedes, whom ethnologists say are the remnants of the "Golden Age" of Eskimo culture 2,000 years ago, revealed that since the ice broke in the spring Russians had been ferrying large quantities of lumber from East Cape to Big Diomed.

The Diomed Eskimos, who are well educated by the Catholic and Lutheran missionaries, are not unfamiliar with the instruments of white civilization. They knew most of the details of the European war through American-built radio sets, had nickel-plated zippers sewn on their reindeer parkas and propelled their skin boats with outboard motors in many cases. They described in detail surveying instruments used by the Russian visitors to Big Diomed, and said that a new

Says Raw Meat Chewing Brings New Set of Teeth

By The Associated Press.

WASHINGTON, July 25.—If you chew enough raw meat you may develop an accessory set of teeth, Dr. Ales Hrdlicka, of the Smithsonian Institution, said today.

He described how some people, particularly Eskimos and Greenlanders who start chewing on blubber leather and other raw meat at an early age, develop a bony ridge of false teeth in the front of the mouth just behind the ordinary teeth.

The anthropologist described the teeth as "supplementary hard bony tissue" which occurs as rows of small protuberances or cone-shaped growths coming up from the lower jaw.

They never ulcerate or decay and seem to be entirely normal bone, he reported after a study of 5,000 skulls gathered from all over the world.

"village" was being built on the island.

The Eskimos, who were in the habit of traveling freely between the Diomedes, Siberia and Alaska until Russian restrictions were established, also said that an unusual thing had occurred. Russian authorities, they said, were buying all the furs—new and old—available. In the past only new furs had been purchased.

This indicated, they thought, the sudden outfitting of a large group of men for duty in some cold climate.

Three Nome residents most familiar with the Diomedes, the Rev. Thomas Patrick Cunningham, Catholic missionary who lived three years on Little Diomed; Ira M. Rank, a "sourdough" of the 1898 gold rush, turned trader, who was on Little Diomed a month ago, and Miss Phebe Sheppard, the government nurse sent to care for the Eskimo tribes near Nome, corroborated the stories of the Eskimos. All three were certain that a radio station to give weather reports was being built. They added that on the side of Big Diomed nearest Siberia the island was sufficiently flat for an airplane runway to be built, capable of accommodating large planes.

SOVIET CITES ARCTIC SPIES

Activities Attributed to 'Certain Pacific Ocean Powers'

MOSCOW, May 9.—In an interesting article on the life of the Arctic border guards, O. Kurgaboff, writing in the magazine Soviet Arctic today, declares that certain Pacific Ocean powers, presuming on the friendly relations of the Soviet Union and the United States, sometimes send spies in cutters and schooners from American waters. Recently, the writer says, the Eskimos arrested such a man on the coast of Chukotski.

On the coasts of Chukotski peninsula, close to North America, the writer says, live the men who are guarding the coasts of the Arctic Ocean. In winter these men and their families are clad in felt boots, sheepskin coats and fur caps, and they generally move about on skis, accompanied by dogs.



Mrs. Madeline Mirow

LIVER OF POLAR BEAR POISONS EXPLORERS

Carnegie Zoologist Reveals an Experience of Party

PITTSBURGH (Science Service)—If you shoot a polar bear don't eat his liver. It is poisonous.

In a recent issue of the Journal of Mammalogy, Kenneth Douth, zoologist of the Carnegie Museum here, tells of the unpleasant experience he and a group of fellow scientists had after a feast of polar bear liver garnished with onions.

One member of the party had shot two polar bears. It was suggested that a meal of polar bear steaks would be nice, but the bears had not yet been skinned. The party decided to compromise on fried liver. Everybody ate heartily, including the crew of the chartered boat. The meat tasted slightly soapy at first, but after that it seemed delicious.

Everything went well until about one o'clock in the morning, when Mr. Douth awoke, ill with a dull headache. Then he suddenly remembered reading explorers' tales of polar bear liver being poisonous.

He debated whether to awaken the rest of the party, but decided not to: "As I had never heard of a death from the effects of polar bear liver, I decided that to wake the others and tell them they had been poisoned might be worse than the poison itself."

Next morning, however, all in the party were sick, with violent headaches, nausea, dizziness and torpor. It was two or three days before everybody again felt normal.

Far North Melons Exhibited at Moscow

Melons grown at 62 degrees north latitude by M. G. Yegorov of the New Life Collective Farm in Yakutia were exhibited recently in Moscow, Russia. He says that melons are cultivated on the collective farms of the Verkhue-Vilyuisk district, at 64 degrees north.

Young Mother Makes Success Of Alaskan Airline

NOME, Alaska (P)—While the 24-hour summer daylight prevails, Mrs. Madeline Mirow, believed to be the only North American woman operating an airline, on scheduled service, is drawing up plans for winter operation.

Small, attractive and in her twenties, Mrs. Mirow, widow of Hans Mirow who was killed attempting to fly supplies to a marooned party, spends long hours charting courses and drumming up business for her six-plane line.

Prospectors, miners and trappers scattered on the Alaskan tundra north of Nome depend on her for mail during the long Arctic nights. The Mirow planes cart gold nuggets worth sometimes up to \$75,000 a load, and enable miners to move in needed freight—a ton at a time.

Next spring, before ice on the Bering Sea, has broken, a plane will call at little Eskimo villages for cargoes of fox furs. If the planes did not call shipments would have to wait for the first boat which comes in mid-summer.

Flying is hazardous in this country. The Nome airport often is blanketed by fog, and airports seldom are much more than cleared areas on the tundra, or sand beaches.

Old Russian Names Are Unpronounceable

JUNEAU, Alaska.—News commentators who struggle with tough words from the European war front should feel fortunate that the conflict is not staged in northwest Alaska.

Early Russian influence combined with the strange nomenclature of both Eskimo and Indian languages has left innumerable names in the territory.

For instance Ankochoagamut, Ek-lutna and Tkikiktoik are familiar names here but also unpronounceable.

Olaikkekakamut is a fish and ingerachuk a wild fowl. Unalakleet is a reindeer center, Oghagemut a mission, Kogguing, a native school, Metlakatle and Oghagemut are towns.

White men have added quaint names to places such as Auk Wing, Fish Egg, Chicken, Grouse Gulch, Yes Bay, Squaw Foot, Gold Run and Red Shirt.

Ice Yields Live Bacteria

MOSCOW (P)—Scientists of the Eternal Ice Research Institute expedition to Abalakh Salt Lake, who returned recently from Siberia, said buried ice formed there "from 50,000 to 100,000 years" ago had yielded "a vast number of live bacteria of peculiar forms," some of soil varieties and the others not yet classified. A spokesman reported the ice, compressed from great masses of snow in the Glacial Period, was found under from six to ten feet of soil over an area of "scores of kilometers," its thickness ranging to seventy-two feet.

STEFANSSON URGES U. S. TIE TO SOVIET

Explorer Holds Our Program Should Embrace Greenland and Also Iceland

Dec. 2

An extension of our "good neighbor" policy to include Soviet Russia was advocated at a press conference yesterday by Vilhjalmur Stefansson, veteran Arctic explorer, who has just returned from a two-month survey in Alaska for Pan-American Airways, for which he is adviser on northern operations.

"That is the way Alaskans feel about it," he said. "With the exception of Mexico and Canada, Soviet Russia is our nearest neighbor, at one point in the Bering Straits less than two miles from our shores. We could agree to disagree as to politics—socialism for them, capitalism for us—and then search for points of common interest."

Mr. Stefansson, who has spent thirteen years in Arctic exploration and who has discovered more than 100,000 square miles of territory, urged Russo-American cooperation on agricultural research, meteorological surveys, pressure on Tokyo to make Japan live up to her sealing and whaling treaties, Arctic trade, and adoption of the Soviet ice-breaker, "the only one in the world for all-year-round usage."

"Great Britain is now trying desperately to come to an accord with Russia," he said. "Let us not make the same mistake. Let us, instead, cooperate with the Soviets now in good times, rather than in a time of stress."

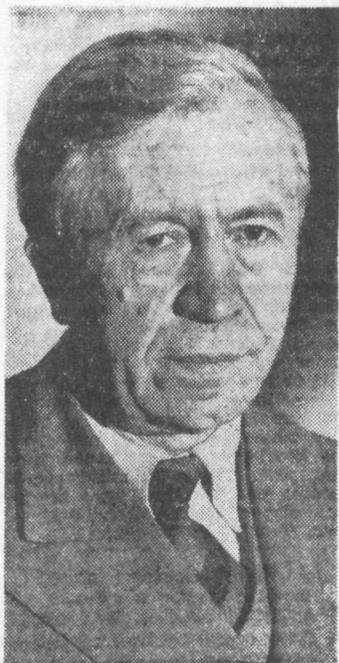
No one in Alaska, he said, had any fear of a Russian attack. Their resentment, he declared, was directed toward Japan, not only for its breaking of the sealing and whaling treaties, but also because "Japanese scientific fishermen" have been sounding and mapping Alaskan waters and probably know the region better than the Americans.

The defense program in Alaska, Mr. Stefansson revealed, is coming along "amazingly well." There is some criticism of the lack of coordination in some cases between various government agencies, he said, but on the whole soldiers' barracks, plane hangars and airfields are being constructed "faster than any one had expected."

"Alaskan defense is vital to the national program," he said. "The odds are ten to one against our Pacific fleet being defeated. But we must prepare against that single chance and go ahead with the reconstruction plan for the three major overland highways linking Alaska and the United States, to insure continuous communication with Alaska in any emergency."

The explorer, who is of Icelandic parentage although born in Canada, said our national defense should be a triangular program, embracing Alaska in the Northwest for Pacific domination, Iceland and Greenland in the Northeast for Atlantic domination and the Panama Canal Zone.

"The acquisition of Iceland and Greenland is necessary and it is not a new idea," he said. "Secretary Seward advocated it at the time he negotiated for Alaska. Right now it is believed Iceland is occupied by 80,000 Canadian troops, so we have no worries on that score."



WANTS U. S.-SOVIET TIE

Vilhjalmur Stefansson
Times Wide World, 1940

But while Denmark is controlled by Germany it will be difficult to acquire Greenland."

Mr. Stefansson said the government should colonize Alaska with more farmers, gardeners and dairymen to make the territory, rich in agricultural possibilities, completely self-sufficient and a source of supply for the United States. The Matanuska Colony, he said, was a step in the right direction, but there were many mistakes by which the authorities could profit.

"The worst," he said, "was in sending the poorest and least able persons in the United States to Alaska. They should send only farmers and men interested in bettering themselves. The Mormons, the best farmers in America, rumored to be interested in an Alaskan project, would be welcomed there with enthusiasm."

ALASKA BEING SCANNED

Geologist Survey Rushes Search for War Metals

With the aid of men, horses, airplanes and all sorts of up-to-the-minute equipment the United States Department of the Interior is expediting its \$100,000 Alaska reconnaissance this season to meet the military and economic defense needs of the nation, reports Current Conservation.

The names of the regions where the Geological Survey is operating are as Alaskan as the Eskimo—the Nabesna and Chisana Rivers, the Lost River area, the Chichagof and Yakobi Islands, the Kuskokwim, the Nenana, the Tanana.

Among the minerals being sought in Alaska are nickel, chromite, tin, designated by the Army-Navy Munitions Board as strategic to national defense.

On Chichagof and Yakobi Islands, just off the coast near Juneau, Alaska's capital, the Geological Survey is searching for nickel. The United States' deficiency in this product is shown by last year's production which amounted to only 394 short tons, while the apparent consumption for the nation was 52,000 short tons.

Sled Dogs Are Mainstay Of Life in Many Remote Places

By JAMES MONTAGNES

TORONTO—When lives depend on dogs, dogs receive good care. That is the way trappers, mounted police, Indians, Eskimos, prospectors, fur traders and missionaries in Canada's northland feel about their dogs.

Everywhere north of Canada's railway line dog breeders, amateur and professional, are at work trying to develop a strain of sled dog superior to the pure-bred Eskimo husky dog which is now fast disappearing. The dogs that ply the trap trails in the wooded regions and the dogs that pull the sleds over Arctic ice fields for missionaries and police are a mixed lot, in every color from a grayish white of the pure-bred husky through blacks, browns, yellows and spotted varieties, telling the story of the mixture with Russian wolfhounds, with wolves, big newfoundlanders, mongrels, collies, even German police dogs. Each breeder has something more in view—to add speed, strength, size and bush-ranging qualities to his sled dogs.

At the farthest north police, mission and fur posts, above the Arctic Circle, where planes do not yet reach and boats come only once a year, the purest-bred Eskimo dogs are found and there they receive the best of care, for they are the main means of transportation.

Here the dogs are fed seal and walrus meat in Winter. In Summer they are left to shift for themselves, finding mussels, crabs, fish, shrimp and other seafood cast up on shore. In Winter they are given feedings every night, for in Winter the white man as well as the native depends most on the dog for transportation. At two or three pounds per night per dog, the sleds have to carry a tremendous load at the start of a trip, for ten dogs or more make up a team and trips last anywhere up to two months.

On these rations or less the huskies will pull in the coldest weather over the most difficult course. Huskies have even been known to travel under severe conditions with little or no food for weeks. Glaciers, wind-swept mountains, jagged sea ice, all are taken in the dog's stride. When food is low the huskies will eat almost anything. Then harness, sled ropes, clothing and kyaks have to be kept away from the dogs and food caches have to be guarded by especially large boulders.

Guarding the Young

The dogs breed all year and a litter can be expected at any season. Usually the female goes away to a wild and secluded place and there has her litter of six or eight pups. She is crabbed and suspicious at that time and will not allow male dogs around, for the very good reason that the male huskies will eat her pups if they get a chance. If it is Winter the Eskimos usually



James Montagnea, from Eldorado Mines An Eskimo pup of Arctic Canada.

build a small snow kennel for the mother dog, place bags or skins on the floor and make the animal as comfortable as possible.

The young pups grow up rapidly. They are petted in their first few months, and so lose their instinctive fear of man. They are fed meat or fish as soon as they leave their mother's milk and within a year have grown to about twenty inches in height, weigh fifty pounds or more and have been taught to take their place in harness.

While the huskies throughout the northland show affection, like any other dogs, parents keep an eye on their children when they are playing with even the pups, for the huskies have been known to attack and kill children and adults.

Good Huskies Costly

Because dogs are in such demand in the northland, their price is often as high as \$250. Prices go up after each dog epidemic, which spreads right across the northland even though no dogs from one settlement contact dogs from another. Science has not yet found an answer to this periodic disease, which strikes at the most isolated posts and will kill off dogs in a few days.

Huskies are able to stand any temperature and any weather. In the coldest weather they will curl up in the open and go to sleep. When blizzards blow they try to find shelter in the lee of a rock, igloo or ice hummock, then contentedly go to sleep without any harm. Only when making their way over serrated Spring ice are the dogs' feet protected with shoes.

Breeding huskies is a profitable business, for there is a continual demand. Police patrols have 400, and buy every year.

Point Barrow 'Getting Crowded'

POINT BARROW, Alaska (AP)—Charlie Brower, grizzled veteran of the Arctic who recalls that once he was the only white man north of Rome, would like to move. The census shows twenty-five white residents. That is the largest in the history of Barrow, the farthest North American community. Brower declares "it's getting too crowded."

How the Eskimos Help in War; Aurora Not Always Radio Bane

OTTAWA—The din of war even though only an echo on this side of the Atlantic drowned the rattle of the anchor chain of the Nascopic as it came to rest in the St. Lawrence River after its 12,000 miles cruise through the Arctic.

But if this three months' trip of the Hudson's Bay Company steamer to the Arctic archipelago aroused less interest this year than usual, it had some novel features. One of these was a visit to Greenland, cut off from Denmark since the Nazi invasion of the homeland and dependent on Canada and the United States for many necessities of life. Both countries have a consul in Greenland and in the Nascopic cargo landed at Godthaab were furniture and materials for the construction of a house for the Canadian official.

Maj. D. L. McKeand, commander of the Arctic patrol and other members of the expedition were struck by the cordiality of the greetings of the Greenlanders who were obviously deeply appreciative of the succor they have received from both the United States and Canada.

On Alert for Suspicious Craft

The little nomadic tribesmen of the northern islands, the Eskimos, are playing their part in the war. Hostile aircraft and ships may never visit these wide barren areas, but the Eskimos fishing in Hudson Strait and trapping on the islands are on the lookout. If any suspicious boat or plane is sighted the Eskimos will immediately inform the nearest post and the news will be radioed south. According to Major McKeand the approach of an innocent Newfoundland boat to the mouth of Hudson Strait was broadcast in amazingly short order to Ottawa.

