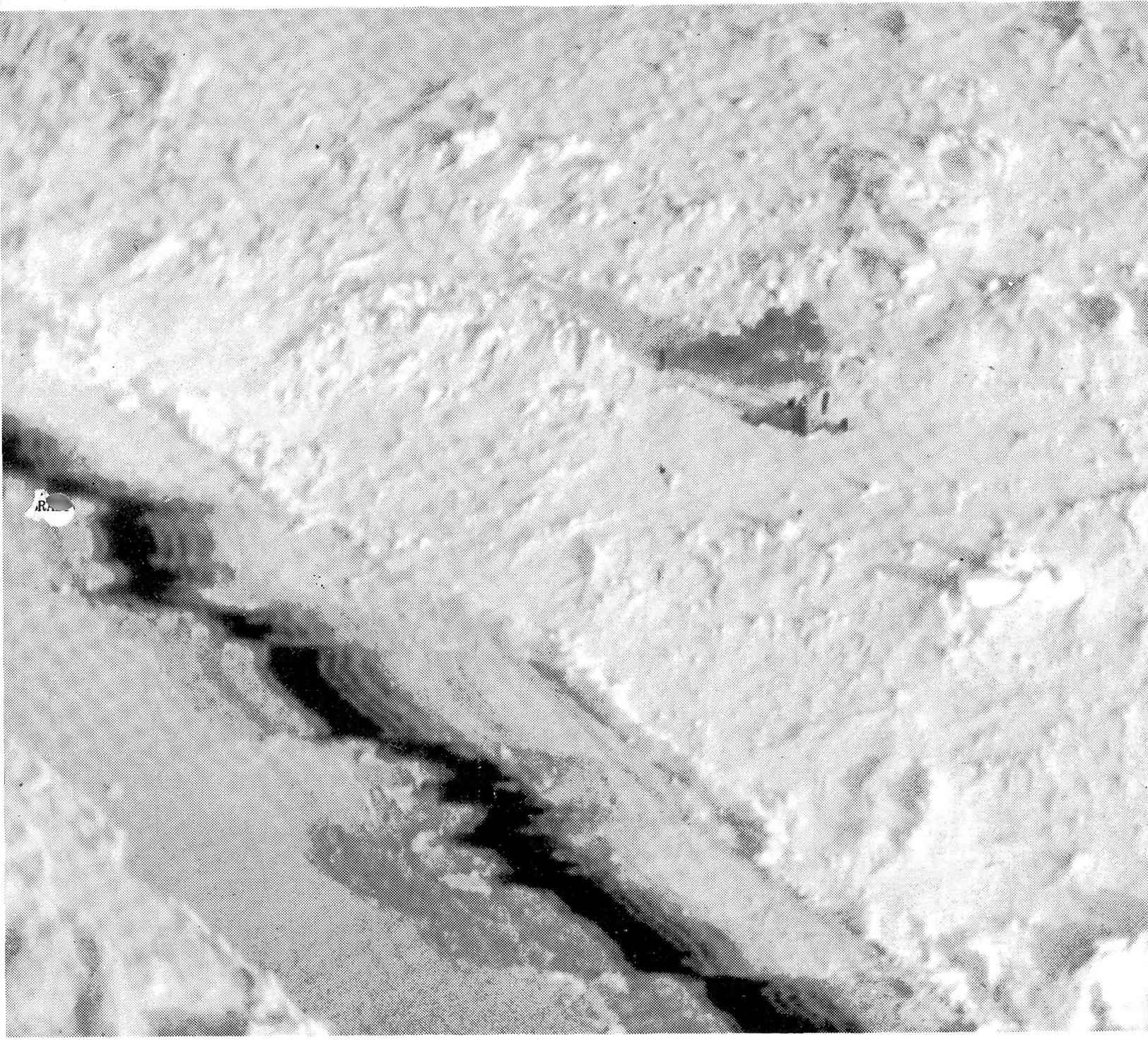


THE POLAR TIMES



At the North Pole! Members of the Plaisted Polar Expedition ice party fire a smoke signal from their last camp, at 90 degrees North. The signal helped airplane pilots spot their tiny pyramid tent on the vastness of the polar ice cap.

National Oceanic and Atmospheric Administration

The Polar Times

ERRATA NOTICE

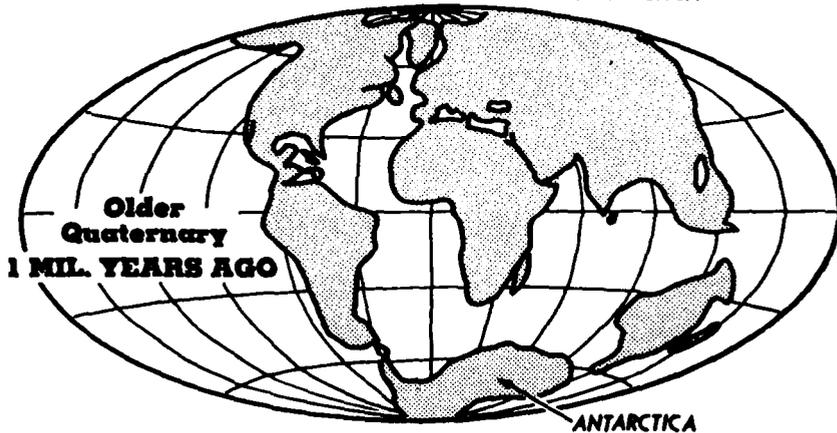
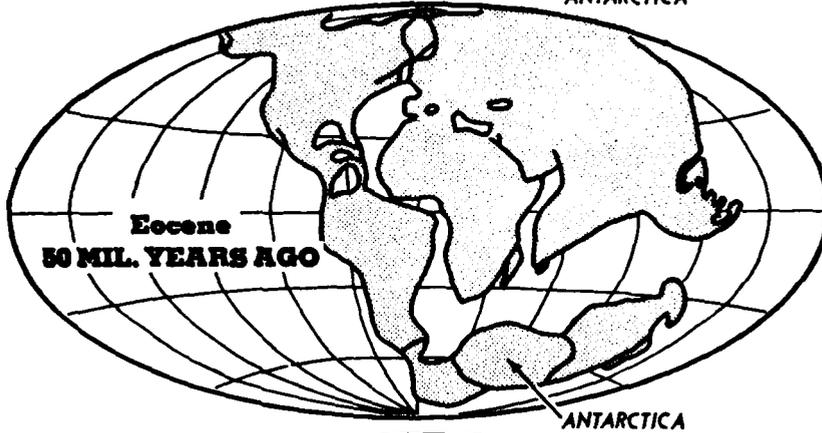
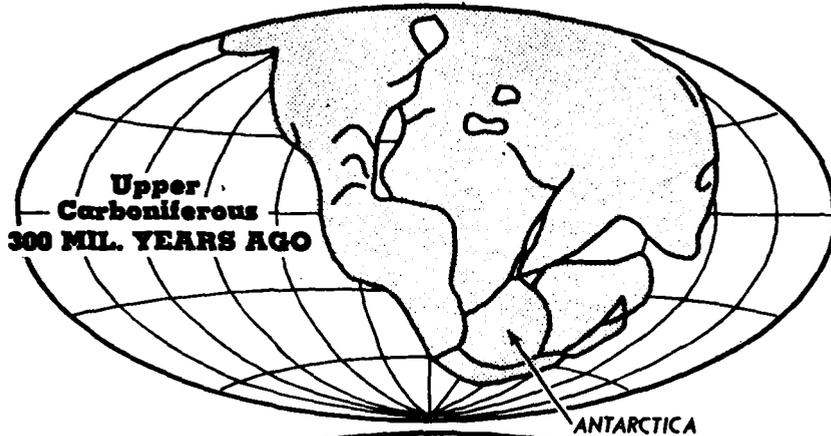
One or more conditions of the original document may affect the quality of the image, such as:

Discolored pages
Faded or light ink
Binding intrudes into the text

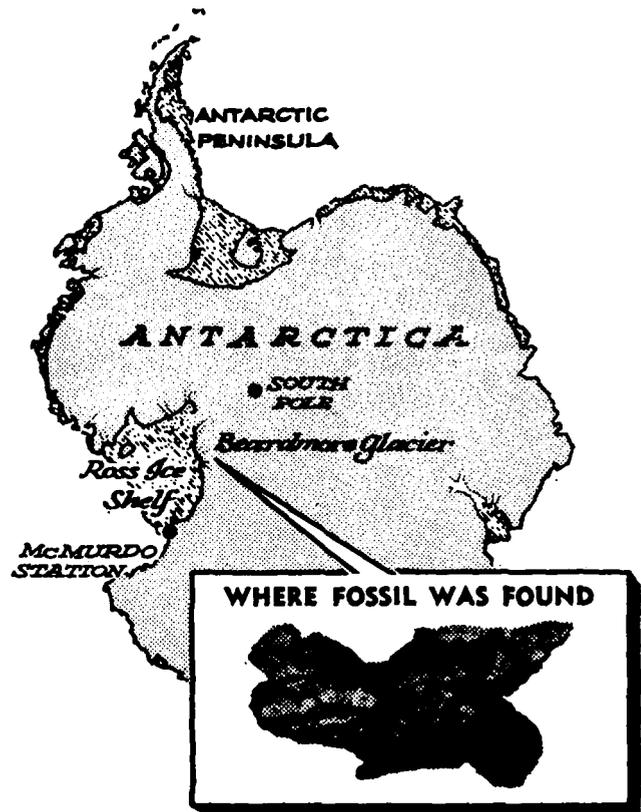
This has been a co-operative project between the NOAA Central Library and the Climate Database Modernization Program, National Climate Data Center (NCDC). Permission to image The Polar Times magazine was granted to the NOAA Central Library by the magazine's Managing Editor on July 14, 2010. To view the original document, please contact the NOAA Central Library in Silver Spring, MD at (301) 713-2607 x124 or Library.Reference@noaa.gov

HOV Services
Imaging Contractor
12200 Kiln Court
Beltsville, MD 20704-1387
August 6, 2010

NEW FOSSIL DISCOVERY OFFERS CLUES ON CONTINENTAL DRIFT



The theory that Antarctica was once part of a supercontinent of all the major land masses has been reinforced by discovery of a fossil jawbone (inset below) near the South Pole. It has been identified as part of a large amphibian whose close relatives lived in Africa and South America. In 1912 Alfred Wegener proposed that Antarctica was nestled between South America, Africa, India and Australia before those lands drifted apart, as shown on the maps, left, taken from his book, "The Origin of Continents and Oceans."



The Polar Times

Copyright 1968 by the American Polar Society

No. 66

JUNE 1968

A Vertebrate Fossil Is Found in Antarctic

By WALTER SULLIVAN

The New York Times

March 13

A fossil fragment of a large amphibian that lived in subtropical forests near the South Pole more than 200 million years ago has been found in Antarctica.

This is the first indication that land vertebrates once inhabited that region. It had previously been thought that Antarctica, isolated by hundreds of miles of stormy seas, had never been reached by such animals.

The discovery supports the view that the continent was once linked to other land masses.

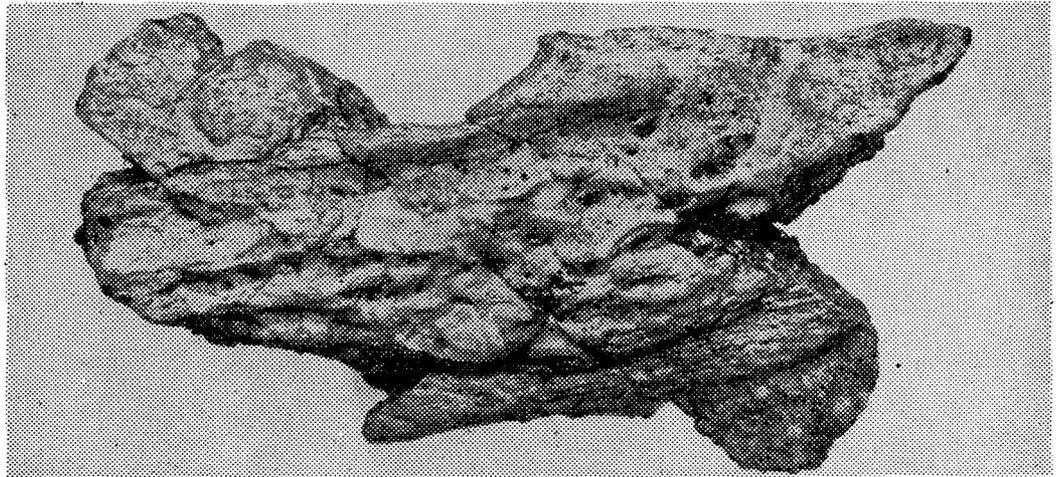
This is because animals of this type are thought to have been unable to travel in salt water. Yet closely related species are known to have lived contemporaneously in South Africa, Australia and even as far away as Spitsbergen, near the North Pole.

Dr. Edwin H. Colbert, curator of vertebrate paleontology at the American Museum of Natural History, at 81st Street and Central Park West, termed the discovery one of the most important fossil finds of the century.

It was he who identified the specimen, a fragment of jaw bone only 2½ inches long. He described the animal as resembling a giant salamander about four feet long.

The specimen, he said, should make "very happy" those who believed the continents were once joined and then drifted apart. The ancient animal belonged to the labyrinthodonts, a major group of extinct amphibians. They are of special interest because they may have been ancestral to all modern land vertebrates, including man.

The Antarctic discovery was made last December by a geology team from the Institute of Polar Studies at Ohio University. The team worked from last



The American Museum of Natural History

Remains, twice natural size, of jaw of the subtropical amphibian found near South Pole



Lola Darling, from "Evolution of the Vertebrates"

An artist's restoration of a labyrinthodont, which lived more than 200 million years ago

November to February in the mountainous country east of the upper Beardmore Glacier and 325 miles from the South Pole. Peter J. Barrett of New Zealand, who led the party, reported from Ohio State, in a telephone interview, that the bone was embedded in a succession of sediment layers 2,500 feet thick.

It lay in what had once been a sediment-filled stream bed among plant fossils of the early Triassic Period, some 220 million years ago. The ferns and other plants are typical of those that lived along fresh-water streams during that time. The association of the fossil with such material is thought to establish the fact that it was a

fresh-water amphibian of the early Triassic.

Findings in recent years have left no doubt that Antarctica was once warm. There has been an argument, however, about whether this was so because the whole world was warmer, or because Antarctica specifically was once in warm latitudes.

When Capt. Robert Falcon Scott of Britain raced the Norwegians to the Pole in 1911-12, he and his companions discovered great beds of coal in the mountain walls lining the Beardmore Glacier.

The fossil vegetation, which includes large tree trunks, is similar to that found in deposits of the same period from such far-flung regions as India, Afri-

ca and South America. This led to the theory of an ancient supercontinent, which geologists called Gondwanaland, that joined all these regions.

One view was that they were linked by land bridges that have since been submerged. This view has lost favor because of detailed mapping of the ocean floors. No evidence of such bridges has been found.

The other theory was that Gondwanaland broke apart into fragments that slowly drifted apart. However a number of scientists have rejected this idea of continental drift.

Fossils have been found that show Antarctica was once inhabited by penguins as tall as a small man, but there has

hitherto been no evidence that any large land animals roamed the dense forests of that continent. Insects were certainly there, as they are in present-day Antarctica, borne from other continents by winds or birds.

The penguin is not considered a land vertebrate because it spends a large of its life in the ocean.

Vertebrates are animals with spinal cords.

Whatever land animals did exist on Antarctica were annihilated as the ice ages heaped snow on the continent until its ice sheet pushed to the sea in all directions.

Dr. Colbert said that, because of the "very far-reaching implications" of the discovery, he had shown the specimen Monday to Dr. Donald Baird of Princeton University, another authority on fossils of that period. Dr. Baird concurred in his identification.

Natural History Museum Shows Antarctic Fossil

The first land-vertebrate fossil found in Antarctica has been put on display in the Roosevelt Rotunda of the American Museum of Natural History. The fossil, a piece of jaw bone from a large amphibian that lived 200 million years ago, is the first clue that land animals once roamed the Antarctic and supports the theory that the continents of the Southern Hemisphere were once linked together and later drifted apart.

The bone was discovered last December by geologists from the Institute of Polar Studies at Ohio State University. Identification was made by the museum.

The Polar Times

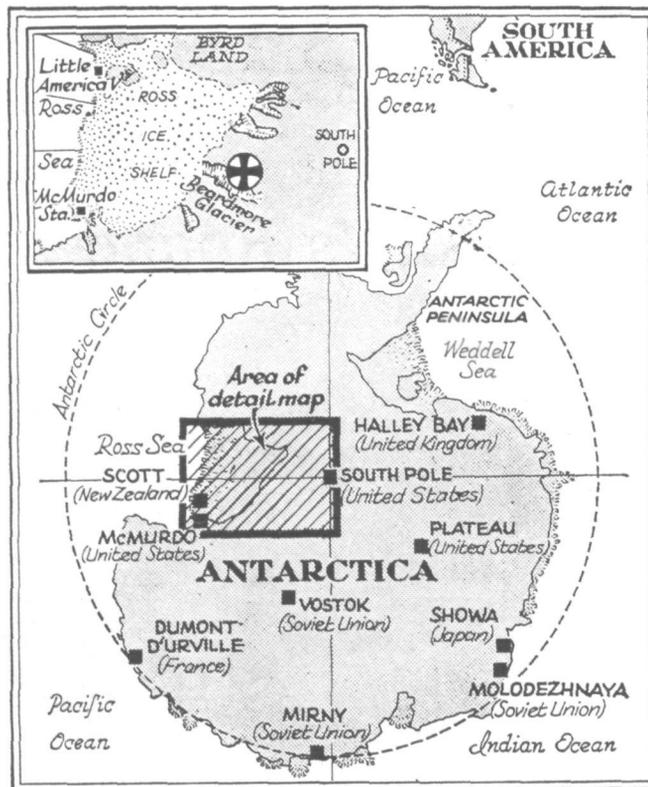
Published June and December by the AMERICAN POLAR SOCIETY, Care August Howard, Secretary, 98-20 62nd Drive (Apt. 7H), Rego Park 74, New York.

AUGUST HOWARD, Editor

THE POLAR TIMES highly recommends "The Polar Record," published 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.

Back issues are 50 cents each.



The New York Times March 13, 1968
Discovery in Antarctica (cross) of the jaw fragment of a 200-million-year-old amphibian supports the view that the continent was once connected to other land masses.

New Clue To Earth's History

By WALTER SULLIVAN
 The New York Times

March 17

In 1908, when Sir Ernest Shackleton and three companions sought to reach the South Pole, they discovered an enormous river of ice that provided them with a route through the Trans-Antarctic Mountains to the Polar Plateau. They named it the Beardmore Glacier. Among boulders riding the back of this glacier they found fossilized leaf impressions.

One of the team, Frank Wild, climbed a slope for a view ahead and found, embedded in sandstone, seams of coal as much as eight feet thick. He brought back a piece of fossilized wood, showing that this region, within walking distance of the South Pole, was once heavily forested.

The discovery revived the idea that the world's continents have drifted apart and in 1912 Alfred Wegener, a German meteorologist and polar explorer, presented the theory to the Geo-

logical Association in Frankfurt. He argued that the continents were once a single land mass, but that during the Cretaceous Period, now put at about 100 million years ago, they began to split apart.

Scientists in general and geologists in particular found this hard to believe. The continental blocks extend 20 to 40 miles down into the underlying mantle material, which is far from being liquid. How could the continents plow through such material?

Wegener and others who support the drift theory pointed to the striking similarity between the fossil vegetation of Antarctica, during the carboniferous, or coal-forming period of the earth's history, and similar deposits in India, Australia, Africa and South America. The skeptics said land connections were unnecessary for the migration of plant life, since seeds and spores are carried long distances by wind.

They pointed out that in all the extensive fossil deposits of Antarctica, no evidence of land vertebrates (animals with spinal cords) had been found.

Last week, however, it was announced by the National Science Foundation and Ohio State University that the remains of a land vertebrate had been found

The fossil was a fragment of jaw bone from an extinct group

of amphibians known as Labyrinthodonts that lived some 200 million years ago. The geological party from Ohio State that made the find was led by Peter J. Barrett. The fragment was identified by Dr. Edwin H. Colbert, curator of vertebrate paleontology at the American Museum of Natural History in this city.

He pointed out that the Labyrinthodonts were fresh-water animals that could not have migrated across salt water. They also inhabited Africa and South America. Hence, he said, the find should make adherents of continental drift "very happy."

South African Girl Is Safe After Ride on Whale at Sea

PORT ELIZABETH, South Africa (Reuters)—An 18-year-old hairdresser reported how she had ridden a 20-foot whale at sea.

Miss Anna Marie Wasserman said she and a friend had swum to a spot off Port Elizabeth, where the whale was frolicking. "The next moment I felt myself being lifted out of the water," she said. She was on the whale's back.

A lifeguard, who had watched the incredible ride, went to her aid as she swam as fast as she could to shore.

Polar Ship Launched

SOUTH BRISTOL, Me., March 28 (UPI)—The National Science Foundation launched its first polar research ship today—the 125-foot, wooden-hulled Hero.

American Polar Society

- ROBERT A. J. ENGLISH
 REAR ADMIRAL, USN (RET)
President
- DR. THOMAS C. POULTER
 CAPT. FINN RONNE, USNR
 DR. JOHN H. ROSCOE
Vice Presidents
- AUGUST HOWARD
Secretary
- DR. WILLIAM B. FIELD
Treasurer

Board of Governors

- DR. WALLACE W. ATWOOD, JR.
- LOUISE A. BOYD
- DR. MEREDITH F. BURRILL
- R. ADM. GEORGE DUFEK, USN
- HERMAN R. FRIIS
- DR. NEIL D. JOSEPHSON
- CAPT. EDWIN A. MC DONALD, USN
- CAPT. ALTON B. MOODY, USN
- COMDR. DAVID C. NUTT, USN
- DR. PAUL A. SIPPLE
- CHARLES H. STOLL
- WALTER SULLIVAN
- R. ADM. CHARLES W. THOMAS
- BRADFORD WASHBURN

COLLAPSE FEARED AT BYRD STATION

Antarctic Buildings Caving
In Under Weight of Ice

By **ROBERT REINHOLD**

The New York Times

BYRD STATION, Antarctica, Dec. 27 — Byrd Station, like its sister station at the South Pole, is caving in under a burden of ice and snow that is crushing it like a giant vice.

Unlike South Pole Station, however, Byrd Station was intentionally placed entirely beneath the surface, using a new construction technique that was supposed to withstand the immense ice pressure that has destroyed so many an Antarctic station. But a flaw in the original design has left the station near collapse just six years since its completion in 1962.

Some believe the station will not endure for more than a year or two unless drastic action is taken to shore up the sagging tunnel walls.

"They built the wrong buildings—they're too damn high," said Lieut. (j.g.) Robert Clark, the station's officer-in-charge, who is a member of the Navy's civil engineering corps, during a walking tour of the station.

The buildings, he said, rise too close to the roof of the tunnels and the heat they emit is causing the ice above to melt and shift, deforming the steel arches that prop it up.

Byrd Station was built in cavernous trenches covered by steel arches designed to protect the occupants from both the elements and the pressure of ice. Today, however, the sides of the arches are buckling everywhere, giving the tunnels a Gothic flavor.

In some places, the metal has been cut away to remove the sagging chunks of ice. Ironically, Byrd was built to replace old Byrd Station, six miles from here, which was abandoned after five years of snow accumulation threatened to collapse it.

The station is named after the late Rear Adm. Richard E. Byrd, American Antarctic pioneer and the first man to fly over the South Pole. It lies in the heart of Marie Byrd Land, 885 miles to the east by air from the chief American Antarctic station at McMurdo Sound.

Little of Byrd Station is visible from the surface. One enters through a mammoth opening in the snow and is greeted by an orange sign overhead:

"Welcome to Byrd — Show-place of Antarctica."



The New York Times Jan. 8, 1968

Beyond, the tunnel divides into a maze of dimly lit smooth-walled ice tunnels filled with tons of supplies, food and equipment.

