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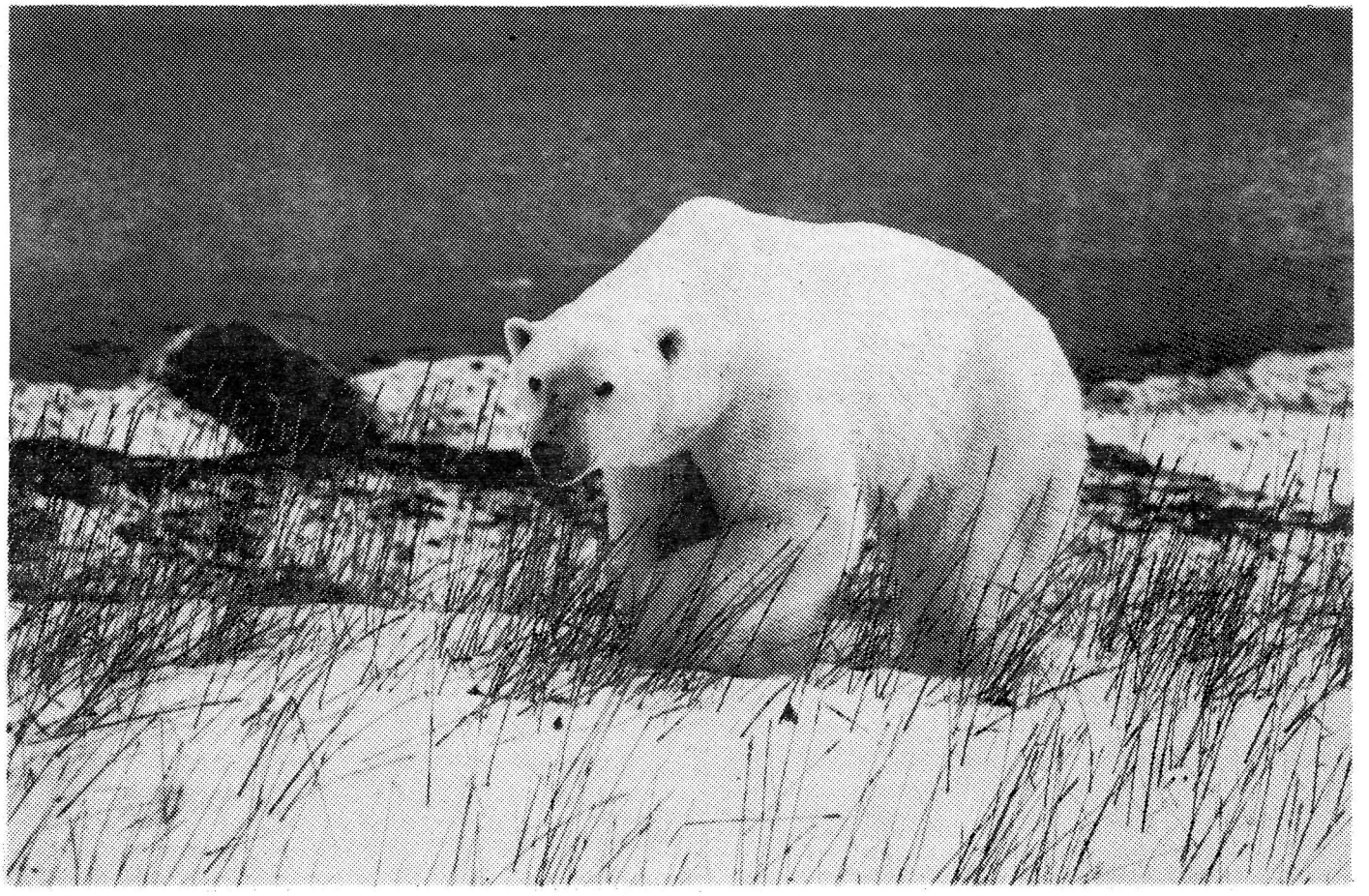
THE POLAR TIMES



Curious and fearless, polar bears like to investigate anything that seems out of place in their monochrome world of snow and ice.

Dan Guravich

National Oceanic and Atmospheric Administration

The Polar Times

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Explorers Reach South Pole

Associated Press Dec. 24

London — Charlie Burton, Oliver Shepard and Sir Ranulph Twisleton-Wykeham-Fiennes of the British Transglobe Expedition don't have to dream of a white Christmas. At the South Pole, Christmas is white as a matter of course.

It's also gift-wrapped in winds over 90 mph and temperatures of 52 below zero.

The three Britons plan to spend Christmas Day at the pole. They arrived there Dec. 15 on the first leg of a round-the-world trip that has been described as "the toughest journey in the world" and the last great expedition on earth.

Riding snowmobiles, pulling sledges and supported by food and fuel drops from the expedition's Chubb Twin Otter aircraft, they left their base 1,200 miles from the South Pole in the Borga Massif mountains on the edge of Antarctica on Oct. 29.

On the day after Christmas they plan to leave the pole for McMurdo, 800 miles from the pole on the opposite edge of Antarctica from the Borga Massif.

When they arrive in late January to meet the expedition's polar research ship Benjamin Bowring, they will have completed the longest crossing of Antarctica ever made.

The expedition's goal is a 52,000-mile zigzag trip around the globe via the South and North Poles in three years.

Led by 36-year-old Fiennes (pronounced Feenes), who claims his Norman ancestors came to England with William the Conqueror in 1066, it's the first time the hazardous sea, ice and land route has ever been attempted.

The expedition is sponsored by 631 companies, including some of the biggest British firms, and backed by Prince Charles, heir to the throne. He gave it an official send-off on Sept. 2, 1979, when he took the wheel of the Benjamin Bowring on the first few miles of its journey down the River Thames at Greenwich.

Fiennes' wife, 32-year-old Lady Virginia, is among 30 members on the expedition, which took eight years to plan.

Fiennes said they undertook the journey "for England," to prove that patriotism and the sense of adventure are not dead.

"For me, England is worth living for, dying for," said the aristocrat whose ancestor Count Eustache de Fyne de Boulogne cut off the head of King Harold after the defeated Saxon monarch was shot in the eye by an arrow at the Battle of Hastings in 1066.

Fiennes has led expeditions to the Nile, the North Pole, Greenland and other parts of the world and is vice president of the World Expeditionary Association.

The expedition traveled down through Europe and Africa, organizing a series of exhibitions along the way on behalf of the sponsoring firms.

Fiennes, Burton, a 36-year-old ex-army corporal and former security guard, and Shepard, a former east London beer salesman, formed the ice party that set off for the pole. The trek took 47 days from the mountain base to the pole.

In a message sent to London, Fiennes described the hardships of the intense cold which split and cracked their fingers, toes, lips and nostrils and made the fan belts on their machines so brittle they snapped.

Heavy snow at one time slowed them from 45 miles a day to 1 mile an hour. Wind piled ice into ridges 5 feet or higher across their path for some 300 miles, snapping the steering skis of their machines or sending them careening into furrows while the towed sledges overturned.

After McMurdo, site of another U.S. base, the expedition goes on to Auckland, New Zealand, then to Sydney, Australia, where Prince Charles is due to meet the team next April.

Dr. Vivien Fuchs, a British explorer and scientist, completed the first overland crossing of the Antarctic continent in 1958.

22nd Team Leaves For Showa Base In Antarctic

The 44-member 22nd Antarctic observation team left Tokyo for the Japanese Showa Base on Ongul Island in the Antarctic Tuesday aboard the icebreaker Fuji.

It includes a wintering team of 34 members who will replace the 21st wintering team now at Showa Base next February.

The Fuji is due to arrive at the outer fringes of the ice pack north of Showa Base early in January. It will return to Tokyo on April 20.

The main objective of this year's observation team is to study rocks and mineral resources in the area surrounding Showa Base.

The wintering team also will check the earth's crust through man-made tremors next year. Nov. 26

The Polar Times

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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 $2.00 a year or $5.00 for 3 years, which entitles members to receive THE POLAR TIMES twice a year.

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UAF scientists join expedition

Two University of Alaska, Fairbanks, scientists are representing the United States on a three-month scientific centennial expedition organized by the Swedish government to commemorate the discovery of the Northeast Passage along the Arctic coast of Europe and Asia.

Involved are Dr. John Kelley, associate professor of marine science at the university's Institute of Marine Science, and technical director at the Naval Arctic Research Laboratory at Barrow, and Dr. Thomas Gosink, a research associate at the Geophysical Institute.

Scientists from West Germany, Great Britain, France, Finland, Norway, Denmark, Canada, the U.S. and Sweden have embarked on the Ymer, a Baltic Sea icebreaker, to conduct scientific research in waters off Spitzbergen, northeast Greenland and Franz Josef Land, in the Russian Arctic.

Kelley and Gosink, with financial support from the U.S. Department of Energy and the National Science Foundation, are studying the air-sea-land exchange of carbon dioxide and trace gases.

Kelley, involved in work at the Barrow research laboratory, was not able to board the Ymer, but is arranging the forwarding of equipment and data to Gosink. He also will help analyze findings after the voyage.

For centuries, explorers had tried and failed to find a maritime route along the arctic coast of Europe and Asia. A Swedish explorer, Adolf Erik Nordenskiold, in his ship the Vega, accomplished this after he set sail from Tromso, Norway, and arrived at Clarence, Alaska, July 22, 1879.

The Anchorage Times July 18

Bear Bugging

The polar bear was called "1795," the number on her ear tag, and she wore a harness that had a radio transmitter. Researchers led by Jack Lentfer of the Alaska Department of Fish and Game released the bear in 1977 and tracked her with the Nimbus 6 satellite.

On July 15, 1978, radio signals from the bear stopped. By then "1795" had wandered more than 700 miles from Point Barrow, Alaska, to Soviet territory along the East Siberian Sea.

It was a worthwhile experiment, Mr. Lentfer says, though the bear was never recaptured. The animal's mobility surprised researchers, he notes, and it raised a question: "Do we have one circumpolar population of bears that has to be managed internationally or do we have several discrete populations that can be managed by the individual countries concerned?"

Last year the United States, Canada, Norway, Denmark and Greenland cooperated in fitting a dozen polar bears with radios. The findings point to discrete populations, Mr. Lentfer says.

Restless "1795" may have been an oddity.

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The Polar Times

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No. 91 DECEMBER 1980

15 Nations to Protect Sea Life in Antarctic

By WALTER SULLIVAN

After prolonged negotiations, 15 nations have signed a convention for the protection of marine life in the Antarctic.

The convention, signed in Australia last week, clears the way for a more difficult task: finding a way to deal with the mineral resources of the continent. This will be the chief subject for discussion at the Antarctic Treaty Consultative Meeting, to be held in Argentina next summer.

Also at issue will be submarine oil and gas deposits that may lie off Antarctica, especially under the Ross and Weddell Seas. Hints of such resources appeared in drilling in the Ross Sea by the American ship Glomar Challenger.