One interesting piece of information brought back by the Nascopic, refuting a common belief in Canada, was that the aurora borealis doesn't always interfere with radio reception. Broadcasts were heard with perfect clarity at a time when there was a profusion of white lights dancing in the sky.

Northern "Society"

The most westerly point visited this trip by the Nascopic was Fort Ross on Bellot Strait between Somerset Island and Boothia Peninsula. This narrow and tumultuous strip of water choked for most of the year by ice floes is the connecting link of the Northwest Passage. It is a fine fishing and hunting ground, and the members of the expedition were pleased to find the band of natives which they transported there from Baffin Land were prospering in their new environment.

There is a never failing charm

for the passengers of the Nascopic on its annual cruise, even though for days there is nothing to be seen but the wide stretch of water, broken ice fields and rocky barren headlands. Calls at trading and police posts where there are always little groups of natives relieve the monotony. There is always quite a variety in the types of passengers. This year five white children, natives of the Arctic and much more at home with the Eskimo than the English language, were brought out to civilization for the first time, and two American girls, one from Sherrill and one from Rochester, N. Y., went north to marry. Miss Dorothy Boehmer of Sherrill was married to Corporal Hamilton of the R. C. M. P. stationed at Pangnirtung, Baffin Land, and Miss Marion Buell of Rochester to P. A. C. Nichols of Newfoundland, who is a manager of fur trading posts. The weddings took place on board the Nascopic.

Men in Yukon Escape Draft Canada Says They Are Too Far and Too Few to Be Sent After

OTTAWA, Sept. 11 (CP).—The call of the Yukon doesn't include the call of widowers without children and single men to compulsory military training, as far as Canada is concerned.

Justice T. C. Davis, Associate Minister of War Services, said tonight that if single men or childless widowers in the Canadian Yukon wanted military training they would have to come to the nearest training center to get it. He said the men were too far, and too few, for the government to go after them.

Bartlett Returns From Cruise in Arctic; Reached Area Unvisited Since Peary Trip

The Effie M. Morrissey, Captain Robert A. Bartlett's forty-ton schooner, nosed into her berth at McWilliam's Shipyard in West New Brighton, S. I., yesterday afternoon, ending her fourteen annual trip through Arctic waters.

"The trip was the most successful of all," Captain Bartlett said. "We reached a point 578 miles from the North Pole, farther north than we had anticipated. We were the first vessel to penetrate that area since Admiral Peary in 1906. There were plenty of icebergs but the weather was fine."

On board were eleven college students who sailed as novices, paying their way, but who returned as full-fledged sailors capable of handling canvas or manning a tiller.

Members of their families and 100 friends of the skipper were at the dock to greet them when the Morrissey came in from Long Island Sound under her own power. Harbor craft saluted her as she came in. There had been a previous stop at City Island where four walrus pups, consigned to the Bronx Zoo, were discharged.

One of the prize exhibits aboard was Carmichael, a lively polar bear

TEMPERATE CLIMATE IS TRACED TO ARCTIC

Paleontologist Says Elm, Maple
Once Grew There

Alaska's frozen wastes were formerly just as warm as the Southern United States, Ralph W. Chaney, noted paleontologist, declares in the Scientific Monthly. Such common trees as the elm, the maple, and even the redwood were formerly common in Alaska, Greenland and Northern Siberia, he states.

Dr. Chaney bases his conclusion on the discovery of fossil remains of these trees above the Arctic Circle, and dates them as of the Eocene period, some 58,000,000 years ago, but only a short while as far as geologic times are concerned. He presents photographs of petrified trees found in Alaska side by side with views of similar trees now growing in sub-tropical climates.

This evidence is presented by Dr. Chaney in connection with a discussion of whether continents have moved over the face of the earth in the distant past.

Dr. Chaney summarizes his views by stating that "for tens of millions of years," North America and Europe "have occupied their present position with relation to the North Pole and ocean basins. During their latest chapter of life history, forests have migrated southward in response to changing climate, over continents whose stability through the ages has been well established."

Young Eskimos Aid Refugees

TORONTO, Dec. 24 (CP).—Eskimo boys and girls living in the Aklavik district, near the mouth of the Mackenzie River, have sent \$80 to headquarters of the Church of England Women's Auxiliary here for work among refugees, officials announced tonight. The money was raised through the sale of hand-made goods.

REINDEER HERDS GROW

Canada Reports 1,700 Born This
Year in Eskimo Area

OTTAWA, Canada (Science Service)—With 1,700 reindeer born this year, Canada's herds in the Western Arctic now total about 6,600 animals. When five years ago reindeer reached Canada's Western Arctic after an overland trip lasting five years from the west coast of Alaska, there were 2,370 animals in the herd which had made the trying trip. Since then the herds in the Mackenzie River district have increased annually to the present total.

The reindeer were imported into Canada to provide a new Eskimo industry, because the caribou on which the Eskimos had counted largely for food had been driven away with the onward march of civilization to the north. Eskimos have been trained as reindeer herders, and this Autumn the second herd will be given to an Eskimo to look after. This will be one of 800 animals which will be driven 250 miles overland from the main herd to the Horton River district.

The first herd, given to a graduate Eskimo herder nearly two years ago, has increased from 950 to 1,600 head. The agreement under which herds are given to Eskimos is that the natives must eventually return to the Canadian Government as many animals as they received to start with, the increase being their property. In this way the natives are taught to keep their herds in good condition to allow for maximum increase. The herds are to provide food and clothing for Western Canadian Eskimos, taking the place of cattle herds of the farm regions of the South.

Snow and Ice Called Transmitters of Sound

Dr. Poulter Tells of Research
at Little America

CHICAGO, Nov. 16 (AP).—The discovery in the wind-swept Antarctic that porous, compacted snow and ice are excellent transmitters of sound, was reported to the Acoustical Society of America today.

The report was made by Dr. T. C. Poulter, scientific director of the Armour Research Foundation, who was the senior scientist and second in command on Admiral Richard E. Byrd's second expedition to the Antarctic. Dr. Poulter told the society of the use of a geophysics seismograph—an instrument new in polar exploration and research.

"We traveled 2,000 miles on skis with this equipment and an equal distance by plane," Dr. Poulter said, "measuring continental ice thicknesses of more than 2,400 feet and floating ice of 1,500 feet."

"During the construction of one of our magnetic tunnels, extending about 1,500 feet to one side of Little America, it was discovered that two men standing as much as ten feet apart in the tunnel would have to talk exceedingly loud to make each other heard. While experimenting with this phenomena, we discovered that the porous, compacted snow and ice were excellent transmitters of sound and that frequently from within the tunnel it was possible to hear persons shoveling in the snow a distance of nearly a quarter of a mile."

Sound waves in the ice were produced by exploding TNT buried under the snow.

Sept. 15
cub, captured after a spirited wrestling match at Hillmere in Greenland. It will go to the Philadelphia Zoo. There also were two mongrel dogs, christened Eleanor and Franklin, which the student sailors purchased for "a pack of cigarettes" somewhere along Smith Sound in Greenland territory.

The sea specimens, which included rare sand, stone, fish and birds, will be distributed among the Academy of Natural Science, the Smithsonian Institution and the Cleveland Museum.

The Morrissey left New York last June 20 and headed directly for Newfoundland, where Captain Bartlett visited his mother and brought her a cow. From there the next stop was Labrador and then on to Greenland, where the party went through Smith Sound, Kane Basin, Hill Basin and Kennedy Channel, the most northerly point reached on the trip. At Cape York, at the head of Baffin Bay, a stop was made to visit the Peary monument erected by Captain Bartlett in 1936.

Plans are already under way for next year's trip to the north, but because of international conditions the captain is not as certain of making it as he was the others.

Priest Back From Arctic Tells Of Smoking Coal Mountains

Saw Other Strange Sights, Including Big Willow Grove

Oct. 26

A slender little Catholic priest is back in Washington today with a story of a 15,000-mile trip into the Arctic wilds, during which he saw smoking mountains of coal that have been burning as long as man can remember, the only willow grove in the Arctic and an island made of alternate layers of ice and soil.

He is the Rev. Arthème Dutilly, 44-year-old research associate in botany at Catholic University, who after a summer in the Far North returned to the Capital in last Saturday's snowstorm with several thousand sheets of botanical specimens, insects, rocks and minerals.

This was his 10th scientific journey North but this time he did 12,000 of the 15,000 miles by airplane. The rest was by rail.

Brought Dialect Dictionaries.

To him, outside of the fact that he went farther north than ever, the highlight of the trip was the bringing back of samples of dictionaries of the Indian and Eskimo dialects prepared by hand by missionaries in the Arctic area for their own use. He photographed many of these manuscripts—something that was made possible by a grant from the American Philosophical Society in Philadelphia.

Often, it was explained, only one copy of these dictionaries was available, usually written in beautifully shaded script with explanations and notations in French.

The burning coal deposits he saw on the shores of the Arctic Ocean as he flew eastward from the Mackenzie River delta. The Eskimos call it "Smoky Mountains"—immense coal deposits which have been burning continuously since man first entered the region.

Willows in the Far North.

Eskimos told him of a valley in which a grove of willows was growing. Not far from Minto Inlet, on Victoria Island, he found them in a sheltered valley about a quarter of a mile long. He said they had grown to a height of 7 or 8 feet. How they have reached this height in a climate where ordinarily at full growth they are no bigger than the palm of a man's hand because of the cold, is a mystery to him and will be one of the things he will try to discover from the samples he brought back.

At the mouth of the Mackenzie River was Herschel Island, some 300 to 400 feet high and giving the impression of being a solid piece of land. Exploring crevasses, Father Dutilly said he found layers of soil 3 to 4 feet thick, alternating with thickness of ice.

Mosquitoes Prove Troublesome.

The bulk of the trip was in the plane Santa Maria, used by Bishop Gabriel Breynat, one of two Catholic bishops having ecclesiastical jurisdiction over the Arctic, in visiting his missions.

The trip had its dangers. At one period fog forced them to fly only 150 feet above the water. The mosquitoes, he added, were terrible.



FATHER DUTILLY.

The specimens brought back by Father Dutilly will be studied and classified by university botanists and in some instances by special Federal scientists interested in the results. Some of the specimens will be sent to the Vatican, to Russia, Sweden, Denmark, Greenland and a number of other educational centers.

Arctic Breeding Ground Of Ross's Goose Found

Long-Hunted Nests Uncovered by Hudson's Bay Men

WINNIPEG, Man., Dec. 2 (CP).—A mystery in North American ornithology has been solved with the discovery of the breeding grounds of Ross's goose in the Arctic. For eighty years Arctic explorers and hunters have sought those breeding grounds. Two Hudson's Bay Company post managers, Angus Gavin and Ernest Donovan, were successful last summer.

They found the birds' nests on islands in an unnamed lake at the head of an unmapped tributary of the Perry River, about twenty-five miles southeast of its mouth in Chester Bay, Queen Maude Gulf, on the Arctic Ocean. Two specimens of the geese and a clutch of five eggs were collected and are now in the National Museum at Ottawa.

Ross's goose, named for B. R. Ross, an early day factor for the Hudson's Bay Company at Fort Resolution, is white and is slightly larger than a mallard duck. The birds winter in the Sacramento and San Joaquin Valleys in California, having a migration route from the Arctic through Alberta and into eastern Canada.

Iceberg Hunt Yields One, Lightest Crop on Record

By The Associated Press.

BOSTON, June 3—The smallest floating iceberg crop on record, a single berg, was reported today by the Coast Guard cutter Chelan upon her return from a 3,800-mile cruise in the vicinity of the Straits of Belle Isle, Newfoundland, and the Grand Banks. The Chelan's officers stated that no further ice patrol of the steamer lanes would be necessary this year.

They said a solitary berg found on the northern edge of the Grand Banks probably would ground and disintegrate. Normally about 140 bergs are found during the month of May, and the forty-year average for the season is 440.

MEDICAL ADVICE GIVEN IN THE ARCTIC BY RADIO

9 Doctors Direct Care Through Vast Northwest Territories

SIMPSON, Northwest Territories, Dec. 27 (Canadian Press)—Radio wave lengths are weaving a network of medical security over the wilds of the Northwest Territories.

Aided by two-way radio sets, nine resident doctors employed by the Territorial Council supply the medical needs of about 10,000 Indians, Eskimos, trappers, traders, miners and missionaries scattered throughout 1,300,000 square miles of icefields, rock and lake country and barren lands.

Their practice extends from the northern boundaries of the three Prairie Provinces and part of British Columbia to the far reaches of the Arctic Circle and from the western end of Labrador to the Yukon Territory.

The outpost physicians previously served only northerners within reach of dog teams or boats and canoes. These restrictions usually held them within a 100 miles of their stations except for airplane mercy flights.

Now northern ether waves crackle day and night with medical messages from resident doctors at Aklavik, Fort Smith, Norman, Pangnirtung, Resolution, Chesterfield, Port Radium, Yellowknife and Simpson. Trading posts, missions and Royal Canadian Mounted Police stations throughout the silent tundra land pick up and send the mercy messages.

The Hudson's Bay Company, oldest trading firm in the British Empire, has installed two-way radio sets in seventy-eight of its 215 northern posts. Each post has at least one employe able to send and receive radio messages and plans are being made to install twenty-five additional sets next Summer.

When aid is required, one of the government doctors is called to the radio. The emergency is described and the physician tells the operator what medicine or treatment is necessary.

All Far North settlements are stocked with medical supplies. Emergencies ranging from measles to childbirth have been eased by radio prescription.

Should weather unfavorable to ra-

Couple Do Research in Glaciology

Yale Lecturers Fly To Arctic; Spending Third Summer in North

EDMONTON, Aug. 5—(C.P.)—Dr. Lincoln Washburn and his wife, both young post-graduate lecturers of Yale University, waited impatiently Saturday at Cambridge Bay, approximately 1,200 miles northeast of here on Victoria Island, for the arrival of pilot Alf Caywood who will fly them still further north.

The young couple—he's around 30 and she's a few years younger—are spending their third straight summer in Canada's Arctic, studying and completing field research work in Glaciology. They worked in the neighborhood of Cambridge Bay the first year and last summer they went along the south coast of the island, earning their passage on a Hudson's Bay Company boat as deck-hands and making good friends all along the way with their good spirits, ambition and hard work.

Now they are switching their studies to the northeast coast of the island. Starting from Greely Haven, they will hop northward a few miles at a time to Elvira Island, which is 1,755 miles northeast of Edmonton.

Maps show a series of dots for the coast-line they intend to cover, indicating it has never been charted. As far as is known here, Caywood's plane will be the first to visit the district.

Caywood was delayed en route to Cambridge Bay today at Yellowknife, on the north shore of Great Slave Lake. Before he sets out with the Washburns he must make a return flight to Port Radium, on Great Bear Lake, from Cambridge with two other passengers.

There will be five at least in the flight along the northeast coast of Victoria Island. Accompanying the Washburns and Caywood there will be C. W. Godefroy, St. Louis manufacturer who is touring the Arctic on a pleasure trip, and Pat Cameron, Caywood's engineer. They may also pick up an eskimo guide.

EDMONTON, Alberta, Aug. 15 (P)—Pilot Alf Caywood returned yesterday from Minto Inlet on the Arctic Ocean, 1,755 miles northeast of Edmonton or about 150 miles northwest of the magnetic pole.

Mr. Caywood had three passengers on the 10-day expedition, Dr. and Mrs. Lincoln Washburn, young geologists of Yale University, and C. W. Godefroy, St. Louis cosmetics manufacturer.

On the return trip the Washburns stopped at Coppermine. They will make their way from there to Cambridge Bay, then return by way of the Mackenzie River Valley to Edmonton.

dio blot out urgent messages in one direction, signals are stretched to far-off sets, sometimes reaching a doctor 1,000 miles away.

Japan Denounces Fur Seal Pact On Ground It Harms Fisheries Ends Treaty With U. S., Britain and Russia to Protect Herds—Offer of New Agreement Within a Year Is Expected

TOKYO, Oct. 23 (AP)—Japan notified the United States, Great Britain and Russia today that she was abrogating—effective a year hence—an agreement for protection of fur-bearing seals, the Foreign Office announced.

During the year, Japan will submit proposals for a new agreement, it was announced. A Foreign Office statement said the seals had multiplied to such an extent in the North Pacific that fishing industries had been damaged.

