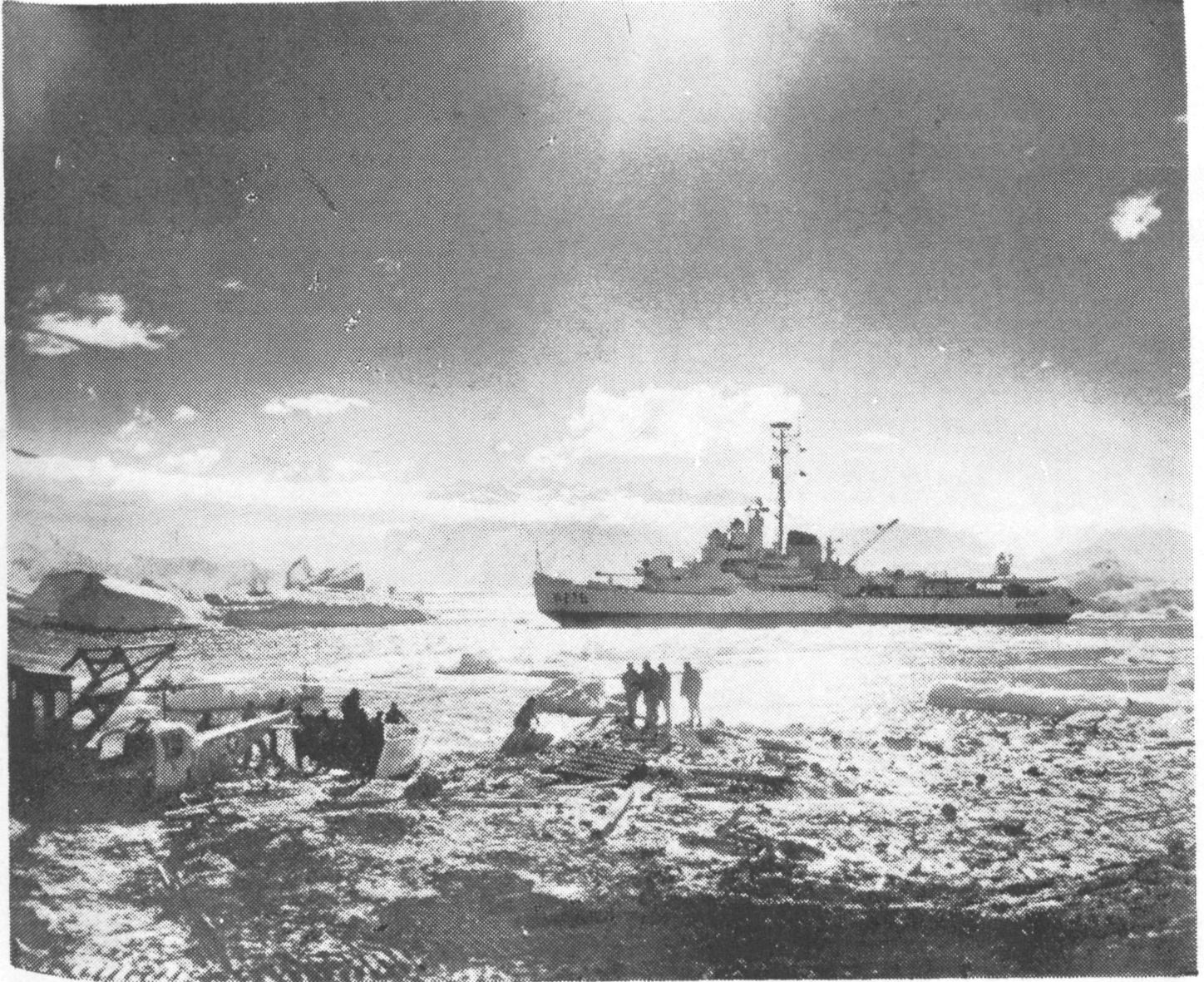


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THE POLAR TIMES

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U. S. Coast Guard

ANTARCTIC OUTPOST: The Navy's Hallett Station presented this scene as winter supplies were unloaded from the Coast Guard icebreaker Eastwind.

National Oceanic and Atmospheric Administration

The Polar Times

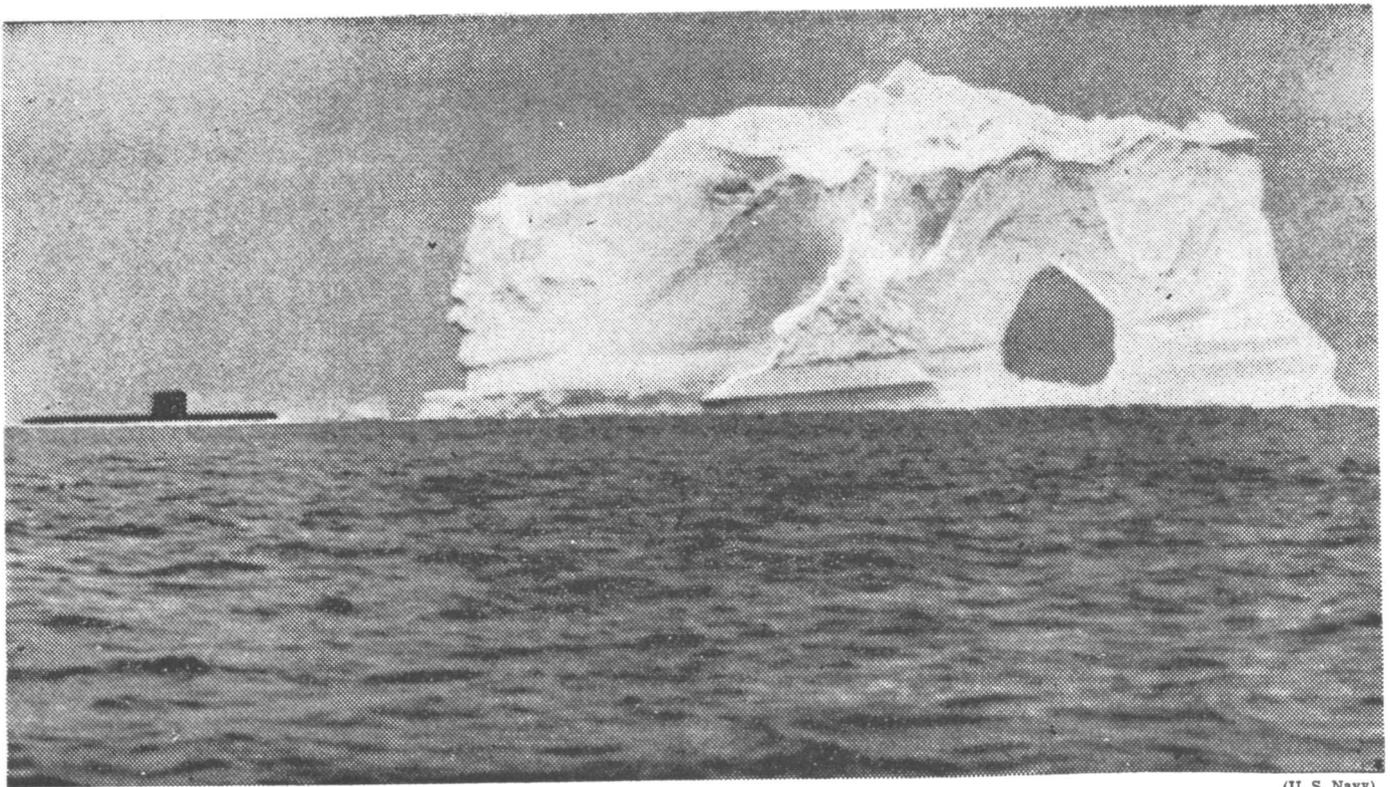
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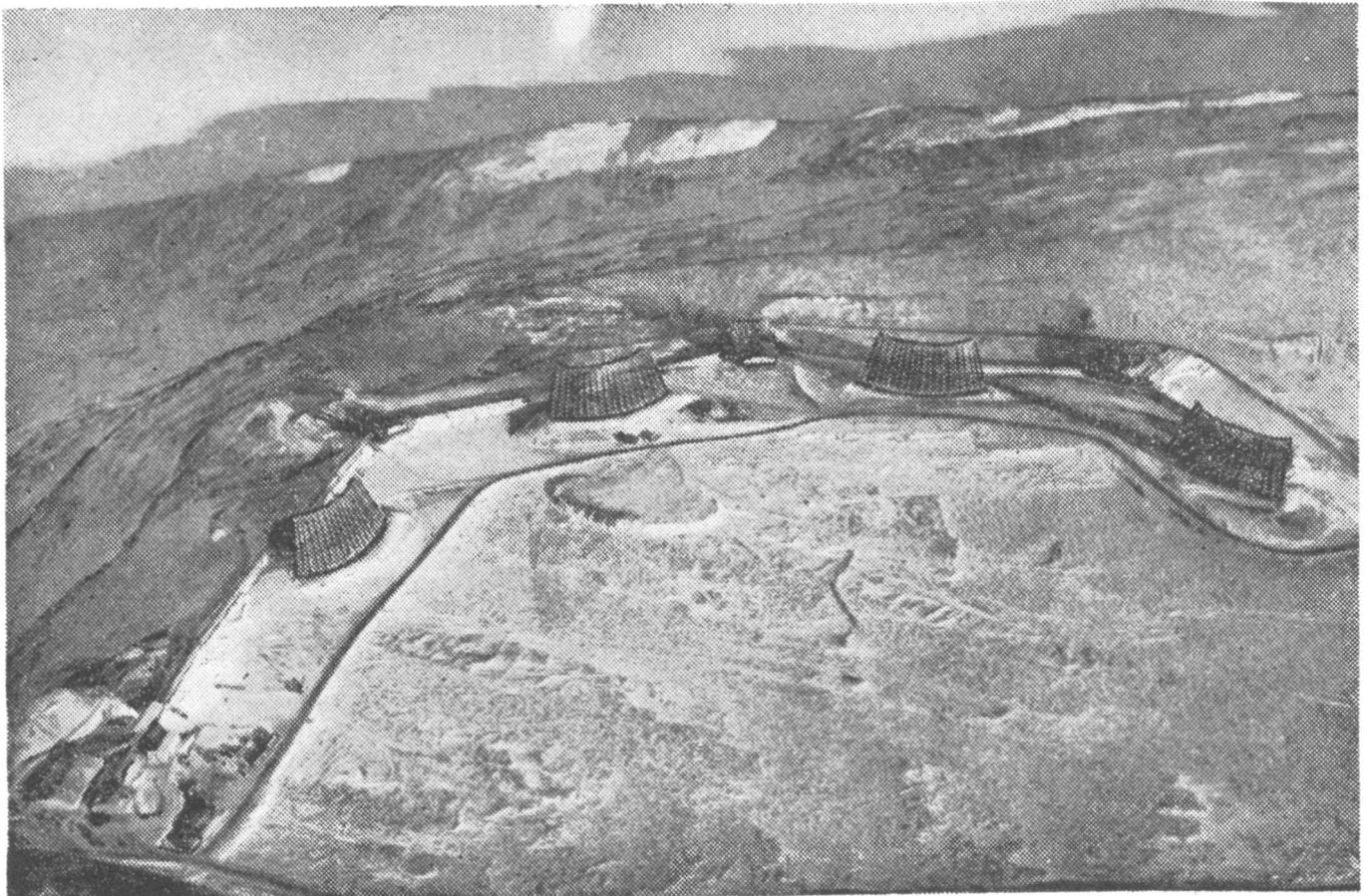
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(U. S. Navy)

NO HAZARD FOR THIS TRAVELER: The nuclear-powered U. S. S. Seadragon preparing to dive under 300-foot-deep iceberg in Baffin Bay during historic voyage across the Northwest Passage from Atlantic to Pacific Oceans.



ARCTIC SENTINELS: The four huge radar antennas of the U. S. Air Force's Ballistic Missile Early Warning System base stand in snowy surroundings at Thule, Greenland. Each of the antennas is 165 by 400 feet in size.

The Polar Times

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No. 51.

DECEMBER 1960.

Antarctic Pact Grew Out of I. G. Y.

It May Point Way to Agreements on Moon and Space

By HAROLD M. SCHMECK Jr.
The New York Times.

Antarctica, which became almost a continent-sized laboratory for science during the International Geophysical Year, might become a laboratory for international cooperation under the twelve-nation treaty.

Supporters of the pact hope its operation may establish a precedent that will help diplomats over the much more difficult hurdle of defining rights on the moon and in outer space.

The Antarctic Treaty was proposed and carried through largely by the United States. The climate of international cooperation fostered by the I. G. Y. contributed greatly to the pact's consummation.

Another powerful force was the fear by some Southern Hemisphere nations that the bottom of the world might become a site for missile bases and nuclear arms depots.

The treaty, in the words of its preamble, is based on the recognition "that it is in the interest of all mankind that Antarctica shall continue forever to be used exclusively for peaceful purposes and shall not become the scene or object of international discord."

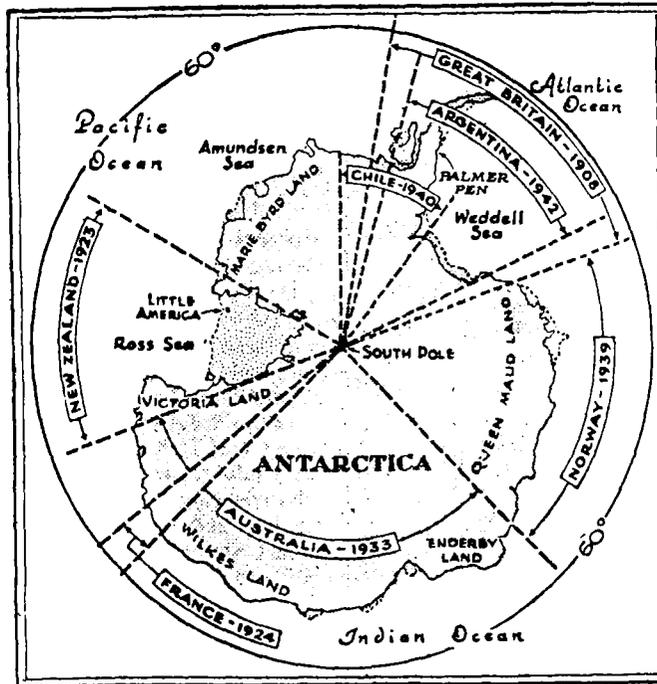
To accomplish this, the twelve nations have agreed to shelve, for at least thirty-four years, all territorial claims to the Antarctic continent. The action is without prejudice to the claims' validity and no new claims may be made while the treaty is in force.

Providing for unlimited inspection and overflight rights as well as for the banning of nuclear explosions, the pact has accomplished agreement in these areas, that so far has proved impossible elsewhere on the globe.

A basic purpose of the agreement is to promote international cooperation in scientific research on the continent.

For that reason the contracting nations agree to maximum feasible exchange of scientific information and plans and even the exchange of personnel between expeditions and stations. Precedent for this type of cooperation was set during the I. G. Y.

The treaty provides for virtually unlimited inspection throughout the continent by authorizing each contracting nation to appoint its own ob-



The New York Times
Aug. 11, 1960
The twelve-nation Antarctic Treaty ratified by the Senate yesterday applies to all areas south of the 60th Parallel, except the high seas. The pie-shaped claims shown above are not renounced, but no new claims are to be made. Dates on map are those on which each claim was asserted.

servers. The observers must be accorded free access to facilities anywhere in Antarctica.

For the first thirty years unanimous agreement is required for changes in the treaty. Also set up by the pact is a consultative committee which will deal with problems arising from the pact after ratification.

Decisions of the committee too must be unanimous, a point which in effect gives each of the twelve nations a veto. A provision is made for taking serious disputes before the International Court of Justice, but this has been put on an optional basis.

After the pact has been in force for thirty years a conference may be called for its revision. A nation may withdraw after four more years have elapsed.

A full year of negotiation preceded the conference in Washington last year, which culminated in the signing of the treaty on Dec. 1.

Though the stage was set for the agreement by the cordiality of the I. G. Y., there had been tense episodes in Antarctica's history earlier in the period following World War II.

The hottest crisis was in 1947-48 when Chile and Argentina were in a dispute with

Britain over claims to the Palmer Peninsula. During this dispute Argentina sent a naval squadron to the area. The British replied with a Royal Navy cruiser.

Most of the Southern Hemisphere nations expressed alarm during the pre-I. G. Y. years over the possibility that the great powers might stage nuclear tests in Antarctica.

Australia and New Zealand were worried about the possibility of Soviet missile bases being set up on the frozen neighboring continent.

The treaty was signed by seven nations that have made territorial claims to portions of Antarctica. These are Argentina, Australia, Britain, Chile, France, New Zealand and Norway.

The non-claimant signatories are Belgium, Japan, South Africa, the Soviet Union and the United States.

The pact's terms allow any member of the United Nations to accede to the agreement and assume its obligations.

One of the provisions of the treaty obligates members to see to it that non-members do not violate the principles that the pact establishes for Antarctica.

SENATE RATIFIES ANTARCTIC PACT; ARMS OUTLAWED

Vote Is 66-21 After 2-Day Debate—Objectors Cite Soviet Participation

By C. P. TRUSSELL
The New York Times.

WASHINGTON, Aug. 10—A treaty dedicating the Antarctic Continent to peaceful pursuits was ratified by the Senate today.

The vote was 66-21, eight more than the two-thirds majority required for approval. Five of the eleven other signatories have ratified the treaty. The Soviet Union is expected to act soon in the light of today's vote.

The pact will go into effect when all twelve signatories have ratified it.

Negotiations for the treaty were initiated by the United States. It was signed in Washington on Dec. 1 after a six-week conference.

Its approval today followed a two-day Senate debate. The opposition voiced a suspicion that the Soviet Union might disregard the treaty and held that Russia had everything to gain, even in a military sense, while the eleven other participating nations had a lot to lose.

The treaty's main purpose is to provide for international scientific cooperation in the frozen continent. It also prohibits military installations, nuclear explosions and the disposal of radioactive waste and guarantees unlimited access to bases for inspection.

Parties to the treaty are Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, the Union of South Africa, the Soviet Union, the United Kingdom and the United States.

Other nations that have ratified the pact are Belgium, Japan, Norway, the Union of South Africa and the United Kingdom.

EFFECTS OF COLD PUZZLE EXPERTS

Research Fails to Produce Agreement on Whether Human Bodies Adjust

By WALTER SULLIVAN
The New York Times.

NATICK, Mass., Dec. 2—Despite several decades of research, scientists still do not know whether the human body adjusts to cold.

This became apparent here today as specialists in acclimatization found themselves in disagreement on the subject.

They were of the same view that rats and rabbits do so. At the Army Medical Research Laboratory at Fort Knox, Ky. it has been found that rats whose bodies have been conditioned to the cold survive an average of thirty-five hours in a frigid environment that kills unconditioned rats in ten hours.

Likewise, it has been observed that cells in the bodies of conditioned rats have undergone characteristic changes.

Nevertheless, Dr. Otto Edholm of Britain's National Institute for Medical Research asserted that he knew of no convincing demonstration of human acclimatization.

The occasion for the discussion was a "Conference on Man Living in the Arctic" held yesterday and today at the Army's Quartermaster Research and Engineering Command. The meeting was sponsored by the Army, the National Academy of Sciences and the Arctic Institute of North America.

Dr. Edholm cited evidence that modern man, in a polar environment, rarely gets cold enough to be forced into bodily change. He does not deny that such changes might occur if the experimental subjects were chilled to the verge of death.

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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 one dollar a year, which entitles members to receive THE POLAR TIMES twice a year.

Back issues are 50 cents each.

Urges Intense Arctic Training

NATICK, Dec. 1—Alaska is our "Gibraltar of the North" and its ever-increasing strategic importance demands far greater conditioning and training maneuvers there than the present two-week exercises, Col Willard Pearson, plans and training officer for the U.S. Army in Alaska, declared at the Arctic conference today.

"A hard core of expert mountain climbers must be trained," he told business men, educators and military men at the Army Quartermaster Research and Engineering Command.

Ski battle groups are needed, he said, and the importance of far northern operations cannot be overemphasized.

He pointed to such disasters as Hitler's Winter campaign in Russia and said "examples of failures to prepare for northern operations can be found from the Napoleonic Wars to the Korean conflict".

Alaska is separated from Russia by only 55 miles of water, Col Pearson stressed, and Russia's Big Diomed Island in the Bering Strait is

But this is not how the tests have been conducted.

A series of recent British studies at polar stations, including one at Halley Bay in Antarctica, site of a base maintained by Britain's Royal Society, were cited by Dr. Edholm. A careful record has been kept of how much time each individual spent out of doors at this station. Over a full year it constituted only 8.7 per cent of the time, with little variation from one man to the other.

Furthermore, as Dr. Edholm and others pointed out, men in the polar regions carry their "micro-climate" with them. Modern polar clothing is so efficient that the body is never chilled enough, he said, to provoke acclimatization.

Col. Joseph Blair of the Army Medical Corps presented the opposing view. He pointed to the experiments carried out at Fort Knox by Dr. Thomas R. A. Davis. These, he felt, showed that the human body moves along the same path toward acclimatization as that followed by the rats and rabbits. The only difference, he added, was that, in experiments, one cannot push the human body to such extremes.

During the program, other specialists discussed the psychological aspects of the problem—such as the tendency of people to become used to the cold mentally, if not physically.

less than three miles from America's Little Diomed Island.

Earlier, Lt Gen Arthur G. Trudeau, chief of research and development, Department of the Army, had stressed the importance of speedy adaptation of Army forces to Arctic regions.

Maj Gen Andrew T. McNamara, quartermaster general, pointed out:

"Today more than 100,000 passengers a year fly over the polar route between Europe and North America."

The Arctic soldier, he added, must be taught to be self-reliant, resourceful, able to operate by himself and prepared to utilize his surroundings to the maximum advantage.

"I do not insist that he should be able to shift over on a day's notice to eating the Eskimo's muk-tuk, or blubber, or the lichens from the rocks which some of the early explorers had to resort to for food," said McNamara.

"But being temporarily cut off from his logistic support should not preclude his ability to function as an effective soldier. Similarly, the unit to which he belongs should be able to man-carry its entire combat gear and supplies, if the situation requires it, and still remain effective."

The conference recessed for the dedication of the Wilkins Arctic Test Chamber at the Natick facility. It honors the memory of Sir George Hubert Wilkins, late distinguished soldier, polar explorer and long-time researcher at Natick, where he was working when he died in 1958.

In the evening, at the Boston Museum of Science, honor was paid to three living pioneers of Arctic exploration—Rear Adm Donald B. MacMillan, Dr. Viljalmur Stefansson and Col Bernt Balchen.

Others receiving posthumous recognition were Robert A. Bartlett, David L. Brainard, Adm Richard E. Byrd, George W. DeLong, Carl Eielson, Lincoln Ellsworth, Adolphus W. Greely, Charles F. Hall, Elisha K. Kane and Robert E. Peary.

Lady Suzanne Wilkins was at the dinner. Dr. Paul A. Siple, scientific adviser, Army Research Office, is chairman of the conference, which continues through tomorrow. Lowell Thomas commented on the achievements of Arctic pioneers.

Noted Geologist in Yukon

Dawson in the Yukon is named after George Mercer Dawson, native of Pictou, N. S., who led a geological expedition to the Yukon in 1887.

EARLY PARLEY SEEN

Polar Treaty Lands Expected to Meet in Canberra

CANBERRA, Australia—Air Minister Francis M. Osborne said recently that it was expected that the conference of the twelve Antarctic Treaty powers would be held here early next year, according to the Australian News and Information Bureau.

In introducing a bill to approve Australian ratification of the treaty, Mr. Osborne said it had been provided that the conference should be held within two months of ratification of the treaty by all signatory nations.

The latest information was that seven of the twelve nations concerned had already ratified the treaty and it was expected that the decisions of the remaining five would come in time to permit of an early 1961 date for the conference in Canberra, he added.

Soviet Ratifies Antarctic Pact

LONDON, Oct. 21 (Reuters)—The Presidium of the Supreme Soviet has ratified the agreement on Antarctica signed in Washington last year by Russian representatives, the Soviet news agency Tass reported today.

American Polar Society

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SCIENTISTS REPORT NORTH POLE SHIFT

Half-Foot Yearly Movement
Toward Greenland Laid
to Melting Ice Sheet

By WALTER SULLIVAN

The New York Times.

HELSINKI, Finland, July 31—Since the start of this century the North Pole has been moving toward Greenland at more than half a foot a year, it was reported here this week-end.

The motion was attributed by one scientist to a melting of the Greenland ice sheet. Such a gradual adjustment of the earth's spin axis should be comforting to those who fear a cataclysmic tumbling of the axis when changes in ice distribution throw the earth off balance.

The migration of the pole toward Greenland was reported by Dr. William Markowitz of the Naval Observatory in Washington. Such a drift had been suspected on the basis of earlier studies, but had never been established to the satisfaction of geophysicists.

Its detection has been complicated by the precession of the earth's axis, which moves the poles in thirty-foot circles every fourteen months. A child's gyroscopic top exhibits this same phenomenon as its axis describes a slow circle while the top is spinning.

Both the drift and the precession have been measured by the International Latitude Service. The service, established in 1896, has five stations, all on the same parallel and hence at the same distance from the poles.