West Germany has recently conducted seismic exploration of sediment under the Ross Sea. Japan and possibly New Zealand are expected to follow suit, and Norway has probed the Weddell Sea floor.

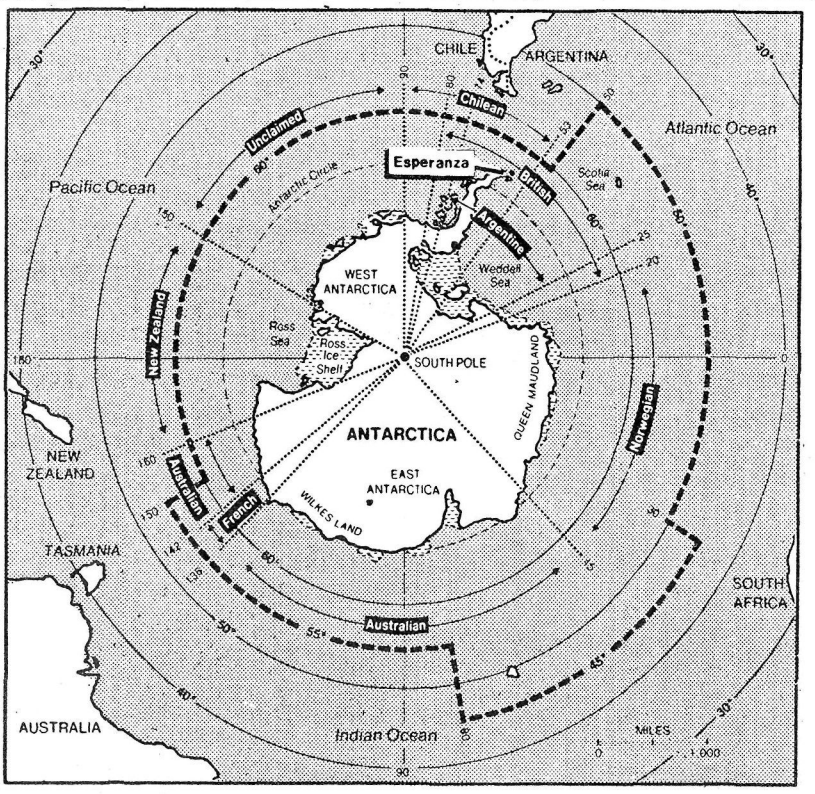
Discoveries of oil and gas reserves in the Arctic have encouraged hopes for the Antarctic, but the water depths there are far greater than those in the Arctic, and ice conditions would be more threatening to drilling ships.

The treaty emerging from the United Nations Law of the Sea Conference in Geneva would establish "exclusive economic zones" extending 200 miles from national territories. Because of the ambiguous state of national sovereignty in Antarctica, application of this treaty there could create havoc.

The Law of the Sea treaty is expected to come into force in 1986 or soon thereafter, and nations adhering to the new Antarctic convention are under pressure to resolve the resources issue before then. Eight of them — Argentina, Australia, Britain, Chile, France, New Zealand, Norway and South Africa — claim sectors of the Antarctic or offshore islands, and some claims overlap. The other participants in the convention — Belgium, East Germany, West Germany, Japan, Poland, the Soviet Union and the United States — make no claims and reject all or most of the others.

Since 1959, when the original treaty on Antarctica was signed by the 12 nations then active there, the participants have been able to dodge the claims issue. Expeditions of various nations have operated freely in claimed zones. The treaty forbids military activity, the testing of nuclear weapons and the disposal of radioactive waste. Its provisions for inspection have been carried out without apparent friction.

Inspections are also provided for in the new Convention on the Conservation of Antarctic Living Marine Resources. As in enforcement of quotas established by the International Whaling Commission, inspectors of a given nationality will board ships regardless of the flag it is flying.



The New York Times/Sept. 21, 1980

The convention is to protect marine life up to the Antarctic Convergence (heavy dashes), the point where cold water meets warmer.

Violations of conservation measures will be reported to the government of the inspector, which will then report to the international commission to be established under the convention.

Harvesting quotas will be set under recommendations by a scientific committee. All signers of the convention will be represented on the commission and the committee, both based at Hobart, Tasmania.

The convention will come into force 30 days after a majority of the 15 signers have ratified it. It applies to the region south of the Antarctic Convergence, where the frigid surface waters constituting the Antarctic habitat dive under warmer water to the north. It is defined in the treaty by a zigzagging line between latitudes 45 and 60 degrees south.

An early concern, once the convention comes into force, will be to determine a harvesting policy for krill, the tiny shrimp that are the main food of Antarctic species ranging from gigantic blue whales to penguins, seals, seabirds, fish and squid. With the depletion of blue whales the population of krill has soared, offering a rich protein source. It is particularly tempting to countries such as Poland that are being denied traditional fishing grounds by the extension of national fishing rights 200 miles offshore.

Whales Already Covered

Seals and whales, already covered by separate conventions, will figure in deliberations of the new commission only as they affect the abundances of other forms of life such as krill.

A concern of developing nations has been that adherents to the Antarctic treaty, acting as a "club" of industrialized nations, will create systems of Antarctic exploitation that work to their advantage at the expense of the third world. Similar fears long hampered negotiations on the Law of the Sea treaty.

The developing countries would probably like to see the resources of Antarctica treated as belonging to all nations and exploited under a system such as the International Seabed Authority negotiated at the Law of the Sea Conference.

This would not be acceptable to the claimant nations, and there appears little enthusiasm among the Antarctic powers for so complex and cumbersome an apparatus. Whether those powers can agree on a system of their own at next year's meeting is uncertain.

Scientists Will 'Tickle' Magnetic Field

By WALTER SULLIVAN

The New York Times / Dec. 14, 1980

SCIENTISTS in Antarctica believe they have probably created an aurora over Quebec. The aurora should have resulted from an experiment conducted Friday to interfere with the earth's magnetic field and, the scientists hope, lead to a better understanding of the natural phenomena that can disrupt long-range communication.

By pushing a button at Siple Station, operated by the United States in Ellsworth Land, scientists jostled the magnetic field far out in space by initiating the transmission of 10-mile-long radio waves. The radio waves presumably released electrons that plunged to earth at Roberval, 125 miles north of Quebec City, probably creating a subtle shower of colored light too dim for observation by the naked eye.

Were it dark in Antarctica, an aurora would have been created there, too, but it is now spring there and daylight is continuous near the South Pole. The first two of seven rockets, however, were sent aloft to measure the plunging showers of electrons, both those induced by the radio transmissions and those occurring naturally. Several balloon launches have also occurred. One rocket, reaching a height of 130 miles, detected emissions triggered by the radio transmission, according to reports from Antarctica.

According to Dr. Louis J. Lanzerotti of Bell Laboratories, whose instruments have been installed at Siple Station to measure local magnetic effects of the experiments, "some very strange natural processes" occur in the high-arching regions of the earth's magnetic field. These affect the performance of communications satellites and ground-based communications, as well as systems of importance for defense.

In the experiment, scientists "tickle" the magnetic field with very low-frequency radio waves. The radio waves are transmitted by an antenna wire 13 miles long laid out on the ice at Siple Station. As explained by Dr. Robert A. Helliwell of Stanford University, chief initiator of the experiment, because the ice is a mile and a half thick, the antenna is, in effect, a mile and a half above the earth. Therefore, relatively little of the energy in such low frequency emissions is absorbed by the underlying ground.

The waves follow magnetic field lines that extend from Siple Station far out into space and back to earth in the vicinity of Roberval.

Electrons forming the earth-encircling radiation belt normally are trapped in paths that spiral around the magnetic field lines and reverse direction as they near the earth at each end of the magnetic arc. If their paths are perturbed by radio waves they fail to reverse and plunge into the atmosphere.

No reports from Roberval, where light-sensitive photometers have been installed to record the auroras, are yet available.

Scientists think the radio waves may induce wave motions back and forth along the magnetic field lines. Such waves could be thousands of miles long, almost as long as the field lines themselves. When specific radio frequencies are transmitted, their effects, which can include electron showers, perturbations of the earth's magnetism and disturbances in the radio-reflecting layers of the upper atmosphere, should all oscillate at a tempo matching that of the transmitted signal.

The program is one in a wide range of studies being initiated as summer approaches at research stations of the United States and other countries. One American medical study that has attracted wide interest seeks to learn why those isolated at the South Pole Station for the long winter night seem unable to purge viruses from their upper respiratory systems. Normally such viruses are "shed" within days after symptoms disappear, but swab sampling of respiratory passages has shown that flulike viruses may persist eight or nine months. An understanding of why this happens might make it possible to treat cases of prolonged viral infection that occur under less extreme conditions. Under suspicion are such factors as the extreme dryness of heated living quarters at the pole, or exposures to low temperature. Temperatures deep in the nasal passages of personnel are being monitored during indoor and outdoor activity with thermocouples inserted at the end of a fine wire.

A Soviet expedition is also studying the physical and psychological effects on its members, and a French trail party into the interior of Adelie Land will reportedly monitor the response of its members to the stresses of that mission.

According to a recent issue of the British scientific journal Nature, West Germany intends to spend the equivalent of $190 million on its Antarctic operations through 1983. The Germans reportedly plan to build a special Antarctic ship and buy one or two of the C-130 Hercules four-engined air transports whose combined ski-wheel landing gear has made them the workhorses of American Antarctic operations.

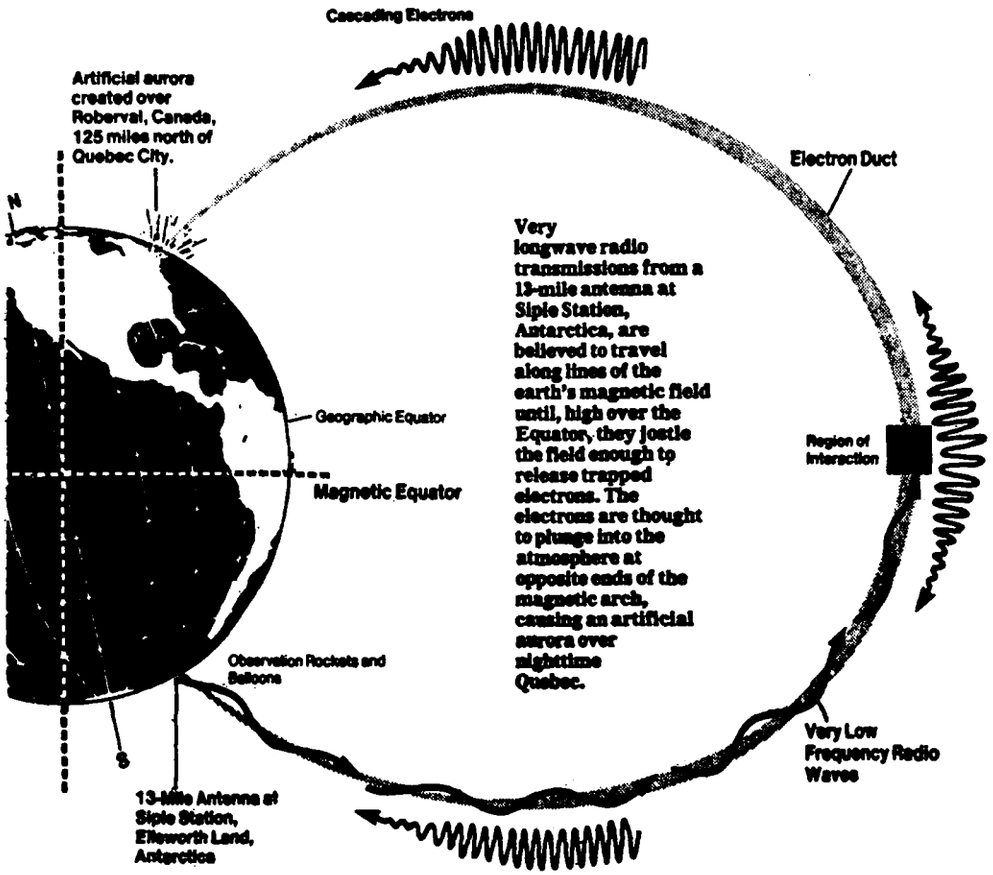
The new German base is in the area where, in 1912, a German expedition sought to establish a base on shelf ice — continental ice hundreds of feet thick — extending out over the head of the Weddell Sea. The ice broke off as an iceberg, destroying the camp.

