

THE POLAR TIMES



On Top of the World
 north of Spitzbergen. They had trudged 3,600

Breaking ice sends members of four-man British trans-
 arctic expedition scrambling for safety of rocky island
 miles across North Pole from Point Barrow, Alaska.

UPI Cablephoto

National Oceanic and Atmospheric Administration

The Polar Times

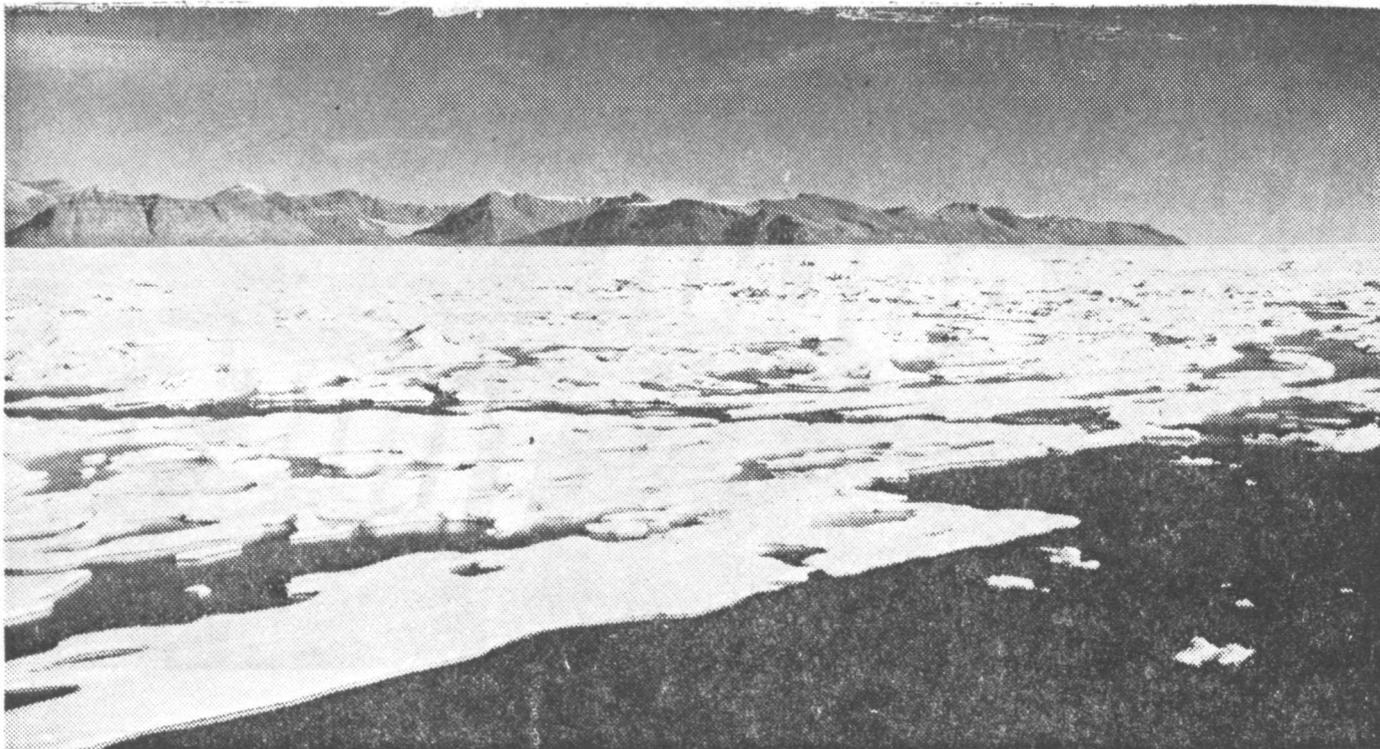
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August 6, 2010



The forbidding, ice-choked ocean off Ellesmere Island — can ships cut through it profitably?



BACK FROM PERILOUS JOURNEY—Members of the four-man British Arctic expedition and the base camp radio operator are shown on their arrival in Portsmouth, England, yesterday, after their 3,620-mile journey across the polar ice cap. Shown with two of the Husky dogs

that survived the trek are, left to right: radio operator Freddie Church; Alan Gill; expedition leader Wally Herbert; Dr. Roy Koerner and physician Dr. Kenneth Hedges. JUNE 24, 1969

The Polar Times

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No. 68

JUNE 1969

4 Britons at North Pole After 407-Day Sled Trek

The New York Times

LONDON, Sunday, April 6—A four-man British expedition reached the North Pole yesterday after a 14-month, 1,300-mile trek by dog sledge, The Sunday Times reported today.

The newspaper, one of the sponsors of the trans-Arctic crossing, said the team arrived at the Pole at 7 A.M., Greenwich mean time (2 A.M., New York time).

The expedition set off from Point Barrow, the northernmost point in Alaska, 407 days ago and traveled by dead reckoning, using only dog sledges to haul the food and equipment.

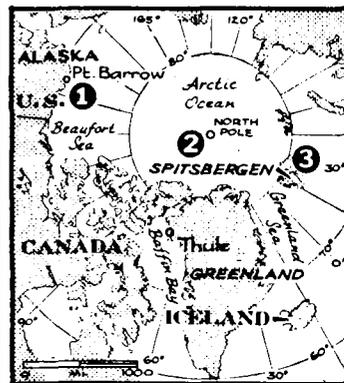
The men made two long stops, one for two months last summer and one for a five-month winter camp beginning in October when they lived in

total darkness. The expedition was supplied by occasional air drops of food, medical supplies and mail.

The expedition is the second in history to make a surface crossing to the North Pole and the first, according to The Sunday Times, "to do it the hard way, by trekking the 1,300 miles from the north coast of Alaska."

The arrival, made in temperatures of minus 50 degrees Fahrenheit, came almost 60 years to the day of the first successful journey on the surface to the North Pole by the American explorer, Adm. Robert E. Peary.

Admiral Peary, known as the discoverer of the North Pole, reached it on April 6, 1909, after several unsuccessful at-



The New York Times April 6, 1969
Expedition left from Point Barrow (1) for North Pole (2) and Spitsbergen (3).

tempts. He traveled over the ice from Ellesmere Island, northwest of Greenland.

The Sunday Times reported that the British expedition's leader, Wally Herbert, 34 years old, had radioed to Point Barrow that his companions were "in good spirits and good health." The other members of

the team are Allan Gill, 38; Maj. Kenneth Hedges, 34, and Dr. Roy Koerner, 36.

Mr. Herbert said in a message to Queen Elizabeth II, and organizations that have supported the trip, that he was "hopeful that by forced marches and a measure of good fortune the expedition will reach Spitsbergen by Midsummer's Day [June 24] of this year, thus concluding in the name of our country the first surface crossing of the Arctic Ocean."

Spitsbergen is an archipelago in the Arctic Ocean belonging to Norway.

The planting of the Union Jack and a "feast of soup and meat boiled down to make a stew" was the only celebration, according to The Sunday Times.

"We had a bit of a scramble to get it out of its bag," Mr. Herbert radioed, "but we all had a hand in planting the flag. It was too cold and too windy to hold any other celebrations."

The newspaper said the team members made camp on thick ice over a depth of 13,000 feet of water yesterday and were drifting beyond the Pole when they radioed the news of their arrival.

After the message was sent, The Sunday Times said: "They made their way back to the Pole through the daylight which will now be with them for 24 hours every day. They took photographs and then prepared to continue their journey to Spitsbergen, 700 miles away."

'I Have the Pole'

On Sept. 6, 1909, Admiral Peary informed the world that he had reached the North Pole in a message he sent to The New York Times when his ship reached Indian Harbor, Labrador, where he had communications facilities. The message read in part:

"I have the Pole, April sixth."
After eight unsuccessful polar expeditions over a period of 23 years, Admiral Peary left the United States in July, 1908, in an ice-breaking ship of his own design, the Roosevelt, and proceeded to Ellesmere Island, the northernmost island of the American continent.

He wintered at Grant Land, the north section of the island, and left Cape Columbia, the northernmost point of Canada, on March 1, 1909. He was accompanied by his Negro aide,

Fire Hampers British Expedition at North Pole

LONDON April 8 (UPI) — A fire has destroyed half of the sleeping equipment used by a four-man British team that spent the weekend camped at the North Pole, The London Times reported today.

The loss forced the men to spend last night huddled under a tent 7½ feet square and 6½ feet high within 12 miles of the Pole, The Times said in a copyrighted story.

One of the members, Alan Gill, 36 years old, also lost his sleeping bag in the fire and spent the night in his wolfskin parka, a jacket he wears while traveling.

The expedition is attempting the first surface crossing of the Arctic Ocean.

Temperatures at the Pole were hovering around minus 30 degrees Fahrenheit. The expedition faces the prospect of sleeping, cooking and eating under the one tent at least until April 16, when the Royal Air Force has scheduled its next supply by airdrop.

The Times report said the loss of the tent, Mr. Gill's sleeping bag and some of their personal items had shattered

Half of Sleeping Equipment Destroyed by Blaze That Stove May Have Started

the expedition's jubilation over reaching the Pole by foot last Saturday.

The fire was apparently started by a stove used to warm the tents and dry clothes it was reported.

Despite the setback, the expedition was moving forward and by today had completed two-thirds of its 3,500-mile trek across the Arctic.

Goal of Expedition

The primary objective of the expedition, sponsored by the Royal Geographic Society, was not to reach the Pole but to make the first surface crossing of the Arctic Ocean on foot in a trek from Point Barrow, Alaska, to Spitsbergen, 400 miles north of Norway.

Wally Herbert, 34, a professional explorer, is the team leader. The other members are Dr. Roy M. Koerner, 34, a British-born professor of gla-

ciology at Ohio State University at Columbus; Capt. Ken Hedges, a 32-year-old Royal Army physician, and Mr. Gill, an expert in geophysics, oceanography and photography.

The expedition set out from Point Barrow almost 14 months ago, on Feb. 21, 1968, with 40 dogs and four sleds.

During their journey, they planned to test theories that suitable food for men and dogs could be obtained anywhere on the Arctic Ocean and also to study ice pack, weather, geophysical and animal conditions.

Their journey was the second to the Pole within a year. An American team led by Peter Plaisted set out in March, 1968, to retrace the route taken by Commodore Robert E. Peary in 1909 when he became the first man to reach the Pole.

Commodore Peary's route began at Cape Columbia, Ellesmere Island, and it took him 36 days to reach the Pole. Mr. Plaisted needed 44 days to lead his six-man team to the Pole April 19, 1968.

Matt Henson; 17 Eskimos, five white men and 133 dogs.

Only Admiral Peary, Mr. Henson, four Eskimos and 40 dogs reached the Pole, the other members of the party having turned back after doing their share in trail-breaking.

The Peary party remained at the Pole for 30 hours, then returned to Cape Columbia in 16 days.

ARCTIC EXPLORERS IN RACE FOR TIME

4 Britons to Go 700 More Miles Across the Ice

The New York Times

POINT BARROW, Alaska, April 19—The four Britons who conquered the North Pole a week ago now face a desperate race against time to complete their historic journey on foot across the Arctic Ocean.

They must reach Spitsbergen 400 miles north of Norway by mid-June before melting and breaking ice makes traveling virtually impossible and leaves them stranded in the Arctic. They have 10 weeks to travel the last 700 miles—but it took them nearly 14 months to cover the 1,300 miles to the Pole.

The race ahead meant little time for the men to celebrate at the North Pole. They were the first men to reach there on foot since the American Robert, Perry, exactly 60 years before—and they were the first ever to complete the long hazardous trek from the North Alaskan coast. In their messages from the Pole, the men thanked Britons, Americans and Canadians for the vital support they have provided.

Within 24 hours of their arrival they were on their way south. Wally Herbert, the 34-year-old leader of the British Trans-Arctic Expedition explained their priorities: "We feel jubilant at attaining the North Pole, but our objective is to reach Spitsbergen and complete the longest ever journey across the polar ice. The pole happened to be the quickest way there."

Every natural inclination must have told the four men to relax. They were exhausted—by their physical exertion and by the nervous strain of a 408-day journey, which had been dogged by a series of near disasters from its earliest days. Their endurance and their sheer determination had forced the men to overcome breaking ice in the first month, and injury to Allan Gill, described as "emotionally the anchor man of the expedition," and unfa-

4 Britons Trudge Across the Arctic

The New York Times

LONDON, May 30—A four-man British expedition touched land yesterday for the first time in nearly 16 months, having achieved the first recorded trek across the frozen Arctic Ocean.

News of the successful 3,620-mile journey over the polar ice cap was received today by the London headquarters of the expedition.

The British team set off from Point Barrow, the northernmost point in Alaska, in February, 1968, and is estimated to be about three weeks from its ultimate destination—Spitsbergen, an archipelago about 400 miles north of Norway.

The terse message announcing the historic feat was relayed by the expedition leader, Wally Herbert, 34 years old, to a Royal Navy ice patrol vessel off the northwest tip of Spitsbergen. It read:

"1900 hours G.M.T., 29 May. A landing was made on a small rocky island at Lat. 80 degrees

avorable winter drift and rugged ice before the Pole.

Dr. Roy Koerner and Major Ken Hedges proved their tenacity as they marched off the Pole, aware that the same obstacles could be lying in wait for them on the final stretch.

They can imagine the possible problems: a sudden crack in the ice forcing them to move camp in a hurry; a field of rough ice taking several weary hours to cross, on open water, bringing them to a frustrating halt.

In the white bleakness, they can never see far ahead and the obstacles loom up suddenly and depressingly. Any advice of the ice conditions ahead is a great relief to the men so they have welcomed ice reconnaissance reports from United States aircraft on routine weather reconnaissance flights across the Pole and from the Royal Canadian Air Force, who have made a series of vital supply drops to the expedition and checked the ice conditions.

Now, a new and perplexing problem—the ice drift. No man has ever made the journey on foot from the Pole to Spitsbergen. The general line of the drift is known, but its speed and exact direction has never been determined. A study of the drift forms part of the scientific program the men are undertaking. The main danger is



The New York Times May 31, 1969

TRANSPOLAR TREK: Expedition began in Alaska (1) will end in Spitsbergen (2).

49 minutes N., Long. 20 degrees 23 minutes E. I would be most grateful if you would inform Her Majesty the Queen that the first surface crossing of the Arctic Ocean has been accomplished."

Other members of the team are Allan Gill, 38; Maj. Kenneth Hedges, 34, and Dr. Roy Koerner, 36.

Mr. Gill and Major Hedges were reported to have made the landing, scrambling across three-quarters of a mile of slushy and fissured ice.

The four men were camped tonight on an ice floe that

that the drift could carry them toward Greenland or the Atlantic, where warmer weather would quickly turn the ice beneath their feet into mere water.

Already the men have been surprised by the strength of the drift. Soon after they left the Pole they estimated they were traveling down Longitude 30 degrees east, but a fix a few hours later showed they were on Longitude 9 degrees east.

But despite all the problems, the party remained cheerful. "It's downhill from here," Wally Herbert said.

He said: "But it will be forced marches all the way. All we want to do now is reach Spitsbergen and feel solid land beneath our feet. We feel very tired, but the good progress we are now making keeps us in good spirits."

As the men struggle with their daily problems they must realize that all their efforts could prove futile if the ice melts early. The slush will slow their 35 huskies down and can sometimes be deep enough for a man to sink in up to his chest.

Already the expedition has switched its watches to Greenwich Mean Time and are traveling at night when the sun drops lower in the sky and the ice is slightly firmer.

was drifting toward H.M.S. Endurance, the ice patrol vessel that serves as the radio link with the expedition. The ship is reportedly ice bound.

Though the team is nearing the end of its journey, many by dead reckoning over uncharted territory, it still faces the formidable obstacle of the Arctic's summer thaw.

There is danger not only from slush, which can bury a man to his waist, but also of drifting ice floes and shifting currents as the men complete the journey to Spitsbergen.

The British team left Point Barrow 464 days ago and survived injuries and temperatures that plunged to 60 degrees below zero Fahrenheit to reach the North Pole.

They arrived there on April 5, almost 60 years to the day of the first successful journey on foot to the pole by the American explorer, Adm. Robert E. Peary. Admiral Peary arrived there on April 6, 1909.

Though the map distance from Point Barrow to Spitsbergen is about 1,800 miles, the men will have traveled more than twice that far primarily because unfavorable currents carried floes they were on in the wrong direction.

The expedition, which used sleds drawn by 35 huskies to haul food and equipment, made two long stops—one of two months last summer and a five-month winter camp beginning in October when the Arctic was in total darkness.

The Royal Canadian Air Force has made scheduled air drops of food, medical supplies and mail, and the United States Air Force has been supplying weather and ice reports on routine reconnaissance flights across the Arctic.

In addition to the natural hazards, the team has reported that polar bears have recently become a menace. Bears have approached to within 20 yards but have been frightened off with rifle shots. One was killed and fed to the huskies.

The Queen Replies

LONDON, May 30 (UPI)—Queen Elizabeth II, upon receipt of the message from the expedition, radioed the following reply:

"I am delighted to hear that the British Trans-Arctic Expedition has successfully completed the first surface crossing of the Arctic Ocean. My husband and I send you all our warmest congratulations."

The exchange of message with the Queen recalled a similar exchange in June, 1953, when she was informed that Mount Everest had been scaled by a British expedition.

SHIPS MAY TIE UP AT 2 ICE 'ISLANDS'

Scientists to Try to Thicken
Large Grounded Floes

HOUSTON, Feb. 21 (AP)—A special four-man crew plans to spend the next 40 days or so spraying water on two large pieces of ice in the Arctic Ocean.

The experiment is part of a high-priority project intended to determine whether a year-round tanker route is feasible for transporting oil from Alaska's Arctic Slope to East Coast refineries.

The plan calls for the spray to add 6 inches of new ice a day to each chunk. Spraying is to continue until the thickness of each is increased a minimum of 20 feet.

The experiment became possible Jan. 26 when it was discovered that two huge "ice islands" had grounded themselves in 90 feet of water 20 to 30 miles north of the Prudhoe Bay area, where two oil wells with great production potentials were completed last year.

It is conceivable that tankers will some day be using the ice lands as moorings.

"This is a God-given opportunity to find out what we want to know," said Stanley B. Haas, project manager of the Arctic marine operations of the Humble Oil and Refining Company.

Dr. Harold R. Peyton, a University of Alaska Arctic engineering expert who is a consultant to Humble on the ice islands study, said:

"Having ice islands in this area is a very unusual circumstance, exceedingly rare. It is so rare it perhaps happens only every 100 years. No one really knows."

About 75 islands of varying sizes appeared off the north slope in January and the two large ones involved in the study grounded themselves about 300 feet apart in just about the exact position that the tanker route would need moorings to anchor while taking on cargo by pipeline.

"What we need to know is how a grounded structure behaves in such an environment," Mr. Haas said. "We thought of building an observation platform and then heard of the ice islands. They seem to be suited for our purpose." Ice islands are formed when giant sheets of shelf ice break off the north side of Ellesmere Island and start a clockwise movement about the Arctic.

They have a thickness of 160 to 180 feet and, before breaking up, may be 10 to 25 miles long.

The ages of the two that are being sprayed off Prudhoe Bay are unknown but they have apparently been floating about the Arctic quite some time in that they are only 115 feet thick and their sides measure only 200 to 300 feet. About 25 feet of ice protrudes above the water line.

The plan calls for the "capture" of the islands by increasing their weight so sharply that they will remain grounded winter and summer despite wind changes and mean temperatures that vary from 40 below zero to 40 above.

"I don't know of anyone who has ever captured an ice island before," Dr. Peyton said.

The United States, the Soviet Union, and Canada, however, have been placing observation camps on some of the floating islands since the nineteen-forties.

Four cargo planes arrived in the Prudhoe Bay area last Monday and the equipment they carried was transferred to the islands by helicopter. The spraying began on Tuesday.

Once the spraying is completed, the four-man crew will become observers and record environmental data, a vital component of the study.

"We think we may have a mooring structure right there if we can preserve the islands," Mr. Haas said. "We are going to let nature help us and if we can keep them through the winter it would be foolhardy not to do so in the summer as well."

Summer temperatures, even in the Arctic, pose special problems.

"We may want to try to insulate the islands to protect them from the sun," Mr. Haas said. "And if we don't do something to protect them from wave action they could be eaten away below the water line."

Possible solutions include an insulation cover of dirt or gravel, a refrigeration plant to aid nature, and the lowering of huge sheets of plastic to protect the sides.

Submarine at North Pole

WASHINGTON, April 25 (AP)—The nuclear submarine *Whale* surfaced April 6 at the North Pole, 60 years to the day and hour from Adm. Robert E. Peary's visit there in 1909, the Pentagon reported today. The surfacing was part of more than a month of operations by the *Whale* in the Arctic Ocean. The crew and skipper, Comdr. W. M. Wolff Jr. of Grand Haven, Mich., planted the United States flag on the ice.

Arctic Explorers Face Shortage of Ammunition

LONDON, June 5 (Reuters)—The four members of a British expedition that achieved the first surface crossing of the Arctic are being menaced by polar bears and the team's supply of ammunition is running low, a spokesman at their London headquarters said today.

"They have had to shoot five bears in the last five days and are now concerned about the shortage of ammunition, with only 60 rounds remaining," the spokesman said.

The team, which struggled for 16 months on a 3,600-mile trek across the polar ice, reported today that it was camped on a drifting ice floe about 27 miles from an island in the Spitsbergen group.

The team's supply ship is standing by in case the expedition cannot reach land. In an emergency, ammunition could be flown to the team from the ship, the spokesman said.

4 ARCTIC EXPLORERS END 467-DAY TREK

Dispatch of The Times, London

LONDON, June 11—Wally Herbert and his three colleagues came in from the cold tonight after their 476th night camped on the Arctic ice.

The four members of the British trans-Arctic expedition were lifted by helicopters in a daylong operation on board H.M.S. *Endurance* drifting just north of Spitsbergen.

Mr. Herbert and his team members, Alan Gill, Dr. Roy Koerner and Dr. Kenneth Hedges, set out from Long Barrow, the northernmost point in Alaska, in February, 1968, and traveled 3,700 miles over the frozen polar ice. They completed the first surface crossing of the Arctic Ocean last month.

The goal of the team—to reach Spitsbergen, an archipelago about 400 miles north of Norway—was not reached because the summer thaw made further travel on the ice unsafe.

The men were 46 miles from the ship and experiencing problems with their radio.

Bishop Visits Greenland

COPENHAGEN, Denmark (Religious News Service)—Bishop Hans Martensen, S.J., of Copenhagen, visiting the Roman Catholics of Greenland, became the first bishop to do so in nearly 600 years.

SCIENTISTS PLAN ALASKAN OIL LINE

Pipes Have to Cross Arctic
Wastelands to Sea Outlet

COLLEGE, Alaska (Reuters)—Scientists at the University of Alaska are studying methods of laying a pipeline across the frozen Arctic wastelands from new oil fields to a sea outlet.