When not at their posts, the 60 or so scientists and Navy men who live here congregate in the mess hall, presided over by Ma Fuller, a burly, mustachioed Navy cook.

About 25 of the men will spend the winter here beginning in March.

As at other Antarctic outposts, they seem to thrive on a light-hearted sense of humor expressed in neatly lettered signs that adorn nearly every building.

"Keep Off the Grass," warns a large sign in front of the mess hall, where a patch of plastic flowers is surrounded by a sturdy black picket fence.

At a nearby beer storage area, fenced in with chicken wire, a sign admonished visitors:

"Beer Cage—Please Do Not Feed the Beers."

The chief business at hand is science. The United States Antarctic research programs support a variety of projects here in upper atmosphere physics, glaciology, seismology, meteorology and other fields.

The problem of constantly shifting ice and snow is one that has long plagued the builders of Antarctic and Arctic research stations.

"It's like trying to live on a big bowl of Jello," says Rear Adm. J. Lloyd Abbot Jr., commander of Operation Deep Freeze, the Navy's logistic support effort in Antarctica.

A variety of approaches to the problem have been tried, mostly without success. The most promising idea to date is to prefabricate station buildings as separate mobile units resembling house trailers.

With this method, already in use at Plateau Station, the

Antarctic Snow to Be Analyzed In a Study of Earth's Evolution

Belgian Finds South Pole Is
Last Place on Earth Free
From Modern Pollution

By **ROBERT REINHOLD**

The New York Times

M'MURDO STATION, Antarctica, Dec. 29.—A Belgian glaciologist is shipping four tons of Antarctic snow from the "cleanest spot on earth" to Brussels.

The scientist, Dr. Edgard E. Picciotto of the University of Brussels, has journeyed to the Antarctic's most remote research station to obtain snow that has not been contaminated by urban air pollution and pesticides.

"Man has contaminated the whole earth—it's impossible to find water without carbon monoxide from automobiles and industrial waste," said the gray-haired taciturn Belgian, a veteran of eight summers of Antarctic research.

Dr. Picciotto, a leading authority on snow chemistry, will use the snow to study the chemistry and rate of fall of microscopic dust particles from outer space. The findings, it is hoped, will contribute to our understanding of the evolution of the earth and the solar system.

Because the Antarctic snow never melts, extraterrestrial dust remains lodged as it falls in neat layers of snow, which can be used to judge its rate of fall over the years.

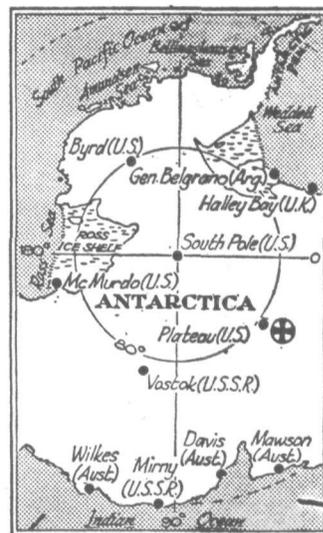
To eliminate terrestrial impurities, however, Dr. Picciotto has had to travel to Plateau Station, an eight-man American research station that is probably farther from human habitation than any other spot on the earth's land surface.

It lies 11,890 feet above sea level high on the vast Antarctic plateau, where the mean tem-

perature is 70 degrees below zero Fahrenheit.

buildings can be attached to a tractor and dragged to a new site every time they are threatened by engulfing snow and ice.

To salvage Byrd Station, the Navy is attempting to retard the melting by cooling the tunnels to zero degrees Fahrenheit. A large room has been carved out of the ice at one end of a major tunnel. In front of the room, a fan will be placed to drag in frigid air through the ice from the surface and blow it through the sagging tunnels.



The New York Times Jan. 9, 1968

perature is 70 degrees below zero Fahrenheit.

"It's the only place on earth you can retrieve atmospheric precipitation from before the industrial revolution and the atomic bombs," the glaciologist said in an interview before setting out for the plateau from McMurdo Station.

The plateau snow is so pure that during analysis the finest distilled laboratory water is "too dirty" for the snow to be dissolve in it.

The snow accumulates so slowly that 25 years of history can be obtained by digging just six feet.

"The whole history of the recent past of this planet is recorded in the layers of ice," Dr. Picciotto said.

Packed in about 40 boxes weighing 220 pounds each when full, the snow will be shipped to Brussels in refrigerated units. The journey will take the snow nearly 20,000 miles in airplanes, ships and trucks by way of New Zealand, New York and Antwerp.

In Brussels, the snow will be stored in a commercial food storage warehouse for use as needed in Dr. Picciotto's laboratory.

Although 2,000 feet of frozen water lie beneath Plateau Station, only one place on earth is drier—Death Valley in California. There is more precipitation during one year in New York than in 20 years on the plateau.

A mostly windless table of unrelieved flatness, the plateau has an unearthly beauty about it. The oxygen-thin air is laden with ice crystals that reflect light, giving the sun a halo of vivid bright spots called sun dogs. Often, colorful "ice bows" decorate the blue horizon.

Sleep Patterns Being Studied in Antarctica

Attempt to Discover Effect of Isolation on Human Beings

By ROBERT REINHOLD

The New York Times

SOUTH POLE STATION, Antarctica—What happens to human beings forced to live for a year in the extreme isolation and cold of a remote research station deep under ice and snow at the South Pole?

Twenty-one men live here at the southernmost point on the globe, where the sun is not seen for five months, where the temperature has been known to drop to minus 113 degrees Fahrenheit, and where there will be no contact with the outside world from March until November of next year.

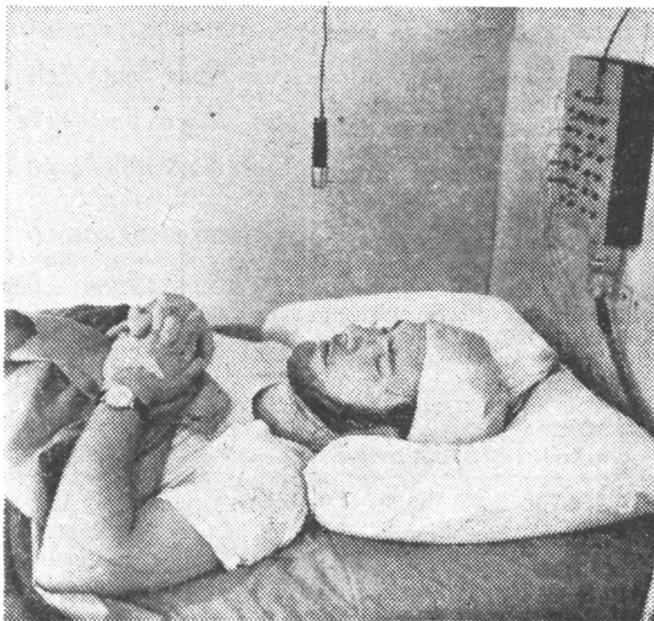
They live and work in nine small wooden buildings buried under 12 feet of ice and connected by ice-walled tunnels in conditions that some men have likened to being adrift in space. As they carry out their normal tasks, 10 are under careful scrutiny by a medical research team performing one of the most comprehensive analyses of human isolation ever undertaken.

The research team, led by Dr. Jay T. Shurley and Dr. Chester M. Pierce, both psychiatrists at the University of Oklahoma Medical Center, is attempting to measure every aspect of life and behavior—especially sleep—under these extraordinary conditions.

The two psychiatrists are not here at the South Pole. Data for their research are being gathered by two bearded young men, Albert T. Joern, a 23-year-old medical student, and Robert E. Brookse, 32; an electronics technician.

"We are measuring the sleep patterns of these men to see if we can use sleep as a test to predict behavior reactions to stressful exotic environments like the South Pole," Mr. Joern said in his cluttered laboratory. "It could have a bearing on other types of forced isolation, such as prolonged space flights and underwater living."

Five of the subjects are scientists, performing a variety of weather and atmospheric studies at the Pole, and five are members of Operation Deep Freeze, the Navy's program to provide logistic sup-



The New York Times (by Robert Reinhold)

Albert T. Joern, a 23-year-old medical student, using himself as a subject in the sleep study at the South Pole.

port for the American research effort in Antarctic. Little is required of them by the Oklahoma study except to sleep.

Previous studies have shown that humans forced to live closely in prolonged and confined isolation frequently undergo severe emotional problems, extreme depression, irritability, hopelessness, inability to concentrate and insomnia. These effects are usually most pronounced during the long months of total Antarctic darkness.

Antagonisms and jealousies that would normally not surface become magnified by the enclosing walls and cause bitter conflicts, even violent fighting, as time goes on. There is no escape; some adjustment must be made.

Some men are better equipped to make this adjustment than others. To determine how these men differ, the Oklahoma team has installed elaborate devices at the station to monitor the sleeping, dreaming and waking behavior of the 10 men.

Sleep and dream patterns, it is believed, are reliable indicators of adaptation to environment. Periodically, each subject is asked to devote his sleep to science by allowing himself to be fitted with electrodes that are attached to his head, eyes, neck, arms and fingers.

As he sleeps, wires from these electrodes lead to a special device, called a polygraph, which records level of sleep, eye movements, muscle tone, skin condition and heart rate. Above the sleeping subject hangs

a microphone to measure breathing patterns.

Taken together, these measurements reflect almost everything that is going on within the subject as he sleeps. For example, it is known that rapid movements of the eyeballs indicate that a person is dreaming.

Other information is gathered to obtain as full a picture as possible of the subject's surroundings and physiology to judge their impact on sleep. Each man submits a self-report card on which he outlines his day's activities. His blood chemistry and other vital functions are checked regularly.

Finally, when winter ends in November, Drs. Shurley and Pierce will journey to the station to interview and examine each man personally. The psychiatrists will attempt to collate all the results, which are to be compared with the normal, or baseline, data that were obtained earlier this year by performing similar studies on each subject before he left the United States.

Their conclusions, the researchers hope, will allow them to develop standards to predict what kind of person is likely to break down under prolonged and stressful isolation.

The study is supported by a grant from the National Science Foundation, a governmental agency that provides funds for all American research in Antarctica.

The work is an extension of Dr. Shurley's studies over the

Conditions at Base Have Been Likened to Those in Space

last six years on the effects of loss of various visual, auditory and other environmental factors on human behavior and physiology. Isolation at the South Pole embodies a number of such losses, called sensory reduction.

The Navy enlisted men in the study seem to have reacted well to it.

"With those wires on," a young sailor said, "I sleep like a baby."

But to some of the many scientists here, the program is somewhat disturbing.

"If such a test were performed on Robert Falcon Scott and the other early Antarctic explorers before they were permitted to come, they probably would have been rejected as nuts," said one.

ANTARCTICA CALLED FULL OF PLANT LIFE

WEDDELL SEA, Antarctica—Contrary to popular notions of a scarcity of plant and animal life in Antarctica, scientists and oceanographers have discovered that great expanses of the Weddell Sea show extraordinary concentrations of marine plant and animal life.

Examples of animal life is greater than anticipated numbers are: penguins, seals and whales.

This and a number of other reports are now being drafted by scientists just back from a cruise to the Weddell Sea on board the United States Coast Guard icebreaker Glacier.

Part I of a two-year international program, this year's Weddell Sea expedition included 50 scientists and oceanographers from the United States, Norway, Argentina and West Germany. The Argentine icebreaker San Martin also took part in the expedition.

Dr. John Rankin of the University of Connecticut, on board Glacier to study marine bethos, reported that life upon the ocean bottom was far more abundant than had been thought. He found the sea bottom heavily populated up to depths of 3,000 feet.

The oceans surrounding Antarctica teem with animals ranging in size up to the blue whale—the largest creature that has ever lived.



The New York Times (by Robert Reinhold)

Adélie penguins out for a stroll near McMurdo Station. Adélies and the larger, statuesque Emperors are the only types of penguins on the Antarctic mainland. Emperors are rarer than Adélies, and one of their rookeries, at Cape Crozier, has been devastated by a fierce storm.

Penguin Chicks Die in Storm

By ROBERT REINHOLD

The New York Times

McMURDO STATION, Antarctica—The famed Emperor penguin rookery at Cape Crozier, discovered in 1902 by early British explorers led by Robert Falcon Scott, has been devastated by a furious Antarctic storm that killed every chick.

Word of the loss, believed to have been about 1,000 chicks, was brought to McMurdo Station by Dr. William J. L. Sladen, a leading penguin authority from Johns Hopkins University, after he had spent two months in field work at the breeding site of the stately, dignified birds.

No sign of Emperor chicks was found when Dr. Sladen and his party reached Crozier in mid-October at the end of the Antarctic winter.

No Chicks in 10 Miles

About 500 of the statuesque, adult Emperors were left at the breeding site, according to Dr. Sladen, but they were acting "like any unemployed person, fooling around" without any young to care for.

"A careful search by helicopter," recounted the gaunt, British-born scientist in an interview, "demonstrated beyond any doubt that there were no chicks within at least 10 miles of the rookery site."

As a result, the National Science Foundation, which supports and coordinates American research on the continent, has ordered that no Emperors be taken to the United States or killed for scientific or other purposes this year.

Dr. Sladen also reported witnessing another storm last month that spread havoc in the vast, sprawling rookery of the more common Adélie penguins. The Adélie rookery lies adjacent to the Emperor site at Cape Crozier.

The cape is the easternmost tip of Ross Island, a small volcanic island that lies along the dividing line between the Ross Ice Shelf and the Ross Sea, about 875 miles from the South Pole.

Emperors and Adélies are the only types of penguin that inhabit the Antarctic mainland. As its name indicates, the Emperor is a tall, handsome bird that stands over three feet high and may weigh 90 pounds. It has been found at only six or seven small rookeries on floating ice along the Antarctic coast.

The Adélie is smaller than the Emperor, usually growing 14 inches high. It breeds in dense rookeries that contain hundreds of thousands of birds. Nearly half a million

are believed to occupy the shores beneath the towering rock and ice cliffs of Cape Crozier.

Difference in Habits

The Adélie lays its eggs during the relatively mild Antarctic summer and migrates north to the outer edges of the pack ice during the dark, inhospitable winter. In contrast, the Emperor remains to breed at the height of the winter's fury. It was during this period, apparently after the chicks were hatched, that the Emperors were raked by the storm.

Each Emperor female lays only one egg a year. However, they are long-lived birds. For this reason, Dr. Sladen does not believe the Crozier rookery is in danger of extinction unless several consecutive years of total chick loss ensue.

A physician by training but a zoologist by choice, Dr. Sladen has been studying penguins in Antarctica for seven years. He is a popular figure here, often seen walking about coatless, wearing only a pullover sweater and a maroon woolen shirt that clashes violently with his pastel-green corduroy trousers.

Dr. Sladen has spent the season performing studies of population, breeding and behavior on the highly sociable

penguins, from which he believes important insights into human behavior can be derived.

Account of the Storm

Dr. Sladen gave this account of the storm that swept the Adélies, a storm that he called one of the most severe he had ever seen in the Antarctic:

"The wind gauge was destroyed in the early part of the storm after it had been recording gusts of well over 100 miles an hour. Many colonies were abandoned during the height of the storm and all eggs blew away, the birds seeking shelter in dips or behind large rocks.

"From time to time—during breaks in gusts—they would struggle back to their sites and sometimes . . . picked up by the wind and hurled head-over-heels, with flippers and legs spread, down the slope . . . like leaves scattered in a storm."

At the end, the Johns Hopkins group ventured from its battered hut to inspect the devastated rookery. Dr. Sladen said:

"Hundreds of adults were lying dead, many more severely wounded, and thousands of eggs were scattered everywhere either as splotches of frozen yoke or frozen solid with cracked shells. On one of the beaches 150 yards long we counted 818 destroyed eggs in a narrow strip of 10 feet, and 155 dead and 65 injured adults.

Space Biologists Study Microbes at the Pole



A glacier stream in Dry Valleys area of Antarctica. Conditions for life are favorable for only four weeks in year.

They Hope to Learn in Antarctic How to Spot Life on Mars

By ROBERT REINHOLD

The New York Times

McMURDO STATION, Antarctica—The National Aeronautics and Space Administration is studying Antarctic microbes to learn how to detect life on Mars.

The sparse bacteria, fungi and algae that maintain a tenuous grip on life in the Antarctic's desolate and eerie Dry Valleys have attracted the interest of a team from the space agency's Jet Propulsion Laboratory at Cal Tech.

The Dry Valleys, unlike the rest of Antarctica, have no ice or snow. Bare mountains rise above wind-scoured valley floors, littered with rubble and rocks carved into other-worldly shapes by millennia of blowing sand.

Tiny organisms manage to persist in these valleys in an especially harsh environment. If life exists on other planets in our solar system, space experts believe, it probably must cope with surroundings at least as hostile.

Such life, because of its environment, would probably be very sparse and simple. The chief problem, however, is to build a device capable of recognizing it. To this end, NASA is attempting to learn how earthly organisms that live under extreme duress adapt to their environment.

"The Dry Valleys are not exactly Mars-like," according to Dr. Roy E. Cameron, a soil microbiologist who leads the team, "but they are the nearest thing to it that we can investigate here on earth."

Dr. Cameron has been working closely with Dr. Robert E. Benoit, a microbiologist from Virginia Polytechnic Institute. Dr. Benoit studies the organisms' metabolism and Dr. Cameron their environment.

Together they are piecing to-

gether a picture of an unparalleled ecology that exists in an area so cold and inhospitable that it was for years thought to be as sterile as a surgical knife.

In this area, conditions are favorable for life during only four weeks every year. At the height of the Antarctic summer in December and January, when the sun shines brightly 24 hours a day small streams trickle down the valley walls from nearby glaciers.

In this rare water, just above freezing, there springs to life a variety of organisms that appear to lie dormant the rest of the year.

Their growth is so slow and their metabolism so fickle, Dr. Benoit said, that previous investigators were unable to detect their presence.

They are bizarre looking organisms—bacteria of almost every shade of orange, red, purple, black and green. It will take some time to identify them properly, but, Dr. Benoit says, "the startling thing about them will not be what they are but

what they can do."

For example, they annually survive temperatures as low as 85 degrees below zero during the months of winter darkness. Live bacteria have even been found well beneath the surface lodged in the permafrost, where they have apparently lain frozen and dormant for thousands of years.

"I sometimes think of them sitting around waiting for the next thaw," said Dr. Cameron in an interview in his laboratory at McMurdo Station.

To obtain samples and record conditions for life, the microbiologists periodically venture into the valleys, which lie about 70 miles across McMurdo Sound from McMurdo Station.

Using sterilized digging instruments, they place specimens in laboratory flasks to be cultured and studied back at McMurdo.

"They're not hardy," Dr. Cameron says. "You have to treat them with kid gloves."

The microbiologists have to determine the distribution, den-

sity and kinds of organisms that make up the natural flora of the valleys.

To get as complete as possible a picture of the environment, they measure air temperature and humidity, soil temperature and chemistry, and radiation, sunlight and evaporation in the valleys.

The Cameron team's findings will be applied to the design of life-detecting equipment aboard the Voyager Biology Laboratory. This spacecraft, still in the planning stages, is scheduled for a 1975 launching, depending on appropriations.

Life detectors operate on a variety of principles, but they must be designed with an advance idea of what to look for and where. For example, one device recognizes life by feeding it nutrients marked, or labeled, by radioactive materials, which can be traced. This entails knowing what the organism "would like" to eat.

The space agency has been making similar studies in other harsh environments, such as the Atacama Desert of Chile, the driest in the world. Antarctica's Dry Valleys are the coldest desert in the world.

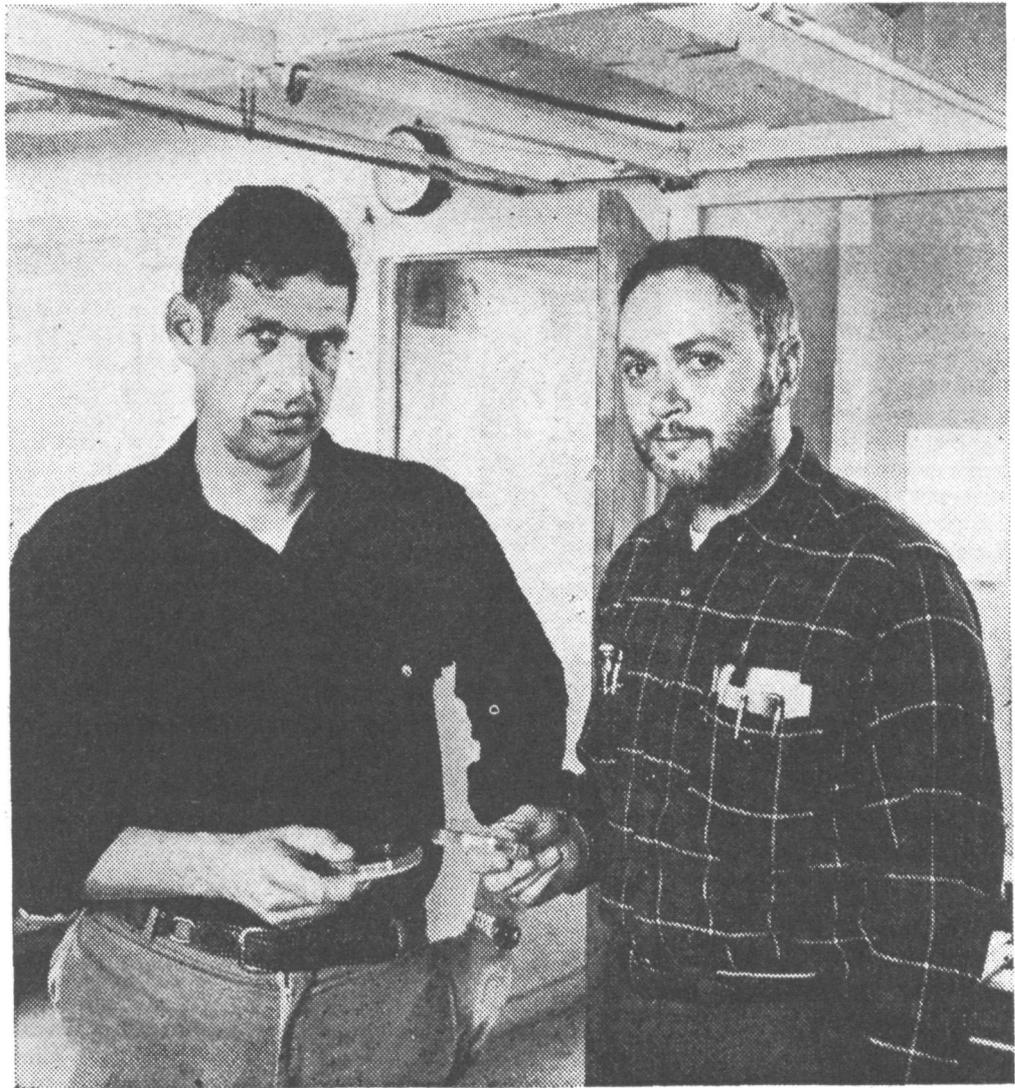
This is not the first time NASA has taken an interest in Antarctica as an analogy for space exploration. Last January, Dr. Wernher von Braun and three other space officials visited the Antarctic to develop ideas for lunar study. Problems of construction, isolation, logistics and locomotion here are considered similar to problems humans will face on the moon.

Contamination is the main problem the microbiologists face. Care must be taken to distinguish organisms carried into the valley by birds or wind from the natural flora. Even their own presence in the valleys casts doubt on the results.

Live Bacteria Discovered In Ice-Free Antarctic Earth

Life in the form of algae and bacteria has been located in a dormant stage at temperatures as low as 47 degrees below zero Science Service reports. Dr. Robert E. Benoit of Virginia Polytechnic Institute and Dr. Roy E. Cameron of Jet Propulsion Laboratory, discovered these organisms about a foot beneath the surface in the volcanic soil of the Antarctic's ice-free Taylor Valley.