The Russians Try Hard

The Soviet effort in Antarctica remains ambitious. Last winter there were seven manned Soviet bases in the Antarctic, compared to four for the United States. In point of numbers, Argentina led all countries last year, with nine stations below latitude 60 degrees south, but several are on islands. Most of the rest are on or near the Antarctic Peninsula, claimed by Argentina, Britain and Chile.

Many countries have taken steps to improve transportation facilities in the Antarctic. Chile has recently built a 4,600-foot gravel runway on King

Disturbing Earth's Magnetic Field



George Island, which also supports a Soviet base, Bellingshausen. The Chilean runway can handle wheeled landings by such large planes as the C-130. The Chileans are offering weekly airmail service for the nearby Argentine and British stations as well as a stopover for German flights to their new station.

Argentina has also built a gravel runway near its Vicecomodoro Marambio base on Seymour Island, but it is on a plateau so high that clouds are said to make it unapproachable much of the time.

Until recently, the only regular airlift to Antarctica has been from New Zealand to the main American base at McMurdo Sound, where most landings are made with wheels on bay ice. Landings on the snow-covered ice of the interior have been considered impractical and the ski-wheel combination has been used.

Traverses across the interior of Antarctica are being made by Australian, French and Soviet parties, the latter accompanied by an Australian scientist.

Other nations are showing an interest in becoming more active in Antarctica. East Germany has asked to be made a member of the Special Committee on Antarctic Research, the international committee that coordinates such research, basing its request largely on research conducted by East Germans with the Soviet expeditions. China has observer status with the committee and has sent scientists with Australian expeditions this year and last. New ships are being acquired or operated by several nations active in Antarctica, including Japan and South Africa.

The interest may be related to current negotiations regarding disposition of Antarctica's mineral resources. A working group of adherents to the treaty that has demilitarized Antarctica and kept rival claims from hindering research there met in Washington last week to explore possible approaches to the resources problem. A formal meeting on the subject is to take place in Buenos Aires next year.

As these and other projects by the United States and other nations get under way in Antarctica, a task force in Washington is taking a hard look at the soaring costs of United States involvement. The budget request for next year's American activities in Antarctica is $60 million, of which $5 million is for aviation fuel and $3.7 million for fuel to drive surface ships and vehicles or provide heating. The rapid rise in fuel costs has greatly increased the budget.

The policy review task force, headed by Ambassador Thomas Pickering of the State Department, includes representatives from the Defense Department, the National Science Foundation and other agencies.

While some American stations can be supplied by ship, Siple Station and the South Pole are entirely dependent on an airlift. Closing the Pole station would lead to large savings, but retaining it carries prestige value as well as advantages for scientific observations.

Navy Testing New 'Device' To Help Recover Torpedoes

By Debby Norman

Oct. 29 Bremerton Sun

The most sophisticated device the Navy has ever used to recover torpedoes is being tested on Hood Canal near the Naval Submarine Base at Bangor.

The "device" is the beluga whale, which Navy officials believe may prove to be the fastest and cheapest way to do the recovery work.

Two of the whales are undergoing training near Bangor, where they are being kept in floating pens near the base's delta pier.

The Naval Undersea Warfare Engineering Station at Keyport is cooperating with a San Diego-based research and development agency, the Naval Ocean Systems Center, in the project.

Like all whales, the beluga has acute underwater hearing. Whales, which like man are classified as mammals, also are regarded as highly intelligent.

The Navy project aims to make use of those qualities in training the whales to locate and retrieve test-fired torpedoes.

"The purpose of the research is to investigate the feasibility of using beluga whales to mark and/or attach recovery lines to practice torpedoes," said NUWES spokesman Lt. Cmdr. Rick Hammes.

"The torpedoes are equipped with a special acoustic beacon, which allows the whale to use its hearing to find the torpedo."

Captured in July 1977, the two whales will be undergoing adaptation and training near pier facilities in Hood Canal and at the Dabob Bay torpedo test range for several months, Hammes said.

The whales are 5 and 7 years old, 10 and 11 feet in length, and weigh 840 and 1,025 pounds, respectively, said Hammes.

They have previously been involved in "deep diving and open water control studies," according to Hammes.

"As part of their daily routine, the whales are trained to follow boats to various work areas," Hammes explained. But they haven't yet been allowed to swim free until they are more accustomed to the new environment, he said.

"They are periodically rewarded with dead fish, such as small mackerel and squid, for performing the behavior correctly.

"Each whale consumes approximately 40 pounds of prepared fish a day. Even though large quantities and various types of live fish are encountered in the work environment, the whales only eat fish offered to them by their handlers."

Beluga whales, which normally live in cold Arctic environments, were chosen for the research because of their ability to withstand both deep dives and a fresh water environment. The species is not normally found in Puget Sound.

The use of belugas "will extend the depth and provide both cold and fresh water capability" for test shot recoveries, according to the Navy.

A spokesman for the Naval Ocean Systems Center said the Navy has measured dives of up to 2,100 feet in the project.

But the current project isn't the first time the Navy has used marine mammals to recover test-fired torpedoes. In fact, such research dates back to 1970.

The earlier venture, christened Project Quick Find, used California sea lions to recover test payloads in water depths up to 500 feet under the direction of a predecessor agency to NOSC.

About 40 recoveries were made under the project.

Both the Quick Find and the current project involve recovery of the ASROC rocket-fired anti-submarine torpedo.

Under current procedure, the Navy uses a cable-controlled underwater recovery vehicle (CURV) to pick up torpedoes that sink to the bottom at the end of a test run. Although the CURV is unmanned and remotely operated, it requires three technicians to operate it from a service craft.

Torpedoes test-fired at NUWES are not armed.

Navy spokesmen said the species is not commercially hunted to their knowledge and is not on any endangered species list. But the beluga, like other marine mammals, receives protection under the Marine Mammal Protection Act.

"The Navy complies fully with the provisions of the act," a Naval Oceans Systems Center spokesman said.

Navy officials also said the project has no applications beyond the recovery of test-fired torpedoes.

Technology developed in the project will not be used to plant explosives or other weapons, according to the Navy.

Indian Ocean Volcano Erupts

MARION ISLAND, Indian Ocean, Dec. 20 (AP) — A long-dormant volcano has erupted on this remote island 1,152 miles southeast of Cape Town, causing no injuries or property damage, South African officials said. The island, one of the Prince Edward Islands, is a South African possession. About 20 weather and research technicians are its only inhabitants.

British Ship, Sunk in 1857, Is Found in Arctic Seas

The New York Times

WASHINGTON, Aug. 16 — Searchers in the Canadian Arctic have found the remains of the Breadalbane, a three-masted British square-rigger that sank 127 years ago, the National Geographic Society announced yesterday.

The Breadalbane, its masts still upright, was detected late Wednesday with a sonar instrument towed by a Canadian Coast Guard icebreaker. It was found in about 300 feet of water, less than 90 miles from the magnetic North Pole.

The ship was crushed by shifting ice sheets early in the morning of Aug. 21, 1853. All 21 crewmen escaped to a nearby steamship. The National Geographic Society said that the sinking apparently is the northernmost shipwreck known.

The vessel's discovery came after a three-year search led by Dr. Joseph MacInnis, the head of a Canadian undersea exploration concern.

"It appears to be in one piece, and we suspect it is well preserved," said Robert C. Radcliffe, a spokesman for the National Geographic Society who talked with members of the expedition by radiotelephone Thursday. "Apparently the ship was sheared in the ice, and it sank straight down very quickly."

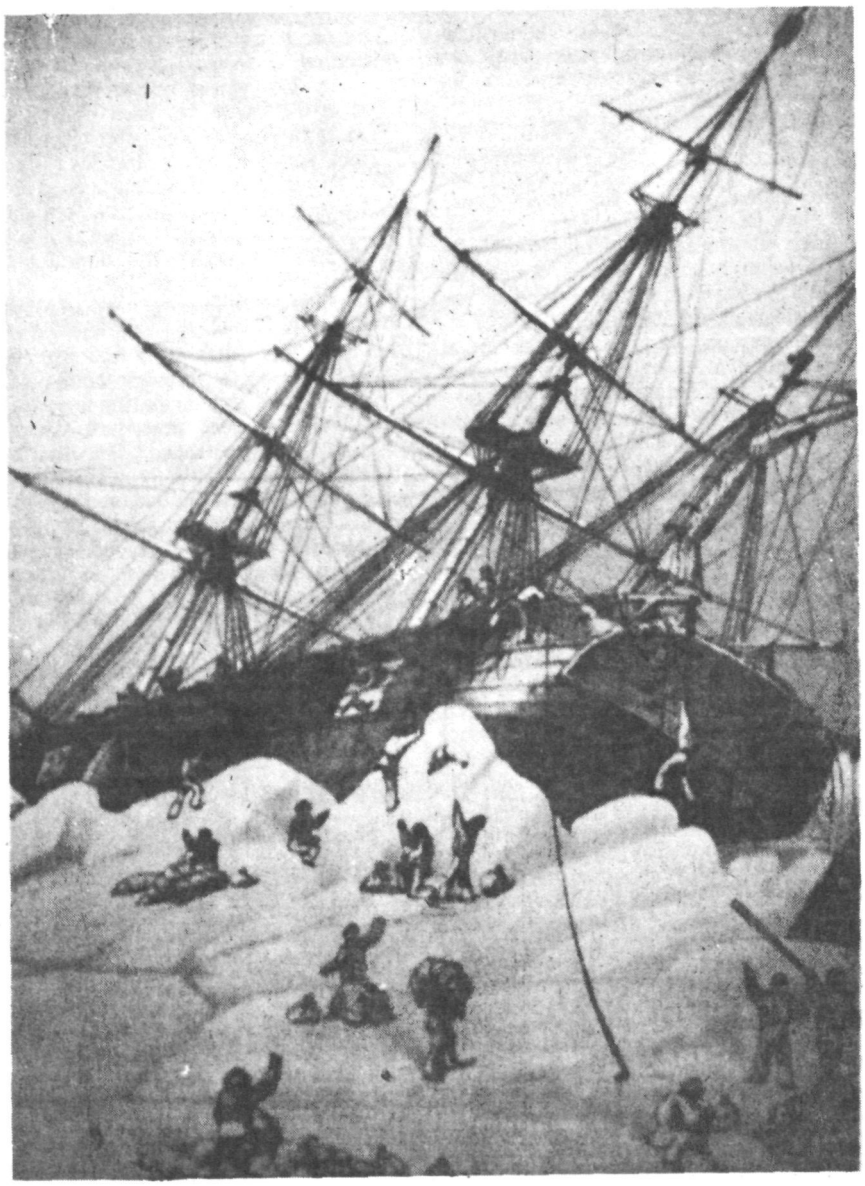
"On the television screen in the search ship," Mr. Radcliffe said, "it looked like a ghost ship floating across the sea."