They regard the project, scheduled to start next year, as one of the most difficult engineering feats of the century.

Pipe Line Technologists, Inc., a worldwide company based in Houston, asked engineers from the university's Arctic Environmental Engineering Laboratory to evaluate the various problems.

Oil industry spokesmen can see no other way of getting the oil from the north slope wells to a port on the Gulf of Alaska. The pipeline will have to snake across 800 miles of some of the most difficult terrain on earth.

Going south from Prudhoe Bay, the pipeline must cross nearly 200 miles of marshy tundra before reaching the imposing Brooks Range, a chain of mountains 8,000 feet high in places.

Once through the range, the line will cross 300 miles of permafrost (frozen layer of ground), forests and swollen glacial rivers. Temperatures in this central Alaska area vary from 80 degrees below zero to 90 degrees above.

Before reaching the Gulf of Alaska, the line will have to surmount the gale-swept Alaska Range, a 300-mile-long ice front crenelated with towering mountains, including the continent's highest peak, 20,320-foot Mount McKinley.

Finally, the pipeline must cross a valley of wild mountain rivers and get across the Chugach Mountains, a belt of 8,000-foot-high peaks.

"I get exhausted just thinking about it," said Dr. Lawrence Bennett, head of the Arctic Environmental Engineering Laboratory survey.

Besides reporting on the various soils for the Houston pipeline company, the engineers are monitoring temperatures in the frozen ground.

Heat from the flowing oil—20 degrees Fahrenheit—probably will be sufficient for the pipeline to embed itself in the permafrost. But during extreme winter temperatures, there may be a need to provide a certain amount of heat to keep the oil flowing.

Dr. Bennett said that so far only the Soviet Union had built long pipelines under conditions such as those in Alaska.

Jetliner to Begin Farthest North Run

The New York Times

March 12

A week from today a Boeing 737 jetliner is scheduled to touch down on a gravel-surfaced runway at Resolute Bay, in Canada's Northwest Territories, to bring jet service to that weather station and oil exploration base.

Only 100 miles east of the North Magnetic Pole, Resolute Bay, with a winter population of about 250 persons (a number that doubles with the influx of geologists in the summer), will then become the smallest and farthest north community receiving regular jet service.

The 737 jet that will be used to inaugurate the weekly service to Resolute Bay left the manufacturer's plant in Seattle last week. To protect the plane from the gravel of Resolute Bay's one 6,000-foot runway, it was equipped with a set of special protective devices, including a device to destroy vacuum-producing currents in front of the engines. It will also have toughened under-surfaces.

Airport runways in a number of Far North places are frequently surfaced with gravel or left unimproved because of extensive heaving of the ground during thawing and freezing, according to a Boeing spokesman.

Gravel and other small stones can damage vital parts of the plane during take-off and landing. Ingested by a jet engine, a small rock can do enough damage to the engine to require a major overhaul.

The 737 that will inaugurate the new service is owned by Nordair, Ltd., a Canadian domestic airline that now flies ageing piston-engined Super Constellation planes to Resolute Bay. The

piston planes did not require the special protection, the main reason being that their engines do not suck in huge quantities of air in a vacuum-cleaner effect as do a jet's.

Nordair's 737 is only the second of that model jet to be equipped with the protective equipment. Another recently went into service with Wien Consolidated, an Alaskan carrier. Eleven of the jets are scheduled to be modified for operation on gravel strips in Canada and Alaska, as airlines have begun to open up more areas to modern-day jet service.

A less ambitious gravel-protection program, involving less extensive protective steps and fewer planes, had previously been carried out on trijet Boeing 727 intermediate-range jetliner. Four 727's have been modified in

the last two years.

The major protective item on the 737 is a short "vortex dissipator" boom that extends forward from the bottom lip of each of the two engines, which are slung under the wings. Pressurized air is forced through orifices in the boom toward the ground. The air blast is designed to break up formations of circular air currents that could form a vacuum and suck bits of gravel into the engine intake.

The larger 727 jet did not require such "vortex dissipators" because its engines are higher off the ground, on the rear of the fuselage.

Other protective steps on the 737 are a "ski" deflector behind the nose wheel, flap-like deflectors between the wheels of the main landing gear, shields over hydraulic

tubing on the landing gear, glass-fiber reinforcement of flap surfaces, Teflon-base paint on the underside of fuselage wings, a higher-strength Distance Measuring Equipment antenna; and a retractable, instead of fixed, anticollision beacon.

Three Who Failed to Ski To North Pole Rescued

LONDON, Monday, April 14 (AP)—Three British explorers, including a woman, have been rescued in the Arctic after failing in an attempt to ski 470 miles to the North Pole, their sponsors reported today.

The Daily Telegraph, which financed the expedition, said the three, Dr. Hugh Simpson of Scotland, his 37-year-old wife Myrtle and Roger Tufft, a teacher, were picked up yesterday by a rescue plane at Ward Hunt Island in north-west Canada.

The team spent 51 days on the polar ice cap, dragging a sledge loaded with 600 pounds of equipment through temperatures as low as 58 degrees below zero. Their radio generator broke down after they had trekked for 90 miles and they skied back to their starting point.

Dr. Simpson said the three debated whether to trek on without the radio, "but we knew this might lead to a massive search and the use of too much taxpayers' money."



DR. WILLIAM O. FIELD

THE EXPLORERS MEDAL

Dr. William O. Field has two qualifications which eminently qualify him to receive the Explorers Medal, the highest honor the Explorers Club can bestow. First, as a glaciologist, he is a man so distinguished in his field that he has, possibly, no superiors and few equals. Second, Dr. Field is a modest, cultured and educated man; in short, a great gentleman. He is the glaciologist of the American Geographical Society and formerly served as chairman of the Panel of Glaciology, IGY, and is on the Committee of Polar Research of the National Academy of Sciences.

The Polar Times

Published June and December by the

AMERICAN POLAR SOCIETY, 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.

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POLAR EXPLORERS BACK IN ENGLAND

Trip Was 'Like Conquering
a Horizontal Everest'

PORTSMOUTH, England, June 23 (AP)—The first four men ever to walk across the polar ice cap returned to solid land today and said that polar bears were the biggest danger they had encountered.

Suntanned as if they had, spent 16 months on a beach, the four British explorers docked here aboard the Royal Navy ice patrol ship *Endurance*, accompanied by two yapping Huskies named Eskimo Nell and Apple Dog.

The team, led by a bearded surveyor, Wally Herbert, 34 years old, set out from Alaska in February, 1968, trekked 3,620 miles over the frozen wastes, landed on small Blackboard Island May 30 this year and then got picked up by a helicopter after 477 days on the treacherous ice floes.

"It seemed like conquering a horizontal Everest," Mr. Herbert said of the expedition.

"The first thing I want is some good food," said Dr. Kenneth Hedges, 33, a physician. The team lived on frozen meat bars and "none of us were particularly good cooks," he said.

Polar bears, Mr. Herbert told newsmen, were as big a menace as cracking ice. The bears were fearless because they had not seen human beings before.

"We had to shoot quite a number of them," Mr. Herbert said.

"When we fired warning shots at them they just sniffed the snow where the bullets hit," said one of the four.

Dr. Roy Koerner, 36, a glaciologist, said that he had tossed one of Mr. Herbert's rubber snow boots at an inquisitive polar bear, "and he tore it to shreds and ate it."

The team battled across the ice in temperatures as low as 45 below zero. Mr. Herbert said that they had built igloos for shelter, and the temperature inside had been "quite comfortable — 28 below zero."

The two dogs the explorers brought back will be used for breeding in England.

The men were greeted aboard the ship by their families, senior naval officers, Sir Vivian Fuchs, a veteran explorer; Sir Alec Rose, a round-the-world yachtsman, and their radio operator, Freddie Church, who had kept in touch with the Arc-

Adventure lures explorers

By Florence Mouckley
The Christian Science Monitor

London

"Man's great adventures on earth are still not finished."

The person making this statement should know.

He is Col. Andrew Croft, Arctic adviser to the four-man British trans-Arctic expedition team which has just successfully completed the first surface crossing of the Arctic Ocean.

Veteran of many Arctic expeditions himself and British War Office adviser on cold weather warfare from 1945-52, Colonel Croft says he is "not a great believer in this last-great-journey-to-be-made-ever-on-earth business."

"There are all sorts of unknown, unclimbed areas in the Himalayas; tremendous amount of work to be done in the Antarctic; terrific excitement in undersea exploration. . . ."

Trans-Arctic team leader, radio operator, and navigator Wally Herbert; geophysicist Allan Gill; physician and physiologist Ken Hedges; and glaciologist Roy Koerner faced incredible challenges, says Colonel Croft, who kept in constant touch with them by radio during their trek.

The four explorers who made the epic 3,800-mile trip across the frozen Arctic Ocean returned to Britain Monday, where a civic reception awaited them in Portsmouth.

Starting from Point Barrow, Alaska, Feb. 21, 1968, the group sledged its way across the frozen ocean to the North Pole. Finally on May 31, after 464 days, two of the team, Mr. Gill and Major Hedges, leaped onto small Blackboard Island north of Spitsbergen.

After making the landfall official, they jumped back onto the ice and rejoined Mr. Herbert and Dr. Koerner.

Although their final destination was Spitsbergen, the trekkers were prevented from completing the journey by broken and fissured ice. On June 11 they were picked up off an ice floe by a helicopter and transferred to HMS *Endurance* which was standing by just north of Spitsbergen in case of such an emergency.

Arctic adventure does not seem to have become any easier despite modern technology.

One of the greatest perils the team members faced came from ice floes breaking up under them.

This happened to them several times, said Colonel Croft, and in one incident a tent caught fire and was destroyed when the ice

floor collapsed and a cooking stove was overturned.

The cold was a constant harassment, the temperature sometimes plummeting to -50 degrees F.

Speaking of these iron-cold days, Mr. Herbert wrote in the *Sunday Times*:

"The cold left our hands too numb for work. We beat them against the sledges but felt nothing. We tried to take off our gloves to warm them but that task, usually so elementary, was now long and complicated. The gloves were molded to the shape of our hands, frozen solid like concrete boxing gloves."

Traveling by night was necessary during some of the summer months because, says Colonel Croft, "there is too much melt on the surface, floes are breaking up, and there is a lot of open water. . . ."

In the dark season, he says, they dog-sledged by day, as long as they were able to see. The moonlight, he explains, reflecting off the immense white wasteland, can be surprisingly bright.

The key to this type of expedition, says Colonel Croft, is aerial supply. The operation could not have been undertaken 40 years ago because of "the unpredictability of ice conditions from area to area and because of the enormous length of the trek."

Small emergency supply drops were undertaken by an American research station at Point Barrow while the team was still close enough. But regular major air drops—except for 4½ months during the depth of the winter—were made by the Royal Canadian Air Force.

If continued the pinpointed drops even when the team was just north of Spitsbergen, which, according to Colonel Croft, is "an enormous trek from bases in Canada."

Although the main purpose of the expedition was adventure, scientific work was also undertaken.

The team collected meteorological data, studied ice formations, ocean currents, survival techniques, and animal life.

Colonel Croft does not yet know how much geological or magnetic work was undertaken but "it was all in the program."

Before Mr. Herbert set off on his Arctic adventure he wrote in the official expedition prospectus:

"It may be argued that a journey across the Arctic Ocean is no longer necessary and the risks no longer justified but I believe that one attribute of a higher civilization is the spirit of adventure—the urge in man to respond to a challenge. To scorn or discourage this attribute is to ignore the innate sense of curiosity which, in the nature of man and in the whole history of human endeavor, has been his motivating energy."

tic team from T3, the American ice island near the North Pole.

The fourth member of the team, Allan Gill, 38, said that the first few months had been

the most frightening, until the men got used to the fearsome noises of shifting ice.

A few hours before they were picked up by helicopter,

Mr. Herbert added, the ice floe they were on cracked and broke only 12 feet away—which could have meant disaster earlier in the trek.

Says Arctic Ocean Will Soon Be an Open Sea

Catastrophic Shifts in Climate Feared if Change Occurs

By **WALTER SULLIVAN**
The New York Times

Col. Bernt Balchen, polar explorer and flier, is circulating a paper among polar specialists proposing that the Arctic pack ice is thinning and that the ocean at the North Pole may become an open sea within a decade or two.

Although he bases his thesis on predictions in recent years by several experts in polar weather and ice behavior, interviews with a number of other specialists have shown a widespread belief that the progressive shrinkage of the Arctic pack ice over the last century has reversed itself, at least temporarily.

Disappearance of the Arctic pack would enable the largest tankers to reach the newly discovered oil fields of northern Alaska. However, of major concern is the possibility of catastrophic climate changes.

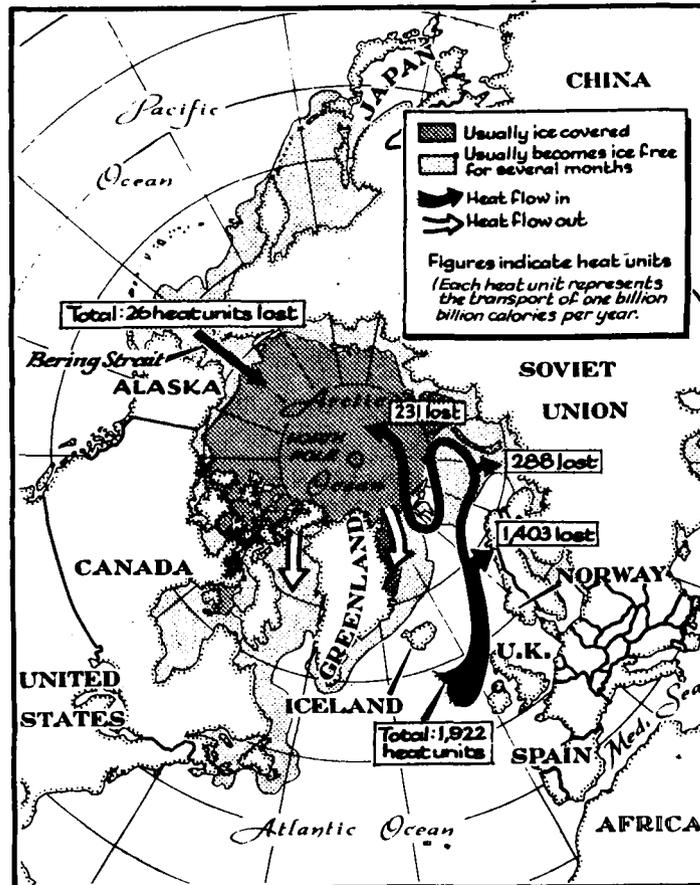
A number of specialists believe that an ice-free Arctic Ocean would not freeze again. If so, it has been predicted that storm paths would change and the food-producing areas of the Central United States and Eurasia might become deserts. Likewise, it is thought that great ice sheets would form farther north.

Soviet scientists reportedly agree with their American colleagues that the warming trend in the Arctic has shifted to a slow cooling. The Russians, because of their dependence on sea routes to ports along their long Arctic coastline keep the closest watch of anyone on weather trends and the drifting pack ice of the Arctic Ocean.

A number of Soviet and American specialists nevertheless believe with Colonel Balchen that the ice cover of that ocean is "vulnerable." A moderate increase in solar heat production or a change in transparency of the atmosphere (man-made or natural) could remove the ice.

Because removal of the pack would probably have cataclysmic effects, investigation of factors controlling this "thermal lever" on the world's climate is being pressed. However, according to sources within the National Science Foundation, the budget for some aspects of this research has been severely cut.

One focal point is the use



The New York Times

Feb. 20, 1969

Substantial heat is carried into the Arctic Ocean, as shown above, from the Atlantic Gulf Stream and to lesser extent from the Pacific. But the Arctic ice pack prevents warming of the ocean surface. Some scientists believe that if the pack disappeared, the Arctic Ocean would become too warm to freeze over again. The map was adapted from studies published by the Rand Corporation.

of giant computers to simulate the world's weather patterns to see what would happen when the Arctic Ocean is free of ice. Would it, in fact, remain so? A preliminary attempt to explore this possibility has been carried out at the University of California, Los Angeles, with results that were reportedly ambiguous. Now, a more ambitious effort is in preparation.

The Arctic pack is a thin crust of ice over a deep ocean. Thus, it differs basically from the Antarctic ice sheet, which rests on a lofty continent. Whereas melting of the Antarctic ice—or slippage of part of it into the seas—would raise sea levels throughout the world by many feet, the melting of the floating ice of the Arctic would have no such effect.

This is because floating ice displaces just as much water as the water produced when the ice melts. When ice cubes in a glass melt, for example, the water level does not rise.

About one quarter of the Arctic pack melts each sum-

mer, although the percentage varies widely. Unlike other oceans, the Arctic Ocean is almost landlocked, but warm Gulf Stream water flows into it from the Atlantic and a lesser amount of heat is also carried in from the Pacific through the Bering Strait.

Hence the Arctic Ocean, at depths below 500 feet, is underlain by a layer of warm water 2,500 feet thick. Its surface would also be warmer, were it not for its covering of ice, which on the average is a few yards thick. The North Pole region receives more solar heat in summer months than do the tropics, since the sun shines on it day and night.

The brilliant white surface of the pack reflects almost all of this energy back into space, but if the pack were gone, the water would absorb much of it. Thus, such specialists as Dr. Mikhail I. Budyko, director of the Main Geophysical Observatory in Leningrad, and Dr. Henri Bader of the University of Miami, believe that the

Other Specialists See No Thinning of Polar Ice Cap

ocean would not freeze again, even in winter, once the pack had disappeared.

In fact Dr. Budyko argues that an ice-free Arctic Ocean is the "normal" situation. He thinks that, throughout the tertiary period—the 70 million years preceding the successive ice ages of the last million years—the ocean was ice-free. He notes that during the tertiary temperate zone vegetation grew on the Arctic islands and along the Arctic coasts, while tropical vegetation moved northward.

There is a strong suspicion on both sides of the Atlantic that the ice ages—which may continue to recur—represent some kind of cyclic behavior related to the presence or absence of ice on the Arctic Ocean.

At present, the ice cover inhibits evaporation from that ocean. It persists as a region of barometric high pressure and the movement of storm paths across the northern continents is therefore deflected to the south.

If the ocean were free of ice, storm paths, it is thought, would move farther north, depriving the plains of North America and of central Eurasia of rainfall. Winds blowing off the Arctic Ocean would become moist, and snowfall on mountains in the path of those winds would be almost continuous.

This would strat the formation of ice sheets such as those that several times have flowed south across North America and Eurasia.

The warning sounded by Colonel Balchen has stirred up enough excitement in Washington for the Navy to ask Dr. Norbert Untersteiner of the University of Washington to prepare an assessment of trends in the pack. His report will appear shortly in Naval Research Reviews.

Dr. Untersteiner, who has spent a good part of his professional career living on or studying the Arctic pack, summarized his report in a telephone interview. In essence, he believes not only that the climatic trend in the Arctic has turned toward cooling, but that the evidence for swift and dramatic thinning of the pack is unreliable.

Those who argue for such radical thinning cite a report

by Fridtjof Nansen from 1893 that the pack was 43 feet thick. Col. Balchen cites a succession of subsequent reports indicating a steady thinning of the pack that, the data suggest, could vanish by 1970 or sooner.

Col. Balchen, who has retired from the Air Force and is now with General Dynamics, flew Adm. Richard E. Byrd across the Atlantic and to the South Pole in the nineteen-twenties. He has been concerned with polar flight operations ever since.

The weakness in drawing conclusions from old ice-thickness reports, according to Dr. Untersteiner, is that the pack varies widely in thickness in terms of season and location. Newly frozen leads, or channels, between the floes may be only a few inches thick.

Yet in the central Arctic, particularly where the circular drift of the ice has subjected it to great compression, the floes become rugged conglomerations many yards in thickness.

Walter I. Wittmann of the Naval Oceanographic Office, who has made five of the seven under-ice journeys of American nuclear submarines, reports no evidence of impending disintegration of the pack.

The journeys, totalling 40,000 nautical miles, were made in winter and summer. The submarines carry devices that accurately record the vessel's depth, in terms of open water, as well as the distance to the bottom of the ice overhead. From these two figures it is possible to calculate ice thickness along the entire route.

Dr. Waldo Lyon of the Navy Electronics Laboratory in San Diego, another leading specialist on Arctic ice, agrees with Mr. Wittman's assessment. He said this week that the pack thickness seems to respond less to climate warming than does the areal extent of the pack.

During the century of climate warming before 1940 or 1950, he said, there was a decrease in areal extent of the pack. However, climate cooling during the last decade or two seems to have reversed this trend, he added. The Navy keeps track of pack ice distribution through monthly Project Birdseye flights over a large part of the Arctic Ocean.

Both Soviet and American specialists predict continued cooling in step with an expected decline in sunspot activity through the nineteen-eighties. Col. Joseph O. Fletcher, a retired Air Force polar specialist now with the Rand Corporation in California, has cited the presence or absence of pack ice around Iceland as an index of such trends.

Arctic Ocean Study Eases Fear That a New Ice Age Is in Offing

By WALTER SULLIVAN

The New York Times

COLLEGE, Alaska, April 11 —The first examination of deep sediments from the floor of the Arctic Ocean indicates that for perhaps as long as several million years there has never been an extended period when that ocean was free of ice.

If confirmed, this would wipe out some of the most widely held theories to explain the successive ice ages of the last million years. It would also lay to rest the hopes of oilmen, and the fears of some climatologists, that the Arctic Ocean is about to shed its ice. This could result in a new ice age.

Several hundred "cores," or cross-sections of the ocean floor, have been obtained by driving a pipe-like device into the sediments and hauling samples to the surface. This has been done from the drifting ice island, T-3, which since 1953 has served as a wandering campsite and observation platform.

The study of these cores, several of which were more than 16 feet long, was described by Dr. David L. Clark of the University of Wisconsin at a two-day symposium on Arctic research, which ended at the University of Alaska here today. The symposium preceded the dedication tomorrow of the newly enlarged and rebuilt

Naval Arctic Research Laboratory on the Arctic Ocean at Point Barrow.

Dr. Clark's report created somewhat of a sensation at the meeting, although others cited evidence along similar lines.

The ice age theories that have been brought into question view the thin crust of ice over the Arctic Ocean as an unstable element in world climate. Every summer a large part of the ice around the fringes of the ocean melts, but normally the floes in the central North Pole area remain intact, although they are thinned by the summer sun.

Once in a long while, according to these theories, something causes all the ice to melt. It is contended that such complete melting would radically alter the northern climate.

Today the gleaming white surface of the ice pack reflects most solar energy back into the sky, but the dark water of an open ocean would absorb it. The ocean would then become warm enough so that the solid pack might not form again for many years.

Such a situation, many agree, would initiate an ice age. The very dry winds blowing down over North America and Eurasia from the Arctic Ocean would become moist. Consequently, snowfall in the north would increase to such an extent that the winter snow would not melt away in summer and ice sheets would accumulate.