WASHINGTON, Oct. 23—Japan's denunciation of the fur seal convention of 1911 was taken without advance intimation having been received here. When the United States Government denounced the commercial treaty of 1911 between the United States and Japan, it also gave no advance notice of its intentions.

Secretary of State Cordell Hull had received no official word concerning the abrogation today and so refrained from commenting. Diplomatic circles were of the opinion that before the denunciation takes effect efforts will be made to reach a new international understanding on the subject.

The convention was drawn to run for fifteen years and thereafter in perpetuity unless denounced by one or more of the parties to it. When this fifteen-year period ended in 1926 Japan raised but did not press to a conclusion the question of the advisability of continuing it. She contended that the seals were interfering with her fisheries. On the other hand, the United States Bureau of Fisheries contended then and has maintained since that the fur seals covered by the convention are a different species from those feeding in Japanese waters.

The convention was designed to preserve and protect fur seals by prohibiting pelagic sealing in the North Pacific north of Latitude 30 degrees North. This includes the Bering, Kamchatka, Okhotsk and Japan Seas. The convention also protected sea otters outside of territorial waters in this area.

It provided a system for taking fur seals under strict governmental arrangements and in limited numbers with percentage distributions of the skins made among the several countries on the part of the United States for seals taken on the Pribilof Islands by Russia, on the Commander Islands by Japan, on Robben Island, and by Great Britain on islands or other territories in her possession.

The arrangement has worked so well that the seal herds, which were faced with extinction through unrestricted hunting, have grown and flourished in the intervening years.

WASHINGTON, Oct. 24 — The State Department received official word from the American Embassy in Tokyo today of Japan's denunciation of the convention of 1911 for the protection of fur seals in the

North Pacific. Under the terms of the convention the denunciation will terminate it in twelve months.

The embassy received from the Japanese Foreign Office an oral statement and a note. The oral statement said that Japan's position was that, whereas there were 140,000 of the seals in the North Pacific in 1911, there are now an estimated 2,200,000, which constitute a serious threat to the fishing industry, one of the most important Japanese industries.

However, the statement said that Japan was desirous of continuing, to protect the seals on a reasonable basis and was submitting some principles for the revision of the convention, the parties to which are Great Britain and Russia in addition to Japan and the United States.

The note is now being translated by the embassy.

JAPANESE BOATS FISH OFF ALASKAN ISLAND

Fleet Believed Whaling and Sealing Near St. Lawrence Island

NOME, Alaska, Aug. 8 (AP)—A Japanese fishing fleet operating within sight of United States-owned St. Lawrence Island was reported today by John Cross, a fisherman just returned from the island.

Mr. Cross said that he saw one large boat and several smaller craft, including power launches. He said that both natives and whites on the island were alarmed by presence of the fleet, which they believed to be whaling or sealing.

St. Lawrence is the largest island off the west coast of Alaska. It lies nearly 100 miles off Norton Sound and is much closer to the Siberian mainland than to the rest of the United States territory.

Known as the industrial center of Eskimo life, the island has only a few whites but a large native population. Many of the natives earn incomes which would impress an average New Yorker. Sale of white and blue fox pelt and sealskins provides most of their money.

Unlike most Eskimos, those on St. Lawrence live in frame houses, some with overstuffed furniture. The Eskimos seldom use the furniture but enjoy having it around. For the same reason they have bought electric washing machines, although no electricity is available. Although the sun seldom shines, sun glasses are popular.

Canadian Whaling Resumed

OTTAWA—After a year's lay-off, Canadian whalers resumed operations and took 219 whales during the 1940 season. This year's catch gave an output of 132,000 gallons of whale oil and 289,000 gallons of sperm oil. In addition, the reduction of the huge sea mammals yielded 181 tons of bone meal and 434 tons of fertilizer.

Soviet North Pole Flier And 3 Aides Die in Crash

By The Associated Press.

MOSCOW, April 29—Four men widely known in Soviet Russian aviation have been killed in an airplane accident, it became known today. They were Pavel Golovin, Julian Piontkoffsky, Konstantin Alexandroff and V. Kolaidbroff.

Golovin received the title of Hero of the Soviet Union for piloting a plane over the North Pole to rescue Ivan Papanin and a group of fellow scientists from an ice floe in 1937.

Piontkoffsky was a veteran flier who participated in the civil war in behalf of the Soviets. Alexandroff was a plane designer and Kalaidbroff a mechanic.

The newspaper Pravda, paying tribute to the four, said they had "devoted themselves to strengthening the air fleet of the glorious Red Army" and had tested many battle planes.

Pavel Golovin piloted a plane on a survey flight in 1937 to Rudolf Island, within 1,000 miles from the North Pole and over the Pole itself, in preparation for the transpolar flight of Sigismund Levanevsky, famous Soviet pilot, from Russia to the United States. Levanevsky and his crew of five disappeared on the flight in August, 1937, and no trace of them has been found.

The United Press stated that Golovin had commanded an air squadron in the Finnish war.

Husky, Retired by Byrd After Antarctic Trip, Dies

Admiral Called Dog 'Only Hero' of Expedition

BEDFORD, Mass., April 10 (UP)—Jack-the-Giant-Killer, the sledge dog which Rear Admiral Richard E. Byrd termed "the only hero of the Second Byrd Antarctic Expedition," died last night at an animal hospital here, it was announced today.

The ten-year-old husky, retired in 1936, was credited by Admiral Byrd with having set record for polar sledging when, as lead dog, he traveled 525 miles in sixteen days on a return trip from Mt. Weaver, southernmost mountain known to man.

During the expedition of 1933-'35, Jack-the-Giant-Killer was the only dog to lead a sledge on a long haul without a skier to break trail. On that trip the husky led two major sledge parties.

On his return to the United States the dog shared honors with Admiral Byrd in a reception at Washington. Later, he was made the central figure of a book, titled "The Long Whip," by Stuart D. Paine, of Durham, N. H., a member of the expedition, and Jane Waldon.

Former Alaskans Form Club

The Alaska-Yukon Pioneers Club, an organization to give first-hand information on Alaska to those seeking it, was formed July 31 at a meeting of former residents of Alaska held at the Hotel Ten Park Avenue. James Gaffney, formerly a resident of Nome, Alaska, was elected temporary president to serve until a meeting can be held to choose permanent officers. The club will have its headquarters at the Hotel Ten Park Avenue.

EXPLORER'S SKELETON IS FOUND IN LABRADOR

Second of Jersey Men's Bodies Reported by Indians

ST. JOHN'S, Nfld., Aug. 23 (AP)—A skeleton found beneath a tattered tent in the North Labrador wilds was believed to be either that of Herman J. Koehler, 60, of Orange, N. J., or Fred R. Connell Jr. of Glen Ridge, N. J., explorers who disappeared nine years ago, the Rev. Edward O'Brien, Indian missionary, reported today.

Labrador Indians made the discovery this Summer and also found a wallet containing identification papers. They did not bring the wallet to the coast, hence identification cannot be made until next Summer, Father O'Brien said.

Koehler and Connell sailed from Montreal July 14, 1931, then took a canoe up the Koksoak River from Fort Chimo on Ungava Bay, to explore and chart new territory which up to that time had only been visited by Indians.

A year later the body of one of them was found and buried in Hopedale, Labrador, without positive identification.

The skeleton was discovered 170 miles from the Hudson Bay Company's outpost at Davis Inlet and twenty miles inland from the place where the other body was found.

DR. W. G. HINSDALE, 78, EXPERT ON ESKIMOS

Syracuse Physician Authority on Their Prehistoric Culture

SYRACUSE, N. Y., July 16—Dr. William Graham Hinsdale, a physician here for more than fifty years and long recognized as an authority on the culture of Indians and the prehistoric Eskimo, died last night in Crouse Irving Hospital, where he was house physician the last ten years.

Dr. Hinsdale studied Indian lore for more than a half century and was a member of the New York State Indian Board. He discovered former village sites of the Indians and the site of a prehistoric Eskimo settlement on Smith's Island, near Syracuse.

He leaves a widow and a daughter, Mrs. Emma H. Beckwith of Harrisburg, Pa.

Edward J. Bell, 86, Dies; Traveler and Explorer

PHILADELPHIA, Dec. 22 (AP)—Edward J. Bell, world traveler and explorer, died yesterday after an illness of two months. He was eighty-six years old.

Circled World in 126 Days

Mr. Bell began his travels soon after his graduation from the University of Pennsylvania, where he received his bachelor's degree in 1873 and the degree of Master of Arts in 1876. He went through the Hudson Bay country in 1879 and later made expeditions to Labrador, Greenland and Iceland. He went around the world in 478 days in 1903 and 1904 and in 126 days several years later.

A sister, Miss Laura Bell, survives.

Maj. Burwash, Arctic Expert, Dies in Canada

**Veteran Explorer, 66, Flew
to Magnetic Pole and
Mapped Region in 1930**

COBURG, Ont., Dec. 21 (P).—Maj. Lachlin Taylor Burwash, who flew to the magnetic pole in 1930, died of pneumonia at his home near Coburg today. He was one of Canada's foremost authorities on the Arctic region. He was sixty-six years old.

Explored Arctic Forty Years

Maj. Lachlin Taylor Burwash knew the Arctic as few men have ever known it. For more than forty years he passed most of his time in its desolate wastes. Most of his trips into its uncharted regions were made alone or with a handful of Eskimos. He had known hunger and snow-blindness. He had seen his dogs die on the trail and he had stood at the point of starvation before the carcasses of caribou made inaccessible by a covering of ten feet of ice.

He survived these and countless other hardships of travel in the Far North and the scientific, geographical and ethnological information he obtained was of great importance to the Canadian government in developing its northern reaches. In 1930 he and W. E. Gilbert, his pilot, became the first to fly over and map by aerial photography the north magnetic pole, to which all compass needles in the Northern Hemisphere point, and surrounding territory.

As a result of his trips, Maj. Burwash was able to shed additional light on the ill-fated Franklin expedition, although the complete story of how those 105 men met their deaths has never been told. Sir John Franklin, with two ships, the Erebus and the Terror, endeavored to discover the Northwest Passage. The two vessels wintered at Beechy Island in 1846, some 400 miles north of where the final relics of the expedition were found.

Party Frozen Fast Two Years

The next spring they made their way between ice floes southward near King William Island, where they froze fast and remained so for nearly two years. Maj. Burwash believed that the Franklin party had made two attempts to reach the mainland from King William Island. From Victory Point, where they were frozen in, the party was traced down the west coast of King William Island to Starvation Point on the northern tip of Adelaide Peninsula.

Bodies of about one-third of the personnel were found along that stretch. Maj. Burwash surmised that, confronted by a wide stretch of open water between Starvation Point and Backs River, which they were trying to reach, the weary men had turned back to man the ships while an advance guard had gone overland. He thought that the remainder of the crews had attempted to sail around King William Island in opposite directions to be sure of finding the advance guard on foot and picking it up. The ship taking

the eastern route, he held, was wrecked with all hands, while the one taking the western route came to grief when it was driven ashore and its crew subsequently starved to death.

Maj. Burwash was physically fitted for his job in the Arctic. He was short, blond, stocky and powerfully built and possessed the stamina to endure hardships. He was born at Coburg, Ont., on Sept. 5, 1874, the son of the Rev. Nathaniel and Margaret Proctor Burwash. He headed for the North almost as soon as he was graduated from the School of Practical Science at the University of Toronto in 1896.

Saw Klondike Gold Rush

He went to the Klondike as consulting mining engineer for Chicago interests and remained there during the years of the famous gold rush. Two years after his arrival there he became an engineer for the Dominion government service, remaining in the Yukon territory until 1912. He was secretary of the Department of Highway of the Province of Ontario in 1920 and 1921 and then passed years in conducting Arctic exploration for the Canadian government.

During the winter of 1923-'24 he started from the east shore of Cumberland Sound on Baffin Island and for twenty-three days fought deep snow and wind storms to get to Cape Dorset at the southwestern extremity of the island, 1,500 miles away. He thus became the first white man to cross the island from coast to coast. On that trip he corrected maps of the region, showing there were two large lakes in the center of Baffin Island, instead of the three formerly shown on maps.

The next year he negotiated the first crossing of the Canadian Arctic coastline from west to east. On that trip he failed to reach the magnetic pole, because he had to turn back to save his Eskimos and himself from starving. He went back in the winter of 1928-'29 and established his camp where dip circle, a very fine compass, showed the approximate position of the magnetic pole.

Made Hourly Observations

And then during the whole of the long winter he made an observation every hour out of the twenty-four each day. The pole was found to shift about, but he rode herd on it and made his daily observations. Finally, when some prospectors, stranded at Cambridge Bay, were called for by plane, he flew out with them in November, 1929.

On his trips for the Canadian government he not only collected geographical data but studied the conditions of the Eskimos, investigated the animal life of the lands he visited and collected material on natural resources. In 1932 he relinquished his post with the government and became interested in developing mining projects in the Yellowknife and Great Bear Lake regions. He was president of the Burwash Yellowknife Gold Mines, Ltd.

During the war he went overseas as a lieutenant with the Canadian Pioneers. After being invalided to England in 1917, he was attached to the Air Ministry as engineer in charge of building airdromes and seaplane bases. He was a member of the Royal Geographical Society and the Canadian Geographical Society. His wife, the former Hazel Keyo Walsh, of Boston, and a daughter, Miss Hazel Dorothy Burwash, survive.

Explorer of Arctic Region



Maj. L. T. Burwash, as he appeared in Arctic costume several years ago

Capt. Lewis L. Lane

Explorer Who Rescued Stefansson in Arctic Dies While Hunting

MODESTO, Calif., Sept. 19 (P).—Capt. Lewis L. Lane, explorer of the Far North, died of a heart attack while on a deer hunting trip in the high Sierras, reports reaching here yesterday said.

In 1914 he rescued the Arctic explorer Vilhjalmur Stefansson from Cape Kellett Banks Land, Mackenzie, Canada. Ten years later, on another Arctic cruise, he found the death camp and the bodies of four men lost from the steamship Karluk, of the Canadian Arctic Expedition. He was in command of the first merchant ship to land at Wrangell Island, which he claimed unsuccessfully for the United States.

BRITISH EXPLORER KILLED

Major Dudley Ryder Took Part in Graham Land Expedition

LONDON, Dec. 24—Major Lisle Charles Dudley Ryder, Antarctic explorer, was reported missing yesterday and is now said to have been killed in action.

He was one of the sixteen members of the British Graham Land expedition, discovering it to be a peninsula instead of an island as had hitherto been assumed. The group spent two years and a half in Antarctica.

Last April Major Ryder was decorated by Poland, receiving a medal at Buckingham Palace.

EXPLORER FEARED DEAD

J. H. Martin Presumed to Have Been Killed in Action

LONDON, Sept. 16—James Hamilton Martin, explorer who recently received a medal for his Graham land expedition of 1935-37, is missing and presumed to have been killed in active service. Martin,

CAPT. JOYCE DEAD, A POLAR EXPLORER

**He Accompanied Scott to the
Antarctic and Laid Depots
There for Shackleton**

LONDON, May 4 (P)—Captain Ernest Edward Mills Joyce, an Antarctic explorer, died here Thursday at the age of 65, it was announced today.

He served with Robert F. Scott from 1901 to 1904 and with Sir Ernest Henry Shackleton from 1907 to 1909, and won fame for an expedition from 1914 to 1917, in which depots were laid for Shackleton.

Shackleton's Ship Crushed

Captain Joyce helped to lay down the depots which Shackleton was to use on his journey across the Antarctic Ocean from Weddell Sea to Ross Sea—a journey that was never accomplished because Shackleton's ship was crushed in an ice pack.

Of the expedition, which Captain Joyce led, Sir Ernest Shackleton wrote: "No more remarkable story of human endeavor has ever been revealed than the tale of that long march. It ranks with the best deeds of polar expedition." Captain Joyce was in command after the collapse of Mackintosh, the leader.

On Christmas Eve, 1914, the Antarctic ship, Aurora, left Hobart, Tasmania, for McMurdo Sound in the Ross Sea, where it arrived in January. A party of men with their dogs left the ship and established a base. After several difficult experiences the party was ready for the "big dash" in August. They prepared to sled thousands of pounds of supplies to the Great Ice Barrier, Bluff Depot, and 400 miles south of there.