By sighting with high precision on the same stars, these stations keep track of the slight wobble in the earth's axis.

It has now been shown, according to Dr. Markowitz, that the entire circle of the pole's precession moved about thirty feet toward Greenland during the first half of this century.

The shift was attributed to by Dr. Walter H. Munk of the University of California at La Jolla. Both he and Dr. Markowitz are participating in the General Assembly of the International Union of Geodesy and Geophysics being held here.

Dr. Munk participated in a symposium on mean sea level. He noted that any substantial loss of Greenland ice would remove weight from an off-center point on the earth's surface and distribute it uniformly over the globe as ocean water.

The consequent reduction in the centrifugal force exerted by Greenland on the spinning earth would then stimulate a drift of the pole in that direction.

This tilting of the earth has

Kansas Eagle Scout Wins Trip to Arctic

A 17-year-old Eagle Scout with sixty-eight merit badges was selected Sept. 21 to be a junior science aide for five months in an under-ice, atomic-powered Army station in Greenland.

He is Kent L. Goering of Neodesha, Kan., a freshman in the University of Kansas. He plans to be an engineer.

The youth, who holds the Explorer rank in Scouting, was among seven finalists in a nation-wide Boy Scout contest who were examined here Sept. 20.

The Eagle Explorer Scout will be the first to visit the research station under the ice cap. It is called Camp Century and is 800 miles from the North Pole.



Eagle Scout Kent L. Goering

Army Is Storing Oil in Arctic Ice

Sept. 29 (AP).

The Army is experimenting with ice reservoirs on Greenland as a possible solution to fuel storage problems in the Arctic.

Reporting this yesterday, the Defense Department said Army engineers last week completed pumping 30,000 gallons of diesel oil into a huge reservoir 100 feet beneath the surface of the Greenland ice cap.

If all goes well, and past tests have indicated it will, the big oil deep freeze will provide fuel for heating and other needs of the Army's research and development detachment at Camp Tuto, Greenland.

had an observable effect on sea level, he said. A study of ten tide gauges in operation for the last century, he said, has also shown sea level changes due to the fourteen-month wobble. Furthermore, he reported, the records of eclipses in Babylonian times indicate that melting of the world's ice has slowed the earth's rotation.

This he attributed to the shift of weight from ice sheets and glaciers in high latitudes, where the centrifugal effect was small, to the oceans, whose water flowed freely to equatorial regions and thus exerted maximum retardation. Dr. Munk likened the effect to that exhibited when a ballet dancer spreads her arms to slow a pirouette.

The retardation attributable to melting ice, he said, is less than the slowing of the earth by tidal friction. Since the latter influences the moon's orbit, he said, the two effects can be separated by analysis of the eclipses of 2,000 years ago, as recorded by the Babylonians.

BASE GETS ATOM POWER

Reactor Starts Operation at
Site in Greenland

COPENHAGEN, Denmark, Oct. 15 (Reuters)—A portable nuclear power plant that will supply heat, light and water to an American base only 800 miles from the North Pole started operation today, the Danish Foreign Ministry announced.

During the coming winter, the nuclear power plant will generate electricity at Camp Century, an American Army installation buried under the ice in Danish Greenland.

The plant produces 2,000 kilowatts of electricity.

UNDER-ICE CHAPEL SET

To Be Part of Atom-Proof
Army Base in Greenland

CAMP CENTURY, Greenland (RNS)—The men of the United States Army soon will be singing the familiar hymn "From Greenland's Icy Mountains ***" from under Greenland's icy mountains, it was disclosed here.

A complete "atom-proof city" and military base are being constructed here under the Greenland ice cap 900 miles from the North Pole and included in the facilities will be a small chapel.

A complement of 100 men and a dog are scheduled to spend next winter living under the ice on the high plateau of North Greenland.

Maj. Gen. Frank A. Tobey, Army Chief of Chaplains, has said in Washington that he hopes to have a chaplain winter with the men, but it is not certain whether the full complement can be housed at Camp Century during the first year of its operation.

In any event, there will be a chapel room

SHIP REACHES THULE

The Point Barrow is the first Military Sea Transportation Service cargo ship to reach Thule, Greenland, during the 1960 shipping season, Rear Admiral J. C. Dempsey, U. S. N., Atlantic commander for the service, announced July 13.

The Point Barrow, one of fourteen ships serving in this year's Eastern Arctic operations, began unloading her cargo on Sunday, the admiral reported. He said more than 40,000 measurement tons of supplies would be brought into Thule by M. S. T. S. ships this year.

The supplies are used by the United States Air Force base at the Arctic port.

*

Greenland Port Closed

The Navy has shut down for the winter a Greenland port used in supplying military bases in the Arctic.

The port, Sondrestrom, which is on the west coast, had received 17,750 measurement (40 cubic feet) tons of dry cargo for its Air Force base and a Distant Early Warning radar station, the Military Sea Transportation Service said here Sept. 16. Those shipments filled most of the bases' supply needs until next spring, it said.

Sondrestrom is one of the three major Arctic ports through which M. S. T. S. is funneling an estimated total of 154,000 tons of dry cargo and more than 3,000,000 barrels of petroleum products this year. The other ports are Thule, Greenland, and Goose Bay, Labrador.

The fleet assigned to this year's operations consists of thirty-seven dry cargo ships and tankers, assisted by three icebreakers. Operations were begun in June.

Sondrestrom, although officially closed, will continue to receive M. S. T. S. tankers with fuel supplies for the airbase until mid-October.

*

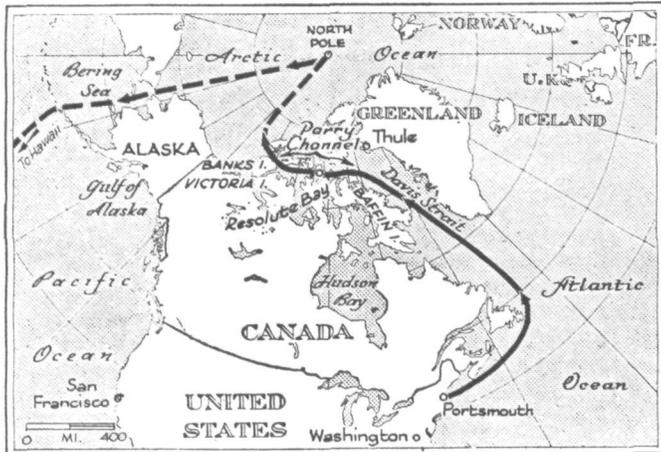
Icebreaker Docks Here

The Coast Guard icebreaker Westwind docked here Oct. 17 after a 147-day mission to the Arctic. The 6,500-ton vessel, a part of the operation to supply military bases, began her 19,200-mile voyage May 23. Her crew of 200 was commanded by Capt. W. L. Sutter.

Most of the Westwind's operations were along the West Coast of Greenland, where she helped open up channels in June into Sondrestrom Fjord, leading to Sondrestrom Air Force Base. Three weeks later she smashed her way into Thule to open that port for deep-sea shipping.

Other assignments included setting up radio navigational aids, and doing oceanographic work to develop data for ice forecasts.

Atom Submarine Opens Route Under Ice of Northwest Passage



The New York Times

Aug. 25, 1960

Seadragon blazes Arctic trail (solid line), then heads for the North Pole and westward exit (broken line).

By PETER BRAESTRUP

The New York Times.

WASHINGTON, Aug. 24—A United States nuclear submarine has made the first underwater transit of the Northwest Passage through the ice-laden waters of the upper Arctic, the Navy said today.

The U. S. S. Seadragon, with Comdr. George P. Steele 2d of Washington, D. C., serving as captain, made the 850-mile east-west passage in six days. She emerged from the waters of McClure Strait on Sunday.

Tonight, the Seadragon was reported in the Beaufort Sea heading for the North Pole.

The submarine, by using the Parry Channel route, was said to have opened a more direct passage through the Canadian archipelago from the Atlantic to the Pacific Oceans. Previous explorers used longer, more tortuous "southern" routes.

The Seadragon sailed from Portsmouth, N. H., on Aug. 1, and went up the Greenland-Labrador "slot" through Davis Strait and Baffin Bay. In Baffin Bay, she dived deeper under ice than any submarine had before. She went under one iceberg that was 1,400 feet long and extended 300 feet down into the sea.

In addition to blazing a possible military and commercial route through the Parry Channel the Seadragon's trip is expected to help the Navy further develop techniques for under-ice operations.

Only five transits have been made of the Northwest Passage. The first was made by the Norwegian explorer Roald Amundsen, whose forty-seven-

ton herring boat sailed the east-west route in 1903-06.

Attempts to find the Northwest Passage began more than 450 years ago. The English explorers, John and Sebastian Cabot, sought to open a trade route in 1502. Henry Hudson sought a way through and got as far as Hudson Bay in 1609-11. A half dozen others tried and failed, some perishing in the ice, before Amundsen succeeded.

The Navy's nuclear submarines have operated under Arctic ice on other occasions. In August, 1958, the Nautilus submerged in the Bering Strait off Alaska, and four days later surfaced in the vicinity of Ice-

land. At the same time, the Skate traveled under the ice to the North Pole. The Skate repeated her performance under more difficult winter conditions in March, 1959. Last February, the Sargo went under the Arctic ice from the West.

The Seadragon is a sister ship of the Skate. For the current voyage, in addition to her crew of seventy-five men and eight officers, she is carrying a group of civilian advisers and technicians. They are headed by Dr. Waldo K. Lyon of the Naval Electronics Laboratory in San Diego, Calif.

Dr. Lyon's group was using sonar and underwater television to study the ocean, the sea ice overhead and the sea bottom.

The Seadragon traveled most of the Northwest Passage submerged but surfaced for a day near the Royal Canadian Air Force Base at Resolute Bay to put ashore mail and photographs of the voyage.

The Seadragon was commissioned at Portsmouth Naval Shipyard, Portsmouth, N. H., last Dec. 5. She has an overall length of 267 feet, a beam of twenty-five feet and a surface displacement of 2,250 tons.

This was her first major cruise.

Prehistoric Tracks Found

OSLO, Norway, Aug. 6 (AP)—Norwegian scientists have discovered the petrified tracks of a giant reptile on the Arctic archipelago of Spitsbergen. The paleontologists think the tracks may have been left by an iguanodon, a huge herbivorous dinosaur living millions of years ago.

Steamer to Be Museum

The sternwheel steamer, *Keno*, is to be set up as a floating museum on the Yukon River at Dawson.



Comdr. George P. Steele of Washington, skipper of nuclear powered submarine Seadragon, waving from pier at Portsmouth, N. H., before craft embarked on attempted trip under polar ice cap from Atlantic to Pacific.

SUBMARINE NETS ARCTIC PLANKTON

Marine Organism Collected Under the Polar Ice by an Automatic Sampler

The New York Times.

WOODS HOLE, Mass., Dec. 10—A submarine has been used for the first time to collect samples of plankton under polar ice.

The samples, collected last summer by the nuclear submarine Seadragon are under study here at the Woods Hole Oceanographic Institution and at the University of Southern California in Los Angeles.

They were obtained during the submarine's voyage from Portsmouth, N. H., to Pearl Harbor by way of the Northwest Passage and the North Pole.

Plankton is the minute animal and plant organisms that float or swim weakly in the sea. As food, it supports large sea life.

The collecting was done by an automatic sampler, somewhat resembling an automatic soft drink dispenser, that was devised and built for the trip. Previous collections have been made by lowering nets through holes drilled through the ice.

Built to operate outside the submarine's "sail," or conning tower, the device is battery powered and completely self-contained. It has a rotary unit similar to those that hold and carry soft drink bottles to the dispensing hole.

With the plankton sampler, the rack turned each hour to place a new plankton net into the stream of water flowing past the submerged submarine.

The sampler shut itself off after each twenty-four-hour run. When the craft surfaced, the samples were removed for freezing and a new set of nets was installed.

The nets are among the smallest used, having an opening of only three-quarters of an inch and a length of twelve inches. Normally such nets are a yard wide and several yards long. The small nets were used on the Seadragon because Arctic water is extraordinarily rich in plankton. Also, because of the speed of the submarine, large volumes of water were filtered through the nets despite their smallness.

The sampler design was worked out by Dr. George D. Grice, marine biologist, Allyn C. Vine and Charles S. Yentsch, all of the Oceanographic Institution. Robert R. Marak of the United States Fish and Wildlife Laboratory in Woods Hole, and Roy L. Rather, formerly of the institution and now head of Commercial Engineering Corporation, Houston, which built and installed the sampler.

AN OLD LOG BOOK AIDED SEADRAGON

Sounding of 19th Century
Helped Submarine Find
Northwest Passage

The New York Times.

HONOLULU, Sept. 14 — Twentieth Century science coupled with an old log book helped the nuclear submarine Seadragon discover a legendary northwest passage through the Arctic, the ship's skipper told a news conference at Pearl Harbor today.

Comdr. George P. Steele 2d brought the 3,000-ton submarine into this Navy base at 10 A. M. after a history-making cruise from the Atlantic to the Pacific. The Seadragon, which left Portsmouth, N. H., Aug. 1, negotiated the Parry Channel through the Canadian Archipelago. She was the first ship in history to make such a voyage.

Commander Steele said some of the most difficult phases of the cruise had been made possible by the use of a borrowed leather-covered book written by Sir William Edward Parry, English navigator, nearly a century and a half ago.

The book contained the only soundings of some of the more treacherous waters.

The Seadragon's skipper gave major credit to the ship's nuclear reactor.

"It worked beautifully," he said. "We depended heavily on that nuclear reactor."

Dr. Waldo Lyon of the Navy Electronic Laboratory, senior scientist among four civilians who made the forty-five-day, 8,000-mile voyage, said it had been the climax of intensive tests that had made the Arctic "just another one of the seas."

Dr. Lyon, who shipped on other nuclear submarines on previous Arctic explorations, said the studies had progressed to a point where an atomic-powered submarine "can go anywhere, wherever it wants in the Arctic."

An inertial guidance system that enabled the Seadragon to reach the North Pole and surface through the ice pack was a major factor in the submarine's success, Commander Steele said.

Another of the scientists aboard was Arthur Roshon, also of the Navy Electronics Laboratory, a specialist in icebergs and their detection.

Commander Steele was decorated with the Legion of Honor by Rear Admiral Roy S. Benson, commander of the Pacific Fleet submarine force, on behalf of President Eisenhower. The crew received the Navy Commendation Medal.

Geologist Receives Chair at Yale

The New York Times.

NEW HAVEN, Nov. 2—The appointment of Dr. Albert Lincoln Washburn, Arctic geologist, as Professor of Geology at Yale University has been announced. He has already taken his chair and has also become director of graduate studies in geology.

In 1953-59 Dr. Washburn was Professor of Northern Geology at Dartmouth College. He holds a bachelor's degree from Dartmouth College and a doctorate from Yale. He has been a member of expeditions to Alaska, Greenland and the Antarctic. He formerly was executive director of the Arctic Institute of North America.



Dr. Albert Lincoln Washburn

Batter's Up at the North Pole With First Base 12 Hours Away

By United Press International.

WASHINGTON, Aug. 25 The nuclear submarine Seadragon broke through the ice at the North Pole tonight and her crew promptly organized a baseball game.

The submarine's skipper, Comdr. George P. Steele 2d, reported this on a Navy telephone radio hook-up shortly after the craft surfaced.

"The temperature at the surface on the North Pole is 28 degrees Fahrenheit," Commander Steele said. "The weather is fine and the sky is clear."

The commander said the polar baseball diamond was laid out in such a way that a home run would travel "from today into tomorrow and from one side of the world to the other," and that a runner leaving the plate would arrive at first base "twelve hours later."

The 360 degrees of longitude and the International Dateline can be spanned in a small area at the pole, where they all converge.

"We have maneuvered the ship through light ice to where we can put a life raft over to the last fifteen feet to ferry over a party to play baseball," Commander Steele said.

He explained that the water temperature also was 28 degrees, and a light skim of ice formed over water in the gaping hole made by the submarine.

The men "are wearing the warmest clothes they can get,"

Commander Steele said.

Officers and chief petty officers were matched against younger members of the crew, he said.

Admiral Arleigh A. Burke, Chief of Naval Operations, was unable to join in the radio-telephone conversation. But Capt. F. M. Lloyd, Navy information chief, conveyed to the skipper, his crew and the scientific party aboard "a hearty well done."

The Seadragon arrived at the pole after charting a new Northwest Passage across the top of the world.

The Seadragon is on the way to Hawaii.

In reply to a question, Commander Steele said:

"Everyone is well and happy to be this far along in an arduous cruise. We are certainly looking forward to arrival with our families in Pearl Harbor."

The commander, who makes his home in Washington, said no trouble had been encountered during the voyage.

Asked if there were amusing incidents during the voyage, he said, "Affirmative. We could spin you yarns all day."

In regard to the fact that in its Northwest Passage the submarine became the first ever to dive under icebergs, Commander Steele was asked what an iceberg looked like from below.

"The underside of an iceberg looks very much like the upper side of an iceberg," he replied. "Some are flat, some have points. No exact shape we could predict."

He said the submarine could not use its television cameras while under the ice bergs, how-

ever, because the ice blotted out most of the light.

He also was asked if the submarine's frogmen were taking part in the baseball game.

"Negative," he replied. "They're going for a swim."

For a brief period before the Seadragon reached the pole, the Navy lost radio contact with it. But tonight's transmission came over the telephone loud and distinct, with very little static.

The Navy also revealed today that Commander Steel had used a 140-year-old explorer's journal "during the most ticklish part" of the 850-mile passage through the Canadian archipelago.

Enlisted Men Win at Pole

WASHINGTON, Aug. 27 (UPI)—The nuclear submarine Seadragon reported today that her enlisted men had defeated their officers in a baseball game played on the ice at the North Pole. The score of the game, played last Thursday, was 13 to 10.

ARCTIC OPEN ALL YEAR

Nuclear Submarines Found Always Able to Operate

SAN DIEGO, Calif., Sept. 18 (AP)—United States nuclear submarines can operate the year around in the Arctic, a scientist who has made five trips to the North Pole in them said today.

"By now," said Dr. Waldo Lyon, physicist and Arctic specialist at the Navy electronics laboratory here, "we have operated in the Arctic under all of its different environments—in shallow water, among icebergs, around islands, through channels, in complete winter darkness and in twenty-four-hour summer daytime. The techniques of navigation, communication and breaking through the ice to the surface are completely operational."

Dr. Lyon and Arthur Roshon, an engineer at the electronics laboratory, have just returned from a cruise in the submarine U. S. S. Sea Dragon through the Northwest Passage to the pole. It was Mr. Roshon's fifth trip, also.

Newfoundland Seals Dwindle

ST. JOHN'S, Nfld. (Canadian Press)—Capt. William Moss of St. John's, a veteran sealer, says that unless a quota of 100,000 kills a year is set and the use of firearms prohibited, the Newfoundland seal industry will die. It is estimated that herds have been reduced by two-thirds through indiscriminate hunting in recent years.

Coats of Arctic Foxes

Arctic foxes have a short-haired, brownish coat in summer, turning to the longer white fur in winter.

ARCTIC FLOE USED AS RESEARCH BASE

Navy Scientists Go Aboard an Ice Island 180 Miles Inside the Polar Pack

KODIAK, Alaska, Oct. 11 (Reuters)—A new scientific research station for a group of Navy scientists has been established on a lonely floe riding the currents of the Arctic Ocean.

The Seattle-based icebreaker U.S.S. Burton Island "docked" beside the floe Sept. 8. She began unloading and setting up the equipment for the station, designated "Arlis One." Two days later the United States flag was raised over the campsite.

"Everyone on board was determined to make this, the first ice floe camp established by ship, a complete success," said a spokesman for headquarters of the Seventeenth Naval District here. "It was an astonishing transformation of a barren ice floe into a site for Arctic research."

At the time of the flag-raising ceremony the station's ten buildings had been completed and equipped with electric light and water and oil heaters to make the interiors comfortable. Food and equipment had been stored, machinery and radios were in operation and even the bunks had been made up.

With the ship's company divided into three shifts to work around the clock, the desolate floe had, by the next morning, begun to take on the appearance of a scientific camp.

The scientists moved from the ship into camp the following day.

An example of what the conditions will be like on the floe came when the unloading efforts were slightly hampered by a "white-out"—an Arctic phenomenon in which cloud and snow color-match so closely that the horizon seems to disappear.

Ice island Arlis One is about 420 miles northeast of Point Barrow and 180 miles inside the Arctic polar ice pack.

The operation to establish the research camp was initiated by the Office of Naval Research in Washington and planned by the Alaskan Sea Frontier here with the assistance of the United States Arctic Research Laboratory.

To provide on-the-spot coordination in choosing a suitable floe Dr. Max Brewer, director of the Arctic Research Laboratory, sailed on the Burton Island, which is commanded by Cmdr. Griffith C. Evans.

Dr. Brewer and Dr. Kenneth Bennington, a specialist in pet-

Proposed Arctic Atomic Blast Is Called Safe

A.E.C. Declares an Explosion Won't Imperil Eskimos

By LAWRENCE E. DAVIES
The New York Times.

POINT HOPE, Alaska, Aug. 15—Proposed nuclear blasts on the Arctic coast thirty-five miles below this Eskimo village were pronounced safe today from a biological standpoint.

Dr. John N. Wolfe, an Atomic Energy Commission scientist, said a fifteen-month field study costing \$2,000,000 had produced no evidence that the detonation would damage the Eskimos' relationship to their environment and livelihood.

The underground experimental explosions would be designed to demonstrate the feasibility of digging harbors and canals with nuclear energy. The Arctic area was chosen for its most nearly primeval conditions, where the Eskimo does little to disturb the balance of nature and where the human population is sparse.

The commission has not yet authorized the detonation, which would take place about 180 miles from the Soviet Union. The guessing is that if it occurs at all it will be delayed for at least two more years. The Geneva nuclear conference and the international picture generally are influencing factors.

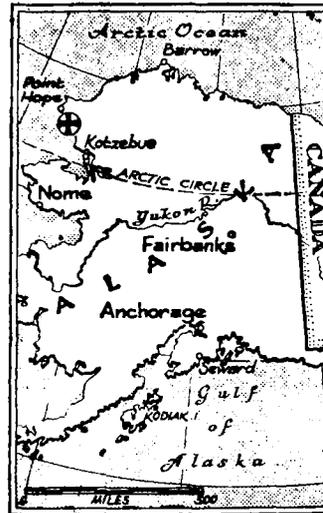
"I would say," Dr. Wolfe told a news conference at the commission field study headquarters camp near Cape Thompson "that there are no biological objections to the shooting on the basis of our investigations. Obviously, with a neighbor as close as 180 miles there may be problems of which we are not aware and which you would have to take up with the State Department."

rofabric of sea ice, made a reconnaissance flight from the ship. When the choice of a floe had been made the Burton Island threaded its way through narrow leads in the pack ice and frequently had to smash through heavy ice to negotiate the final twenty miles to the site.

The six scientists on the floe are led by Dr. Bennington, who is on the research staff of the University of Washington, Seattle. The others are Charles Knight, an expert in the crystal orientation of sea ice; George Brayton, an oceanographer; Renold Hansen, a micrometeorologist; Robert Ditzler, a micrometeorologist and radio operator, and John Tibbs, a marine biologist.

Frank Akvik, an Eskimo, has the job of camp maintenance.

Three to five more men will be stationed on the floe.



The New York Times AUG. 17, 1960
Blasts would take place near Point Hope (cross).

Point Hope, a village of nearly 400 persons, lies at the ocean end of a twenty-mile-long spit on the extreme northwestern coast of Alaska. This is the community nearest the blast site. The sentiments of its people — fishermen, hunters and trappers as well as plumbers and artisans who go as far as Fairbanks 500 miles away to work during the summers—are divided.

David Frankson, 57 years old, a short, slender, bespectacled postmaster and president of the Village Council, feared the Eskimo hunting ground would be endangered by the experimental blast.

"I haven't been to the colleges," he said, "but I'm against it."

Allen Rock, who with his wife Frances operates the Point Hope Lodge and Restaurant, shrugged off worries of fellow townsmen as silly.

"As far as I'm concerned," he said, "they can shoot it off tomorrow."

Amos Lane, vice president of the council, is on the commission payroll at the Cape Thompson project.

A score of Jamesway huts — insulated arched canvas structures on steel and wooden frames with paneled flooring — provide barracks, offices, dining room and other facilities for a scientific personnel of up to eighty pursuing twenty-two investigations.

This Arctic phase of Operation Plowshare, the over-all program dealing with peaceful uses of atomic energy, is directed by the commission's committee on environmental studies. Dr. Wolfe, chief of the commission's environmental sciences branch in the division of biology and medicine, is its chairman.

He and two fellow members,

Detonation Was Proposed to Create Alaska Harbor

Dr. Allyn H. Seymour of the University of Washington's laboratory of Radiation Biology, and Dr. Norman J. Willimovsky of the Federal Fish and Wildlife Service's Bureau of Commercial Fisheries, took part in the news conference.

It is there, in a bowl-shaped valley of treeless tundra, with the Ogotoruk River flowing into the ocean, where one 200-kilotron and four twenty-kilotron explosives would be detonated simultaneously from depths of 400 and 800 feet. The atomic bombs exploded over Hiroshima and Nagasaki in World War II were of twenty kilotrons.