In recent months it has been argued by some polar special-

tion, thus trapping the earth's heat like the roof of a greenhouse.

There is evidence that the carbon dioxide content of the world's air has risen from 10 to 15 per cent during the last century. However, the cooling trend of recent years indicates that other factors are at work, including perhaps the volume of dust and smog in the air. This tends to reduce the solar heat reaching the surface.

According to Dr. Reid A. Bryson, professor of meteorology at the University of Wisconsin, transparency of the atmosphere above the highest summit of the Hawaiian Islands has been decreasing at a rate of 30 per cent each decade. In view of the summit's remoteness from industrial areas, this is taken as an index of global air pollution.

ists, notably Col. Bernt Balchen, the flier, that the ice cover of the Arctic Ocean is shrinking towards the vanishing point. This would be a boon to those seeking to take giant tankers into that ocean to haul out the newly discovered oil from the north coast of Alaska. However, it could also start a new ice age.

Several scientists had suggested ways in which the open-sea explanation for the ice ages could be tested by examining microscopic shells from layers in the floor of the Arctic Ocean. They included Dr. David B. Ericson, Dr. Maurice Ewing and Dr. Gosya Wollin of Columbia University's Lamont-Doherty Geologic Observatory and Dr. Orville Bandy of the University of California, Los Angeles.

A peculiarity of *Globigerina pachyderma*, a tiny creature that lives a drifting life in the seas, is that the shells of those living in very cold water spiral to the left while those in slightly warmer water spiral to the right. If during the ice ages the Arctic Ocean became open and warmer, there should be an increase in right-spiraling shells from sediment land down in that period.

No such effect was seen by Dr. Clark, although one 18-foot-long core that he studied, obtained at Lat. 80 degrees N., Long. 158 degrees W., was thought to include sediment extending back some four million years. The lowest part of this core produced very few shells, but he voiced confidence that the sea has been ice-covered at least 1.5 million years.

The other proposed test was based on the assumption that sediment laid down in an open ocean, at the height of an ice age, would differ markedly from that deposited under pack ice conditions.

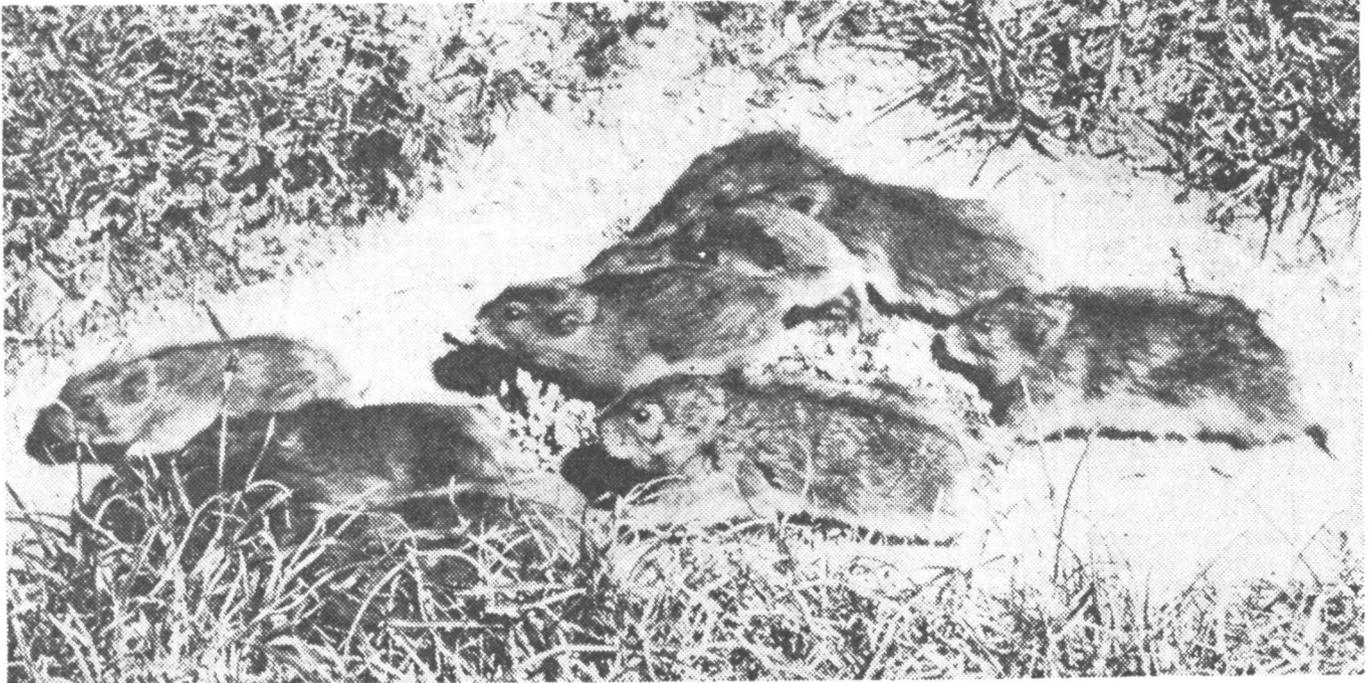
Life would have been more abundant, leading to heavy deposits of *Globigerina* shells, and icebergs cast loose by ice sheets along the coasts would melt in midocean, dumping sand and other debris they had picked up on shore. Such a period should show up in all cores as a layer rich in sand, shells and other coarse materials.

While such layers were seen in many cores, they occurred randomly both as to time and location. That is, they were apparently not the product of an oceanwide condition.

Huskies to Fade in Yukon

WHITEHORSE, Yukon Territory (AP)—Dog teams of the Royal Canadian Mounted Police will not be heard in the Yukon wastes next winter. They will be replaced by airplanes or motorized sleds.

Science Finds a Clue to Mysterious Deaths of Lemmings



A new explanation for the suicidal behavior of lemmings, above, has been developed by two California researchers

By WALTER SULLIVAN

The New York Times

After years of frustrating effort by scientists to discover why lemming populations multiply at a frantic pace and then collapse in a mass die-out, the answer seems to be within reach.

Furthermore, the explanation may show why, at the time of their population "crash," these small mammals—four to five inches long—seem to go mad, in some cases allegedly diving en masse into the sea.

Recent research near Point Barrow, at the northernmost top of Alaska, has eliminated the classic theories of lemming cycles.

One of these holds that the lemmings multiply until they exhaust their food supply, then die out until the tundra vegetation can recover.

Another theory, based on studies of temperate zone animals, attributes the sudden population decline to a halt in reproduction. According to this concept, crowding induces hormone changes that act as a form of birth control.

The answer that is now emerging involves changes in the animals' bloodstreams. Two California researchers, working independently, have identified a substance in the lemming blood that serves two purposes.

It acts as an "antifreeze," enabling the lemmings to remain active throughout the

winter in a climate that no other small mammal can tolerate without hibernating.

Yet it also acts as a population control, for it reportedly attacks the central nervous system, killing almost all members of a lemming population a certain time after a spell of warm weather. In that way the tundra is saved from total devastation and recovers to feed future generations of lemmings.

The two researchers, Dr. David A. Mullen of the University of San Francisco and Dr. William B. Quay of the University of California at Berkeley, hope soon to announce the nature of this substance. They have reportedly found it in other arctic mammals.

If, in fact, the substance does serve as an "antifreeze"—for example, by increasing blood flow to the skin and extremities—it might be applicable to man. Thus soldiers or plane crash survivors could function at temperature that otherwise would be fatal.

Some of those who have been studying lemming cycles are not yet convinced that warm weather is the stimulus that causes the "antifreeze" to clot and kill.

It has been found, for example, that lemming blood is flooded with steroid hormones at the population peak. This has led to the suggestion that crowding releases the hormones, which,

in turn, set in motion the fatal transformation of the "antifreeze."

When the lemmings at Point Barrow reach their peak, they number as many as 200 per acre. A visit there last month revealed that great numbers of them were already poking out of their breathing holes in the snow.

Dr. Frank A. Pitelka, head of the zoology department in Berkeley, who has been following the lemming cycles at Point Barrow for two decades, said the animals seemed already to be looking for new living space. He predicted that this would be a peak year. Previous peaks occurred in 1960, 1963 and 1965.

If this is, in fact, such a year, it may be possible to pin down the precise sequence of events that leads to a population "crash."

In a recent telephone interview, Dr. Mullen said that in the summer of 1960 about 4,000 lemmings were trapped near Barrow. The next summer, despite a 25 per cent increase in the trapping schedule, only 20 were caught.

To survive the arctic rigors, lemmings must be able to multiply with extraordinary rapidity during favorable periods. They are ready to breed three weeks after birth, they gestate in 20 days and there may be as many as 13 in a litter.

His research and that of others has shown that the animals do not die hungry. They tend to be particularly fat at the time of their population crash. Nor is there a drop in fecundity, such as has been reported in temperate zone mammals.

Mass plunges into the sea have rarely, if ever, been reported from Alaska. Dr. Mullen suggested that they might occur in Norway because the fiord terrain funnels the animals towards ocean cliffs when they seemingly run berserk in their final death throes.

He suspects that this behavior is caused when the "antifreeze" invades and disrupts the nervous system.

Evidence for such an invasion of nervous tissue was first observed by Dr. Quay a decade ago, although the nature of the material and its properties were not discovered until later.

Dr. Mullen believes that a warm spell on the tundra sets in motion a sequence of events that simultaneously kills off lemmings throughout a large region. The effect, however, is sufficiently delayed so that the die-out may occur after the first autumn snow.

In that case, when spring comes, the animals are gone. Normally the lemmings survive the winter by browsing on dead grasses, burrowing through the matted tundra under the snow.

Zoologists have long won-

Artist Finds Her Paradise in the Arctic

By LISA HAMMEL

"I GET very nostalgic to go back to the Arctic," said the blue-eyed woman relaxing on a sofa in a Kips Bay Plaza apartment.

Claire Fejes (pronounced Fey-esh, it's a Hungarian name) quite likely is one of the few native New Yorkers who can make that statement. And mean it.

Since 1946, Mrs. Fejes has lived with her husband, Joseph, and their two children—Mark, 22 and Yolanda, 16—just below the Arctic Circle in Fairbanks, Alaska.

"In Fairbanks, everything ends," Mrs. Fejes said. "The highway stops and the railroad comes to a halt." But for the couple, who are staying in a friend's apartment during a visit to New York, Fairbanks is where everything began.

Mr. Fejes had been stationed in Alaska during World War II. An electrician and violinist from Cleveland who also happened to speak Russian, he was sent there by the Army as an interpreter.

The couple, who were married in 1942, were fascinated by the area and decided to return after the war to seek their fortune. In the warm weather they lived in the wilderness, panning for gold; in the winter they lived in Fairbanks. Within a few years they were broke, without so much as a nugget to show for their efforts.

They then settled down in Fairbanks, where Mr. Fejes was an electrical contractor and Mrs. Fejes took care of their first child and painted.

About 10 years ago, Mrs. Fejes developed a strong desire to go beyond the

Arctic Circle, into the remote reaches of northwestern Alaska, to paint Eskimos.

She said she had seen many Eskimos in Fairbanks, "but they were like town people; I didn't feel I could really paint those faces until I had lived with them and slept on the ice until my bones hurt and shared their lives. Then I thought I might understand what was in their faces."

Husband Plays Violin

Her husband, whose artistic inclinations are musical rather than visual (he plays the violin with the Fairbanks University Symphony), agreed that she should go for about two months during the summer while Mr. Fejes stayed at home to look after the children, then about 5 and 11.

Mrs. Fejes took a 450-mile bush flight to an Arctic outpost. Then, with some Eskimos, she traveled on the Bering Sea in an open boat to a temporary tent village set up by natives hunting for whales.

She slept in a tent on the edge of the Bering Sea, helped the Eskimo women cut up whales and seals and ate sourdough pancakes for breakfast and boiled whale and seal meat for dinner. She helped take care of minor illnesses and even gave art lessons to the Eskimo children. And she painted.

By the time she returned home, her skin bronzed by the summer sun, she was almost indistinguishable from an Eskimo, she recalled.

"Except for my blue eyes," she added. "They're a dead giveaway."

During the winter she painted from

memory and the following summer traveled even farther north, to a permanent Eskimo settlement at Point Hope. She did this for five consecutive years and has returned since and thinks she will inevitably be pulled back there again.

Out of her experiences, she wrote a charming memoir called, "People of the Noatak," published by Alfred A. Knopf in 1966. Naturally, she illustrated it herself. She is now working on a children's book about Eskimo life that will be published this fall by Pantheon Books, a division of Random House.

Although Mrs. Fejes enjoys her occasional trips to New York to visit her family (but finds the New York winters too cold!), she and her husband are always happy to return to their adopted home.

The couple live in a spacious split log and stone house on a residential street. In 1960, they turned the bottom half of the house into an art gallery, Eskimo artifacts repository and cultural center. They also periodically hold poetry readings there.

"Hardly anybody uses a dog sled anymore," Mrs. Fejes said. "Anyone with \$800 goes out and buys a snowmobile."

Mrs. Fejes welcomes such growing sophistications as the five concerts held in Fairbanks each year. But the city still retains its measures of small town hospitality.

"There are always visiting Eskimos sleeping on the couches in our house," she said. "And where else could you have Isaac Stern in town for a concert and invite him to lunch and feed him moose steak?"

dered what happens when lemmings are plentiful in the fall and nowhere to be seen in the spring. Dr. Mullen told of his efforts to explain this disappearance.

He went out under cover of a series of blinding blizzards with 600 dead lemmings, which he placed under the snow by poking them down with a 10-foot stick. He was careful to offer predators no clue—such as a glimpse of himself or the scent of his track—to the locations of the buried animals. With extraordinary thoroughness, Arctic foxes found every lemming despite a two-foot cover of snow. Apparently the cold does not dull their olfactory powers.

Other scientists who have been studying lemming cycles at Point Barrow and elsewhere agree that the substance identified by Dr. Mullen and Dr. Quay is significant, but some of them believe other factors may be at work. Dr. Pitelka, for example, argues that cycles in the nitrogen and phosphorus content of the lemming diet

may play a role. Dr. Richard V. Andrews of Creighton University in Omaha, Neb., adheres to the view that the stress of crowding may set off the sequence of events leading to a crash. Release of the substance found by Dr. Mullen and Dr. Quay, in his view, may be a sequel.

He has found that steroid hormones in the blood are elevated as much as 30 times the normal amount when the animals reach their population peak. Some members of

the California group suspect that this effect is secondary to the appearance of the blood factor identified by Dr. Quay and Dr. Mullen, rather than vice-versa.

Despite such disagreements as the sequence of events, it is evident that by monitoring bloodstream changes, zoologists are zeroing in on an explanation of what are widely viewed as the most dramatic population cycles among all the higher animals.

U.S. Arctic Jobs Open

Enjoy the cold weather? Does solitude turn you on? Do you favor long days and quiet nights? If you answer yes, the Department of Commerce may have the job for you.

Cooks to Technicians

The Weather Bureau and the Canadian Meteorological Service, which operate five Arctic weather stations, have a few job openings—positions paying from \$10,500 to nearly \$15,000 a year.

The openings are for cooks,

meteorological technicians, mechanics, electronic technicians and others. The jobs start in the spring, just before the hot weather sets in here.

Among the advantages—there's no place to spend your pay.

The Commerce Department says anyone interested should write Personnel Division, Environmental Science Services Administration, Rockville, Md. 20852.

East Alaska Asbestos Find Called First in That Region

WASHINGTON—Asbestos, a fibrous industrial mineral used in making insulation and fireproof construction materials, has been discovered in a remote mountainous area in the Yukon-Tanana Upland near Eagle in Eastern Alaska, the Geological Survey of the Department of the Interior announced.

The discovery was described in a United States Geological Survey circular as the first deposit to be found in that part of Alaska.

Dr. Helen L. Foster, geologist at the United States field center at Menlo Park, Calif., said: "Although the size of the deposit has not been determined, this discovery is important because it shows that geologic conditions in the Yukon-Tanana Uplands are favorable for the formation of asbestos."

U. S. to Replace South Pole Base

AMUNDSEN - SCOTT STATION, South Pole, Antarctica, April 6. — The United States is to build a \$2 million scientific base at the geographic South Pole. It will replace the present Amundsen - Scott station which is being crushed by ice and snow.

The new station's main feature will be a large geodesic dome, prefabricated of aluminum. Inside the dome, three separate buildings will provide living and working quarters for 16 men during the austral winter when temperatures outside fall as low as 110 degrees below zero.

The new station is scheduled for construction during the Antarctic summer of 1971-72, and is designed to last 10 to 15 years.

The United States has manned a scientific base at the South Pole since the end of 1956 when the present station was set up under Dr. Paul Siple's leadership for the international geophysical year.

This complex, named after the Norwegian and British explorers who first set foot at the pole 57 years ago was supposed to last only about three years.

Now, after 12 years of service, it is completely buried under a mountain of drifting snow weighing thousands of tons.

Despite extensive and costly repairs, and the addition of heavy metal reinforcements, the station's days are obviously numbered.

Twisted walls and shattered beams are to be seen in numerous places, and the present station leaders believe at least two buildings may be unsafe for use by the end of the coming Antarctic winter.

The scientific glamor of the pole station has also faded somewhat over the years, but in certain fields such as upper atmosphere physics — including cosmic rays, aurora, and magnetism — the pole is unique for research.

Leaders of the U.S. Antarctic Research Program believe the cost of building and maintaining a new station is well justified.

The geodesic dome will be 164 feet in diameter and 44 feet high in the center. It will contain a galley, recreational, communications and medical facilities, and living quarters.

125-Foot Wood Research Ship Built

Transportation has been one of the major limitations to exploration of the Antarctic, according to Science Service. Snow tractors, commonly used for short overland hauls, are far too small to handle adequate scientific equipment and personnel and are limited in range. Icebreakers need deep water to float and therefore cannot be used close to shore.

Helicopters are not only expensive for their carrying ability, but in Antarctica they face the treacherous whiteout, the horizon completely disappears between snowy land and featureless, white sky, sometimes causing pilots to fly straight into the ground.

One answer to the transportation problem, a new research vessel called Hero, combines modern research facilities with a flavor of past centuries, including sails and a wooden hull. Hero will be the first ship based in Antarctica.

Early in 1963, the need for appropriate transportation, equipped with laboratories for research on the way, became obvious to United States scientists hunting a site for a United States research station on the Antarctic Peninsula. Fjords, channels and hundreds of tiny islands surround the peninsula, which stretches northward to within about 600 miles of Cape Horn.

Life Abounds

The vast finger of snow and ice has long been of interest to scientists, partly because of its varied, storm-tossed climate, in contrast to the dry air masses of the inner continent. However, its major attraction is its abundance of life. Low-pressure weather systems cause upwelling of the surrounding bottom waters, bringing with them a rich supply of silicates,

nitrate and phosphates, a feast for marine life.

The United States has been scientifically interested in the peninsula since 140 years ago, when James Eights, a naturalist, made a series of observations in the South Shetland Islands. Three major United States expeditions went there from 1946 through 1948. However, the impetus for a permanent research station did not come until the United States Antarctic research program expanded to include biology and other life sciences that were largely ignored through the end of the International Geophysical Year in 1958.

When the actual site survey got under way, just over four years later, the investigators spent two months looking over 30 possible sites, finally settling on a 24-by-37-mile piece of icy, mountainous waste called Anvers Island. Anvers was picked because it was about midway along the peninsula's length, and about as far south as a ship could get, even in the December-to-April summer season, without running into dangerous amounts of sea ice.

Need Was Clear

The need for a special ship operating from the base was clear from the start. In 1964, Britain offered the United States the use of its Base N, which had been deactivated since 1958, located at the island's Arthur Harbor. In the same year, the National Science Foundation awarded the contract for the ship's design. From their inception, ship and station were planned as a single facility, part of which was equipped to go to sea.

In March of 1968, a permanent station near Base N was christened Palmer Station, for Nathaniel B. Palmer, who in

1820, at the age of 20, became the first American to sight the Antarctic continent. Eight days later, on the high tide, the unusual research vessel slid down the ways of the Harvey F. Gamage shipyard in South Bristol, Me., after having been christened the Hero in honor of Palmer's sloop.

Ship Draws 12 Feet

The 300-ton vessel draws only 12 feet 6 inches of water, compared with the 29-foot draft of a typical icebreaker.

"It can get in and around these islands in the Antarctic Peninsula, so that we have a platform for research," says Dr. John H. Dearborn, a marine biologist at the University of Maine's research center at Walpole, who went on the Hero's Arctic shakedown cruise.

"It's sort of a cross between a large oceanographic ship and a shore party."

The ship's 125-foot length would dwarf the original Hero, but the ship's most unusual feature, for a modern-day research ship, is her sails. A 760-horsepower diesel provides the main power, but for steadying the ship during precise measurements, as well as for providing an emergency push if necessary, the dark green ketch-rigged trawler carries some 1,700 square feet of high-visibility orange nylon sails.

Though not a full-fledged icebreaker, the new Hero has been made as strong as possible for her pioneering role as the first ship to be based in Antarctica. Unlike icebreakers, which stay at the isolated outposts only long enough to deliver supplies and changes of personnel, the Hero will operate out of Palmer Station throughout the Antarctic summer, departing for winter quarters at Punta Arenas, Chile, only when gathering ice threatens to make operations perilous.

Visit to Reds In Antarctica

Newark News

Feb. 3

McMURDO STATION, Antarctica — A party from this main U.S. Antarctic station made a three-hour visit this week to Russia's Vostok Station.

The flight was carried out in an Operation Deep Freeze LC130 Hercules aircraft. On board were 17 passengers, a 10-man crew and 22,659 pounds of cargo.

The plane was commanded by Cdr. E. W. Van Reeth, commanding officer of Antarctic Development Squadron 6.

Representing Commander, U.S. Naval Support Force, Antarctica on the annual visit were: Capt. C. Navarrette Jr., who recently reported to Task Force 43 as assistant chief of staff for operations and plans; Coast Guard Cdr. C. R. Gillett, staff ship operations officer; and Cdr. E. G. Lightsey, officer in charge, U.S. Naval Support Force, Antarctica, Detachment 1.

Also making the flight was Michael Maish, a member of the U.S. Antarctic research pro-

gram. He is an exchange scientist from the United States and will winter-over at the Russian station.

Antarctic Rescue On

Christchurch, New Zealand, March 3 (Reuters)—The United States icebreaker Edisto was steaming 1,000 miles to an Antarctic station today to bring out a badly injured Navy officer. Lt. H. G. Anderson of San Francisco suffered a fractured skull during rock blasting near Palmer.

PROBING THE DEEP

The eyesight of a whale is better under the water than above it.