Some of the party suffered badly from the intense cold and had to remain in tents. Eventually, on the return journey, Commander McIntosh had to give up, to be rescued later; one member of the party died, and others were taken ill. They faced extremes of weather, with the temperature at times down to 100 degrees below zero, a lack of fresh provisions, and other hardships usually attendant on polar exploration.

When Captain Joyce wrote of his adventures in THE TIMES of Nov. 3, 1929, he said:

"Richards and myself are the only two survivors of that terrible journey. Strung out on the Great Ice Barrier the chain of depots still stretches for 360 miles to Mount Hope, holding their food rations, perhaps to save the lives of future explorers, perhaps only as a memorial, unseen by man, to the faithfulness of the men who did not fail. On the interior of the Barrier and of the plateau no living thing stirs, and stores of food have remained for years and may remain for centuries untouched by beasts or birds and preserved by frost from decay."

who was 41 years old, was a lieutenant in the Royal Naval Volunteer Reserve.

In 1933 he led the Oxford-Cambridge expedition into the Arctic and later spent two Winters in the Antarctic on a schooner.

WILFRED GRENFELL OF LABRADOR DEAD

Founder in 1892 of Medical Mission Known Throughout World Stricken in Vermont

CHARLOTTE, Vt., Oct. 9—Sir Wilfred Thomason Grenfell, founder of the Labrador Medical Mission, who devoted his life to caring for the spiritual and physical needs of Eskimos, Indians and fishermen of Labrador and Northern Newfoundland, died tonight of a heart ailment in Kinloch House, his home here, at the age of 75. He had been in failing health for some time.

Name Linked With Labrador's

In 1887 a young medical student forsook a professional career and chose a hard and comfortless life as medical missionary among the fishermen of the North Atlantic. For five years he cruised with them, sharing their hardships along the stretch between the Bay of Biscay and Iceland in good weather and foul. Then he went to Labrador, a barren and benighted country, and there he remained for all those years and became known to the world as "Grenfell of Labrador."

After studying at Oxford and London Hospital, Sir Wilfred had obtained his M. D. degree, and he already had much experience as surgeon and physician for poor fishermen when he landed on the bleak Labrador coast in 1892. A weaker man would have set sail for other parts, for Labrador, in those days, was a wild country inhabited only by Eskimos and a few white settlers, a wind-swept land of rocks and mountain chains, bleak and forbidding.

The young doctor had fitted out the first hospital ship for North Sea fishermen. When he decided to remain in Labrador he made his base at St. Anthony, on the northern shore of Newfoundland, and set out methodically and with great deliberation to colonize and improve conditions in those parts.

At first little was heard about Dr. Grenfell's mission, but in time he built five hospitals, seven nursing stations, two orphanages, two large schools and a chain of cooperative stores. He also started industrial works, and was indefatigable in carrying on child welfare along the coast.

Received Many Honors

Years later, after many hardships in the North, he was knighted and showered with honors, but he never once gave up his main interest—Labrador. Up to 1935, when his doctors advised against his remaining in the land because of his advancing years, Dr. Grenfell, with the exception of short trips in the interest of his cause, left Labrador only once for any length of time. That was during the World War, when he went to France as a Major in



SIR WILFRED GRENFELL
Times Studio

the Harvard Medical Unit.

Sir Wilfred Thomason Grenfell, K. C. M. G., C. M. G., was born at Mostyn House, Parkgate, near Chester, on Feb. 28, 1865. He was a son of Algernon Grenfell and the former Jane Georgina Hutchinson, and was educated at Marlborough, Queen's College, Oxford and London University, studying under Sir Frederick Treves at the last-named institution. At Oxford he played on the Rugby team and indulged in all college sports.

Then came his five-year apprenticeship aboard the North Sea fishing fleet, a period of hardening and preparation for the lifetime of Arctic endeavor that was to follow.

When Sir Wilfred decided to throw in his lot with the fishermen, he had taken out his master mariner's papers, and he was a fully fledged skipper of the hospital ship that he operated. Not only did he accompany the fishermen and attend to their physical and spiritual needs, but he established homes for them on land and arranged mission vessels for them at sea.

Changed Lives of Inhabitants.

To begin with, Sir Wilfred's work in Labrador was that of a pioneer. Practically single-handed, he changed the lives of the inhabitants, and for upward of half a century he cruised annually along the Newfoundland and Labrador coasts as surgeon-in-chief and master of the steamer *Sirathcona II*.

The late Lord Strathcona, Canada's "grand old man," who spent sixteen years in Labrador, said that Sir Wilfred Grenfell was "the most useful man in the North American Continent." As time went on, Sir Wilfred increased his activities.

The struggle for existence in this part of the frozen North became less intense, children were educated, their social conditions were brightened and the hygienic changes were no less than revolutionary.

In the Summer of 1937, after an international celebration of Dr. Grenfell's forty-fifth anniversary of landing in Labrador, the physical equipment of his organization in the North included the following:

Six hospitals, seven nursing stations, four hospital ships, four orphanage boarding schools, fourteen industrial centers, three agricultural stations, twelve clothing distribution centers, a Seamen's Institute at St. Johns, Nfld., a supply schooner, a cooperative lumber mill and a haul-up ship for schooner

repairs.

This modern set-up was a striking contrast to the scene which greeted Dr. Grenfell when he first came to Labrador. At that time there were hardly any fit buildings and scarcely any medical knowledge.

In October, 1934, Dr. Grenfell reluctantly gave the first indication that he believed his active days in the medical missionary field were nearing an end when he declared, "I'm getting too old to drive dog teams and I'm afraid I must take it easy until the time comes to cash in my checks," as he and Lady Grenfell sailed from Boston for a five-month visit in England.

The following Summer his doctors advised him against returning to his Northern headquarters at St. Anthony. He spent the Summer at his home overlooking Lake Champlain at Charlotte, Vt., but remained actively in touch with the affairs of his mission and the International Grenfell Association.

At that time he reiterated his claim that "I am too old" for active work in the North, but added, "I feel, too, that I can now be of more assistance here in raising funds to continue the work of the association that means so much to those people."

The following years, until his death, were spent in a series of tours throughout the United States and Canada as well as England, where Dr. Grenfell delivered lectures on his work. His appeal for continued financial support of his mission always met with eager response from his listeners.

He still visited and kept in close touch with his Labrador stations and advised the various boards of the Grenfell Associations in New York, Boston, Ottawa, St. Johns, Nfld., and London.

Recognized as Empire Builder.

Sir Wilfred was recognized as an empire builder, and honors came from all parts. In 1915 he was made an honorary fellow of the College of Surgeons of America, and received degrees from Williams College, Harvard, Toronto University, the University of New York, McGill University, Montreal; Middleburg College, Vermont; Princeton, Bowdoin College and St. Andrews University, of which he was Lord Rector from 1929 to 1931.

Sir Wilfred received the Murchison bequest from the Royal Geographical Society in 1911. He was a fellow of the Royal College of Surgeons. The National Academy of Social Sciences awarded him its gold medal in 1920, and he also received the Livingstone Medal of the Royal Scottish Geographical Society.

In 1935 Dr. Grenfell received the gold medal of the Council of the Royal Empire Society "in recognition of his services to the empire and the excellence of his book 'The Romance of Labrador.'"

In 1939 the American Geographical Society of New York conferred honorary membership upon him.

Sir Wilfred wrote many books, mainly on life in Labrador. They included "Adrift on an Ice Pan," "A Man's Faith," "Down to the Sea," "Down North on the Labrador," "The Adventure of Life," "Immortality," "The Autobiography of a Labrador Doctor," "Tales of the Labrador," "Labrador Days," "Yourself and Your Body" and "Labrador Looks at the Orient."

His wife, Lady Grenfell, died on Dec. 9, 1938. She was the former Anne MacClanahan of Lake Forest, Ill., a graduate of Bryn Mawr. They had two sons and a daughter, all of whom survive. They are Wilfred Thomason, Kinloch Pascoe and Rosamond Loveday.

MRS. G. W. DE LONG, EXPLORER'S WIDOW

Edited Journals of Husband,
Head of Ill-Fated Jeannette
Arctic Expedition, 1879-81

Nov. 25

Mrs. Emma Wottan De Long, widow of Lieut. Comdr. George Washington De Long, who headed the Jeannette Arctic Expedition of 1879-81, died Sunday night at her home, 324 West Eighty-ninth Street, where she had lived since 1890. She was 89 years old.

Mrs. De Long edited her husband's journals, which were published in 1883 under the title "The Voyage of the Jeannette." In them he told of his twenty-two months' search for the North Pole, the eventual crushing of the ship Jeannette in the ice and the grueling journey back to land which led to his death from starvation in frozen Siberia. Two years ago she published her memoirs, "Explorer's Wife."

Born in New York on March 11, 1851, she was the daughter of James A. Wottan, a sea captain, and the first ten years of her life were spent entirely aboard his vessel. In her middle teens her father went to France to represent the New York and Havre Steamship Company at Havre and she was educated there.

After she met Captain De Long, he proposed to her the third time a trial two years' separation. When the young captain returned they were married.

Eight years later, in 1879, Lieut. Comdr. De Long said goodbye to his wife in San Francisco and the Jeannette cleared the Golden Gate never to be seen again in home waters. Mrs. De Long did not learn the fate of her husband until three years later, when other members of his party reached Russian settlements. De Long's body was recovered and brought to New York for burial.

A statute to his memory was unveiled in Woodlawn cemetery in 1928.

Two years ago Soviet scientists came across a copper cylinder containing another diary kept by De Long. Water-soaked almost to a pulp, it was taken from Siberia to Moscow, where it was opened. But time and the elements had made it indecipherable.

Mrs. De Long is survived by a grandson, Lieut. Comdr. De Long Mills, U.S.N., of Norfolk, Va., a granddaughter, Emma De Long Mills, and a niece, Miss Marguerite C. Wottan. The last two lived with Mrs. De Long.

MRS. VASHTA M'CLURE

SAN FRANCISCO, April 18 (AP)—Mrs. Vashta McClure, one of the few women ever to explore in the Arctic, died here today at the age of 55. Before the World War, Mrs. McClure, then Vashta Dalton, gained fame as an explorer and teacher in the bleak area near Point Barrow, Alaska.

She spent recent years writing of the Eskimos and producing scripts for films of Eskimo life.

Dr. Cook, Hailed Once as Finder Of Pole, Is Dead

Explorer, Discredited After Triumphant Welcome in '09, Succumbs to Stroke

New York Herald Tribune

NEW ROCHELLE, N. Y., Aug. 5.—Dr. Frederick Albert Cook, explorer whose claim to discovery of the North Pole caused a nation-wide controversy for many years, was found dead at 8:30 a. m. today in his bed at New Rochelle Hospital. His physician, Dr. William Blake Burke, of Scarsdale, N. Y., said he had died quietly during sleep after a cerebral hemorrhage. He was seventy-five years old.

Dr. Cook suffered a stroke May 3 at the home of Ralph Shainwald von Ahlefeldt, of Larchmont, N. Y., also an explorer, where for three weeks he had maintained a day and night vigil beside the sickbed of his host's wife, who died April 30.

He was taken to United Hospital, Port Chester, N. Y., where on May 17 he received word that President Roosevelt had granted him a full pardon on a conviction in 1923 of using the mails to defraud in oil stock promotion. Dr. Cook had served even years of a twelve-year sentence in Leavenworth penitentiary before being paroled in 1930.

News of the pardon appeared to strengthen Dr. Cook and he was removed to Mr. von Ahlefeldt's home. On July 24, however, his greatly weakened condition made it necessary to take him to New Rochelle Hospital.

Surviving are a daughter, Mrs. Helen Vetter, of Snyder, N. Y.; a step-daughter, Mrs. Ruth Hunt Cook Hamilton, of East Aurora, N. Y.; a sister, Mrs. Lillian C. Murphy, of Toms River, N. J., and a niece, Miss Ada Murphy, of Toms River. His wife, Mrs. M. Fidele Cook, obtained a divorce in 1923.

Defended Claims to the Last

Dr. Cook, denounced by many as a faker, nevertheless was not without defenders to his dying day, even among persons who seemed to know something about Arctic exploration. His last years were passed in attempts to establish his claim that he discovered the North Pole in 1908, and in libel suits against his detractors. The attempts to vindicate him, however, became increasingly apologetic. It was said that Dr. Cook was too ignorant of scientific observations and navigation to have been able to fake the data on which he based his claim to discovery. This explanation, the kindest view of his exploits which seemed tenable to many, of course implied that he could not accurately have identified his position, even if he had succeeded in attaining the northernmost point of the world.

On Sept. 1, 1909, Dr. Cook emerged from the Arctic on his way to Denmark with an announcement that he had reached the North Pole, long the goal of explorers. Five days later, the late Admiral Robert E. Peary, a much better known explorer, arrived at Indian Harbor, Labrador, and announced that he had discovered the North Pole. When they reached points at which it was convenient to give further details, Dr. Cook said he had reached the pole

on April 21, 1908, and Admiral Peary said he had found it on April 6, 1909.

Admiral Peary's claim did not immediately dim Dr. Cook's glory. He was feted by the King of Denmark, honored by the University of Copenhagen. He was welcomed at New York's City Hall, and garlands of roses were hung around his neck by his old neighbors in Bushwick Avenue, Brooklyn. He was elected president of the Explorers Club. But all this was short-lived. Dr. Cook refused to answer specific questions about his polar dash. Admiral Peary's data received scientific approbation. Dr. Cook withheld his notes from American investigators, but sent them to the University of Copenhagen, which eventually announced it had been mistaken in honoring him.

His degradation was rapid. His enemies investigated and announced that he had faked his earlier claim that he was the first man to reach the summit of Mt. McKinley in Alaska, North America's highest peak. The Explorers' Club expelled him. Theodore Roosevelt denounced him. Admiral Peary was honored by Congress and the National Geographic Society. Dr. Cook attained that depth of notoriety in which his name became a contemptuous word of current slang. "Tell it to Dr. Cook!" in those days was a common expression of complete disbelief.

Dr. Cook dropped out of the public eye for more than ten years. He went to Borneo and traveled in Europe, then went to Texas, where he turned up in the early 1920's as an oil-stock promoter, an activity in which Federal authorities soon took an interest. Dr. Cook had great success in selling stock to persons who had been fooled once but were ready to try again. He obtained stockholders' lists of more than forty defunct companies and brought about a merger of the companies, with new capital obtained from the old stockholders. There were millions in the idea. Lurid illustrated prospectuses were sent out, showing pictures of big wells, represented as big producers. Circulars represented that the company had 150 wells in production, which appeared to be a substantial exaggeration when Dr. Cook and others were brought to trial for using the mails to defraud. Dr. Cook maintained that he had been merely an "easy mark" for his associates, but he was found guilty and sentenced to serve fourteen years and nine months in prison.

"History gave us Ananias and Sapphira," said the judge who sentenced him. "They are forgotten," but we still have Dr. Cook."

Oil Lands Later Produced

From 1923 until 1930 Dr. Cook remained in prison, then was released on parole. His last years in Leavenworth Prison were embittered by the ironical news that some of the lands fraudulently promoted by his company, which were sold at bargain rates after his conviction, actually had brought in a rich flood of oil after wells had been dug there. On his release he settled in Chicago, where for a time he held a job as physical director of the Boys Brotherhood Republic, an organization of boys who had been in trouble with the law.

In 1936, then seventy years old, Dr. Cook again emerged from obscurity to try to vindicate himself. He filed libel suits for a total of \$125,000 against the publisher of the Encyclopedia Britannica, the Viking Press, and the Houghton Mifflin Company for publishing works disparag-

ing his claims. He won election to honorary membership in the International Mark Twain Society, under qualifications defined as "outstanding achievement in any field of knowledge." He appealed to the American Geographic Society for a re-examination of his case, and his plea was taken under consideration.

Dr. Cook was born on June 10, 1865, at Callicoon Depot, Sullivan County, N. Y., of German-American parents who had changed their name from Koch. The family moved to Brooklyn in 1878, and there he completed public school. Two years of medical study at Columbia University and three at New York University gave him his Doctor of Medicine degree in 1890. For a time he practiced medicine in Bushwick Avenue, but he was soon drawn by the lure of Arctic exploration.

In 1891-'92 Dr. Cook sailed to the north as surgeon to the expedition of his future rival, Admiral Peary, which went to northern Greenland and neighboring regions, and in 1893 and 1894 he was attached to two other Greenland expeditions. In 1897-'99 he was surgeon, anthropologist and photographer of the Belgian Antarctic Expedition. As a result of these services he picked up some knowledge of exploration, and began to be fairly well known as a writer and lecturer on the frozen areas of the world.