It is estimated that the detonation would blow up 30,000,000 yards of material, some of it as high as 30,000 feet. It would presumably excavate a channel about 750 by 2,000 feet and a turning basing about 1,500 feet across.

"I wouldn't want to say that the committee is advising for or against the shots," Dr. Wolfe asserted. "I would say the scientific value of our studies to date is greater than the \$2,000,000 cost. I think, to keep the perspective proper, we are sort of riding on the coattails of an engineering project of great magnitude. We would learn more if the shots were delayed but there is a point of diminishing return and we would be in a bad position if they were delayed until 1965 or 1970."

Dr. Seymour doubted that there would be "a single fish or other sea organism killed by radiation" nor would there be any mortality from this sort of land either.

Associated Press.

NOME, Alaska, Nov. 19.—A non-nuclear explosion was set off yesterday in a test phase of a project aimed eventually at using a nuclear blast to create a harbor. The Atomic Energy Commission would say only that the explosion at the Project Chariot site was successful.

Large Salmon Trade

Salmon fishing, Alaska's leading industry, earns more than \$80,000,000 a year or more than eight times the price paid for the former territory by the United States in 1867, according to UPI.

Large Canadian Musk-Ox

A full-grown male of the musk-ox herds of Canada's far north and Arctic islands may weigh up to 900 pounds.

ALASKA AREA EYES ALL FORMS OF LIFE

A.E.C. Studying Men, Fish and Animals Where Atomic Blasts May Make Harbor

BERKELEY, Calif., Dec. 3 (AP)—On the bleak northwest coast of Alaska there is a small area that is undergoing a most unusual scientific investigation. Every man, animal, fish and bird is, theoretically, under observation.

If an Eskimo goes hunting, the investigators note and record where he went, what he bagged and when he returned. If a whale shows up offshore its species, movements and duration of stay are recorded.

The same goes for caribou that may wander in from the hills, for birds that fly by or nest in cliffs not far away; for fish that may struggle in and out of a little creek mouth.

Even the seaweed and other small marine life in the tidal area and offshore are under the eye of watchers. The scrubby vegetation of the tundra, such as grasses, brush, mosses and lichens, are also observed.

And before the investigators finish their job they will drill several hundred feet into the earth to investigate the permanently frozen subsurface and find out if there are any fossil remains of prehistoric man in the area.

All this information is being funneled to the Atomic Energy Commission. It will guide the commission's workers if they set off nuclear explosives to form a harbor there.

The plan, called Project Charlot, still is in the problematical stage, for two reasons.

First, the United States and the Soviet Union are observing a moratorium in the testing of nuclear weapons. Without some understanding beforehand, the detonation of atomic explosives there might upset the present calm.

Second, the A. E. C. does not have all the information it wants to calculate the after-effects and the long-range results of the explosions.

Some more observations have to be made, particularly on the weather and geological aspects of the undertaking. A few tests have to be made with ordinary dynamite or TNT, both at the site and at the nuclear test site in Nevada, to calculate how the big nuclear blasts will come out.

But the pre-detonation studies of the environment—those relating to all forms of life that might be affected—are about complete, says Dr. John

Navy Ice Breaker Sets Polar Record

POINT BARROW, Alaska, Sept. 27 (AP)—The 6,000-ton Navy ice breaker Burton Island returned here today after penetrating farther into the Polar ice pack, its officers said, than any ship had ever done under its own power.

The Burton Island established an Arctic research station 420 miles northeast of this northernmost settlement on the North American continent. It left seven men there to study oceanography and Arctic weather.

N. Wolfe, head of the commissions scientists making the survey.

"We know now," said Dr. Wolfe, "that the excavation won't affect the health, food sources and general livelihood of the natives.

"I don't think it can change the native way of living, at least not in the way the radio, the airplane and the motorboat have changed it.

"There will be considerable damage in a purely local way, because the blasts will move 30,000,000 cubic yards of earth. So there will be some destruction of plant and animal habitats. But there is no evidence that the damage will be widespread or will have any long-range effect on the environment."

Dr. Allyn Seymour, radiation biologist member of the investigating committee, said the projected five nuclear blasts, equal to 280,000 tons of conventional explosive, should produce less radioactivity in the air than did the Hiroshima or Nagasaki bombs.

The bombs detonated in Japan each were rated as equal to 20,000 tons of TNT. Dr. Seymour said the harbor excavation blasts should release into the air no more radiation than a bomb rated as 14,000 tons.

As planned, the bombs will be placed below the surface of Ogotoruk Creek where it runs into the Chuckchee Sea. The Chuckchee is an indentation of the Arctic Ocean. The site is 110 miles north of the Arctic Circle.

There would be five blasts. One would be of 200,000 tons, buried 800 feet below the surface to produce a bowl-shaped cavity about one-third of a mile across for an inner harbor. Then there will be four 20,000-ton blasts to dredge a channel at least 30 feet deep, 500 yards long and 250 yards wide leading into the sea. The smaller devices would be planted 400 feet down.

At these depths the explosions should release only about 5 per cent of the total radiation they will produce, Dr. Seymour

3 WILDLIFE AREAS SET UP IN ALASKA

Seaton Has Also Restored About 20 Million Acres Withdrawn During War

WASHINGTON, Dec. 7 (AP)—Three new national wildlife ranges totaling about 11,200,000 acres were established in Alaska Wednesday by Secretary of the Interior Fred A. Seaton.

The areas include the huge Arctic National Wildlife Range on which Congress failed to act this year.

Mr. Seaton also restored to the public domain about 20,000,000 acres of Alaska land withdrawn from such status in 1943. This land is a portion of about 48,800,000 acres in northern Alaska withdrawn for defense purposes during World War II.

The 20,000,000 acres had been opened to mineral leasing and mining claims in 1957 through a modification of Public Land Order 82. They are now entirely open to public entry under public land laws.

The new wildlife ranges include the following:

¶The Arctic, about 9,000,000 acres.

Even with this low radiation level extreme precautions will be taken to protect all forms of life against injury, Dr. Wolfe said.

It will not be necessary to move the Eskimos from their nearest villages, Dr. Wolfe reported. These settlements are Point Hope, thirty-two miles to the northwest, with a population of about 300, and Kivalina, a slightly smaller town forty miles to the south.

Dr. Wolfe and Dr. Seymour returned recently after spending a part of the summer at the portable hut village set up for the scientists at Cape Thompson, close to the harbor site. This consists of some eighteen plastic-insulated, fabric-covered structures that housed a scientific population of fifty-five persons this year.

Two investigators are remaining on the job—Doris Saario of the University of Alaska, who is at Kivalina, and Donald Foote, at Point Hope. They will keep the observations up to the minute.

It probably would be physically impossible to do the excavating before 1962 because of the big logistics job involved, the AEC says.

Meanwhile, the biological picture changes with the seasons, so the environmental investigators have to keep up their observations.

acres in northeastern Alaska, which Congress failed to authorize although the House passed enabling legislation. This is the country's largest national wildlife preservation area. Mr. Seaton said the Fish and Wildlife Service had emphasized to him the area's "unique values in wildlife, wilderness values and scenery."

¶The Kuskokwim National Wildlife Range of about 1,800,000 acres in the Yukon-Kuskokwim river delta in Western Alaska. Mr. Seaton's action made final the steps that were initiated in 1948 to withdraw the area from public domain status. The Secretary said this "is probably the greatest waterfowl breeding ground on the North American continent."

¶The Izembek National Wildlife Range of about 415,000 acres on the north side of the Alaska Peninsula, the long land arm reaching out and joining the Aleutian Islands. Steps toward withdrawal of this area from the public domain were initiated in 1942. The area, Mr. Seaton said, contains the most important concentration point for waterfowl in Alaska.

The Interior Department said that opening and restorations of public lands in Alaska during the Eisenhower Administration to date had greatly exceeded withdrawals and reservations. It listed withdrawals at about 11,900,000 acres and openings to various forms of public use

in mining and mineral development at about 23,500,000.

In addition, the department pointed out that the Administration had recommended and supported legislation that would open 24,000,000 more acres in far northern Alaska to mineral development. This will be done by abolishing the "Navy's obsolete Petroleum Reserve No. 4," the department explained, which is a portion of the withdrawal in 1943 of 48,800,000 acres.

Reviewing events that led up to his creation of the Arctic range by administrative action, Mr. Seaton said the Fish and Wildlife Service by his direction filed a withdrawal application on Nov. 19, 1957, in the Fairbanks Land Office.

From time to time since then, he recalled, he has stated that in the event Congress was either unable or unwilling to act both to preserve the resources values of the area and to authorize limited mining and mineral leasing activity compatible with the basic purpose of the withdrawal he would have to consider taking administrative action to create the new range.

He emphasized that he would continue to support legislation to permit mining activities in the range area, provided it conforms with the proposals supported in the last Congress by his department and the National Conservation Organization.

DARTMOUTH GETS TONS OF POLAR ICE

Study Samples Up to 5,000
Years Old Transported by
Plane, Ship and Truck

BAYONNE, N. J., Sept. 15—A shipment of Canadian Arctic ice and snow weighing several tons was unloaded here today at the Navy's supply depot.

On hand to take over the unusual shipment was 23-year-old Robert T. Blair of Maumee, Ohio, a research assistant in the Geology Department of Dartmouth College.

The ice cores were bored from an ice shelf near Ward Hunt Island, the northernmost Canadian island, 300 miles south of the North Pole, and were said to be 1,000 to 5,000 years old.

Mr. Blair was one of twenty members of a United States-Canadian expedition stationed at the island from May 1 to June 30 to study the nature, origin and future history of floating ice shelves.

The ice cores were obtained from various depths by hand drills. Samplings ranged in size from less than an inch to more than thirty inches.

Mr. Blair said that a year ago a similar effort to bring back ice samples had failed because the ice melted. It must be kept at temperatures between zero to 15 degrees Fahrenheit to avoid a change in crystal structure.

This time the samples were wrapped in plastic liners and placed in aluminum-coated cardboard cylinders, three feet long and three inches in diameter. They were then nestled in snow in three huge wooden crates lined with plastic.

On June 10 the crates were flown by the Air Force to Thule Air Base in Greenland and stored under refrigeration until Sept. 1, when they were loaded on the refrigerator-equipped Navy freighter Bondia for the trip here.

When the vessel docked this morning the crates were put into a refrigerated storeroom. This afternoon they were loaded on a trailer-truck equipped with a refrigeration unit, for the nine-hour trip to the college at Hanover, N. H.

The ice cores will be studied at Dartmouth's Cold Weather Laboratory.

Pribilof Seal Catch

About 90,000 fur seals are taken annually from the Pribilof Islands in the Bering Sea.



The New York Times

STRANGE CARGO: Robert G. Blair, geological researcher at Dartmouth College, unpacks cores of Canadian Arctic ice at the Navy Supply Depot in Bayonne, N. J. The ice will be used in research on floating ice islands

Army Unit to Move To New Hampshire For Cold Conditions

CHICAGO, Oct. 15—An Army research unit will move from suburban Chicago to New Hampshire next year because, among other things, winters in the Chicago area are not severe enough.

The organization is the Snow, Ice and Permafrost Research

Establishment of the Army Corps of Engineers. The unit now has headquarters in Evanston and in "cold rooms" in a three-story building in Wilmette. Both are North Shore suburbs along Lake Michigan.

Col. William L. Nungesser, director of the group, explained this week the reasons for the unit's transfer late in 1961 to a \$3,225,000 center at Hanover, N. H.

"One of the reasons is that, to us, Chicago's weather is not bad enough," he said. "A site with more snow and a longer

Northern Lights Traced To Radiation Belt 'Leak'

The satellite Explorer VII has proved that auroras or "northern lights" are caused by radiation leaking out of the earth's radiation belts.

Dr. James A. Van Allen, discoverer of the radiation belts, reports their link with auroras in the current Journal of Geophysical Research. Dr. Van Allen's team at the State University of Iowa designed the radiation instruments in Explorer VII.

These instruments, he reports, detected a funneling of radiation from the globe-circling radiation belts. Data showed an intense peak of radiation under a 15-mile-wide "hole" in the radiation belt near the North Pole.

At the same time, an observer in Montana photographed a broad auroral arc.

Magnetic disturbances apparently caused the radiation leak.

Dr. Van Allen has often described the doughnut-shaped radiation belts as "leaky buckets." The bottoms of the buckets hover near the North and South Poles and radiation often escapes through them into the earth's atmosphere.

Even before the Explorer VII data, Dr. Van Allen had theorized that "apparently, something happens on the sun. It sends out a burst of gases.

"The reservoirs (belts of radiation) above our earth shake like a bowl of jelly. The radiation droozles out at the ends and makes the auroral displays at the North and South Poles."

Now Dr. Van Allen and co-workers report that Explorer VII has proved the "droozles" and linked them with auroras.

winter period of cold will be more suitable.

"Another reason is to bring together in one center our establishment and an Arctic Construction and Frost Effects Laboratory, now established in Boston."

Colonel Nungesser said the unit's eighty scientists and technical experts are almost never able to enjoy a warm summer.

"Their work necessitates spending summer months in Greenland," he said. "Then, instead of enjoying palm tree country in the winter, they are likely to be in Alaska or at our local research station at Houghton, Mich."

Basically, the unit's task is to assemble, from its studies in the Arctic and from research performed for it by twenty-one American universities and scientists all over the world, the techniques to enable United States forces to build installations and, if necessary, to fight, in the coldest regions of the globe.

One of the toughest problems is that of constructing buildings, runways and other installations on the permafrost, the layer of frozen earth found in the Arctic.

Called permafrost because under normal conditions it remains permanently frozen, this water-bearing earthen layer becomes exceedingly impermanent when a warehouse or a runway is built on it. Runways have been broken up by its heaving, settling action, and buildings have sunk into it.

Near Thule, Greenland, the unit has built a 632-foot tunnel, with great side tunnels branching off. Here, inside the ice, buildings, reservoirs for fuel oil, and, in effect, a small military city are to be built.

The surface above it is swept by gales so strong that wind recorders have been smashed when they reached their maximum reading of 185 knots.

"Data obtained from this and other projects is of vital importance in many ways" Colonel Nungesser said. "A place such as Greenland, for instance, is, in effect, a refrigerator 1,800 miles long and 600 miles wide, offering the possibility of tunnels scores of hundreds of miles long in which anything can be stored against, perhaps atomic attack.

Soviet Opens Arctic Railway

MOSCOW, Dec. 18 (AP)—The Murmansk-Pechengà railway, northernmost in the world, has been opened to traffic, the Soviet press agency Tass said today. The railway will transport nickel ore from north of the Arctic Circle to processing plants.

Large Iceberg Source

The largest icebergs generally come from the Antarctic. One spotted off the Falkland Islands in 1893 was estimated to be 100 miles long.

ARCTIC INSTITUTE SETS UP STATION

Scientific Project Will Study
Devon Island Conditions
on Year-Around Basis

MONTREAL, Aug. 1 (Canadian Press)—The Arctic Institute of North America, for more than a decade a leading force in the search for knowledge in the North, begins this summer one of its most ambitious projects.

Since it was founded in 1946 the institute—which has both Canadian and American support and personnel—has sponsored more than 400 scientific and exploratory projects. But never before has it attempted, as it is doing this summer, to set up under its direct control a year-around station for an integrated study of the North.

More than fifty tons of equipment were loaded aboard the Department of Transport icebreaker D'Iberville before her departure July 23 from Montreal for Devon Island. The island is 600 miles north of the Arctic Circle between the northern tip of Baffin Island and the southern shore of Ellesmere Island.

It is there that the permanent station will be constructed, with five buildings to be erected before the final freeze-up and long Arctic winter.

When the buildings are completed, the institute's scientists will leave, returning next spring to the bleak island, which will be their home until the autumn of 1963.

In charge of the expedition is Spencer Apollonio, 26-year-old marine biologist from Rockport, Me., and Yale University. Despite his youth, he has been going into the Arctic almost every year since 1952.

Mr. Apollonio's particular scientific discipline is only one of six which will be represented at Devon Island. The others are at glaciology—the study of glaciers—meteorology, terrestrial biology, geology and archaeology.

Among those accompanying him are D. R. Oliver, 29, of Saskatoon, Sask.; C. R. Harrington, 27, of Calgary, Alberta, and Geoffrey, E. Stewart, 21, of Ashby-de-la-Zouch, Leicestershire, England, zoologists at McGill University, and Maj. Vernon Boyd of Steamboat, Nev., who was on the Admiral Richard E. Byrd expeditions to the Antarctic.

The broad range of sciences gives point to the institute's explanation of the purpose behind the project.

Although it feels small parties doing reconnaissance and individual studies in the Arctic are still important, the institute says



The New York Times Aug. 7, 1960
ARCTIC STATION SET UP:
Cross shows its location.

"there now is a need for intensive and coordinated studies if basic research is to be materially furthered."

Chosen by Mr. Apollonio in 1955, Devon Island has glaciated and nonglaciated and marine environments; it is Arctic by every criterion; lies near the edge of permanent pack-ice and yet can be reached by ship.

Three of the buildings being erected this summer will be put up near Cape Sparbo on Jones Sound on the northern coast of the island and the two others on the icecap that covers the eastern end of Devon, where the glaciologists will do much of their work.

When the scientific data gathered during the life of the project have been analyzed, the institute hopes to have one of the most complete pictures ever obtained of a part of the Canadian Arctic.

There will be a picture of the relationship between the sea, the icecap and the air around them, of the way the sea and the life within it are affected by the slowly melting glacier ice, of the musk-oxen on Devon Island, the lemmings and the Arctic owls that prey on them.

And there will be some understanding of the Eskimo settlements that were established there more than 1,000 years for relatively brief periods as Canadian Eskimos migrated slowly north and east to Greenland.

ARCTIC ONCE TROPICAL

Islands Yield Fossil Evidence
in Study by Dartmouth

HANOVER, N. H., Oct. 22—Dartmouth College geologists have found evidence that the North American Arctic had a climate that was tropical to warm until perhaps 50,000,000 years ago. They based their findings on fossils uncovered last summer in the Canadian

ICE WEDGES SPLIT ARCTIC SURFACES

Resulting Cracks in Earth
Pose Problems in Man's
Conquest of Area

AXEL HEIBERG ISLAND, Northwest Territory, Oct. 20 (Canadian Press)—In many parts of the North, the earth's skin is patterned with cracks like the glaze on an old teapot.

Seen from the air the network of cracks can be so strikingly orderly as to seem man-made, but they are made by the unrelenting, immeasurable forces of the cold.

And they can easily unmake what man tries to make in the Arctic and sub-Arctic.

The soil polygons can be of many shapes, regular or irregular. Squares and hexagons are usual. Around shallow lakes a spider-web pattern of concentric circles with radiating ribs is often seen. Each figure can cover large areas of ground.

Figuring out why and how the earth splits is one of the fields in which youthful Dr. Arthur Lachenbruch of Palo Alto, Calif., is one of the world's acknowledged leaders.

Dr. Lachenbruch, 34 years old, a specialist in ground heat-flow, was borrowed from the United States Geological Survey by the Jacobsen-McGill University's scientific expedition to Axel Heiberg Island, a lonely land 2,000 miles north of Winnipeg. "What is significant to the engineer is not so much the soil polygon," said Dr. Lachenbruch,

Arctic islands.

The geologists, led by Prof. Andrew H. McNair, mapped subsurface structure and brought back fossils for the Arctic paleontological collection of the college.

Geologic maps of some 5,000,000 acres of Prince of Wales, Bathurst, Ellef Ringnes and Amund Ringnes Islands were made during the summer. The work was part of a study several oil companies are making to evaluate the petroleum possibilities of North America's largest untested oil province.

Detailed studies of large, dome-shaped structures on Ellef and Amund Ringnes Islands provided new data on how certain geological formations originated, Professor McNair said. Some of the structures proved to be similar to ones on the Texas-Louisiana Gulf Coast and others to those in the Middle East.

"but the ice wedges in them.

"It's because of the ice wedges that a road can sometimes turn into a canyon fifteen feet deep. Even engineers with Arctic experience are surprised sometimes to see their airfields suddenly look like an alligator's back."

Simply, this is what happens. The cold makes the ground tighten and split into the polygonal pattern. The crack, which can be thirty or forty feet deep or even more, fills with water melted at the surface.

But the water is trickling down into permafrost, the ever-frozen subsoil of the Arctic. There it freezes, filling the crack with ice. This is the start of an ice wedge.

At the next contraction, the ice splits because it is weaker than the ground. More water runs in and more ice is formed. The ice wedge expands. Century after century, the same pattern of cracks can reappear.

People have heard the cracks appear with a sudden sharp bark like a rifle shot.

A danger lies in the uncovering of an ice wedge. The ground, the vegetation, even the snow, form a blanket atop the ice wedges that keeps them from being greatly melted by the summer sun. But man often finds it necessary to strip off the insulation.

It was the removal of the natural insulation that caused roads and construction sites in Alaska to be cut to pieces by great canyons.

The reasons crack-patterns form as they do, and where they do, are not clearly understood. But it is known that where the soil lies atop stratified rock, as on the slopes of gentle hills, the cracks will appear along the lines of the layers of underlying rocks, then at right angles to these main cracks to form a squarish pattern.

Dr. Lachenbruch believes he has established that polygons around a lake, or what was once a lake bed, depend on the temperature gradient. A lake is a good storer of heat. The ground near it is warmer than the ground farther way, and there is a gradual fall in earth temperature farther away from the lake.

Dr. Lachenbruch believes the cracks will form along lines of equal temperature roughly parallel to the lakeshore, and further cracks will appear at right angles.

Seal Herds Protected

The seal herds at the Pribilof Islands in the Bering Sea have been maintained at an annual average of 1,500,000 since 1916. Hunters may take only the surplus bull seals, according to an international agreement.

CANADIANS STUDY POLAR ICE SHELF

Scientists Return From a
'Blanket' Expedition—See
Years of Research Ahead

OTTAWA (Canadian Press)—So far, so good, report scientists back from a first prolonged look at the ice-laden Canadian polar continental shelf. But it may take perhaps fourteen years to find some of the answers. More than fifty men took part this year in the blanket scientific project engaging oceanographers, geologists, glacier experts, marine-life experts and surveyors.

Work began last year with a pilot party setting up the main program—a field in which Canada lags behind the Soviet Union and some other northern countries. A sum of \$1,134,400 was set aside for the project's current fiscal year, about double the amount last year.

The objectives are mainly scientific—of use in peace or war—to delineate an unknown Canadian area. But the project is also regarded as an expression of Canadian sovereignty over land too barren to support human life, other than scientists nourished by a long airborne supply line.

Most scientists were on the spot last march, and most now are back south after encountering one torrential rainstorm and the usual variations of wind, Arctic sun, and temperatures as severe as 40 below zero.

"About average," commented Dr. Fred Roots, the project coordinator whose headquarters were centered on the Isachsen weather station on Ellef Ringnes Island, about 1,900 miles north of Regina.

The area under study is the flank of the western Arctic archipelago. The "shelf" is a sloping land shoulder easing out under the sea to a sharp drop to the true ocean floor. This is the pattern followed along most of the world's coasts, in varying degree.

Military and civilian interests make it valuable to know just how much shelf Canada has, where it goes, its depths, and its tidal, current and ice conditions.

In an interview, Dr. Roots mentioned some initial indications. The Canadian shelf may lie deeper than expected, lower than that off Siberia.

Without actually sampling the potential of fish life, it appeared from water studies that commercial prospects are not bright, although some lakes teem with rosy-fleshed Arctic char.

The combining of scientists

in various specialities in one project seems the cheapest way of operating, in view of high transportation costs for men and supplies.

It appears also that for a few years at least this blanket type of operation seems the best scientifically, until a groundwork of facts is laid out for specialists to tackle in their own way and their own time.

The party used three helicopters and two light Otter aircraft as well as chartered transport craft. Ski-wheels on the Otters enabled them to land on the gravelly northern surfaces or in mud.

Three radio beacons established on Meighen, Ellef Ringnes and Borden Islands helped off-shore parties to pinpoint the location of sounding and other work. They worked as far as 150 miles out to sea on the polar ice.

A side aspect was the counting work on the Meighen Island ice cap, described as a tidy chunk of ice for studying the factors that cause these bodies to expand or contract. It ties in with similar work on Ellesmere Island to the east.

The Meighen ice cap measures about six by ten miles and is perhaps 600 feet thick. It appears to be fed by snow resulting from an open patch of water caused as the polar ice is broken by currents before crashing through channels in the archipelago.

Petroleum remains the most likely mineral to be found, said Dr. Roots.

Wildlife caused some exciting moments. Polar bears, which in that latitude tend to regard humans as just more seals, poked around the expedition and some had to be shot. A friendly seal came up on land about a quarter of a mile to inspect a radio party.

A few muskox are scattered on the islands and Dr. Roots recalled seeing a herd of the little Perry caribou on a barren area where not a vestige of food—not even kchens—was visible on the snow blanket.

CANADIAN BUILDER AIDS ARCTIC STUDIES

AXEL HEIBERG ISLAND, Northwest Territories (Canadian Press)—It was not George Jacobsen's fortune to have been born in the Nineteenth Century, when the great Arctic explorations he loves were under way. Nor has it been his fate to settle down into the academic life of a university campus, as he would have liked to do. But Dr. Jacobsen, a business man and intellectual, has combined his work and his dreams.