Japan Team Completes Round Trip To S. Pole

Mainichi Daily News

An 11-man Japanese team returned to Showa Base, Japan's Antarctic observation base on Ongul Island, at 11.30 p.m. February 15 (Japan time) after completing a 140-day 5,200-kilometer round-trip to the geographical South Pole, according to reports received by the Japanese Antarctic research expedition headquarters in the Education Ministry Monday.

The team, headed by Masayoshi Murayama, had left the Showa Base September 28 last year, and reached the United States Amundsen-Scott Station at the South Pole on December 19.

After resting there, the members began their return journey December 25.

The team was originally made up of 12 members, but one was injured by an ice drill on October 3 and forced to return to Showa Base.

The group was the eighth expedition to succeed in making an overland trek to the South Pole. It was first visited in December 1911 by a Norwegian group, led by Roald Amundsen.

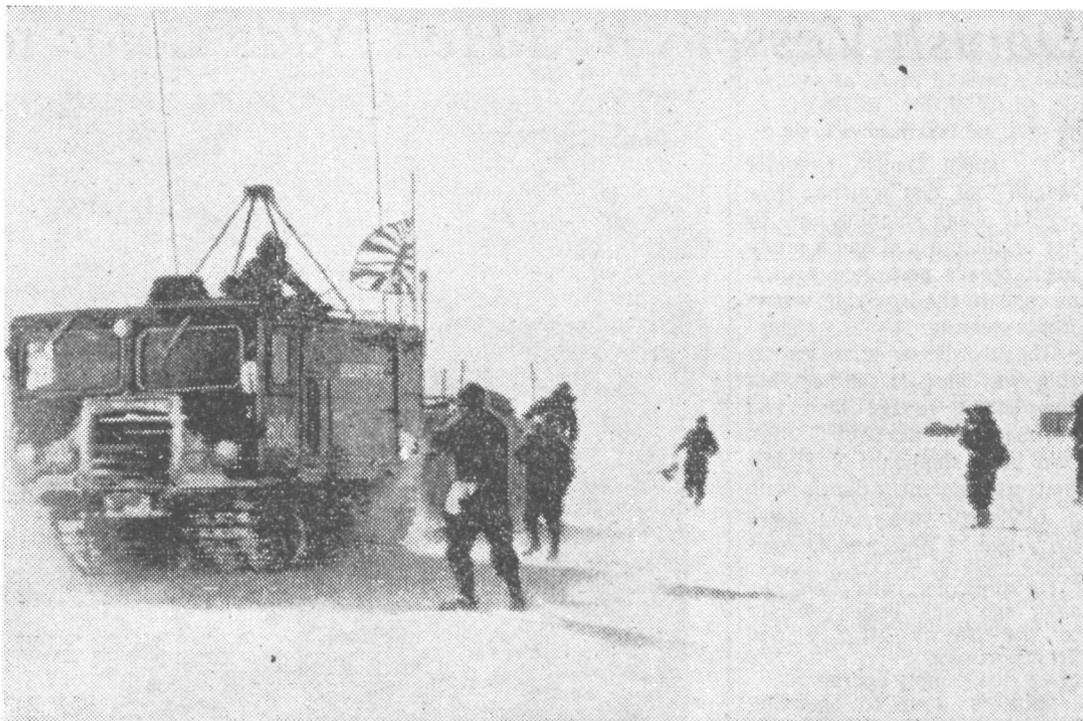
During the round-trip, the team members engaged in various observation tasks involving weather, topography and geology, and brought back much research material, including ice.

Polar Expedition Papers Presented

A set of papers, diaries and photographs of the Putnam Polar Expedition to the Arctic in 1927 has been presented to the National Archives' Center for Polar Archives.

The documents were a gift from John A. Pope, director of the Freer Gallery of Art here, who joined the expedition led by George Putnam and recorded his impressions of the U.S. mission that corrected maps of part of Baffin Island in the Arctic.

Participating in the presentation, besides Pope, were U.S. Archivist James B. Rhoads and Mrs. Evelyn Stefansson Nef, widow of the late Arctic explorer Vilhjalmur Stefansson.



SHOWA BASE, Antarctica—Japan's first team ever to reach the South Pole returns to the Showa Base on Ongul Island Saturday (above) and Masayoshi Murayama, right, the team leader, toasts their success over beer with Hiroshi Kusunoki, who is expected to head the next winter team to the Antarctic (left).

by ice 80 miles from Wilkes Station and waited a week for help from the 5,000-ton icebreaker

Antarctic Fossils Found

Reuters

OSLO, Norway, March 27—A Norwegian expedition recently in the Antarctic found fossil plant leaves in geological layers 150 to 200 million years old, it was announced here today. The finds may support a theory that the Antarctic continent was at one time part of a vast continent.

Soviets Study Antarctic

Reuters

MOSCOW, Feb. 18—Soviet scientists have set off a series of powerful explosions in Antarctica to make the first studies of the continent's inland geology, the Communist Party newspaper Pravda said today.

Japan's Whale Catch Is Up

TOKYO, Jan. 25 (UPI)—Japanese whalers said today that their catch was up this year. They said that three fleets caught 870 blue whales since Dec. 12.

Conrad Abandons Plan To Fly Over South Pole

CHRISTCHURCH, New Zealand, Jan. 13 (Reuters)—Max Conrad, known as the flying grandfather, announced today that he had abandoned his plans to fly over the South Pole.

The 65-year-old American pilot in a message to the United States Navy here said that mechanical problems, doubts about fuel and weather "but in particular my lack of Arctic know-how" prompted him to call off his plan to circle the globe over the polar route.

Mr. Conrad, who set out on his around-the-world flight Nov. 1 from St. Louis, Mo., in a twin-engine Piper Aztec, is on Adelaide Island, about 1,300 miles from the South Pole.

U.S. Icebreaker Clears Passage

Reuters

MELBOURNE, Feb. 16—The U.S. Icebreaker Southwind shepherded a supply ship into moorings near the Australian Wilkes Station in Antarctica last night after clearing a way through pack ice.

A spokesman for the Commonwealth Department of Supply said here today the Southwind will help with unloading the 2,000-ton Thala Dan, a Danish vessel chartered by Australia, and see it safely out through the pack ice.

The Thala Dan was halted

Danish Vessel's Red Hull Adds Color to Waterfront

The New York Times

The small Danish freighter Magga Dan, distinguished from regular ocean shipping here by her bright red hull and a prominent crow's nest, lent a dash of color to the Brooklyn waterfront recently.

The sturdy, angular motorship was in port on her first commercial voyage here and her master, Capt. Bent C. Ries, said in a shipboard interview that crossing the Atlantic with a 1,000-ton cargo of Polish hams in tins wasn't exactly his ship's "cup of tea."

On previous calls here, he said, she was under charter to the Navy's Military Sea Transportation Service for use in Arctic resupply operations.

"She is used to spending her time in the ice-choked waters of the Arctic or the Antarctic," he said.

"But anytime you see her helicopter platform aft folded in half you know she isn't doing what she was designed to do," he added.

The bright red hull and rigging color, Captain Ries said, was chosen to make it easier for the ship to be spotted in ice.

The 1,855-ton ice-strengthened motorship, he explained, is the oldest unit in the 14-unit fleet of polar vessels owned and operated by J. Lauritzen Lines, Copenhagen.

This specialized fleet, the largest of its kind in the world, performs all types of winter and specialized polar shipping services, including a winter service to St. Lawrence River ports. The ships, Captain Ries explained, can go anywhere in the world during the winter months.

However, his ship's diesel machinery, he added, wasn't powerful enough to permit the ship to act as an icebreaker.

But, he added, her construction was sufficiently strong to withstand any kind of ice pressure for any length of time.

"In our business we never know how long we might be stuck in the ice. That's why we carry supplies for six months, just in case," he said.

The ship's 13-year career is documented by a special guestbook. Its first page bears the signature of Queen Elizabeth II and the date of Nov. 13, 1956.

Her majesty, Captain Ries explained, came aboard the then brand-new cargo ship at London for a royal sendoff of



The Magga Dan during the British Trans-Arctic Expedition, early in her 13-year career

the British Trans-Arctic Expedition, headed by Dr. Vivian Fuchs.

Dr. Fuchs, now Sir Vivian, wrote in the ship's guest book that all members of that expedition "feel a special interest and indeed a pride in the Magga Dan since they had the privilege of traveling on board during the first voyage."

A feature of the 246-foot, 12-knot vessel, is the sturdy and compact crow's nest atop her red foremast.

The crow's nest, Captain Ries explained, was equipped with a complete set of navigation instruments and controls and was used any time condi-

tions made it necessary to follow leads in the ice spotted by helicopters.

"I've spent up to 24 hours up there at a stretch," he said.

A tour of the vessel showed compact, wood-paneled accommodations for 36 passengers, backed up by a small dining room and a lounge.

Although not of the luxury variety, the living spaces aboard the vessel are modern and clean and apparently comfortable enough for the ship to have served as the world's first Antarctic cruise ship.

Last year, while under charter to Lindblad Travel, the Magga Dan made two month-long

cruises from New Zealand to McMurdo Sound, in the Antarctic. On each voyage she carried 24 passengers.

Captain Ries closed the guestbook and said "we'll be sailing again in 24 hours. This time for the Prince Edward Islands to take on a cargo of frozen vegetables for Grimsby, England."

The matter-of-fact tone in which he described the ship's next voyage implied that carrying vegetables wasn't exactly the right kind of service for his sturdy polar craft.

"But, at least," he added, "we'll be running into some ice."

Antarctica Men Get 1,000 Bibles

Nearly 1,000 men serving with Operation Deep Freeze in Antarctica have been presented with Bibles on behalf of the Laymen's National Bible Committee, it was announced here April 16. The Bibles were presented to the Navy men and civilian engineers and scientists by Capt. Milton Prince, USNR, of Brooklyn, who made a special trip there for the occasion.

ANTARCTIC FOSSIL FRESH-WATER FISH

SYDNEY, Australia, May 31 (Reuters) — The fossilized remains of an air-breathing freshwater fish that lived more than 350 million years ago has been found in the Antarctic.

The curator of fossils at the Australian Museum, Dr. Alexander Ritchie, said today that the remains of the fish, with an almost perfectly preserved jaw, were found on Australian Antarctic territory about 150 miles from Scott Base.

The remains, part of the largest collection of fossils discovered in the Antarctic, were first located in 1957 by two New Zealand geologists.

A follow-up party led by a New Zealand geologist, Dr. Peter Webb, and Dr. Barry McKelvey, an Australian, collected hundreds of pounds of rocks containing fish fossils.

Dr. Ritchie believes that the fossilized fish resembles fragments he has found in eastern Australia, supporting the theory that the world 100 million years ago was divided into three huge continents that later separated.

Details On Obtaining Deep Freeze Covers

Philatelists may have covers postmarked at the South Pole and Byrd Stations in Antarctica and aboard Deep Freeze ships which operate a post office during the 1969-1970 Antarctic season.

Collectors are limited to one cover per person to be postmarked at Byrd Station, South Pole Station, and from each Deep Freeze ship operating a post office. (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.)

The 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 mailing 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.

Philatelic mail to be postmarked at the Byrd or South Pole Stations must reach Davisville not later than September 1, in order to be processed during the Deep Freeze '70 Antarctic winter.

The postmarked covers should be received by the collector between October 1970 and March 1971.

Cancellations can be obtained from the following ships participating in Deep Freeze '70:

USCGC BURTON ISLAND (WAGB-283), Box 20820, Long Beach, Calif. 90801; covers must be received by November 19.

USCGC GLACIER (WAGB-4), Box 20900, Long Beach, Calif. 90801, November 19.

USCGC EDISTO (WAGB-284), Boston, Mass. 02109, November 12.

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 above, or when covers are submitted to Deep Freeze ships or units which do not operate a post office.

ASPP Asking For U.S. Antarctic Stamp

The American Society of Polar Philatelists has proposed that the U. S. Post Office issue a commemorative stamp later next year on the 150th anniversary of the discovery of the Antarctic Continent. In November 1820 Nathaniel Palmer, a young captain of a



A FOUR-MAN BRITISH TEAM left Point Barrow, Alaska February 22 last year on a 16-month trek of 3200 miles across the frozen Arctic Ocean. Its goal is the Spitzbergen Archipelago 400 miles north of Norway, and radio communications are being maintained by Leo Church at the base station of the Arctic Research Laboratory. Team members are Wally Herbert, Dr. Ken Hedges, explorer Allen Gill, and glaciologist Roy Koerner. This cover carries the autograph of Mr. Church; it is the property of Jack Treutle, Keyser, W. Va.

Stories of Antarctic

A WORLD OF MEN, by Wally Herbert. 232 pp. Putnam's. \$6.95.

By DANIEL LINEHAN

Wally Herbert admits he is an adventurer: "I am undeniably, a romantic—the appeal of the South for me was the adventure, and only indirectly the quest for knowledge."

In this book, "A World of Men," he proves it. He tells the story of his first trip to

small American sailing vessel, the "HERO", made the first sighting of land amid the ice-laden sea surrounding the southern continent. The HERO was part of a small fleet which had sailed out of Stonnington, Conn. earlier that year.

Today the United States maintains five permanent bases in the Antarctic and over 2000 American scientists and support personnel visit there each year to study weather, animal behavior, geology, and man's survival in a hostile environment.

Because of this last point, Antarctica is considered a testing ground for man's journeys into space. NASA, the Navy, and the National Science Foundation are all involved in the activities at the southernmost part of our planet.

The ASPP has over 800 members who are interested in the philately of the polar regions. A bimonthly journal "Ice Cap News" is sent free to members. Information on the society can be obtained from Joe Lynch, 213 Clay Dr., Pittsburgh, Pa. 15235.

Antarctica to the northernmost part of the Antarctic Peninsula, which, as a Britisher, he calls Graham Land. From Montevideo he hitch-hiked back to Great Britain. He later went to the Arctic Island of Spitzbergen.

After this he tells of his trip to the west coast of Greenland to procure huskies for the New Zealand Antarctic Expedition, and then of accompanying them to Antarctica. Another book will tell of his trip to Alaska in 1965.

In this forthcoming book he will relate his 2,000 mile sledge trip over the Arctic Ocean which began in the summer of 1968. In this he hoped to cross on foot from Alaska over the North Pole to Spitzbergen.

HERBERT IS so bound up with the life of the rough outdoors, taken by the beauty of nature, that he bemoans the fact that scientists are in Antarctica. That a scientist is interested in his equipment and perchance might like to operate it in a warm room, is contrary to Herbert's feeling they ought all to be living in a tent. He would never exchange mechanical transportation for a dog team.

During the International Geophysical Year, and afterwards, thousands of miles of geophysical surveys were conducted with the operators laboring under adverse conditions, yet they had to be mechanized.

Meteor counts and auroral studies were made in Rawin Towers during the winter nights, without the benefit of heat; heavy coring equipment was transported hundred of miles inland to take ice cores to further our knowledge of prior ages. If the scientists had had to depend upon dogs these feats would never have been accom-

plished.

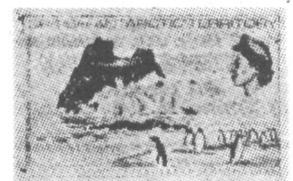
HOWEVER, if the reader wishes to share adventure with a self-styled romanticist he will enjoy this book. Author Herbert is not only a portrait-artist sketching his companions and scenes with pencil, he is also a good photographer, and above all he is an excellent artist with words and phrases. He describes the simple casting off of the ship's hawsers: "Two thick ropes smacked the water. Limply they sank, then coming to life they wriggled towards the ship and were hauled aboard bristling and dribbling." The pages are filled with his word pictures.

The history of Antarctic exploration is nicely woven through the main fabric of the story. Some material is taken from Ross, Scott, Amundsen, Shackleton, and from the many others who have contributed to the uncovering of Antarctica. One can learn a lot from this book about the continent and the men who went there. This reviewer enjoyed it.

Rev. Daniel Linehan, S. J., director of the Weston Observatory, was twice decorated by the Navy for his contributions to the exploration of Antarctica.

Four From British Antarctic Territory

On February 6, British Antarctic Territory released 3½d, 6d, 1/-, and 2/- stamps commemorating the 25th anniversary of continuous scientific work by the British Antarctic Survey Office.



The 3½d features a view of the Lemaire Channel, an iceberg and some Adelle penguins, the 6d depicts a sonde balloon and its operators, the 1/- pictures a "muskeg", which is now used in place of a "sno-cat", pulling some tent equipment, and the 2/- illustrates surveyors with a theodolite.



Across the bottom of each is the caption "25th anniversary of continuous scientific work" in all capital letters, while at the top is "British Antarctic Territory" with the Queen's portrait in the upper right corner of the design. The name of the motif is vertical along the left edge.

Last Survivor of Peary Expedition

Donald Baxter MacMillan

By JOHN H. FENTON

The New York Times

PROVINCETOWN, Mass., April 6—Still erect as a stanchion on a schooner's fo'c'sle, Rear Adm. Donald B. MacMillan, retired, "paced the deck" as usual today and reflected on the expedition that discovered the North Pole on this date 60 years ago. On learning that four Britons had reached the Pole by dog sledge yesterday with the aid of air drops of medical supplies and mail, the doughty admiral commented: "It had to be that way; they couldn't possibly take enough food on one sledge. But it's great."

The Britons, according to The Sunday Times of London, were the first expedition to reach the Pole by sledge since Rear Adm. Robert E. Peary led a party there in 1909. Last year a four-man American-Canadian team using snowmobiles reached the Pole in 44 days.

Now 94 years old, "Mac," as oldtimers in Provincetown call him, is the last survivor of the Peary expedition.

Admiral MacMillan's deck these days is the street-floor porch of his shipshape home on the ocean side of Commercial Street in this seafaring village at the tip of Cape Cod. He paces it daily.

The comfortable living room in the MacMillan homestead, which once served as a barracks for Harvard student soldiers in the Civil War, still has a seagoing atmosphere.

There are such navigational aids as a barometer, an anemometer and a revolving globe. And over the whitewashed brick fireplace is an enlarged photograph taken by Mac of a polar bear and three of her cubs on an ice flow.

Although his seaman's deep blue eyes are clouded by glaucoma and cataracts, Admiral MacMillan's head is cocked toward the broad Atlantic Ocean on which he sailed northward during 27 Arctic expeditions. He still hears reasonably well and is as alert as he was on his last sea trip north in 1954.

Admiral MacMillan never set foot on the North Pole. But he did fly over it, in the predawn of the space age, in

1957, with three other members of the Arctic Brotherhood, Sir Hubert Wilkins, Peter Fruechen and Col. Bernt Balchen.

Frozen feet forced Admiral MacMillan to drop out in the final push to the pole in 1909. But he managed to hobble back along the trail to set up caches of supplies for the return trip of the six men who made the goal.

With Admiral Peary on his historic discovery were Matthew Henson, an American Negro who accompanied Admiral Peary on six expeditions, and four Eskimos.

The first word Admiral MacMillan received of the success of the expedition was contained in a letter he received from Admiral Peary several weeks later. In it, the explorer commented, "Northern trip entirely satis-

factory."

Donald Baxter MacMillan was born in Provincetown, Nov. 10, 1874. His father, a fishing captain, was lost at sea when the boy was 9. The youngster, known then in the Provincetown Scottish manner as Danny Baxter, later went to live in Maine with an older married sister.

After working his way through Bowdoin College, from which he graduated in 1898, he became a teacher. He still is officially on leave from Worcester (Mass.) Academy.

The paths of the young MacMillan and Peary first crossed in 1900, when the naval officer, then a commander, entered his son, Robert Jr., in a summer camp run by Mr. MacMillan in Maine.

Admiral MacMillan's wife, Miriam, who eventually accompanied him on nine Arctic

expeditions, was five years old when the North Pole was discovered. He was 60 when they were married. Once asked why he remained a bachelor for so many years, he replied: "Just never had the time before."

Today, Mrs. MacMillan read the admiral the scores of messages he received.

From the weekend White House at Key Biscayne, Fla., President Nixon sent this message:

"I am proud to join the many Americans who are one in admiration for you. Your courageous spirit of adventure will live forever to inspire endless new generations. On this, the 60th anniversary of the successful Peary North Pole Expedition, I want you to know you have my personal respect for the intrepid feat that earned you the world's esteem."

The Apollo 11 astronauts, who are scheduled to land on the moon, added their congratulations, asserting that "what you did represented a triumph of a human mind, body and spirit over the harshest and most hostile environment here on our planet earth."

The message was signed by Neil A. Armstrong, Michael Collins and Edwin E. Aldrin Jr.

A polar museum in honor of Admirals MacMillan and Peary, also a Bowdoin alumnus, has been established at the college on the Brunswick, Me., campus. Many of the artifacts of the MacMillan expeditions have already been removed from the home here to the museum for safer keeping. Other memorabilia are in the Provincetown Museum, maintained at the foot of the Pilgrim Memorial here by the Cape Cod Pilgrim Memorial Association.

One of the admiral's last public appearances was in 1967, when he received the Bradford Washburn Award of the Boston Museum of Science as "the nation's most distinguished living Arctic explorer."

Among the messages he received that day was one from Capt. Alan B. Shepard Jr. of Derry, N.H., the nation's first astronaut, announcing that there was space available for a trip to the moon and asking him, "Are you available?"

"Damn right," said Mac in an aside to those near him.



Ted Polubbaum for The New York Times

Sixty years ago his feet were freezing

WHO'S CRABBY NOW?

The sale of king crab meat earns Alaska more than \$14 million a year.

Daughter of Adm. Peary Recalls Father's Exploits

By MARYLYN LOPRETE

Newark News Staff Writer

April 6

LAKE MOHAWK — Today is a day of vivid recollections for Mrs. Marie Peary Kuhne of this lakeland community, whose father, the late Admiral Robert E. Peary, discovered the North Pole 60 years ago.

The vibrant, loquacious Mrs. Kuhne, wife of retired sea captain William W. Kuhne, recalls getting the news of the discovery.

"Mother and I were at our summer place at Eagle Island, Maine, when the word came via a newspaperman who rowed out to the island—we had no phone or radio at that time of course. Mother was very calm but unwilling to believe it because there were so many false reports circulating then. I remember her saying, 'If my husband has discovered the North Pole I will have a personal message from him.'"

"We waited on tenderhooks until shortly afterward, when a telegram from Dad came," Mrs. Kuhne continued, "and then Mother believed it. Of course we celebrated with a great party."

No stranger to the Arctic herself, Mrs. Kuhne was born in 1893 on an expedition to Greenland, and had the honor of being the only white person to be born North of the Arctic Circle. She was dubbed "Snow Baby" by the Eskimos, at her birth because her white skin reminded them of the snow, and later she wrote a book "The Snow Baby's Own Story," of her experiences in the Arctic.

She remembers her father as a very friendly person who loved people. "One trait he had which was rather unique was his ability to see a thing in its completeness and yet see the details, too. He also had a keen sense of humor, and nearly drove me wild with his teasing of my beaux."