Two Mountain Ventures

In 1906, after one unsuccessful attempt to scale Mt. McKinley, Dr. Cook made a second trip to Alaska with a party including Dr. Herschel Parker, inventor and scientist, of Columbia University. They were unable to find a route to the summit, and the party returned. But Dr. Cook remained in the mountain, supposedly to hunt and study glaciers. A month later he telegraphed that he and a companion had reached the mountain's summit. He published a book about the feat, with a photograph entitled "The Top of the Continent."

There was some skepticism about this at the time, especially in the mind of Professor Parker, his erstwhile companion, but no one really undertook to explode the mountain-climbing story until Dr. Cook claimed to have discovered the North Pole.

Then investigators found Edward Barrill, the packer who, Cook said, had accompanied him to the peak, and Mr. Barrill made affidavit that they had never been nearer the summit than fourteen miles, that he had falsified dates and entries in his diary at Dr. Cook's direction, and that the photograph which Dr. Cook had published as taken from the summit, was actually taken twenty miles away. Dr. Parker further pointed out that, while Dr. Cook said his barometer reading at the summit showed 30,000 feet, the barometer which Dr. Cook had would not scale higher than 18,000 feet. Dr. Parker also remarked that in Dr. Cook's book were two photographs of exactly the same mountain, one labeled 20,390 feet and the other 8,000 feet.

But these matters did not come out until after Dr. Cook's Arctic expedition. In 1907, with John R. Bradley, of New York, Cook went to Etah, Greenland, 600 miles from the pole, and passed the summer hunting. Mr. Bradley then returned to New York, and Dr. Cook wrote to friends that he meant to try for the pole. Mr. Bradley later said that the polar dash had been Dr. Cook's intention all along, but that he had kept quiet about it because Admiral

Peary was then making a similar attempt.

In 1909 some concern began to be expressed for Dr. Cook, long absent in the Arctic. Then, on Sept. 1, came his announcement that he had reached the pole. Within a few days he was at Copenhagen, receiving honors from the King and from Danish scientists. A large corps of newspaper men rushed there to get his story. His narrative was scant in scientific details, but he related that he had urged his Eskimos on to superhuman feats, to cross the ice fields, by feeding them gumdrops. Philip Gibbs, alone among those at Copenhagen, sounded a note of violent skepticism in his newspaper stories, a note which was soon to become a chorus.

Dr. Cook's announcement came as a violent shock to the Peary Arctic Club, a loyal group of supporters who, time and again, had raised funds to send Peary into the north. This was Admiral Peary's sixth expedition, and there was no word from him. Meanwhile, another claimed the laurel. Also the Peary supporters knew Dr. Cook from the 1891 expedition, and they had no great faith in him.

On Sept. 5, while Herbert L. Bridgman, secretary of the society, was absent from his office, some one discovered that a cablegram had been dropped there during the morning, and that it had passed unnoticed. It was opened and Mr. Bridgman was called on the telephone to hear its contents. It came from Battle Harbor, Labrador, was signed by Peary, and contained but one word, "Sun." It was the code word which meant that Peary had succeeded in reaching the pole. "Moon" would have meant failure.

Jeers Mar Acclaim

By the time Dr. Cook reached New York the skepticism regarding his claim had become strong. He was welcomed at City Hall, although Mayor George B. McClellan, a man of scientific leanings, was conspicuously absent. A triumphal arch was erected in Bushwick Avenue for the explorer. But amid all the hullabaloo there were a substantial number of Bronx cheers. Admiral Peary's data were turned over to the National Geographic Society, and stood up under examination. The American Geographic Society offered to consider Dr. Cook's claims, but he said that he felt obliged to send his data to the University of Copenhagen first.

In December the scholars of Copenhagen, after considering the data, announced that Dr. Cook's documents did not support his claim, and that they had been the victims of a fraud. The data submitted to them, it was made clear, were not Dr. Cook's original diaries but a record purporting to have been made from them. The Copenhagen students said that they had given no consideration to affidavits which had been submitted to them, made by Capt. A. W. Loose, a navigator, and George H. Dunkle, an insurance man, to the effect that they had been hired by Dr. Cook to prepare "astronomical records" which would bolster up his claim, and that these figures had been sent to the university.

Dr. Cook disappeared for a while. Later he toured in vaudeville, telling how he had discovered the pole. Then he wrote a magazine article, in which he said he had "honestly believed at the time" that he was at the pole, but that he did not really know whether he had been or not.

THE GLACIAL GEOLOGY OF THE PACIFIC ANTARCTIC

By LAURENCE M. GOULD

INTRODUCTION

THAT PART of the Pacific Antarctic which is known to be part of the continental land mass above sea level is included in the term West Antarctica. As may be noted from the insert in figure 1, it is in reality a great peninsular extension of the main continental land mass into Pacific waters. Its known eastern and western seaward margins are bounded by the world's most extensive areas of shelf ice.

A fringing belt of shelf ice of varying width obscures the western boundary of the Weddell Sea and the eastern coast of the Palmer Land peninsula, which forms the eastern or Atlantic boundary of West Antarctica. On the Pacific or western margin is the Ross Shelf Ice, which covers the head of the great Ross Senkungsfeld. The eastern margin and parts of the southern margin of this great depression form the western structural boundary of West Antarctica.

The Pacific seaward border of West Antarctica is quite unknown. Ships have never been able to penetrate the heavy ice of this sector far enough to make even legitimate guesses concerning the position of the coast line. Conditions do not lead to the concept of extensive areas of shelf ice, for these normally occupy protected places such as interisland areas or reentrants like the Ross and Weddell seas. But whether the seaward fringe of the inland ice is here modified in one of the other two ways which are common elsewhere about the continent can only be guessed. In places on the Indian Ocean coast of East Antarctica the inland ice moves into the sea in great sheets, unhindered by nunataks or mountain ramparts. In other places, as along the coast of South Victoria Land, the ice is forced to follow constricted channels as great outlet glaciers which enter the sea to form floating piedmonts or ice tongues afloat.

PALMER LAND

The peninsula of Palmer Land and its associated islands have been fields of activity for many expeditions, including some of the most fruitful, scientifically, of all Antarctic expeditions. This peninsula with its islands is made up of three folded mountain axes the spreading roots of which disappear in the main part of the continent but which converge to form the increasingly slender peninsula in the direction of South America. So exact a duplication of Andean and South American structures is Palmer Land that its main mountain ribs have long been known as the Antarctandes. The region as a whole is one of the wildest, most inhospitable mountain regions on earth. Peaks rising to heights of 8000 feet are common and some of more than 10,000 feet are known.

EASTERN COASTAL REGION

Though there are ice-free areas along the eastern coastal zone and adjacent islands, the dominant aspect is that of a land still heavily burdened with ice. Ice caps and even ice masses of the dimensions of Island Ice (Wright and Priestly, 1922, p. 147) are found on the islands. A fringe of shelf ice of varying width stretches almost the entire length of the peninsula. The famous Nordenskjöld Shelf Ice (Nordenskjöld, 1920, pp. 158-168) is a part of this fringe.

Among the most conspicuous features of the mainland, Wilkins (Wilkins, 1929, pp. 360-369) emphasizes the great ice-filled fiords, some of which almost sever the peninsula. Mountain glaciers of some variety, including sizable streams flowing into the sea and shelf ice, are common. Beyond and above all of these features of the coastal zone rises the ice-clad plateau of the main mass of Palmer Land itself.

Joerg (1937, pp. 433-437) has pointed out the fact that aerial photographs taken on the Ellsworth trans-Antarctic flight of 1935 demonstrate that the rugged, mountainous, southeastern coast of Palmer Land, where it widens into the main continental land mass, is especially cut up into headlands and capes by a number of wide valley glaciers. Some of the glaciers spread out at their

outlets into piedmonts and others extend directly into the shelf ice of Weddell Sea.

WESTERN COASTAL REGION

Among the major achievements of the British Graham Land Expedition of 1934-1937 (Rymill, 1938, pp. 297-312) was the demonstration of the peninsular character of Palmer Land. The scientific reports of this expedition will doubtless give us some of the most definitive information yet collected in West Antarctica. According to the brief preliminary report of Fleming (1938, pp. 508-512), the glacial phenomena of the western coastal regions are no less varied than those of the east. Here are found great outlet glaciers from the plateau which parallel the coast before turning to flow into the sea. Between the foot of the mountains of the peninsula and the shore lies a belt of fringing glaciers which is notably narrow for its length. These glaciers are all short in the direction of flow and end in cliffs generally varying from 60 to 90 feet in height, but occasionally reaching 200 feet.

The islands are generally covered wholly or in part by ice. Indeed, here are to be seen classic examples of island ice.

The Rymill expedition found Alexander I Land to be a great projection from the mainland rather than an island as was formerly believed. The long indentation between this land and the base of the Palmer Land peninsula, which was designated King George VI Sound, was found to be covered with shelf ice which exhibited spectacular surface features. Pressure phenomena are represented in ridges 100 feet high and stacked and tilted blocks which were called "Stonehenge ice." Circular bowl-shaped depressions up to one mile in diameter, the shapes of which are so like that of centrally collapsed volcanic cones that they were called "ice calderas," were also found, and seem to bear no relationship to pressure phenomena and to points of entry of glaciers flowing into the shelf ice.

Fleming observed everywhere that the present glacial features are shrunken representatives of a former more extensive glacierization. The fringing glaciers lie below the present snow line and formerly merged with extensive areas of shelf ice which filled the bays along the Palmer Land coast. Only small remnants of such shelf ice masses still remain. Stagnant glaciers, polished and striated surfaces, and deposits from which the ice has receded are further evidences of the present recessionary character of the ice.

INTERIOR OF WEST ANTARCTICA

Our knowledge of glacial phenomena between Palmer Land and Marie Byrd Land rests solely upon the data brought back by Ellsworth (1936, pp. 1-35) and Hollick-Kenyon as a result of their great flight from Dundee Island to the vicinity of the Bay of Whales. Joerg (1936, pp. 460-461), who has studied the data from this flight, points out the fact that the inland ice mantle of Hearst Land is pierced by the peaks of Ellsworth's Eternity Range, which rises to heights of 11,000 feet. This range is a direct continuation of the main axis of Palmer Land.

Nunataks and even mountain ranges were discovered along the flight track almost halfway across West Antarctica, culminating in the Sentinel Range which rises to a height of 12,000 feet in approximately 86° W long. and 76½° S lat.

From the last mountains projecting through the ice in 92° W long. and 73½° S lat., the inland ice extends in an unbroken sheet to the Ross Shelf Ice. It maintains an altitude of from 6000 to 6400 feet from this position to long. 115° W, where it begins to descend. It decreases to 4500 at the 127th meridian and to 1000 feet in about long. 149° W and lat. 79¾° S, where it ends at the Ross Shelf Ice.

Summarizing his observations, Joerg concludes that "the interior of the ice cap, unlike its counterpart of the same size in Greenland, does not completely mask the underlying topographical features." In other words, the inland ice mantle of West Antarctica, so far as observed, has more in common with the so-called Spitzbergen type of ice or Wright and Priestly's (1922, p. 148) Highland Ice than it does with true continental glaciers or inland ice sheets.

Whether this Highland Ice is but the thinning fringe of a great main inland ice dome lying toward the geographical center of the continent, or whether West Antarctica is covered by its own ice sheet, separated from the larger center by a broad sag after the manner of the two ice domes of Greenland, is sheer speculation. It is possible that the mountain spine which Ellsworth and Hollick-Kenyon followed defines the Pacific boundary of the continent, for the latter noted a water sky to the north of their flight route. Though it seems to me there remains no very good reason for believing in the existence of a marine connection between the Ross and the Weddell seas, if the Queen Maud Mountains horst continues eastward beyond Leverett Glacier, as is suggested in the position of the Horlick Mountains, there may well be at least a broad intermontane plateau or plain between their continuation and the mountain spine discovered by Ellsworth.

THE EASTERN BORDER OF THE ROSS SHELF ICE

Though the main features of the Ross Shelf Ice have long been known and the major parts of the western and southern boundaries mapped, we are yet without critical information about important segments of the more complex eastern margin.

The northwestern part of West Antarctica and adjacent areas of shelf ice



FIGURE 1. Glaciers of the Queen Maud Mountains.

Aerial photograph by A. C. McKinley

were the chief scenes of activity for the second Byrd (1935, pp. 399-474) Antarctic Expedition. Wade (1937, pp. 584-591), who made a sledge journey into the Edsel Ford Mountains, which define the extreme northwestern coast of Marie Byrd Land, demonstrated that this range is transected by great outlet glaciers which empty into the shelf ice that occupies Sulzberger Bay, the great indentation between the Edsel Ford Mountains and the peninsula of King Edward VII Land. From the latter Land the inland ice descends as a great sheet into Sulzberger Bay, by heavily crevassed steeply bordered slopes.

The flights and tractor journeys of the second Byrd Expedition demonstrated that the Ross Shelf Ice boundary south of King Edward VII Land swings eastward to form a great reentrant culminating in about lat. $80^{\circ} 45' S$ and $145^{\circ} W$. Apparently the inland ice descends from Marie Byrd Land into the shelf ice along this border in heavily crevassed slopes.

On his southbound sledge journey, Blackburn (1937, pp. 598-599) found indications of greater heights in the shelf ice in about $84^{\circ} S$ and $154^{\circ} W$. From this point southward almost to Supporting Party Mountain of the Queen Maud Range, he found crevasses, folds, and other pressure phenomena, trending roughly southeast-northwest, thus indicating thrustlike stresses from a general easterly direction. Blackburn's route may have been near the eastern boundary of the Ross Shelf Ice.

Unfortunately the two sets of observations just described still leave the region lying roughly between latitudes 81° and $84^{\circ} S$ quite unknown.

In a paper on the Ross Shelf Ice, I (Gould, p. 1382) have stated that since the eastern boundary of the Ross Senkungsfeld appears not to be characterized by structural equivalents of the Queen Maud Mountains horst, the ice from the interior of Marie Byrd Land pours down into the Ross Shelf Ice as a great sheet. There are other reasons for believing that great volumes of ice are received by the Ross Shelf Ice from this direction.

On the sledge journey made by Crockett, Vaughan, Goodale, Thorne, O'Brien, and myself along the foot of the Queen Maud Mountains in 1929-1930, we discovered that the main trend of ice movement at the head of the Ross Shelf Ice was from an easterly direction. Furthermore it was so strong that it deflected toward the west, the great tongues of ice entering the shelf ice through the main part of the Queen Maud Mountains from the south. While the direction of this movement along the foot of the Queen Maud Mountains follows the general direction of the axis of Leverett Glacier, it seems very doubtful that the volume of the latter is large enough to account for the great thrust necessary to deflect the tongues of Liv, Axel Heiberg, Kent Cooper, Isaiah Bowman, Amundsen, and Thorne glaciers so strongly toward the west. The energy of Leverett Glacier is reinforced by much greater westward-moving floods from Marie Byrd Land just to the north of it.

Commander H. E. Saunders, who is preparing the maps from data collected by both Byrd expeditions, has informed me by letter that he plans to plot as accurately as possible a 400- to 500-foot contour line from the Ross Sea to the Queen Maud Mountains and call that the easterly limit or boundary of the Ross Shelf Ice.

GLACIERS OF THE QUEEN MAUD MOUNTAINS

OUTLET GLACIERS

Within the area explored by the geological party of the first Byrd Antarctic Expedition (Gould, pp. 171-214), which extends from about $145^{\circ} W$ to $170^{\circ} W$, the most distinctive of all glacial features observed were the great outlet glaciers (fig. 1). Unlike the parts of the great horst zone of South Victoria Land to the west and northwest of the Queen Maud Mountains which were conspicuous for the paucity of such features, the Queen Maud Mountains horst in the area explored is transected by no fewer than seven such major outlet glaciers.

Liv and Axel Heiberg Glaciers were discovered and named by Amundsen on his sledge journey to the South Pole in 1910-11. Liv Glacier was the gateway through which Commander Byrd and his companions flew on their way to the South Pole in 1929, and it was by way of Axel Heiberg that they returned. The remaining outlet glaciers of Kent Cooper, Isaiah Bowman, Amundsen, Thorne, and Leverett were discovered by members of the first Byrd Expedition. Blackburn led a sledging party on the second Byrd Expedition which followed Thorne Glacier to its head. His party mapped this glacier and added details to the map made by the geological party of the first expedition, in the vicinity of Supporting Party Mountain.