These microorganisms, which are dormant during the winter months, become active only with the summer flow of runoff waters from the glaciers



The New York Times (by Robert Reinhold)

Dr. Robert E. Benoit, left, a microbiologist from Virginia Polytechnic Institute, and Dr. Roy E. Cameron, soil microbiologist with the National Aeronautics and Space Administration. Dr. Cameron said the Dry Valleys are the nearest thing to Mars here on earth.

situated in the mountains above the valley.

Dr. Cameron's studies of Ant-

arctica's microbial life are expected to provide information useful in developing life detec-

tion equipment for automatic landing devices planned for Mars.

Whaler Tells of Industry Shift From Oil to Production of Food

The whaling industry is undergoing a profound change, according to the only Norwegian shipowner still active in the business in Antarctic waters.

Jorgen Jahre, head of the Norwegian shipping concern of Anders Jahre Company and operator of the 15,000-ton whaling ship Kosmos IV, said that the emphasis in whaling had shifted from oil to meat.

In an interview during a brief visit here last week, Mr. Jahre noted that whaling was dying because of the scarcity of whales. Norway, he said, had every intention of hoding onto

her international whaling quota. He also said that his company intended to stay active in whaling as long as conditions permitted.

As for whale oil—the initial reason for man's pursuit of the world's largest mammal—Mr. Jahre noted that demand has diminished because of declining prices and competition from Peruvian fish oil and African vegetable oils.

Because of the depressed oil prices, he said, various by-products of whaling have become more valuable.

Mr. Jahre said the Kosmos IV recently returned with some 7,000 tons of frozen whale meat

that was sold to the British subsidiary of an American pet food company.

He also told of a recent effort by his company to market 1,500 tons of frozen whale meat in Norway for human consumption. Reception of the whale meat by Norwegian housewives was good, he said.

Another valuable by-product of whaling, he said, is the production of meat extracts for soups.

The decline of the Norwegian whaling industry, he noted, was also demonstrated last year when the Kosmos IV was diverted from whaling to serve as a processing center for Norwegian herring boats.

He said the experiment was successful, adding that he did not believe that this was the proper work for a whaling factory ship.

DRILLS HIT BOTTOM OF ANTARCTIC ICE

Cores Brought Up for Study of Area's Ancient History

By ROBERT REINHOLD

United States Army engineers have completed drilling a hole through the Antarctic ice cap and have struck rock a mile and a third beneath the surface.

It is the first time the ice sheet has been penetrated to the bottom.

Later studies on the four-and-a-half-inch wide ice cores, removed from the hole and samples of the underlying rock are expected to give important insights into the climatic and atmospheric history of the earth over tens of thousands of years.

Success in the project, begun at Antarctica's Byrd Station late in 1966, was achieved on Jan. 29. Word reached Washington a few days later.

The achievement was hailed yesterday by glaciologists and Antarctic specialists as a landmark in Antarctic research. The 7,111 feet of ice cores represent a kind of vertical filing cabinet that scientists can draw on to study climate and atmosphere during the distant past.

The drilling was carried out by an eight-man team from the Army's Cold Regions Research and Engineering Laboratory in Hanover, N. H. Samples of the cores will be sent to the Hanover laboratory for complete physical and chemical analysis.

Because the Antarctic's snow never melts, the ice cores and the air bubbles trapped in them hold a continuous record of the earth's precipitation and atmosphere over the years, all neatly preserved in compressed layers for easy study.

If the Antarctic ice sheet ever melted, it has been estimated, the level of the world's oceans would rise by 200 feet, covering the Statue of Liberty to her nose and flooding every major seaport. Moreover, the ice sheet exerts great influence on the weather in other parts of the world.

Scientists, therefore, have a great interest in determining the rate of snow accumulation and movement of the ice sheet. They hope that the core obtained at Byrd Station will



The New York Times (by Robert Reinhold)

Anthony J. Gow, at Byrd Station, inspects a section of the core of ice. He makes preliminary chemical and physical analysis of the ice, which gives clues to ancient climates.

provide important clues.

Because of technical problems, the Army's drilling team has not been able to bring up a substantial sample of the rock. In a telephone interview from Hanover, B. Lyle Hansen, the project director, said that the team had drilled one foot into the rock but that the ice, shifting at the rate of an inch a day, had threatened to break the drill and it had to be removed.

The hole will be kept open until next October when the team will resume its work. The last 18 feet of ice cores contained dirty ice and gray and black rock fragments up to 2½ inches that appeared to be volcanic material.

But no conclusions about the nature of the underlying land can be drawn, Mr. Hansen said, until a substantial core can be obtained.

Unexpectedly, the team found water at the bottom.

The presence of the water, Mr. Hansen said, indicates that the temperature there is somewhat higher than expected. This may suggest, he said, that the ice at the bottom is much older than expected and had absorbed more heat from the

earth's interior than younger ice would have.

The unexpected water presented a problem. As it was lifted up the hole, it began to freeze under the lightened pressure and, expanding, made it difficult to withdraw the drill.

Unlike a conventional oil rig, the drill has no solid stem. The drill and motor are suspended together on a flexible electric cable that is lowered into the hole. The bit is designed to bring up a continuous intact core.

The drill was operated 24 hours a day in a dimly lit cavernous tunnel in Byrd Station. Under the direction of Herbert T. Ueda, a mechanical engineer, the team averaged 100 feet a day. Preliminary chemical and physical analysis of the cores was performed by Anthony J. Gow, a New Zealand-born glaciologist.

Back in New Hampshire, the cores will be subjected to radioactive dating tests. Other tests will seek to measure rate of snowfall, seasonal temperature variations in Antarctica, the rate at which particles fall from space, the composition of the atmosphere over Antarctica and the physical and chemical prop-

NAVY OPENS COLLEGE FOR ANTARCTIC TEAM

McMURDO STATION, Antarctica—Men stationed here during Operation Deep Freeze '68 will be able to add to their knowledge and obtain college credits through the United States Navy's Program for Afloat College Education.

Five instructors attached to the Commission on Extension Courses of Harvard University came here to set up the first college classroom on the Antarctic Continent. The program comprises 15 half-hour films, textbooks, study guides with reading assignments and, occasionally, case problems to accompany the films.

Fifty-two Navy men have enrolled in a total of eight subjects in natural science, social science and the humanities.

The college program was originally established in 1960 by the Harvard Commission on Extension Courses in cooperation with several other institutions for the crews of the Polaris submarines based in New London, Conn. The curriculum was later extended to a few surface ships and Navy shore installations.

WEATHER BALLOON SETS FLIGHT RECORD

A weather balloon launched by the United States as part of the Project GHOST program circled the world 32 times in 351 days, the longest trip on record, a Federal scientist reported last week.

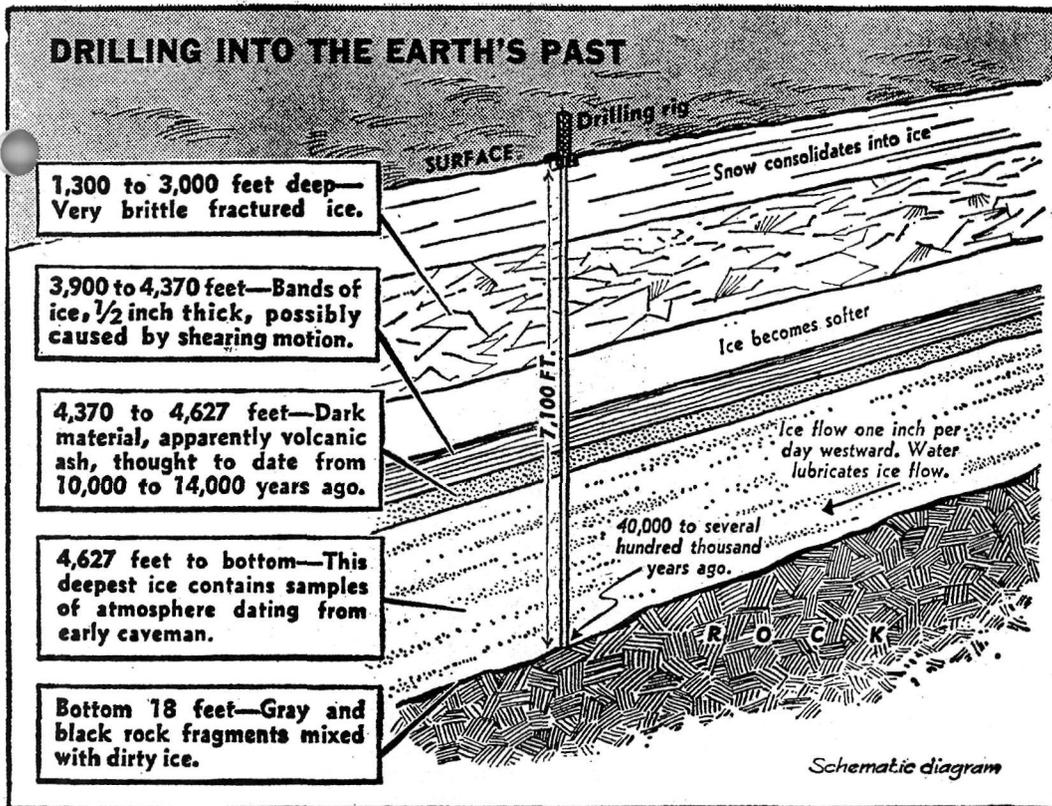
Vincent E. Lally of the National Center for Atmospheric Research, Boulder, Colo., said the balloon, about the size of a medicine ball, was launched from Christchurch, New Zealand, and circled the globe at an altitude of 40,000 feet.

A similar balloon launched from McMurdo Sound in the Antarctic circled the world 30 times in 315 days, he said.

About 120 helium-filled plastic spheres have been launched as part of Project GHOST, or Global Horizontal Sounding Technique, which is testing a plan to feed worldwide weather information to computers in an attempt to make global weather forecasts.

erties of the ice and underlying material.

Samples of the cores will be made available to other scientists by the National Science Foundation, which coordinates American research in Antarctica.



A record of the earth's history, possibly going back several hundred thousand years, lies frozen within the ice covering the Antarctic Continent. The cross-section shows what has been learned so far.

History in an Ice Core

By WALTER SULLIVAN

The New York Times

Feb. 11

The snows have been sifting down on the Antarctic for untold millennia—probably since before the cave man era. They have been packed and compressed under the weight of steady accumulation until the snow crystals have been squeezed into solid ice. Within that ice is the air that became trapped in the compressed snow. It is ancient air—a sample of the earth's atmosphere from the distant past.

Thus the great ice sheet of Antarctica—in places three miles thick—is an archive of the earth's history for a period that probably reaches several hundred thousand years into the past. Preserved within it, besides samples of the atmosphere throughout that period, is a record of varying climate—including possible clues to the timing and cause of the ice ages—plus layers of ash or dust laid down by cataclysms, volcanic or otherwise.

Last week it was announced that for the first time the blanket of ice covering the Antarctic Continent, encom-

passing some 90 per cent of the world's fresh water, had been pierced. A drill rig developed for this task over a 10-year period had penetrated 7,111 feet of ice beneath Byrd Station to the rock beneath it. The task was undertaken by the Army's Cold Regions Research and Engineering Laboratory in Hanover, N. H., under B. Lyle Hansen.

The bit on this rig is hollow, leaving a central core of ice intact. Every 15 feet a section of this core was hauled out and stored for future study. The result is a cross section of the ice sheet.

Under development is a device that, hopefully within a year, can be lowered into the hole to extract enough carbon dioxide at successive depths to establish, through radioactive carbon measurement, the age of the ice at each level. Such a chronology is the key element required to resolve a wide range of mysteries, including the question of whether ice ages in the Southern Hemisphere coincided with those of the North.

It is also hoped that this

device can be used within the Greenland ice sheet to sample lead levels in the atmosphere of past centuries, determining the rise and fall of ancient smelting industries.

The idea of probing an ice sheet as an archive of climate dates to at least 1930-31 when Ernst Sorge of Germany dug a 50-foot pit at Eismitte, the outpost where he and Johannes Georgi wintered in the center of Greenland. A more ambitious project was undertaken in 1956 and 1957 when United States Army scientists used oil drilling equipment to penetrate 1,356 feet into the Greenland ice.

In the Greenland borings a dark layer was found at a depth representing snow that fell in 1912. That was the year of the cataclysmic Katmai volcanic eruption in Alaska. Winds swept the resulting ash across all of Canada and deposited some of it on Greenland. Two such layers have been found in the new Antarctic hole, at depths of 4,370 and 4,627 feet. They are thought to have been laid down between 10 and 14 thousand years ago, either by a local eruption or some global catastrophe.

Another dramatic discovery from ice excavations in Greenland was that the lead content

of the atmosphere has risen sharply since the introduction of leaded gasoline as automobile fuel. Air trapped in successive layers of ice in both Greenland and Antarctica has been analyzed by Dr. Claire C. Patterson of the California Institute of Technology for its lead content.

Last week, in a telephone interview, Dr. Patterson summed up his findings. From ice excavated at depths of 150 feet at Camp Century, an Army research station on the Greenland ice sheet, it was found that from 1750 until about 1940 the lead content rose from 10 micrograms (millionths of a gram) per ton to about 70 micrograms. This was presumably a byproduct of the industrial revolution.

Then there was a rapid rise in little more than a decade to 200 micrograms. Dr. Patterson considers this ominous since even small amounts of lead can be poisonous.

The problem is to get enough ice from any particular level, to date it and measure its lead content. Three or four tons of ice are needed to extract sufficient radioactive carbon for an age determination. To extract such a sample from a specific layer in a bore hole 6 1/2 inches wide and more than a mile deep is the challenge that it is hoped can be met by next fall.

Unfortunately, dating with radioactive carbon has been good for only the last 50,000 years at best. There is a suspicion that the ice at the bottom of the new Byrd Station hole may be several times that old.

At the present rate of snowfall the ice at the bottom should be only 48,000 years old. Yet the presence of water and comparatively warm temperatures at the bottom suggests that the lowest layers of ice may have been there as long as several hundred thousand years, storing up heat emanating from the earth's interior.

Were there periods when the seas around Antarctica were frozen, preventing the evaporation of moisture needed to feed its snows? And if so, did this coincide with the ice ages of the Northern Hemisphere?

The ice-sampling equipment now under development should help establish a chronology that could answer these questions.

Deep in the Heart of Antarctica

By ROBERT REINHOLD

The New York Times

When the Belgians established a remote research station in Antarctica some years ago, they sent along a psychiatrist to study the effects of the prolonged isolation and extreme environment on the other station members. The psychiatrist, it turned out, was the only one who could not tolerate the isolation and had to be evacuated to Brussels for psychiatric treatment.

Today, 10 years since the Antarctic first came under heavy scientific scrutiny during the International Geophysical Year, one must travel quite far to find much isolation. Antarctica has come to the end of an era. For better or worse, man is there to stay with most of the comforts of civilization.

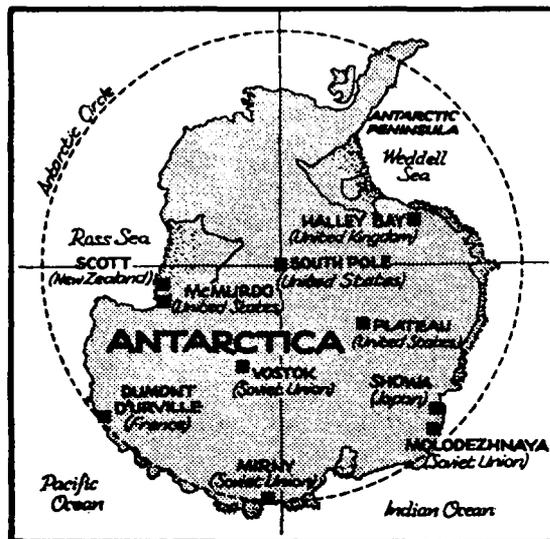
The continent's arcane wonders no longer attract the explorer breed—the men for whom almost insuperable hardship and unexplored terrain represented an irresistible challenge. Today's "Antarcticans" are laboratory scientists whose projects happen to take them to the frozen wastes and to whom the harsh environment is more of an inconvenience than a challenge.

Unlike the old guard, the new breed is interested more in the "why" and "how," rather than the "what," of Antarctica. An American expedition is now mapping the last unexplored region. When they finish, the Earth's last land frontier will have vanished.

As a kind of epilogue to the era, a shipload of the first tourists to cross the Antarctic Circle will dock at McMurdo Station next Sunday. There they will tread on land that has been reserved for the select few for more than a century.

Where do we go from here? The survey era may be over, but Antarctica still holds many mysteries. Little is known, for example, about the land of Antarctica—a territory the size of the United States and Europe combined that is almost completely buried by an ice cap more than two miles thick at some spots. Locked within its geological formations is probably the answer to how Antarctica and the other continents evolved. What mineral wealth may lie beneath the ice can only be guessed at.

In the years since the I.G.Y.,



the Antarctic has become a vast outdoor laboratory equipped with the latest electronic equipment for monitoring weather and atmospheric events. As the only region on earth largely uncontaminated by the industrial revolution, it also has attracted scientists doing basic research in glaciology, geology, oceanography, biology and other fields.

It has been estimated that if the Antarctic ice sheet ever melted, the level of the world's oceans would rise about 200 feet, covering the Statue of Liberty to her nose. For this reason, the question of whether the ice is advancing or retreating has received great attention. Glaciologists believe it has stabilized.

The Antarctic has attracted large numbers of biologists in the last two or three years. Because the ecology is so uncomplicated, biologists have the unique opportunity of studying the interaction of organisms under the simplest conditions.

Man has mastered the environment and, with aircraft and electric power, Antarctic research has settled into a comfortable routine. Little more effort is required to work there, remarked one scientist, than it takes to buck the New York rush hour.

Nevertheless, the Antarctic will not yield up its secrets readily. The problem, as in nearly every field of scientific inquiry from medicine to astronomy, is money. Although officials in charge of the American Antarctic effort are reluctant to discuss it, the Vietnam pinch is clearly being felt on the ice.

The National Science Foundation, which supports and coordinates all American research on the continent, has not been able to increase its budget or staff for Antarctic research since the beginning of the Vietnam buildup in 1965. The 1965 Antarctic outlay, including related stateside projects, was \$7.6-million. The anticipated figure for 1968 is the same.

In the meantime, sharply rising costs have forced a retrenching and the foundation is barely managing to maintain its continuing project commitments. Few new programs are being undertaken and many grants have been denied.

The United States is one of 12 signatories to the Antarctic Treaty, a 1959 agreement that sets aside the continent for peaceful, scientific purposes and suspends all territorial claims until 1989. Ten of the nations presently maintain a total of about 40 more or less permanent stations and many temporary field camps.

No nation attempts as ambitious a program as the United States, although certain countries—particularly Japan and France—are steadily increasing their Antarctic investment.

The Soviet Union maintains four stations, but its program, according to a British scientist who has spent 18 months at one Soviet station, is relatively unsophisticated and lags behind the American effort. The center of Russian activities is being shifted from Mirny, built on an inhospitable site, to Molodezh-

naya, on the opposite side of the continent from McMurdo. The Russians place heavy emphasis on upper atmosphere physics, geomagnetism and meteorology.

Japan has been steadily building up Showa station on the Indian Ocean side of the continent. A Japanese team is carrying out a traverse from Showa to Plateau Station, an American outpost deep within the continent.

France, based at Dumont D'Urville station, has substantially increased its Antarctic commitment. The British Antarctic Survey, with one station on the mainland (Halley Bay) and several along the Antarctic Peninsula, has also been strengthening its program. New Zealand maintains one of the most active research stations at Scott Base.

Australia, Argentina, Chile and South Africa maintain small stations, concentrating largely on weather and atmospheric studies.

Court Holds South Pole Trip Doesn't Rule Out Taxpaying

WASHINGTON, April 17 (UPI)—The United States Tax Court ruled today that going to the South Pole will not stop the Government from collecting income taxes.

The court denied a petition by Larry R. Martin of Wellesley, Mass., that it overturn an Internal Revenue Service ruling that he owed \$1,282 in taxes on income of \$7,000 he earned during 1962 while on an expedition at Byrd Station, Antarctica.

Mr. Martin, who is employed by the Arctic Institute of North America, contended he owed no tax because United States law says any citizen who is "present in a foreign country or countries" for 18 months is exempt from taxes. He was out of the United States from October, 1961, until March, 1963.

The court said the only issue was whether Antarctica was a foreign country. It decided that because no single country controls the territory the answer is no.

Antarctic Study Is Urged

TOKYO, June 14 (AP)—The Scientific Committee on Antarctic Research, made up of 12 signatory nations of the Antarctic treaty, ended a five-day session Friday by urging creation of an international research system for studies on the formation and geological features of the Antarctic continent.

Last Unexplored Area of Antarctic Is Mapped

An American Team Discloses Region Is Featureless—Sounded Depth of Ice

By **ROBERT REINHOLD**

An American expedition has mapped the last unexplored region of Antarctica.

The 19-man team completed an 815-mile traverse on Jan. 30 over the vast, windswept and nearly featureless ice plateau of Queen Maud Land—the area of Antarctica nearest Africa.

In reporting their findings, they disclosed no surprises. There were no mountains or valleys. The flat white expanse of ice was interrupted only by occasional wind-sculpted snow elevations about a foot and a half high.

The two-month expedition began last December and was the third leg of a traverse that began late in 1964. A few small details must still be filled in, but there is not a major area of the Antarctic that remains unexplored by overland travel.

The expedition, known officially as the South Pole-Queen Maud Land Traverse, began at Plateau Station, a small American scientific outpost high on the Antarctic plateau.

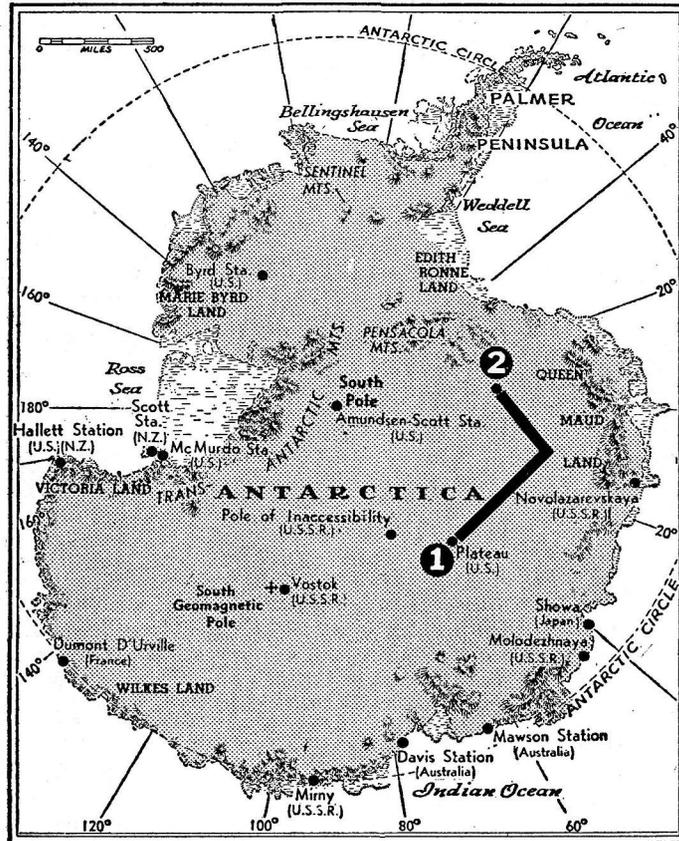
It ended at a spot nearly 900 miles from the South Pole and about 400 miles from the Weddell Sea. As the team moved along in large tracked vehicles called Sno-cats, they used sounding devices to measure the thickness of the ice beneath them, which varied from one to two miles.

They also performed a variety of seismic, gravity, glaciological, geomagnetic and weather studies. The data, once collated, will be used to construct maps of the terrain beneath the ponderous ice mantle, as well as gravity and magnetic maps.

The traverse was mounted by the United States Coast and Geodetic Survey, an agency of the Department of Commerce's Environmental Science Services Administration. It was financed by the Antarctic Research Program of the National Science Foundation.

The team was led by Norman Peddie, a geophysicist with the Coast and Geodetic Survey, who also served as navigator and geomagnetic observer.