Her father took a personal interest in her education, supervising her reading in English, history and geography. "I used to have a headboard at my bed full of books I had

read and every once in a while I would look over the list of titles and find that my father had slipped in a new book. That was his way of suggesting that I read that one, which I of course immediately perused voraciously. I was always a great reader."

Mrs. Kuhne recalled a remark made by her mother about her father's career. One time when the Admiral was off on a long expedition, her mother exclaimed, "The Arctic is your father's mistress." But the wife of the famed explorer wisely adapted to sharing her husband with his "icy woman of the North."

Mrs. Kuhne's maiden name was Marie Ahnighito Peary. Her middle name was that of an Eskimo woman who made her first snow suit, and her parents thought it fitting for an explorer's daughter to have her initials spell MAP.

Since the Admiral's death in 1920, Mrs. Kuhne has worked on cataloguing his papers and they are now chronologically arranged in the National Archives in Washington, where she lived for many years with her first husband, the late Edward Stafford, an attorney. She had two children by her first marriage, one of whom, Navy Cmdr. Edward Stafford, died in Vietnam.

In 1932 she led an expedition to Cape York, Greenland, to supervise the building of a stone monument to her father and in 1959 published a biography of the Admiral entitled "Discoverer of the North Pole." She has been decorated by the Governments of Denmark and France and received the Geographic Society of Philadelphia's award for distinguished achievement in geography. She is also the author of five children's books on life in the Arctic.

During World War II she supported a French village, Ramonchamp, and was awarded the French Legion of Honor for her work there.

Since her remarriage in 1967 to the former American Export Lines captain, Mrs. Kuhne has given up her lecture tours, which used to take



MEMORABILIA—Mrs. Marie Peary Kuhne, daughter of famed Arctic explorer Admiral Robert E. Peary, is pictured at her Lake Mohawk home with a chronometer used by her father on an expedition to Franklin Bay in 1902.

her away from home for two or three weeks. "The Skipper wants me right here," she said and she keeps busy working on her father's papers and on the Captain's papers. He is planning to write an autobiography on his life at sea.

Their summers are spent in Brunswick, Maine. The Pearys' homestead in Eagle Island has been given to the State of Maine as an historic site, where the Admiral's possessions will be on display in a permanent museum.

Oil Tanker Will Sail the Northwest Passage

Humble Oil to Make First Commercial Try at Crossing

By WILLIAM D. SMITH
The New York Times
June 4 —

A doubling of the United States tanker fleet, a new international trade route, untold mineral and oil wealth are just parts of the stake that will be riding on the success of the S.S. Manhattan when she steams out of New York on July 15 in an effort to become the first commercial ship to travel the fabled

Northwest Passage.

In a briefing yesterday at the Overseas Press Club, officials of the Humble Oil and Refining Company explained the problems and potential of the voyage, which M. A. Wright, chairman of Humble described as "a \$30-million gamble."

Charles F. Jones, president of the Standard Oil Company (New Jersey) subsidiary, commented: "Our motives in opening the Northwest Passage, admittedly, are economic. Our thoughts are oriented toward our own company's well-being. But we feel we are doing something which will go into the history books. We are doing it for limited purposes but the ultimate effects may be almost unlimited."

The executive said that the basic purpose of the journey is to test whether the Northwest passage can be used to transport Arctic oil to the East Coast market of the United States.

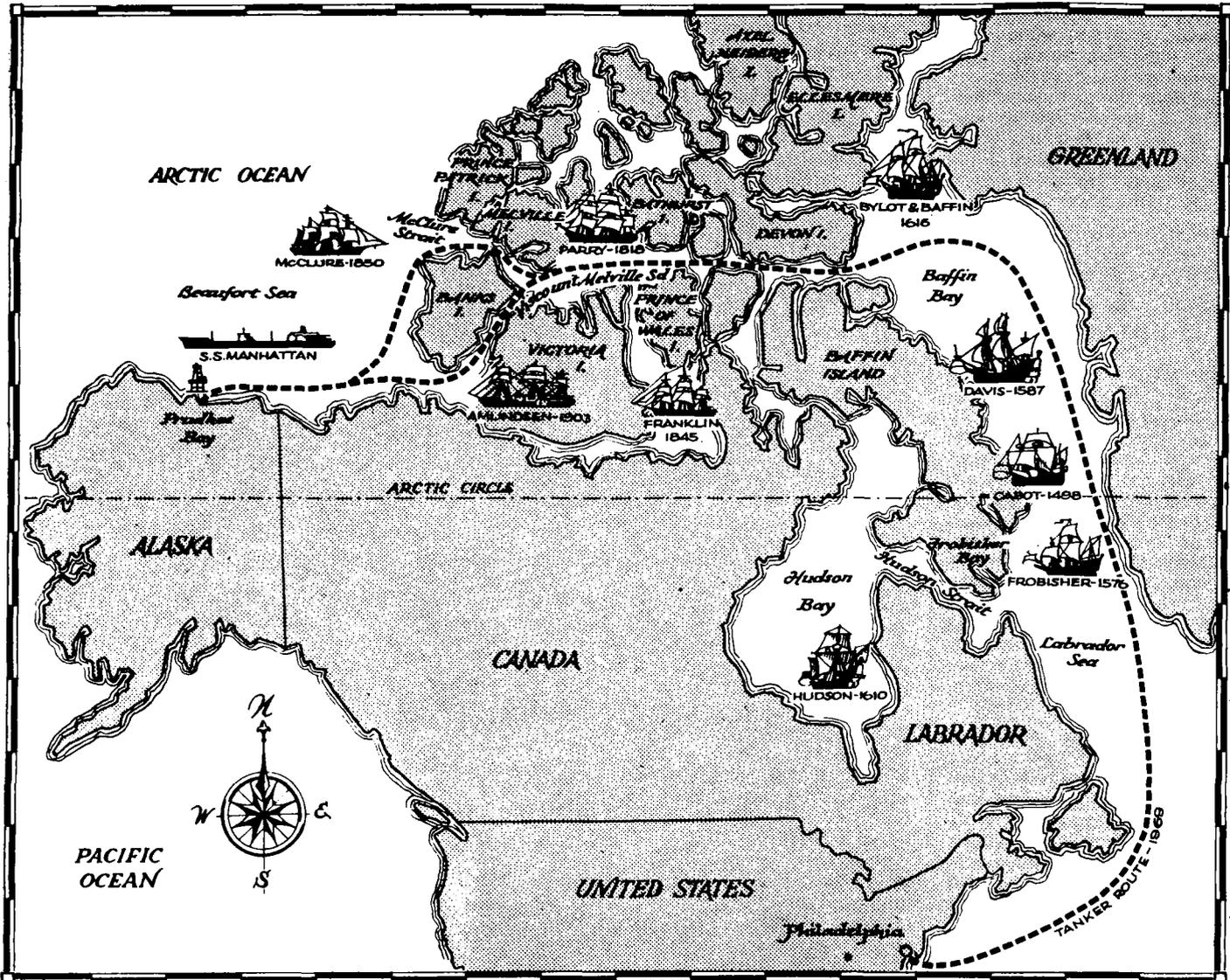
"The tanker route would enable us to bring crude oil to the Atlantic Seaboard at a substantial cost advantage over alternate methods of transportation," Mr. Jones said.

"Not the least of the beneficiaries from a Northwest-passage route would be the United States shipbuilding industry," the oil man explained. "Provided that our experiment is successful, we estimate that our company will need six giant ice-breaker tankers of the 250,000 dead-

weight-ton class by 1975. Each of these tankers will cost as much as \$50-million, or a total anticipated investment of some \$300-million.

"If the other companies on the North Slope follow this lead, we might very well see 25 or 30 super tankers of this class operating across the top of the continent. Thus by 1980 the United States flag tanker fleet may easily be two and a half times its present size."

Jack F. Bennett, general manager of Humble's supply department explained the reasoning behind the attempt to commercially breach the Northwest Passage by saying, "On the basis of our projections of the needs of the



Search for Northwest Passage has occupied explorers for 500 years. Effort by Humble Oil & Refining Company to send tanker through ice is latest. Map shows some of the attempts that were made in past and the tanker's route.

United States economy and of the potential of the North Slope, we have felt we needed to design transportation for a total flow of oil from the area of as much as 2 million barrels a day by 1980.

Mr. Jones said the company was hoping not just to demonstrate the feasibility of commercial conquest of the Northwest passage but to prove that the route can be used 12 months a year. "We are shooting for a seven, not just trying to make a point," he said.

The Humble president added, "One essential fact is that the Alaskan finds will have a tremendous impact on the United States' self sufficiency in oil. He went on, "But there is more to this project than oil. An open Northwest Passage means not merely an oil route, but an international trade route that will have a profound influence on the rate of Arctic development and patterns of world-wide trade.

"It will mean the fulfillment of the need felt centuries ago for a shorter and more direct route from Europe to the Far East.

Mr. Jones continued, "The central fact about the Northwest passage is not the technical difficulties nor the hostile weather but its key position. American defense planners have known for years of the importance of the Arctic; now the planners of commerce must take it more seriously. There is a point on the north shore of Banks Island, some 500 miles east of Prudhoe Bay, which is roughly equidistant from the cities of New York, London and Tokyo.

With this central position, the Northwest Passage could become the catalyst which opens up the resources of far northern Alaska and Canada to the world. A year-round sea route in this area could do what the railroads did for the Western United States, and do it quicker.

If the Northwest Passage venture is unsuccessful, Humble is considering building pipelines across Canada or across the United States to eastern refineries. While Humble has revealed its plans to tap the Alaskan oil supplies, the other dozen large companies holding leases on the North Slope have yet to announce what they will do.

The difficulties of getting anything from the frozen tundra and ocean waters go back 550 years. The first man credited with going through the Northwest Passage was Commodore Robert McClure, a Britisher, in a

Men at Lonely DEW Line Post Scan Canadian Sky in Shifts

By EDWARD COWAN
The New York Times

CAPE DYER, Northwest Territories—On a cliff on the Canadian coast looking out over ice-jammed Davis Strait toward Greenland stands Dye Main.

It is one of seven main stations of the Distant Early Warning chain of radar posts built across the Arctic 15 years ago from Alaska to Greenland to detect Soviet bombers winging across the top of the world toward North America.

Even now, in the age of intercontinental missiles, the isolated, severely functional, rigidly standardized DEW Line stations are still watchfully pouring electronic impulses into the sky. But the strategic purpose for which the bases were set up seems, in the opinion of many, less urgent than it once was.

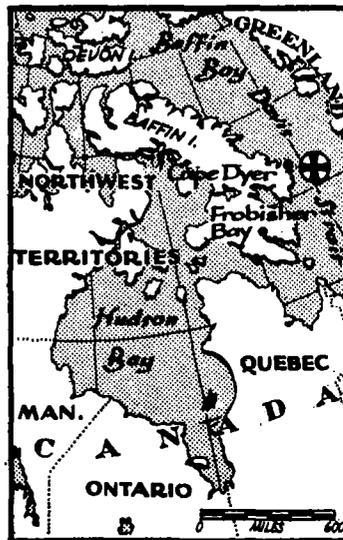
Occasionally, an unidentified aircraft is spotted, but no one gets excited. Probably it is an Arctic bush pilot who forgot to file a flight plan. Officials do not deny that an attack by manned bombers is a possibility, but they don't believe it will happen.

In Washington a few days ago, the Pentagon disclosed that flights by Soviet bombers toward, but not over, North America had become so routine that fighters were not always sent up to intercept the Soviet aircraft.

ship called the "Investigator." He entered the Arctic from the west, lost his ship in the ice and had to travel by sled nearly 200 miles across the frozen seas before he was rescued three years later in 1853.

Then in 1903 a young Norwegian named Ronald Amundsen made the first crossing entirely by water in his tiny yacht "Gjoa." That journey also required three winters. In 1940 the Royal Canadian Mounted Police in the "St. Roch" made the first crossing in one season, and in 1958 the nuclear submarines U.S.S. "Nautilus" and "Skate" made successful polar cruises under the ice cap.

The first known attempt was five years after Columbus made his first voyage to America. John Cabot set out from England in 1497 in hopes of unlocking a passage to the Orient. He got as far as Nova Scotia and Newfoundland before being forced back. The Manhattan hopes to register these landmarks with little more than points on the map.



The New York Times April 14, 1969

For the men, mostly civilians, who watch the radar scopes in darkened rooms, operate communications, repair equipment, cook, paint, drive and deal with paper work, DEW Line duty is devoid of drama. Indeed, for one recent visitor to three of the four main stations in Canada, it is hard to imagine a more confined, routine existence.

There is whisky after 5 o'clock but there are no women. There is no place to go for an evening. A normal tour of duty lasts a year but a man can take a break after six months if he likes, and can quit at any time.

Men work in shifts around the clock, six days a week. There are few visitors or other events to break the monotony. "Those guys were so happy to see anyone fly in," said an Air Force officer who used to visit DEW Line stations, "they'd break out steaks and ice cream for us at 9 o'clock in the morning."

In February, 1965, Robert S. McNamara, then Secretary of Defense, said in testimony in Congress that he thought any "deliberate, determined attack" would begin with missiles. Since then, 22 offshore radar ships and 282 small intermediate detection sites between main stations have been shut down to save money.

Thirty-two auxiliary sites, somewhat larger than the intermediate sites, still operate to plug gaps in radar coverage between main stations. A separate early warning system for ballistic missiles has been built.

DEW stations, in addition to their monitoring function, also play a role in military communications, particularly Dye Main, which is an important link in the United States De-

fense Communications Agency's traffic to Europe.

A third task is to give position fixes on request to bush pilots and commercial airliners.

The DEW stations are part of the North American Air Defense Command. Aircraft that cannot be identified within three minutes of spotting are reported by one of several high-speed communications channels to NORAD headquarters at Colorado Springs.

In Canada, a Canadian military officer is in charge of each station and United States Air Force officers are designated "technical representatives."

Last year, the United States Air Force paid the Federal Electric Corporation of Paramus, N. J., \$24-million to operate the DEW Line, and spent millions more for airlift and sealift of men and supplies. Federal Electric and the Radio Corporation of America are bidding for a new contract, to start July 1.

At each station, the men live in "trains"—long, narrow buildings laid end to end with bedrooms about 6 by 12 feet on either side of a central corridor.

SCIENTISTS MAP OUT THE OCEANS' FLOORS

SUITLAND, Md.—The world's oceans, which cover 70 per cent of the earth's surface, conceal a rugged terrain, part of which scientists of the United States Oceanographic Office are charting for the International Hydrographic Bureau.

The scientists are collecting, from soundings, depth measurements that reveal the contour of the ocean floor of areas of the Pacific and Atlantic up to 2,000 miles off the coasts of North and Central America.

These depth measurements, combined with those collected by the United States Coast and Geodetic Survey for two specific areas, one in the Pacific and one in the Atlantic, will represent the American contribution to a scientific chart being prepared by the International Hydrographic Bureau to show the contour of all the oceans' floors.

The chart, entitled "General Bathymetric Chart of the Ocean," will be composed of 24 full-color sheets, 16 providing coverage between the Arctic and Antarctic Circles at a scale of 1:10 million, and eight sheets at a scale of 1:3.1 million covering the two polar areas.

Canada Seizes Sealing Ship

OTTAWA, March 22 (Canadian Press)—The Norwegian sealing vessel Polar Circle was arrested early today by Canadian fisheries protection officers off the coast of Labrador.

Canadian Concern Over Northwest Passage Jurisdiction

By JAY WALZ
The New York Times

OTTAWA, March 14 — The discovery of enormous oil deposits in Alaska and new drilling in the Canadian Arctic islands have given the Trudeau Government fresh concern about Canada's jurisdiction over the historic Northwest Passage.

Is it an international channel, a territorial water or part of a Canadian inland sea? Premier Pierre Elliott Trudeau conceded in the House of Commons this week that his Government did not know but he said it would soon announce whether it would assert a claim of exclusive jurisdiction.

The question confronted this Government immediately as the result of the oil discoveries last summer at Prudhoe Bay. Over a longer period Canada's claims are important because of major oil drilling projects in the Arctic islands undertaken by Panarctic Oil Ltd., a consortium of private companies and the Canadian Government.

Next summer, American oil interests, with the help of the United States Coast Guard, plan to send a tanker, the 143,000-ton Manhattan, through the Northwest Passage. The object is to find whether the route can be a short way to ship Alaskan oil to markets in Europe and on the east coast of the United States.

Roald Amundsen, the Norwegian explorer, made the first westward trip through the Northwest Passage in 1903 to 1906.

Although the passage is not precisely charted because of variations caused by seasonal ice conditions, the National Geographic Society charts it closely along the route pursued in 1940-42 by the Royal Canadian Mounted Police schooner, Saint Roch, when the first eastward passage was negotiated.

The former Conservative Prime Minister, John Diefenbaker, who charged that United States interests were disputing Canadian ownership there, pressed Mr. Trudeau for a statement on Canada's sovereignty in the Arctic region.

Since the discoveries at Prudhoe Bay, there have been suggestions that some United States maps show Canadian Arctic territory as disputed. Testifying before a Commons committee, Gen. Charles Foulkes, who was chairman of the Canadian Chiefs of Staff from 1951 to 1959, charged that such maps existed in Washington.

The State Department is reported to have denied in Wash-



The New York Times March 15, 1969
Black line shows the proposed Northwest Passage oil route

ington that any such official maps exist and to have said that Canada's sovereignty in the area is not challenged.

Mr. Trudeau said in the Commons that he did not intend raising the question in talks with President Nixon when he visits Washington on March 24 and 25. The United States has not contested Canada's sovereignty over Arctic islands, he said.

Opposition members in the Commons asked Government leaders several times about reports that Canada had not been invited to take part in the Manhattan project because the United States Government disputed Canada's authority over the Northwest Passage.

In reply, Jean Chrétien, Minister of Northern Development, said that the Panarctic Company, in which the Canadian Government has a 45 per cent interest, had been asked to participate in the experiment.

A spokesman for Mr. Chrétien's department explained later that unquestionably Canadian officials would be aboard the Manhattan on her voyage. The remaining question was whether the Canadian Government or the Panarctic Company would contribute financially to the project.

Answering Mr. Diefenbaker in Commons, Mr. Trudeau said:

"Of course we claim we have sovereignty to all the lands in the north. The problem has arisen about the ice and the water and whether the water is inland or territorial waters. That is a rather difficult question.

"Because of the international implications which would result from a claim made by us

regarding territorial rights, it is important that all departments report on this matter before a statement is made."

U.S. Reports No Claim

The New York Times

WASHINGTON, March 11 — The United States has informed Canada that it has no intention of staking out a claim to the Northwest Passage in the project to try to find a short and inexpensive route to carry Alaskan oil to markets on the east coast.

The Department of State recently informed the Canadian Ministry of External Affairs that the projected effort of the tanker Manhattan to find a passage with the aid of the United States Coast Guard was part of a feasibility study.

Poor Schools Said to Bind Eskimos to Traditional Life

SYDNEY, Australia (Reuters) — Young Eskimos live in the way of their forefathers because they cannot get enough education, a Canadian Eskimo sculptor, here to exhibit his work, said.

"Eskimos find that jobs are hard to get, and the lack of education for the Eskimo people results in youngsters carrying on the way of life of their forefathers," Joanase Salomonie, from Frobisher Bay, Northwest Territories, said at a news conference.

"The Government treats us very poorly. They do not take a great interest in us, or in what we do."

The father of two children, Mr. Salomonie, 32 years old, said: "I still go hunting for food because we need it; if I didn't, my family would not have enough."

Alive on the Ice With Frozen Eyes

April 6.

MONTREAL (AP)—Ray Munro, 47, of Lancaster, Ont., greeted his wife with a kiss Friday, five days after he parachuted onto an Arctic ice floe with his eyes frozen shut.

Munro wanted his 500th parachute jump to be the first on the North Pole, but bad weather forced him to jump farther south.

He told reporters: "I went out of the plane at 3,000 feet and my goggles froze up right away, so I ripped them off. Then my eye froze shut."

Munro had nothing but chance to guide him to the ice. Had he landed in the Arctic Ocean, "we had arranged that ... there would be no attempt whatsoever to rescue me," he said.

He landed in four feet of soft snow on polar ice 1,500 miles north of the Arctic Circle.

Anglicans Appoint Eskimo As Deacon for East Arctic

POVUNGNETUK, Quebec (Religious News Service)—The Rev. Isa Kopekoalok, 51 years old, was ordained here as the first Eskimo deacon of the Anglican Church of Canada in the Eastern Arctic.

The Very Rev. Donald B. Marsh, Bishop of the Arctic, performed the ceremony in the hall of St. Matthew's Church before 300 people. Mr. Kopekoalok is only the sixth Eskimo in Canada to reach clerical rank.

Archdeacon James Clarke of Fort Chimo, Quebec, told the Eskimo congregation in their own language of the responsibility they had to Mr. Kopekoalok in his new ministry. Bishop Marsh presented a syllabic Eskimo New Testament to the new deacon.

Mr. Kopekoalok is married and has five children, two of whom are adopted.

Ship to Circle Americas

OTTAWA (AP) — A 47,000 mile Canadian oceanographic voyage of scientists will mark the first circumnavigation of the Americas, Resources Minister J. J. Greene told the House of Commons. The voyage is scheduled to begin at Halifax, N. S. Nov. 19 on the Canadian ship Hudson and end in October of 1970.

Canada Promotes Nationalism in the Arctic

By JAY WALZ

The New York Times

CHESTERFIELD INLET, Northwest Territories, May 2— In a small community hall packed with villagers, Eskimo grade-school pupils sang a lusty song of the Arctic to Roland Michener, the Governor General of Canada.

To the guitar strumming of the Rev. Joseph Meeus, a Roman Catholic mission priest, it rang out:

*We Canadians of the North
Pray that He who sends you forth
Grant you help and weather fair,
Pride in this great land we share.*

The hymn of patriotic fervor, with lyrics by a teacher-nun, was exactly what the Governor General had come to hear. But on a 9,000-mile, 11-day tour of the Canadian Arctic, just coming to an end, he had not always heard them.

"Who's the Governor General of Canada?" asked an American worker at Cape Dyer station of the Distant Early Warning Line, where Mr. Michener and his party stopped for lunch.

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"Who's the Governor General of Canada?" asked an American worker at the Cape Dyer station of the Distant Early Warning Line, where Mr. Michener and his party stopped for lunch.

An Eskimo schoolgirl in Frobisher Bay said that she believed that the Governor General "guards the Queen." The prime mission of the Governor General, it appeared, was to tell the 15,000 Arctic Canadians, most of them Eskimos, who he was.

"I am the personal representative of the Queen of Canada," he said over and over, "and I am here to tell you that the Queen considers Eskimos to be Canadians, the same as those of us who live down South."

Some Canadian officials complain the Eskimos are becoming "Americanized" before they are "Canadianized," but here on the west shore of Hudson Bay, the 69-year-old Mr. Michener received a hearty welcome and an enthusiastic response.