Naturally, figure 1 shows but the main outlines of these great streams of ice. Their detailed patterns are more complex than could well be indicated. In addition to the main streams of ice from the reservoir on the polar plateau, there are many tributaries derived from catchment areas within the mountains themselves. Figure 2, which shows part of the eastern section of Liv Glacier, is fairly typical of the rest.

These streams of ice, together with their prototypes along the western and southwestern margins of the Ross Senkungsfeld, are the greatest valley glaciers known anywhere in the world. The historic Beardmore, discovered by Shackleton and traversed by him on his journey to within 110 miles of the South Pole, and later by Scott on his successful but tragic polar journey, is the longest glacier known. It is possible that Leverett will be found to equal if not exceed it, when the latter is fully known and mapped. Of the glaciers in the Queen Maud Mountains, only Axel Heiberg and Thorne have been completely traversed by sledge. The latter is revealed by Blackburn's journey to be not less than 100 miles long and from 8 to 20 miles wide, so that it is comparable with Beardmore.

The most interesting but the least explored of the Queen Maud Mountains Glaciers is Leverett. Though the volume of ice poured into the Ross Shelf Ice by this stream exceeds that from any of the other outlet glaciers examined, its observed part has a flatter gradient and its boundaries are less sharply defined than any of the rest. To be sure, the Thomas Watson escarpment gives its

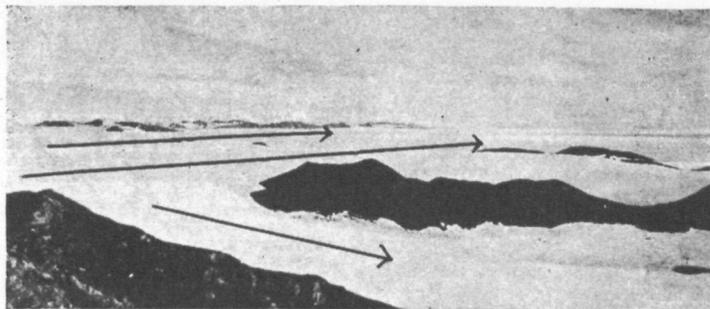


FIGURE 2. Mouth of Liv Glacier, showing main streams of ice and distributaries.

southern boundary sharp outlines, but its northern and eastern margins are imperfectly defined by nunataks. Near the mouth of the glacier small distributaries dissipate some of the ice from the main current as they squeeze down between the nunataks (fig. 2). Free entry of the main glacial stream into the Ross Shelf Ice is further interfered with in parts of its 20-mile-wide mouth by a few low nunataks; only the western part of the channel, with a width of 8 miles, is completely unobstructed.

The Queen Maud Mountains reach their greatest mass and height in the vicinity of Mount Fridtjof Nansen. Eastward they become progressively lower and the glacierization is more extensive. The eastern foothills are much more nearly submerged beneath the snow and ice than are those to the west in the vicinity of Liv and Axel Heiberg Glaciers. Likewise, evidence of a former more intensive period of glacierization is more conspicuous in the eastern section. Mountain masses the tops of which have been deeply scored or rounded by former ice floods rise above the present ice level as much as 800 feet in places.

Great as are these outlet glaciers, they appear to drain but relatively limited areas of the inland ice. Sledge journeys to the South Pole have shown the ice divide to lie between the Queen Maud Mountains and the Pole, as is shown in the insert in figure 1. Furthermore, these streams of ice lose their identity soon after leaving their confining valley walls.

THE PIEDMONT ZONE

In no place did we observe an outlet glacier shearing its way into the shelf ice. Nowhere did we find one spreading out into an expanded foot. On the contrary, we found a great common piedmont resulting from the welding together of all the ice tongues from Liv to Thorne glaciers, through the northwestward thrust from Leverett Glacier and other, and as yet unknown, ice streams to the north of it.

The thrust of the ice tongues entering this piedmont normally push it up into a series of low open folds. Usually these are of limited extent, but below Liv Glacier low gentle anticlines from 15 to 20 feet high and from one-half to three-fourths of a mile apart were found about 20 miles from the mouth of the glacier. Nearer the mouth of the glacier the folding was more intense. Axel Heiberg Glacier enters the piedmont zone with an abrupt crevassed monoclinal slope.

MOUNTAIN GLACIERS

Mountain glaciers of considerable variety add their diminutive increments of ice to the Ross Shelf Ice all along the foot of the Queen Maud Range. They are larger and more spectacular along the western sector. Figure 3 shows a small nameless glacier a short distance east of the mouth of Liv Glacier in the James Duncan Mountains. Largest of all mountain glaciers we examined was one which heads on the north flanks of Mount Nansen and which we crossed to reach the rocks of this mountain. From the side of this mountain we could see through, or transection, glaciers joining the heads of tributaries of Liv Glacier with similar tributaries to this large mountain glacier. In other places well-developed horns and serrated ridges separated these two glacial drainage basins.

While cirques or cwms or corries, as they have been variously called, were found all along the range, they are especially well developed in the western section. Some were found filled with ice; some had but shrunken remnants of the ice masses which formerly filled them, and a goodly number were empty of all glacial ice (figs. 5 and 6).



FIGURE 3. Nameless glacier in James Duncan Mountains.

Aerial photograph by A. C. McKinley

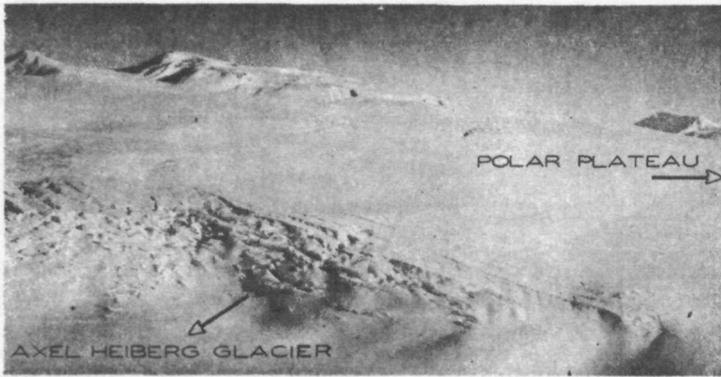


FIGURE 4. The head of Axel Heiberg Glacier.

Aerial photograph by A. C. McKinley

ORIGIN OF OUTLET GLACIER VALLEYS

Whether such great outlet glaciers as those which occur in the Queen Maud Mountains and throughout the South Victoria Land horst inherit basins of tectonic origin or preglacial drainage channels, either of which they have deepened and otherwise modified, or whether they have resulted from the headward extension of cirques as suggested by Taylor (1922, pp. 161-164), is difficult to prove. Taylor ascribes primary importance to cirque formation and recession by nivation and bergschrund action; he says that "most of the glacial erosion which gives so characteristic a facies to a glacial region is due to these humble agents of sapping and nivation." In his "palimpsest" theory he develops the idea that cirques formed first in ancient valleys and by headward extension developed into finger valleys which tapped the inland ice dammed up behind the horst. Or cirques may have formed on opposite sides of the horst and sapped their way headward until they met to form cols through which the inland ice poured as outlet glaciers. In other words, even very long glaciated valleys may have developed through the long-continued action of very short glaciers.

According to Taylor's concept, the melt waters from the short glaciers must have been adequate to dispose of all the waste material; otherwise so small a burrowing glacier would leave in its trail a valley choked with debris derived by sapping at its head. It seems more reasonable to suppose that typical, long, glaciated valleys have been occupied by glaciers approximating the length of the valley at some time or other. Only thus is it easy to understand the disposal of the weathered and eroded material and its common disposition in moraines in the lower parts of the valleys.

Taylor further believes that valleys formed by such cirque recession were not greatly modified by the outlet glaciers which later submerged them and which must have persisted in them throughout all the later history of glaciation. The great rock bars, or riegel, which transect the valley of the Ferrar-Taylor glacier system, he believed to be remnants of margins of cirques which actually formed the valley before it was overridden by the ice of the outlet glacier.

To be sure, such rock bars or treads are common in glacial staircased valleys. Their existence is, however, more likely due to differential erosion caused by local differences in rock structure or hardness. Fractured or shattered zones of rock are peculiarly subject to quarrying and deepening by glacial action.

Taylor's contemporaries in Antarctic exploration do not agree with his thesis. Though Priestly (1923, pp. 75-77) sees little evidence of preglacial stream topography in South Victoria Land generally, he does suggest that the great outlet glaciers occupy preëxistent drainage channels, and that these were initiated along lines of structural weakness, such as faults and shatter belts which would accompany the sagging portions of the great horst.

Wright (1923, p. 17) also believes in a tectonic origin for such valleys, and is of the opinion that there are signs of differential movement on opposite sides of the great Beardmore Glacier Valley.

I have pointed out in an earlier paper (Gould, p. 978) on the structure of the Queen Maud Mountains my reasons for believing that such great glaciers as those which transect this range occupy downfaulted blocks, belts, or even graben.

Taylor's "Palimpsest" theory seems totally inapplicable to the Queen Maud Mountains region. This great mountain horst has suffered profound erosion along its exposed north face. The present fault-line scarp is from 15 to 20 miles south of the fault scarp itself. The irregular hills of Pre-Cambrian rocks which mark the fault scarp are but a few hundred feet high at most. The heights increase progressively in the direction of the great tabular mountains to the south, which define the present fault-line scarp and which rise to heights in excess of 13,000 feet. These broad-topped tabular mountains are covered with the flat-lying Beacon Sandstone series which totals 7000 feet in thickness on Mount Nansen. All this series, as well as some of the underlying granites, gneisses, and schists, has been removed from the foothills over the 15 or 20 miles between the present northern face of the tabular mountains and the actual fault scarp. To attribute such profound erosional results to cirque or cwm action seems incredible. It is rather more reasonable to believe that the faulting which produced the Queen Maud Mountains horst began in Tertiary time long before the inception of glacial conditions, and that the horst was being profoundly modified by the various processes of subaerial weathering and erosion even as it rose. It may be as Priestly (1923, p. 75) points out, that the "finishing touch to the climatic environment necessary to bring about the Antarctic Ice Age was given by the tectonic movements which brought about

the elevation of the horst and the tilting of the continent." Nevertheless, such great horsts could not have been formed with catastrophic suddenness. The evidence points to a contrary conclusion.

The Beacon Sandstone Series from its occurrence in lat. 68° S and long 150° E, throughout all its known exposures extending over the Queen Maud Mountains, presents a nearly uniform level-bedded character—an indication of great stability. Yet the vertical uplift involved in the Queen Maud Mountains could hardly have been less than 6000 to 7000 feet and may have been twice that amount. Such uniformity over such great distances indicates gradual, even uplift. This being so, the horst zone throughout must have suffered modification by streams and other agencies before the culmination of glacial conditions.

While the paucity of tributaries to the outlet glaciers and the fewness of such glaciers along the South Victoria Land horst were interpreted as evidences of little or no preglacial stream erosion, such reasoning does not hold for the Queen Maud Mountains horst, which is, of course, a continuation of the South Victoria Land horst. As previously pointed out, outlet glaciers are large and numerous and the pattern of Liv Glacier, at least, with its tributaries entering at acute angles from above, suggests the dendritic pattern of a stream system. If the outlet glacier valleys are determined by major structural features, there is little reason to suppose that strong tributaries would have developed on such limited interstream areas as separate the Queen Maud Mountains valleys.

SURFACE FEATURES

Deposits.—Perhaps the most conspicuous feature of all types of glaciers of the Queen Maud Mountains is lack, or scarcity, of debris on top or within the ice. We found no morainal accumulations on the main part of any of the glaciers, and but few had developed lateral moraines. These were everywhere weak and poorly defined and disappeared below the Ross Shelf Ice before they had hardly left the confining walls of their glacial valleys. Glacier tables, dirt cones, moulins, and other features which are typical of mountain or valley glaciers in lower latitudes were lacking.

Blackburn's journey up Thorne Glacier revealed much less surface debris throughout than would be expected on glaciers elsewhere in the world.

Even as the stagnant waters of a lake allow the outlet streams to leave without a load of sediment, so does the nearly stagnant mass of ice which covers Antarctica furnish its outlet glaciers with few or no tools. The extremely limited scope of bergschrund action allows but little debris from such sources. Such slow-moving masses of ice as the Antarctic glaciers are weak agents for quarrying rocks from below and along the sides of the glacier.

We found one huge solitary granite boulder 12 miles out on the piedmont in front of Thorne Glacier.

Weathering the ablation.—Though the air temperature rarely if ever rises above 32° F., masses of rock continuously exposed to the sun, as they inevitably are during the summer, do absorb a good deal of heat. Adjacent areas of snow and ice are thereby melted. Avalanches were occasionally heard. Pools of water were common in the rocks and even on the ice in a few places. In a few exceptionally favored places the melt water actually accumulated voluminous enough to flow down the rocky slopes as small streams, which congealed when they reached the flatter ice-clad areas below.

Exposed rock surfaces are subject to rather vigorous frost or freeze-and-thaw action because of the melt water. Effects of such action were especially conspicuous in the closely jointed, shaly phases of the Beacon Sandstones, of arkoses, as they should be called in the Queen Maud Mountains.

In this windiest of all continents it is to be expected that snow, ice, and rock surfaces would all be somewhat affected. Because of the limited exposure of rocks and the paucity of mineral tools, the abrasive action of the wind is hardly a universal process, so far as the rocks themselves are concerned. The shaly and cross-bedded members of the Beacon Series are, however, deeply etched wherever exposed, and such differentially eroded or honeycombed surfaces as that illustrated in figure 8 can hardly be interpreted as due to anything but wind action.

The pronounced drying and warming effects of the foehn winds which sweep down the mountainsides and particularly through the great glacial troughs make such winds important agents in dissipating the snow and ice. We were amazed when we returned to our base camp after having been absent but 13 days to note how it had changed. Our snow depot had shrunk to half its original size. Great blocks of snow which we had placed around our supplies to protect them were honeycombed with holes. Icicles several inches in length were hanging from many of them. Yet this camp was several miles from the mouth of any outlet glacier.



FIGURE 5. Small glacier and empty cirques in James Duncan Mountains.

In spite of the great amount of ablation due to such winds we saw few places on the glaciers themselves where the real glacial ice was exposed, except of course in crevasses. Owing to the persistently low temperatures, rates of firnification and eventual formation of glacier ice are undoubtedly very slow, so that the glaciers are normally covered with great thicknesses of snow and firn.

The maximum effects of the foehn winds seem to be achieved near the mouths of the glaciers and, even more, out on the piedmont. In places the latter is covered with hard-packed, sastrugi-roughened snow. In other places it possesses an icy, rippled surface. In still others it presents great expanses of snow- and firn-free, white, bubbly glacial ice. During the summer months the rate of dissipation along the piedmont zone is evidently more rapid than the rate of supply. The piedmont zone is generally lower than the shelf ice to the north, which lies beyond the effects of the foehn winds.

Crevasses.—Crevasses are widely developed and are common to all the glaciers and the piedmont zone below them.

The outlet glaciers are characterized by heavily crevassed slopes (figs. 1, 3, 4) separated by flatter stretches. In places the irregularities of the valley floor beneath the glaciers are so great that the ice descends in veritable falls with great toppling crags and blocks across which there is no passing.

The piedmont was found to be generally crevassed, particularly in the areas below the outlet glaciers. The largest and most persistent crevasses encountered anywhere were found below Liv Glacier.

In lower latitudes, crevasses at all comparable with those observed in Liv and other outlet glaciers would be undoubted indications of great activity. In Antarctica, however, they are rather reflections of the rigidity and inflexibility of the ice which make it unresponsive to easy deformation by flow. The continuous low temperatures are the underlying cause of these characteristics. Whatever the mechanism of glacial flow may be, all the factors involved seem to be adversely affected by low temperatures.

Throughout our sledging operations, whether on the glaciers or across the piedmont, we were repeatedly impressed by the absence or limited indications of movement, in spite of the numerous and prominent crevasses just described. Over great areas we found crevasses filled with snow and covered with hard, even icy, snow, in such fashion as to indicate that they had not been disturbed for a long time.

RATE OF FLOW OF GLACIERS

Though we had no opportunity to make any quantitative study of the rate of flow of any of the glaciers, there is no reason to suppose that they move any faster than Beardmore and other glaciers of South Victoria Land horst, if, indeed, as fast. A few measurements have been made in that sector. After considering all the factors involved, Wright and Priestly (1922, p. 133) give an estimate of 3 feet per day for Beardmore and slightly more for some of the glaciers farther north. It is doubtful if any of the Queen Maud Mountains glaciers exceed that rate; it is more likely that they do not equal it.