He is the hard-driving head of Tower Construction, a company that specializes in Arctic building. The money he makes building in the north he spends on getting the north explored.

As much as anyone, he has

HUDSON BAY AREA ONCE INLAND SEA

Studies Reveal That Vast
Body of Water Covered
Much of 3 Provinces

WASHINGTON (NANA)—The present Hudson Bay is a remnant of one of earth's greatest inland seas of all time.

This vast body of water between 6,000 and 7,000 years ago covered much of the present area of Quebec, Ontario and Manitoba and extended northward to cover the present Southampton Island and several other Arctic islands.

Studies upholding this thesis have just been reported to the American Association for the Advancement of Science by Dr. Hulbert A. Lee of the Geological Survey of Canada. By various techniques he has been able to trace the shifting shore lines of this ancient body of water which he has named the Tyrrell Sea after the Canadian Explorer and geologist, Joseph Burr Tyrrell, who died three years ago and who first advanced the vanished-sea hypothesis.

The region covered by the waters, he reports, was in about the center of the last great glaciation, at its maximum advance. It was greatly downwarped by the enormous weight of the ice forming a deep basin that was filled with water as the ice receded.

The time when the ancient sea was at its maximum, the report says, is shown by radiocarbon ages of shells collected from near the highest strand lines west and south of the present bay. Dates are not yet available for the east coast.

"The advance of the Tyrrell Sea into the Hudson basin," says the report, "shaped the direction of the last ice recession. These shifts of glacier flow are recorded both east and west of Hudson Bay. Upwarping of the land upon removal of the load of the ice sheet caused a regression of the Tyrrell Sea.

"Radiocarbon" dates of shells,

worked to make McGill University Canada's leading institution for Arctic study. His help was instrumental in setting up the McGill Sub-Arctic Research Laboratory at Schefferville, 600 miles northeast of Quebec City, and he is co-sponsor of the Jacobsen-McGill expedition to Axel Heiberg Island, 2,000 miles North of Winnipeg.

When the three-year expedition ends in 1961, the Tower-constructed buildings there will become a permanent McGill Arctic Research Laboratory.

wood and bones collected from the marine deposits at known elevations around Hudson Bay give information on the rates of this land emergence. The highest shore lines at about 800 to 900 feet above present sea level are recorded east of Hudson Bay in contrast to about 400- to 600-foot elevations to the west. It indicates an initial rapid uplift of the order of about 20 feet per century and later a much decreased rate of one to two feet a century.

ARCTIC PATROL SAILS

Canadian Official on 39th
Annual Trip North

July 25

The Eastern Arctic Patrol sailed from Montreal recently aboard the C. D. Howe, according to the Canadian Weekly Bulletin, a publication of Canada's External Affairs Department. It is the thirty-ninth annual Arctic Patrol and tenth trip for the C. D. Howe, which was designed and built for this type of work in 1950.

Government officers aboard the C. D. Howe include representatives of the Departments of National Health and Welfare, Northern Affairs, Mines and Technical Surveys, Transport, National Defense and Post Office.

The largest single group in Arctic Patrol is the medical party of the Indian and Northern Health Services. The medical party will carry out an intensive chest X-ray, dental, immunization and medical program among the 2,800 Eskimos to be visited during the patrol.

Arctic Travel Held Easier

VANCOUVER, B. C. (Canadian Press)—Modern navigational aids make Arctic voyages almost like midnight cruises, says Capt. Jim Whammond. The 42-year-old Vancouver skipper took the Arctic Rover 1,200 miles east of Point Barrow, Alaska, during the summer, supplying isolated centers and radar stations.

VOLCANO IN ARCTIC

Moscow Reports Discovery in
Survey of the Ice Floes

MOSCOW, Aug. 27 (AP)—Soviet polar explorers have discovered another active volcano in the Arctic Ocean, the press agency Tass said Saturday.

Vasily Antonov, an explorer, detected traces of the volcano in an aerial survey of ice floes in the northeastern part of the Chuckchee Sea and on the west of the Beaufort Sea, Tass said.

"The entire ice cover in these areas looked very disturbed and dirty, and its coloring was a bright rust red. The rusty shade of the ice cover might be due to the effect of oil eruptions," the press agency's account continued.

BERING DAM HELD DISASTROUS PLAN

Soviet Scientist Opposes
Countryman's Proposal
of Project on Strait

By WALTER SULLIVAN

A Soviet scientist has predicted disaster, instead of prosperity, if a countryman's proposal to dam the Bering Strait is carried out.

Last year P. M. Borisov, an engineer, suggested that a dam be built across the fifty-mile-wide strait between Alaska and Siberia. His plan called for a system of pumps to draw 500 cubic kilometers of water daily from the Arctic Ocean and deliver it to the Pacific. A kilometer is roughly five-eighths of a mile.

This plan, he said, would stimulate a replacement flow of warm Gulf Stream water from the Atlantic into the Arctic Ocean. He predicted that the result would be a melting of the pack ice cover on the Arctic Ocean and a warming of the whole Arctic climate.

His views were published in the Moscow newspaper *Literaturnaya Gazetta*.

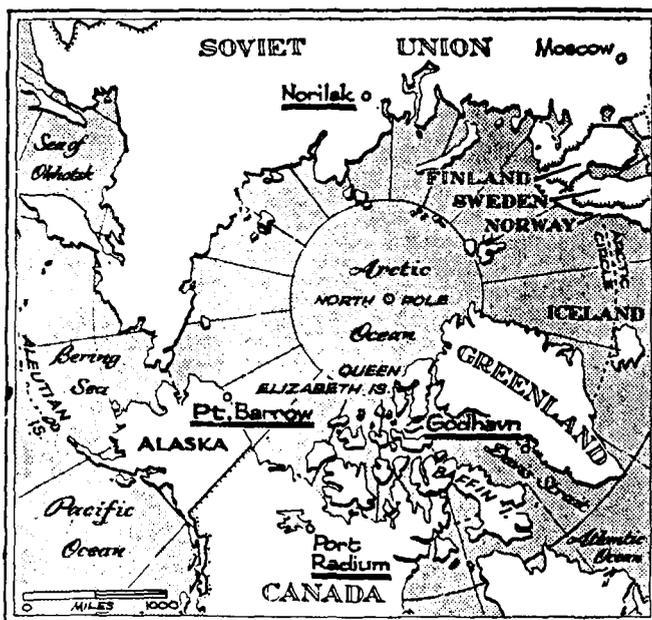
In a reply, published in the journal *Priroda*, D. A. Drogaytsev said that such tampering with nature could do "irreparable harm."

The scheme would extend the Gobi desert and other Asian and African deserts northward into fertile areas, he asserted.

It would suck arctic ice into the Bering Strait, clogging the strait and diverting great masses of pack ice into the north-flowing rivers of Siberia, he said. These rivers provide transport arteries vital in the current drive to develop the Siberian Arctic.

The accumulation of ice would chill the near-by land, not warm it, he said. In addition, the increased delivery of Arctic water into the Pacific would chill the northern part of that ocean, making winters colder and harbors icier along the Asian coast, he said.

Mr. Drogaytsev doubted that all the Arctic ice would be melted by such a scheme. The volume of ice, he said, is controlled chiefly by air temperatures, not by the coldness of the water. In short, he said that the effects would be catastrophic and that no such scheme should be undertaken without careful advance study of its world-wide effects.



The New York Times Dec. 5, 1960
BOOM IN SIBERIA: Soviet Union has developed Norilsk into a city of 110,000. The only Western towns so far north are Point Barrow, Port Radium and Godhavn.

Soviet Builds Arctic Boom Town While Western Communities Lag

By WALTER SULLIVAN

Dec. 4

At Norilsk, in the northern wastes of Siberia, a booming city of 110,000 persons has sprung up, built around the local mining of copper, nickel, gold, cobalt and coal.

In 1940 there was little more than a trading post at the site. Now the talk is that its size will double in the next five years.

The only communities in the Western Hemisphere so far north are at Point Barrow, Alaska, with a population of about 950; Port Radium, Northwest Territories, and Godhavn, Greenland, the last two with some 300 residents apiece. One of these, Port Radium, may soon be a ghost town.

These situations were cited last week to illustrate the contrasting efforts being made in the Soviet Union and North America toward development of the Arctic. The problem was discussed at a conference on the Arctic held at the Army's Quartermaster Research and Engineering Center at Natick, Mass.

The dramatic growth of Norilsk was cited by several of the specialists who spoke. Dr. Trevor Lloyd, Professor of Geography at McGill University in Montreal, mentioned the wither-

ing away of several communities in the American Arctic because local mineral deposits had been exhausted or become uneconomical.

He predicted that there would be no large-scale development of the region until governments were willing to invest large sums there. The necessary outlays were beyond the capabilities of private investors, he declared, despite the rich prizes that await exploitation.

Dr. George W. Rogers, Carnegie Visiting Professor of Economics at the University of Alaska, said the investment requirements must be reckoned "not in millions but in billions of dollars." Paul Queneau, vice president of the International Nickel Company, said that Soviet northern investments, such as those at Norilsk, were based on economic analyses identical to those of the West.

Thus, he said, any northern enterprise had to be justified by a demonstration that it would yield more, in terms of dollars, rubles or other "energy" units, than had to be pumped into it. The only exceptions, he added, were such installations as air defense radar centers.

Dr. Lloyd echoed this interpretation of Soviet northern enterprises. In the West, he said, the sums and risks involved are sufficient to frighten away private investors. Thus, Dr. Lloyd

said he was told by a Norwegian: "Bankers don't loan money north of Trondheim." That town is about a third of the way up the coast of Norway.

Yet, he said, by greatly increased public expenditures, scientific research, planning and concentration on selected targets, there would be a development of the region that would open the way for private enterprise.

Dr. Lloyd, a widely known authority on the Arctic, has been serving as consultant to a group of industrialists, including Cyrus S. Eaton, in a plan for exploitation of iron deposits on the Ungava Peninsula in northern Quebec. Dr. Rogers served as economic adviser to the last three Governors of Alaska.

The conference was sponsored by the National Academy of Sciences and the Arctic Institute of North America, as well as by the Quartermaster Corps.

SOVIET KEEPS PACT ON SEALS, U. S. FINDS

WASHINGTON (UPI) — The Fisheries and Wildlife Office of the State Department says the Soviet Union is "playing fair and square" in honoring a North Pacific seal harvest treaty with the United States, Japan and Britain.

Furthermore, a spokesman said, the Soviet Union and the United States have successfully completed an exchange of scientific observers who inspected each other's seal herds.

Fisheries and Wildlife officials in the State Department are not so bold as to suggest that they are setting an example for their diplomatic colleagues concerned with nuclear inspection and some of the more serious aspects of East-West relations.

"I'm afraid the issues involved here are of somewhat different character," said Stuart Blow, State Department fisheries expert.

Except for a brief lapse on the part of Japan during the Nineteen Forties, none of the nations has violated the four-power agreement, first made in 1911.

The second North Pacific treaty was signed Feb. 9, 1957. It is scheduled to expire in 1963, but by that time results of research programs are expected to provide the basis of terms for a new pact.

Icebreaker Lenin Ends Season

MOSCOW, Nov. 6 (UPI) — The atomic icebreaker Lenin has docked at Murmansk to be prepared for the next navigation season, the Soviet press agency Tass reported today. Last month, Tass said, the Lenin completed her first Arctic navigation season, having led 100 ships and river fleets through the Arctic ice between July 15 and Oct. 24.

Canada Is to Celebrate Her Northwestern Regions in '61

By KENT B. STILES

CANADA'S Postmaster General William Hamilton has made public the design of the first stamp he will issue in 1961. The large-size 5-cent red and green stamp, to appear on Feb. 8, will be "a tribute to the development of Canada's Northland and the increasing activity there." That area has progressed from "a remote land of untapped possibilities to a vital segment of the Canadian economy," he emphasized, primarily because of Government programs in mining, communications and other fields.

"The Eskimo people," Mr. Hamilton added, "are to share through an expanded educational and vocational endeavor. In the cultural field they have been encouraged to express their unique artistic talents.

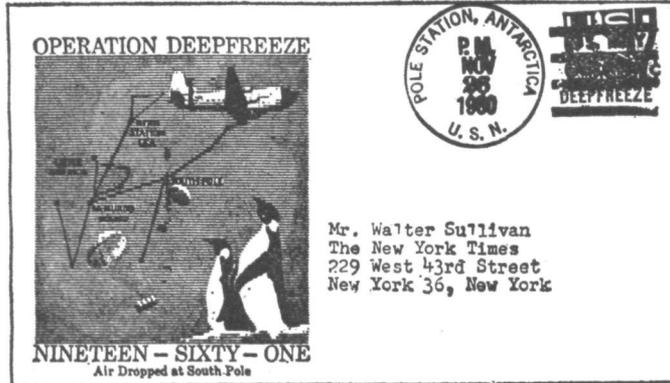
"In the Northwest Territories, the economy and society have been vitalized by the Government's programs. Potential riches in minerals and oils revealed by geological survey have attracted exploration on a large scale. Some settlements have emerged as main centers of population. The isolation has been broken by improvements in airfields, radio facilities, navigation routes and roads into resource-rich areas."

The design of the 5c stresses "the changing concept of the terrain." A large modern earth-moving machine and a surveyor with a compass are pictured. Lines of latitude and longitude, the latter converging at the North Pole, suggest the great expanse of Canada's vast frontier in the North.



To be released Feb. 8, 1961

South Pole Letter Takes 4 Days



Mr. Walter Sullivan
The New York Times
229 West 43rd Street
New York 36, New York

Envelope of letter received from U. S. base in South Pole

Dec. 1

A letter mailed from the United States outpost at the South Pole last Saturday afternoon reached The New York Times at 10 A. M. yesterday.

Sent by John Osmundsen of The Times, it was carried by ski plane from the lofty South Polar Plateau to McMurdo Sound. From there it was airlifted to New Zealand, whence regular air service carried it to the United States.

The nonstop flight from Antarctica to New Zealand alone takes half a day in

piston aircraft.

The envelope carries a special cachet inscribed "Air Dropped at South Pole." Apparently it was parachuted to the station so that it could be sold at the "ship's store" operated there by the Navy. Since it went via military mail, the postage was 7 cents.

The postmark indicates that the letter was mailed Monday afternoon and the cancellation bears the inscription: "U. S. Navy Operation Deepfreeze." This operation is the Navy's annual task of resupplying and maintaining the American Antarctic stations.



KERGUELEN

France has issued for the colony of French Southern and Antarctic Territories a horizontally arranged 25-franc stamp bearing a portrait of Yves Joseph de Kerguelen-Tremarec

(1734-1797), flanked by sailing vessels of his period. Kerguelen was a French navigator who in 1772 discovered the sub-Antarctic island named for him, but today better known as Desolation Island. He was seeking a new continent in the southern Indian Ocean. This bit of terrain was annexed by France in 1893.

DANISH EXPLORER

A half-century ago the Danish ethnologist and Arctic explorer Knud Johan Victor Rasmussen



(1879-1933), born in Greenland of an Eskimo mother, established at Thule, Greenland, the Cape York trading station. From this base he led several expeditions in search of confirmation of his theory that the Eskimos sprang from the same stock as North American Indians. He wrote several books regarding his experiences.

Rasmussen's adventures will be recalled to the people of Greenland on Nov. 24, the commemoration date, when a Greenland 30-öre red stamp bearing a Rasmussen portrait will be issued. Above the likeness will be inscribed "Thule 1910-1960 Knud Rasmussen" in two lines.



Japan notes the 50th anniversary of its first Antarctic expedition with this 10-yen stamp. It pictures Lt. Sirase, commander of the 1910 expedition, and a map of Antarctica.

ARGENTINA — A 5-peso lilac and black stamp calling attention to the national census



A map and census symbols provide the design for the lithographed stamps.



Cover carried on the "first submerged Northwest passage," the atomic submarine Seadragon's east-west transit under the polar ice. The Seadragon broke through the ice at the Pole on August 25 and reached Nome, Alaska, on September 5.

BURT M'CONNELL, EXPLORER, DEAD

Assistant to Stefansson on
1913-14 Arctic Expedition
—Was Author, Editor

The New York Times.

NANTUCKET, Mass., Sept. 24—Burt M. McConnell of 33 Riverside Drive, New York, Arctic explorer, writer and editor, died today in Nantucket Cottage Hospital, after a long illness. He was 72 years old. His summer home was here.

Mr. McConnell was an assistant to Vilhjalmur Stefansson and was meteorologist on the Canadian Arctic Expedition in 1913-14. He took part in the rescue of survivors of the Karluk from Wrangel Island in 1914.

The Karluk, main ship of the expedition, had been crushed in ice and had sunk at the outset. Mr. McConnell, in Olaf Swenson's gasoline schooner, King and Wing, sailed from Point Barrow, Alaska, to Wrangel Island.

In an account in The New York Times, Mr. McConnell told how the craft had gone through ice almost as high as her masts. In a boat made of skins, manned by an Eskimo crew, Mr. McConnell and others took survivors off the beach of Wrangel Island. At Cape Waring, the rescue party went ashore over the ice floe to fetch other survivors. The men were later transferred to the revenue cutter Bear and taken to Nome.

Mr. McConnell was born in Port Norris, N. J. He attended the American School of Physical Education in Chicago and took extension courses at Columbia University.

In World War I Mr. McConnell served in the Aviation Section of the Army Signal Corps. As a squadron transport sergeant, he took part in the St. Mihiel and Argonne offensives in France.

After the war Mr. McConnell became a newspaper and magazine writer, specializing in aviation and Arctic exploration. He was on the editorial staff of the Literary Digest from 1919 to 1929 and later edited the Explorers Journal.

In World War II Mr. McConnell served as a captain in the Army Air Forces at Cold Bay in the Aleutians. He was active in cold-survival tests and in development of equipment and methods of avoiding frostbite and freezing.

Survivors include his widow, Jane; a son by a former marriage, Dr. Allen McConnell of the Queens College history department, and a brother, Charles.

Nicholas A. de Transehe Dies; Arctic Explorer

SUMMIT, N. J., Dec. 28—Nicholas Alexander de Transehe, an Arctic explorer and retired expert on Russian affairs for the Central Intelligence Agency, died here yesterday at Overlook Hospital after a brief illness. He was 74 years old.

Mr. de Transehe, who lived at 32 East Fifty-eighth Street, New York, and in Dresden, Me., was a former commander of the Imperial Russian Navy. He was instrumental in persuading Czar Nicholas II to acquire Russia's first submarine from Simon Lake, the American inventor.

Arriving in this country in 1923, Mr. de Transehe served as an Arctic expert for the American Geographic Society for five years, during which he and Bernt Balchen charted the course for Admiral Richard E. Byrd's first trans-Polar flight.

From 1928 to 1934 he served as vice president and chief engineer of the De Bothezat Impeller Company, now a division of the American Machine and Metals Company. He invented and developed co-axial and bifurcator fans used for ventilation aboard ships and for transportation of corrosive gases in the chemical industry.

During World War II, Mr. de Transehe was a chief electrical engineer for the Army Transport Service here. Shortly after the war ended, he joined the C. I. A. in Washington as an expert on Russian affairs and served abroad on a number of missions. When he retired in 1956 he was awarded the Medal of Merit.

Born in Vladivostok, Mr. de Transehe attended the Imperial

Plan Memorial To Adm. Byrd

WELLINGTON, N. Z., Dec. 7 (UPI).—Friends and admirers of the late Adm. Richard E. Byrd plan to build a memorial to the explorer, it was announced today.

The Adm. Richard E. Byrd fellowship announced plans for the memorial, to be built on the highest hill overlooking this city.

The idea for the monument originated with A. Leigh Hunt, founder of the New Zealand-American Society and the Antarctic Society, who two years ago also founded the Byrd Fellowship.



Nicholas A. de Transehe

Russian Naval Academy and, after his graduation, served in the Russo-Japanese War. He also attended the War College at Kronstad, where he specialized in communications and submarine torpedo design. He received three decorations from the Russian Government, two for services during World War I.

From 1911 to 1915 he commanded the Russian icebreaker Tamir on two Arctic expeditions. His party discovered several islands, one of which was named for him. From 1915 until the overthrow of the Czar and the immobilization of the Imperial Navy he commanded a cruiser in the Baltic Fleet.

Mr. de Transehe leaves a daughter, Mrs. Charles R. Skinner Jr. of Summit, and two granddaughters.

PROF. JOHAN ANDERSSON

STOCKHOLM, Sweden, Oct. 30 (Reuters).—Prof. Johan Gunnar Andersson, geologist and archaeologist, died here yesterday at the age of 86.

As a young man he took part in several polar explorations, including Otto Norden-skjoeld's Antarctic expedition of 1901-1904.

In 1909 he was appointed head of the Swedish Geological Institute and later spent about ten years as adviser to the Chinese Government on geological research.

Professor Andersson was an honorary member of the Society of Antiquaries in London, of the Royal Anthropological Institute of Great Britain, and of the Ecole Française d'Extrême-Orient in Hanoi.

THOMAS M'LEOD, 87, OF SCOTT EXPEDITION

KINGSTON, Ont., Dec. 17 (AP)—Thomas McLeod, who survived expeditions to the Antarctic that claimed the lives of such explorers as Robert F. Scott and Sir Ernest Shackleton, died yesterday in a home for the aged here. He was 87 years old.

In 1910, Mr. McLeod sailed from New Zealand with Mr. Scott on the expedition that claimed Mr. Scott's life. Married for many months, Mr. McLeod and several others survived and later were decorated by King George V.

In 1914, he signed on as an able seaman aboard the ship Endurance for the British imperial expedition under Sir Ernest. Plagued by disaster almost from the start, the expedition endured shipwreck, a lengthy march across the Antarctic and months on the sea in open boats before it was rescued at a Norwegian whaling station.

Mr. McLeod returned to the Antarctic in 1920 with Sir Ernest on an expedition during which Sir Ernest died.

Born in Stornaway, Scotland, Mr. McLeod went to sea at the age of 14. He had lived in this area nearly forty years.

WILLIAM E. BELTZ, 48, LED ALASKA SENATE

ANCHORAGE, Alaska, Nov. 22—William E. Beltz of Unalakleet, the part-Eskimo president of the State Senate, died of brain cancer last night at the Native Service Hospital here. He was 48 years old.

Senator Beltz' colleagues elected him unanimously in January, 1959, as the first presiding officer of an Alaskan State Senate. He had been in the hospital since last March, when he collapsed on the Senate floor.

A carpenter by trade and a former officer of the Carpenters Union, Mr. Beltz entered politics by chance. As head of a committee to find suitable native candidates for the Territorial Legislature in 1948, he reported that no one wanted to run. So he was selected and won election to the House easily.

His father was a Pennsylvanian, who came to Alaska in 1897 and married an Eskimo.

He is survived by his widow, the former Anne Bulkeley; two sons, Mark and Billie; a daughter, Katherine; two sisters and five brothers.

Eskimo Carvings Purchased

WINNIPEG, Man. (Canadian Press)—The Winnipeg art gallery has purchased 130 Eskimo carvings, the first such collection acquired by a Canadian gallery. The carvings are scheduled to go on display.

'DEEPPREEZE 1961' PLANS ATOM PLANT

6th Antarctic Expedition to Start Work on Permanent Nuclear Power at Base

WASHINGTON, Aug. 28 (AP) — The Navy is preparing a force of men, ships and aircraft for its sixth consecutive Antarctic expedition. Work will start this year on an atomic power station to provide electricity for the permanent scientific exploration of the South Polar continent.

Plans for "Operation Deepfreeze 1961" were announced today by Rear Admiral David M. Tyree, Naval support force commander. They call for the assembling of nine ships, more than thirty aircraft and some 3,000 men to start moving south next month.

The first American aircraft will be in New Zealand in September, ready to take off about the end of the month for the initial flight of the Antarctic summer season.

Surface ships are scheduled to leave United States ports early in October to carry heavy provisions and some of the Navy men and civilian scientists who will replace the 198 Americans who remained at Antarctic stations through the winter.

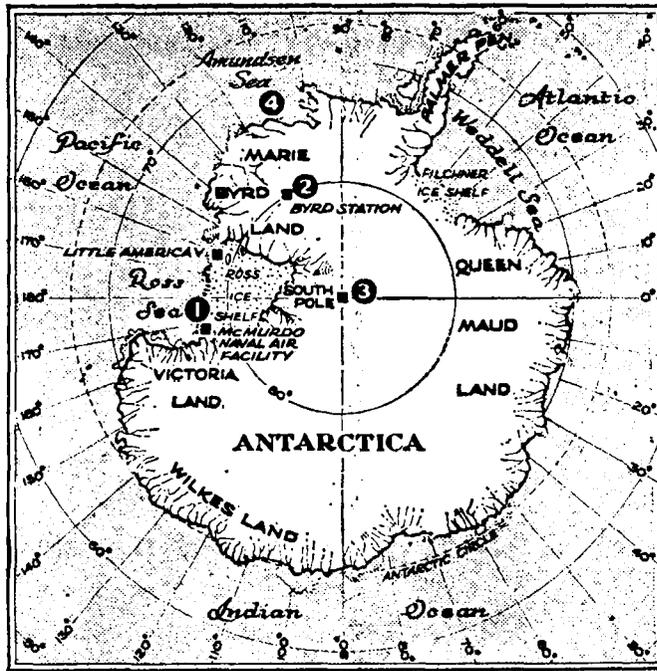
The National Science Foundation, which will distribute about \$4,000,000 in support of research programs during the year, said that about 120 scientists and their technical associates would spend the summer in Antarctica. Forty-three are expected to remain next winter, summer in the United States.