The hunt for the 125-foot barque was conducted over three summers, but a National Geographic Society statement issued yesterday said that weather and sea conditions had permitted only six full days of active searching.

The Breadalbane, an expedition supply ship, went down while searching for Sir John Franklin and his 128-member crew, who perished while seeking a northwest passage across North America.

According to the cargo records of the Breadalbane's sponsors, nothing of great value was aboard the ship when it sank.

Wrecks found in very cold water, like this one, are considered particularly valuable to historians because the ship and its stores are usually in a good state of preservation. Next spring, Dr. MacInnis plans to cut a hole through the ice above the wreck and to lower a diver to retrieve any accessible relics.



ICY ESCAPE—An artist's sketch depicts crewmembers fleeing the doomed H.M.S. Breadalbane, which was trapped in crushing ice floes and sunk 127 years ago in arctic waters off Canada.

Stalking Diamonds

One of the more tantalizing discoveries of recent decades has been the occurrence of diamonds in material heaped up near the Great Lakes by ice sheets that swept south across Canada during the ice ages. Somewhere in the region traversed by the ice there must be a rich source of diamonds, and geology students have spent many a summer looking for it in vain.

Soviet geologists reportedly have been luckier, tracing a trail of glacier-strewn diamonds to their source in Siberia. And a team from Lehigh University has tried the same approach on an active glacier in Alaska. Last summer, they collected samples of material deposited by the Trident Glacier in the Alaska Range, midway between Fairbanks and Anchorage.

As the glacier cut into mountainsides far up the valley, it picked up rock that was then deposited in moraines that can be traced to the specific mountain from which the material was carved. It is hoped that, by examining these "mineral collections," promising resources can be identified.

Ice Ends Dome's Beaufort Sea Drilling

CALGARY, Alberta, Oct. 15 (Reuters) — Dome Petroleum Ltd. announced it had suspended its oil drilling operations in the Canadian Beaufort Sea area until next June because of poor weather conditions.

Dome said ice conditions were "the worst in its five years of drilling" in the area.

The announcement was made as a Government deadline for drilling was about to expire. The Canadian Government, which closely regulates drilling operations in the region, originally set Sept. 25 as the final drilling day this year, but then granted a company request for an extension.

It's 40 Below in Canada's Arctic, Where U.S. Winter Gathers Fury

By ANDREW H. MALCOLM
The New York Times

YELLOWKNIFE, Northwest Territories, Dec. 28 — New York City's winter starts way up here.

And if present temperatures in these parts are any indication, the cold snap that hit the New York metropolitan area and much of the United States in recent days is just the beginning of a long and very cold winter.

It was warmer here in the capital of Canada's Northwest Territories today: The thermometer crept up to about 40 below zero. But that was still cold enough to knock out electric power in at least one major community, where water and sewage pipes and people began freezing within hours and power linemen spent the night shinnying up utility poles by the eerie green rays of the Northern Lights.

Typically, these cold high pressure zones (American weather forecasters always call them "cold Arctic air masses"), such as the one growing here now, squat over northern Canada for days, building pressures higher and higher and making temperatures go lower and lower. Rising up to 10 miles in the air, the bitter cold domes eventually collapse on themselves, squirting long streams of icy fingers and fronts toward the south and east.

There, they clash with warm southern air, igniting chains of storms that barrel in off the Great Lakes, newly laden with tons of warm moisture, to dump more than two inches of snow an hour at times on parts of New York, Pennsylvania, Ohio and other areas.

Seen from above, these winter weather systems look like some giant continental coffee cup with white storms — some of them 150 miles long — swirling about like milk being stirred in. "Humans think on too small a scale," said Michael Newark, a Government meteorologist. "We are talking cold air masses spread over thousands of miles, dragging dozens of storms in their wake all over North America and even down into Florida."

Canada monitors the coming weather by satellite and unmanned weather stations scattered about the north, which, though sparsely populated, actually makes up 40 percent of the country's 3.9 million square miles.

The weather brewing here, more than 4,000 miles from New York City, has many effects on life throughout the United States. It can keep warm fronts farther south. It can lead them farther north. They can do battle over the Great Lakes or the Plains and paralyze the nation's transportation system. Or Canada's cold air can slide under an Atlantic Coast warm air mass, as it did in February 1969, freeze the rain as it falls through the cold strata and bury New York City in a record-breaking blizzard.

The New York Times / Dec. 29, 1980

Canada's north makes up 40 percent of the country's land area.

"Canadians," the British actor Robert Morley once observed, "love to sit in the dark trembling with fear at weather forecasts." But according to Mr. Newark, Canada is unfairly regarded as the birthplace of the cold snap, although hot chocolate is still a best seller at baseball games in July. Mr. Newark says Canada's northern air masses are actually too cold to carry snow. It is the warmer United States air and moisture that temper the bitter cold to about 20 degrees to set off the big snowstorms.

Canada's north, where average temperatures have begun to decline again after five decades of slight increases, is actually a desert, with most areas recording less than 10 inches of precipitation a year, compared to New York's 42 inches. There is less than five inches of snow here now; it comes in the fall and blows around for six months.

But with its vast, open spaces, its long nights free of blanketing clouds, its minimal winter hours of warming sunlight and its snow-covered expanse to reflect back what little heat does filter down, Canada's Arctic region is an ideal breeding ground for cold weather systems.

It is also less than ideal for humans accustomed to or spoiled by modern conveniences. Some vehicles are turned on in the fall and turned off in the spring. Nowadays others are plugged in to electric heaters while idle. Overnight, rubber tires are frozen flat on one side. Fuel oil bills can reach $250 a month. Auto exhausts create frozen fog that hangs over highways for hours. Accident victims trapped outdoors have been frozen solid within hours.

The quickest venture outside requires a full parka, mittens and boots, which even then can be quickly pierced by the most gentle breeze. For example, 20 below in still air plunges to 45 below with just a 10-mile-an-hour wind.

Many Arctic veterans tell the temperature by chimney smoke. A straight plume is about 30 below. A slanted plume is closer to 40 below. A swirled plume means, "Forget it."

The plumes were swirling last night in Rae, an Indian community of 1,700 about 60 miles from here. The Dogrib tribe was gathering for its annual year-end feast and weddings at 4 P.M. when the lights went out in one end of town. After five hours of work electricity was restored — for a few minutes.

Then, with all the furnaces, Christmas lights, stoves, car heaters and other appliances drawing too much power, the main transformer gave out. From the sky Rae was erased from the landscape. A visitor asked how long the power would be off. "Too long," said Dan Marion, an Arctic veteran who immediately began assembling propane heaters and draining water pipes and tanks.

By midnight homes without wood stoves were chilled. Children, whose ancestors spent entire lifetimes living only in animal skin tents, were huddling under blankets, some of them crying. The feast was postponed, but the foods were put out on tables — to freeze for safekeeping.

Bulky linemen swaddled in protective clothing struggled in the cold where screwdrivers snap like candy canes and hammers shatter on impact. Overhead the filmy green folds of the Northern Lights danced in the clear sky while spectators protectively blinked their eyes every few seconds against the instantly stinging cold. According to the calendar, the first week of winter was officially over.

Q. *If a Foucault pendulum were constructed over the North or South Poles, would its motion be circular, rather than back and forth?*

A. No. It would swing back and forth in the normal manner, but if free from local influences the direction of its swing would rotate. At the North Pole, the rotation would be clockwise. At the South Pole, it would be in the opposite direction. In both cases, a full circle would be completed each sidereal day (23 hours and 56 minutes).

The reason is that the earth rotates, whereas the pendulum continues to swing in the same direction in inertial space (that is, with reference to the stars). The sidereal day is the time required for the earth to rotate, relative to the stars.

At the Equator, no change in the direction of swing would be observed. The rotation rate varies at other locations depending on the latitude. (At a given location, the rate per sidereal hour is 15 degrees multiplied by the sine of the local latitude).

The effect was first demonstrated in 1851 by J. B. L. Foucault when he suspended a 62-pound ball on a 200-foot wire from the dome of the Pantheon in Paris.

EXXON USA

THIRD QUARTER, 1980

Protecting bear and man in the Arctic,

The oil industry learns how to conduct oil exploration with minimal risk to bears (and from bears) in the Far North.

by Richard Davids

Polar bears inhabit the ice floes of the Far North, seldom journeying inland more than 100 miles. Blacks and especially grizzlies are strongly territorial in their feeding habits; not so with polar bears.

Formerly it was believed that polar bears were complete nomads, wandering anywhere at will across the ice pack. Scientists now agree that there are several discrete populations, with strong attachments to their maternity denning areas.

Nevertheless, a few individual polar bears have been known to make prodigious journeys. One trapped off the coast of Greenland and fitted with a radio transmitter traveled east all the way to Russia at which point the radio ceased functioning. A pregnant female, similarly monitored, roamed from Alaska west to the Soviet Union where officials, with unprecedented humor, promised "a warm reception to this transgressor of state borders." The Soviets concluded, "Maybe she was born in our country and crossed the two continents to give life to her children in the place of her birth." Ten years earlier, the Russians reported a polar bear in the forests a thousand miles from the sea.

There's hardly a place in the arctic — no matter how remote — where polar bears haven't been found. Observers have reported them in the vicinity of the North Pole. Two years ago, a Japanese adventurer seeking to travel by dogsled to the North Pole was awakened when a polar bear ripped apart his tent. The man fled while the bear ate the expedition's supply of dog food.