The other members were John Clough and Carl Poster of the University of Wisconsin, who performed seismological and sounding measurements; Michael Galan and Philip Tenney, traverse engineers, also



The New York Times

April 21, 1968

Route of the final mapping expedition of Antarctica

from the University of Wisconsin; Arthur Rundle and Rossman Smith, glaciologists from Ohio State University; William De Brueck, a glaciologist from the University of Brussels; and Yngvar Gjessing, an exchange scientist from the University of Bergen in Norway.

A tenth member, John Freitag of the University of Wisconsin,

was forced to return to Plateau Station because of illness.

The party encountered temperatures as low as 50 degrees below zero, but the 24-hour sunshine of the Antarctic summer dispelled some of the cold. Although the area they crossed is often racked by hidden crevasses, the men encountered no unusual difficulties.

Russian Asks Polar Exchange

Reuters

CHRISTCHURCH, New Zealand, Feb. 14—A Soviet scientist who completed a one-year exchange visit at the U.S. Amundsen-Scott Base at the South Pole today called for greater international cooperation in polar research.

The Russian, P. G. Astakhov, a geophysicist with the Arctic and Antarctic Institute at Leningrad, described his visit at the U.S. base as "wonderful."

The American scientists at the base were "a good bunch of guys," Astakhov added. He said exchanges of scientists "could involve more than just one scientist from a country."

Vancouver Whale Crashes Through Aquarium Window

VANCOUVER, British Columbia (Canadian Press)—Skana, Vancouver aquarium's 3,000-pound captive killer whale, crashed through a plate glass window, suffering several jagged cuts on her head.

Prompt action by aquarium attendants saved the whale from possible drowning. They tied a rope around her and pulled her from the remains of an inch-thick underwater viewing window.

"We don't know why the window broke but we believe Skana hit it with her head," Curator Vince Penfold said.

"It would take a sledge hammer type of blow to break the glass. We don't believe pressure from repeated dives by Skana over the weeks she has been in captivity were responsible."

RULES FOR WHALING ARE ALTERED BY U.S.

WASHINGTON — The Department of the Interior has published regulations modified by the International Whaling Commission, and simultaneously published a proposal to amend United States whaling regulations to have them conform with the international rules.

The most important proposed changes in the United States regulations prohibit commercial whaling for blue whales in the North Atlantic before 1970 and humpback whales before 1969, except for 10 humpbacks by small vessels in Greenland waters. Neither blue nor humpback whales may be killed in the North Pacific and its dependent waters before 1971.

The blue whale is the world's largest mammal, past or present. One of the largest taken in recent years was 89 feet long and 43½ feet around. It weighed more than 150 tons—the tongue alone weighed three tons.

Sixteen nations are signatories to the International Convention for the Regulation of Whaling. They are: Argentina, Australia, Canada, Denmark, France, Iceland, Japan, Mexico, the Netherlands, New Zealand, Norway, Panama, U.S.S.R., United Kingdom, United States, and Union of South Africa.

The Whaling Commission meets annually to assess the condition of the whale resources and periodically amends whaling regulations to conserve and protect these marine mammals.

Satellite Aids Antarctic Ships

LONDON, March 12 (AP)—The U.S. satellite *Essa 3*, in orbit 200 miles above the South Pole, is helping ships navigate safely through Antarctic ice.

Sir Vivian Fuchs, director of the British Antarctic Survey, said pictures relayed from the satellite helped guide the ships *Perla Dan* and *John Biscoe*.

Fuchs met the *Perla Dan* on Monday when it docked at Southampton with 19 scientists and technicians who had worked on British bases in the Antarctic for 2½ years.

9-Man Antarctic Wintering Team Reports on Reconnaissance Trip

Jan. 11

The nine-man Japanese antarctic wintering team at Showa Base Wednesday sent a 40-day travel report from the base to the U.S. base, which forwarded it to the Education Ministry's Antarctic Observation Promotion Headquarters in Tokyo.

The wintering team, headed by Tetsuya Torii, has been conducting a reconnaissance trip since last November to prepare for its expedition to the extreme point of Antarctica.

The travel report was written by Mr. Torii and team member Shigeo Yoshida at the U.S. base and sent from there by air.

According to the report, the team left Showa Base on three large snowcars and one small car on the morning of Nov. 5 to make a survey as far as latitude seven degrees south, to open the way for a trip to the extreme point of Antarctica this year as well as to test newly-developed large snowcars.

The report says that after passing the crevice area, blue ice on the surface of the continent disappeared and a slope of snow appeared.

Five days after leaving Showa Base, the report adds, the team reached its depot, 235 kilometers (145.7 miles) away, where the members took out four sleds that had been stored there last September. Drawing them behind the three large snowcars, the team headed southward at the slow speed of four kilometers per hour (2.5 mph) through rugged ice, measuring the distance by a gyrocompass and confirming their position by astronomical observations.

With the advance southward, the continent became higher and higher, often presenting steep slopes. The frozen snow in this area was so solid that shovels were ineffective.

With the rise in topography the output of the engines dropped and breathing became difficult.

Nov. 29, the team reached an area some 681 kilometers (422 miles) from Showa Base and located near latitude 74 degrees south. It was about 3,000 meters (9,900 feet) above sea level and its topography was even, deepening the impression of hinterland.



Three snowcars bearing members of the nine-man Japanese antarctic wintering team work their way south over the frozen wastes of the White Continent in a reconnaissance trip in preparation for a later expedition to the extreme point of Antarctica.

Asahi Shimbun

Temperatures in the daytime were 28 degrees centigrade below zero (-18.4 degrees Fahrenheit) and 42 degrees C. below zero during the white night.

Nov. 30, the team reached a point at latitude 75 degrees south and longitude 42 degrees 50 minutes east where the thickness of ice was measured by artificial

earthquakes through the refraction method.

After a three-day rest, the team headed for the U.S. base, which it reached Dec. 14.

The team is expected to be back at Showa Base about the middle of this month, according to the report.



Fuji Returns After Antarctic Voyage

Apr 12

The 7,760-ton Antarctic observation ship Fuji returned to Tokyo Port at 9 am Friday after a 139-day voyage to Antarctica with the ninth Japanese wintering team.

The ship also carried to Antarctica 508 tons of observation instruments and equip-

ment, including the launching platform for a rocket to be used in 1969.

This was the most equipment ever to be transported there from Japan.

The Fuji succeeded in mooring alongside the coast of the continent, this being the first time for a Japanese observation ship to achieve the feat.

The ship covered a distance of 35,000 kilometers during the voyage.

Russians Establish 5th Permanent Post For Antarctic Study

March 6

The Soviet Union has announced the establishment of a fifth permanent research station in the Antarctic, according to Moscow newspapers received here.

The outpost, formally inaugurated on Feb. 24, is on King George Island in the South Shetland group, 600 miles from South America's Cape Horn.

The Russians thus joined Britain, Argentina and Chile in operating scientific bases in the northernmost—and warmest—part of Antarctica.

A few days after its inauguration, the new Soviet station, now in the Antarctic summer, reported a violent rain-storm and a temperature of 35 degrees Fahrenheit. On the same day, the Russians' Vostok station, in the interior of the Antarctic continent, had a temperature of 65 degrees below zero.

In addition to Vostok, which has been operating since 1957, the Soviet Union runs three permanent stations on the Antarctic coast. They are Mirny, the headquarters of the Soviet Antarctic program; Molodezhnaya and Novolazarevskaya.

The new outpost on King George Island has been named the Bellingshausen station, for Fabian von Bellingshausen, a Russian explorer whom the Soviet authorities credit with having been the first to sight the Antarctic continent, in 1820.

The station's 11-man team, headed by Arnold B. Budretsky, a 39-year-old polar scientist, was brought to King George Island aboard the Soviet research vessel Professor Vize. It will be relieved by another crew in April, 1969.

The island, also known as Waterloo Island, is about 43 miles long and 16 miles wide at its broadest part. It was named about 1820 for Britain's reigning king.

Radar Maps Ice Cap

Reuters

ADELAIDE, Australia, Jan. 22—Airborne Radar was used to penetrate a 14,000-foot thick ice cap in the Antarctic to map geographical features beneath the ice, Dr. D. Robin, a rector of the Scott Polar Research Institute at Cambridge University in Britain, said here yesterday.

4 Men, in a 44-Day Trek, Reach The North Pole in Snowmobiles

The New York Times

April 20

A team headed by a well-to-do insurance man from Minnesota and financed by a manufacturer of motorized sledges reached the North Pole yesterday afternoon after a 44-day trek over the frozen Arctic Ocean.

The four men who reached the pole got there in four Ski-Doo snowmobiles manufactured by Bombardier Limited of Valcourt, Que.

They were the first men to reach the North Pole overland since 1909, when Robert Edwin Peary did the same thing with dog power.

A snowmobile is a motorized sledge propelled by a rubber track and steered with skis.

The Ski-Doo team achieved success at about 4 P.M. Eastern standard time, according to its leader, Ralph Plaisted, the insurance man, of St. Paul, Minn. Word was relayed by radio from the pole to the Selz Organization, a Chicago public relations concern that was employed to publicize the expedition.

Several months ago a Selz man was asked whether the expedition was being mounted for scientific purposes. He said no. The motive, he explained, was "adventure."

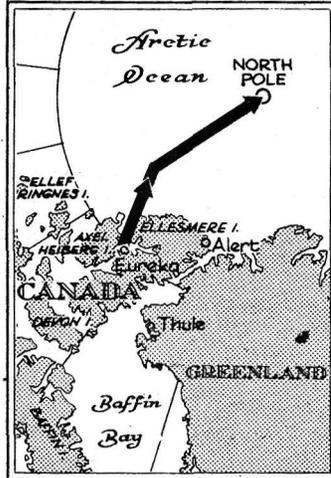
The Plaisted expedition started out March 7 from Ward Hunt Island in northern Canada. Winding through jagged ice ridges in the twilight of the late Arctic winter and early spring, the team logged 825 miles to cover a bee-line distance of only 474 miles.

A spokesman for the Selz organization reported that the temperature at the pole was 23 degrees below zero, which is fairly warm for this time of year. The skies were clear as the expedition completed the last 10 miles yesterday.

A weather station operated jointly by the United States and Canada at Eureka, on Ellesmere Island in northern Canada, relayed a message to Washington yesterday that a United States Air Force plane had sighted the Plaisted team at the pole. The plane was on a routine mission.

With Mr. Plaisted were Walter H. Pederson of St. Cloud, Minn., and Jean Luc Bombardier of Montreal, both sledge operators and mechanics, and Gerald R. Pitzl, a St. Paul high school teacher, who acted as navigator.

Two other members of the expedition did not make the last lap.



The New York Times April 20, 1968
Route taken to North Pole

They were the deputy leader, Donald E. Powellek, a St. Paul electronics engineer, and Dr. Arthur C. Aufderheide, a physician from Duluth, Minn.

Mr. Plaisted led a similar expedition last year but was forced to turn back far short of the pole when the ice began to break up and impede travel.

Crowd Greet Plaisted Group

ST. PAUL, April 27

A Northwest Airlines jet landed at 11:50 a.m. with Ralph Plaisted and eight fellow members of his triumphant expedition to the North Pole.

They were greeted by about 500 cheering people from St. Paul, White Bear Lake, Minneapolis, Duluth and St. Cloud.

MRS. PLAISTED and her 1-month-old David were first to enter the big jet to give Papa Ralph his first view of his small son.

PLAISTED'S expedition is estimated to have cost more than \$125,000. Expenses will be met by donations from companies and individuals.

The equipment used in the expedition will be given to the city of Montreal for display in the Man and the Arctic Regions exhibit at a continuing exhibit in the city.

Plaisted Expedition Snowmobiles Covered 825 Miles

By R. J. R. JOHNSON

St. Paul Dispatch

April 24

The Plaisted Polar Expedition's snowmobiles travelled 825 miles to reach the North Pole from takeoff point at Ward Hunt Island in Canada, the expedition's public relations contact reported today.

The "crow-flight" distance from base camp to the pole is about 474 miles. The expedition was forced into many detours because of pressure ridges and open water.

RALPH PLAISTED and three of his companions reached the pole Friday. They had left Ward Hunt Island March 7. Plaisted reported on the mileage by radio from the pole. Some details of that radio conversation were released today.

"We were overwhelmed when Gerry Pitzl, our navigator, told us we were at the North Pole," Plaisted is quoted.

"What did we do first? We all bowed our heads while Walt Pederson, our chaplain, said a few words. Then there were a few backslaps. We were very happy—and very tired."

PLAISTED, 40, is a St. Paul insurance man who lives in White Bear Lake. With him at the pole Friday were Pitzl, 34, of St. Paul; Walter Pederson, 40, St. Cloud, and Jean-Luc Bombardier, 30, Montreal.

Plaisted reported that they had had only about four hours' sleep in the 48 hours leading up to attainment of the pole. And, he said, the men were ready to head for home.

"I'm sure none of us want to spend 43 more days on this ice cap that has been our home since we left Ward Hunt Island."

THE TEMPERATURE was 23 below zero; the weather was clear when the Plaisted group reached the pole at 3 p.m. (St. Paul time) Friday. The men were on a big ice pan about a mile in diameter,

with pressure ridges of ice 5 to 20 feet high surrounding it.

Pitzl shot sun fixes with his sextant every hour to keep track of their position at the pole. On Saturday an Air Force weather plane verified their position. Four hours later the men were aboard their twin-engine Otter support plane and on their way back to Ward Hunt Island.

EXPEDITION MEMBERS, now are packing up their gear at base camp and shuttling equipment to Resolute Bay for a flight to Montreal Thursday. Friends and relatives will meet them in Montreal.

In his radio report, Plaisted said all equipment functioned beautifully.

The expedition's major problem last month was fighting ice pressure ridges up to 40 feet high and waiting out bad weather conditions. In the last week to 10 days, open water was the big problem.

"AT ONE point," Plaisted said, "we sat for two days waiting for a two-mile-wide water lead to freeze enough for us to cross. Water openings only 3 or 4 feet wide we simply jumped with our machines and sleds."

The men had four Ski-Doo snowmobiles and tow sleds.

"A couple of us went into the water," Plaisted said, "and our sleds and machines often got wet. Getting wet from crossing thin ice has been an almost daily routine lately."

Survey Set Off Alaska

WASHINGTON, June 15

(UPI)—The United States will search the continental shelf this summer beneath the Bering Sea off Nome, Alaska, for scientific information and for signs of gold, tin, platinum, and oil deposits. The project was announced jointly Saturday by the Environmental Science Services Administration and the United States Geological Survey.

Dream Made North Pole History

By R. J. R. JOHNSON

St. Paul Dispatch

The big jet roared thunderously over the top of the world, the beat of its engines hammering at the ice only 200 feet below.

It scared hell out of the four men who were quietly breaking camp on the polar ice. They were, after all, in one of the loneliest places in the world.

"Holy smoke! The roar!" recalls Ralph Plaisted, of that bright Thursday morning, April 18, and the first sight of the U. S. Air Force plane that was to assure him a place in history.

Two days later that airplane, Lark 47, would pinpoint and confirm the location of the Plaisted Polar Expedition at 90 degrees North, the exact geographic North Pole. It would put the official cap of accomplishment on a dream that had kept a small group of men working and hoping for two years to achieve.

Ralph Plaisted was the leader. He's 40, lives at 2105 Stillwater St., White Bear Lake, and sells insurance from a St. Paul office.

"We thought he saw us right away," Plaisted recalled, "but then we could see he was flying a search pattern. I said, 'Jean-Luc, throw your mirror on them.' And Jean-Luc hauled out his pocket mirror and flashed a spot of light at the plane. They came back with their landing lights on."

Jean-Luc Bombardier, 30, is a mechanical engineer from Montreal, the only Canadian in the party. His firm, Bombardier, Ltd., made the Ski-doo snowmobiles used on the trip. Bombardier was "the pathfinder," a man with great ability to pick the best and safest route for the machines, when enthusiasm didn't get the better of him.

The men on the ice and those in the aircraft were soon in radio contact. The Air Force pilot assured Plaisted it would be possible to verify his accomplishment once he reached the pole.



Plaisted



Bombardier



Pitzl



Pederson

"IT WAS THE greatest thing we ever heard," Plaisted said. "We could just see ourselves getting there and having the same dispute Peary did. We really wanted that verification."

The airplane stayed near the expedition for nearly an hour. It flew to the pole and back and reported big leads of open water at 12 and 7 miles away.

"Let's see how you travel," radioed the aircraft.

The four men loaded their gear onto sleds, hitched the sleds to their four snowmobiles and headed north.

"Now," said the voice from the airplane, "we'll fly to the pole again and show you. When we go up — that'll be it."

THE MEN WATCHED the plane disappear low over the horizon, then saw a great column of black smoke as Lark 47 shot skyward over the North Pole, just 40 miles away.

They were elated and supremely confident with their goal so close and the promise of confirmation when they reached it. They ran their machines some 49 surface miles, bearing west of the pole to take advantage of the eastward flow of the Arctic Ocean ice.

"It was a bad, rough day," Plaisted said. "We had open water and some of the worst ice ever. It seemed this dirty ocean would fight us right to the end. It was like fighting something alive."

THE MEN MADE camp about 15 miles short of the pole, according to their calculations. The airplane returned at 11 p. m., checked their position and told them they had overshoot. They were, said the airmen, 23 miles past the North Pole.

Plaisted and his men were astounded, but still confident of their work.

"How do you tell that big bird up there that he's crazy?" asked Jerry Pitzl. As word of the overshoot was being bounced, radio to radio, from the pole to St. Paul, he was busy rechecking their position.

Gerald R. Pitzl's job was navigation. He's 34 and lives at 1524 Osceola Ave. He's a geographer, working and studying at the University of Minnesota.

PITZL MADE A series of sun shots. He decided the party was, actually, 11 miles short of the pole and that the Air Force navigator had made an error. He even determined exactly how the error had been made and they all rested easier.

One spot on the polar ice cap looks very much like any other. Just shifting ice and occasional open water. There are no people, no roads, no signs. There is no marker at the North Pole. And in the sunlit nights of spring and summer there are no guide stars; nothing but the rolling sun to shoot, time after time.

Fortunately for the Plaisted group the days (and nights) were bright and clear during the final days of their 44-day push to the pole.

Friday morning's sun shots disclosed that the camp had drifted with the ice five miles closer to the pole, leaving a mere six miles to go. The Air Force plane would not be back for final documentation until Saturday morning.

"WE'RE NOT MOVING anywhere," said Pitzl. "We've got to sit right here. We're drifting right in on the current, right to the pole."

So the men sat it out. At 4 p. m. by their watches (3 p. m. St. Paul time) Plaisted got on the radio to announce

to the world that they were at 90 degrees North.

"We were within walking distance of the pole," he said later. "This was our final camp. We'd never move it, see. Wherever the pole was at the time the plane came out to verify it we would walk to it—or take a sled and a beacon and establish that this was the pole."

"We didn't know then but what the drift would move us past it and we'd have to come back. I think I told base camp that for all practical purposes we are at the pole. From now on it's just a matter of technical pinpointing."

IT WAS AT THIS point that Walt Pederson asked all the men to bow in prayer of thanksgiving. They did.

Walter H. Pederson, 40, was the chaplain. He also was star mechanic and engineer who got the snowmachines going, even in —62 degree cold. He's from St. Cloud.

It was a beautiful day at the farthest north: bright, windless and only 25 below zero. The men were exquisitely tired. No one had slept more than a few hours at a time in recent days. Pitzl had been taking hourly sun shots for 42 hours. The other men woke him for the job.

They spent much of Friday night on the radio. They talked with newsmen in Chicago and London, with backers in the States.

FRIDAY, PLAISTED said later, was the emotional attainment of the pole. That's when excitement ran highest, when they felt the goal had been achieved.

The good feeling was dampened only by the fact there were only four men — not six — at the pole. Two of the original members of the ice party, Dr. Arthur C. Aufderheide, photographer-surgeon, and Donald E. Powellek, deputy leader and radio specialist, had dropped back to base camp for the good of the party.

They were missed, sharply, but their sacrifice, coupled with the hard, tedious work of the regular base camp crew of four, made the success of the ice party possible, Plaisted decided.

Tomorrow it would be official.

Plaisted's Pole Position Verified By Air Force Evacuation Plane

By R. J. R. JOHNSON

Saturday, April 20, 1968. The men of the Plaisted Polar Expedition ice party got moving early for their rendezvous with Lark 47, the U.S. Air Force jet that was to pinpoint their location at Earth's geographic North Pole.

Navigator Gerald Pitzl of St. Paul said the moving Arctic Ocean ice, which had carried their camp in a steady eastward ride Thursday night and early Friday, had come to rest sometime Friday.

THEY WERE, he said, just about 4 miles from the precise, magic spot.

Ralph Plaisted, expedition leader and also a St. Paul area man, and Jean-Luc Bombardier, the only Canadian member of the party, took a snowmobile and sled, tent, heater and radio beacon, and drove quickly to the place indicated by Pitzl. Pitzl and Walt Pederson, chaplain and mechanic, remained at the last camp, on a great flat pan of ice where the evacuation plane could land.

Bombardier and Plaisted set up their tent — an emergency measure in case the shifting ice separated them from camp — and waited impatiently for the jet.

THE MEN were confident they had succeeded, but counted heavily on "documentation" of their position by an outside navigator. This would remove any possible public doubt of their attainment of the pole — doubt such as clouded the accomplishment of Adm. Robert E. Peary in 1909.

The four men of the Plaisted expedition were the first to have made a surface journey to the North Pole since Peary; the first to have used mechanized surface transportation on such a journey (snowmobiles), and they hoped to be the very first surface party able to prove the achievement.

Bombardier was shoveling a big "90 N" in the snow at the pole. Plaisted flicked on



Powellek



Cavouras



Aufderheide



Moriarty

the hand-held radio beacon the airplane would use as a position guide. The plane was due about 10:45 a.m. At 9:50 the beacon quit working.

PLAISTED made a dash for the tent, fired up the little gas heater and spent 15 minutes changing radio batteries. At 10:05 he had the beacon going again. It ran for 3 minutes; quit for 2, and started signaling again.

"At 10:10 I was praying it would just run for 10 minutes so they could get a fix on us," Plaisted said later. "I'm standing there, frozen over that heater, not moving a muscle, with that thing on. Then we hear Lark 47. He's spotted us and he's right directly over us. The navigator says, 'It looks like you're right on the button.'"

THE AIR FORCE plane "ran everything" — every sort of position test available — on Plaisted and Bombardier, Plaisted said.

The official verdict: 90 degrees North, the North Pole, at 10:45 a.m. (9:45 a.m. St. Paul time), April 20, 1968.

"It didn't look any different; it just felt different when that plane said we were there," Plaisted remembered.

From that point, the emotional jag went into sort of a hangover stage. Lark 47 guided "Whisky Whisky Papa," the support plane, in for a landing at the last camp. The men loaded three snowmobiles, the flags they had carried to the pole, and little else aboard the twin-engine Otter.

PLAISTED, kicking through the equipment that would be left on the polar ice, found himself thinking more and more about the expedition members who were not in on the wrap up. How would



Cook



Horton

they ever get proper thanks and credit for their work?

Dr. Arthur Aufderheide, 43, Duluth physician, had dropped out first, after taking hundreds of photographs, when it became apparent help was needed back at base camp on Ward Hunt Island to tighten up the expedition's impossibly long supply line.

Don Powellek, of 2119 Clear Ave., 40-year-old deputy leader and "a genius in electronic ability," also volunteered to fall back when trouble developed in the receiving beacon aboard the support plane. The beacon was essential to locating the ice party.

"HOW DO YOU repay guys like that," Plaisted was to say later. "Anyone who talks about FOUR people getting to the pole — well, we stop 'em pretty fast."

Actually, Plaisted decided, the expedition was sort of a "rubber band" with a weight stretched to the pole. Along it were 10 men, holding the thing together. "And at one time or another each was the most important man along the line."

The regular base camp crew was composed of Lt. Col. Andrew S. Horton, USAF, 50, of Alexandria, Va.; Dr. Weston Cook, 52, of Columbia, S.C.; George Cavouras, 43, of 15 S. 1st St., Minneapolis, and John Mor-

arty, 29, of 1943 Bayard Ave.