Children, taking a holiday, went out on the ice, as did their parents, to greet the Governor General and his wife,



The New York Times

Governor General Roland Michener and Eskimo of Alert, Northwest Territories, most northerly settlement in world.

Norah. When he stepped from his plane in muskrat fur coat and cap in the chilling wind, they waved Canadian maple-leaf flags that they had cut and pinned from red and white paper.

When he ventured higher into the Arctic Circle, however, the Governor General found evidence of Eskimos who think of themselves as Eskimos and not Canadians.

Before an elementary class in Resolute Bay on Cornwallis Island, Mr. Michener got not one word of response when he asked the children "Do you know who I am?" He didn't even get a cheer when he announced that as Governor General he could exercise the Queen's prerogative of granting a holiday for the children to remember his visit by.

This cool detachment on the Eskimos' part, and the formidable obstacles of climate and terrain to non-Eskimo migration, impede the Government's program for developing the vast north.

The slow progress there concerns Prime Minister Pierre Elliott Trudeau. That was one reason for the trip that sent Mr. Michener farther into the northland than any of his predecessors had ever gone.

The Governor General and his wife—accompanied by members of their staff and a dozen correspondents—visited the Panarctic Oil Company's drilling operations on Melville Is-

land and flew to the site of a Canadian Forces Base and a joint United States-Canadian weather station at Alert, the northernmost habitation in Canada. Alert is at the upper tip of Ellesmere Island, where Adm. Robert E. Peary began his dash to the North Pole. Twelve Eskimo settlements were also on the itinerary.

As the Queen's representative, Mr. Michener holds a non-political office, and cannot speak or defend Government policy. His visit to the Arctic, however, coincided with a special effort by Mr. Trudeau to secure Canadian sovereignty in the north.

In a recent news conference, Mr. Trudeau conceded that there was no threat at present to Canada's claim to all island territories north of the continental mainland. Ownership and exclusive access to the Arctic waters surrounding the islands is another question.

The old requirements for sovereignty — discovery, occupation and establishment of authority — are today not enough, in the view of some of Mr. Trudeau's advisers. The modern requirements of international law, they feel, is that "occupation must be effective."

The primary problem for the Government is to speed the development and process before expected new discoveries of oil and minerals make the northern islands an area of contention.

Mr. Michener made a point of flying 255 miles out of his way to see the first all-Canadian oil drill begin sinking a shaft at Drake Point, but oil production in the Arctic might take one year or 10 years.

Ore deposits such as the mountain of iron at Mary River may not be productive until the next century.

"I was impressed by the beauty of the land, its purity and vastness" said Mr. Michener to a group of reporters on the last day of his trip through the snow-covered terrain. "But I was also impressed by the absence of human activity."

There is not a single human being to be seen in the vast reaches of the Arctic. The Eskimos have not "effectively settled" the land. They live in tiny clusters in a handful of settlements on the water's edge, where they hunt for the valued polar bear, seal, walrus and narwhal.

In some settlements, notably Rankin Inlet and Yellowknife, capital of the Northwest Territories, the Government is trying to give Eskimos employment at the canneries—especially in processing Arctic char, their favorite fish, and other Eskimo delicacies such as muk-tuk, the thick chewy underskin of the whale.

But farther north, at Resolute Bay, Pond Inlet, and Grise Fiord, Mr. Michener saw settlements where the Government has concentrated on housing and schools. This produces the anomaly of Eskimo men leaving houses that have electric lighting, oil heat and indoor plumbing to go out on the ice with a sled and dog team to stalk bear and seal in the fashion of their forefathers.

During his travels, the Governor General saw the United States flag flying over Canadian soil at least five times—twice on the DEW Line at the stations operated under contract with the Federal Electric Company, an American concern based at Paramus, N.J.

The Michener party also saw other evidence of the American presence at Frobisher Bay. There, a well-drilled school chorus honored the visitors by singing a popular song from "Sound of Music."

Canada's development of its north is proceeding tentatively. But the feeling is that when the Canadian Arctic grows "hot" commercially and industrially, the Americans will be there with their money and their technical skill. Canada and Mr. Michener do not want their north to go by default.

Eskimos Find They Are Caught Between Two Cultures

By EDWARD COWAN

The New York Times

IGLOOLIK, Northwest Territories—Mark Ivalurchuk and his wife and three children live in a modern, Government-owned house, as do most other Canadian Eskimos these days. He works as a clerk in the Hudson's Bay Company store here, a five-day job that assures enough food for the family table.

But partly because he misses the kind of food he was raised on, and partly because it is a traditional way of life, he goes hunting on weekends, braving Arctic winds and temperatures 30 or 40 degrees below zero in quest of such staples as caribou meat.

The situation of Mark Ivalurchuk is typical of that of the 11,000 Eskimos who live in Canada's vast Northwest Territories, and it is a matter of increasing concern not only to the Eskimos but also to the whites who govern them.

Education is part of the problem, as it is in neighboring Alaska, where Senator Edward M. Kennedy and members of a subcommittee headed by the Massachusetts Democrat journeyed recently to examine problems of schooling among the state's Indians, Aleuts and Eskimos.

But for the Canadian Eskimo, beyond education there is the more fundamental problem of a man who finds himself caught between two cultures—his own leisurely one of hunting, socializing and living by the season



The New York Times (by Edward Cowan)

Mark Ivalurchuk's wife, Louise, kneading dough for bread in their Government-subsidized house in Igloolik, Northwest Territories. With her is Deborah, one of children.

and the white man's structured style of schools, jobs and living by the clock.

For example, Mark—Eskimos are called only by their first names, and few have taken a second name—and most of the other 430 Eskimos of Igloolik would like the Eskimo as

well as English language to be used in school. They also would like two grades to be added to the elementary school's six to delay the time when youngsters must go nearly a thousand miles to high school and be separated from their parents for 10 months.

The Eskimos' views were expressed at a recent town meeting with Stuart M. Hodgson, the 45-year-old Commissioner of the Northwest Territories. Mr. Hodgson and the officials and reporters who traveled with him on an 18-stop, 14-day tour of the eastern Arctic heard Eskimos at many places voice similar thoughts.

In large terms, the Eskimos are concerned that they are losing their own culture, that education is creating a generation gap, and that the white man will have no jobs for them once they acquire the white man's type of education and life style.

These concerns raise questions about whether schooling of Eskimos, especially in the first two or three grades, should be in their own tongue, and whether most Eskimos should be encouraged to go beyond grade four or five.

What to teach Eskimo children is a question inseparable from the development of their homeland and possible job op-

portunities. Neither the Federal Government, nor Mr. Hodgson's expanding territorial administration in Yellowknife, has a comprehensive development plan.

The Northwest Territories encompass 1.2 million square miles, or about 30 per cent of Canada's surface. They stretch 2,100 miles from east to west—from the Yukon almost to Greenland—and 1,600 miles from north to south, reaching to within 500 miles of the North Pole. Only 31,000 people live in this immense expanse—besides the 11,000 Eskimos, there are 6,000 Indians and 14,000 whites. That part of the territories north of the tree line which divides Eskimo from Indian country, is generally referred to as the Arctic, even though in the East it reaches below the Arctic Circle.

As recently as 1950, most Eskimos lived in small, scattered camps of 10 or 15 families. The camps are disappearing as Eskimos swap igloos and the unremitting danger of starvation for Government-built, windproof, heated houses, free medical care, schools and a larder of canned goods.

It is change at breakneck speed and many Eskimos are uneasy about what they are becoming.

"Most kids," said Jack Waye, Igloolik's school principal, "go out to school for only one or two years. They come back to the settlements and drift around. They're neither white men nor Eskimos. They're carbon copies of us, lost souls."

"It's pretty frustrating," commented a white woman who has lived in the North for many years, "when you've been to school outside the settlement and your parents don't understand you and you don't adjust anymore to life where you were brought up and you can't really live in Yellowknife or Edmonton or Toronto. You're not accepted either among your own people or in the white man's town."

"We have imposed our southern, suburban schools on these people," said an education expert. "We're trying to make little white people out of these children."

At Arctic Bay, a classroom wall proclaimed old-fashioned homilies, such as "Procrastination is the thief of time" (most Eskimo children who can be coaxed into speaking English at all, utter single words or short phrases) and "Actions speak louder than words" and, for some reason, "The bigger they are, the harder they fall."



The New York Times

April 13, 1969

Eskimos in Northwest Territories (shaded) face dilemma

Although Eskimos are becoming concerned about preserving their cultural integrity, they are virtually powerless to do much about it. They have chosen, by and large, to live in the Ottawa Government's houses (at subsidized rents of \$68 a month or less, depending on income) and that choice has unleashed other forces.

The men of a settlement of, say, 350 persons must have snowmobiles and gasoline (\$1.05 a gallon) to travel far enough to find caribou, seal, white fox and polar bear, whose skins and meat clothe, feed and bring cash to Eskimo families. If a man is invited to go to Vancouver for technical training to qualify for a job at the Department of Transport shop in the settlement, he goes, takes the job and perhaps becomes a weekend hunter.

"Unemployment is the most serious thing we have to cope with in the North now and for many years to come," says Commissioner Hodgson, a Vancouver trade union leader until his selection in 1964 for one of the appointive seats on the Territorial Council, which led to his becoming Commissioner in 1967.

Education, population concentration, creature comforts, the harsh vagaries of hunting and trapping and, quite probably, the white man's movies are all turning Eskimo youths away from the hunt as a livelihood.

Welfare rolls are still short in the eastern Arctic, but migration from outlying camps is continuing. Most important, Government medical care has cut deeply into infant mortality, which is still high but falling quickly, causing a population boom.

Possible production of coal, metals and oil holds out some promise of jobs. But the mining and oil companies in the western Arctic complain that Eskimos and Indians are unreliable.

On the other hand, Hudson's Bay stores have employed Eskimo clerks and cashiers with considerable success, and at the Cape Dyer radar base, supervisors praised Eskimo employees. At some settlements, Eskimo cooperatives provide municipal services, manage summer fishing camps, sell stone art and operate retail stores. Some settlements, however, seem to be dispirited, lacking energy and leadership.

Most experts generally refrain from telling the Eskimo to look for work in the white man's world. If Eskimo culture, and indeed Eskimos themselves, are to survive, jobs will have to come to the Arctic. But will they?

Hudson's Bay Lures Hardy Youth

By EDWARD COWAN

The New York Times

ARCTIC BAY, Northwest Territories—Four times a day, often in stiff winds and temperatures 40 below zero, Bob Giroux or Iain Hoey reads the weather instruments at the top of the hill and radios the data to the Government weather station at Resolute.

Mr. Giroux, a 21-year-old Canadian, is manager of the Hudson's Bay store here. Mr. Hoey, a 22-year-old Scotsman, is the clerk.

Young men like these, sometimes assisted by local Eskimos or Indians, run the Hudson Bay Company's 214 "northern stores" in Canada.

Some are modern but still small versions of the fur trading posts established along James and Hudson bays 300 years ago.

Some qualify as modest supermarkets. Most are in the desolate Arctic or sub-Arctic regions of the Northwest and Yukon territories although a few lie further south in the provinces.

In 1670, when King Charles II granted a charter to The Governor and company of adventurers of England trading into Hudson's Bay, he assured them of "the sole trade and commerce" of a vast region.

That monopoly no longer exists in law, but it continues in fact in countless northern settlements.

Extra curricular activities are part of minding northern stores and the Winnipeg-based company encourages its managers and clerks to participate in community activity provided it is non-political.

Mr. Giroux and Mr. Hoey, for example, also operate Arctic Bay's radio-telephone. Mrs. Giroux, an Eskimo, is employed by the Government to instruct Eskimo women in home-making.

Bay men may find themselves serving as lay preachers, construction supervisors, repairmen, Sunday school teachers or community peacemakers.

Iain Hoey is representative of the 20 or 30 youths aged 17 to 21 the Bay hires in Scotland each summer to work in Canada's North.

These lads, especially those from small towns in northern Scotland, have been found to be adaptable, stable and content with the low-key, outdoors way of life in Eskimo and Indian settlements.

Their fitness is sternly tested by an initial assignment of two years without a vacation.

The \$200 a month plus lodg-

ing and meals which the Bay offers to beginners look good to a youth from Glasgow's slums. A shepherd from the Outer Hebrides, off Scotland's west coast, is accustomed to isolation.

"Why did I come over here?" said Mr. Hoey. "Go to Britain and look at the economic situation. A 40-year-old laborer gets \$120 a month."

After two or three years, a clerk can become a store manager at a minimum of \$425 a month. Beyond that, said Desmond H. Pitts, general manager of the northern stores department, there are opportunities to become a district or division manager.

He added that "without exception, everyone of our 21 district managers started as a clerk."

As in the old days, a Bay clerk must learn to judge the furs, chiefly white fox, polar bear and seal skin, offered by native trappers and hunters.

Outside working hours, diversions are limited for Bay men. There usually is a movie each week and a dance. Hunting, fishing, jolting about the countryside on a snowmobile,

listening to recorded music and socializing are pretty much the gamut.

Clerks are virtually forbidden to marry until they become managers. At many places, the clerk has a bedroom in the manager's house. If the clerk has a wife, a second house would be necessary.

A clerk will be more successful with customers and native clerks and have a more satisfying social life if he can pick up the local tongue as well as has Neil D. Greig.

Mr. Greig, who is 19, came to Pangnirtung on Baffin Island two years ago. He had worked in a Scottish brewery for 18 months after dropping out of school and he decided he was "wanting a change, you know, different country, different faces."

Just such a flair for language made Duncan W. Pryde, who, fresh out of Scotland, worked for the Bay for 12 years, one of the best known white men in the central Arctic and got him elected to the Northwest Territories Council.

Mr. Pryde has been compiling a dictionary and grammar of the Eskimo language.



The New York Times (by Edward Cowan)

Hudson Bay Company outpost at Pangnirtung on Baffin Island. Company still maintains a chain of stores in Arctic, but each year they are shifting more from the fur trade.

For Eskimos, a House—Not Igloo—Now Is Home

By JAY WALZ

The New York Times

GRISE FIORD, Northwest Territories, May 16—To show Canada's Governor General, Roland Michener, an igloo, the Grise Fiord Eskimo Council directed Philapusie, an old hunter, to build one. Philapusie and his helpers set it up far out on the bay ice, sawing the blocks out of

wind-packed snow. They fitted out the interior with a sleeping loft, a seal oil stove and a whale lamp. The show-piece igloo had to be built specially because the people of Grise Fiord don't live in snow houses any more, except the hunters when they go far afield stalking the polar bear, seal, walrus or narwhal. Not even Philapusie, who often recalls that as a youth he appeared in the famed 1922 film by Robert J. Flaherty, "Nanook of the North," lives in an igloo.

Philapusie is Grise Fiord's oldest and most respected citizen. No one is sure just how old he is. Honored for his prowess as a hunter, he still can bring down a bear or caribou and is a respected teacher of the younger men.

At a banquet of roast caribou and apple pie in the Grise Fiord Community Hall, Philapusie sat to the right of the Governor General. This caribou, however, had been shot by Peeamenee, another veteran of the hunt who also sat at the table of honored guests.

GRISE FIORD—which the Eskimos say means Great Fiord—is the most northerly Eskimo settlement in Canada, snuggling between jagged mountains outlining the southern coast of Ellesmere Island. With a population of 92 Eskimos and six whites, it is probably one of the smallest communities in the country.

It is also one of the newest villages; it was moved to the present site by the Government's Department of Northern Development six years ago from Alexander Fiord across the bay.

Grise Fiord, officials say, is frankly an experiment. The Ottawa Government has given the Eskimos prefabricated housing with electricity, water and oil heat at rents ranging from \$2 to \$67 a month, depending on the size of the family and its ability to pay. But if the in-



The New York Times (by Jay Walz)

Eskimo girl riding seesaw in the playground at Grise Fiord, a tiny settlement in Canada's Far North. At rear are prefabricated houses built by the Canadian Government.

roduction of modern facilities has taken Grise Fiord families out of the igloos, it has left them free to hunt, trap and fish as always.

On the day of the Governor General's visit, Peeamenee, serving as the town spokesman, apologized for the many men absent because of the spring hunt. They were out after polar bear, now just emerging from hibernation. Their favorite fare is the seal, now coming up on the ice floes to bask and produce calves.

It is a busy season for hunters. Each is allowed to kill two polar bear a year, and each skin is worth about \$300 at the local cooperative store.

PEEAMENEE, a small but sinewy man with brown leathery skin and piercing black eyes, wore a dark blue business suit. When his turn to speak came, he thanked Mr. Michener for the Government's help to Grise Fiord, commenting: "We couldn't do it by ourselves." He mentioned specifically the new houses, two teachers, a Royal Canadian Mounted Police constable and a nurse.

Peeamenee spoke in Eskimo, with translation provided by Roger, the storekeeper.

The spokesmen revealed

something of the Eskimos' stoic spirit and humility when he called on a 9-year-old schoolboy to present two white fox furs to the Governor General and his wife.

"We give these to you as a gift from all the people of Grise," he said. "We give them to you through this child because we are like children. In front of you we are not bigger than this boy. We'll follow the laws even though we can't do anything."

GRISE FIORD hunters earn \$1,500 to \$2,000 a year from animal skins, with the best ones making as much as \$3,000 in a good year. The hunting also brings in meat for the families and the dogs. Maurice R. Cloughley, the Government administrator, said Grise Fiord was one of the few Eskimo settlements where no one was on public welfare, "except old-age pensioners" like Philapusie and Peeamenee.

Grise Fiord has three dog teams, but this form of transport is giving way to the snowmobile. The settlement now has 15 of these. "Snowmobiles pull our sleds even faster than dogs can and don't have to be fed when idle," one hunter said.



The New York Times May 17, 1969

POLAR DOLPHIN SKIN USED FOR CURE-ALL

Specialist at the Soviet Polar Institute of Sea Fisheries and Oceanography at Murmansk have started studies of the alapera, the skin of the polar dolphin, or the belukha, as it is called in the north, Tass, the official Soviet press agency, reports.

Its jelly-like layer, a third of an inch thick, possesses curative properties, long known to the Pomors, who lived on the islands and coast of the White and Barents seas. From the alapera and grasses they produced a cure-all which healed many grave diseases.

The amazing properties of the alapera were described in the documentary story, "Journey on the Shchelva," by Mikhail Skorokhodov. He writes in part:

"The belukha lives beyond the Polar Circle, amidst ice, in the most difficult conditions, lives through the polar nights and knows no diseases. Over the millions of years it has developed a reliable 'armor,' which protects it from all ailments."

Medics have shown interest in this mysterious "armor." Parcels with alapera have been sent from Murmansk to various medical institutions of the Soviet Union.

Canada's Polar Bear Express, which runs 186 miles north from Cochrane, Ont., stops anywhere for anyone who flags it down. The train's engineers have orders to pick up stranded persons who otherwise could easily perish without food in this rugged region.

Winter-Only Road Links Alaska And Its Oilfields in the Arctic

By WALTER SULLIVAN

The New York Times

For thousands of years Anaktuvuk Pass was known only to a handful of Eskimos and the countless migrating birds, caribou, wolves and other creatures that found it the gateway to the North Slope of Alaska.

Now suddenly it has become a route for fume-spewing tractor-trailers. On March 12, after less than four months of slashing and gouging by bulldozers, a 470-mile "winter road" was completed, linking the rich new oil field on the Arctic Ocean with the internal Alaskan highway system.

Since the first oil strike near Prudhoe Bay in January of last year, 13 oil companies have joined the rush and, at last report, 15 drill rigs were at work.

A recent visit to the area disclosed that 250 truckloads of drilling equipment had already been hauled over the many ice bridges and across the pass and the tundra of the North Slope—perhaps the wildest and ecologically most fragile region of the Americas.

Those trucks that have not made their way back are unlikely to do so until the freeze-up next fall, for already the spring sun is weakening the ice bridges, including the 1,500-foot one built by a team of Athabaskan Indians across the Yukon.

Likewise the frozen ground that constitutes the road's foundation is becoming a black mire of mud and running water. Parts of the road are, in fact, expected to become a rushing torrent, making it necessary to plough a new route each season.

This is a prospect that does not evoke much enthusiasm to those who already resent the long, narrow scar that the present road has cut across hundreds of miles of previously virgin territory.

The North Slope of Alaska is the region lying between the Brooks Range and the Arctic Ocean. The Brooks Range, a continuation of the Rocky Mountain system, stands as a giant barrier, isolating the Arctic coast of Alaska from the interior.

Anaktuvuk Pass cuts through the Brooks Range at about the midpoint of the 470-mile winter road.

In 1935 the Brooks Range was described to a visitor in terms of Indian and Eskimo legends—a romantic region

whose rugged fastness had been penetrated by only a handful of white men.

Jesse Ahgook, one of the Nunamiut Eskimos who has been watching the procession of trucks through Anaktuvuk Pass, remembers seeing the first white men go through in 1901. It was a party led by Frank C. Schrader of the United States Geological Survey.

Thus within a single lifetime the Anaktuvuk community has leaped from the Stone Age to the eve of the 21st Century. A few days ago, at a symposium organized in Alaska by the Naval Arctic Research Laboratory at Point Barrow, Dr. Lawrence Irving, the laboratory's first director, told of his initial visit to the Anaktuvuk area in 1947.

The Eskimos were living in skin tents as they had for many millenniums. In fact some of their camp sites on the North Slope go back 8,000 years, said Dr. Irving, whose interest was in the clouds of migrating birds that are funneled through the pass.

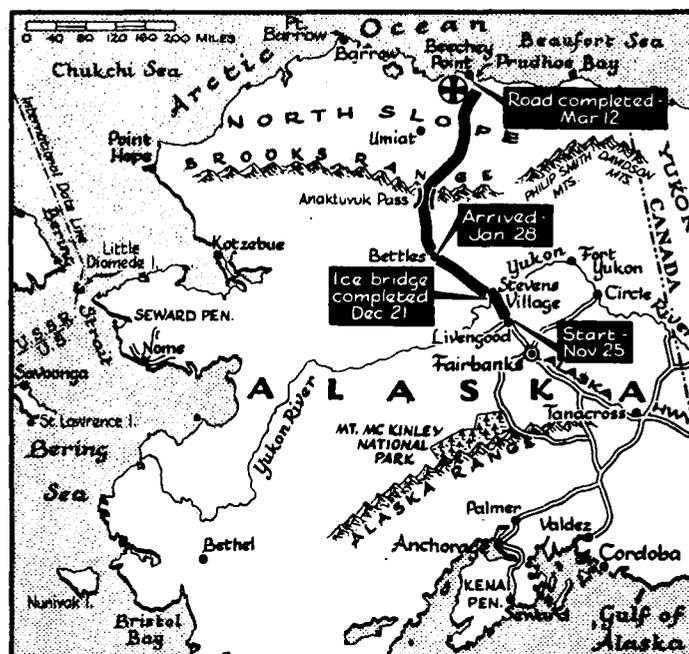
The birds come from as far afield as Asia, the Pacific Islands and South America to nest in the continuous daylight that shines on the North Slope in summer. A warbler that comes from Venezuela, he said, "performs this journey with the accuracy of an intercontinental missile."