CIRQUES

That the question of the origin of cirques should have provoked the interest of Antarctic explorers is inevitable. Though such features are characteristic of high levels in regions of mountain glaciation generally, in lower latitudes, they are found along the great horst of South Victoria Land, including the Queen Maud Mountains, at all levels. Some indeed are so low as to be partly submerged, either by the Ross Shelf Ice if they are on the front of the horst, or by the ice of some of the outlet glaciers if they occupy positions on the valley sides of these glaciers.

That such an abundance of cirques can be explained by nivation and bergschrund action under present climatic conditions is manifestly impossible. To be sure, there is some bergschrund action where the cirque ice is so thin that melt water can penetrate to the rocks by way of shallow bergschrunde before it refreezes. The morainal fringe below the shrunken ice in the cirque illustrated in figure 6, is being added to in this way. The large mountain glacier which we crossed to reach the rocky flanks of Mount Fridtjof Nansen had such great crevasses near its head that they greatly complicated the task of reaching the rocks. It must be said, however, that these are exceptional. Bergschrunde are generally lacking about the heads of cirques and mountain glaciers, as may be seen by examining figures 1, 3, and 4.

As pointed out earlier, Taylor credits the formation of cirques to nivation and bergschrund action; furthermore he believes them to have been formed at some earlier time, when climatic conditions were much less severe than now.



FIGURE 7. Granite boulder (erratic). Eastern part of Queen Maud Mountains.

Priestly (1923, pp. 41-47) believes that by far the greater number of Antarctic cirques were preceded by the widening and deepening of gorges on cliff faces, through a combination of freeze-and-thaw action. Winter accumulations of snow in such depressions are subject to such action about their margins as the summer approaches. Continued melting may cause the whole mass to be dislodged with catastrophic suddenness, carrying much debris with it. When half-funnel-shaped depressions formed in this way become deep enough to maintain permanent masses of ice, sapping around the sides and head by bergschrund action continues the recession.

Priestly further believes that cirques which become submerged by overflowing ice have their cirquelike characteristics accentuated. The ice would be thickest where the walls and base of the cirques meet, and erosion which is a function of the thickness of the ice would be most rapid there. The cirque shape would therefore be accentuated rather than softened. He also believes that cirque shapes might be initiated "without any other predisposing factor than the occurrence of a shallow gully."

It is difficult to accept either of these ideas. That an overriding mass of ice would be effective in deepening a cirque under the conditions stipulated by Priestly is open to question. It is more reasonable to suppose that a cirque would be reduced rather than accentuated. The writer has seen cirques in the Holstensborg district of Greenland planed off by later advances of the inland ice. The cirque walls were rough, as they had been left by sapping of cirque ice, rather than polished and striated as they would have been if according with Priestly's theory. A cirque filled with ice might easily be overridden by floods of ice which would have no effect except to reduce the height of the walls. Priestly's theory assumes that the ice of the cirque would be thrown into eddies which would erode at the bottom and along the sides.

If cirques could be initiated by ice floods through the influence of shallow gullies, they should be found in greater abundance in glaciated regions of North America, for instance. However, such features do not abound.

Submerged cirques.—I believe the key to the explanation of Antarctic cirques is held by the most interesting of all such types, namely, those which are partly submerged. Priestly's suggestion that such occurrences are indicative of a general continental depression seems very reasonable. That the heavy mantle of ice has depressed the Antarctic continent is evident from the present overdeep position of the continental shelf.

These submerged cirques, like the others, are the products of nivation and bergschrund action, widely operative processes in the advancing hemisphere of glaciation when climatic conditions were much less severe than they are now. They were higher-level features than now, and were largely, if not entirely, carved out before the thickening mantle of ice behind the horst had greatly depressed the entire land mass. That the cirques are all inherited from an earlier stage of Antarctic glaciation when climatic conditions were much milder than they are now, seems the only reasonable explanation.

That it is possible for a land surface to be completely mantled with ice and yet to suffer little or no erosion is evident from the present appearance of the interglacial area between Liv and Axel Heiberg glaciers. As might be expected on account of the greater height of the horst in this section, the foothill region below or north of Mount Nansen, shows less evidence of glacial sheet erosion than the lower portion of the range to the eastward, where submerging floods of ice were sufficiently great and long continued to produce profound effects. Fewer cirques are found in the eastern section than in the Mount Nansen area. However, polished and striated surfaces are found above the present ice level on Mount Cohen. Figure 9 is a *roche moutonnée* on this mountain spur.

Empty and partly filled cirques are other evidences of a former greater abundance of ice in this section. That the sharply defined and partly submerged cirques illustrated in figure 10 have been overridden, can hardly be questioned. Even now, the ice field behind them is at the level of the heads of the cirques. Figure 11 shows this ice field and side and rear views of the same cirques as are illustrated in figure 10.

If the cirques just referred to had never been covered with a protective mantle of ice, but had been subjected to subaerial weathering and erosion throughout the immense amount of time involved since their formation, they would long since have lost their sharp outlines. That a sheet of ice completely covering a land surface must of necessity operate as a powerful agent of erosion to smooth it down or iron out its topographic inequalities clearly does not hold

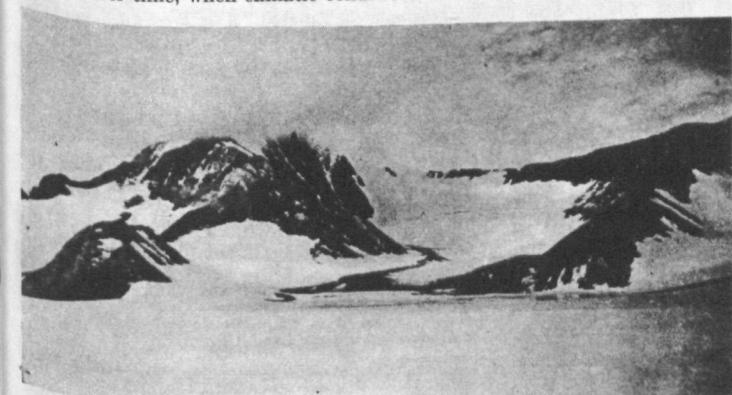


FIGURE 6. Shrunken cirque ice in front of horst near Thorne Glacier.

in Antarctica. An ice cover of the Spitzbergen or Highland Ice type would normally have a conservative effect in such places as the interglacial area between Liv and Axel Heiberg glaciers. From an examination of figures 1, 3, 4, 10, and 11, all of which are photographs from this region, it is evident that profoundly greater glacierization than the present would not be necessary, in order to cover the rock masses now exposed.

That the present Antarctic ice masses, generally, have a conservative rather than a destructive effect, is evident from a comparison of the rate of rock wastage due to processes of sub-aerial weathering and erosion, and the rate of denudation beneath the ice. As previously pointed out the former processes are very active, while the denudation beneath the sluggish ice, which is generally free of debris, is bound to be slight.

THE ROSS SHELF ICE

The Ross Shelf Ice is the westernmost feature of the Pacific Antarctic, or West Antarctica, and a consideration of its character should be included in this report; but the results of the observations made during the sledge journeys of the first Byrd Expedition concerning this feature have already been published (Gould, 1935, pp. 1367-1394). That report reviews the information then available from previous expeditions as well as from the first Byrd Expedition. Various theories regarding the origin of shelf ice are discussed, with emphasis upon the two which seem to have specific application to the Ross Shelf Ice. These two theories involve the idea of the formation of shelf ice by the accumulation of snow upon a base of fast sea ice, and formation from tongues of ice supplied by the marginal glaciers. Both of these processes have clearly been operative in the formation and growth of the Ross Shelf Ice, but there seems no way to determine which was the more important in the early or formative stages.

From observations made on the second Byrd expedition in the eastern and northeastern parts of the Ross Shelf Ice, Wade (1937, p. 593) has concluded that Island Ice was an important factor in the formation of shelf ice, in that sector at least.

FORMER EXTENT AND ACTIVITY OF ICE

It is the testimony of all Antarctic investigators, based upon information collected from all sides of the continent, that all the present glacial features, from the inland ice itself to the shelf ice masses about it, must be considered as shrunken remnants of a former, more intensive, and more extensive period of glaciation. As to the maximum extent of various glacial features at the culmination of glaciation, there is of course a difference of opinion. The shelf-ice areas were much more extensive, and there are mountain ranges now exposed which were formerly ice clad. Estimates of the thickness of the inland ice in excess of the present thickness vary from 1000 to 4000 feet.

GLACIAL ACTIVITY AND CLIMATE

The explorer is so intimidated by the widespread evidence of reduced effectiveness of glacial activity in this continent, as compared with other parts of the earth, that he is apt to interpret present conditions as being typical for the full period of Antarctic glaciation. This can hardly be true.

Evidently the present frigid climate, which automatically slows down all processes of glaciation and likewise prevents much precipitation, is the result, and not the cause, of glaciation.

With the declining temperatures of the advancing hemicycle of glaciation, permanent snowdrifts first formed in high levels. From such beginnings mountain glaciers later developed and began their progress to lower levels. Ice accumulated on the polar plateau, coalesced into great sheets, and began its outward journey through the tectonic valleys of the horst. Whether the greatest heights of the horst were completely covered at the culmination of glaciation can hardly be demonstrated, but certainly the foothills below them were submerged by great ice sheets.

The growing mass of ice automatically accentuated the cooling climates which caused it, and, through the operation of the glacial anticyclone, produced drastic climates in the surrounding regions. Persistent low temperatures and heavy precipitation are mutually exclusive, so that ice accumulation

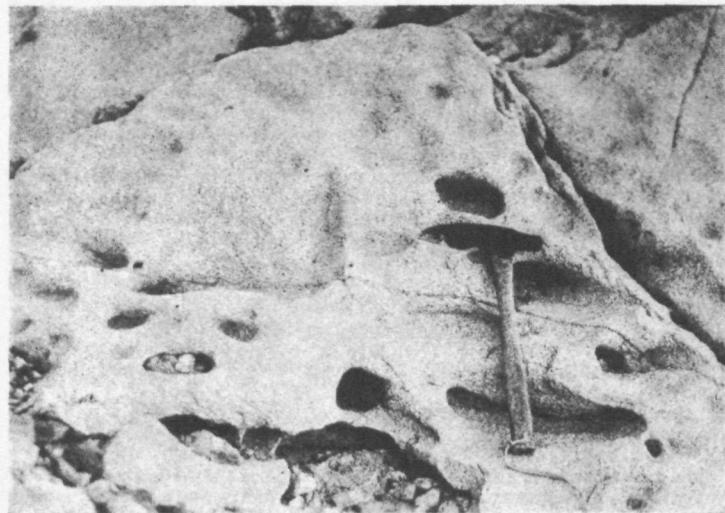


FIGURE 8. Differential weathering and erosion in granite.



FIGURE 9. Roche moutonnée on Mount Cohen.

eventually came to a standstill. The present waning Antarctic ice sheet is not due to rising temperatures, but to starvation through lack of precipitation. There is little reason to doubt that the immediate effect of an increase in solar energy would be increased evaporation, and therefore precipitation in the form of snow, in Antarctic regions, and the rejuvenation of glacial activity.

Present climatic conditions are clearly warmer for most of the earth, if not all of it, than they were in the Pleistocene. They are nevertheless too severe for effective glacial activity in Antarctica. Before climatic conditions had become severe enough to produce ice sheets of continental dimensions in North America and Europe, they must have begun to affect, adversely, Antarctic glaciation. The starvation processes due to the intense cold which now characterize Antarctic inland ice masses probably had their beginning in the early Pleistocene rather than near its close.

The effective glacial erosion of Antarctica must have preceded the rest of the world of the Pleistocene by a very great period of time. That it began in the Middle Tertiary, at least, and that the major erosional effects were produced in Late Tertiary rather than Pleistocene time, seems reasonable. The relationship of volcanic debris to intercalated layers of ice about Mount Erebus indicates that glaciation must have begun there in the Middle Tertiary (Wright and Priestly, 1922, p. 183). Mount Erebus is on Ross Island, which stands at the northwestern apex of the Ross Shelf Ice.

GLACIAL EROSION

That evidences of erosional effects are not more abundant is due to the fact that the inland ice cover of the continent is so complete that depositional records are buried beneath the sea. It is certain that the Antarctic continent

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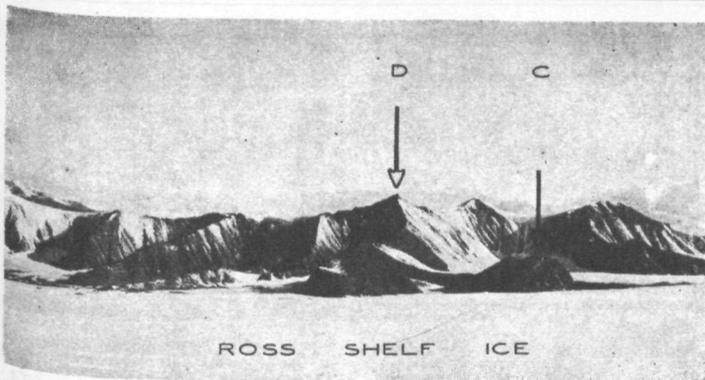


FIGURE 10. Partly submerged cirques.

Aerial photograph by A. C. McKinley

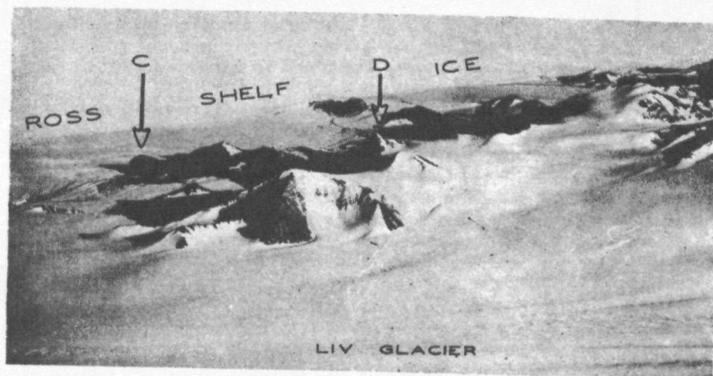


FIGURE 11. Ice fields above cirques shown in figure 10.

Aerial photograph by A. C. McKinley

must have been denuded by glacial erosion during the advancing hemicycle of glaciation at least.

Stetson and Upson (1937, pp. 58-66), who examined the bottom samples collected by the second Byrd Antarctic Expedition point out that the entire continental margin of Antarctica is encircled by a zone of terrigenous deposits. They identify the samples examined as a "marine till" and state that it has all the characteristics of a till laid down on land. Such material mantles the continental shelf and slope down to about 2000 fathoms.

Taylor (1930, p. 160) has suggested that the Pennell Bank, which extends across the Ross Sea, may be part of a vast terminal moraine. The same interpretation might also be applied to the Iselin Bank, a newly discovered submerged ridge north of Pennell Bank (Roos, 1930, p. 577).

Mawson (1925, p. 30) says: "Everywhere beyond the margin of the continent are to be found, beneath the sea, immense terminal moraines which out-

line the former maximum extension of the ice cap." While these submerged ridges, which are often from 50 to 100 miles from the shore, are usually of the order of hundreds of feet high, off the Adelie Land coast, "the height of the main off-shore moraine is possibly to be reckoned at something of the order of 3000 feet."

Granting Mawson's interpretation of the submerged ridges, when one compares these dimensions with the Pleistocene deposits of the Upper Mississippi Valley, the maximum thickness of which does not exceed 600 feet, it becomes apparent that Antarctic glaciation must have been much more intense than glaciation anywhere else in the world in Cenozoic time.

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1939

ANTARCTIC REGIONS

By LAURENCE M. GOULD

THE MOST workable classifications of the earth into geographic or natural regions are based upon climate or the relationships between climate and flora. Since the summer temperature determines almost exclusively the vegetation in the Polar Regions, Nordenskjöld¹ has made a useful division based upon the warmest-month temperatures. Three main belts are apparent.

CLIMATIC REGIONS

The warmest or Outer Polar Belt lies between the warmest-month isotherms of 50° and 41° F. Its warmest boundary thus coincides approximately with the northern timber line or the southern limits of the tundra. Bush vegetation with close plant association is the normal land cover.