PLAISTED recalled how his initial concern for Cavouras vanished during the trip; how the man he'd never seen in anything other than a business suit ended up, parka clad, wrestling fuel drums and riding a runway grader.

And how young Moriarty, a food technologist from the Pillsbury Co., had spent hour after hour, day after day mixing fuel for the snow machines in the comparative warmth of the generator shack at Ward Hunt Island.

Moriarty was the "mayor" of Ward Hunt, a title he earned during two weeks spent alone on the island with gasoline, generators and radios for company. He'd greeted the first plane back with, "What're you guys doing on MY island."

NOW IT WAS over. Plaisted decided he wouldn't for a million dollars go back on the ice of the Arctic Ocean.

Nor would he, for an equal amount, have missed the experience. Locked firmly in mind were the sights, sounds and sensations of 44 days on the ocean; 413 nautical miles traversed in 830 machine miles around pressure ridges and leads; days and nights, sometimes welded together; 150 hours and 45 minutes storm-trapped in the tent.

Unforgettable too were the "butterflies" in the stomach that came with racing a snowmobile across a mile of thin, black, rubbery ice with the salt spray turning to slush in the sled. Or, worse, waiting on the far side of the slightly frozen lead to see if the others would make it too.

PLAISTED was impressed with the courage and coolness of all the men. He was impressed, too, with the obsessive drive that seemed to take hold of Pederson and Bombardier near the end of the journey when they seemed, he said, to toss caution aside to press on.

The little things were big: increased courtesy with increased difficulty; enough gas to heat the tent; jokes about the people who said they'd never make it.

March 7 to April 20. Their second try at the pole, and they'd made it.

An iceberg with a red mark on it means that the International Ice Patrol has been at work.

B-52 WITH H-BOMBS PLUNGES INTO ICE IN GREENLAND BAY

CO-PILOT DIES IN CRASH

6 Others Are Saved as Pilot Orders Plane Abandoned After Fire Breaks Out

By JOHN W. FINNEY
The New York Times

WASHINGTON, Jan. 22—An Air Force B-52 bomber carrying four hydrogen bombs crashed in flames into the ice off Greenland yesterday while attempting to make an emergency landing at the Thule Air Force Base.

In announcing the crash today, the Defense Department said that the bombs were "unarmed, so that there is no danger of a nuclear explosion at the crash site." The department declined to disclose what had happened to the weapons.

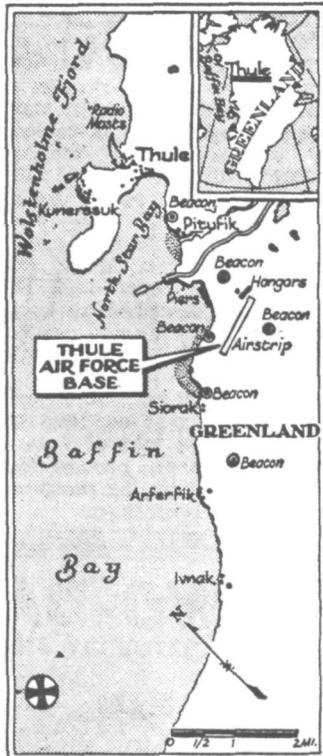
One crew member, the co-pilot, was killed. The six other crew members, who parachuted from the burning airplane, survived. One of the survivors was missing for a few hours until he was rescued by personnel from the Thule base.

The B-52 took off from the Air Force base in Plattsburgh, N. Y. It was flying what is called the Arctic Circle route as part of the airborne alert operation maintained by the Strategic Air Command. In such an operation, a bomber flies into the Arctic region, ready to proceed to targets in the Soviet Union before returning to its base.

A number of Strategic Air Command bombers are aloft at all times in such alerts, which are designed to prevent the bomber force from being destroyed in a surprise missile attack.

Officials in Washington indicated that the Arctic darkness was hampering the search operations. At this time of year there are only about four hours of twilight in the area.

The brief Defense Depart-



The New York Times Jan. 27, 1968
Pieces of missing bombs were found near the site of the bomber crash (cross).

ment announcement said that the B-52 crashed at about 3:40 P.M. Eastern standard time on the ice of North Star Bay, about seven miles southwest of the runway at the Thule base in northwest Greenland.

A fire was reported to have broken out in the navigator's compartment of the bomber, which was on one of the airborne "alert" flights routinely carried out by the Strategic Air Command. The plane was said to have continued burning after crashing into the ice.

Capt. John M. Haug, 36 years old, of Phoenix, Ariz., the plane's commander, attempted to direct the plane toward the Thule base for an emergency landing, according to the sources, but smoke in the cockpit made navigation impossible. He ordered the crew to bail out.

Capt. Leonard Svitenko, 27, of West Springfield, Mass., was killed. The manner of his death was not immediately clear.

Capt. Curtis R. Criss Jr., of North Wayne, Me., the navigator, was found after a search. He had a broken shoulder and frostbite on the hands, and was listed in fair condition at the base hospital.

Besides Captain Haug, the survivors were Maj. Frank F. Hopkins, 35, the radar navigator, of Dodge City, Kans., Maj. Alfred J. d'Amario Jr., 38, instructor pilot, Baltimore; Capt. Richard E. Marks, 29, elec-

tronic-warfare officer, Los Angeles, and Staff Sgt. Calvin W. Snapp, 29, gunner, Morristown, Tenn.

WASHINGTON, Jan. 23—Air Force search teams were reported today to have detected small amounts of radiation from some or all of the four hydrogen bombs missing after a B-52 bomber crashed on the ice off northwest Greenland.

The radiation suggested that some of the bombs might have broken apart in the impact of the crash and during the subsequent explosion in the bomber as it careened several hundred feet across the ice. If the bombs have split and spilled fissionable materials, this could present radiological health problems in cleaning up the radioactive debris from the explosion.

The radiation detected was that of alpha rays, given off by plutonium, a fissionable material used along with enriched uranium in the trigger of a hydrogen bomb.

If ingested or inhaled, plutonium is highly toxic. But in the uninhabited stretches of northwest Greenland, the plutonium is not expected to present a particular health hazard.

Search operations were hampered by the darkness of the Arctic winter, subzero temperatures and swirling snow.

Helicopters were unable to land in the crash area because crews were unable to get bearings in the darkness and snow.

Surface search operations have thus far depended on dog-sled teams. They were reported clearing a small landing area for helicopters. Plans called for moving a small Arctic shack to the crash area to provide heat and light for the search teams.

Search teams were reported to have found the area where the bomber crashed and apparently exploded as its fuel went up in flames. Some pieces of the plane, such as an engine nacelle, have been discovered scattered across the ice.

The key question is whether the bomber, either in the crash or in the subsequent fire, plunged or melted its way through the ice, which is six to nine feet thick, carrying the bombs with it. On this point, there was fragmentary and contradictory evidence.

Some large cracks in the ice have been observed in the crash area, but it is not clear whether the cracks were caused by the impact of the plane or were already in the shifting ice.

The search operations are under the command of Maj.

RADIATION DANGER DOUBTED IN CRASH

Parts of H-Bombs Found on Ice Near Thule Base Where B-52 Went Down

By NEIL SHEEHAN
The New York Times

THULE, Greenland, Jan. 26—Air Force teams have found parts of missing hydrogen bombs at the site where a B-52 bomber crashed Sunday, the Air Force general in charge of the recovery effort said yesterday. He added that radioactivity at the scene apparently did not constitute a danger.

"From what I know so far in my preliminary investigation," said Maj. Gen. Richard O. Hunziker, Deputy Chief of Staff for matériel of the Strategic Air Command, "I would say it does not present a dangerous situation to anyone."

At a news conference at the air base, General Hunziker said that the bombs' parts had been found lying on the snow above the ice within 300 meters, nearly 1,000 feet, of the path the plane made as it skidded across the ice in flames and then exploded.

The general displayed an aerial photograph that showed a black gash in the snow-covered ice surface. The ice, about 10 feet thick, had been partly melted by the plane and then had frozen over in the Arctic cold. He said the gash was about 500 yards long and about 70 yards wide.

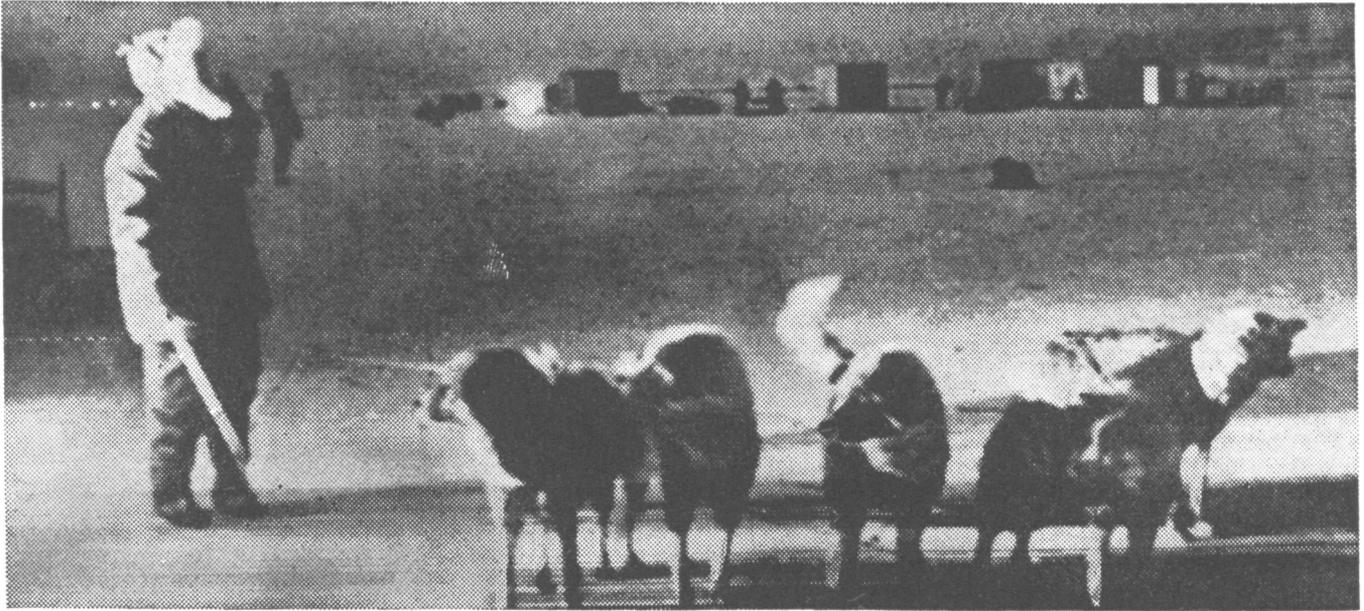
The general said that he did not know if the pieces of the weapons found today were from each of the four bombs.

The general said that he and the specialists on his team were still examining the fragments and that he would not know more until the examination had been completed.

Gen. Richard O. Hunziker, deputy chief of staff for material of the Strategic Air Command. General Hunziker flew to Thule yesterday from S.A.C. headquarters in Omaha.

Air Force officials said the B-52 bomber had not flown through the airspace of Greenland, which is owned by Denmark. Under the 1949 agreement giving the United States air base rights at Thule, United States planes carrying nuclear weapons are forbidden to fly over Danish territory.

Pilot Says Fire Forced Crew to Quit B-52 in Arctic



Sled dogs are used in search for hydrogen bombs in plane that crashed at left rear. Temporary huts shelter workers.

By NEIL SHEEHAN
The New York Times

THULE AIR FORCE BASE, Greenland, Jan. 27—The pilot of the B-52 bomber that crashed on the ice near this Arctic air base last Sunday with four hydrogen bombs aboard said today that he and his crew had had to abandon the aircraft because a fire in the navigator's compartment was out of control.

"We used up all our fire-fighting equipment and we even tried to smother the fire, but the smoke got so bad I had no choice but to bail out my crew," Capt. John M. Haug, 36 years old, of Phoenix, Ariz., said in a very brief news conference at the base hospital here.

At the end of 10 minutes an Air Force doctor standing beside the captain said he was too tired to talk any longer. He is suffering from bruises of the face and head and a twisted knee, but his condition is officially listed as "very good."

Captain Haug, a slight man of medium height with dark hair, said he had deliberately headed the bomber toward Thule after the fire broke out because he felt that if he and his crew bailed out over the ice of Baffin Bay far from the base in the 20-odd degrees below zero temperature "none of us would have had much chance to survive."

"I wanted to save the crew," Captain Haug declared.

He said he had intended to circle the base while the crew bailed out and then to attempt an emergency landing but this did not prove possible and he gave the order to eject just

RADIOACTIVE SNOW TO BE SENT TO U.S.

WASHINGTON, March 1 (AP)—The United States and Denmark have decided to scoop up and transport to this country the snow that was contaminated by the shattering of four hydrogen bombs in the crash of a B-52 off Greenland Jan. 22.

The radioactive snow lies over a flame-blackened area of frozen bay off the Greenland coast where the Strategic Air Command bomber went down.

"This material will be stored

south of Thule.

THULE AIR FORCE BASE, Greenland, Jan. 28—Officials of the Strategic Air Command announced today that parts of all four hydrogen bombs lost in the crash of a B-52 bomber off Greenland last Sunday had been found.

The officials said that the bombs had broken into fragments when the plane crashed into the ice of North Star Bay seven and a half miles northwest of this base.

Working by flashlight and gasoline lantern in the Arctic darkness, Air Force technicians found fragments that bore serial numbers corresponding with those of various components of the four weapons, the announcement said.

at Thule Air Base, Greenland, in sealed metal containers for subsequent shipment to the United States during the summer shipping season for final disposal," the Pentagon said today.

Ships cannot get to Thule until the bay thaws in summer.

Officials maintain that only low-level, relatively harmless alpha radiation was released when the 1.1-megaton bombs broke apart in the fiery crash.

Presumably the United States agreed nonetheless to remove any hint of hazard to ease the fears of the Danes. Greenland is part of Denmark.

The officials permitted correspondents to visit the edge of the crash site this morning for 10 minutes. The short helicopter ride from a well-heated hangar on the base transports a visitor into a frigid and eerie world where 50 men are at work.

It is a world that is dimly lit by only four hours of natural twilight each day from 10 A.M. until 2 P.M. The rest of the time only portable searchlights, hand flashlights and gasoline lanterns illuminate the darkness.

In the confined glare of the floodlights the outlines of six rectangular plywood shacks glow. They have been built on the snow cover over the ice to serve as a command post and to provide warmth and supplies. Behind them, four snow igloos have been built as survival shelters in case of a sudden storm.

No Atom Peril in Thule

Washington, March 19 (UPI)—U.S. and Danish officials said today that there is now "no risk for human, marine or plant life" of radioactive contamination in the area near Thule, Greenland, where a B-52 bomber with four hydrogen bombs crashed Jan. 21. Officials and scientists from the two nations made the announcement at the end of a two-day meeting.

Two of the igloos were built by the Americans and show the amateur's touch. They are small and have pointed roofs. They contrast with the larger, rounded igloos built by the Eskimos, whose dogsled teams are helping ferry men to and from the site.

Except for the occasional roar of an incoming helicopter, the only sounds are the rumble of the small generators beside the shacks and the faint shouts of the men hundreds of yards farther out on the ice. The men are searching for debris and surveying the area to pinpoint the location of each significant fragment. They hope to reconstruct exactly what happened after seven crew members bailed out of the burning aircraft. The co-pilot was killed but the rest were rescued.

Greenland Fishing Cleared

COPENHAGEN, Denmark, April 10 (UPI)—Authorities have ended fishing restrictions in the sea near where a B-52 bomber crashed in Greenland with four hydrogen bombs, Danish officials said today.

Icebreaker Will Probe Off Siberia

WASHINGTON, June 9 — The U.S. Coast Guard icebreaker Staten Island will shove off from Seattle next Saturday on an oceanographic probe of the international waters bordering Soviet Siberia.

In announcing the mission, which is to be completed sometime in July, the Coast Guard emphasized that the ship would remain outside the 12-mile territorial waters limit of the U.S.S.R.

Some Coast Guard officers are still miffed over the humiliation suffered by the icebreakers Edisto and Eastwind last August when the Soviet denied the ships the customary right of innocent passage through the Vilkitsky Straights which connect the East Siberian and Laptev Seas.

The icebreaker Staten Island is not likely to urn into any international controversies.

Her orders are to operate well outside the 12-mile line. The ship will make her survey in the Chukchi Sea, The Bering Sea and the Bering Strait.

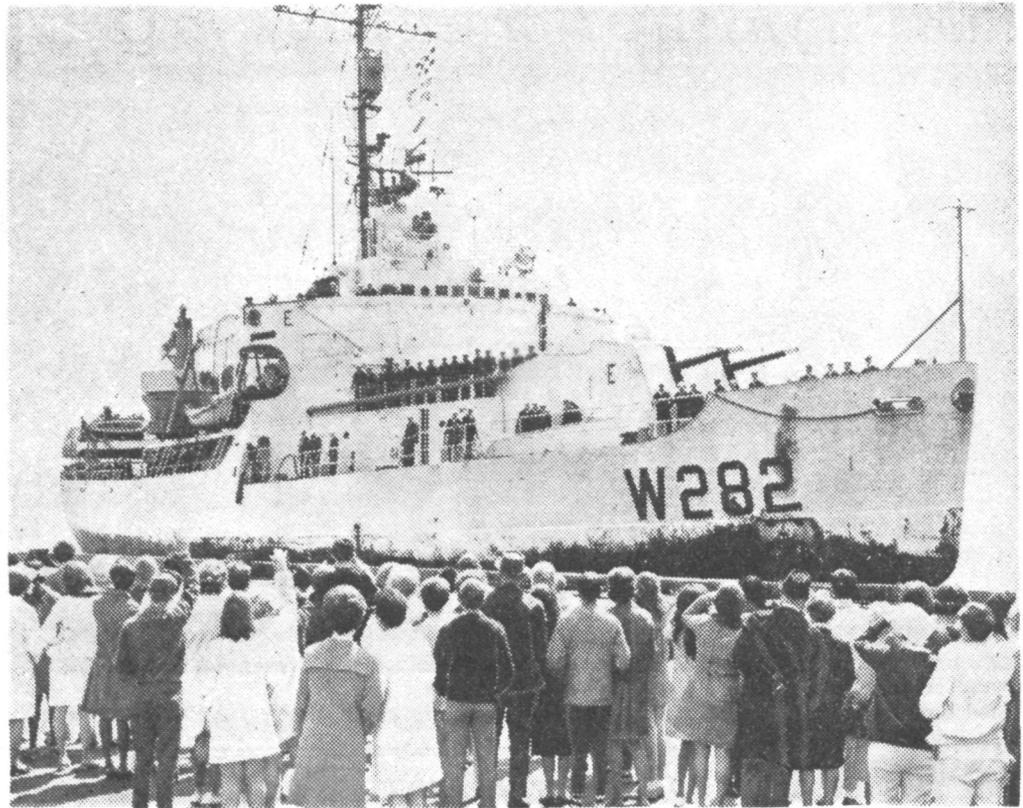
Better Transport Is Sought To Tap Alaska Resources

WASHINGTON—Tapping the vast wealth of natural resources in Arctic Alaska can only be achieved through improved transportation, according to a group of polar experts participating in a Department of Transportation study.

The officials, who met recently to study ways of opening up the Arctic and Antarctic, also indicated that a good transportation system would greatly enhance the country's scientific aims in these areas.

In addition to aiding in polar exploration, a good transportation system could also help to open up Arctic Alaska, potentially the richest area in resources under the United States flag, they found.

Transportation in these frigid areas has been limited by the rugged environment and relative distance from the continental 48 States. In addition, private industry has hesitated to expand in these areas because of the present high costs.



Cold Voyage Ends

Seattle Times

April 21

The Coast Guard icebreaker Northwind returned to pier 91 yesterday after the first oceanographic survey to be made off the Siberian coast by an American ship.

The Northwind, commanded by Capt. James F. Phair, left her home port of Seattle January 22 for the Anadyr Gulf, off Siberia, and St. Lawrence Island in the Bering Sea.

During February the four scientists and a civilian electronics technician collected water samples and measured the current along the western edge of the Bering Strait.

These were the first measurements to be made in the winter in this area by a United States vessel.

In March the ship met the floating biological-physiological laboratory, the Alpha Helix, at Dutch Harbor, and made a path through the Arctic ice for her, on two occasions towing the smaller vessel.

Scientists from the Scripps Institution of Oceanography,

the Alaska Department of Fish and Game and the University of Alaska were aboard the ships, studying plant and animal life.

"This information," Captain Phair said, "was vital for the United States to protect its interests at the conference table with Russia and Japan."

At the end of March the scientists of both ships left

for Kodiak.

The Northwind then began a fisheries patrol, with men from the Bureau of Commercial Fisheries aboard, to insure compliance by foreign and domestic ships of the various Bering Sea fisheries treaties.

Captain Phair said the men on the cruise experienced cold of 23 degrees below zero.

Thawing a myth

MADISON, Wis. (UPI) — The Eskimo is a lean, muscular chap who does not live in an igloo, rub noses, abandon his old people to die or offer his wife to visitors.

University of Wisconsin anthropologist William S. Laughlin said stereotypes get in the way of understanding Alaskan Eskimos.

Laughlin said only one in 10 Eskimos has ever been inside an igloo, and most live in frame houses. The nose rub, he said, has been replaced with the kiss.

Laughlin said the Eskimo is not usually fat, either, tending to be lean and muscular. And his conception of what makes a good host does not include offering Mrs. Eskimo to male guests, Laughlin said.

A five-year study is about to be undertaken to study Eskimos — direct descendants of Alaska's earliest pioneers who crossed a land bridge from Siberia 8,000 years ago.

ALASKA ESKIMOS GET OWN LIBRARY

Gift of 5 Dictionaries Whets
Appetite for Reading

MONMOUTH, Ore. (AP) — Eskimos in nine Alaska villages have their own libraries because Angyalik thinks Eskimos are about the finest people on earth.

Angyalik means leader, or captain. It is the name the Eskimos have given to Paul Jensen, a junior high school teacher.

In 1962, Mr. Jensen visited Gambell on St. Lawrence Island off the Alaska coast.

An old Eskimo, reading a book, told Mr. Jensen that, if he had a dictionary, he could figure out what the words meant.

Mr. Jensen said he would send him one when he got back to Monmouth.

Mr. Jensen told the Monmouth Rotary Club about it, and got five dictionaries. He sent them to Gambell, and the old Eskimo replied that everybody had started reading books.

That started the library movement rolling. The Monmouth and Corvallis Rotary Clubs, the Monmouth Lions Club, teachers and students started a flow of books into Mr. Jensen's home that has not stopped.

Mr. Jensen and Leonard Rice, president of the Oregon College of Education at Monmouth, are the Eskimo library committee.

Gambell has 3,400 books in its library, situated in a school basement.

The next libraries, with 1,000 books each, were established at Gaboonka, also on St. Lawrence; the Yukon River village of Huslia; Anaruvuk Pass in the Brooks Range north of the Arctic Circle; at Barrow on the Arctic Ocean, and at Wainwright, west of Barrow.

Libraries were started this year at Ekwok, New Stuyahok and Koliganek, all interior villages.

The Rev. James Poole, a Roman Catholic priest, is librarian at Barrow. The library is in the Presbyterian Church, and the Boy Scouts help run it.

Mr. Jensen is a teacher at Highland View Junior High School in Corvallis, but is temporarily running a Federally financed project to help teachers evaluate their own teaching.

He is handling similar teacher evaluation projects in Alaskan Eskimo schools. That enables him to get to Alaska every

couple of months.

Since he made that first visit to Alaska in 1962, Mr. Jensen has studied the culture of the Eskimos. He lives with them each summer.

"The Eskimo," he says, "is a very warm person, and I have developed wonderful relationships with them. They are childlike, and accept you.

"The only way to develop a friendship with an Eskimo is to say nothing when you first meet him. He wants to size you up first.

"He has a keen sense of any living thing.

"The Eskimo sets himself to the task of learning to live. He has learned to live with himself in the Arctic silence and loneliness."