The atomic power station is to be built at McMurdo, principal base for American operations in Antarctica. When the plant is completed in the spring of 1962, its reactor-produced electricity will replace the oil furnaces now used.

Another pioneering job to be started this year is the construction of an under snow camp at Byrd Station. Eventually some fifteen buildings and a second nuclear power plant will be housed in tunnels and caves carved out of snow and ice.

Another project scheduled for the sixth Deepfreeze operation is an overland tractor train journey to the South Pole, where the United States maintains a permanent observation station. At the end of the 800-mile journey from Byrd Station, the three tractors will be left at the pole for use in future construction there.

Exploration of the Amundsen Sea by two Navy icebreakers will be carried out this year.



The New York Times

Aug. 29, 1960

ANTARCTIC GOALS: United States plans to put up an atomic plant at McMurdo base (1), build under snow camp at Byrd Station (2), send a tractor train from Byrd Station to South Pole (3), explore Amundsen Coast (4).

Plans for Atomic Power Station In Antarctica Speeded by A.E.C.

WASHINGTON, Aug. 10 — The Atomic Energy Commission announced today plans to build the first atomic power station in the Antarctic.

The 1,500-kilowatt plant will be at McMurdo Sound and is scheduled to be in operation by early 1962.

Because of the high cost of shipping conventional fuels into the frozen continent, the Antarctic is viewed as one of the few places in the world where atomic energy shows immediate promise of producing much cheaper electricity than conventional power.

Cost studies by the Defense Department and the Atomic Energy Commission indicate that atomic stations could produce electricity and heat at one-fourth the cost of conventional plants.

The economic attractiveness of atomic power in the Antarctic led Congress this year to authorize construction of three atomic stations, at a cost of \$13,000,000, to be located at McMurdo Sound, Byrd Station and the South Pole.

Senator Henry M. Jackson, Democrat of Washington, who suggested authorization of the plants, commended the commission today for its "expeditious action" in pushing ahead with the McMurdo Sound plant. He expressed the hope that the commission would act with similar dispatch on the two other reactors.

Administration approval of the Antarctica stations had been delayed by a Budget Bureau impasse over whether the Navy or the commission should fund the plants. A commission spokesman said it had finally been decided that the commission would pay for the plants.

The commission announced that it had selected the Martin Company of Baltimore to build the plant at a price of not more than \$3,950,678. The reactor, which will be of the pressurized water type, will be assembled in sections at the factory and shipped to McMurdo Sound for erection.

The commission said the plant would be designed and operated so that no radioactive wastes would be deposited in Antarctica, as called for in the Antarctica treaty ratified by the Senate today.

Bowling Reaches The Antarctic

American Machine & Foundry Co. will install a four-lane U. S. Navy bowling center for the first time in the Antarctic.

The center will serve naval personnel and scientists of Operation Deep Freeze 1961, the Navy's project supporting scientific study in the Antarctic.

FISH LIFE STUDIED IN THE ANTARCTIC

Scientists at McMurdo Post Work in a Hut Erected Over Hole in Ice

WELLINGTON, New Zealand, Nov. 21 (Reuters) — Scientists on McMurdo Sound are conducting research into the fish under the Antarctic ice.

Dr. D. E. Wohlschlag, a marine biologist from Stanford University, California, is in charge of the work, which has gone on for a number of years. Some 120 species have been caught and recorded.

This year the research workers are better—and more comfortably—equipped for their task than ever before.

Fishing is done through a hole cut in the ice. One problem in the past has been to keep this hole from freezing over. This year, a small hut has been built on the ice three miles from the shoreline and an oil-burning stove and a fan have been installed near the hole. A portable generator keeps the hut lighted and warm.

While Dr. Wohlschlag studies the catches, Dr. W. L. Tessier, an oceanographer from the United States Navy hydrographic office in Washington, sits comfortably in a chair, straddled across the hole in the ice. He measures the temperature of the water at different levels, its salinity, the direction of the current and the state of the ocean floor.

Fishing is carried out to a depth of 2,000 feet. The catches include marine fleas from the ocean floor.

The ice on which the hut sits is constantly, though slowly, being pushed out to sea. Thus the site of the investigation is always changing.

The abundance of fish in these waters has given Dr. Wohlschlag a variety of material for his biological studies. These are focused mainly on the metabolic rate of fish in Antarctic waters compared with the rate in warmer oceans.

"The sea around here is quite rich in fish," Dr. Wohlschlag said. "Before 1935, thirty species were known. At the latest count, 120 had been recorded. If we carry on, we may find even more new species."

From the hut, the samples are taken three miles to the biology laboratory at McMurdo Base for analysis and observation.

Medals for Antarctic Heroes

WASHINGTON, July 7 (AP) — Provision for medals for persons who serve with a United States expedition to Antarctica is made in a bill signed today by President Eisenhower.

ANTARCTIC BASE IN ANNUAL BOOM

Christchurch Makes Ready
for Deep Freeze Parties
—6th Season Opens

The New York Times.

AUCKLAND, N. Z., Aug. 13

—A United States base that grows and shrinks with the seasons is starting its annual boom as spring comes to the Southern Hemisphere.

The first parties have arrived at Christchurch to prepare for the sixth season of United States Operation Deep Freeze. By treaty with New Zealand, Christchurch is the advance base for American operations in the Antarctic.

During the southern winter the base contracts to a small maintenance party. But with the first hint of spring, fleets of Globemasters and other long-range aircraft bring men and supplies ready for the air and sea lift to the far south.

This annual influx has brought striking changes to Christchurch, largest city of New Zealand's South Island.

Traditionally Christchurch prides itself on being like an English cathedral town. It has a population of 215,000 and a sedate air. With its central square and stream meandering among stately trees it has, indeed, an old world aspect.

But the coming of the United States base has also made it the most subject to American influence of any New Zealand city.

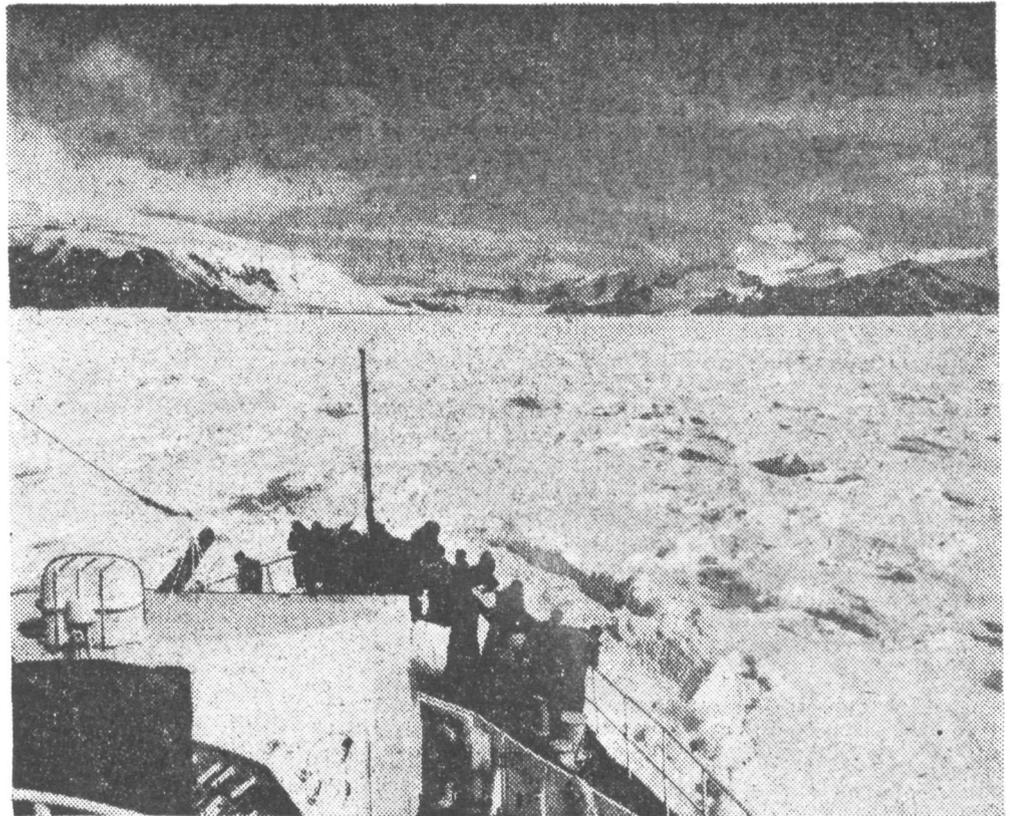
The Americans call it "Chee Chee," an abbreviation of its name. During the Antarctic season hundreds of naval and Air Force personnel and civilians are permanently stationed at the base. Hundreds more pass through going to and from the ice and there are sometimes as many as 2,000 Deep Freeze men in the city at once.

The base itself is on the edge of Christchurch airport. Its facilities have steadily increased. A hangar large enough to service Globemasters has recently been completed.

The base today has an air of permanence. Negotiations are in progress with the New Zealand Government for further expansion.

Barracks at the base house substantial numbers of Deep Freeze men, while frequent overflows spread over Christchurch hotels and occupy flats and houses in the city.

When the wintering parties return to the city from the Ant-



U. S. Coast Guard photo

Icebreaker approaches Cape Hallett, Antarctica, site of a weather station.

arctic in spring, and again when the summer parties are brought back from the far South in fall, the city is bustling with men spending accumulated pay. There is little to buy in the frozen South.

Christchurch night life, once almost nonexistent, has lived considerably in response to American demand. But the behaviour of the Americans is considered very good and they enjoy a high reputation.

Spring came to Christchurch two weeks earlier than usual this year, with the arrival of two aircraft with personnel at the beginning of August. Extra time was needed to prepare the new hangar and additional barracks for occupancy.

South support forces are expected at Christchurch on Sept. 1 and the airlift to bases in Antarctica is to start in the first week of October. In the following few weeks about 1,250 men will pass through Christchurch to the Antarctic bases.

ANTARCTIC SHIP SAILS

Coast Guard Plans to Chop
Harbor in McMurdo Ice

BOSTON, Oct. 25 (AP)—The Coast Guard ice breaker Eastwind sailed for Antarctica today.

Her mission is to make a seaport at McMurdo Sound by

Science Puzzles In Antarctica

If you are a Navy technician at McMurdo Sound, Antarctica, you have to think up things to do in your spare time. One thing is to play tricks on the scientists.

The geologists were baffled by a strange kind of rock, not related at all to the general run of rocks to be found where winds have bared the surface. A sailor had imported the fifty-seven-pound rock all the way from New Zealand and had planted it where the geologists would find it.

Another sailor bewildered the biologist with the Navy expedition. He gathered up dead flies he found on a window ledge in the plane crossing the Pacific and put them in the insect trap the biologist set out.

cutting out a V-shaped area eight miles wide at the outside and two miles across at the inner end, where the apex meets the shore.

This slot in the ice, it is hoped, will make a port for landing of supplies and equipment for the McMurdo Sound base.

Capt. Joseph W. Naab Jr. of Freeport, Me., Commander of the Eastwind, said it was hoped the prevailing wind would help in the operation by carrying the slab of ice out to the open sea.

PHYSICIAN EXPLAINS LURE OF ANTARCTIC

WASHINGTON (Science Service)—Half the men who go to the Antarctic do so to get away from women.

About 20 percent take this means of escape consciously; the remaining 30 per cent are motivated subconsciously, Capt. E. E. Hedblom, Medical Corps, United States Navy, said.

Captain Hedblom reported to the Association of Military Surgeons of the United States on medical problems encountered in the Antarctic. He is medical adviser to the Commander, Naval Support Force, Antarctica. He is also cold weather consultant to the Commandant, United States Marine Corps; medical consultant to the Arctic Institute of North America; and heads the department of cold weather medicine at the Naval Medical School.

Captain Hedblom, in explaining why such a high proportion of the men who go to the womanless Antarctic, said they are seeking an escape from women. He contends there is a psychological advantage to be gained from occasional separation of the sexes, even among married couples.

Men serving on the ice have seven times more neuropsychiatric difficulties than other Navy men. Hazardous environment and isolation are the explanation, Captain Hedblom said.

3 CREWS TO MEET 2D SUMMER OF '60

Back From Arctic, One Navy
Ship Is on Way, 2 Others
to Go to Antarctica

Nov. 28

A group of civilian seamen of the Navy's Military Sea Transportation Service is about to experience its second summer in the same year—both of them on the cool side.

The seamen are the crews of three ships that have been assigned to Navy Task Force 43, charged with resupplying United States installations in Antarctica, where summer begins officially on Dec. 21.

During the northern summer, the vessels participated in the annual supply mission to bases in Greenland and other Arctic locations.

The first of the three, the freighter Pvt. John R. Towle, sailed from Brooklyn on Nov. 19 loaded with 10,000 tons of cargo for Antarctica's McMurdo Sound. That is the headquarters of the task force and principal staging area for Operation Deep Freeze.

On Dec. 12 a second cargo ship, the Greenville Victory, will sail from Brooklyn for McMurdo. Both ships will make one round-trip, with a stop-over in New Zealand. The third ship is the tanker Alatna.

The Alatna, with 30,000 barrels of petroleum products on board, will depart from Norfolk on Dec. 7, also by way of the Panama Canal and Port Lyttelton, New Zealand. After making her initial fuel delivery, the ship is scheduled for two more trips to New Zealand to pick up and deliver 60,000 additional barrels.

The basic mission of the operation, now in its sixth year, is to support United States stations in Antarctica; bring in new personnel and supplies, evacuate and relieve 198 Navy personnel and civilian scientists who have spent the winter there and replace temporary facilities built during the International Geophysical Year (1958-59) that are no longer usable.

Specific assignments are to prepare the site for a nuclear power plant at McMurdo Sound and to complete a rebuilding project at Byrd Station.

The aerial phase of the operation was started last month with a fleet of twenty-six aircraft, most of them equipped with ski landing gear. The fleet includes four helicopters. The operation will last through February.

Other ships assigned to the task force which under the command of Rear Admiral David M. Tyree, are four icebreakers, an attack cargo ship and a radar picket destroyer.

Antarctic City Greet Its 'Summer Tourists'

By WILLIAM HINES
Washington (D. C.) Star

McMURDO SOUND, Antarctica.—The "summer tourist" season is just beginning, and the greatest little city on the ice is starting to jump.

The population, stable at 130 during the long Antarctic winter night, had swelled to about 400 by the third week in October, and will reach a peak of 700 by the third week in mid-November. This will make McMurdo by all odds the No. 1 metropolis south of the Antarctic Circle.

McMurdo is a complex of some 50 buildings affording adequate comfort against even the worst weather Antarctica has to offer. At best, Antarctic weather is rugged; at worst, it is a vignette out of the cold side of Dante's Inferno.

The "summer tourist" season at McMurdo begins about October 1. There are no actual tourists as such, unless reporters and visiting VIPs fall into that category. "Tourist" is the half-derisive name given October arrivals by those who have "wintered over"—the men with the beards and the far-away look in their eyes.

There is a sort of snobbery associated with experiences in the Antarctic. The men at the interior stations—Byrd and South Pole—regard themselves as frontiersmen and the McMurdo people as sybarites. The stations on the periphery of the frozen continent are laughingly referred to as the "banana belt."

The wintering-over men have something the summer tourists lack: A camaraderie based on the intimate sharing of a profoundly moving experience. Though the "wintering-over" look is a giveaway, it is not a sign of stir-craziness. The wintering-over party survived the winter with no crack-ups and no serious morale problems, according to all evidence.

Officers, chief petty officers and enlisted men enjoyed during winter and continue to enjoy now their separate clubs. Beer, sold by the case to individuals, a 140-case pallet-load at a time, was and is the "wine of the country." Movies were and are nightly attractions, with comments from the audience often surpassing the sound-track in entertainment value.

Lt. Comdr. Edwin R. Weidler, of Corpus Christi, Tex., an Evangelical and Reformed chaplain with a patriarchal grey beard, set up a hobby shop in the rear of his tiny chapel. Men with languages and sci-

Music Needed In Antarctica

By Wadsworth Likely
New York Herald-Tribune

McMURDO SOUND, Antarctica, Nov. 26.—To help counteract the stresses and strains of the months ahead of isolated, constricted living, Navy men here on Operation Deep Freeze '61 are devising many answers.

Some men are music-makers, and have brought with them guitars, mouth organs, fiddles, an accordion—even a French horn.

They will make their own music, but what they need is sheet music and song lyrics.

"We want the old songs," said Engineman First Class R. D. Peruchiti, from Free-land, Mich., "anything from about ten years old to fifty years old. We'd like to have at least 500 different songs."

entific skills taught each other in the informal classrooms of the "University of Antarctica."

When October arrived, and with it Admiral Tyree and the summer tourists, the pace of the station changed. It is now a boom town, geared to handle the incoming supplies for the next winter—3¼ million gallons of petroleum products, 1,000 tons of air-drop supplies for Pole Station and thousands of tons of other equipment, food and materials.

By February the summer tourist season will be over, and the population of McMurdo will be back around the 150 mark. Then the wintering-over party of Deep Freeze '61 will dig in for another long Antarctic night.

Husky Dogs Well Padded

The sled-pulling husky dogs have an outer and inner coat of hair, and their feet are furred between the pads and toes.

SIX U. S. SCIENTISTS GIVEN POLAR POSTS

WASHINGTON, Nov. 16 (AP)—The National Science Foundation named four scientists today to top posts at United States Antarctic stations. Two others were named as United States representatives for cooperative programs with Australian and Argentine scientists.

The scientists will arrive in Antarctica this month and will remain for a year to fifteen months.

Dr. George H. Meyer of Austin, Tex., will be station scientific leader at McMurdo. He is from the University of Texas.

Norman S. Benes of Washington, D. C., will be scientific leader at Byrd Station.

Ben W. Harlin, of Louisville, Ky., will direct scientific work at the South Pole Station.

Robert W. Titus of Reno, Nev., and Santa Rosa, Calif., will head the scientific program at Hallett Station.

L. David Drury of East St. Louis, Ill., will be the United States representative at Ellsworth Station on the Weddell Sea coast, where the United States and Argentina conduct a cooperative program.

John E. Breckenridge of Binghamton, N. Y., will be the senior United States representative at Wilkes Station, where the United States and Australia are conducting joint research.

Mr. Titus, Mr. Drury, Mr. Breckenridge and Mr. Harlin are meteorologists with the United States Weather Bureau.

Navy's Advice To Antarctica: Drive Safely

McMURDO SOUND, Antarctica, Dec. 24.—Naval and scientific personnel are wondering how to comply with one of the latest messages received here from the Secretary of the Navy.

The message, presumably sent to all Navy installations, read:

"With the approach of winter and the holiday season, road and traffic conditions will become more hazardous . . . all personnel are encouraged to reduce travel to a minimum in the hours of darkness and to drive defensively at all times."

The trouble is: it's now summer in the Antarctic, there will be no hours of darkness for some months to come and last, but far from least, there's a scarcity of vehicles here as well as roads on which to drive them "defensively."

SCIENTISTS PROBE ANTARCTIC 'OASIS'

5,000 Square Mile Ice-Free
Area Described to I.G.Y.
Unit by U.S. Geologists

WASHINGTON (NANA)—Preliminary surveys of an "oasis" covering about 5,000 square miles of the Antarctic have just been reported to the International Geophysical Year committee of the National Academy of Sciences.

The region, as described by Dr. Troy L. Pewe of the United States Geological Survey, presumably is the largest ice-free area of the south polar continent, which, for the most part, is covered with ice more than a mile thick. The area lies just west of McMurdo Sound at the western end of the Ross Sea, on whose shore several expeditions have made their headquarters.

The oasis, as described by Dr. Pewe, is as much as fifty miles wide and at least 100 miles long. It consists of alternating high ridges and valleys. The continental icecap has withdrawn entirely. A few large glaciers, however, flow from the border of the icecap through mountain passes toward the sea and numerous small alpine glaciers, quite independent of the icecap, originate in the mountain valleys.

The ice-free area lies in the area of British-claimed South Victoria Land and is dominated by high peaks of the Royal Society Mountains, some of which rise to as much as 13,000 feet above sea level. Generally, however, the elevation of the region is between 3,000 and 6,000 feet.

The term oasis indicates only the absence of the ice sheet. Otherwise it is hardly appropriate, for the area apparently is lifeless and about as dreary a stretch as could be found on the earth's surface.

Within the first twenty to thirty miles from the sea, according to Dr. Pewe's report, the area is characterized by dense rocks with occasional intrusions of granite. The highlands farther west, including a considerable part of the Royal Society range, consist largely of sedimentary rocks, mixed with extremely old volcanic formations. The lowlands are covered with glacial deposits and many of the valleys contain small alkaline lakes. These are the remnants of lakes formed along the ice margins during the last Ice Age.

To the south and east of McMurdo Sound ice-free land is much rarer and consists only of a few volcanic regions. Such is the peak of Mount Erebus, more than 13,000 feet above the sea

McMurdoites Respect Guest Soviet Scientist

By WILLIAM HINES

Washington (D. C.) Star
MCMURDO SOUND, Antarctica.—Nikita Khrushchev's table-pounding may have bruised Soviet prestige in the eyes of the world, but 135 Americans who wintered here have affection and respect for at least one Russian citizen.

He is Sven Yevtyeyev, 28-year-old glaciologist from Moscow who spent last winter with the American Navy-scientific group at this Antarctic outpost.

The Russian-American scientific personal exchange began in the cordial atmosphere at the International Geophysical Year and continued through Operation Deep Freeze-60, which is concluding now.

A man of average height with a pleasant, Slavic face, Mr. Yevtyeyev came to McMurdo after two seasons at Mirny. He spent several months at home in Moscow before reporting to McMurdo last January 31.

In a community of well-heated living and working quarters, "Sven's" laboratory is necessarily frigid. It contains ice samples from glaciers, snow deposits and lakes which cannot be allowed to rise above their below-freezing temperatures.

level, which dominates the entire McMurdo Sound region. It is an active, but at present dormant, volcano. Ice-free patches range in area from one to fifty square miles. Some are in the form of small islands projecting through the Ross Ice Shelf.

The glaciers in the McMurdo Sound region, Dr. Pewe's report explains, extend from the South Pole with temperatures below freezing throughout the year. Only in December and January, the height of the Antarctic summer, are there brief interludes when glacial ice melts to form shallow streams. Most of these drain into lakes in the ice-free valleys.

The flow of the glaciers seems to be very sluggish. There have been no perceptible retreats or advances of their fronts for the last fifty years, the report says.

Dr. Pewe's major interests were in the glacial history of the region. He found indications of at least four major ice formations that have completely covered the region in the past 15,000 years, but each has been less extensive than the preceding one.

The reasons for the retreat of ice from the great oasis region are still a mystery. There was no evidence that the area is growing bigger.

Despite the chill, it is not uncomfortable in Sven's "ice house" because there is no circulation of air. Visitors—whose numbers are held to a minimum, not out of unfriendliness but to prevent unwanted temperature rise—soon remove their outer gear and stand around chatting in comfort. Sven works most of the time without wearing gloves.

Glaciologists, as their title implies, study glaciers—their creation, their demise, their composition, their movement. Sven is regarded by his colleagues as an excellent glaciologist, who knows a great deal for a scientist so young.

He received his training at Moscow University, where he was graduated in 1955. Married, he became the father of a daughter, Jalia, last March.

Sven gets along swell with his American colleagues as long as politics is avoided. "Mention politics," a close associate says, "and he clams up."

The soft-spoken Russian finds little difference between American and Russian methodology in his scientific field. As far as relations on the "people-to-people" level are concerned, "in general people are the same all over the world," he says.

ANTARCTIC WARMING TO U. S.-SOVIET CHESS

MCMURDO SOUND, Antarctica, (NANA) — The great antarctic chess game is well on its way, and the outcome is still in doubt.

At Mirny base, 1,600 miles across the Antarctic Ice Cap, a Russian chess expert completed the game's 117th move on Oct. 21, and radioed the move to his opponent here.

The opponent, Lieut. Comdr. John E. McNearney of Alexandria, Va., prepared to reply.

Mr. McNearney, who instigated the radio chess game last July, says the game is still undecided, but that the best he can reasonably hope for is a stalemate. The Russian has the advantage of the moment of extra mobility.

Mr. McNearney set up the game through the good offices of Dr. Sven Yevtyayev, Soviet glaciologist who wintered over here. His original suggestion of a full-scale chess tournament was turned down by the Russians, so was a second offer to play two games simultaneously. One game was all the Russians would agree to.

The American, base supply officer here, does not know

whom he is playing at Mirny. Dr. Yevtyayev believes the opponent is a glaciologist named Solovyev, but a grapevine report has it that a Soviet pilot is opposing Mr. McNearney. When the question was put bluntly, the Soviet station replied: "It is Mirny vs. McMurdo."