Biologists generally rate the black bear as timid. Exceptions include females with cubs and park bears emboldened by feeding. Grizzlies, on the other hand, are uniformly irritable. They will charge whenever they feel that an intruder threatens their cubs, their food supply, or their own private range. Even so, most grizzlies get out of the way when aware of human presence. The person who is injured or killed by a grizzly is generally someone who has surprised an animal at close range in thick cover. For that reason, seasoned explorers in grizzly habitat are sure to announce their presence with plenty of noise.

Polar bears are something else. Less aggressive and contentious than grizzlies, they are curious about anything that differs from their monochrome world of snow and ice. Generally they are fearless. Last fall a naturalist tried to frighten a bear away from a plastic drum of water at the foot of an observation tower. The animal simply stared at him. Then it stood erect and tried climbing the girders.

It is the polar bear that most concerns oil exploration crews. Unlike grizzlies, which are omnivorous, polar bears are carnivores, the biggest and most powerful in the world. To exist they must hunt seals — and they do this all year long. They are consequently superb hunters, wise in the ways of stealth, concealment, and camouflage. Observers have seen them submerge completely, swim to a seal sleeping on the edge of an ice floe, then surface to seize the prey with such speed and accuracy that the seal has no chance of escape.

Sometimes their yellowish-white coats make them easy to see against the snow. More often, they merge into the landscape, all but invisible. Photographer Dan Guravich tells of driving along a narrow gravel ridge beside Hudson Bay, straining his eyes for bears to photograph. Within half a mile he found 28 bears but didn't detect a single one until it had leaped out of its "day bed," a shallow depression in the snow.

Early explorers report polar bears stalking them, following their tracks and concealing themselves. Two years ago, a biologist, hearing a soft crunch in the snow, turned to see a bear crawling towards him on its belly like a cat after a mouse.

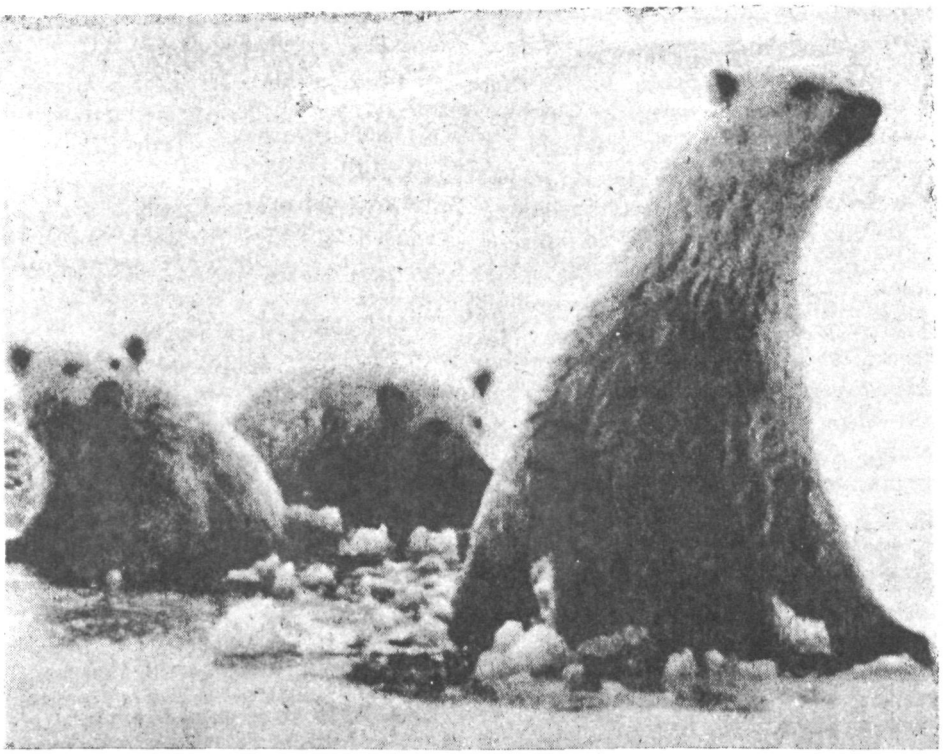
In the bright light of an arctic summer, the danger from polar bears is lessened. But as the dark of winter sets in, it becomes all but impossible to see them as they patrol the leads of open water between ice floes, investigating every unusual sight or smell. As scrupulous as oil camps are in disposing of garbage, and they are careful to take out everything they bring in, some scents arise and are borne downwind, alerting any bear a mile and possibly much farther away.

Such was the case when a sow and two second-year cubs climbed onto Exxon's Duck Island drill site just off Alaska's arctic coast during freezeup in October, 1979. For two days, the bears roamed the area, keeping workers always on alert and allowing only groups to venture out to operate equipment or move supplies. Nothing seemed to frighten the animals. Finally, large firecrackers flown in especially for the purpose sent them scrambling.

In the interest of protecting his crew, superintendent Gordon Ashwood built a large cage of steel tubing. The cage wasn't for the bears. It was for the men. Workers could take refuge in it if bears suddenly appeared. The men promptly dubbed it their "bear lunchbox."

Unlike blacks and grizzlies, which sleep away the long months of winter, polars (with the exception of pregnant females) are active all year. The obvious way of protecting people in a camp is to hire a "bear monitor" to keep watch. But they are no guarantee of safety, especially in winter. More than that, no oil company wants polar bears shot if there is any alternative. People who work in the arctic come to respect the white bears for their amazing ability to survive and prosper amid the terrors of blizzards and cold and the shifting, grinding ice pack.

In the world there remain perhaps 20,000 polar bears. In the last few years, these have been protected by a worldwide ban on hunting by anyone other than native Eskimos, Aleuts, or Indians. Some authorities say this has enabled the bear population to stabilize and that numbers are now slowly grow-



Scott Harding

This sow and cubs smelled food in the kitchen of Exxon's Duck Island well in Alaska, and came to search for it.

ing. Others say there is no good evidence that hunting, or a decline in hunting, has affected bear populations one way or another.

Meanwhile the search continues for better ways to protect both bears and people from each other. Some answers are beginning to emerge from the work of a young Canadian named Don Wooldridge, whose education embraces both biology and engineering. With funds from several branches of the Canadian government as well as from several oil companies, he has tried a number of techniques.

With speakers tied to the base of an observation tower, Wooldridge tried playing recorded growls of angry bears. In the first year of testing, nine bears were repelled 100 percent of the time by aggressive bear sounds; in the second year, seven bears were repelled only 35 percent of the time. A composite synthesis of aggressive bear sounds doubled the effectiveness.

A graduate student tested the recorded human voice; hearing the sound, a bear went to the loudspeaker, stood up, put a paw on each side of it, and looked in. At the shout of "Get away, bear!" the animal promptly bashed the loudspeaker off its mounting.

The virtues of acoustics have so far been limited. The bear must first be seen and allowed to approach closely before the noise is effective. At a drill site in the Beaufort Sea, Wooldridge installed one of his sound systems. Shortly after he left, a bear approached; when it was 600 yards away the recorded roars were beamed at it. The bear came closer. At 100 yards, the machine was turned on again and this time the bear ran away.

After several years of experimenting with trip wires that activate warning buzzers, Wooldridge has devised a system that detects nearly all bears. There are problems, however. Foxes can set it off. So, too, can dogs, which are often kept around a camp to warn of bears. Now and then, someone on the crew will step on it accidentally. The result is that warnings aren't always taken seriously. In addition, drifting snow limits the system's reliability.

An electrified fence has been only marginally successful. A bear's long hair effectively insulates it against a shock of any strength less than dangerously high voltage. Animals that touched their muzzles to the wire and received a sharp shock were effectively conditioned to stay away. Wooldridge is repeating his experiments using chunks of food attached to the wire.

Still another warning device Wooldridge has tried is a proximity antenna designed to detect a large warm-blooded creature that approaches within three feet. In the first year's trials, the device worked about two-thirds of the time when approached by 41 bears.

His current project employs laser beams mounted on posts at each corner of a drill site. A bear intercepting the beam would set off a warning. There are problems here, too. A blizzard might contain enough snow to interrupt the beam; shifting ice might move the posts. Yet the idea seems promising as a way to detect a bear's presence during the months of winter darkness.

Wooldridge reports that he had hoped to try the highly publicized "taser" as a bear scarer. The taser employs a bullet wired to a battery to give a powerful electric shock to anything it strikes. It immobilizes a victim with what has been described as an all-body charley horse. A bear once struck with one would almost certainly be fearful ever after of humans, Wooldridge believes. But the device was outlawed after it fell into the hands of criminals.

Wooldridge isn't adverse to trying any idea proffered . . . and suggestions from a mechanical bear with a loudspeaker inside to a mannequin, wired for sound, that would pop up and shout if a bear were to approach have been offered.

So far, almost every repellent and warning system works — most of the time. "But that isn't good enough," says Wooldridge. "We need something that always works, and so far, we haven't found it."

Meanwhile, oil companies use several systems to be on the safe side, and have laid down strict rules to safeguard bears. Besides strict sanitation and a ban on personal firearms, no harassment by aircraft is permitted and known denning areas are avoided.

Alaska's bear expert, Jack Lentfer, worries that exploration activities around maternity dens might cause denning mothers with cubs to desert their dens too early, with adverse results. Accordingly, seismic exploration permits contain stipulations designed to protect bears from the presence of people and machinery.

Meanwhile, polar bear populations

are increasing. Since the passage of the Marine Mammals Act of 1972, which prohibits hunting by anyone not an aboriginal native, there has been pressure in Alaska to permit a regulated sport take of polar bears. Now, Alaska has asked that limited hunting be allowed to resident Alaskans for either subsistence or recreation, and that hunters be permitted to travel by either dog team or snow machine. The Alaskan proposal would outlaw the killing of mothers and cubs (at present natives can take bears without regard to age or sex of the animals) and would place a bag limit on numbers.

Canada's polar bear expert is Ian Stirling, whose research assists that government in assessing the environmental effects of offshore drilling in arctic waters. Besides directing research on the behavior and movement of ice and seals, Stirling is estimating numbers of bears and studying their seasonal movements and distribution in all parts of the Canadian arctic. He also serves as technical adviser on U.S. bear programs.

Stirling says that as people and camps increase in the arctic, the number of man-bear encounters will also increase unless more effective deterrents are developed. He says, "Government and industry — having recognized the problem — must now cooperate in its solution."

In the interest of both bears and people, that's good advice.

RICHARD DAVIDS

ABOUT THE AUTHOR

Richard Davids contributes regularly to *Exxon USA*. A widely published free lance, he specializes in nature and wildlife subjects. He lives in Bagley, Minnesota.

Cutback in arctic research

Daily News-Miner, Fairbanks Sept. 20

ANCHORAGE—Scientists foresee a weakening of America's leadership in research if the decline in federal dollars and a gap among responsibilities of federal agencies continue.

At a closing business meeting Friday during the 31st annual Alaska Science Conference, Alaskan scientists expressed fears that Alaska, now perceived outside as having more money than it knows how to spend, will be a target for federal cutbacks, and those slashes include scientific research.

Fairbanks scientists Neil Davis and Vera Alexander are among a group writing a "white paper" to the America Association for the Advancement of Science, Alaska Division.