Mr. Jensen says the Eskimo's patience and skill, and his closeness to nature, has made him a great artist, especially in sculpture.

But he says the present educational system is not working. By the time an Eskimo child is in the fourth grade, he is at first grade reading level.

"The reason for this," he says, "is that Eskimo children don't use English during the summer vacations, so they forget it.

"But if we get enough libraries, we might solve that problem. And the children do love the libraries.

"The Eskimos like simple books and stories about people who are different from them."

He said 90 per cent of the Eskimos read English.

POLAR-BEAR HUNTING THREATENS SPECIES

OSLO, Norway (Reuters) — Nobody knows exactly how many polar bears have survived in the Arctic. But, with a growing sophistication in hunting methods, the number is dropping.

Naturalists and scientists from Western and Communist countries are trying to find a way to preserve the magnificent white-furred "king" of the polar regions.

Estimates suggest there is up to 17,000 bears in the Arctic. Every year, about 1,300 are killed by hunters using snow-scooters, helicopters and planes taking part in tourist "safaris."

Of these, about 500 are killed in the Spitzbergen and adjacent Arctic areas. There are too many, Dr. Tore Gjelsvik, director of the Norwegian Polar Institute, says. He estimated that about 20 per cent were killed in Norwegian-controlled areas.

Although Norway has banned snow scooters, "safari" hunting is still permitted. It is expensive and can only be afforded by the wealthy.

MUSK OXEN HERDS OUTSTRIP FORAGE

Their Survival Threatened
on an Island Off Alaska

Jan. 21

Musk oxen, once nearly extinct, may be eating themselves out of house and home in Alaska.

This was reported yesterday by the Fish and Wildlife Service of the United States Department of the Interior, which reported that their survival was being threatened by depletion of forage.

The species, long-haired members of the bovine family, once ranged through the Arctic regions of North America, including Greenland. The herds were depleted by the hunting of Eskimos and others.

The last musk ox in Alaska was killed in 1865.

In 1930, the Federal Government transferred 34 musk oxen from Greenland to Nunivak Island off the Alaska coast. Because the 2,000-square-mile area contained no natural enemies for the herd, their population has increased to 700.

The Government does not permit them to be hunted.

John Gottschalk, director of the Bureau of Sport Fisheries and Wildlife of the Department of the Interior, said that his agency and the Alaska Department of Fish and Game were considering several possibilities for reducing the herd so that the animals would not starve.

"We might use surplus musk oxen to re-establish herds on the Alaska mainland," he said, "or spare animals could be given to research institutions for experimentation. Museums are interested in the animals for public display, and some private individuals seek them for domestication. Controlled shooting by wildlife managers or hunters is a last resort."

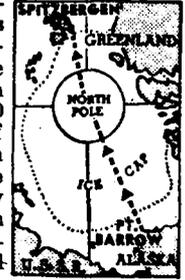
The animal, somewhat smaller than a domestic ox, has outer hair about 20 inches long and a highly valued dark gray wool undercoat. It is sure footed on icy terrain and can use its sharp hooves to cut through snow and ice for covered food, such as lichens and other alpine-type plants, and dwarf willows,

When under attack, the bulls and older cows form a circle around the calves to present a solid front of sharp, curved horns to the enemy, classically wolves. The bulls paw the ground, move their heads menacingly and bellow.

Begin Arctic Trek

Point Barrow, Alaska, Feb. 22 (Reuters)—A four-man British expedition left here today on a 16-month, 3,200-

mile trek across the frozen Arctic Ocean to the Spitzbergen archipelago, 400 miles north of Norway. Team members were leader Wally Herbert, Dr. Ken Hedges, explorer Allen Gill and Roy Koerner, a glaciologist, all in their 30s. They will maintain communications with scientists of the arctic research laboratory here.



Canada Flies Aid To Expedition Afloat

EDMONTON, Alta., June 11 (AP)—A Canadian military aircraft left here yesterday with food and supplies for a British expedition floating on a square mile of ice in the Arctic Ocean.

The four-man, 40-dog expedition headed by explorer Wally Herbert, 53, is on a 3500-mile trek from Point Barrow, Alaska, to Spitzbergen island in the Greenland Sea to measure ice and snow depths and to make weather and other observations.

Outpost in Arctic Is Utilized In Check on Magnetic Field

LOS ANGELES—Tungsten, a remote mining town 350 miles south of the Arctic Circle, now serves as an outpost for space scientists from the University of California at Los Angeles and the University of Alaska.

In a small insulated house next to Tungsten's pump station, the team of scientists installed a magnetometer, a four-pound electronic package that will gather information about the earth's magnetic field and neighboring areas in space.

With these magnetometers serving as "listening posts" for magnetic field signals both in space and on earth, the team now has a unique method for probing space.

Five Quakes in Aleutians

ANCHORAGE, Alaska, Feb. 21 (AP)—The Coast and Geodetic Survey reported a series of five earthquakes ranging from 4.5 to 5.5 on the Richter Scale occurred in a span of 20 minutes Wednesday about 50 miles off Alaska in the Aleutian Islands.

4-Nation Study of Eskimos Set

WASHINGTON, Jan. 16

To find out how they thrive in the "earth's most-hostile environment," the United States, Canada, Denmark and France are undertaking the largest study of the Eskimos in history.

Starting in July, the four-nation project will take scientist teams to three spots in the Arctic world where Eskimos have lived for centuries.

The U.S. team will go to Wainwright, Alaska, a village of 300 that is 90 miles from Point Barrow, the Canadians to Iglulik in the Northwest Territories and the Danes and French to Upernavik on the northwest coast of Greenland.

Occupying the longest linear distance of any peoples in the world, about 77,000 Eskimos today live in Alaska, Canada and Greenland. Unlike any other race, they have never migrated from this circumpolar world.

The four-nation project, announced yesterday by the National Academy of Sciences, will be conducted under the auspices of the 50-nation International Biological Program.

"We hope," said Dr. Frederick A. Milan of the University of Wisconsin, coordinator of the project, "to gain insight into the general patterns of human adaptability and evolution."

They also hope to gain a greater insight into the way Eskimos have adapted to change, lived reasonably free of disease and even swelled in population—all without ever making any apparent attempts to interbreed with other races.

Scientists who will go among the Eskimos will study the way their infants are born, the way their children grow and the way their young adults stay fit and perform as members of their communities.

Health studies will emphasize fertility, illnesses and the biological consequences of inbreeding.

Eskimo women chew the leather of which Eskimo hunting boots are made in order to soften it.

EXPEDITION PROBES ANCIENT ESKIMO LIFE

WASHINGTON—An expedition to explore prehistoric Eskimo life in Canada will excavate sites at the northwest corner of Hudson Bay this summer.

Depending on ice and flying conditions, anthropologists will begin work at Thule Eskimo settlements about July 10.

The project is sponsored by the National Geographic Society in cooperation with the National Museum of Canada. It will be headed by Prof. Charles F. Merbs, a University of Chicago anthropologist who has carried out earlier Arctic studies.

Professor Merbs will investigate the coast of Roes Welcome Sound and the Wager Bay-Chesterfield Inlet areas. The region is rich in artifacts from the Thule Eskimo culture.

The Thule people began migrating from the north Alaska coast about 1,000 years ago.

One wave of migrants drifted to the Thule region of Greenland, hence the name given now to the entire culture. Another wandered down the eastern shore of Hudson Bay and the Labrador coast.

Between about A.D. 900 and 1300, the Thule of the mainland displaced or absorbed the Dorset, a settled but little-known people.

The Thule thrived in the environment of Hudson Bay. Unlike the Dorset, the newcomers used dogs for hunting and transportation. They killed the great baleen whale for food and oil for their lamps.

SOVIET UNION BUILDS ATOM ICEBREAKERS

MOSCOW, June 23 (Reuters)—The Soviet Union has begun the construction of new atomic-powered icebreakers, but nuclear power is still too expensive for other kinds of ships, the Soviet minister for the shipbuilding industry said yesterday.

The new icebreakers will be even more powerful than the 44,000-horsepower Lenin, which was built 10 years ago, Boris E. Butoma told the railroad union newspaper Gudok.

They will be used to keep northern sea lanes open for longer periods in the summer and autumn, he said.

Mr. Butoma said that the new icebreakers would have more economical power plants than the Lenin. Knowledge gained from their construction will help to reduce nuclear power for freighters and other ships that will be able to compete with conventional vessels, he added.

Icebergs Are Sighted Unusually Far South On Atlantic Routes

May 17

A dozen icebergs have been sighted unusually far south in the Atlantic sea lanes, the Coast Guard reported yesterday. As a result, its International Ice Patrol has been ordered to maintain an especially close watch on concentrations off the coast of Newfoundland.

The icebergs are near the 48th parallel, or only 80 to 100 miles north of ocean Track B, the route recommended by the patrol as safe for shipping between April 11 and June 30.

A Coast Guard spokesman said it would probably not be necessary to order the use of emergency Track A, which is farther south.

The spokesman noted that deterioration of the ice would be accelerated as it moved south into warmer waters.

Another large group of icebergs was noted by the Coast Guard. It is farther north, several hundred miles off the Labrador coast.

Ice patrol headquarters said the current ice situation in the North Atlantic was one of the worst in recent years. The patrol season which normally ends in mid-June, may have to be extended.

The patrol, maintained by the Coast Guard under international agreements, was instituted in 1914, two years after the British liner Titanic hit an iceberg and sank on her maiden voyage from Liverpool to New York, with the loss of 1,513 lives.

Treaty to Curb Hunting Of Fur Seals Extended

MOSCOW, April 12 (Reuters)—The United States, Canada, Japan and the Soviet Union decided today to extend an 11-year-old curb on the hunting of fur seals in the Pacific Ocean.

The four countries agreed at a conference that the fur seal population in the northern Pacific was still too low to permit unrestricted hunting.

Fur seals may now be caught only in summer, when they go ashore. Under these conditions, the United States caught 65,816 seals last season and the Soviet Union 17,505.

The ban on ocean sealing, introduced in 1957 because of the near extinction of the fur seal, will be restudied next February at a meeting in Tokyo.

ESKIMOS BACK PLAN TO HUNT MUSK OXEN

OTTAWA (Canadian Press)—Eskimos in the Eastern Arctic have lined up with the Government of the Northwest Territories in its debate with conservationists on whether limited sports hunting of musk oxen should be permitted for the first time in 51 years.

After meetings with a committee of three territorial council members, the Eskimos approved a plan allowing 32 of the animals to be shot by wealthy big-game hunters.

The Canadian Wildlife Service, among others, is opposed to the territorial council's tentative decision to bring hunters into the Arctic to shoot the huge, shaggy beasts.

Under the plan, hunters would pay \$4,000 apiece for chartered aircraft, Eskimo guides and hunting licenses. The meat of the animals and \$1,500 would go to the Eskimos.

Territorial officials say the plan would be a shot in the arm to Arctic tourism and would put money in the pocket of the Eskimo and meat on his table. Conservationists contend that even limited hunting would pose the threat that the musk ox, last native survivor of the ice age, would become extinct.

CANADA WILL PURSUE HUNT FOR ARCTIC OIL

OTTAWA (Reuters)—The federal Government has gone into partnership with private industry in a trail-blazing attempt to tap the oil riches of the high Arctic.

Minister for Northern Development Arthur Laing has announced the formation of Pan Arctic Oils, Ltd, for Arctic oil exploration. It is a consortium of 20 private corporations and the federal Government, with the latter holding a 45 per cent interest in the firm.

This Government participation in the petroleum industry was aimed at retaining Canadian control of resources development of remote regions difficult of access.

Architect of the plan is a Calgary geological consultant, J. Campbell Sproule. His plan for a Canadian-dominated oil exploration consortium was faltering until the Government took an interest in it.

The petroleum industry already has spent many millions of dollars on exploration of the Arctic. It has been spent on fragmented efforts, however, and in the most accessible rather than the most promising regions.

Ice
Island

U. S. Increases Arctic Studies

By STANTON H. PATTY

Seattle Times

BARROW, Alaska — Russia has been leading the way in Arctic research since 1937 when a tent-equipped station was planted by the U. S. S. R. on floe ice only 40 miles from the North Pole.

That was the first of 15 Soviet - ice stations in the Arctic Ocean.

Max C. Brewer, director of the Arctic Research Laboratory here, is convinced that for its own good the United States must become "Arctic oriented" with expanded research programs.

"Overall, the Russians are going at it much bigger than we are," Brewer said.

"We know more about the moon than we do about the Arctic Ocean."

But Brewer takes pride in the Arctic Research Laboratory, headquartered in Barrow, near Alaska's largest Eskimo village. The laboratory has grown from a one-quonset - hut operation in 1947 to a swelling complex.

THE A. R. L. is operated by the University of Alaska for the Office of Naval Research.

Brewer, 43, has been director since 1956. He is a geologist and geophysicist.

The headquarters area occupies several quonset-style buildings in a Navy-base camp built originally for oil explorations. Next door is a key station in the Distant Early Warning Line.

Under construction now is a \$2 million headquarters with facilities ranging from laboratories to living quarters.

Right now it is a chilly, bleak area of snow, slush, puddles and coarse sand.

Brewer brims with enthusiasm and conviction.

To understand his zeal, you have to tip a world globe and look down on the Arctic basin as a Northern Mediterranean.

The Arctic Ocean covers some 5.5 million square miles.

BANKED AROUND this mysterious ocean are the United States, Canada, Russia and some of the Scandinavian countries.



MAX BREWER

The Arctic already is an international skyway for commercial jetliners. Now there is talk of submarine commerce one of these days, with nuclear-powered undersea freighters and tankers crossing the Arctic Ocean. When this happens as much as 7,000 miles will be trimmed from some routes now traveled by surface vessels between Europe and Asia.

The late Gen. H. H. Arnold, commander of America's air forces in the Second World War, once warned:

"If World War III should come, its strategic center will be the North Pole."

About one sixth of the Soviet Union lies north of the Arctic Circle. Russia has more than 10,000 miles of coast along the Arctic Ocean. Canada has an Arctic coastline of 5,770 miles and the United States just over 1,000 miles.

There have been recent reports that Russia is planning commercial - surface shipping from Japan to Europe, via the Arctic, this year.

Brewer said the Arctic Research Laboratory here is "ideally situated".

"From Barrow, you go 120 miles to the northeast and you are in 12,000 feet of water — you go 120 miles from Barrow to the northwest and you are in only 120 feet of water" he said.

BREWER SEES ahead to the time when there will be sizeable communities in the Arctic as our population swells.

"The Soviets have been working to develop the Arctic for decades," he said. "They have towns, big min-

ing areas, shipping, lumbering and so on."

Brewer said he can think of no reason why there should not be American communities in the Arctic. Not even the harsh climate?

"We can work around that. We're doing it," he declared.

"But the big thing is that the United States, the mainstream of American thought, is not Arctic - oriented yet.

"We still have people asking us if we ever see the ground up here through the snow. Hell, yes, we have poppies blooming here every year. We get less snow here than they do in some of the Southern states.

"Unless we know something about the Arctic, we're not going to be in on it in the future because we will be afraid of it. Man is always frightened about the things he doesn't understand.

"We don't need romantic adventurers up here. We need people willing to get in and work."

THE A. R. L.'s SCIENTIFIC work covers a wide scope including operations of drifting ice stations in the Arctic.

T-3, the four-by-seven-mile ice island managed by the laboratory, first was occupied by the Air Force in 1952 when an Alaskan Air Command reconnaissance plane sighted the island 80 miles from the North Pole.

But in May, 1960, T-3 went aground ("just drug bottom," Brewer says) on the shallow continental shelf 88 miles northwest of Barrow. It was evacuated 11 months later as having little scientific value in its "anchored" position."

In September, 1960, the A. R. L. established a temporary station called Arlis I on floe ice. That effort involved a record 210-mile penetration of the Arctic pack by the Navy icebreaker Burton Island. Arlis I was evacuated in March 1961.

A prize known as Arlis II established in May, 1961, and lasted for almost four years until it drifted around Greenland and broke up.

Then, in February 16,

came the happy rediscovery of valued T-3. The 100-foot-thick ice island was wrenched loose from its grounding site in storms and sailed 150 miles north.

THE ARCTIC Research Laboratory "inherited" T-3 this time and put a crew aboard. The real buildup on T-3 began in the spring of 1966.

In addition, there was Arlis III, another small and temporary station maintained for 101 days in 1964.

Last was Arlis IV, also on floe ice. It was established in the spring of 1965 about 150 miles northeast of Barrow and served for three months.

T-3 is all that is left. True ice islands are rare.

What is T-3's future?

"Pretty good," Brewer said.

"T-3 is making a zig-zag circle in the Beaufort Sea current. It is in an 'eddy.'

"We see at least four more years on this 'trip,' maybe more."

Using T-3 and Arlis II as stepping - stones, two A. R. L. pilots made a daring, trail-blazing flight in May, 1963. They landed two single-engine Cessna 180s on skis at the North pole for scientific studies.

But the Arctic Research Laboratory is much more than ice islands and polar flights.

"In any one year we will have projects going on here in anthropology, archeology, bacteriology, physiology, botany, zoology, marine biology, geology, micro-meteorology, weather, sea-ice physiology, limnology, entomology, various geophysics and other fields," Brewer said.

THE LABORATORY's classroom extends from the Brooks Range to T-3 and the North Pole — and from the Bering Sea into Canada.

There are 21 A. R. L.-operated field camps available for year-around use in Northern Alaska.

America's Arctic research, although lagging far behind Russia's, is beginning to quicken.

Northernmost Tip of the World Is Said to Be Mapped Incorrectly

Cape Morris Jesup Described by Explorers as an Island 12 Miles East of Charts

By JOHN NOBLE WILFORD

A team of polar explorers has just returned from Greenland with data showing that the earth's northernmost tip of land is apparently not exactly where all the maps place it.

The explorers, led by David Humphreys of Australia, said that their navigational measurements indicated that the frozen, windswept Cape Morris Jesup on the northern coast of Greenland was actually 12 miles further east and a mile north of its position on all known maps.

Moreover, the explorers found that the cape was an island, not a peninsula.

The accuracy of their measurements has been checked by computer calculations and is now being reviewed by the United States Army Map Service in Washington. The findings have also been reported to the National Geodetic Institute of Denmark, the nation that owns Greenland.

"I think the findings are valid," Robert M. Iverson, coordinator of geophysical operations of the Army Map Service, said yesterday in a telephone interview. "This does not surprise us at all because in the days the cape was last mapped we had such poor instruments."

Pending further study of the data, the apparent discrepancy could necessitate a complete revision of all maps of Greenland's entire northern coast. This would be of particular importance because of the extensive nuclear submarine operations under the polar icecap.

The cape was first sighted in 1900 by Robert E. Peary, the American arctic explorer, and was named for the president of the American Museum of Natural History at that time. Only three other parties had visited the forlorn spot until this year.

The coordinates determined by the Humphreys expedition for Cape Morris Jesup are Lat. 83 degrees 40.2 minutes N. and Long. 30 degrees 52 minutes W. The northernmost inhabited point on earth is a Canadian weather station at the southern end of Ellesmere Island, which is Lat. 77 degrees N.

The four-man expedition began on Jan. 18 as an attempt



The New York Times May 29, 1968

DISCREPANCY: Explorers found an error in map location of earth's northernmost land tip, Cape Morris Jesup. Cape is indicated by cross.

to make the first winter crossing on the Arctic ice by sled to the North Pole. But weather conditions and logistics problems forced them to turn back several times and finally abandon the attempt.

Instead, on May 6 the party flew from Canada to Cape Morris Jesup because, as Mr. Humphreys said in an interview, "I had a hypothesis that with our instruments we could correct Peary's map."

It was an ideal day, for it was the one day in the month when in the polar sky the sun and the moon are at right angles to earth. At noon the sun shone high in the sky to the south and the moon to the east.

With a theodolite, a surveyor's instrument, Mr. Humphreys took 16 readings to determine their true position at the point where lines from the sun and the moon intersected.

The measurements were radioed to Minneapolis, where they were processed by computers at the Control Data Corporation, one of the expedition's sponsors. The other was the National Broadcasting Company, which plans to run this fall an hour-long documentary television show on the journey.

Besides the 34-year-old Mr. Humphreys, a professional navigator, other members of the party were Leif Lundgaard, a Norwegian veteran of three polar expeditions; Dick Michelson, an American cameraman, and Phursumba Sherpa, a nephew of the Tibetan Tenzing Norkay who accompanied Sir Edmund Hillary on his ascent of Mount Everest.

Polar Team To Probe Old Crime Story

WASHINGTON (UPI) — A young American professor will trek into the northern reaches of Greenland this summer in an effort to unlock the mystery of a government-sponsored expedition that erupted into wild drinking, brawling, shipwreck and possibly murder.

Dr. Chauncey Loomis, a professor of English at Dartmouth College, plans to lead a five-man expedition to Polaris Promontory where Charles Francis Hall, a one time Cincinnati businessman turned adventurer, was buried nearly a century ago.

"The Navy concluded that Hall died a natural death but there is enough evidence to indicate he was murdered," Loomis said.

Hall, owner of a seal engraving firm in Cincinnati, became a heavyset black bearded polar explorer who, according to Loomis, lived with the Eskimoes.

The mysterious voyage aboard the Polaris, a converted tugboat, was financed by the Navy Department. It was to have been the first successful expedition to the North Pole.

Accompanying Hall on the expedition was a group of scientists headed by Emil Bessels, a well-known German who was noted for his Teutonic thoroughness and self-discipline.

"There was an abrasion of personalities," Loomis said.

The "abrasion" was not only between the explorer and the German scientist, but between the captain of the Polaris, Sydney Buddington, and Hall and the scientific staff and the ship's officers.

The quarrelsome ship got as far as northwest Greenland until, in 1871, the vessel became "wintered in"—locked in by the frozen sea.

The Polaris thus became a cage of bickering seamen, scientists and adventurers.

Some liquor was smuggled aboard the tiny vessel when it left the United States. That was quickly consumed. The men then hit the ship's medical chest and the raw alcohol.

Frequent battles broke out aboard the Polaris in which almost everybody was involved. The friction between the German scientist and the burly polar explorer reached a breaking point.

During the height of the tensions, Hall set out on a sled journey northward, seeking a sled route to the North Pole. He returned with plans for a series of sled trips from the boat.

Back in the warmth of the Polaris, Hall drank a cup of steaming coffee in his cabin. Minutes later, the former engraver slumped forward, then fell from his chair.

"It took him two weeks to die," the professor said. "He said he was poisoned."

Hall's journals mysteriously disappeared after his death.

Hall's body was buried at Polaris Promontory. Members of the crew supposedly buried with him written statements of what had gone on aboard the boat.

Six months later, the survivors were rescued. They returned to Washington.

A Navy board of inquiry ruled that Buddington was guilty of negligence, that he had not performed his duties properly during the expedition and that his drinking interfered with his duties.

It also ruled that Hall died a natural death.

Asked how he expected to determine whether Hall was murdered after nearly 100 years in the grave, Loomis said he didn't expect much difficulty.

"He is buried in an area that is very dry and on the edge of the perma frost," he said. "I think there will be enough flesh to determine the cause of Hall's death."

Loomis, accompanied by Dr. Frankling Paddock of Pittsfield, Mass., and two or three others, plans to leave July 31.

Team of Scientists Opens Study of Northern Lights

BALTIMORE, Jan. 15 (AP)—Scientists will begin using rockets, a jet plane, a satellite and ground stations this week to try to solve the mystery of the aurora borealis, or northern lights.

The operation, sponsored by the National Aeronautics and Space Administration, got under way today as a team of 250 men began moving to Fort Churchill, Canada, for the first of two expeditions this winter.

William G. Fastie, a physicist and experimental projects planner at Johns Hopkins University, and T. M. Donahue, a University of Pittsburgh physicist, are leading the expeditions. Experiments will be conducted with optical, spectographic and electromagnetic instruments from Jan. 18 to Feb. 8 and from Feb. 21 to March 12.

Jan Mayen and Bjørnøya

The Postman Calls Once a Year!