Another game, between the small New Zealand Scott Station two miles from here and the Soviet Lazarev Station 2,200 miles across the ice, ended when Scott resigned after Lazarev's nineteenth move.

Noses Run, But Throats Hurt Less In Antarctic

WASHINGTON, Nov. 1 (AP). — "Running nose" leads all sick call complaints among Navy men in the Antarctic, but service doctors refuse to recognize it as a real sickness.

"A running nose is normal to hard work in the cold—it's not coryza (the common cold)," says Capt. E. E. Hedblom, a doctor-veteran of the Navy's Operation Deepfreeze in Antarctica. He told about it yesterday in a talk at the Sixty-seventh annual convention of the Association of Military Surgeons of the United States.

A check on sick call statistics for the five years of Deepfreeze, he said, shows that "running nose" cases totaled 18 per cent of all complaints.

However, he said Navy men in the Antarctic contract fewer severe sore throats than do sailors in the Navy generally. He told a reporter he believes this is due to "more regular hours" in the Antarctic, a greater intake of food (thus providing more vitamins), and much less contact with "sick people."

Briton to Visit Polar Station

GENEVA, Oct. 10—D. A. Davies, secretary general of the World Meteorological Organization, will visit the Antarctic at the invitation of the United States Government, the United Nations Weather Agency said today. Mr. Davies, a Briton, is to study meteorological and other scientific work being done there.

4 Saved in Antarctic Crash

WELLINGTON, N. Z., Tuesday, Dec. 27 (Reuters)—Four men were rescued today from a United States Navy plane that made a forced landing in the Antarctic. The plane, piloted by Capt. T. Morrow, a Marine, was carrying two Navy crewmen and Capt. L. S. Bridge, leader of a New Zealand Antarctic party. The crewmen were not identified.

FISH RELICS OFFER CLUE TO POLAR ICE

Hint Freezing of Sea Water Formed the Ross Shelf

By JOHN A. OSMUNDSEN

The New York Times.

McMURDO SOUND, Antarctica, Nov. 22—Scattered remains of more than fifty fish and other forms of aquatic life have been found more than a mile from open water on the Ross Ice Shelf about thirty miles southeast of here.

The find was said to suggest the existence of a well-developed animal life beneath the ice shelf. It was also said to support a long-standing theory as to how the shelf itself had been formed.

The partly decomposed bodies of fish, clams, snails, lamp shells, sponges and corals may be 100 to 2,000 years old, according to the University of Michigan scientists who found them.

The specimens were apparently wrenched off the sea floor some feet below and carried to the surface by the relentless forces that are believed to maintain part of this large mass of unbroken ice, the scientists said.

The ice near the easternmost of the Dailey Islands, where the find was made, is probably more than 100 feet thick and about fifteen feet above sea level, according to Dr. Charles W. M. Swithinbank. He is the glaciologist who led the Michigan party on a thirteen-day field trip over the ice.

Some of the specimens were still attached to rocks that once lay on the floor of the sea. How they got to the surface may be explained by a theory proposed nearly fifty years ago by Frank Debenham, a geologist who accompanied Capt. Robert Falcon Scott's British "Terra Nova" expedition to the Antarctic.

During that 1910-13 expedition, headless remains of fish and some well-preserved sponges and corals were found on top of the ice and in this same region of the shelf. It was Mr. Debenham's notion that they had been trapped in the ice on the sea floor when the Ross Sea froze to the bottom and had been gradually carried upward as the bottom ice ascended in maintaining an equilibrium with the melting ice above.

Dr. Swithinbank believes that the main body of the Ross Ice Shelf probably gets most of its nourishment from snowfall rather than from the freezing of sea water on its under surface as Mr. Debenham would have had it.

The cache of aquatic remains was discovered by David G.



Mr. Darby inspects sponge that he discovered, along with other aquatic specimens, more than mile from open water.



The New York Times Dec. 5, 1960

Fish relics have been found (cross) in the Antarctic.

Darby, a Michigan graduate student in paleontology, who was on the lookout for much older evidence of life in this area.

Attempts to identify the species have been started by Dr. Donald E. Wohlschlag, head of the biological laboratory of the United States Antarctic Research Program here.

LANDING IN ANTARCTIC

Navy Plane Is First to Reach Bellingshausen Sea Site

CHRISTCHURCH, New Zealand, Dec. 10 (UPI)—A United States Navy C-47 plane made history today by landing on Bight's Coast of the Bellingshausen Sea in the Antarctic. It was the first such feat in history.

The plane was on a reconnaissance flight from Byrd

Air From Pole Shipped via Air

Associated Press.

AUCKLAND, New Zealand, Dec. 22.—Two sealed crates containing nothing but air left Auckland by air today for the Scripps Institute of Oceanography at La Jolla, Calif.

The crates were filled with air at the United States station at the South Pole and were sent to the U.S. for research.

Each contains 11 cubic feet of Polar air and weighs 75 pounds. They are marked "From the South Pole. Please don't air drop."

Station to determine whether a geological team could be flown in.

Two Navy Hercules ski-equipped planes later flew in the party and its equipment. The expedition was headed by Dr. J. Campbell of Craddock University of Minneapolis.

Antarctic Minerals

Antarctic experts believe there are valuable mineral deposits in that continent. Traces of gold, copper, lead, chromium, molybdenum, antimony, zinc, and tin have been found, says the National Geographic Magazine, but none in exploitable quantity or quality.

REMAINS OF FISH 1,100 YEARS OLD

Scientists Hope to Learn How Specimens Turned Up

By JOHN A. OSMUNDSEN

The New York Times.

McMURDO SOUND, Antarctica, Dec. 14—The remains of more than fifty fish and other sea creatures discovered last month on top of the ice more than a mile from open water have been found to be about 1,100 years old.

Word of the age determination of the specimens by their radioactive carbon content has just reached here from the Institute of Nuclear Science in Wellington, N. Z., where the specimens were sent for dating.

The question remains as to how partly decomposed bodies of fish, clams, lamp shells, sponges and corals came to be where they were found.

One explanation might be that the animals had been trapped on the sea floor when the Ross Sea froze, then had been wrenched off the bottom and borne upwards as the bottom ice ascended in reaction to the melting on the upper surface.

This theory, advanced nearly fifty years ago by Frank Debenham, a geologist who accompanied one of Capt. Robert F. Scott's expeditions to the Antarctic, has received some support from the age determination. More information will be required for further substantiation, however.

The team of University of Michigan scientists who made the discovery are in the field and could not be reached for comment.

Dr. Donald E. Wohlschlag, Stanford scientist directing the United States Antarctic biological laboratory here, raised these three unknown factors related to the find.

The thickening of the ice at the site of the discovery, the rate of surface melting and ice formation on the shelf bottom, and the speed and direction in which the ice is moving.

These factors, with the age that the specimens are now known to be, should give a three-dimensional picture of what had happened—where the fish might have been trapped, the course their remains had taken through the ice shelf, and the length of time they had lain waiting to be discovered.

Ambergris, a substance from the sperm whale, is an important ingredient in perfumes,

POLAR STUDY GIVES CLUES TO AURORAS

Young Antarctica Scientist Relates Radio-Wave Hiss to the Southern Lights

By JOHN A. OSMUNDSEN

The New York Times.

SOUTH POLE, Nov. 30—A young Japanese scientist, who spent the just-ended winter at this desolate scientific outpost, believes he has found a connection between hissing radio signals from outer space and the flashing colored "southern lights" of the aurora australis. The finding was described by Dr. Edwin C. Flowers, scientific leader this year of the United States Amundsen-Scott South Pole station here, as a "tremendous step forward in understanding what causes auroras." The achievement appears also to provide a new basis for explaining certain types of very low frequency radio signals from space whose exact origin heretofore has been a major scientific mystery.

A thorough knowledge of the nature of auroras and such radio signals from beyond the earth would be important to basic science and for such practical matters as long-range communications and manned flight into space.

According to data collected and analyzed by Henry Morozumi, of the State University of Iowa, auroras and at least the "hiss" form of extraterrestrial very-low-frequency signals are caused by protons from the sun. Those atomic particles—nuclei of hydrogen atoms—produce their spectacular effects when they plunge along spiral paths into the uppermost reaches of the earth's atmosphere, the 24-year-old graduate student explained in an interview.

This is not the first time that solar corpuscular radiation such as protons and electrons have been cited as a likely cause of auroras. The first solid clue that auroras might be produced by emanations from something extraterrestrial came from work reported in 1851 by Dr. Aden B. Meinel of the University of Chicago and associate director of the Yerkes Observatory in Wisconsin.

Dr. Meinel had photographed an extremely bright aurora overhead through a special spectrophotometer, or light analyzer. This filtered out all radiation but that which was characteristic of hydrogen.

Dr. Meinel noted that hydrogen atoms were rapidly approaching the earth in the region of the auroral display.

3 Penguins Waddle 2,200 Miles On Antarctic Ice to Find Home

By JOHN A. OSMUNDSEN

The New York Times.

McMURDO SOUND, Antarctica, Dec. 3—The third of five little Adelie penguins that were released here a year ago today has apparently returned to its stoney rookery at Wilkes Station, 1,500 air miles away.

Word to that effect has reached the headquarters of the United States Antarctic research program here from Richard Lee Penney, the University of Wisconsin zoologist who banded the five birds last year at Wilkes.

They were flown here with a member of Wilkes Station's support force who was evacuated for medical reasons. Flights are seldom made into or out of that joint United States-Australian scientific observatory, so last December's emergency flight gave Mr. Penney an opportunity to perform a significant experiment in his studies of the sex and orientation behavior of Adelies.

The questions he wanted to answer were: would the birds find their way back to their breeding and hatching grounds at Wilkes, and if so, how long would it take them?

Both questions were answered early last month when two of

the birds showed up at their nests two days apart, indicating that they had not traveled together. Mr. Penney guessed that they had come by way of the sea and the pack ice, probably covering a distance of between 2,250 and 2,400 statute miles through sixty degrees of longitude.

He believes they found their way by a combination of means. These included cues from the positions of the sun and stars, indications of water from the neutral color of the sky near the horizon over the sea, coastal land marks, and an innate time sense still not well understood.

What appeared to be the third of the five penguins to return—and probably the last, now that the breeding season is over—came to the Wilkes rookery the other day.

Its identity was uncertain because it was not wearing a band on its flipper-wing. But worn feathers where a band should be and the nest site it selected indicated that it was one of the five.

The bird—whose sex was uncertain—was in good condition and apparently in good voice after its long forced journey.

ANTARCTIC STUDY EXPLAINS STORMS

Cloud Physicist Develops a Theory on the Conditions Needed for Blizzard

By JOHN A. OSMUNDSEN

The New York Times.

BYRD STATION, Antarctica, Dec. 2—Research on the winter winds that howl across this snowy plain, sometimes for weeks without a letup, has borne a new theory to explain Antarctic blizzards.

The studies were made by Luis Aldez, of the United States Weather Bureau, who left here today after serving as scientific leader of this United States

research station for the last year.

Mr. Aldez, a cloud physicist, came down last year to study airborne ice crystals. But blizzard winds made collecting specimens impossible and venturing just 300 feet into the open for weather data was hazardous.

In one blizzard, the scientist nearly lost his way back to shelter. In another, his eyes were frozen shut by the icy blasts that reached ninety knots in gusts.

So he shifted the focus of his research from cloud physics to Antarctic blizzards. He wanted to find what caused them and whether it would be possible to tell in advance when one would hit.

Mr. Aldez, who did his work on a grant from the National Science Foundation, began by looking for meteorological phenomena that might be related to those storms.

Earlier, Dr. Carl Gartlein of Cornell University had observed auroras on the horizon. He found evidence that hydrogen atoms there were moving both toward and away from the earth, just as they would have appeared to do had they been traveling earthward in spirals and observed from the side.

Similar observations were made during the last Antarctic

winter by Mr. Morozumi.

In addition, the young physicist made continuous recordings of auroral activity with an all-sky-photometer, an electronic device, which he devised. This instrument measured the total amount of light in the sky constantly and signaled the scientists instantly whenever there was an auroral display to observe.

Twice a day, radiosonde balloons were sent aloft. They sent back data on humidity, temperature and atmospheric pressure at high altitudes. Tracking the balloons gave information about upper altitude wind speed and direction.

In addition, surface weather observations were taken every three hours. Information was collected on maximum and minimum air temperatures, pressure, humidity, visibility, clouds, snow, temperature and wind direction and tendency.

The first factor that Mr. Aldez noted that seemed to be related to the onset of a blizzard was a warming trend at an altitude of about 7,000 feet. On the basis of that observation, he forecast blizzards several times early in the winter just passed, but none materialized.

Checking back through his records, Mr. Aldez found two weather conditions that were present whenever a warming trend was not followed by a blizzard. They were prevailing winds from the south and high atmospheric pressure.

He also noticed, however, that whenever a warming trend was accompanied by a solid air current from the north and lower than normal barometric pressure, a blizzard ensued from twenty-four to thirty-six hours later. An explanation he worked out for this constitutes Mr. Aldez' theory for the nature of the Antarctic blizzard.

According to that theory, northerly winds blowing over this station and toward the South Pole bring in warm moist air from the sea. They also set up a field of vertical velocities that enhance surface winds by transferring energy from the fast, jet-like air currents in the middle and high troposphere about 20,000 feet above the ground.

Winds below an altitude of about 7,000 feet rush downward. Those above blow upward and create a low pressure condition at ground level. Blizzards so generated are accompanied by clear skies above and no precipitation.

Southerly winds blowing over this station from the Pole, on the other hand, create opposite conditions of high pressure, clouds, snow and no high winds.

Mr. Aldez does not know how generally this theory may be applied to blizzards throughout the continent, for he has not had access to weather data from other stations here. He does not believe his "rule" will apply to coastal locations but that the general mechanism it implies may be useful for forecasting blizzards in the interior. He knows it works here, at any rate, by the "amazingly good batting average" he ran up last winter in predicting blizzards.

He is anxious to return to his studies of cloud physics, however, and says weather forecasting is out of his field, "but this was fun."

U. S. SHIP BLAZES ANTARCTIC TRAIL

Icebreaker Glacier Is Week
Ahead of Her Schedule on
Passage to McMurdo

By JOHN A. OSMUNDSEN
The New York Times.

ABOARD THE U. S. S. GLACIER in McMurdo Sound, Antarctica, Dec. 12—This largest and most powerful of nine American icebreakers is nearing the end of what its skipper called "an extraordinary passage" to the Antarctic Continent.

Now less than six nautical miles out of the United States naval air facility at McMurdo Sound, this vessel is more than a week ahead of schedule on her mission to deliver scientific and other supplies and to open a channel through the ice for other ships to follow.

This was a result of an unusual combination of weather conditions, a brittle ice pack, most of which "shattered like glass," and a series of long openings, or polynia, in the unbroken ice field that were all lined up for the vessel to steam through unobstructed.

Usually, the journey south through the high latitudes is roughened by easterly and westerly winds that rock this roundbottomed vessel through arcs of as much as seventy or eighty degrees, thereby slowing her passage.

This year, however, the Forties did not roar, the Fifties did not howl and the Sixties did not scream. The Glacier made her way to the ice pack as steady as a rock all the way.

Commander Philip Porter, commanding officer of the Glacier under Capt. Edwin A. McDonald, attributed it all to the weather.

After two days of smooth sailing through flat calms, he said, the Glacier picked up a strong northerly wind off her stern—unusual for this time of year—and rode it between two low pressure areas with their treacherous crosswinds all the rest of the way to the security of the ice pack. There, the crew received an even greater surprise.

"Whenever we punched in," Commander Porter said, "the ice opened in tremendous, long cracks. Last year, we just nibbled at it."

Although the unbroken ice field beyond the region of ice flows was more extensive than last year, the Glacier had an easier time getting through. The reason for this, Commander Porter said, was partly because the ice was so brittle but mostly because the polynia were all lined up, making it easier to pick

U. S. Antarctic Team Begins Trek to the Pole

Eight Men and Their 68-Ton
Caravan Leave Base

By JOHN A. OSMUNDSEN
The New York Times.

McMURDO SOUND, Antarctica, Dec. 10—Eight men and sixty-eight tons of vehicles, food and equipment rolled out of the camp area here today on an overland traverse to the South Pole.

The expedition from the University of Wisconsin lumbered southeast, then veered westward over the Ross Ice Shelf toward the heavily crevassed Skelton Glacier 200 miles away. There, the group will ascend to the vast expanse of the polar plateau.

At the top of the glacier, the party will make the first of twelve major and more than a hundred minor stops for scientific observations. The traverse will then snake over the ice cap to the Pole, transcribing a gigantic S more than 1,400 miles long.

When the party reaches 90 degrees South on or about Feb. 15, Dr. Albert P. Crary, the traverse leader, will dismount the lead vehicle and become the first man in history to have set foot on both of the earth's geographic poles.

That distinction will not be without honor. Nor will that of the party's being only the fifth one to have reached the South Pole by an overland route since the one led by Roald Amundsen, the Norwegian explorer, in 1911.

Far more important to Dr. Crary and the other members of the traverse, however, will be the scientific data collected along the way.

Some of it will have immediate practical application as will the meteorological data for local weather forecasting.

Most of their observations, however, will be useful only in the long run when related to those made by other traverses, field parties and permanent sci-

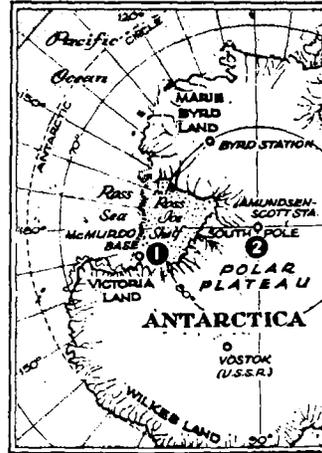
entific stations that dot the periphery and interior of Antarctica. This is a land half again as big as the United States.

Despite its size, the Antarctic Continent will have surrendered more than a third of its surface area and much of the atmosphere above it and the waters that surround it to man's scrutiny by the close of the current summer season, Dr. Crary said in an interview before he left.

Findings that are being made at this gigantic ice-bound laboratory bear on matters of even greater proportions—the formation of the earth's great land masses, the evolution and dispersal of life on this planet, the mechanics of the world's weather and the physics of outer space.

Largely for those reasons, the National Science Foundation has provided almost \$4,000,000 for nearly fifty research projects. The United States Navy, with the assistance of the Air Force, is supplying \$15,000,000 worth of logistic support.

Data that Dr. Crary's traverse will collect relate to determinations of the history of the ice cap, to whether it is grow-



The New York Times Dec. 12, 1960

Team left McMurdo Sound
(1) for the South Pole (2).

ing on the ice ahead of the 6,600-ton ship as her bow rams in, rears up and over the unbroken ice, and then settles through it into the blue-green water below, can feel the entire surface heave with the blow and watch frozen waves form many yards around.

At this rate, the Glacier, due at McMurdo Jan. 2, will now probably arrive before Dec. 20.

From there, the Glacier will head back to New Zealand to pick up fuel and have her screws, which have become worn in the ice, straightened before heading south again as Captain McDonald's flagship, accompanied by the Staten Island, in the exploration of the Amundsen Sea coast, a region never before penetrated by ship.

Ice has been recorded as 5,000 feet deep at some parts of the Antarctic.

Answers to those questions can be deduced in many ways. These include measurements of surface elevations, ice thickness, snow accumulation, types of snow windrows called sas-trugi, movement of the ice sheet, ice temperatures deep in the polar cap, physical properties of ice crystals there and variations in the earth's gravitational field.

The temperature of ice thirty feet beneath the snow surface, for example, is within a half degree of the average annual temperature of a region. Ice temperatures below fifty feet reflect the climate of the past.

Measurements of the yearly annual snow accumulation are correlated with data on ice thickness and movement over the polar plateau.

This build-up of the ice cap can be balanced against ice wastage through the outward movement of glaciers, calving of icebergs from the ice barrier surrounding the continent and melting of ice from the bottom of the ice shelves. This will determine whether the world's largest supply of ice is increasing or diminishing.

Dr. Crary, who serves as chief scientist for the United States Antarctic research program of the National Science Foundation, said he did not expect to find evidence that a great change was taking place in the Antarctic ice cap, "because it would be reflected in the sea level, and this has not changed in 10,000 years."

However, he said, it will probably be several years before anyone knows for certain whether the ice cap here is advancing or receding. This is so because the amount of ice wastage by any of the processes involved is not known to within 25 per cent.

Other members of the expedition that is being conducted by the University of Wisconsin are a grant from the National Science Foundation are:

Colin Edwin A. Robinson, Wisconsin geophysicist; Mario Giorvinto and Jack C. Zahn, Ohio State University glaciologists; Sveneld Evteev, a Russian exchange scientist, who spent the winter here; Ardo Meyer, geomagneticist from the United States Coast and Geodetic Survey, and Jack B. Long and Ralph E. Ash, Traverse engineers from the University of Wisconsin.

Expedition Is to Make Study of Continent's Icecap

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Ice has been recorded as 5,000 feet deep at some parts of the Antarctic.

ICE IN ANTARCTIC REPORTED ON RISE

Sheet Growing at Rate of 293 Cubic Miles Yearly, Soviet Expert Says

By WALTER SULLIVAN
The New York Times.

HELSINKI, Finland, Aug. 3—The immense mass of Antarctic ice is growing at the rate of about 293 cubic miles a year, a Soviet glaciologist estimates.

Such a trend would be contrary to the observed shrinkage of almost all glaciers in other parts of the world. It is thought, however, that it may be a side effect of the general warming of the earth during the last half century. Such a climate change might increase the volume of the moisture-laden air delivering snow to Antarctica.

The Soviet estimate was made by Dr. Pyotr Shoumsky, who has long been active in ice studies in the polar regions. He told an international symposium on Antarctica here that, according to his calculations, snowfall was contributing 2,550 cubic kilometers (612 cubic miles) to the continent yearly.

Some of the snow is blown out to sea before it can settle. Some is lost by melting or evaporation. But by far the largest subtraction from the Antarctic ice budget is through the breaking off of icebergs, some of which are as large as Long Island. Dr. Shoumsky estimated that, the total loss, in various ways, was only 1,330 cubic kilometers (319 cubic miles).

This leaves an annual surplus of 1,220 cubic kilometers, or 293 cubic miles.

A comparable estimate has been made by Dr. Malcolm Mellors, an Australian scientist, and a similar conclusion is said to have been reached by Dr. F. Loewe who took part in the French expeditions.

Skeptics at the symposium asked why, if so much water was being placed into cold storage, there was no lowering of sea levels. Dr. Herfried C. Hoinkes of the University of Innsbruck, a well-known glaciologist, suggested that the answer might be a slight expansion of the oceans, caused by warming of the water in recent decades.

Actually sea levels have risen a small amount, which has largely been attributed to melting of world-wide glaciers. Dr. Hoinkes noted, however, that this might be primarily a thermal effect.

The symposium was organized

New Director Is Named For Mariner's Museum



U. S. Navy

Rear Admiral George Dufek

Rear Admiral George Dufek, retired, a leading authority on Arctic and Antarctic exploration, has been appointed director of the Mariner's Museum in Newport News, Va.

Admiral Dufek, a much decorated combat veteran of World War II and the Korean War, was graduated from the Naval Academy in 1925.

The museum, which has attracted visitors from all over the world since its founding in 1930, is dedicated to the preservation and advancement of all the arts and sciences relating to the sea.

in connection with the general assembly of the International Union of Geodesy and Geophysics. It constituted a summation of what had been learned of Antarctica and its ice covering during the International Geophysical Year of 1957-58 and the successor programs of the past two years.

Much of the Soviet work was presented to Western specialists for the first time. According to one analysis, in the vicinity of the chief Soviet base at Mirny 1,400,000 tons of snow blows to sea yearly across each kilometer of coastline. This is less than some earlier estimates and is small compared to the amount discharged into the sea by the breaking off of icebergs.

The Russians agreed with Dr. Mellors that most of the ice delivered to the sea comes from the ice shelves that sometimes push out over the water at a rate of several feet a day across a front hundreds of miles in

ICE MOVING TO SEA FAST IN ANTARCTIC

Rate of Ross Shelf Fixed at 5½ Feet a Day—Exceeds Past Glacier Speeds

By JOHN A. OSMUNDSEN
The New York Times.

McMURDO SOUND, Antarctica, Dec. 13—The Ross Ice Shelf—largest unbroken mass of floating ice in the world—is moving out to sea at a rate of about five and a half feet a day, according to measurements just made near here.

That speed was said to be greater than that of any other water-borne glacier yet measured with the precision attained in the new measurements.

It was about a foot a day faster than had been indicated by measurements several years ago of the movement of a food cache left on the shelf ice by Capt. Robert Falcon Scott, the British Antarctic explorer who died in 1912 on his return from the South Pole.

The new measurement was part of a continuing study of snow accumulation and wastage over the ice mass that runs between 330 and 13,000 feet thick over 196,000 square miles of the Ross Sea.

Data being collected will be helpful in understanding the contribution that the South Pole ice cap and its surrounding waters make to the world's weather. Another possible fruit of the study was suggested by

length. The shelf fronts are about 800 feet thick.

One Soviet paper also reported that a substantial portion of the precipitation in the heartland of Antarctica was in the form of hoarfrost. At Vostok, one of the Soviet stations in that region, it was said that these tiny crystals fell almost the whole year around.