The paper will spell out the "symptoms" and dangers of federal cutbacks.

America is already losing its competitiveness in the field of Arctic research, Davis said. The only real polar research is being done in Antarctic.

"We're one of the major Arctic regions. Alaskan problems are U.S. problems," Davis said.

The white paper is intended to attract the attention of the national scientific community. Eventually scientists hope to flag the attention of Congress.

Among the problems are the closing of federal facilities in Alaska, a decline in research funding to the University of Alaska, and a gap among federal agencies as to responsibilities and interest.

An example is the Naval Arctic Research Laborartory facility at Barrow, now in jeopardy of being reduced to "caretaker" status because of the decline in research.

The large science projects being funded federally today are "mission oriented," and no longer focuses on the quality of the science, which Davis said is "very dangerous."

Other examples of early symptoms described at the meeting were the closing of the U.S. Environmental Protection Agency laboratory in Fairbanks; and the Army's Cold Region Research Lab, which once funded University of Alaska is now competing against the UA for funds.

What America stands to lose by arctic research cutbacks touches areas such as defense and preparedness, environmental protection, human life and occupancy in the arctic.

Keith Mather, UA vice president of research, carried the argument. The Department of Defense's withdrawal of support for the NARL laboratory at Barrow is a sign that it has completed its original work.

"The depressing thing to me is not so much the withdrawal of the Navy . . . but no other federal agency is forthcoming to assume it, which says that the U.S. as a whole has no interest in the Arctic," Mather said.

He suggested the U.S. Interior or Commerce departments as agencies that could do so, and asked "How much interest should Alaska display dollar-wise in its own future in the Arctic?"

USGS hastens mineral studies

ANCHORAGE (AP)—The U.S. Geological Survey reports it is stepping up activities to determine the potential mineral and petroleum reserves Alaska.

The federal agency said in a weekend news release it has 114 projects under way in the state.

Among the major efforts are:

- Resource assessment studies to identify minerals through mapping, aeromagnetic and geophysical surveys and geochemical analyses;
- Environmental impact studies focusing on energy-related transportation corridors such as the trans-Alaska oil pipeline and the proposed natural gas pipeline;
- Continued mapping and studies of all known and suspected earthquake faults in the state;
- Completion of 22 exploratory oil and gas wells in the National Petroleum Reserve on the North Slope;
- Studies of the Columbia Glacier near Valdez in relation to the number of icebergs in the marine tanker routes from the oil pipeline terminal;
- Expanded oil and gas leasing;
- Geothermal studies on the Alaskan Peninsula, eastern Aleutian Islands and the Wrangell Mountains;
- And completion of large-scale topographic maps for Anchorage, Valdez, Cordova, North Kenai, Seward and the new state capital site near Willow.

The question of how much and where the reserves are located within the state has been a key point of dispute in the current debate over the Alaska lands legislation. Aug. 11

Icebergs From Alaskan Glacier May Imperil Ships

The New York Times

ANCHORAGE, July 9 — Icebergs are breaking off of a glacier about the size of Los Angeles and entering the waters off the southern Alaska coast, giving rise to fears by Government geologists that it will pose a shipping hazard in the early 1980's.

The Columbia Glacier, one of the largest and most magnificent on the southern Alaska coast, has been studied by the United States Geological Survey since 1974. The latest report predicts that icebergs, some weighing 10,000 tons or more, will begin moving into shipping lanes in alarming frequency in 1982, and will continue to pose problems for three years.

The icebergs will enter open seas near Valdez, the terminal for the 800-mile Alaska oil pipeline. More than a million barrels of oil a day are loaded into tankers there.

Austin Post of Tacoma, Wash., one of the Geological Survey experts studying the glacier, said the Columbia Glacier's movement did not create immediate problems for ships operating out of Valdez.

But he said the hazard warning reflected the fact that "we do consider it to be serious." Asked if a 10,000-ton iceberg could damage an oil tanker, Mr. Post said, "It would be rather surprising if it didn't."

The Coast Guard, responsible for safety of ships in the Gulf of Alaska, is not worried about damage to tankers yet, but a Coast Guard official said there could be problems for smaller passenger and fishing vessels.

The Columbia Glacier was once noted for its stability. Until recently the massive glacier was believed to be about the same size and in about the same position when it was discovered by a European expedition in 1794.

But the Geological Survey reports that new evidence indicates a rapid retreat is imminent. Mr. Post said that the Columbia was unusual and potentially unstable because it was the last major glacier in North America that extends over a deep fiord. As the glacier retreats into the deeper water of the fiord, larger chunks of it break off and drift out to sea.

A moraine, an accumulation of earth and stones deposited by the glacier, prevents icebergs more than 70 feet deep from escaping out to sea. But a 70-foot iceberg may weigh as much as 10,000 tons.

Glaciers that shed icebergs generally retreat at the rate of one to three kilometers a century, the Geological Survey report said. The Columbia is moving at the rate of about a mile a year.

Carter Signs a Bill to Protect 104 Million Acres in Alaska

By SETH S. KING

The New York Times

WASHINGTON, Dec. 2 — The Alaska lands bill, which creates more than 104 million acres of national parks, wildlife refuges and wilderness areas from Federal holdings in that state, was signed into law today by President Carter.

The ceremony in the East Room of the White House ended a four-year struggle between environmentalists and developers over how to use these widely scattered Federal lands, which add up to an area larger than the state of California.

Mr. Carter used the occasion to make another appeal for public support in protecting the nation's environment, even if it means sacrificing possible development of new sources of energy and the use of new technology.

"We cannot let our eagerness for progress in energy and technology outstrip our care for our land, water and air and for the plants and animals that share them with us," the President said.

Warning About Pollution

"Every time we dig out minerals or drill wells or ignore erosion or destroy sand dunes or dam a wild river or dump garbage or create pollution, we are changing the living earth," Mr. Carter said. "We are affecting the air we breathe and the water we drink."

"We have nothing more precious than life, nothing more valuable than health," he went on. "We must not forget these in our pursuit of progress."

The bill that Mr. Carter signed was a compromise that did not go as far in protecting Alaska's wilder areas as many environmental groups had wanted, but it went further in prohibiting mineral and timber extracting and sports hunting than many Alaskans had wanted.

A Balance Is Sought

Mr. Carter called the new law "one of the most important pieces of conservation legislation in the history of our country." He said that the measure struck a balance between protecting areas of great beauty and tapping the state's vital resources, which include strategic minerals, petroleum and timber.

"With this bill we are acknowledging that Alaska's wilderness areas are truly this country's crown jewels, and that Alaska's resources are treasures of another sort," Mr. Carter said. "How to tap those resources is a challenge we can now face in the decade ahead."

In designating more than 97 million acres as national parks and wildlife refuges, the new law doubles the size of the nation's national park and refuge system.

It triples the size of this country's wilderness areas by classifying 56 million acres in that category. And it protects 25 free-flowing Alaskan rivers in their natural state, doubling the size of the wild and scenic rivers system.

Allowing Oil Exploration

In a concession to the developers and the state of Alaska, the new law will permit oil exploration in the William O. Douglas Arctic Wildlife Range, a breeding ground for the continent's last large caribou herds. However, if oil or natural gas are found there, drilling will not be allowed without permission from Congress.

The new law also extends the area within the Misty Fjords wilderness in which molybdenum may be mined and permits extensive logging in virgin timber areas on Admiralty Island.

Both sides in the controversy over the bill have announced that they will attempt to change it in the next session of Congress.

Stevens Pledges Further Action

Senator Ted Stevens, Republican of Alaska, said today that the bill was a milestone in conservation legislation, but many Alaskans, he said, believed that it denied them access to badly needed resources.

"We are not finished, Mr. President," Mr. Stevens declared. "We are just started.".

In a statement from Juneau, Gov. Jay S. Hammond said that the new law was "not ideal" for either Alaska or the nation, but that it was a compromise that was more balanced than the state once thought it would be.

Icebreaker to leave for Arctic mission

Aug. 29

SEATTLE (AP)—The Coast Guard super icebreaker Polar Sea will leave Seattle Sunday for a seven-week scientific mission in the Arctic, the Coast Guard says.

The 399-foot vessel will provide support for six scientists, who will be placed on an ice floe in the Chukchi Sea for three weeks to study the ocean's cooling rate and the effects of the Arctic environment on underwater sound waves.

The scientists also will study Arctic water temperatures, said Petty Officer Ed Moreth, a Coast Guard spokesman.

Conservationist Efforts Are Set Back in Whaling Talks

By R. W. APPLE Jr.
The New York Times

BRIGHTON, England, July 26 — The annual conference of the International Whaling Commission ended today with a series of severe setbacks for conservationists.

"We have lost our momentum and plunged into a kind of vortex," said Thomas Garrett, a conservationist who served as deputy United States commissioner during the six-day meeting here. "It's not yet clear to me whether we can reorganize and regain the initiative."

The other whaling nations, led by Japan, organized themselves into an almost impregnable bloc during the months before the meeting. Japan reportedly made a number of deals with smaller countries involving trade and other considerations to guarantee their support. On the major votes, the prowhaling bloc held firm, preventing the antiwhaling majority from gaining the three-fourths majorities required by the commission's rule on key issues.

Some progress was made by the conservationists. The total quota for all species of whales was reduced from just over 16,000 this year to about 14,500 next year. That represents a reduction from 46,000 in the mid-70's, although the opponents of whaling had hoped for more. The commission also made explicit its ban on factory-ship operations against killer whales in the Antarctic, where the Russians killed almost 1,000 last winter.

But the antiwhaling forces were unable to muster three-quarters of the 24 members in attempts to ban all whaling, to impose a moratorium on the hunting of sperm whales or to ban hunting of sperm whales altogether in the northwest Pacific, which is the Japanese hunting ground. They were also unable to ban the use of cold harpoons, which cause whales to bleed slowly to death.

The Metropole Hotel was filled with lobbyists from such organizations as Greenpeace, Monitor and Friends of the Earth as the delegates huddled all day yesterday, attempting to reach compromises. Their mood was bitter. A British activist said despairingly, "I never imagined that politics could be so venal."

Canada Criticized for Its Vote

Conservationists in several delegations blamed the Canadian Government for having voted against the sperm whale moratorium. That measure came closest to passage of any of the major antiwhaling initiatives, failing by only one vote (14 for, 6 against, 4 abstentions) to gain a three-quarters majority. The Canadian vote apparently grew out of a fishing-rights dispute with the United States.

The conservationists burnt a Canadian flag outside the hotel after the moratorium was rejected on Thursday.

For a time it appeared that the whaling countries would prove so unwilling to compromise that no quotas at all would be set for several species. In the end that did not happen, but it took until 2 A. M. to deal with sperm whales in the northwest Pacific. The commission's scientific commission recommended a zero quota, a move that was blocked by the Japanese and their allies. Eventually the limit was set at 890, compared with 1,350 for this year.