JAN MAYEN is a desolate island between Iceland and Svalbard. The island is of volcanic origin, rising from an ocean depth of about 3,000 m, with peaks of over 2,000 m. There are several extinct volcanos on the island, and the last known eruptions took place in 1732 and 1818. However, hot steam is still pouring out of small clefts in the rocks near the radio station. Earthquakes occur occasionally.

Mount Beerenberg is the highest volcano. Its crater is covered by a glacier, with tongues stretching right down to the sea.

The only known mammal on the island is the Polar fox and an occasional Polar bear. Schools of seals can often be seen around the coast. However, the bird life is very rich and varied during the summer. The flora is very poor, and patches of green vegetation provide a striking contrast against the blackish-brown rock surface. Hunting is banned on Jan Mayen.

Rain and stormy weather occur frequently, and the island is often engulfed in fog. There is Midnight Sun from May 16 to July 27, and complete darkness from November 19 to January 25. The island is surrounded by pack-ice in winter. A radio station was established in 1921. Since 1944, meteorological observations are transmitted every three hours. The island is entirely uninhabited, apart from the technical staff of the radio station.

It is believed that Jan Mayen was first discovered in 1607 by Henry Hudson and rediscovered in 1614 by the Dutch explorer, Jan Mayen, who named it Joris Eyland. The island was explored, surveyed and described by the Norwegian Arctic Expedition of 1877, and an Austrian expedition spent the winter on Jan Mayen in 1882-83. Several Norwegian and British expeditions visited Jan Mayen between 1914-19 and 1939-45 world wars. In 1929, Jan Mayen was declared Norwegian territory.

The island is highly inaccessible. The coast is generally very steep, without natural ports. There are 2 or 3 lagoons, with lots of drift-wood from distant places. There are no regular shipping services to Jan Mayen but a seal catcher especially chartered for the purpose will call at Jan Mayen once a year (around July 1) in order to bring new taff for the radio station.

"Main Street," Bjørnøya (top), the famous "Walrus Museum" of Jan Mayen (center), and a section of the Jan Mayen Camp.

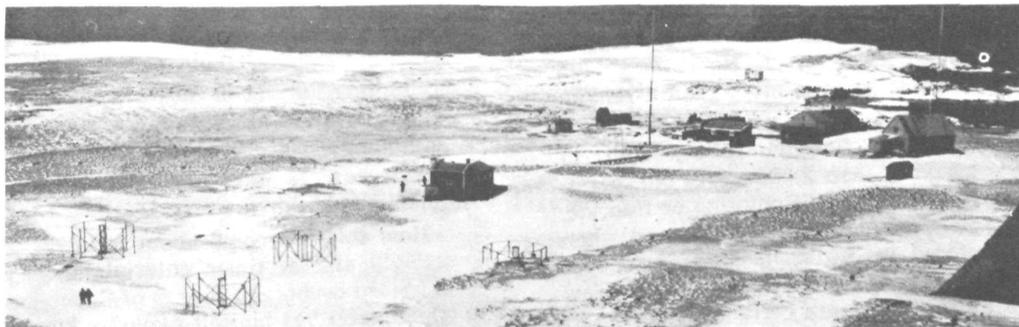
Bjørnøya (Bear Island)

BJØRNØYA (Bear Island) lies in the Arctic Ocean between Norway and Svalbard (Spitsbergen), covering an area of 178 sq. km. It is only about 20 km long and 15 km wide with a great profusion of lakes — over 700 in all. The north sector consists of lowlands with shallow lakes. The southeast sector is characterized by Miseryfjell, a large rock plateau with 3 peaks, of which the highest is only 1800 ft. The southwest sector consists of rugged mountain country with no peak higher than 900 ft. The climate is inhospitable, cold and usually foggy throughout

the summer, but not always; with luck, Bjørnøya is a fascinating sight.

★
THE island is entirely uninhabited but for the crew operating the radio and meteorological station. There are no regular steamer connections.

Bjørnøya's South Cape is distinguished by high cliffs lifting straight out of the sea, the home of millions of auks, guillemots and gulls. It is possible, while viewing this remarkable sight, to fish for cod with a hand line, and it is not at all uncommon to catch 50 pounds of fish in an hour, for here lie the famous Bjørnøya fishing banks. The bays and shores of Bjørnøya are strewn with fascinating remnants from its past — a coal mine, a rusted narrow-gauge railroad, walrus carcasses and whale skeletons — all destroyed but preserved by the cold; monuments to the power of nature and the feebleness of man in this wild region.



A Few Mysteries Remain

THE GREENLAND ICE CAP. By Borge Fristrup. Illustrated. 312 pp. Seattle: University of Washington Press. \$20.

By TREVOR LLOYD

DURING half-a-dozen visits to Greenland, I had not until recently set foot on the icecap, which forms more than four-fifths of the country. Many a trans-Atlantic air traveler has watched its gleaming surface glide below like sugar icing, and bits and pieces of it in the form of icebergs have often added excitement to a late spring Atlantic crossing. Even residents of Greenland only rarely approach near it. The Eskimos feared it, and their Norse neighbors knew it as little more than a remote landmark.

Today, Greenland ice, said to be more than 2,000 years old, germ-free and without chlorine or fluoride, guaranteed to crackle and pop when placed in drinks, is being promoted by the Danish Consulate in New York. There are certainly reserves to meet the most enthusiastic demands. More significant, the length and breadth of the icecap is now crisscrossed by tractor trails; its depths have been probed by drills and echo sounders; scientific stations have been perched above it, have rested on its surface and been buried cosily within it. Few of its early mysteries now remain.

Most of the scientific revelations have come since World War II, and the driving force behind the massive search has been mainly the need to develop ways of living and traveling in what might some day be a theater of war. Fortunately, military priority did not prevent collaboration of scientists from many nations, and this

MR. LLOYD, professor of geography at McGill University and chairman of the Board of Governors of the Arctic Institute of North America, was Canadian Consul in Greenland during World War II.

paved the way for the even more comprehensive international scientific program on the much larger Antarctica icecap.

Independent civilian research in Greenland has been greatly facilitated by the logistics now available there. My own brief excursion to the middle of the ice at 77 degrees N. was only possible because a ski-equipped Hercules freighter of the United States Air Force was evacuating personnel of the Danish-American seismological station there. At the same time a party which had been on an ice-traverse was picked up and ferried to the coast. Farther south another group was being serviced by helicopters of the French Air Force.

More permanently established on the icecap are two of the lesser-known DEW Line stations whose radar personnel serve their tour of duty in well-built quarters resting on long, steel, telescopic legs set in the ice. Last summer they were jacked up another 20 feet or so to keep the floor above the accumulating snow. Technology has almost brought even the icecap to the fringes of the inhabited world.

How this has come about is interestingly and at times entertainingly described by Borge Fristrup of Copenhagen, who has himself played a key role in the change. His book, "The Greenland Ice Cap," is large and handsome, illustrated with clear maps and magnificent photographs in color and monochrome. But it is no mere coffee-table exhibit. Something like 50 expeditions to the icecap during the last two centuries are discussed, and the remarkable upsurge in activity since the opening of Thule Air Base in 1951 is documented in some detail.

Here is the story of "Camp Century," the United States research base buried within the ice and served by an atomic reactor; the account of observations carried on during the International Geophysical Year of 1957-58; and of the early fifties when young French explorers cruised all over the middle of Greenland under the exuberant direction of Paul Emile Victor, a master of polar logistics. It was he who, unable to af-

ford the luxury of parachutes for dropping equipment and supplies, coaxed pilots of four-engined aircraft almost to skim the surface, while cargo handlers tumbled barrels and boxes out of the hatches to bounce softly on the snow.

World War II had brought mechanized travel to the north, with the need to rescue downed aircraft and to insure that Nazi weather stations were not operating secretly in the heart of Greenland. Before this, travel had necessarily been more primitive and hazardous—man-hauling, the use of dogsleds and even ponies. Those were days when only exceptional men could survive, let alone perform useful scientific work on the icecap, and the record is a listing of the great figures of polar exploration—Courtauld, Hobbs, Lauge Koch, Freuchen, Rasmussen, Mikkelsen, Peary, Nansen and many more.

Mr. Fristrup has contrived to pack into the record all kinds of fascinating details. Few probably realize that in 1860 a serious study was made of the possibility of laying part of the trans-Atlantic cable across Greenland, since the ocean bottom was proving too uncertain a foundation. Charles Lindbergh and his wife flew over the ice in the early 1930' while seeking a practicable air route between North America and Europe. The U.S. Army drove a 1,200-foot tunnel into the edge of the icecap, using coal-mining machinery, in order to house scientists wishing to measure precisely just what goes on deep in a glacier. Incidentally, it was a very snug little community, complete with bedrooms, a pool table, steam heat, forced air ventilation, a sewage system and plenty of freshly thawed water. Drills have brought up from the depths of the icecap samples that fell as snow when Eric the Red lived in Greenland.

"The Greenland Ice Cap" is a very good value indeed. It provides a historical record not available before, and is the first full account of the scientific and technological revolution that has brought understanding of the origins, persistence and possible future of the world's major icecaps. The book is also a fine example of Danish printing craftsmanship.

THE NEW YORK TIMES BOOK REVIEW

Area on Island Off Alaska Thrust Up by 1964 Quake

WASHINGTON (AP) — The United States Geological Survey reported that sections of

Montague Island in Alaska's Prince William Sound were thrust upward as much as 38 feet in the disastrous earthquake of March 27, 1964. The island was uninhabited at the time.

The report is one of a series

of studies of the quake's results. Its author George Plafker, a geologist, said two clear fault lines had been found on the island after the earthquake, one of them running the island's full 22-mile length.

The greatest upward thrust

was along this line on the island's southwestern coast. There, the land rose 37.8 feet and a segment of ocean floor more than 1,000 feet wide rose above water level to become dry land.

American Antarctic Veteran To Retire

Christchurch, N.Z. Press

March 16

A man whose association with American exploration and research in the Antarctic extends over 40 years will shortly leave Christchurch for the United States.

He is Mr E. E. Goodale, who has been the National Science Foundation's representative in Christchurch each summer since 1958.

In that time Mr Goodale has been responsible for looking after the accommodation, equipment and travel needs of more than 2000 scientists who have passed through the city on their way to and from the Antarctic.

He has procured items ranging from needles and tractor parts to complicated scientific instruments.

This season has been Mr Goodale's last as the foundation's representative in Christchurch. He will work with the foundation in Washington until September. Then he will retire.

Because it was his final season Mr Goodale brought his wife, whom he married last year, to Christchurch to see New Zealand, which he describes as "one of the pleasantest countries I have ever visited."

"More than likely we will return in a few years as tourists to see many of the places we missed this summer," he said.

Cold Weather Work

Mr Goodale said his original interest in cold weather work began when he was 19. Because of his health at the time his father suggested he took a year off from studies and did some outdoor work.

"In 1921 I went to Labrador with Sir Wilfred Grenfell's medical mission as an assistant on the hospital staff, although what I had to do was mostly out of doors," he said. On his return to the United States a year later Mr Goodale studied geology and meteorology at Harvard for two years. He returned to the Arctic for three winters as a cold weather consultant to the Army Air Force during and after the Second World War. Later Mr Goodale joined the United States Weather Bureau and was responsible for the establishment, with the Danish Meteorological Service, of a joint weather station at Thule, Greenland. He later worked in search and rescue operations.

Mr Goodale's interest in the Antarctic was first aroused when he read Dr G. Murray Levick's book on Antarctic penguins. Dr Levick was in the northern party of Scott's last expedition.

Three Harvard students, Messrs N. D. Vaughan, F. E. Crockett and Mr Goodale, resigned from Harvard after deciding to go to the Antarctic with Rear-Admiral R. E. Byrd's first expedition in 1928-1930. More than a year before the expedition began the three men, labelled "The Three Musketeers," by Byrd, spent their time in the hills of New Hampshire learning to be dog handlers.

In the Antarctic "The Musketeers" helped to establish depots on the Ross Ice Barrier in preparation for the spring journey—a six-man geological sledge trip of 1500 miles. This was as led by Dr L. M. Gould and was from Little America I to the Queen Maud Range. It was at that time the longest

sledge journey ever undertaken for purely geological investigation. The men were in the field for three months.

The sledge party was camped near Mount Betty which Roald Amundsen had ascended on his return from the South Pole in 1912. Dr Gould discovered the cairn which Amundsen had built. In it was found matches, a can of kerosene and a note left behind 17 years earlier. The party mapped 175 miles of the front ranges of the Queen Maud Range.

Between November 4, 1929, and January 19, 1930, Mr Goodale's party acted as a support party for Admiral Byrd's South Pole flight.

There is a 7000ft mountain in Antarctica named after Mr Goodale. It is a high granitic peak in the Will Hays Mountains between the Robert Scott and Amundsen glaciers in the Queen Maud Range. It was discovered in December, 1929, by a geological expedition led by Dr Gould. It was

officially named Mount Goodale by Admiral Byrd.

Four More Visits

Since that first expedition Mr Goodale has been to the Antarctic four times. He was the I.G.Y. representative on board the Navy ice-breaker, Glacier, for six months in the summer of 1955-56. Next summer he went south for the installation of Byrd Station.

In November, 1963, he spent three weeks in the Antarctic, and on the occasion of the tenth anniversary of the installation of Scott Base, in January, 1967, he visited the continent for the fourth time.

Mr Goodale believes that three distinctive features have, more than anything else, opened up Antarctica to greater exploration. They are: Ski-equipped aircraft, the replacement of dog teams by motor toboggans, and the helicopter. There has been little change in buildings apart from the attempt to establish a greater degree of permanency.

Mr Goodale sees little future change to the basic over-all pattern of American Antarctic research. "I cannot see us spending more money on building bases. I think we will be more likely to make our existing stations more permanent."

Naval Academy Getting New Chief

ANNAPOLIS, Md., May 3 (AP)—Rear Adm. James F. Calvert, who commanded the first production model of the nuclear submarine has been selected as new superintendent of the United States Naval Academy.

He will replace Rear Adm. Draper L. Kauffman, who has served as superintendent since June, 1965. The academy made the announcement today.

Admiral Calvert, 47 years old, is a native of Cleveland. He will become the youngest flag-ranking officer ever named to the academy post.

He was commanding officer of the nuclear-powered U.S.S. Skate when she became the first ship in history to surface at the North Pole in February of 1959.

Admiral Calvert comes to the academy from a 15-month tour as commander of a cruiser-destroyer flotilla operating in the Mediterranean.

The new academy head holds a Doctor of Science degree from Oberlin College, which he attended for two years before his appointment to the naval academy in 1939. He is the author of three books.

After his tour aboard the Skate, Admiral Calvert served for two years as commander



Rear Adm. James F. Calvert

of a submarine division and then attended the National War College.

Following his graduation in 1962, he became head of the Europe and North Atlantic Treaty Organization branch of the Politico-Military Policy Division in the office of the Chief of Naval Operations.

No date has been set for the change of command and there has been no word on the future duties of Admiral Kauffman.

AERIAL PHOTOS USED TO MAP ANTARCTICA

WASHINGTON — A million square miles of aerial photographs were flown in western Antarctica in the past nine years, providing the basis for scores of new maps that reveal the rugged face of much of the polar continent for the first time, a geological survey by the Department of the Interior reports.

The survey has published 41 maps in the 1:250,000 scale series (1 inch equals nearly 4 miles) covering 170,000 square miles, and four shaded-relief sketch maps at 1:500,000 scale (1 inch equals nearly 8 miles) covering 185,000 square miles. In addition, 44 maps at various scales are in preparation, covering 382,000 square miles.

William R. MacDonald, chief of the United States Geological Survey's Polar Operations section in Washington, and a veteran of eight Antarctic seasons, described the history and progress of aerial photography in Antarctica at the joint annual meeting of the American Congress on Surveying and Mapping and the American Society of Photogrammetry.

Tourists Enjoying Their Antarctic Cruise

(By Captain E. A. McDONALD, U.S.N. (ret.), polar consultant for Lindblad Travel, New York) Christchurch, N.Z. Press Jan. 27

Fur seals, pack ice, Antarctic seals and penguins have been the highlights of the first tourist cruise to sail into the Ross Sea area of the Antarctic. During most of the daylight hours, and that is around the clock at this time of year, the red parka-clad tourists are out on deck.

Cameras click and pencils record their impressions of a weird, white, unspoiled part of the world that ordinary tourists never see. All count themselves lucky to be aboard the 215-foot ice-working ship Magga Dan.

The belt of pack ice which the little cruise ship pushed and shoved aside, smoking Mount Erebus, and the marble-like Ross ice-shelf were sights never to be forgotten for the 21 tourists, 11 women and 10 men, who make up the first Lindblad Travel party. Never before have tourists crossed the Antarctic Circle. For this occasion, they toasted the land of the Emperor penguins by sipping champagne on the bridge of the cruise ship.

What amazes me most about these tourists is their capability for getting along. Though the ship rolled and pitched in the rough sea on the way down, no one was really seasick. They all carry numerous rolls of film. They are quick and eager to learn why the Antarctic is like it is. They write many letters and postcards. They are an independent and eminently successful lot who can take care of themselves anywhere in the world. That they are middle-aged and decrepit, and unable to cope with difficulties, is just not true. One should see them clambering over the slippery rocks and negotiating their way through the rugged terrain of the Antarctic islands.

To keep the tourists healthy, busy and educated as to what the Antarctic offers to them, a management team

headed by the tour leader, Mr Lars-Eric Lindblad, of New York, Mrs Marie Darby, a New Zealander of the Canterbury Museum staff, of Christchurch, Dr R. L. Sexton, the cruise doctor from Washington, D.C., and the author, who now comes from Ridge-wood, New Jersey, is on hand to lecture, answer questions and maintain interest. The same management team will go south again with the second tourist group.

Mrs Darby, who has spent most of her waking hours on the bridge of the Magga Dan, has perhaps made the most complete count of bird, seal and whale life from a ship crossing into the Ross Sea that has ever been made. She has faithfully recorded everything that has appeared within eyesight. Her list is an amazingly long one that will indeed be a valuable contribution to Antarctic knowledge. She has had many helpers, too.

Somehow, on a cruise of this sort, everyone learns about nature. Down in the Antarctic it is, basic, besides being an important everyday topic. Antarctica always seems to bring one closer to nature. The author can attest to this at first hand. Once birds were only birds. Now each one has his own identity and characteristic. It's part of the Antarctic.

The reactions of the individual tourists are interesting. How does Mr Joseph A. Moore, jun., once head of the large Moore Shipbuilding Company of San Francisco, California regard this cruise? He says: "One surely can admire the courage and fortitude shown by early explorers like Sir James Clark Ross who sailed these same seas in his tiny sailing ships Erebus and Terror. They must have had a driving determination to get through in spite of the hazards of ice and uncharted obstructions of an unknown sea."

Mr Carl G. Grimm, a manufacturer of nurses' uniforms, views it differently. He says: "The reason I came down here, I tell people, is to see how the world appeared thousands of years ago. Here, in the Antarctic, there are no cities nor air pollution. It's a rewarding experience and makes a man wonder if it is not really better to adapt ourselves more to the country

than to try to adapt the country to ourselves."

Mrs Bessie L. Ferguson, of Harrisonburg, Virginia, during the night the Magga Dan negotiated the ice peak made the following statement: "I'd go to bed, then every time the ship struck a big ice floe, to crunch against it and throw it aside, I'd always get so excited I'd have to go up on deck to see what was happening. You could hear the ice breaking, and you could almost imagine the ship was a train that had jumped the track and was running along the roadbed. Sometimes the floes broke in two and sometimes they had us up until they finally swung aside to let us pass. Then sometimes there were penguins on the ice floes looking at us as if they were people who had never seen a ship before. I guess they thought we were some kind of monster or something. It sure was a lot of fun."

No doubt Mr and Mrs George E. Holton view this cruise a bit differently from the other tourists. They are on their honeymoon although the cabin arrangement and number of passengers aboard preclude their sharing a room together. The tiny doll-like bride is from Taiwan. She has never seen snow before.

"I came down here to learn about the Antarctic," says Mr Arthur J. DeBlois, chairman of the DeBlois Oil Company of Rhode Island. "This is my second Antarctic cruise and the more I learn about this portion of the world the more impressed I am about the wonder of nature." Mr DeBlois takes pride in showing his Antarctic movies to clubs and educational societies and activities back home.

March 2

Each tourist is assigned shipboard responsibilities either in bird or mammal watching (with identification), plankton collecting, or the logging of various observations such as sea and water temperatures, wind direction and velocity, cloud cover, and ice. Lectures by staff personnel daily instruct in procedures and techniques to be followed.

The crossing of the convergence wherein water and air temperatures take sudden drops was particularly significant. Equally impressive was the viewing of tiny zoo plank-

tonic life through high-powered microscopes on board. The latter, however, has had its ups and downs. Aboard the Magga Dan the collection of plankton samples is always maintained in the ship's salon next to the bar. Invariably somebody is always mistaking the glass of plankton for a cocktail.

Again as with the first group of tourists, women outnumbered the men, this time by a score of 13 to 11. The eighteen tourists include: Mr and Mrs Richard Bissel, editor and writer from Darien, Connecticut; Mr and Mrs Bjorn Bolstad, photographers from Wayne, New Jersey; Mrs Wilma Brown, chemist from Toorak, Melbourne, Australia; Miss Margaret Cairns, world traveller from New Farm, Brisbane, Australia; Miss Elsie Crosby, world traveller from San Antonio, Texas; Mrs Ruth E. Hanscomb, medical technician from Landover Hills, Maryland; Mrs Dorothy Braxton, journalist from Christchurch, New Zealand; Mr and Mrs Vern I. McCarthy, executives from Honolulu, Hawaii; Mr W. Morris Mitchell, executive from Cleves, Ohio; Mrs Masuko Morishige, actress from Setagaya-ku, Tokyo, Japan; Mr David M. Payne, lawyer from Pound Ridge, New York; Mr Cyril E. Peet, real estate agent from Perth, Western Australia; Miss Pennie Rau, jewellery designer and manufacturer from Hollywood, California; Mr A. A. Wiegner, investments consultant from Long Beach, California; and Mrs Marilyn Farwell, naturalist from Florida. There are five members of the staff.

The entry to Cape Hallett station was made in perfect weather on February 16. The sun glistened brightly on the flaring shoulders of ice-covered Mount Herschel out of a cloudless sky to give photographers the kind of subject matter that they have always dreamed about. In the afternoon tourists were invited ashore to view the station buildings and the straggler penguins remaining in the 500,000 penguin rookery which surrounds and invades the station.

The talk of the summer party of 17 Americans and one New Zealander who presently man Hallett station centred mostly upon their oncoming return to home via ship on February 28. "My wife is missing me."

First Antarctic Cruise Ship Freed After Going Aground

CHRISTCHURCH, N. Z., Tuesday, Jan. 23 (Reuters)—The first Antarctic cruise ship, the Magga Dan, was freed today from a shoal in McMurdo Sound, Antarctica.

The ship, which went aground Sunday night with 27 tourists aboard, was freed by the United States Coast Guard icebreaker Westwind, which had tried three times before to refloat the vessel.

The Magga Dan, which left Lyttleton, N. Z., Jan. 8, is owned by J. Lauritzen Lines of Copenhagen. She is chartered by Holm & Co. of Wellington, N. Z., and subchartered to the Lindblad Travel Agency of New York.

The passengers, who paid a minimum of \$5,880 for berths on the ship, spent yesterday ashore at scientific stations and then returned to the vessel with several scientists and the base commander.

The New York Times

AUCKLAND, N. Z., Jan. 23—

The Magga Dan is apparently undamaged, but her hull may still be examined by divers before she sails Thursday for Cape Hallett.

The tour organizers say passengers were never in danger. Rear Adm. J. M. Abbott said he would decide on policy toward further tourist visits after studying the facts.

Polar Tour Ship Stalled Again

CHRISTCHURCH, New Zealand, Jan. 24 (UPI)—The Antarctic cruise ship Magga Dan, freed yesterday after being grounded for three days, had engine trouble today and had to call again for help from the Coast Guard icebreaker West Wind.