Also a new series of explosion soundings at Vostok have shown the land beneath that spot to lie roughly at sea level, although the elevation of the ice surface is 11,000 feet.

F. G. van der Hoeven and Dr. Albert P. Cray of the United States reported a similar result in the north-central portion of Victoria Land, between Vostok and McMurdo Sound. The rock was found to lie more than 2,600 feet below sea level, although the coastal mountains dam up the ice to a depth of many thousands of feet.

Thus estimates of the amount of ice in the world continue to grow by leaps and bounds. The figure now is close to double what it was prior to the I. G. Y. A French scientist, A. Bauer of Strasbourg, told the symposium

Dr. Charles W. M. Swithinbank, leader of the University of Michigan field party that made the new measurement of the ice shelf's velocity.

"People will come here to stay someday," he said. "It will be important, therefore, to know how glaciers work—whether they will bury buildings, tumble them into the sea, leave them stranded on ice pedestals, or what."

This is the fourth consecutive season that University of Michigan scientists have spent studying the Ross Ice Shelf. In previous studies during the International Geophysical Year, 1957-59, most of the work sought to determine snow accumulation, ice thickness and depth of water under the shelf.

Last year, studies were begun on the rate at which the shelf's 400-mile-long seaward edge, the barrier, was moving out to sea.

That work consisted of staking the edge of the barrier with flagged aluminum poles and fixing their positions from sun sightings or with land-based reference lines of greater precision.

The new determination of the shelf's velocity was made by measuring the movement of three such stakes from a 1,640-foot baseline of land at Cape Crozier, across Ross Island from the naval air facility here at McMurdo Sound.

Dr. Swithinbank and other members of his party have just left for the field to continue a new phase of the Ross Ice Shelf study. This study began this summer under the support of the National Science Foundation's United States Antarctic research program.

he thought the total in Antarctica to be 30,000,000 cubic kilometers, which is about 95 per cent of all the world's ice.

Snow accumulation measurements at American, British and Soviet stations show that most of the additions to the ice sheet are made within a few hundred miles of the coast. The situation in the heartland is comparatively static and one Russian proposed that the deep ice there dates from the start of Antarctic glaciation.

Dr. Harry Wexler, director of meteorological research at the United States Weather Bureau, submitted an estimate that it must have taken at least 112,000 years for accumulation of the deepest ice in the heart of Marie Byrd Land. This included the period when it was a floating shelf over the strait that once connected the Ross Sea with the Bellingshausen or Amundsen Seas.

On the other hand, Dr. Edward Thiel of the University of Wisconsin reported that his most recent series of explosion soundings rules out any large channel between the Ross and Weddell Seas.

Hamsters Go Around With Flies In Polar Biological Clock Tests

Antarctic Scientists Study the Effect of Earth's Rotation on Time Sense Shown by Most Living Things

By JOHN A. OSMUNDSEN
The New York Times.

McMURDO SOUND, Antarctica, Dec. 17—Hamsters, fruit flies, cockroaches, cockleburrs, bean plants, fungi and bread molds are going around together at the South Pole this summer.

They are all spinning slowly—some more slowly than others, some in one direction, some in the other—on steel turntables set up in the garage of the Amundsen-Scott South Pole Station.

A second batch of revolving plants and animals is maintained in the biological laboratory here as a check.

This is part of an attempt by three scientists from the Los Angeles campus of the University of California to find out what makes biological clocks tick. More precisely, they want to see if the rotation of the earth has anything to do with the innate time-measurement mechanism that most living things seem to possess.

For nearly fifty years, scientists have been trying to discover what accounts for the precision with which some persons are able to awaken without assistance at the same time every morning.

They also want to know how birds and other animals navigate, how plants as well as animals seem to "know" the date by the length of the day, and how even protozoa and insects maintain precise cycles of activity.

The first well-controlled experiments aimed at finding an explanation for such phenomena were conducted between 1914 and 1918 by J. S. Szymanski, a Polish biologist. He showed that some animals followed a twenty-four-hour cycle of activity even when outside stimuli that were known to affect them—such as temperature and light—were held constant.

Since then, scientists in Austria, Germany and the United States have shown that those biorhythms persisted even under widely varying conditions. Exposure to extremes—temperatures close to freezing, prolonged darkness, flashes of bright light—could set the clocks back or slow them, but they would eventually revert to the cycle on which they had initially been set.

Two theories have been put forth to explain the mechanism.

One is that instinctive time-measurement is purely a function of an organism's metabolism and is independent of all external influences. This theory runs into trouble, however, because chemical reactions involved in metabolism should show a sensitivity to heat and cold, and biorhythms have been found amazingly persistent over a wide range of temperatures.

The other theory holds that an organism's internal clock is driven by clues from some external physical force—such as variations in air pressure or fluctuations in radio waves from outer space—which has not yet been recognized as having an effect on living things.

Another force that may be involved, either directly or indirectly through one or more of its consequences, is that derived from the rotation of the earth. This is the one that the California scientists are testing.

By running their experiments at the South Pole, Dr. Karl C. Hamner and Dr. Raj Sirohi will be able virtually to eliminate—or at least to reduce greatly—whatever effects the earth's rotation may have on living

things. This is being accomplished by rotating some of the organisms counter to the direction of the earth's spin and exactly at the same speed.

Because the effect of this may be difficult to measure in the short time that the scientists have to collect their data, some of the plants and animals are kept in stationary cages, some are rotated either faster or slower than the earth, and some turn in the same direction as the earth's spin. Corresponding experiments are being conducted here, where the effects of the earth's rotation cannot be reduced as greatly as at the pole, by Dr. Takashi Hoshizaki.

In tests being run on hamsters, for example, each rodent is kept in a darkened cage equipped with an exercise wheel. Normally, the animals are active at night and sleep in the day on a rigid cycle of about twenty-three hours and fifty-three minutes, even when kept in constant darkness.

If the earth's rotation does play a role in winding biological clocks, the scientists expect to see it reflected in alterations in activity cycles of the hamsters and cockroaches, the times at which fruit flies pupate, the blooming of cockleburrs, leaf movements of beans and growth rings of molds.

A positive answer would go a long way toward explaining one of the most important mechanisms by which plants and animals adapt to their environment.

Seal Protection Planned

Soviet and Norwegian experts have agreed on a joint research program for 1961 to protect the seal stock and regulate sealing in the Arctic Sea, according to New of the Norway, a publication of the Norwegian Information Service.

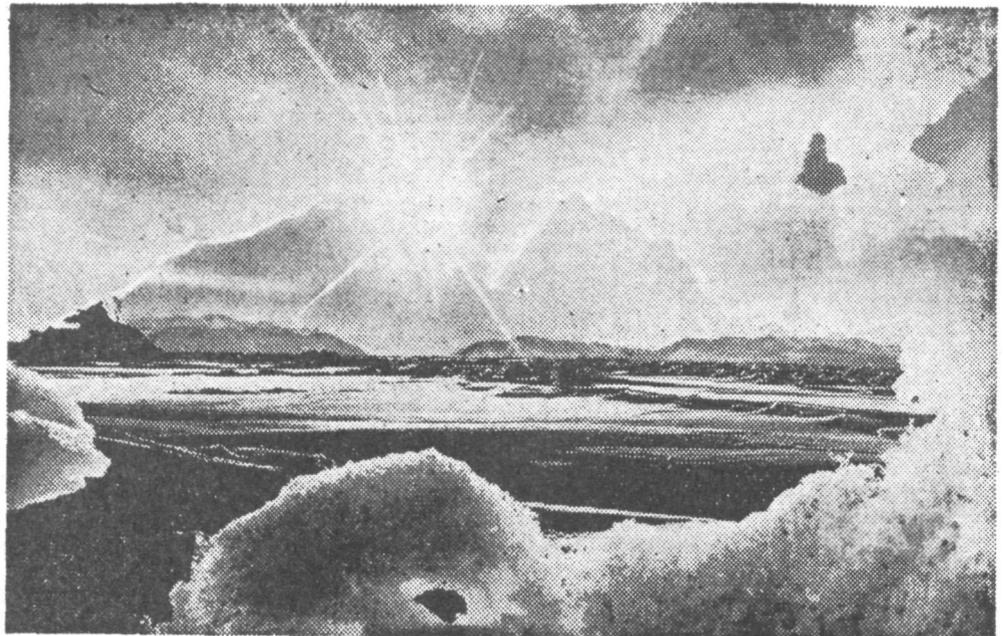
The Cold Continent

FOR those who have found, in the vastness of the polar regions, a special serenity and cleansing of the soul, Herbert G. Ponting has, for almost half a century, been the photographic master. His artistry caught the grandeur of Antarctica; it revealed the spirit of the men who, with Capt. Robert F. Scott, made the fatal dash to the South Pole in 1911-12.

Now we have a book, *ANTARCTICA* (Simon & Schuster, \$15.), that, in its mid-twentieth-century way, is a rival to the work of Ponting. Its photographer-author, Emil Schulthess, had the advantage of color film, modern equipment and mechanized transport to carry him into the most remote and magnificent corners of Antarctica. He has used these tools well. It is hard to think of another book that even approaches this one in capturing the mood and the image of the continent that caps the bottom of the world.

Mr. Schulthess is a Swiss who went to Antarctica in 1958 to join Operation Deep Freeze IV, the Navy-supported program of American scientific research. Rear Admiral G. J. Dufek has contributed an account of Deep Freeze IV, and Dr. Henry M. Dater a report on science in Antarctica. There is a preface by Sir Raymond Priestley.

WALTER SULLIVAN.



Ice formation on the Ross Sea.

—Photo by Emil Schulthess.

Nuclear Era to Meet Ice Age in '61

By Wadsworth Likely

MC MURDO SOUND, Antarctica, Dec. 25.—The atomic age will meet the ice age here next year.

A 1,500-kilowatt nuclear power plant will be placed on Observation Hill, above this settlement, and will go into operation by March 1, 1962.

Scheduled originally to be emplaced on the opposite side of the McMurdo's naval camp area, at Hut Point, where the Antarctic's foremost explorer, Robert Falcon Scott, camped fifty years ago, the site has only recently been changed to a plateau halfway up Observation Hill. Failure to find bedrock at the proper depth caused Arthur Ritch, site engineer for the Martin company, Baltimore, which is building the nuclear power plant, to urge acceptance of the Observation Hill site.

Drilling just completed has shown abundant bedrock on the Observation Hill plateau. According to Mr. Ritch, there should be no objections from either the Atomic Energy Commission or the Navy to the new site. The third interested party, the National Science Foundation, might possibly have ob-

jections because its cosmic ray observation station is situated near the hill. Mr. Ritch says, however, that 300 feet of rock will shield the cosmic ray station from any neutron radiations emanating from the exhaust of the nuclear power plant.

To save time, planning for the plant was done backward. Usually, a site is examined and approved first. In this case, the Hut Point site was selected provisionally from photographs, and firms were asked to bid on contracts for the plant before they actually saw where it would be placed.

The Martin company, the successful bidder, sold to the government a modified version of a plant originally designed for an Air Force base at Sun Dance, Wyo. The plant is packaged in modules, or huge cartons, which will fit into the fuselage of a C-130 turbo-prop transport plane. Once flown to what Martin calls an "obscure" site, it can be fitted together. Seventeen or eighteen packages make up a complete nuclear power plant.

However, this plant will be brought in here at the beginning of the summer shipping

season to begin soon. It is hoped that the foundation materials and the buildings to house the plant will be brought here this year and installed before the plant modules arrive next year. Once they arrive, Martin has sixty days to install the plant and another fifteen days to check it out and bring it up to full power.

Navy officials envisage other nuclear power plants at Byrd Station and the South Pole. A fourth 1,500-kilowatt plant will later be attached to the original plant here.

The Navy now burns thousands of barrels of fuel each year to power American permanent stations in the Antarctic. This fuel must be expensively shipped to McMurdo and then even more expensively flown to Byrd Station and the South Pole itself. The McMurdo plant will pay for itself in less than five years, others in less time than that.

Because of the twelve-nation treaty now governing the Antarctic, atomic waste materials from the plant will have to be encased in fifty-five-gallon drums and transported back to the United States for disposal.

Nuclear Site Chosen

The New York Times.

MC MURDO SOUND, Antarctica, Dec. 11—A favorable site for the first atomic power plant on the Antarctic continent has been selected here.

Pending approval of the site by interested agencies in Washington, excavation and foundation work for the 1,500-kilowatt power installation will begin soon on a plateau halfway up Observation Hill overlooking the naval air facility and scientific camp area.

Completion of the project is slated for March 1, 1962. The McMurdo plant will be the forerunner of three others projected for installation at American bases in Antarctica.

Two of the others are planned for the new Marie Byrd Station, soon to be constructed at a site six miles from old Byrd Station, and for the new South Pole Station that will be built on a site as yet unselected near the old Amundsen-Scott South Pole Station.

A 1,000-kilowatt reactor is planned for each of those stations.

The fourth atomic power station will house a 1,500-kilowatt reactor and will be attached to the one here at McMurdo.

Atomic energy was selected as the best suited and cheapest source of power for American bases in the Antarctic. Studies over the last two years showed that costs for supplying fuel to United States Antarctic sta-

tions ranged from \$1 to \$3 a gallon at McMurdo to \$5 to \$7 at Byrd Station and as high as \$11 a gallon at the Pole Station, compared with 14 cents in the United States.

It was calculated from these figures that the cost of a nuclear power plant could be written off in 4.9 years at McMurdo, 2.9 years at Byrd and 1.9 years at the Pole Station.

Approval of the site here must come from the Navy's Bureau of Yards and Docks, the Atomic Energy Commission and the National Science Foundation, which directs all scientific work here and supports many of the projects.

The Observation Hill site was selected after another one northwest of here at Hut Point did not provide enough bedrock for the installation.

Power will come from a pressurized water type of reactor. In a pressurized water reactor, water rendered radioactive by the nuclear pile is kept in one loop. Non-radioactive water, under pressure for conversion to steam that drives turbines for generating electrical power, is kept in another loop.

Wastes from the reactor will be concentrated and put into concrete in fifty-five-gallon drums for transport back to the United States.

AURORA AIDS SCIENCE

Australis Is Found Benefit to Study in Antarctica

MELBOURNE, Australia — The Aurora Australis, which has lighted the evening sky over southern Australia and is partly responsible for disrupting radio communications, has been welcomed by Australian scientists in the Antarctic, according to the Australian News and Information Bureau.

A senior scientist of the Antarctic Division of the Department of External Affairs, Dr. F. Jacka, made the statement.

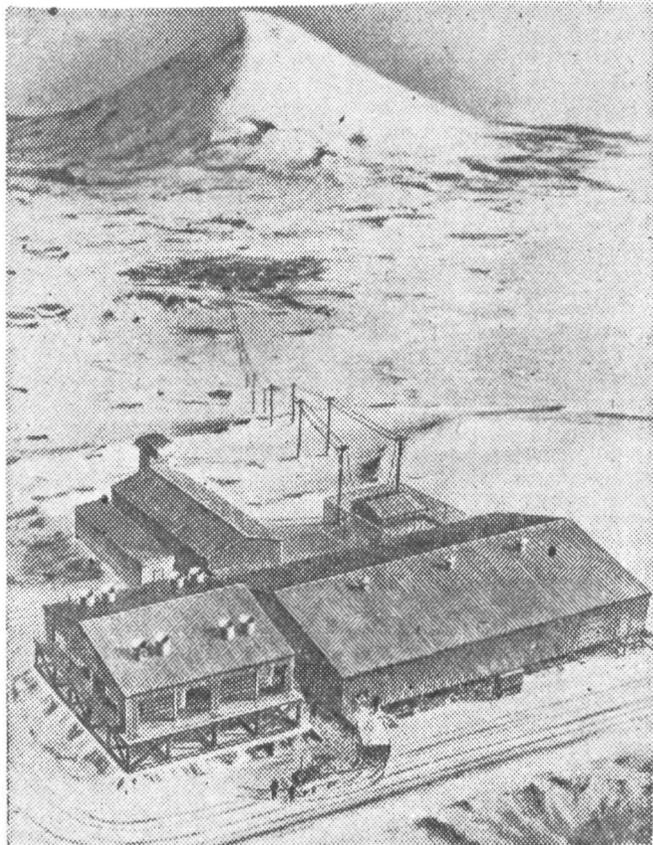
The scientists are studying the effect of the Aurora Australis as one of their major projects.

The recent manifestation was one of the strongest seen in the Southern Hemisphere for some time. The Aurora is related to sunspot activity, which has caused heavy ionization of the upper atmosphere over the South Pole.

The Montreal and London telecommunications circuits were recently subject to interruption because of sunspot activity.

Soviet Whaling Ship Launched

LONDON, Oct. 31 (Reuters) — A 44,000-ton whaling ship was launched at the Nikolaev shipyards in the Ukraine today, Tass, the Soviet press agency reported. The ship—the Hvet'skaya Rossiya—has two 7,500-horsepower engines and is capable of speeds up to sixteen knots, the agency said.



NUCLEAR POWER STATION FOR ANTARCTICA—Artist's conception of 1,500-kilowatt nuclear power plant that will be constructed at McMurdo Sound.

U.S. BUILDING BASE ON POLAR ICE CAP

Trench Digging Started at First Undersnow Post for Scientists in Antarctic

By JOHN A. OSMUNDSEN
The New York Times.

McMURDO SOUND, Antarctica, Dec. 26—Men and machines are burrowing into the polar ice cap 800 miles southeast of here where the first all-undersnow scientific station on the Antarctic Continent will be built.

Observers who returned here today from the construction site reported that excavation of the station's grid of snow trenches has just started.

When they are covered with galvanized steel arches and a thick layer of specially processed snow, the trenches will provide shelter for the station's fifteen buildings and facilities. These will include scientific laboratories, a gymnasium and a nuclear power plant—convincing evidence that the United States has come here to stay.

The new installation, named Marie Byrd Station for the wife of the late Admiral Richard Byrd, will replace the existing Byrd station, which is six miles away and in some places as much as fifteen feet under the snow.

Byrd station was built in 1956 and 1957 as a temporary scientific observatory for the International Geophysical Year. It had not been intended to last more than two years. It is now yielding fast to the weight of snow that has drifted over its once-exposed buildings and to the contortions of the moving ice on which it stands. The dying station has a certain nightmarish, fun-house quality about it.

Scientists sometimes walk sideways to get past the four by six wood stanchions lined up through the center of their building to support its sagging roof. The ceiling of the garage is sinking so fast that a large tractor, pulled in for repairs a month ago, may have to have its high-riding headlamps amputated before it can be pulled out again.

Buckled beams everywhere seem to be stopped—as if by a camera—in the midst of collapsing. But there is little likelihood that one will let go suddenly and cave in. All are held in the frozen grip of solid ice that, like tempered steel, has great strength although it deforms under pressure.

Burying a snowbound station to deny the winds a target for

New Coal Deposits Discovered in the Antarctic

Anthracite Seams Found Near Mackay Glacier

By JOHN A. OSMUNDSEN
The New York Times.

McMURDO SOUND, Antarctica, Dec. 27—A rich deposit of hard coal has been discovered in the mountains ninety miles from here.

The find is believed to be the largest ever made on this continent. It was reported by John Mulligan, a geologist from the United States Geological Survey, who returned here last night from a field trip to Mount Gran, just north of the Mackay Glacier.

Mr. Mulligan brought back with him nearly 300 pounds of anthracite from the twelve seams he had found.

Most of the seams were one to two feet thick, but two were seven and eight feet thick—"good sized," even in comparison to those in the coal fields of Pennsylvania, the geologist said.

Coal found here in the past has been of low grade. Last year discoveries of anthracite in the Horlick Mountains and in the region of the Beardmore Glacier were made. They do not



The New York Times
COAL DISCOVERY: Site of deposits in Antarctic (cross).

appear to rival the new find in size however.

Although the coal is of the same quality as that commonly used for fuel, there is little likelihood that the deposit will have commercial significance, at least in the foreseeable future.

The cost of exporting it would be prohibitive, and all installations here are either using oil for fuel or will soon switch to nuclear power.

Mining the coal would also

A Promontory Named For Antarctic Explorer

FORT MONMOUTH, N. J., Dec. 24—The Board of Geographic Names of Antarctica has named a rocky promontory south of Thurston Island, Antarctica, Cape Waite.

The action honors Amory H. Waite Jr., an Army Signal Corps radio engineer and explorer who has taken part in eight expeditions to the South Polar regions.

Cape Waite is the westernmost part of Burke Island, named for Admiral Arleigh A. Burke, Chief of Naval Operations. It is bounded north and east by Peacock Bay, and south and west by Amundsen Sea. Both bodies of water are part of Bellingshausen Sea.

Mr. Waite made his first Antarctic trip with the late Admiral Richard E. Byrd in 1933.

their drifting snows has been tried successfully by the United States Army in Greenland. Camp Century there served as a model for the men who are building Marie Byrd station here.

A crew of sixty Ceabees is now at the site. They are quartered in a green Jamesway hut 408 feet long, no doubt the longest in the Antarctic. Some 800 feet away are three empty

fuel drums marking the site of the meteorology building that was selected so that its barometer could be installed at the same elevation as the one at Byrd Station.

The snow surface between there and the construction camp is kept clear of equipment and supplies, which are arranged neatly alongside the Jamesway hut.

There are at least three good reasons for the extraordinary orderliness of the construction site, according to Lieut. (j.g.) David C. de Vicq, who is directing the work.

First, the men want to show that it is possible to prevent Antarctic camps' looking like the day after Christmas with packing crates, fuel drums and broken-down equipment scattered about as is the case at most stations here.

Then, the men want to prevent drifting in the area where the trenches will be dug. Most important, however, anything lying about would be made fast work of by the big red metal teeth of the two snow millers that are now digging the trenches.

These Swiss machines slice swaths 5 feet deep and 8 feet wide as they go. They are scheduled to cut trenches 17, 20, 30 and 40 feet wide, all 28 feet deep.

When they are finished and the tunnels properly covered, all supplies and the long Jamesway hut will be pulled inside

Analyses May Yield Clues on Continent's Climate

be a problem, for the deposit is at an altitude of more than 6,000 feet.

The immediate importance of the find lies in the clues it can give to the history of the antarctic.

Coal is created by heat and pressure applied over a long time to vegetation. Dating the newly discovered deposit would thus tell when that region had last supported plant life, revealing much about the changes in climate that this continent has undergone.

That knowledge in turn would help resolve questions about continental drift and the movement of the geographic poles.

To get an estimate of the age of the coal deposit, Mr. Mulligan collected rock samples from above and below the seams as well as fragments of petrified wood.

All were packaged neatly in plastic bags and white cloth sacks when the helicopter from the United States Navy's Air Development Squadron 6 swooped down to take them away on the first stage of their journey to the laboratory in Washington for analysis.

until next season. Thus the site will be left as bare as it was at the start.

SPERM WHALE 'GUSHER' Oil Content Makes It Too Valuable for Own Good

WASHINGTON—The sperm whale is too valuable for its own good.

A large reservoir of oil is stored in the mammal's head and blubber. The yellow, waxy substance is widely used as an additive in automatic transmission fluids, textile chemicals, plastics, cosmetics, and detergents. A 60-foot whale yields eighty barrels of sperm oil.

Because they possess such a fortune, or misfortune, more than 20,000 sperm whales are killed each year, the National Geographic Society says.

Gone are the days when whales could escape had-propelled harpoons. Modern equipment, including helicopters and harpoon guns, gives a sighted animal only a slight chance to miss death.

When attacked, this normally peaceful mamal can become a killer. Liek its fictional ancestor, Moby Dick, the leviathan will use its mighty head and powerful jaw to fight whaleboats. Even large, modern vessels have been dented by enraged sperm whales.

Eight Scientists Die in Fire At Soviet Base in the Antarctic

By The Associated Press.

WASHINGTON, Aug. 19—A fire at the main Soviet station in Antarctica took the lives of eight men Aug. 3. It was the worst tragedy reported in six years of organized international scientific exploration of the South Polar continent.

The victims were six Russians, a Czech and a German, all scientists specializing in meteorology. The fire destroyed the meteorology building at Mirny, headquarters for the large-scale operations conducted by Russia and other Iron Curtain countries.

Word of the disaster came early today in a message received here from the main United States Antarctica base at McMurdo, about 1,400 miles from Mirny. The message, to the National Science Foundation, carried no explanation of why the Soviet base delayed the reporting of the accident to the rest of the international scientific community in the Antarctic and to the world.

The one American scientist at Mirny was not injured, according to the message. He is Gilbert Dewart of Cloverdale, Calif., and is at the base in connection with cooperative studies.

The Russians who died in the fire were identified in today's message as O. G. Krichak, chief of the aerological-meteorological section at Mirny; Visamushkov (no initials available), aerologist; A. L. Dergach, meteorologist; I. A. Popov, aerologist; A. M. Belilikov, aerographer, and A. Z. Smirnov, aerologist.

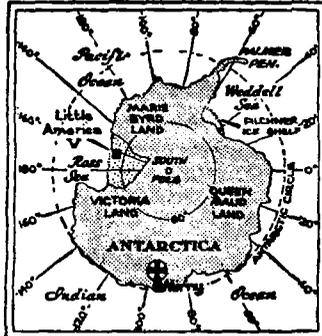
The Czech was identified as A. Kostka and the German as C. Popp, both meteorologists.