Although the total weight of the bird is only 10 grams, he said, it carries "the entire machinery" for guidance of its navigation, for memory that leads it to the same nesting area each year, for its operation in flight and for starting the long journey at the right time.

Dr. Irving enlisted the help of the Anaktuvuk Eskimos in keeping track of these migrations, hoping for clues as to how the birds do it. Such cooperation continues, but this year the villagers also contracted to mark all or part of the 182 miles of the new winter road that snake across the treeless, snow-blown North Slope from the Anaktuvuk Pass to the oil field on the Arctic Ocean at Prudhoe Bay.

This they did with clumps of brush, anchored with rock and topped with an orange flag.

Construction of the road began on Nov. 25 when a crew from the Alaska Highway Department began pushing north from the Liven-



The New York Times

April 22, 1969

The heavy black line shows the "winter road" that links new oilfields (cross) with the Alaskan highway system.

good end of the all-year Fairbanks to Livengood highway. At the same time snow was cleared from the Yukon at Stevens Village, an Indian settlement, to provide an air strip. This is near the site of the projected Rampart Dam.

Indians from the village cut logs, laid them on the ice, then pumped water over them to freeze and form a highway over the river. The long push north from the river began on Jan. 14, after the 22-man team, including tractor drivers and a cook, had waited for days for the temperature to rise above minus 50 degrees.

It did—to minus 49—and they set forth, dragging their own living trailers, or wannigans, with them. Working around the clock in the almost constant darkness the three largest tractors moved forward side by side.

For 176 miles, as far as Bettles, they were able to follow an old tractor trail, but from there on north the route had to be picked each day, using aerial photographs and reconnaissance with a Cessna airplane.

So difficult is the long journey that the trucking charges (said to be about \$200 a ton) exceed those for air transport (some \$160 a ton). However, the air carriers are booked up months in advance and they cannot carry some of the bulkier items needed at Prudhoe Bay.

Eventually it is expected that the road will also be the route of the world's largest pipeline (48 inches in diameter). How to build this line is a major problem, for the

pipeline, containing oil at moderate temperatures, could melt the floor of the trench, generating torrents of water that would destroy the line.

An experimental pipeline has been built at the Navy laboratory at Point Barrow to test various solutions. Since the oil comes out of the ground at high temperature it may have to be cooled before entry into the pipeline and, in the end, it may be necessary to mount the pipe on piers, keeping it well above the frozen ground.

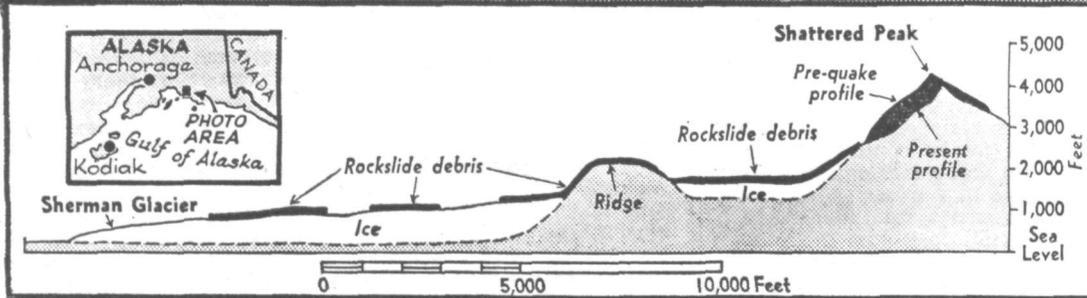
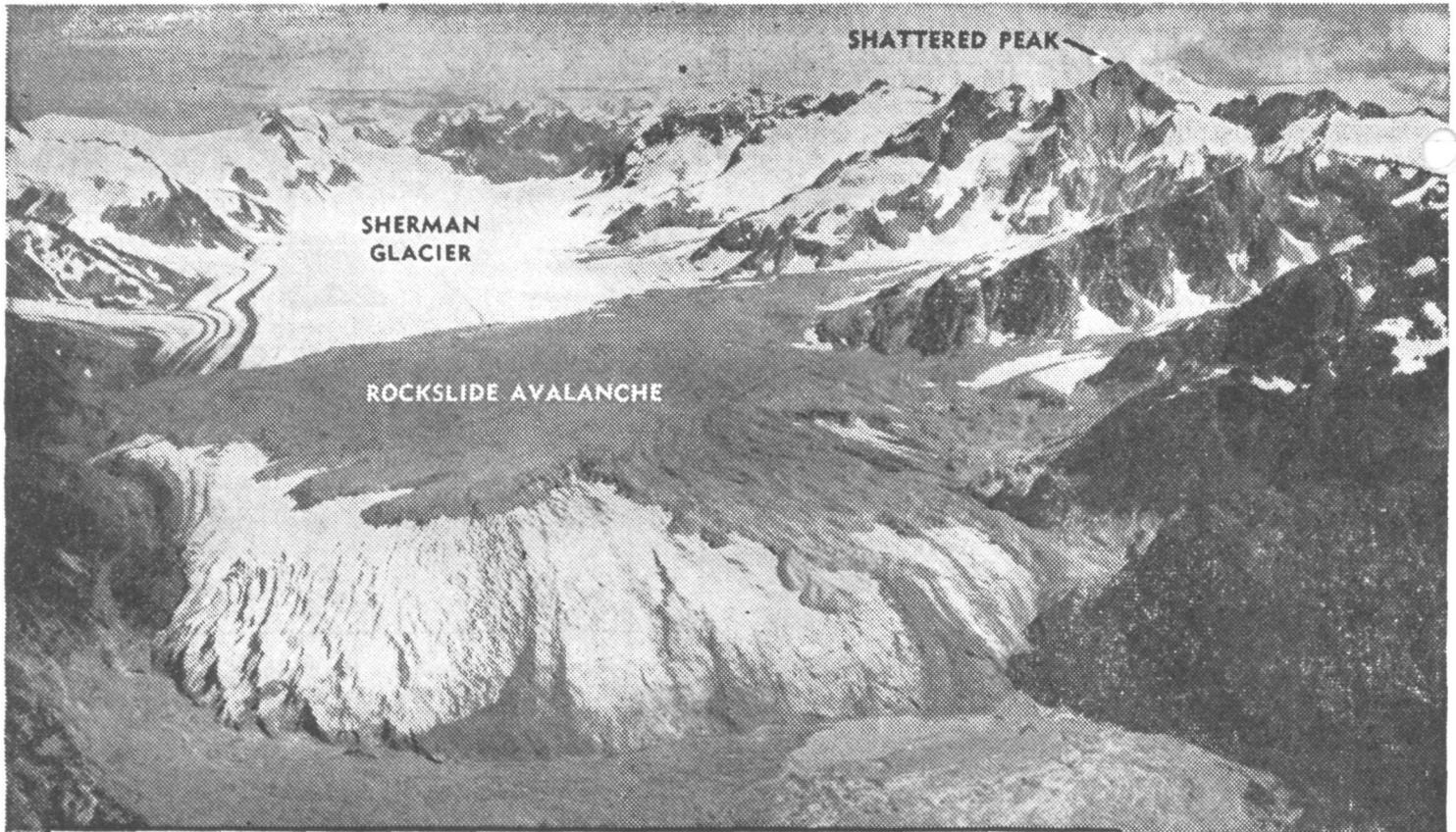
Sharp Quake Hits Aleutians, Causing No Major Damage

ADAK, Alaska, May 14 (AP)—A severe earthquake in the Aleutian islands today rocked Navy and Coast Guard stations at Adak and an Atomic Energy Commission site at Amchitka.

There were no reports of major damage or injuries.

The Coast and Geodetic Survey observatory at Adak said the quake had an intensity of 6.5 to 6.7 on the Richter Scale. This is strong enough to cause damage in a well-populated area but far below the 8.3 rating of the Alaskan earthquake of 1964, in which 113 persons died.

Leroy Pankratz, assistant chief of the observatory, said the tremor's epicenter was in the uninhabited Delarof Island group about 75 miles east of Amchitka and 100 miles west of here.



QUAKE'S EFFECT: In Alaska's 1964 earthquake part of a mountain, now called Shattered Peak, collapsed. The debris flew over a ridge as a flying carpet of rock and landed on Sherman Glacier, above. Diagram shows the course of the fall.

The Awesome Power of an Earthquake

On March 27, 1964, at about 5:36 P.M. Alaskan time, a mountain, shaken by a great earthquake, split apart. One side of it, including its Matterhorn-like summit, plunged downward and flew over a 450-foot-high ridge like a ski jump, leaving vegetation on the far side of the ridge intact.

The disintegrating mountain-side spread into a flying carpet of fragments more than a mile wide and two miles long. Its drooping edges apparently confined a cushion of compressed air beneath it so that the carpet, like a gigantic hovercraft, traveled at more than 115 miles an hour without touching the glacier beneath it. The rock then landed, blanketing much of the Sherman Glacier (see picture and diagram).

Meanwhile, swimming pools in Texas were being partially

emptied as their water sloshed back and forth — also a result of the quake. In Australian, African and Eurasian wells the water was pumping up and down as the earth responded to some of the most intense tremors of modern times. Alaska's so-called good Friday earthquake is thought to have released at least twice the energy of the 1906 quake that devastated San Francisco. It altered the surface of the earth to an extent never before observed.

Now the National Academy of Sciences has made public the first of eight volumes generated by an intensive study of that quake and its worldwide effects. The study was ordered by President Johnson in the hope that lessons could be drawn from the Alaskan quake that would be useful in dealing with, and anticipating, future disasters of this sort.

The first volume is primarily concerned with hydrology—the effects of the quake on aggregations of water and ice. The studies have shown for the first time that such a quake can permanently alter groundwater levels thousands of miles away. The sloshing of water in lakes and streams of the Southeastern United States showed the striking — and previously unsuspected—vulnerability of that region to earthquake damage. The discovery that several Alaskan mountains collapsed, producing “rockslide avalanches,” hinted at what such flying carpets of rock could do if they landed on a community thoughtlessly built too close to an unstable mountain.

Some experts believe the observation of water in wells and lakes may serve not only as an index of vulnerability to quake damage but also as a warning of

an impending quake. A Chinese scientist, Kuo Tseng-chien, believes subtle changes in ground water level can indicate alterations in rock strain preliminary to a quake.

The study has shown that deep-rooted crustal structures, like the Rocky Mountains, act as barriers to destructive earthquake waves. Thus virtually no effect was observed in lakes and wells just east of the Rockies, whereas virtually every deep well in Florida, the most distant state from the quake, was affected. At Perry, Fla., 17-foot fluctuations in water level were recorded.

The report suggests that the structure of the earth's rocks between Alaska and the southeastern states may have channeled and focused earthquake waves. These then acted on the very deep sediments laid down in the South by millions of years of North American erosion.

When shaken, such sediments act somewhat like a bowl of

jelly, greatly amplifying the motion. To date, however, the region has been spared because local earthquakes there are rare.

The most dramatic sloshing in an open body of water — known as a seiche — took place in Kenai Lake, Alaska. Bark on trees along the shore was peeled off 20 feet above the ground as water or ice in the lake rolled back and forth. On Francois Lake in British Columbia a seiche drove water up through fishing holes in rhythmic geysers. Where earthquake waves alternately squeezed and stretched sodden Alaskan terrain, thousands of "mud spouts" or "sand fountains" squirted in unison.

Because water behavior seems to be an index of earthquake danger, the report urges automatic global monitoring of water level in wells and open bodies of water.

The extraordinary behavior of the "rockslide avalanche" that blanketed Sherman Glacier was one of the most remarkable discoveries of the study. While the apron of rocky debris looks from the air as though it had flowed across the glacier, the snow and ice beneath it were found largely undisturbed by friction. It was also difficult to see how the rock could have traveled several miles across a comparatively level surface if impeded by friction.

Likewise the shattered chunks of the mountain, most of them sandstone, showed no signs of turbulent flow. Their edges remain knife-sharp. Some of the large boulders carry a conical load of fine debris which seems to have fallen on them from above. One huge fragment still carries soil and grass that clung to it when it formed part of the precipitous mountain.

To the study group all of these clues seem to permit only one explanation: The apron of rocky debris on the glacier got there by flying through the air.

—WALTER SULLIVAN
The New York Times

SATELLITE SENDING DATA ON POLAR ICE

5-Year Program Is Set Up to Expand Forecasting

SUITLAND, Md. — Ice-condition information transmitted via photographs from a weather satellite is helping oceanographers formulate a five-year program that the commander of the United States Naval Oceanographic Office says will expand ice-forecasting coverage to the entire North American Arctic and portions of the Antarctic.

Capt. T. K. Treadwell said that oceanographers, using the satellite data to supplement information obtained on aircraft reconnaissance, had successfully relayed weekly ice charts to the fleet resupplying Arctic bases in the Baffin Bay area. They are also issuing ice-condition messages to several resupply and research ships deployed in the Ross and Weddel Seas, he added.

"Tentative plans call for expansion of geographic coverage to the Alaskan Arctic in July of 1969, East Greenland-Svalbard in July of 1970 and the Canadian Archipelago in June of 1971," Captain Treadwell asserted. He added that the oceanographers working as ice forecasters planned to increase the number of transmitted charts and messages from the present one a week to one every other day by 1971.

The charts and messages, Captain Treadwell continued, will be transmitted via radio, teletype message or mail from about June to September for the Arctic and from November to March for the Antarctic. These transmission periods were chosen, he explained, because the weather satellite — ESSA VII — is "capable of providing a significant amount of usable ice information only when sunlight is illuminating either the Arctic or Antarctic."

mail "special delivery."

Life on Jan Mayen may not be the loneliest in the world, but it is not far behind. The island is 360 miles northeast of the North Atlantic pact's base at Keflavik, and the men based there rely on the Navy patrol squadrons based at Keflavik to drop their mail.

Only 147 square miles in size, the island looks like an "i" in the cold waters of the Norwegian Sea. The dot of the "i" is a 7,500-foot dormant volcano.

U.S. TRAINS ESKIMOS FOR LARGE-CITY JOBS

WASHINGTON — The Eskimos sometimes arrive at the Seattle Orientation Center, a motel unit near the University of Washington campus, in heavy parkas, wool clothing, and mukluks, the Department of the Interior says.

They come to Seattle as the first lap in a journey toward a better life. Each applied to the Bureau of Indian Affairs in Alaska to move to a large city where employment and training opportunities would be better than they were at home.

In the opinion of the Bureau's Employment Assistance Branch in Alaska, the Alaska native, whether Eskimo, Indian or Aleut, needs orientation to urban life in the "Lower 48" before he can be successfully trained or employed. This is

Because the satellite data is usable only during periods of sunlight illumination, Gabriel J. Potocsky, an oceanographer who has been working with the development of the forecasting project since 1966 when oceanographers began to study photographs transmitted from ESSA II, reported that the oceanographers definitely were not ready to retire aircraft used in aerial ice reconnaissance. "The aircraft can utilize moonlight or twilight to observe ice during periods of polar darkness," he explained.

Mr. Potocsky added that aircraft reconnaissance must also still be used to gain ice condition information on days of dense cloud cover, because the satellite's photographic sensors had not been developed to the point where they could penetrate the opaque cloud cover.

Since clouds do appear on the satellite's photographs, even on partly cloudy days, the oceanographers must study the photographs carefully in order to avoid interpreting a cloud as an ice area. But repeated day-to-day inspection of the satellite's photographs, Mr. Potocsky said, can eliminate interpretation of clouds as ice, since the ice pack, unlike clouds, does not change rapidly except during periods of disintegration. The satellite's precise navigational-positioning capabilities also help the oceanographers to remove clouds from the ice picture.

These two advantages—continuity and precise positioning — along with economics are the very reasons the oceanographers have begun to incor-

the task of the Bureau's "half-way house" — the Seattle Orientation Center.

A shopping center near the motel becomes a "school." Its two large supermarkets, bank, post office, dime store, hardware store, and drugstore are used by the Eskimos and their counselors as "textbooks."

A Tractor, Running Wild, Kills 3 Soldiers in Alaska

FAIRBANKS, Alaska, Feb. 1, (AP)—An unattended tractor ran wild and killed three Fort Wainwright soldiers, injured another and crashed through a private home early today at the start of the military forces' big Acid Test Arctic exercise.

The names of the dead and injured were not immediately available.

The tractor, which, was not involved in the military maneuvers, cut a wide swath of destruction several miles before it crashed into a tree and came to a halt.

porate the 13 pictures they are now receiving daily from the satellite into their ice messages and charts.

Mr. Potocsky said that aircraft reconnaissance was "not economically feasible on a continuous basis" because several days "may be required to provide complete ice coverage of an area the size of Baffin Bay-Davis Strait." In addition, adverse weather conditions or mechanical difficulties, he noted, may either cancel or limit flights.

But satellite reconnaissance, he went on, "is relatively inexpensive once the satellite has been placed in orbit." This is because the satellite can provide coverage of remote areas where aircraft reconnaissance is not feasible because of range factors, especially in the Antarctic where few landing strips are available, he asserted.

Training in Arctic Survival Is Delayed by Heavy Snow

About 800 Minnesota National Guardsmen had to wait an extra day to get started on two weeks of training in Arctic survival — because of too much snow, The Minneapolis Journal reported.

Members of the 2d battalion, 135th Infantry, of the Viking Division, headquartered at Mankato, Minn., were scheduled to leave for Camp Ripley, Minn., from eight southwestern Minnesota communities.

But roads blocked by snow prevented them from reaching their armories and their departure was delayed for a day.

U.S. NAVY FLIES MAIL TO NORWEGIAN ISLE

The United States Navy's tradition of helping out wherever it can be of service takes many forms, according to All Hands, a publication of the Bureau of Naval Personnel.

For the 36 Norwegians on Jan Mayen Island in the Norwegian Sea, the Navy's helping hand is in the form of an air

'04 Note Stirs Polar Mystery

By WALTER SULLIVAN

A note seemingly indicative of defection during the race for the North Pole at the start of this century has been found by Russian explorers on Rudolf Island, northernmost point in Soviet territory.

Adding to the mystery, according to the Soviet account, has been the excavation, from ice covering the island, of women's shoes, top hats, tail coats and false shirt fronts.

In the cabin of the American leader, the Russians say, was "an infernal machine, the wire of which extended to the dynamic charge in the food storage."

Did this mean, the Russians ask, that the expedition failed because of "animosity" among its members?

The note that was found, in a state of partial decay, would seem to indicate such dissension. According to the Soviet account, it said:

"We, the opposition, are leaving the camp on Saturday, July 2, 1904, having 18 dogs, two ponies and an indian boat."

It was signed, the report said, by "Tess, Veddy and Ralliet."

Also excavated at the site were "crystal and porcelain dishes covered with gilt" as well as a small barrel of rum. All buildings of the station, said the report, were linked by telephone.

The base was that used by the Ziegler-Fiala Expedition of 1903-1906. From it three abortive efforts to reach the North Pole were made.

At the same time Adm. Robert E. Peary and Dr. Frederick A. Cook were thrusting northward from the American side of the Arctic. Cook claimed that he reached the Pole in 1908, and Peary said he did so in 1909.

The finding was reported recently by Novosti, the Soviet feature agency. The report was made on the basis of a finding by a Soviet wintering party.

In an effort to elucidate the account, a search has been made by this writer of the records of the American expedition and of an Italian party previously based at the same site.

The account written by the leader of the American venture, Anthony Fiala, a Brooklyn photographer, made no mention of telephones—or "infernal devices." However, he said, the camp was wired for electric lights, powered



The New York Times, Jan. 30, 1969

American camp site (cross)

by a mile-long wire from the expedition ship.

In a storm one night the lights went out and when the gale subsided the ship had vanished. She had broken loose. She finally returned, only to be crushed by ice soon thereafter.

Fiala's account was published by the National Geographic Society under the direction of Gilbert N. Grosvenor. The expedition was a major enterprise, with 39 men, 218 dogs and 30 long-haired Siberian ponies. It was financed by William Ziegler, a millionaire who founded the Royal Baking Powder Com-

pany and made another fortune in Brooklyn real estate.

In one respect the Russians give credit to the expedition where it is not entirely due. They say it was "considered successful" because Fiala brought all of his men home. Actually one member of the expedition who died was buried on Rudolf Island—possibly, Fiala said, the northernmost grave in the world.

Fiala had taken part in an earlier expedition, also financed by Ziegler, that failed to achieve the Pole. In March, 1904, from his base on Rudolf Island, Fiala made two abortive attempts to start for the Pole. In both cases he was turned back by bad conditions and a variety of mishaps.

He decided to remain a second winter and try once more in 1905. However, according to his account, he allowed all who wished to go home to retreat south to an agreed-upon rendezvous with a rescue ship.

"The politicians in the retreating party," Fiala wrote, "used their influence and persuasiveness to enlarge their own party—until those to whom 'Northward!' had become a shibboleth, became, like Gideon's band, fewer and fewer."

After the homeward bound party had left, two other men "made no secret of the fact that they had grown

discouraged with the outlook." They took off after the retreating group.

However, the ship Terra Nova, assigned to rescue them, was unable to breach the ice and the entire expedition had to remain another winter. The Terra Nova later carried Capt. Robert F. Scott on his ill-fated expedition to the South Pole.

The note found by the Russians dates from the time when most of Fiala's men, temporarily under his leadership, had marched south to await rescue.