British Trawlers Are Told To Avoid North Iceland Area

LONDON, Feb. 9 (Reuters)—British trawlers have been ordered to stay away from fishing grounds off north Iceland where 58 men have died in the last month when three British trawlers sank.

The order said that trawlers should not fish in the area until a British Navy ship arrives around Feb. 14 to look after the fishing vessels.

The order was issued by British trawler owners Thursday after a meeting here with Government ministers and union leaders.

The navy ship will carry meteorological equipment to give warning of approaching storms.

Changes Noted At McMurdo

(By CAPTAIN E. A. McDONALD, U.S.N. (ret.), polar consultant for Lindblad Travel, New York)

Christchurch, N.Z. Press

March 9

I first visited McMurdo Sound while commanding the ice-breaker Burton Island during the summer season of 1947-48.

Subsequently, I spent a major portion of nine other years in Antarctic operations, a portion as number two for Rear-Admirals George Dufek and David Tyree, one as ship consultant and as a member of the survey team for locating a suitable site for Palmer Station in the Antarctic Peninsula area for the National Science Foundation, and two as polar consultant for Antarctic tours for Lindblad Travel, Incorporated.

Changes have occurred, some for the better, some perhaps for the worse. Today, McMurdo station's multi-coloured buildings with tints ranging from a dark chocolate to a light cream, appear far more attractive than the dark one-colour buildings of yesterday. The large personnel building now under construction, with completion scheduled for next season's summer operations, will concentrate the functions of berthing, messing, ship's store, barber shop, snack bar, laundry, and gymnasium under one roof, thus making it possible for doing away with the smaller Jamesway huts. The large garbage dump, however, is just as unattractive as ever, depending upon the annual break-up of ice in front of the station, a chancey occurrence at best.

I believe that the old Deep Freeze operations held an advantage over the present, that of wearing various coloured over-clothes to cover the military parkas. Made of dark khaki material, military parkas are drab, uninspiring affairs. In the days when Rear-Admiral Dufek presided, we wore blue for the staff, yellow for the Sea-Bees, red for VX6, and green for ship people. Now, only U.S.A.R.P. scientists and Antarctic tourists provide a splash of colour by wearing international orange-red parkas.

There is no question that Deep Freeze operations are of a more routine, more disciplined character than they were formerly. This is perhaps a normal transition. The glamour and pioneering spirit always seem to lie with those who have led the way or have

been first on the scene. To an oldtimer, it seems in some ways too bad that such has come to pass, as if some of the adventure had disappeared from the scene.

Individual character and personality used to stand out like bright beacons on a dark, stormy night. The mayor of McMurdo, I remember, always greeted new arrivals with a very formal but cheery welcome. He wore a long black coat, the badge of office around his neck, and sported a high silk hat on his head. The good old days seem to be deadlier than a flattened mackerel at the bottom of an old brine barrel.

On Saturday, February 24, the Magga Dan passed close aboard the seldom visited Balleny Islands to provide tourists with a photographer's dream. The sun shone brightly on the icy slopes of 3800-foot high Russell Peak on southernmost Sturge Island. It shone also to advantage on the hundreds of strangely-shaped icebergs floating majestically near the islands.

On February 29, elephant seals and penguins became the order of the day when tourists visited Australia's MacQuarrie Island.

Is Antarctic tourism here to stay? The answer is an unequivocal yes. Six of these tours, one during the early months of 1966, two last year, and three this year have been organised by the present management.

Although the first expedition this year by the Chilean transport Navarino, in the Antarctic Peninsula area, was abandoned because of a damaged steering gear, the second under the leadership of Peter Scott, son of Captain



Cmdr. Peter Scott

Robert Falcon Scott, attained two "firsts"—entering the harbour of the recently active volcanic Deception Island (which erupted last December) and crossing the Antarctic Circle off Adelaide Island.

Although short helicopter flights can now be made from the decks of expedition ships, lengthy flights by planes for tourists must wait until commercial airfields and facilities are constructed on the Antarctic Continent. These may not be long in coming. The future for Antarctic tourism seems brighter than ever.

Carl M. Hansen, Arctic Explorer With Amundsen

Jan. 17

SEATTLE (AP)—Capt. Carl M. Hansen, 76, Arctic navigator known as "Northpole Hansen," died Monday after a brief illness.

Capt. Hansen was one of the two remaining members of the Roald Amundsen expedition which tried to drift across the North Pole in the early 1920s.

A native of Bodoe, Norway, Capt. Hansen went to sea at 15 and was a skipper at 17. After the North Pole expedition, he settled in Seattle.

In 1932-33, he was master of the Nanuk, used to film Peter Freuchen's book "Eskimo."

Capt. Hansen was master on several fur traders and made frequent voyages to the Arctic. The late King Haakon VII of Norway decorated him with a St. Olav Cross for his participation in the Amundsen expedition.

Lincoln Ellsworth was an American explorer associated with Roald Amundsen in his Arctic aviation ventures.

Dr. R.G. Frazier, Explorer, Dies

Salt Lake City, Jan. 15

Dr. Russell G. Frazier, 74, 4177-2300 East, head physician and surgeon on Adm. Richard E. Byrd's third Antarctic expedition and long-time Utah river explorer, died Sunday* at 4:45 p.m. in a Salt Lake hospital of cancer.

Dr. Frazier received a congressional medal in 1947 for his special study of diabetes as it is affected by the heat and extreme cold while at Little America in the Antarctic from 1939-41.

He headed two exploration expeditions for the Deseret News on the Middle Fork of the Salmon River in 1938 and the Yampa River in 1937. Dr. Frazier began explorations of the Colorado when river running was in its infancy. He also had extensive experience on the Green and Yellowstone rivers and explored the Everglades of Florida.

In 1938 he discovered an inscription on the walls of Glen Canyon showing white men had explored the region as early as 1534. Previous to that time it was believed that the first expedition to that area was in 1776. He found the actual Crossing of the Fathers on the Colorado River in 1939 with the late Julius F. Stone Third Expedition through the famous area, and put up a plaque at Separation Rapid in honor of the three men who left the Powell Expedition at that place.

Dr. Frazier's exploits earned him a membership in New York's famous and exclusive Explorers' Club and brought him a fellowship in the Royal Geographical Society of London.

He came to Utah in 1919 as a physician for the Utah Copper Mines at Bingham Canyon and held that position until retirement in 1951.

He received an honorary doctor of science degree from Morris Harvey College at Charleston, W.Va., and was a graduate of the University of Louisville School of Medicine.

He was a member of El Kalah Shrine and Canyon Lodge 13 F&AM.

Born July 5, 1893, in Fraziers



Dr. R. G. Frazier

Bottom, W.Va., he was a son of Robert and Lelia George Frazier. He married Irene Johnson on July 28, 1919, in Louisville, Ky.

Survivors include his widow, a son and two daughters, Russell, Loundonville, N.Y.; Mrs. Jean Knight, Reno, Nev., and Mary Frances Strathairn of San Anselmo, Calif.; eight grandchildren and a sister, Mrs. Emma Holloway, Fraziers Bottom, W.Va.

Mrs. Matt Henson, Widow Of Aide to Peary in Arctic

March 15

Mrs. Lucy Ross Henson, widow of Matthew (Matt) Henson, who accompanied Adm. Robert E. Peary to the North Pole, died Wednesday at the Medical Arts Center Hospital on West 57th Street. She lived at 246 West 150th Street, which had been the couple's home before Mr. Henson's death at the age of 88 in 1955.

The Hensons were married in 1907. It was in 1909 that Mr. Henson, who was a Negro, and four Eskimos reached the Pole with Peary, who is officially recorded as its discoverer. Afterwards, Admiral Peary wrote of Mr. Henson: "He has shared all the physical hardships of my work. He can

Thomas R. Henry Dies; Science Writer of Star

WASHINGTON March 4

Thomas R. Henry, who won recognition for his reporting in science, exploration, war and general assignments for The Star, died of leukemia last night at the Veterans Hospital here. He would have been 75 years old on St. Patrick's Day, March 17.

Although he formally retired from The Star 10 years ago, he continued to write his column "Vistas in Science" for the newspaper, which he joined in 1923 as a copyreader.

Born of Irish parents in Boston on St. Patrick's Day, 1893, Mr. Henry began his lifelong association with newspapers before his graduation from Clark University, Worcester, Mass. Before joining The Star he was with the old Washington Herald as a reporter and later with the Washington Daily News as city editor.

His interest in science was evident in his early years and he went on to produce a memorable body of newspaper articles and books in that field.

In 1939 he was in Scotland with his wife covering science meetings when World War II broke out. Turning his talents to war reporting, he again made important journalistic contributions from North Africa, Sicily and Corsica.

It was also in 1946 that he made the first of his trips to the Antarctic and formed a lasting friendship with Rear Admiral Richard E. Byrd. He said later that the most thrilling moment of his life was sailing into the Ross Sea on New Year's Eve on the S.S. Mount Olympus with Byrd's expedition.

"It was almost the sensation of landing on the moon or Mars. You can go north into the Arctic as long as you want to; it is a gradual transition. But go southward and when you get close to the Antarctic Circle, you jump into another world."

His best-selling book, "The White Continent," also came out

probably handle a sledge better and is a better dog driver than any other man living except some Eskimos."

Mrs. Henson belonged to the Harlem Club, the New York chapter of the Negro Business and Professional Women's Club, the National Council of Negro Women and was active in the work of the Utopia Children's Center, 236 West 129th Street.



THOMAS R. HENRY

of that trip. A Book-of-the-Month Club selection, it carried a foreword by Admiral Byrd.

He spent the winter of 1948-49 on a Navy icebreaker in the Arctic Ocean, watching experiments at the other end of the world. He also went along on expeditions to Greenland (twice), to Venezuela, Guatemala and the Choco jungle, and others throughout the United States.

He had married Lola J. Wilson in 1923. Their son, Thomas R. Jr., is an FBI agent in Atlanta, Ga.

Rev. Arthur J. Cunneen, 67, 'Radio Priest of North Pole'

The New York Times

SCRANTON, Pa., March 10 —The Rev. Arthur J. Cunneen, a Maryknoll missionary who was once known as "the radio priest of the North Pole," died yesterday at Mercy Hospital. He was 67 years old and lived at the Maryknoll Junior Seminary, Clarks Summit.

Father Cunneen received his nickname while serving in 1952-53 at the northernmost mission ever established by the Roman Catholic Church.

He was ministering to air base construction workers at Thule, Greenland, less than 900 miles from the pole. Despite an archaic Danish law that called for the beheading of any priest found on the island, Father Cunneen broadcast over the Thule radio station.

Later, the priest served in the tropic climes of Honolulu. He was ordained in 1932 and became a China missionary. During World War II, he served as a Navy chaplain in the Pacific.

Deep Freeze '69

Philatelists may send covers to be postmarked at the South Pole and Byrd Stations in Antarctica, and aboard "Deep Freeze" ships which operate post offices during the 1968-1969 Antarctic season.

Collectors are limited to one cover per person per station to be postmarked at Byrd and South pole Station, and one cover per person from each "Deep Freeze" ship operating a post office.

Byrd and South Pole Station postmarks can be obtained by placing two addressed covers bearing United States postage at the letter mail rate in an envelope and mail them to:

Deep Freeze Philatelic Mail, U. S. Naval Construction Battalion Center, Davisville, R. I. 02854.

International Reply Coupons may be used by collectors from foreign countries to defray postage on covers submitted.

One cover will be sent to Byrd Station and the other to the South Pole for postmarking. If a cancellation is desired from only one station, the word "Byrd" or "Pole" should be written in the lower left corner of the cover.

Philatelic mail to be postmarked at Byrd or South Pole Station must reach Davisville, R. I. not later than September 1, in order to be processed during the "Deep Freeze '69" Antarctic Winter. The postmarked covers should be received by the senders between October 1969 and March 1970.

Cancellations from participating ships can be obtained by sending covers to "Deep Freeze" Philatelic Mail, Name of ship from which postmark is desired, and The Fleet Post Office Address as shown below.

The following "Deep Freeze '69" ships are operating post offices; their address and cover cutoff dates are:

USCGC SOUTHWIND (WAGB-280), FPO New York 09501, October 4 deadline.

USCGC BURTON ISLAND (WAGB-283), Box 20820, Long Beach, Calif. 90801, October 12.

USCGC GLACIER (WAGB-4), Box 20900, Long Beach, Calif. 90801, October 15.

USCGC EDISTO (WAGB-284), Boston, Mass. 02109, November 5.

Covers postmarked aboard "Deep Freeze" ships will be returned to collectors during the operating season as expeditiously as postal backlogs permit.

Philatelic mail will be returned unprocessed when more than the authorized number of covers is submitted; if it appears that a commercial motive is involved; if covers are received after the cutoff dates established; or when covers are submitted to a "Deep Freeze" ship or unit which does not operate a post office.



NARWAHL

Canada on April 10 will release a 5-cent Wildlife stamp depicting the narwhal, a small whale found around Baffin Island and in the Repulse Bay area. Called a sea unicorn by early explorers, the male narwhal is noted for its tusk, which can grow to seven feet, although the mammal rarely exceeds 16 feet in length.

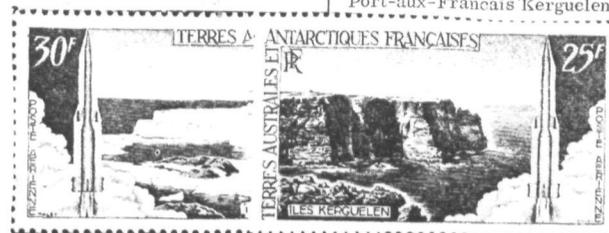
Designed by John A. Crosby, who created the polar bear Wildlife stamp of 1953, the horizontal adhesive will be in four colors and will show a partially submerged narwhal in the blue-green waters of arctic Canada.



Canada will issue a new stamp to honor the Voyage of the Nonsuch. The story behind this stamp is that of the originators of a scheme to tap a vast fur potential by explorations through northern waterways. They were first to go to Europe to put their plan before Prince Rupert. He enlisted the patronage of his cousin Charles II. Sailing from Gravesend, England on June 3, 1668 the tiny 43 ton 36 foot ketch Nonsuch "heaved to" on Sept. 29 in James Bay at the mouth of a waterway which the adventurers christened Rupert River. Their point of landing was to become Charles Fort and in turn Rupert's house. Here newcomers met the primitive Cree Indians who displayed a significant lack of hostility. Actually two vessels began the trip but the other one was forced to turn back. But the Nonsuch carried on and this year is remembered postally.

FRENCH ANTARCTIC TERRITORIES.

"Test Rocket Firing" set of two bicolor stamps, printed in strip with descriptive label between.



ANTARCTIC

For its research work in the Antarctic and commemorating its postal facilities in that area, Argentina on Feb. 17 will release three stamps, as follows: 6 pesos, radiopostal stations; 20p, Almirante Brown scientific station; 40p, transpolar round-trip flight, 1965. The stamps, all multicolored, were designed by Eduardo Miliavaca, and are being printed at Argentina's state mint.

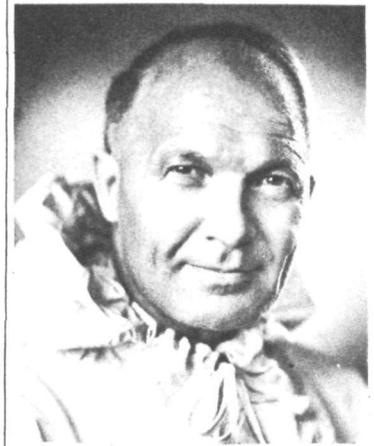


Bicolor stamp commemorates Naval Commander and Explorer Dumont d'Urville



Multicolored airmail pictorial shows Port-aux-Francais 'Kerguelen Islands'

The Explorers Club
46 East 70th Street
New York, N.Y. 10021



Finn Ronne

The Explorers Medal was awarded April 5, 1968, to Finn Ronne, for a lifetime of devotion to polar exploration and the discovery and mapping of vast areas of the Antarctic continent.

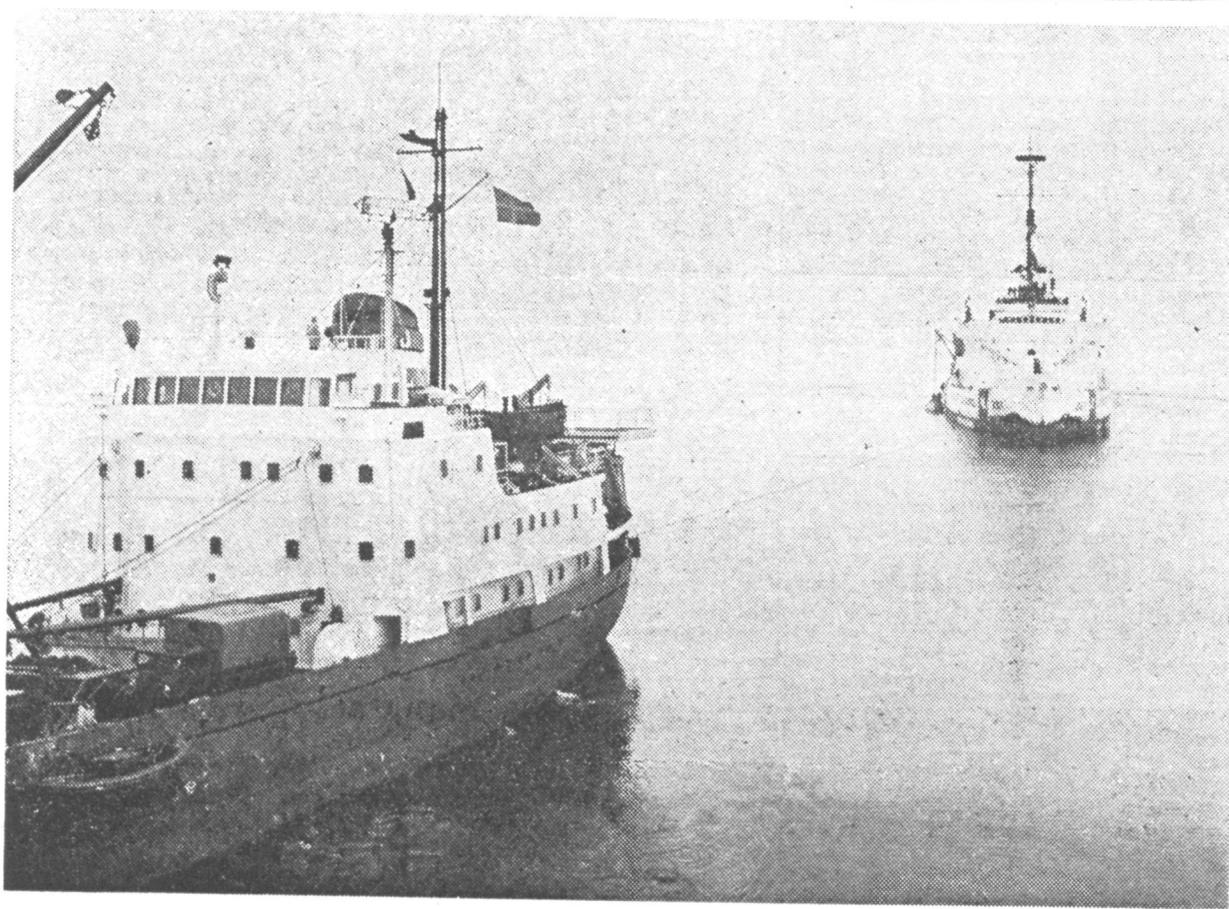
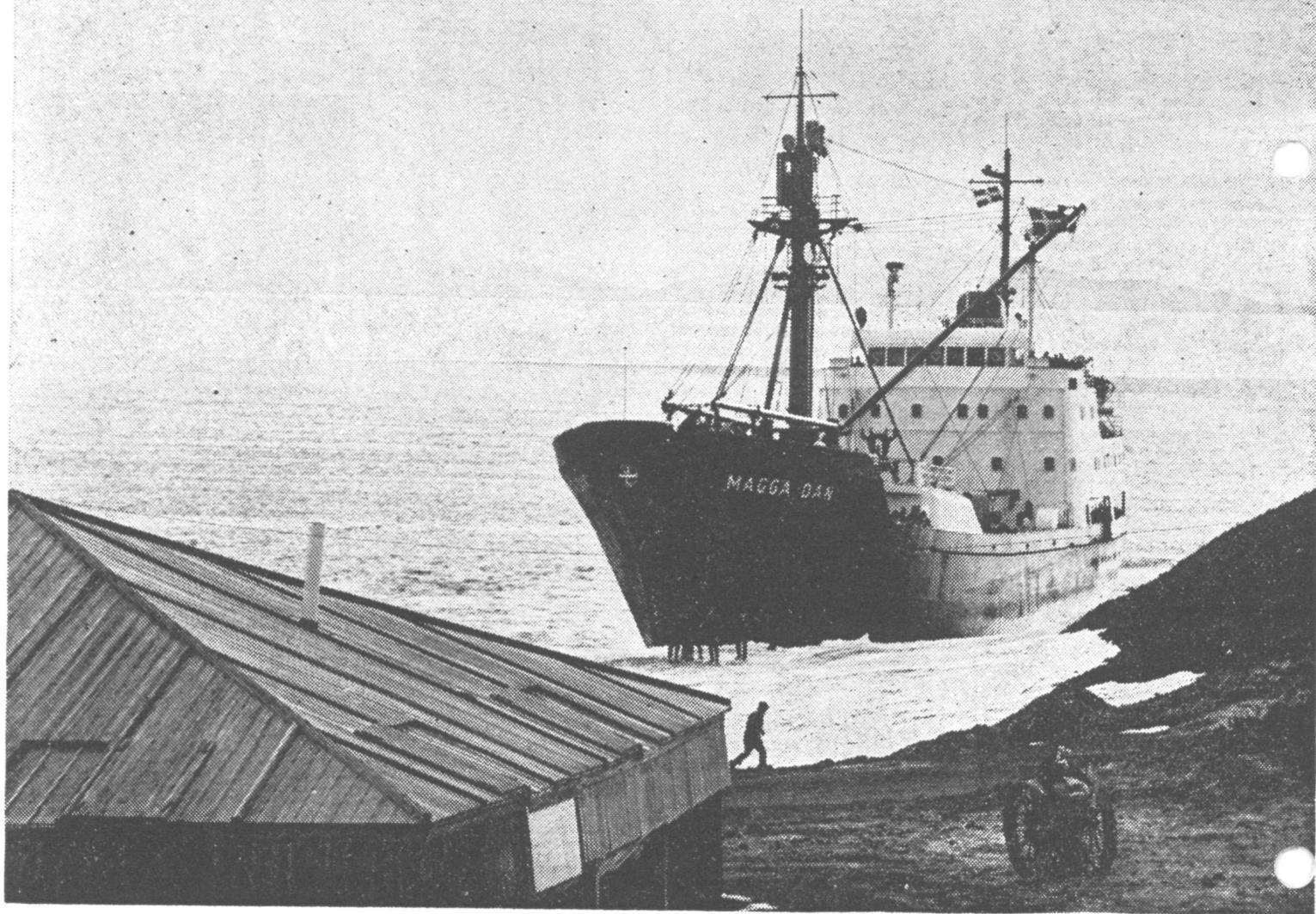


On May 29, Britain will issue four multicolored stamps for anniversaries of events being celebrated this year.

1 shilling 9 pence: bicentenary of Captain James Cook's first voyage of discovery into the Pacific Ocean. Another design by Mr. Abbott, a facsimile signature of the explorer forms the background for a representation of his ship, "Endeavor."



Canada's new five-cent stamp commemorates the 200th anniversary of the first weather readings started at Fort Prince of Wales, originally established as Fort Churchill in 1768. The fort was founded by William Wales, a leading astronomer and mathematician who later accompanied Capt. Cook on the latter's voyages. The left panel of the new stamp depicts a portion of a weather map, the right panel shows a composite of weather instruments.



Above: The Magga Dan stranded on an ice pinnacle at McMurdo Sound. The hut in the left foreground was built by Scott's 1901 expedition. Left: The United States Coastguard ice-breaker Westwind towing the vessel from the pinnacle

—United States Navy photograph.