The second or High Polar Belt lies between the warmest-month isotherm of 41° F. on the one hand and 32° F. on the other. In northern latitudes this becomes the High Arctic Belt, which includes all coastal lands beyond those of the Outer Polar Belt. Vegetation is scattered or separated by bare spots.

Beyond the High Polar Belt, or within the warmest-month isotherm of 32° F., lies the Antarctic Province, represented only by the inland ice sheets of Antarctica and Greenland.

The warmest-month isotherm of 50° F., which approximates timber line in northern latitudes, is not specifically applicable in high southern latitudes, because of the contrasting relationships in the distribution of land and sea. Here Nordenskjöld proposes as the boundary of the Outer Polar Belt the areas

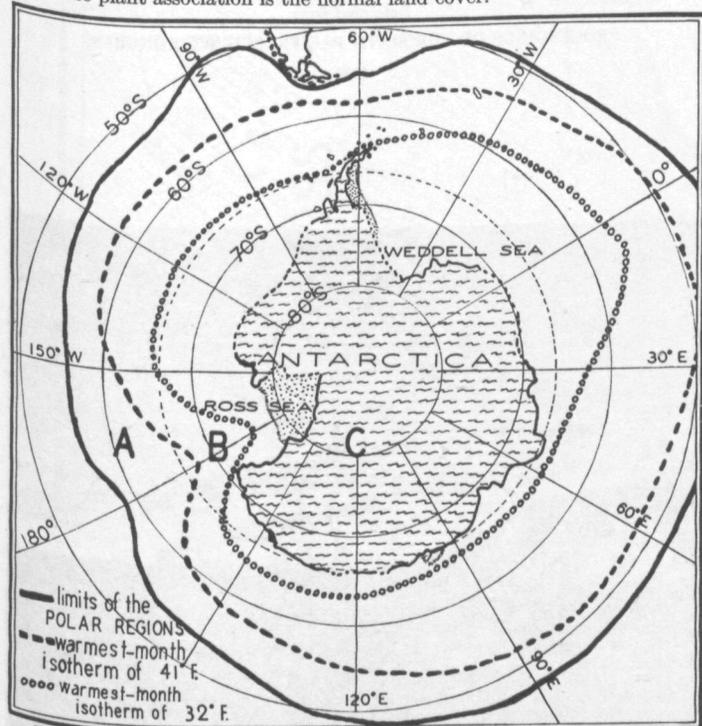


FIGURE 1. Natural regions of Antarctica. A. Outer Polar Belt. B. High Polar Belt. C. Antarctic Province.

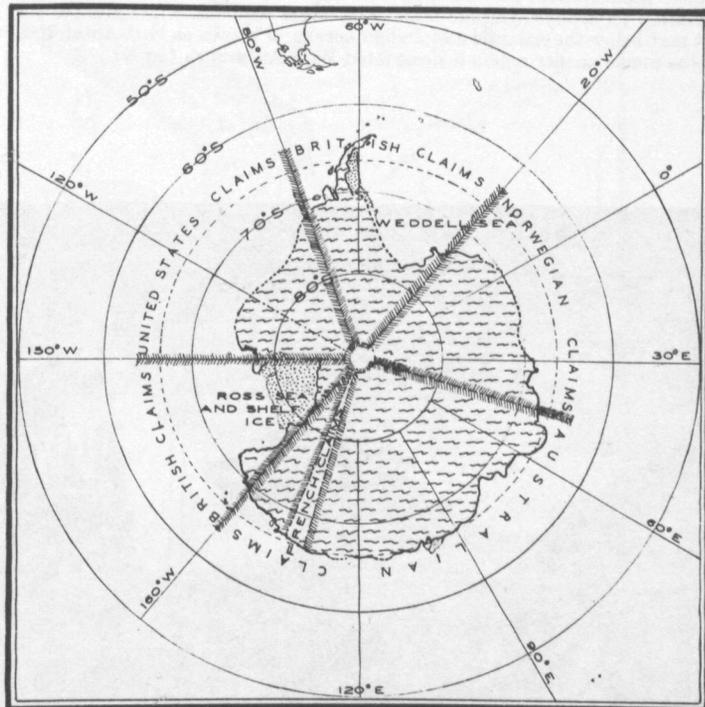


FIGURE 2. Major political claims in Antarctica.

¹ Otto Nordenskjöld and Ludwig Mecking, "The Geography of the Polar Regions," *Am. Geog. Soc. Spec. Publ.* No. 8, pp. 72-78, 1928.

with warmest-month isotherm of 48° F., if the coldest month is at least 32° F. The limits of the South Polar Regions, as they appear in figure 1, therefore approximate the warmest-month isotherm of 48° F. rather than 50° F. as in the Arctic.

It is at once apparent that however useful such a division of the Polar Regions may be in the Arctic, it gives the geographer no useful plan for detailed studies in Antarctica. Because of its heavy mantle of ice, which welds the continent together into a great physical unit, Antarctica possesses a physiographic unity without parallel among all other continental land masses. This fact and its circumpolar position are the underlying causes for the concentric arrangement of the natural or climatic regions. Furthermore, within the same circumpolar latitudes one finds essentially similar phenomena not only of climate, but of life and other geographic phenomena as well.

POLITICAL DIVISIONS

With so much interest currently focused on the matter of political claims in Antarctica, the division of the continent into political geographic regions at once suggests itself. In figure 2 the major political claims only are represented. Characteristically these proposed political boundaries have no relationship to any natural or geographic phenomena, and for scientific purposes such a division is of no use.

QUADRANTAL DIVISIONS

A division of the continent into quadrants along the meridians of 0° and 180°, on the one hand, and 90° E and 90° W on the other, was used by the American Geographical Society in the preparation of their great map published in 1928. These quadrants are generally referred to as the American Quadrant, the Pacific Quadrant, the Australian Quadrant, and the African Quadrant. Although such a division is useful for purposes of orientation and cartography, the meridional boundaries are unrelated to any geographic features.

OCEANIC SECTORS

Antarctica is unique among the continents in being bounded on all sides by waters of oceanic depths. The three greatest oceans of the globe merge around this continent. Since our knowledge of it is still for the most part confined to its coastal regions, and since this zone alone exhibits biogeographical phenomena of any consequence, its division into segments the outer boundaries of which are the Pacific, the Atlantic, and the Indian Oceans has been useful, if somewhat inexact.

Such a division into sectors becomes even more useful for purposes of orientation if the southern continents are likewise used to identify the parts of Antarctica which lie to the south of them. Thus we have the American, the Pacific, the Australian, the Indian, the African, and the Atlantic sectors.

PHYSICAL REGIONS

The question of whether the Antarctic continent is a single land mass, or a large one and a much smaller one separated by a straitlike connection between the Ross and Weddell seas, has long excited the interest of Antarctic explorers. Personally, I believe the work of the first and second Byrd Antarctic Expeditions makes the idea untenable. Nevertheless, a line drawn roughly from the southeastern quarter of Ross Sea to the western coast of Weddell Sea does separate the continent into the only two major subdivisions which have any foundation on a physiographic basis. The larger segment, which lies for the most part below the Atlantic and Indian oceans, is known as East Antarctica, and the much smaller region is designated West Antarctica (fig. 3).

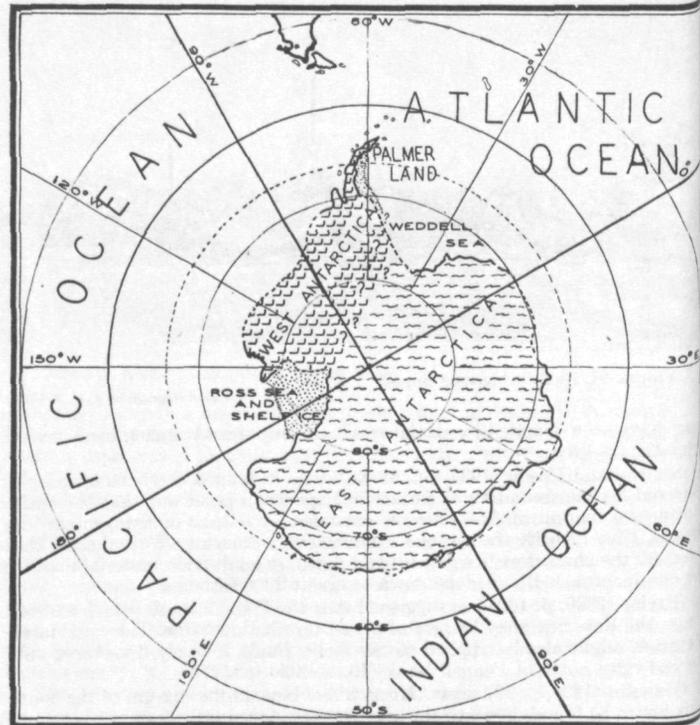


FIGURE 3. Physical regions of Antarctica.

Our present information about East Antarctica indicates that its structural and other geological features align it with Australia and Africa. Broad plateaus bounded in places by notable horsts are its known major lineaments.

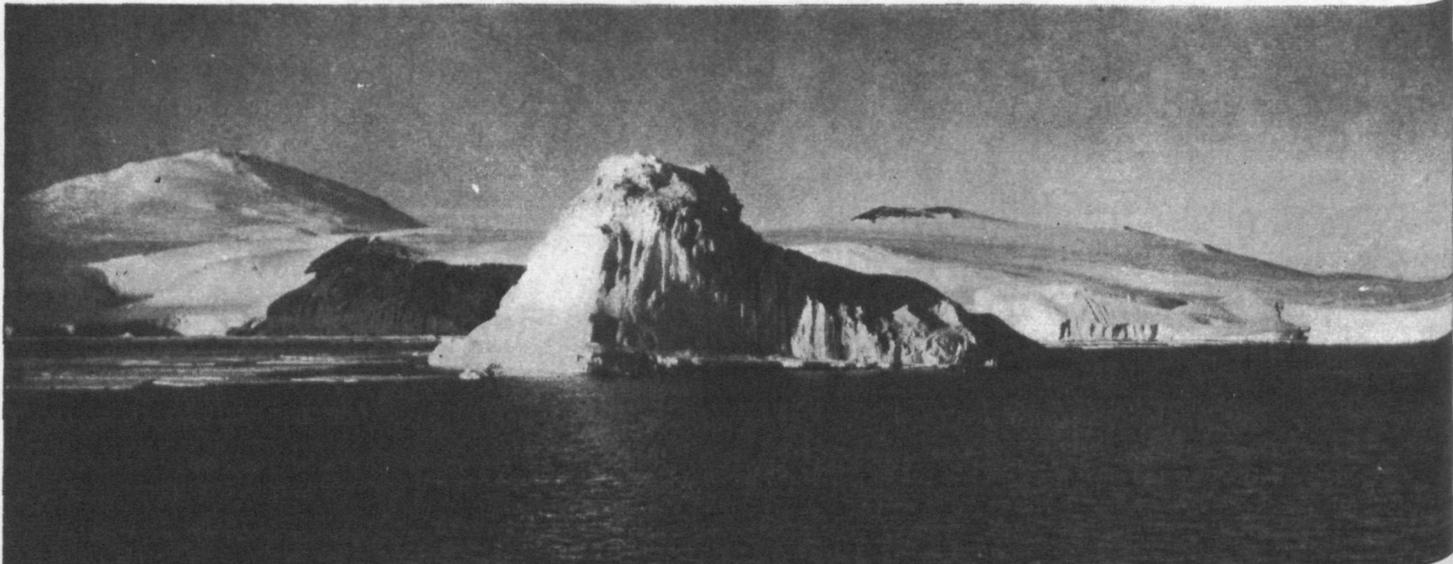
On the other hand, West Antarctica is known to have structural and lithological characteristics which relate it more particularly to the southern part of South America.

It is apparent from figure 3 that West Antarctica and the Pacific sector of Antarctica, or the Antarctic Pacific, to use the terminology of this symposium, approximately coincide, though the second designation is somewhat more vague and comprehensive than the first. Though the peninsula of Palmer Land is bounded in part by Atlantic waters, it is included in the term "Pacific Antarctic" as used herewith. Its geographical and geological features make it an integral part of West Antarctica. It is therefore considered as the easternmost portion of the Pacific Antarctic and the Ross Sea with its shelf ice to the westernmost.

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Mountains 6,000 ft. high rise like ghosts out of the ocean near the south magnetic pole. The expedition discovered that the magnetic pole has shifted position since 1912, the last time it was

definitely located. Although in this picture the water is calm, it is an area of sudden and violent storms. The winds sometimes reach 100 m.p.h. velocity and no plane or ship is safe.

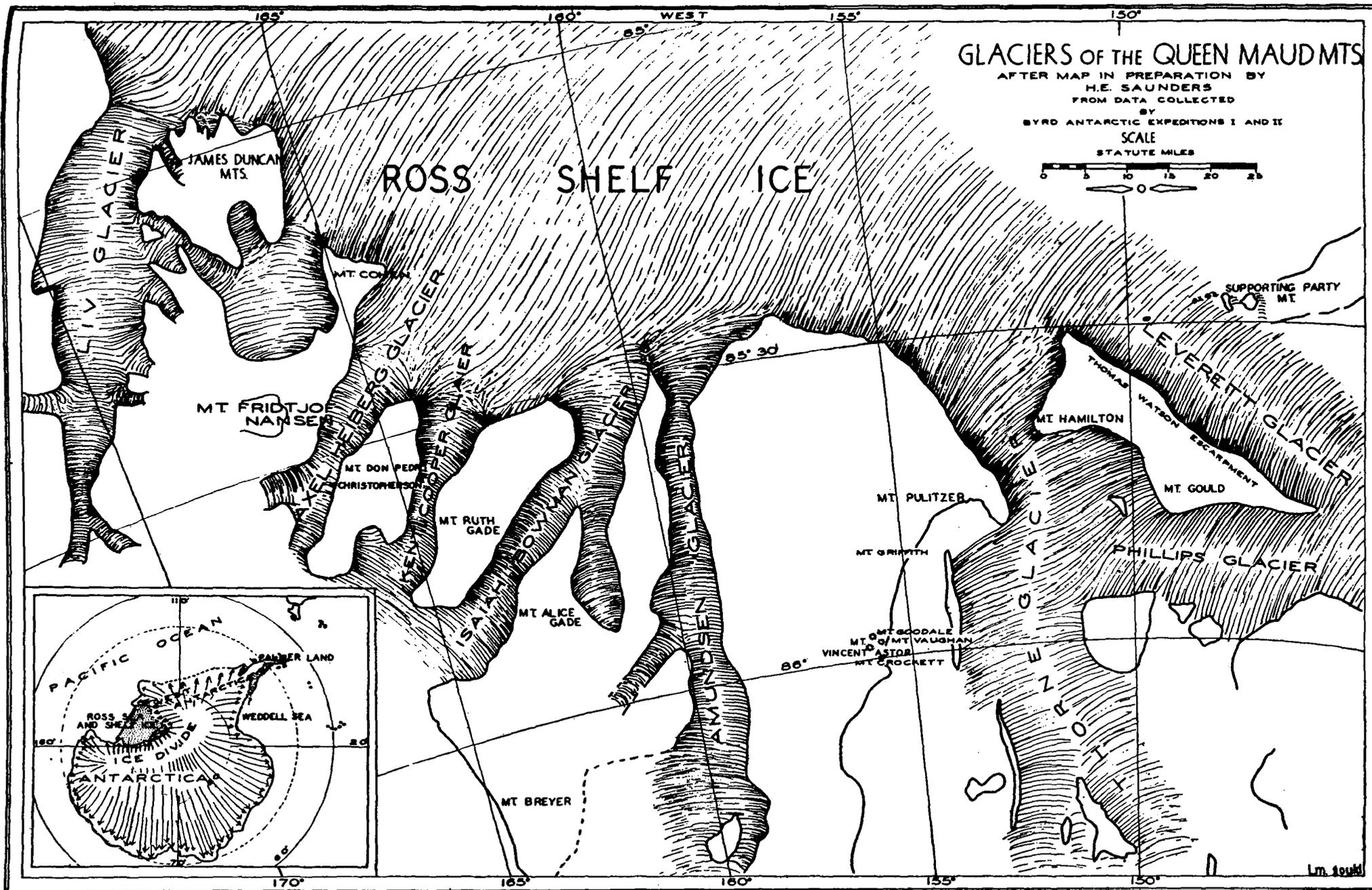


FIGURE 12.—Glaciers of the Queen Maud Mountains.