No commercial hunting of any kind is permitted for the bowheads. But they form a central part of the culture for 5,000 Eskimos in eight villages, providing not only meat and oil but the ceremonial high point of the year. American environmentalists are split on the issue of the bowheads; some put preservation of the whales first, others the preservation of a small and fragile culture.

One of the smallest groups of whales — the bowheads in the Bering Sea off Alaska — probably occupied the most time and generated the most emotion.

Q. Please explain the wind-chill factor to me. Is it really possible that we have had days recently when the temperature seemed as if it was −40 degrees, as we heard on TV?

A. The business of determining how much heat the body will lose under given conditions of temperature and wind started from a theory developed by the late Paul A. Siple, explorer and geographer, who worked during and after World War II with the Army Quartermaster Corps as a civilian expert on design of cold climate clothing and equipment for use in polar regions. Actually, it started long before that when Siple, then 20, traveled with Admiral Byrd as the youngest member of the 1928 expedition to the Antarctic and became interested in cold weather in relation to the needs for existence in that region. Studies later showed that the heat that is lost by the surface of the body because of wind and temperature variables, can be estimated by multiplying factors for the wind and temperature. The result is the wind-chill index, which is the equivalent temperature in cooling power on *exposed* flesh under calm conditions and out in the open. According to a spokesman for the U.S. National Oceanic and Atmospheric Administration, it is misleading to say, as some weather broadcasters do, that the wind-chill index indicates how cold it feels, when in reality the individual may be bundled up in several layers of clothing (as spectators were at the Cleveland-Oakland game in Cleveland two weeks ago when it was announced that the wind-chill factor at the game was −37 degrees). Neither was the wind-chill factor as low as −37 degrees for the players, who were moving about on the field and not "calm," to use the weather bureau's terminology. Their clothing, individual metabolism, state of nourishment, and emotional pressure, will all have affected the wind-chill factor.

Oil Drill Study Muddies Waters For Bowhead Whales Off Alaska

ANCHORAGE, Nov. 12 (AP) — A two-inch-thick, 753-page, $1.2 million report "documents how little the Government knows" about the endangered bowhead whale, according to a spokesman for the Eskimo whaling community.

The conclusion of the 26-member team: Few of the whales spend significant time in the lease area. But the scientists added that more studies were needed.

Eskimos are interested in the bowhead because whale hunting is a vital part of their life. The Government is interested because the huge marine mammal migrates through the frigid Beaufort Sea, a prime location for oil and gas exploration and drilling.

Scientists estimate that the bowhead, once plentiful in the North Pacific, now numbers only 1,000 to 3,000.

The Endangered Species Act forbids Government action that jeopardizes the existence of endangered or threatened species or the destruction or modification of their habitat.

Connie Wassink, spokesman for the Outer Continental Shelf office, differed with Mr. Buchholdt's assessment of the study, saying that native whaling captains were indeed consulted for their "intuitive" knowledge of whales, especially where to find them.

But, she said, the Government also needs solid scientific research on which to base its decisions. She said there was a need to "meld" the Eskimo whaling wisdom with scientifically obtained data. At least a dozen other studies are planned or under way, she added, to see if drilling noises disturb whales or whether potential oil spills would harm them or their food supplies.

Bowhead whales, which grow to lengths of 40 feet and more, follow the melting ice pack each spring from the southeastern parts of the Bering Sea north through the Bering Strait into the Beaufort Sea.

The freeze-up prompts the return trip of more than 1,800 miles.

Area of Disputed Oil Lease

The disputed lease area stretches about 75 miles east and west, centered roughly on Prudhoe Bay, site of one of the world's richest oil fields.

"Bowhead whales do not migrate through or inhabit the lease area during the spring migration," the scientists say, based on sightings of 249 whales. "During the fall migration, a total of six bowhead whales was observed in the lease area and 84 bowhead whales were seen near the lease area."

Bowheads feed on plankton strained from seawater by hairlike structures in their mouths known as baleen. One of the fears about oil development is that oil spills could damage the whales' ability to feed.

"Slight to extreme fouling with crude oil showed that there was a marked decrease in filtering efficiency to near zero with extreme fouling," the study found.

The Eskimos, along with environmental groups, have waged state and Federal court battles against offshore oil development, have thus far succeeded in delaying, but not prohibiting, drilling.

Boy Scout joins antarctic research teams

THOMAS R. DEW

Public Relations Division
Boy Scouts of America

During the 1978–79 research season, nineteen-year-old Mark. W. Leinmiller followed in the footsteps of Paul A. Siple, one of the world's best-known polar explorers and researchers. In 1928, the Boy Scouts of America (BSA), acting on a request from Commander Richard E. Byrd, chose Siple, then a Eagle Scout to accompany Byrd on an exploratory voyage to Antarctica. This trip marked the beginning of Siple's distinguished polar career. In commemoration of Siple's adventure and to dramatize the opportunities offered by the BSA, Leinmiller was selected in 1978 to be a participating member of a scientific research team in Antarctica.

Participating with the BSA and the National Science Foundation (NSF) in the program was the Reader's Digest Association, which picked up the costs for the selection process and its promotion. The selection committee was headed by Richard A. Chappell of Hunter College, who, during the International Geophysical Year, had been the second Eagle Scout to go to Antarctica, and it included, in addition to NSF scientists and BSA representatives, Ruth Siple, widow of the explorer and president of the Antarctican Society. Leinmiller was chosen from some two thousand Boy Scouts and Explorers who applied.

Offered a choice among several scientific disciplines, Leinmiller chose to join glaciological and geological teams headed by George Denton, Robert Thomas, and Terence Hughes, all of the University of Maine. Their projects concern the interaction of the Ross Ice Shelf and Byrd Glacier and geological evidence related to the West Antarctic Ice Sheet's possible disintegration.

Leinmiller's activities with the teams included soil sampling, carbon dating, and study of the glaciers' effects on landscape and warm and cold cycles.

He would like to return to the Antarctic some day. "It was a fantastic experience and I was lucky to get the chance," he said, after returning late in January 1979. "I've been offered the opportunity to go back, and there's a possibility I might even make a career of it. I've been offered the chance to return, but I want to finish my education first." That education, in mechanical engineering at the Georgia Institute of Technology, resumed in September 1979. Between preparations for the trip and BSA commitments afterwards, Leinmiller, now a sophomore, missed a full year of college.

Runners-up in the selection process were given a week's stay at the BSA's operation Okpik in northern Minnesota. Ironically, the runners-up, who took their trip in January, experienced colder temperatures than Leinmiller encountered in Antarctica. According to Leinmiller, "The day we arrived on the Darwin Glacier, it was 23 degrees [F] below and the wind was blowing at 35 mph—but that was the coldest it got." The runners-up in Minnesota experienced temperatures as low as −40° F.

Researchers put nose to window of polar volcano

By Patrick Young
Newhouse News Service Dec. 24

McMURDO STATION, Antarctica—An international team of scientists is preparing to place seismometers on the slopes of Mt. Erebus near here in an effort to solve one of the major mysteries of volcanoes—the movement of molten rock within them.

"We're really dealing with a unique volcano," explained team leader Philip R. Kyle of Ohio State University.

"Mt. Erebus is the southernmost active volcano, and only one of two volcanoes with an active lava lake."

The lava lake is just that—a 200-foot-wide lake of molten rock at 2,000-degree temperatures inside Erebus, its surface 670 feet below the rim of the volcano's crater.

No one knows how deep it is. From time to time, small explosions spray the lava about inside the crater and scatter it around the mountain's summit.

KYLE AND OTHERS believe this lake is one key to a better understanding of volcanoes. The only other lava lake lies in Erta-Ale, a volcano in Ethiopia that is essentially inaccessible because of warfare in that African nation.

A better understanding of Erebus, Kyle says, could lead to some ability to predict volcanic eruptions like that of Mt. St. Helens, and perhaps to methods of tapping the heat of certain volcanoes to produce geothermal energy.

"Most volcanoes have inside them what is known as a magma chamber—essentially a big staging area for molten material," Kyle said. "We don't know what goes on within a magma chamber. If we can make some observations on Erebus, they should be applicable to many other volcanoes in the world.

"We are fascinated with Erebus because the lava lake is a window to the magma chamber; it is part of the magma chamber. In other volcanoes, you don't see the magma chamber."

Mt. Erebus—named for one of the ships of the English explorer Sir James Ross who discovered it—dominates Ross Island, home of McMurdo Station.

Its 12,464-foot summit is crowned by a white plume of steam and volcanic gases.

KYLE'S TEAM OF U.S., New Zealand and Japanese scientists will install two seismometers on the flanks of the volcano. A third unit will be placed at the summit.

When molten rock flows past solid rock, the heat causes the solid rock to creak and crack. This causes earthquakes, often too small to be felt by humans.

The seismometers will record Erebus' tiny tremors and radio the data to Scott Base, the year-around station two miles from McMurdo.

By analyzing many such quakes, Kyle's team should be able to develop a three-dimensional picture of the magma chamber and the movement of molten rock within Erebus.

"The interesting thing about Erebus is why the lava lake doesn't 'freeze over' [solidify]," Kyle said. "Most volcanoes well up and freeze over. In Erebus, there must be a lot of heat coming up from below, and this is probably related to the size of the magma chamber."

The New Zealand-born Kyle has been studying Erebus since 1971, when he was a graduate student at Victoria University in Wellington, New Zealand.

His work is now financed by the U.S. National Science Foundation.

British Antarctic Territory to note geographical society

The British Antarctic Territory Postal Authority will issue a set of six stamps during the next southern summer marking the 150th anniversary of the Royal Geographical Society.

Each stamp depicts former presidents of the society who have supported expeditions to the BAT, including Sir John Barrow (1835-36) 3 pence; Sir Clement Markham (1893-1904), 7p; Lord Curzon (1911-13), 11p; Sir William Goodenough (1930-33), 15p; Sir James Wordie (1951-54), 22p; and Sir Raymond Priestley (1961-63), 30p.

Anthony Theobald designed the set which was printed in lithography by Secura Singapore Ltd. in sheets of 50, according to Crown Agents Stamp Bureau, St. Nicholas House, Sutton, Surrey SM1 1EL, England.

The RGS was founded in 1830 when Princess Victoria granted the society a royal charter which defined its objectives as "The Advancement of Geographical Science" and "The Improvement and Diffusion of Geographical Knowledge."

The Royal Geographical Society will be noted with this set of stamps from BAT.

The society is synonymous with the names of Hillary, Hunt, Livingstone, Scott, Stanley and Schackleton, men who contributed to the history of British exploration and discovery in the 19th and 20th centuries.

The society has sponsored and organized many outstanding expeditions, including those of Robert Falcon Scott and Sir Ernest Shackleton; the Mount Everest expeditions from 1921, including the successful ascents of 1953 and 1975; and Vivian Fuchs' Commonwealth Trans-Antarctic Expedition of 1955-58.

Between 1870 and 1912, the society was housed at Saville Row, London. In 1912, the president, Lord Curzon, arranged the purchase of Lowther Lodge in Kensington which had been built in 1874.