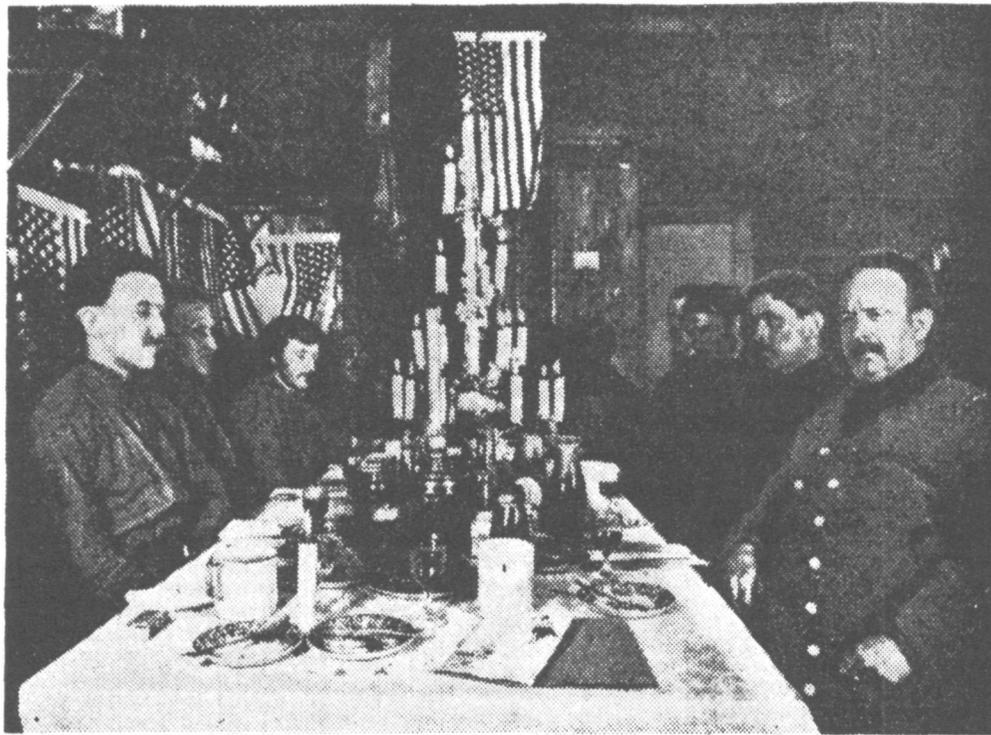
While the names given in the Soviet account are garbled, it is clear that the note was signed by: Peter L. Tessem, the Norwegian ship's carpenter; Charles E. Rilliet of St. Louis, Mo., quartermaster in charge of equipment, and one of the two Vedoe's on the expedition.

Both were from Boston and probably were brothers. John Vedoe was assistant quartermaster. Anton Vedoe was an assistant ship's engineer.

The episode that gave rise to the note is not described in Fiala's account. He was absent from the camp at the time. When he returned the three men had apparently ended their defection.

From Fiala's account he seems to have remained on good terms with Rilliet and the two Vedoes, but he virtually ignores Tessem.

The Soviet report of finery



American expedition on Rudolf Island celebrating Christmas in 1904. Russians reported finding top hats, tail coats and other finery at the site, though it is not evident here.

is puzzling since photographs of the expedition at Christmas dinner, both in 1903 and 1904, show no elaborate clothing.

It is possible that the Russians, who now maintain a station on Rudolf Island, dug up material left by Luigi Amadeo, Duke of the Abruzzi, several years earlier.

The Duke, a mountaineer, explorer and a dashing national hero of Italy, made his camp at the same site in 1899. His men marched across the pack ice to within 300 miles of the Pole—the furthest north achieved to that time. This led leaders of the two Ziegler expeditions to believe Rudolf Island was a good jumping-off place.

The Duke, in his account, told how he and his companions celebrated the birthday of Queen Margherita of Italy by opening her gifts. They had been delivered to the expedition by Count Oldofredi when the ship called at Archangel. The Queen's husband, Humbert I, was assassinated while the expedition was in the Arctic.

The unopened gifts of the Queen and others had been salvaged when the expedition ship was lost. "One box had already been opened on Oct. 21," the Duke wrote in his account, "and the presents so kindly given by the Duchess Elena of Aosta were divided among the officers and men.

"Her majesty the Queen had allocated silver chains to the men and various objects for the officers. Each object bore the name of the person to whom it was to be given—a most tender bit of attention and one that permitted me to make my comrades happy with these remembrances of distant Italy."

It is at least possible that the expedition's royal sponsors thought top hats and tails would enliven evenings at a polar camp. The shoes may have been a memento of a more intimate kind.

A Bow Ice Plow May Open Arctic Waterways to Ships

TORONTO, (UPI)—A new device, the Alexbow ice plow, is being developed in Canada and could extend the current Arctic navigation season from six weeks to six months.

The ice plow would attach to freighters and push through ice in the same manner that a highway or snow plow works. Arctic waterways previously have been cleared by heavy, reinforced icebreakers, which batter rather than cut the ice.

Land Farthest North Is Kaffeeklubben Island

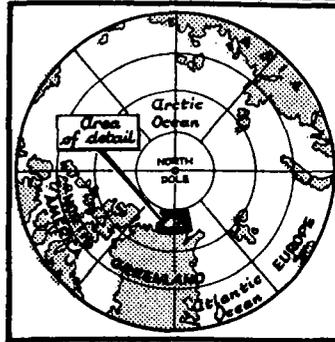
Cartographers in north Greenland have found that Kaffeeklubben Island is farther north than any previously known point of land.

Hitherto, the northernmost point was thought to be Cape Morris Jesup, about 20 nautical miles to the west of Kaffeeklubben, which means coffee club in Danish.

The measurements were made by R. L. Lillestrand, director of Electro-Optics Research at the Control Data Corporation in Minneapolis, and E. F. Rots, coordinator of the Canadian Polar Continental Shelf Project.

They determined that the Danish island, discovered by Adm. Robert E. Peary in May, 1900, is four-tenths of a mile farther north than Cape Morris Jesup.

The positions are as follows: Kaffeeklubben—Latitude 83 degrees 39.7 minutes north; Longitude 33 degrees 25 minutes west; Cape Mor-



ris Jesup—Latitude 83 degrees 39.7 minutes north; Longitude 33 degrees 25 minutes west.

GREENLAND MOVING TO GRACIOUS LIVING

GODTHAAB, Greenland (AP)—A few Greenlanders still get their drinking water by hacking chunks of ice from icebergs, but this arctic island is on the move toward gracious living.

No more igloos for the descendants of the Eskimos, no more huts built of turf. Sledge dogs are barred from the towns in southern Greenland; they are too mean.

Huge cranes sent from Denmark swing over the larger towns on the west coast of this ice-capped land. Long apartment houses, mostly two and four stories high, already dot the rocky plains of Godthaab, Sukkertoppen and other towns.

They are warmed by central-heating plants, lighted by electricity and served with running water from pipes electrically heated where necessary to prevent freezing.

The Danes, who own Greenland, are determined that the 40,000 Greenlanders get a taste of the living standards enjoyed in Denmark. The Danes are spending about \$75-million a year to do it.

Canadian Magazine Hailed

WINNIPEG, Manitoba (Canadian Press)—The Beaver, a magazine published by the Hudson Bay Company, won the award of merit of the American Association for State and Local History.

American Pilot Rescued From Ice Cap in Greenland

COPENHAGEN, Denmark, Jan. 5 (Reuters)—Robert Iba, an American pilot, was rescued today after having spent two nights on a 5,000-foot-high ice cap in Greenland.

He was picked up by a Danish helicopter and taken to Narsarsuak in southern Greenland. He landed on the ice cap Friday while ferrying a light British plane from England to Florida, where he owns an air taxi service at Fort Lauderdale.

He told newsmen that during the flight he lost sight of the ground and picked up signals from a radio beacon he assumed to be guiding him to Narsarsuak. "I never saw the ice cap before I hit it at 5,000 feet," he said.

Beetles Help Canadian Lab By Eating Bear Carcasses

INUVIK, Northwest Territories (Canadian Press)—A colony of beetles is working for the Federal Government in this community 125 miles north of the Arctic Circle.

The beetles are used by the Federal research laboratory at Inuvik, near the mouth of the Mackenzie River 1,000 miles northwest of Edmonton. They eat the carcasses of polar bears, muskrat, moose and wolf for the benefit of science.

FISHY, BUT A GOOD BUY

NOME — Since the beginning of the Alaskan fishing industry, the cumulative value of its products has reached an estimated \$4 billion—more than 550 times the 1967-Alaska purchase price of \$7.2 million.

Soviet Opens Tidal Power Station

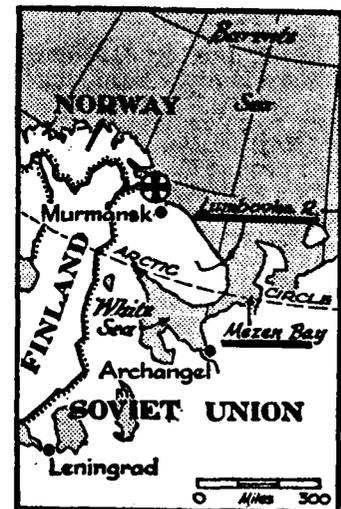
The New York Times
MOSCOW, Dec. 29 — The Soviet Union announced today the start of operations at its first experimental tidal power station on the Arctic Ocean.

The station, 50 miles northwest of Murmansk, on a small fjord-like inlet called Kislaya Bay, has been under construction for several years.

The first power is being produced by a French-manufactured 400-kilowatt turbine. A second turbine, to be installed later, will raise capacity to 800 kilowatts.

The Soviet Union has lagged behind other countries, notably France, in the development of tidal power. This small initial station is designed to serve as a pilot project for far more ambitious power plants.

Future projects include a 320,000-kilowatt station at the mouth of the Lumbovka River, on the northeast coast of the Kola peninsula, and a 14-million-kilowatt tidal power plant at Mezen Bay, farther to the east across the



The New York Times
Dec. 30, 1968
Site of new station (cross)

mouth of the White Sea.

The 5,000-ton shell of the power house of the new station was cast in reinforced concrete at an assembly ground near Murmansk and floated to the station site earlier this year.

There May Be Oil Under Arctic Ocean

Moscow.

A Soviet scientist said he thought huge reserves of oil and natural gas were hidden under the Arctic Ocean.

Professor M. K. Kalinko of the National Geological Oil Research Institute was quoted by the official Tass news agency as saying that the Arctic's geological structure was very similar to that of the oil-rich Gulf of Mexico.

But he added that detailed prospecting would have to await the development of special equipment for submarine operations in arctic conditions.

His statement came about three months after an official report that prospectors had discovered the first oil deposits on the shores of the Arctic in northern Siberia.

'ALASKA' ALEUT WORD

JUNEAU—The name "Alaska," is believed to be of Aleut origin and to mean "Great country" or "Great continent." It was first reported by a Siberian merchant in 1762 who referred to the southwest end of the Alaskan Peninsula as "Alaksu" or "Alakshak," in 1768 Russian naval officers referred to a large island northeast of Unimak Island as "Alaxa" in the same general manner.

SOVIET PROTECTION RESTORES REINDEER

MOSCOW (Reuters)—Protection policies and 40 years of hard work have restored the once nearly extinct reindeer population of Russia's far northern Kola Peninsula to a point where reindeer meat is now an important export.

The reindeer, which once roamed over the northern cap of the European Continent from Norway to Murmansk, nearly disappeared by the 1920's.

Overhunting in Czarist times and the ravages of the civil war that followed the 1917 Bolshevik Revolution reduced the animals on the Kola Peninsula at one time to only 100.

At the same time, the human



ATOMIC ICEBREAKER: The Soviet ship, the Lenin, plowing through ice in Arctic ocean. Vessel is said to be first atom-powered icebreaker according to Soviet agency, Novosti.

Soviet miners on Arctic frontier 'rough it' in a full-fledged city

By Reuters

Apatity, U.S.S.R.

A raw, frontier quality characterizes the Soviet Arctic, where men still find themselves locked in a primeval struggle with nature.

Life dwindles before the eyes as one moves north into the Arctic—the trees become smaller, the log cabins, typical of northern Russia, become scarcer, and the snow-covered forest tundra takes over.

At first it appears that only reindeer can survive in this wilderness. Then suddenly there is a town—a full-fledged city with

multistory apartment houses, movies, restaurants, and bus lines.

'Company town'

Apatity, 65 miles above the Arctic Circle on Russia's Kola Peninsula, is such a city. It now has a population of 45,000. Nine years ago, it did not exist—and it is still not shown on most maps.

If Apatity were in the Canadian or American West, it would be described as a company town. The city was built as a residential center for the giant apatite mining combine, which extracts and processes apatite ore

for use in superphosphate mineral fertilizers.

The combine and its subsidiaries employ virtually all the workers in the city and in nearby Kirovsk, a 40-year-old city with a population of 55,000.

Basic necessities appear to be well taken care of. "Our state is aware of the difficult conditions we live and work in. It looks after us," one province official said.

"We receive the Moscow papers on the same day they are published and Leningrad is less than 24 hours away by train. We do not feel isolated up here," he added.

population of the area, many of whom were reindeer breeders—also dropped. The population began to climb again when the Soviet Union began its massive industrialization program at the beginning of the 1930's.

Today, more than 20,000 reindeer wander the Kola tundra, and hunting them for their meat has become a major local industry.

Small Atomic Heat Plants Designed for Soviet Arctic

MOSCOW (AP)—The Soviet Union has designed a small atomic plant to provide heat and power for remote settlements in the frozen arctic regions of the country, Tass, the

official Soviet press agency, reported.

The atomic units, designed to operate a 1,500-kilowatt turbine, would provide power 60 to 90 per cent more cheaply than standard fuels. The number of small reactors used for any settlement would depend on power requirements.

Polar Bears Achieve A State Close to Hibernation

By WALTER SULLIVAN
The New York Times

COLLEGE, Alaska, April 11 —After years of debate as to whether or not bears hibernate it has been shown that even the most unlikely hibernators — the male polar bear — can slip into a state of almost completely suspended animation.

The pulse rate after a week or so of drowsing sinks to a nighttime rate of eight beats a minute, compared with the bear's summertime sleeping pulse of 40 or above. However, the bears are not true hibernators in that their body temperatures do not drop radically during their winter nap.

These findings were disclosed here today as Dr. G. Edgar Folk Jr. of the University of Iowa told of current research on hibernation at the Naval Arctic Research Laboratory at Point Barrow. He spoke at a two-day symposium here at the University of Alaska that was a prelude to the dedication tomorrow of the laboratory's new facility at the northernmost tip of American territory.

In the true hibernators, such as the marmot, ground squirrels and chipmunks, not only does the pulse rate drop to a few beats a minute but the body temperature can also sink close to freezing point.

Such animals as rabbits, foxes, wolves and wolverines may sleep 15 hours at a time in winter instead of their usual eight, Dr. Folk said in an interview, but in most of them the pulse rate actually goes up, presumably to keep the animal warm against extreme cold.

The hibernating abilities of other animals, such as raccoons, badgers, weasels and skunks, are unknown, he added, even though their summer habits are very familiar.

The bear, with its dramatic drop in pulse, but only slight drop in body temperature — from four to five degrees below normal—is in an intermediate category. The same, Dr. Folk said, may be true of the raccoon, a relative of the bear, but this has not been tested.

The factors that enable some mammals, but not others, to hibernate are of major interest because of their possible application to man. Suspended animation could be used to enable astronauts to endure space flights to other planets.

Another possible use of a treatment that gives man a "physiological vacation," according to Dr. Folk, would be in time of famine. Large population, he said, "could, perhaps, live comfortably on half rations."

Of interest to those seeking

to protect soldiers against the cold, he added, is the fact that frostbite is rare in new-born caribou, moose and seals. If this is because of increased circulation in the extremities, this might be achieved in man by means of drugs, he said.

Nevertheless, it was found that male polar bears in the frigid environment of Point Barrow curl into a tight ball, switch their tails over their noses, and doze off for prolonged periods. Even during the season of total darkness their pulse rate shows a diurnal cycle, rising to a comparatively high peak at noon and sinking to eight or ten beats a minute at midnight.

How their bodies know when it is noon is still unknown.

Such pseudohibernation has not been observed in laboratory experiments at lower latitudes, Dr. Folk believes, because it is not cold enough. The bear, he said, "has to feel pretty miserable" before he wants to curl up. He must also be fat. Bears encountered in the wild in midwinter tend to be skinny ones who do not have enough fat to live on and must seek food.

During the winter period female polar bears are inside a den on land where during Feb-

ruary once every two years they bear their young. Dr. Folk believes they probably wake up at the noontime period of peak heartbeats to suckle their young, then drop off to sleep again.

The accounts of several Eskimos have convinced him that the females never leave their den throughout the winter. These Eskimos have told how they set up their winterquarters in a hut, living there peacefully until about April 1 when a she-bear and her cubs suddenly burst forth from a hidden den nearby.

Dr. Folk admires bears, not only for their sleeping ability but their intelligence. He warned against trying to outwit a bear. He told of friends who camped near the brink of a cliff. Having seen a bear in the vicinity they lowered their provisions by a long rope from an overhanging spot on the cliff. When they awoke the next day the bear had hauled up the rope and made off with all their food.

Of interest to those seeking to protect soldiers against the cold, he added, is the fact that frostbite is rare in new-born caribou, moose and seals. If this is because of increased circulation in the extremities, this might be achieved in man by means of drugs, he said.

Home, Home On The Tundra— It's Reindeer Roundup Time!

NOME, Alaska (AP) — It's roundup time out west—out west of Nome, that is. And it's tough going.

This is reindeer roundup time on Alaska's lonely, frozen Seward Peninsula, where the skies are mostly cloudy all day—and it's 30 below zero.

But it's a living for the Eskimo herd owners and their "waddies" who go about the tough and dangerous job of herding and branding in the powdery snow.

Typical of the herd owners is Lawrence Davis, a wiry Eskimo from Nome. He and his men, like Wilfred Kakaruk, Rodney Jugzruk and Clifford Attatayuk, round up the frisky animals with sled dog teams, snowmobiles they call "iron dogs" and afoot.

They live in tarpaper shacks on the icy tundra and dine mostly on reindeer meat, some stuff they call "pilot bread" and tea.

The reindeer are herded into a giant, round corral where they mill endlessly with thunder in their hooves and great horns clacking as they knock against each other, while little clouds of steam spurt from their nostrils.

Boldly, the parka-clad Eskimo herders move into the corral where one miscalculation would mean getting trampled—maybe to death.

The herders shout and wave their arms to turn the reindeer into a wooden counting chute. Animals already branded with small cuts in their ears are allowed to pass and return to the range.

The Eskimos grab the others,

sometimes with a flying tackle that would make a pro football player smile, and brand them, too.

Reindeer herds are an important industry on this Texas-sized peninsula that juts into the Bering Sea. There are an estimated 30,000 reindeer in Alaska and, except for government herds, only natives can own the animals.

The industry supports hundreds of native families in the state. Gross income from the sale of reindeer meat and hides is reported to be about \$300,000 a year.

An Eskimo can get started in the business with a loan of 500 reindeer from the federal Bureau of Indian Affairs. At the end of five years, he returns the 500 "starter" deer and goes on

from there with whatever surplus he has.

Davis says it's a rugged, year-around job to build and keep a herd, to guard it, protect it from predators and market the animals.

But Davis and his men seem to love it. And, who can tell, maybe some day they'll find one with a red nose. Then they'll all get rich.

1.5 Million Reindeer Disrupt Industrial Area in Siberia

MOSCOW, Nov. 23 (Reuters) — About 1.5 million reindeer, moving south in search of food, disrupted a new industrial area in northwestern Siberia and got lost in a network of roads, railroads and construction sites, the Soviet Press Agency, Tass, reported yesterday.

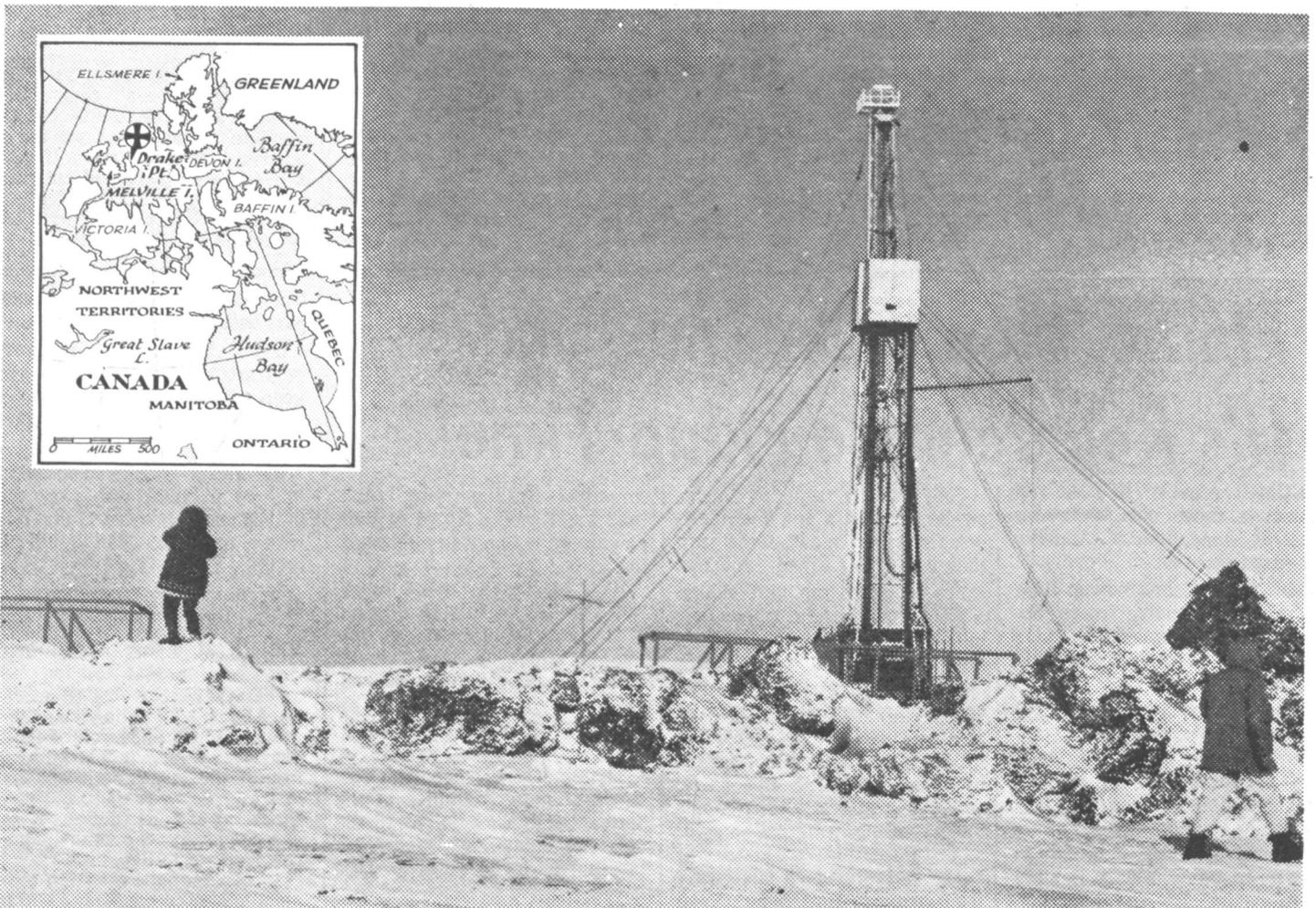
It said that the invasion took place north of the Arctic Circle at Norilsk, which has only a tiny settlement when the last mass reindeer migration took place 30 years ago.

Rescue parties were formed to set the hungry animals on the right route to the south.



From "Fighting the Polar Ice," Doubleday, Page & Co., 1906

Long-haired Siberian ponies of the American expedition of Ziegler-Fiala pulling sleds over Rudolf Island on attempt at North Pole



The New York Times (by Jay Walz)

Panarctic Oil Company's first well is being drilled 24 hours a day on Melville Island in the Northwest Territories