The present lecture hall, council room and library were added as part of the society's centenary celebrations in 1930.

The society maintains a library of over 100,000 books and periodicals and 25,000 pamphlets. This is an outstanding source of information and covers all aspects of geography, travel, exploration and related services.

The RGS' collection of over 600,000 map sheets and 4,000 atlases is probably the largest private collection in Europe, according to Crown Agents.

An archivist supervises the society's collection of documents. These include the society's records, correspondence with its officers, special collections and notebooks.

The society also houses a collection of paintings, rare maps and explorer's relics.

Canada's Inuit

The cultural heritage of its past has been commemorated by Canada as it concluded the four-year series of 16 stamps devoted to its Inuit, the Eskimos of Canada. The last segment of the series is devoted to representing the spirits and beliefs of the Inuit. Preceding segments pictured hunting, shelter and community life.

Inuit, which means simply "the People," is what all the people of the Arctic coastal regions call themselves. Their Indian neighbors called them the Eskimo, an Algonkian word for "raw meat eaters."

The Inuit Spirits issue consists of a se-tenant pair of 17-cent stamps for domestic letters and another se-tenant overseas airmail 35-cent stamps. Each se-tenant pair is made up of an art print and a sculpture. The representations of Inuit spiritual life are the work of Inuit artists, as have been the aspects of Inuit life on the preceding stamps. All 16 stamps were designed by Reinhard Derreth of Vancouver.

A print entitled "Return of the Sun," by the artist Kenojouak, depicting birds and animals greeting the sun after the long winter night, appears on one of the 17-cent stamps. Its companion has a sculpture of a mermaid figure, the woman Sedna, believed to live at the bottom of the sea and to control the supply of sea animals. Ashoona Kiawak is the sculptor.

One of the 35-cent stamps is a print called "Shaman," the work of Simon Tookoone. The shaman, or medicine man, was the intermediary between the Inuit and the spirit world and was credited with amazing powers. He appears masked and with wings for arms. The other 35-cent is a sculpture called "Bird Spirit," with the human face on the bird's body designating the presence of the spirit.

The Inuit believe a spiritual force exists in every phenomenon of nature — not just in living things but also in inanimate objects such as snow, rocks and wind, and even in such things as sleep and a person's name. The Indians of the Pacific Northwest had similar beliefs that were likewise translated in their art.

The arctic stratus clouds are a summertime phenomenon that contribute significantly to weather conditions and climate throughout the United States. The structure of the stratus is determined by the heat and moisture that is being transported in the clouds.

WILLIAM S. ELMORE
Dead at 65

Nov. 10

Brig. Gen. William S. Elmore, former adjutant general of the Alaska National Guard, died Saturday at his Rabbit Creek Home. He was 65.

He served in the Guard here for 20 years and was noted for mobilizing the Guard for rescue and recovery missions after the 1964 Good Friday earthquake.

After service in World War II as a Liberator bomber pilot in the Pacific in 1945 and 1946, "Pappy" Elmore started a flying service in Casper, Wyo. The former stunt pilot and barnstormer headed for the Territory of Alaska in 1949 and four years later was back in uniform, in the Alaska Air National Guard.

"He came up here because Alaska was more air-minded than Wyoming," said his widow, Kathryn.

He started flying when he was about 16 and 17, when he hunted coyotes in Wyoming in aircraft he made by wiring crates together.

He and his wife homesteaded in Rabbit Creek in 1950.

In 1959, he set up and conducted an airlift to Anchorage for the children of St. Lawrence Island for much-needed eye, ear, nose and throat treatment.

That same year the Air Guard flew emergency food supplies to Aniak to relieve a critical shortage.

He was appointed assistant adjutant general for air in 1960, and to major in the Air Force Reserve.

He engineered a daring rescue of 11 University of Alaska scientists who were downed on an Arctic ice floe while flying in a Navy aircraft in 1961. Despite the jagged condition of the floe and the 500-mile-distance from the nearest land, he was able to put two C123Js on the floe and rescue the scientists.

The Guard's biggest challenge came in 1964 when the Good Friday earthquake hit Alaska.

Elmore and his troops saved people trapped in the Anchorage International Airport tower and then set up an emergency tower for incoming aircraft.

After retirement in 1973 he worked for several years as assistant operations manager at Anchorage International Airport. In recent years he worked as a private pilot instructor.

He was born on April 26, 1915, in Goldthwaite, Texas.

In addition to his wife, he leaves two sons, Morgan of Houston and Charles of Anchorage; three daughters, Kathryn Christy of Big Lake, Earlene Caress of Anchorage and Foster "Sollie" Elmore of Anchorage; and 11 grandchildren.

The Anchorage Times

Mikhail Vodopyanov Dies at 80; Pioneered Soviet Arctic Aviation

By THEODORE SHABAD
The New York Times / Aug. 14, 1980

Mikhail V. Vodopyanov, a noted Soviet Arctic flier and an author, has died in Moscow. He was 80 years old.

Mr. Vodopyanov was in the news in the mid-1930's when the Soviet Union promoted a program of Arctic exploration.

He pioneered new polar air routes and took part in the rescue of a marooned Soviet expedition on the ship Chelyuskin, which became stuck in ice in an attempt to navigate along the north coast of Siberia in 1934. For his exploit he was one of the first Russians to receive the title of Hero of the Soviet Union.

Mr. Vodopyanov is credited with the idea of establishing a base camp on the ice at the North Pole, and he piloted the plane that located a suitable floe and landed the expedition members there in May 1937.

The expedition, under Ivan D. Papanin, floated for 274 days southward along the east coast of Greenland until it had to be taken off the collapsing floe by two Soviet icebreakers in February 1938. The Papanin expedition has since been followed by dozens of other drifting stations in the Arctic, set up both by the Soviet Union and the United States.

After having helped set up the Papanin ice station, Mr. Vodopyanov took part in a fruitless search for another Soviet flier, Sigismund Levanevsky, who vanished in an attempt to make the 4,000-mile hop across the North Pole from Moscow to Fairbanks, Alaska. One of those participating in the search from the North American side was Sir Hubert Wilkins, the Australian-born polar explorer.

In April 1936, on reaching Rudolf Island in the Arctic Archipelago of Franz-Josef Land, Mr. Vodopyanov found huts used by two American expeditions shortly after the turn of the century in unsuccessful attempts to reach the North Pole. The expeditions, both financed by William Ziegler, a baking powder manufacturer, were led by Evelyn B. Baldwin, in 1901-02, and by Anthony Fiala, in 1903-04.

Mr. Vodopyanov began his career as a civilian pilot in the 1920's on some of the Soviet Union's early airline routes, between Moscow and Leningrad, and between Moscow and Irkutsk in Siberia.

In World War II, he commanded an Air Force division, and rose to the rank of major general in 1943. He retired in 1946 and published an autobiography and a number of novels and stories based on his Arctic flights.

Noted Arctic researcher dies

A noted Arctic researcher who was awarded an honorary doctorate degree from the University of Alaska-Fairbanks died recently, friends here say.

He was Dr. Per F. Scholander, professor emeritus of physiology and former director of the Physiological Research Laboratory at Scripps Institution of Oceanography. He was 74.

He received an honorary degree from UAF for his "extraordinary and distinguished career in Arctic and Antarctic research and notable achievements in science."

Scholander was born in Orebro, Sweden and moved to Norway at an early age. He received a degree in medicine from the University of Oslo in 1932.

He came to the United States in 1939, became a U.S. citizen in 1945, and served in the U.S. Air Force in World War II.

In 1977 he received an honorary doctor of science degree from Uppsala University in Sweden.

He is survived by his wife, Susan Irving Scholander of La Jolla, Calif.; and his sister, Lillemor Hjarne of Lidingo, Sweden. He was the son-in-law of the late Dr. Lawrence Irving.

News-Miner, Fairbanks, July 15

U.S. Navy photo by Dana Babin

At Bull Pass in the dry valleys, Israeli researcher Jacob Garty penetrates a rock's surface in search of fungus growth. He is part of the field team investigating the dry valleys for evidence of terrestrial microorganisms.

ANTARCTIC JOURNAL

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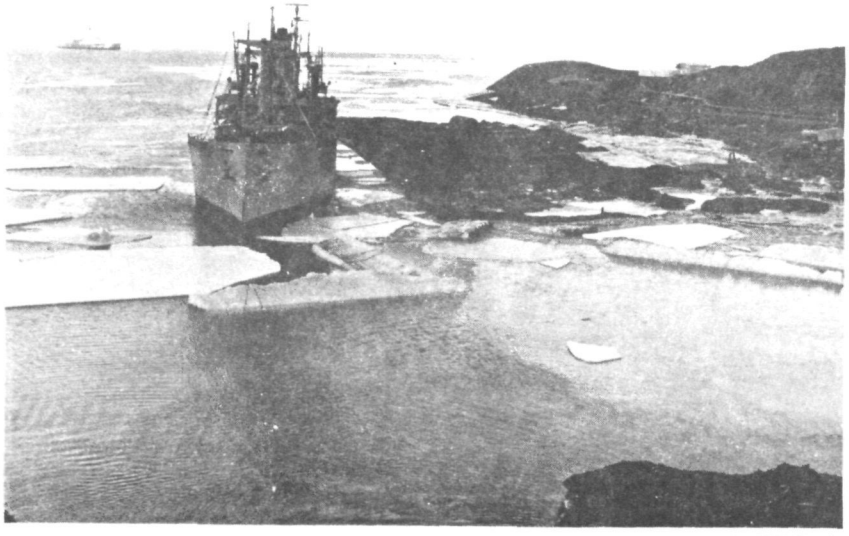
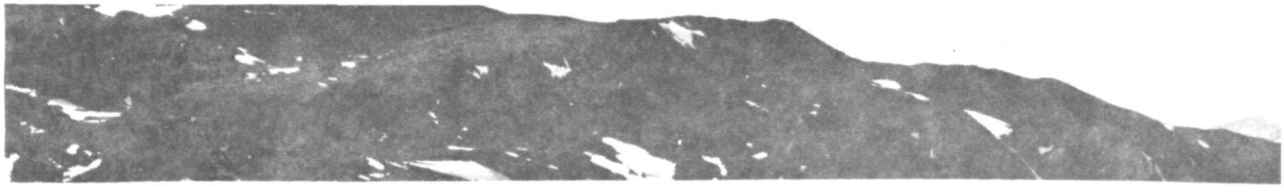


U.S. Navy photo by PH2 Wurth

Each year icebreakers open a passage, through the ice surrounding Antarctica, for research and supply ships. Above, the USNS Towle, the yearly re-supply ship, docks at the ice pier at McMurdo Station (29 January 1980).



U.S. Navy photo by Douglas K. Nortrell

UH-1N helicopter lands at an Ellsworth Mountains field camp. While in the field, scientists gathered new data on fossil flora and fauna, the evolution of land-forms, and the movement of antarctic glaciers.