This is winter in the southern hemisphere, a season that brings to Antarctica a long night in which temperatures range from 45 to 145 degrees below zero.

There have been small fires in several Antarctica stations in recent years, with no reported casualties. In the frigid weather there is little or nothing that can be done to save a building once it gets afire.

About 100 scientists and technicians were assigned to the Soviet base at Mirny for this Antarctic winter. The Soviet Union maintains two other wintering-over stations with about ten men at each and a small auxiliary camp at which two men are stationed.

This year's winter population at United States bases in the Antarctica is 195, with most of the personnel at McMurdo. The American station at the



The New York Times Aug. 20, 1960
Cross shows scene of fire

South Pole has a roster of nineteen.

The Soviet base at Mirny had more than forty buildings. It exceeded in size in Antarctica only by the United States base at McMurdo.

Base on 'Pravda Coast'

Mirny is on the Indian Ocean at Wilkes Land or, as Russian maps call it, the "Pravda Coast" of Antarctica. The base was set up in 1956 with the long-term view that it would not be abandoned when the studies of the International Geophysical Year ended in 1958.

In February of 1958 a group of Americans visited the base. It was reported that they made no sensational discoveries there, no indications of rocket-launching plans or the like.

In a tour they found that the base had eighteen prefabricated buildings as sturdy and more homey than those at any United States polar base. They noted that Soviet meteorological equipment seemed to be on a par with that at the American bases.

The Soviet expedition reached Mirny in February, 1956. The basic buildings included special magnetic, seismic and aerological centers and geophysical, geological, glaciological, gravimetric and aerophotogram-metric laboratories.

The living quarters were replete with Persian carpets and central steam heating plants.

The worst American accident in Antarctica occurred on Oct. 16, 1958, when six men were killed and seven injured in the crash of a Navy Globemaster transport plane near Cape Hallett.

The plane was on a routine cargo run from the United States Antarctic supply headquarters in Christchurch, N. Z. The crash was about 450 miles from the McMurdo base.

On Jan. 5, 1959, two Navy pilots in a single-engine plane crashed and were killed near McMurdo.

In the preparations for the I. G. Y. and in its early stages several Americans were killed in air and land accidents.

Early in 1956 a serviceman, R. T. B. Williams, was identified as the first fatality in Operation Deepfreeze when his tractor dropped into a crevasse at McMurdo. A base on the Ross Sea was named in his honor. In that same year M. R. Kiel died in another tractor plunge.

In October, 1956, three Navy men were killed when their P-2V Neptune patrol bomber crashed on shelf ice near McMurdo. A helicopter pilot, Lieut. John P. Moore, was killed two years earlier in a crash near Little America.

In December, 1958, two men operating a snow tractor at McMurdo barely escaped death when the vehicle plunged into 110-foot crevasse. A similar accident brought death Nov. 20, 1959, to one of three members of the New Zealand Antarctic expedition when their Sno-Cat tracking vehicle plunged through a crevasse about 180 miles from their Scott Base.

In an earlier accident at Mirny tons of ice crashed down on the Soviet icebreaker Lena and hurled two men into the sea, where they died of shock and cold.

Mr. Dewart, member of the faculty of the California Institute of Technology, arrived at Mirny early this year. He is a specialist in seismology, the science of earthquakes. He was graduated from the Massachusetts Institute of Technology in 1953 and the next year received the master's degree in science there.

WEATHER DATA LOST IN ANTARCTIC BLAZE

WASHINGTON (Science Service)—The fire at Mirny, the Soviet scientific station in the Antarctic, which took the lives of eight scientists and demolished the meteorology building, also destroyed meteorological records vital to the study of Antarctic weather conditions.

Morton Rubin, United States Weather Bureau meteorologist who spent fifteen months at the Soviet station, said all the meteorological records compiled at Mirny since January probably had been destroyed and there appeared to be no duplicates or copies.

The fire started Aug. 3 during a storm in which wind gusts of 126 miles an hour occurred. The cause of the fire has not been determined, according to reports received here by the National Science Foundation from the United States Navy station at McMurdo Sound, Antarctica. A spokesman for the Science Foundation said there were about forty

buildings at the Mirny station and reports indicated that only the meteorology building had been destroyed.

Five Soviet aerologists, a Soviet meteorologist, a Czechoslovak meteorologist and a German meteorologist perished.

SOVIET EXPEDITION SET

Scientists to Study Antarctic Territory of Norwegians

LONDON, Sept. 27 (Reuters)—Russian polar scientists will undertake major explorations in Norwegian Antarctic territory within the next few days, the Soviet press agency Tass said today.

The agency said a radio message had been received from Yevgeny Korotkevich, chief of the fifth Soviet Antarctic Expedition. The message said a group of scientists would fly to Queen Maud Land, which has been under Norwegian sovereignty since 1939.

The message—from Mirny camp in Queen Mary Land—said the Russian plane's 2,200-mile route would pass over Australia's Mawson and Davis stations, the Japanese Shiowa station and the Belgian King Baudouin station.

The Soviet research program includes geological, geographical and glaciological work. A site will be found on Queen Maud Land for another Soviet polar station, Tass said.

ANTARCTIC TRIP BEGINS

10 Russians and an American Seek Magnetic South Pole

MOSCOW, Oct. 26 (AP)—A tractor sledge train carrying ten Soviet explorers and an American scientist, Gilbert Dewart has started on a thousand-mile journey across Antarctica to the geomagnetic South Pole.

This was reported today by the Soviet press agency Tass. Tass said the route leads from the Davis Sea, where the Russian Antarctic base of Mirny is situated. The geomagnetic pole lies 791 miles from the South Pole and marks the southern tip of the axis of the earth's magnetic field.

New Red Antarctic Base

MOSCOW, Dec. 18 (UPI)—Soviet scientists are setting up a new base on an "oasis" in the Antarctic, the Soviet official news agency Tass said today. It said the station is on a rock outcropping free of snow and ice and about fifty miles from the coast.

Whales Can Dive Deep

Sperm whales, in search of their favorite food—the squids—may plunge as deep as 3,200 feet.

Weight of Antarctic's Ice Sinks Continent

Soviet Data Indicate Much of Land Mass Is Under Sea Level

The New York Times.

MOSCOW, Aug. 16—Although Antarctica was once probably the highest of all continents, its hinterland is so laden with ice that a large part of it has sunk below sea level.

This is the conclusion of Soviet scientists, based on ice soundings made on their recent tractor journey to the South Pole.

Their newly published profile of the terrain beneath the ice along the 1,100-mile route differs so markedly from earlier Soviet results, obtained further to the north and west, that some revision of the latter may be necessary.

Likewise the initial report by Sir Vivian Fuchs of soundings taken on his transcontinental journey two years ago described the rock surface beneath the ice sheet as above sea level the whole way, except the coasts.

Most thrusts into that portion of Antarctica lying in the Eastern Hemisphere have shown a general tendency of the land to rise with increasing distance from the sea. Much of the terrain, as observed by explosion soundings and gravity measurements, has been mountainous.

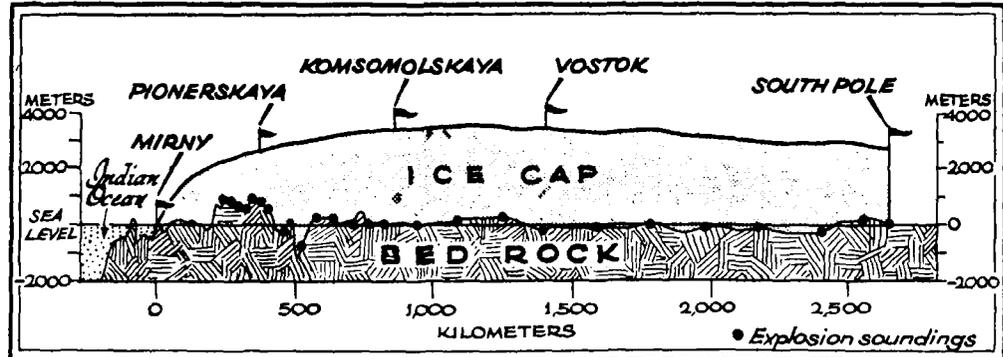
The new profile shows only a rolling plain, most of it below sea level, surmounted by ice two miles thick.

The analysis of the soundings has been made by Dr. Andrei P. Kapitsa, son of Dr. Pyotr Kapitsa, the nuclear physicist who left his post at Cambridge University in England to return to his native Russia and become one of its leading scientists.

The young Dr. Kapitsa, who is at Moscow State University, feels that the new results are fairly accurate, for they agree with the depth obtained at the South Pole by United States scientists last November. At that time Dr. Kapitsa and his companions, led by Gavril A. Dralkin, were working their way toward the pole, where they arrived a month later.

An important feature of these latest Soviet soundings is that they tie in the United States and Soviet networks of land profiles. The South Pole is the hub, where there now appear to have been four soundings: the first by the Rev. Daniel Linehan of Boston College, the next by the British, followed by the most recent American and Soviet measurements.

To obtain accurate results it is necessary to fire the shots in deep holes, so that they give the ice a proper jolt. The Soviet



Profile of Antarctic from Indian Ocean to South Pole, as determined by Soviet expeditions. Stretch from Komsomolskaya to South Pole was sounded by expedition that returned early this year. Portion from Mirny, on coast, to Komsomolskaya was recorded by previous expeditions. Remainder of rock profile was recorded by gravity observations.

party carried a drill rig that enabled it to bore holes from 115 to 165 feet deep for each explosion. Charges of from one to ten kilograms were used, a kilogram being roughly 2.2 pounds.

This was done at twelve points between Station Komsomolskaya and the Pole. In addition, gravity measurements were made at twenty-eight points. The configurations of the terrain below the ice produce slight variations in gravity. Hence such measurements can be used to fill in the profile between explosion sites.

The Soviet gravity observations were made both going and coming on the round trip to the Pole. Elevations of the ice surface were determined by altimeter and an attempt was made to correct for weather-induced variations in air pressure.

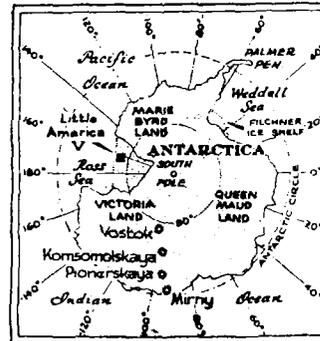
This was done by making the altimeter readings at the time of scheduled barometer observations at the United States South Pole station and at Vostok and Komsomolskaya, the two nearest Soviet bases.

Dr. Kapitsa's report knocks almost 7,000 feet off the previously determined elevation of the land beneath Station Vostok, near the South Geomagnetic Pole. Instead of rising roughly 6,000 feet above sea level, the land near Vostok sank to the lowest point observed on the journey, close to 1,000 feet below sea level.

The earlier error was attributed to a single erroneous explosion sounding at Vostok. The echoes which were obtained from the rock layers below Vostok suggested sedimentary deposits.

A journey to the Pole of Inaccessibility in the heart of Antarctica the previous year took a party of Soviet explorers across what they interpreted to be a 10,000-foot mountain range completely hidden beneath the ice.

It was suggested that this range might extend as far south as the pole. Dr. Kapitsa crossed a low rise just short of the



The New York Times Sept. 5, 1960
Circles show Soviet bases

pole, but observed no mountains. Hence, he reported, the trend of the range is uncertain. Measurements by both the Soviet and American expeditions have shown that the interior of Antarctica is generally in gravitational equilibrium. That is, the land has subsided sufficiently to compensate for the added weight of the ice on the earth's plastic interior. If the ice melted, the land, during subsequent centuries, would rise two or three thousand feet.

Such a readjustment, consequent to the last ice age, is still taking place in parts of Europe and North America. Portions of Finland, for example, rise about three feet a century, adding considerably to the land area along the coast and changing the directions of rivers.

Dr. Kapitsa's report appears in the current issue of the *Information Bulletin of the Soviet Antarctic Expeditions*. The results are preliminary, but not grossly in error, he said.

The highest ground that he observed was less than 700 feet above sea level. His South Pole depth was 9,200 feet of ice, resting on rock at sea level. The dome from which ice flows in all directions toward the sea is he said, at about Latitude 85 degrees South, Longitude 95 degrees East.

Despite the great ice thickness along the route, the rolling terrain two miles below the

tractors was represented by wave-like configurations on the surface that seemed to run parallel to the buried ones.

Soviet Whaling Expanded

LONDON, Oct. 13 (Reuters) —The Soviet Union will have three whaling flotillas operating in Antarctic waters in the coming whaling season, the Soviet news agency Tass announced today.

The flotillas are named the Slava, Sovietskaya Ukraina and Yuri Dolgoruki, it said.

Tass reported that the Slava flotilla had already sailed from its home port of Odessa on its fifteenth voyage. The Sovietskaya Ukraina flotilla is to depart in the next few days, and the flotilla Yuri Dolgoruki is already on its maiden voyage in Antarctic waters.

The 40,000-ton factory ship Yuri Dolgoruki was built in East Germany. The two other flotillas were whaling in Antarctic waters last season.

A new factory ship, the Sovietskaya Russia, is being fitted out in a Ukrainian shipyard as the giant of the Soviet whaling fleet with a displacement of 45,000 tons. It is expected to sail for the first time next year.

Antarctic Survey Planned

LONDON (Canadian Press) —The Naval survey ship *Owen*, which leaves this month for a nine-month voyage to the Antarctic, will follow much of the route taken by the *Beagle* in 1831 with naturalist Charles Darwin. The main tasks for the scientists on the *Owen* will be to bring South Georgia sea charts up to date.

Norwegian at South Pole

WASHINGTON, Nov. 28 (UPI) —The first Norwegian to visit the South Pole since Roald Amundsen discovered it nearly fifty years ago is spending a few days with United States scientists there. He is Dr. Olav Liestol, Oslo glaciologist.

U. S. IS REASSURED ON ANTARCTIC AID

New Zealand to Renew Pact
Informally Providing for
Cooperation in Region

The New York Times.

AUCKLAND, N. Z., Oct. 14—Prime Minister Walter Nash of New Zealand has indicated that a New Zealand-United States agreement on co-operation Antarctic activities is about to be renewed on the present basis.

The co-operation rests largely on good faith and mutual desire to help. Little is formally defined.

The two countries have worked together in Antarctic operations for years. The scale of co-operation is steadily increasing.

New Zealand's chief contribution has been the provision of advanced-base facilities for American ships and aircraft on Antarctic duty.

In return, the United States has contributed the transportation of New Zealand personnel and material to Zealand bases in Antarctica.

Joint manning of the base at Cape Hallett, on the Ross Sea, is being continued. The two countries take turns in supplying the scientific leader for this station in alternate years.

The main United States advance base for aircraft flying to and from the Antarctic is at Christchurch, in the South Island of New Zealand. It is still classed as temporary, but is taking on massive proportions. Recently, a big hangar has been added and living accommodation has been improved.

The basis for co-operation was established in an exchange of notes between the United States and New Zealand in 1958. However, the terms are quite sketchy and do little more than provide an official framework for co-operation.

The real basis is that each country helps where best able, whether in New Zealand or the Antarctic. Mr. Nash explained it neatly when telling the New Zealand Parliament that the agreement was about to be renewed.

"We just cannot think of charging anything to the Americans because of the many advantages we get out of their work," he said.

"Why, they just say: 'Come down to the Antarctic and have a look at us,' and it may cost them £500 [\$1,400] for everyone that goes. They are a great and an adventurous group."

Mr. Nash, an advocate of international agreements to neutralize the Antarctic, indicated that he would still like very much to visit the southern con-



HUT OF DEAD POLAR EXPLORER REVISITED:
Capt. Robert Falcon Scott, leader of British Antarctic expedition of 1910-1913, in hut at Cape Evans in 1912.

A POLAR PIONEER REVISITS '13 SITES

British Scientist, on Scott's
Antarctic Team, Returns
for Radio-Wave Study

By JOHN A. OSMUNDSEN

The New York Times.

CAPE EVANS, Antarctica, Dec. 17—Sir Charles Seymour Wright, a member of the British Antarctic expedition of 1910-1913, returned to the wood hut here today where he had waited vainly for Capt. Robert Falcon Scott to come back from the South Pole.

Captain Scott, the expedition leader, and his four companions never returned. The bodies of the captain and two other men were found by Sir Charles in December, 1912, almost a year after they had died in the snow eleven miles from a cache of food and supplies that might have saved them.

That was a cruel memory for Sir Charles, who is revisiting the Antarctic for the first time since then. He is on a six-week study of very-low frequency

continent. His ambition is to be the first Prime Minister to reach the South Pole.

United States leaders in the Antarctic have asked him to be their guest. For several years, however, pressure of business has forced him to postpone his projected visit.

Although now 79 years old, he told Parliament: "I'll still go if I get a chance. I'd love to go."

radio-wave propagation.

Some pleasant memories that made the 73-year-old scientist smile were recalled by sights he had not seen for nearly fifty years—his old bunk in Captain Scott's hut here and Sir Ernest Shackleton's hut at Cape Royds where Sir Charles remembered having "gorged" on penguin eggs and tinned mushrooms while waiting for the British ship Terra Nova to come for them.

"I say, this has stuck it well," he said upon entering the Shackleton hut.

"Let's see, there used to be a table right here," Sir Charles said, as he stood in the center of the hut's main room. When he saw it last in March of 1913 the shelter was beginning to fill with snow.

Mount Discovery across the Ross Sea ice and the black volcanic rocks on which the Cape Evans hut was built also seemed more clear of snow than Sir Charles had recalled their being.

But Barne Glacier, between Evans and Royds, looked "precisely the same." And so did the Scott hut, now being dug out by a group of New Zealanders, who are restoring the historic huts around here.

"I was up there, on top of that thing," Sir Charles told Leslie Quartermain, director of the restoration activity.

"But I don't remember that stove at all," he said, gesturing toward an ice-filled pot-bellied radiator alongside his bunk.

Sir Charles arrived at Cape Evans by Navy helicopter from McMurdo Sound.

"My! A whole day's journey in ten minutes," he mused while walking to the hut.

Shortly before he arrived Mr. Quartermain and his crew had opened the darkroom and photographic laboratory of Herbert Ponting, perhaps the most

famous of all Antarctic photographers. Sir Charles was the first man to enter the ice-crystal chamber.

"I used to keep my gravimetric instruments in here on the floor," he said.

After examining the interior of the hut, Sir Charles strode past stakes he had sunk in the volcanic gravel and up to an "absolute magnetic" shack where he and Sir George Simpson had worked together.

The tall, white-haired scientist stood on the rise of ground near the shack, his orange parka open, cap off, looked over the roof of the hut below toward the sea and said:

"You know, it's very, very nice to be allowed to see this all again."

Sir Charles, who was a glaciologist with Scott's expedition, is this year pursuing an area more closely allied to his early training—and later experience—as a physicist.

He is here at the request of the Canadian Defense Research Board in association with Stanford University, to conduct research on the fluctuations of the earth's geomagnetic field.

Youngest of Scott's Men

LONDON, Dec. 19—Sir Charles was the youngest of Scott's men. He was 23 years old in the expedition's first year. After the expedition he was appointed lecturer in cartography and surveying at Cambridge University.

He served with distinction in the Royal Engineers in France in World War I. In the last year of the war he was attached to G. H. Q. France for intelligent duties.

After the war he joined the Admiralty Research Service and made his home in England.

In 1939, just before World War II, one of Sir Charles' jobs was to examine every suggestion, from whatever source, for the safety of submarines.

Husky That Survived Antarctic Ordeal Dies

TOKYO, July 13 (AP).—

—Japan was saddened yesterday by a report of the death of one of the huskies with the Japanese Antarctic Expedition.

A report to the Antarctic expedition headquarters here from Showa Base said the dog "Jiro" died last Saturday of a weakened heart. He was 4 years, 2 months old.

Jiro last year became Japan's hero when he was found alone in the Antarctic. He was one out of two of 15 dogs abandoned on the island early in 1958 to survive. The other dog is Taro, still healthy.

ANTARCTIC ACTIVITY SET BY AUSTRALIA

CANBERRA, Australia — In the Federal Parliament here recently Prime Minister Robert G. Menzies outlined the proposed 1960-61 program of exploration and scientific inquiry at the Australian permanent scientific research stations in the Antarctic, according to the Australian News and Information Bureau.

During the forthcoming year there would be thirty-seven men stationed at the main base at Mawson, twenty-three at Wilkes, nine at Davis, and fourteen at Macquarie Island, Mr. Menzies said.

Aerial mapping of the Mawson and Davis hinterland would continue with Dakota and Beaver aircraft, and surface exploration would be pushed forward by field parties in tractors, Weasels and Snocats, Mr. Menzies said. A 300-mile tractor-train journey would be undertaken inland from Wilkes for the purpose of making seismic measurements of the polar ice-cap in that region.

All four stations would be engaged in widely varied scientific programs. The main features of the year's work would be:

Three United States meteorologists and a United States biologist would join the Australian party at Wilkes.

Major meteorological programs would be mounted, and biological investigations would be expanded, at all four stations.

New glaciological studies would be undertaken at Mawson and Wilkes; auroral investigations would be further developed at Mawson; a new cosmic ray recorder would be installed at Mawson, and geomagnetic and seismological programs would be continued at all four stations.

Ionospheric soundings would be continued at Mawson and Wilkes, and important new radio facilities would be installed at both these stations.

POLAR PROGRESS CITED

Australian Expedition Tells of Antarctic Journey

MELBOURNE, Australia — Radio reports received here at the headquarters of the Australian (Department of External Affairs) Antarctic Division revealed that an Australian expedition from major Australian scientific research station at Mawson was making good progress in its journey across the polar ice plateau toward the Prince Charles Mountains, according to the Australian News and Information Bureau.

The party was now moving across an immense ice field at an altitude of about 7,000 ft in temperatures as low as 100 degrees below freezing point.

Soviets Circumnavigate Antarctica

The Antarctic Continent has been circumnavigated by a single ship for the first time.

This epic voyage has been accomplished by the Ob', flagship of the Soviet Antarctic Expedition, according to a Soviet announcement, a translation of which is issued by the Department of Commerce.

The entire voyage of the Ob', according to the Soviet account, was made south of the 65th parallel in the Ross, Amundsen and Bellingshausen seas and partly south of the Antarctic Circle.

"Ice reconnaissance and radar surveys," says the announcement, "yielded completely new facts about the ice belt around Antarctica and the manner in which icebergs are carried out into the ocean. It is now clear that there is no continuous belt of floating ice surrounding the entire continent. Ice was

only encountered in the regions influenced by the cyclonic circulation of the waters in the ocean. In other parts the belt of marine ice was confined directly to the shores of the continent.

"Icebergs are carried into the ocean only in a few regions where extraordinary 'iceberg rivers' flow to the north. Virtually none were encountered in other places along the route.

"Observations of currents in Antarctic waters also yielded interesting results. These were made by using modern electro-magnetic methods. A comparison of the data with that recorded in past years has shown that the so-called westerly wind current, approximately eight times greater than the Gulf Stream, was noticeably weaker. This leads us to conjecture that a cooling process has now begun in the Antarctic, as well as in the Arctic."

Hendrick Geysen, leader of the party, reported. Traveling in tractors about 250 miles inland from Mawson, the party had been held up for two days while a frozen fuel-pump was dismantled.

When the party reached the Prince Charles range, it would pick up additional supplies of food and fuel left there two years ago by an earlier party.

POLAR MISSIONS SET

Australia Details Plans for Antarctic Research

MELBOURNE, Australia — A spokesman for the Australian Antarctic (Department of External Affairs) Division said here recently that the Australian National Antarctic Research Expedition for 1960-61 would be the largest ever mounted by the Australian Government, according to the Australian News and Information Bureau.

The party for the relief of Australia's four permanent scientific research stations in the Antarctic would comprise eighty-three men, all of whom would undergo specialized training in Melbourne before leaving, the spokesman said.

The first of two relief vessels would leave Melbourne in December, first to relieve the Macquarie Island station and then to go on to the mainland station at Wilkes; the same vessel would leave Perth, Western Australia, in January 1961, for Oates Land.

The second relief vessel would

leave Melbourne for the main base at Mawson, on the coast of MacRobertson Land, and for Davis, in Enderby Land.

2 PLANES BLOWN AWAY

Incident Marks Blizzard in the Antarctic

MELBOURNE, Australia — The Australian Antarctic (Department of External Affairs) Division headquarters here has received a radio message from Australian Antarctic permanent scientific research station Mawson, stating that a blizzard had destroyed two aircraft attached to the station, according to the Australian News and Information Bureau.

The officer in charge at Mawson, Hendrick Geysen, said the blizzard was one of the worst ever experienced there.

At the airfield on the ice plateau behind the station, the front tie-down cable of a Dakota aircraft broke inside the ice where it was secured; the fifteen-ton cable sheared at the junction of the undercarriage, and both seven-ton wind-cables failed. The Dakota disappeared and so far had not been found.

A Beaver aircraft held by its cables disintegrated, its wings being pulled out of the roots and its back broken. A workshop caravan on the airfield had been blown away.

During an attempt to save the Beaver, men were lifted bodily into the air and thrown yards away, causing the attempt to be abandoned. There was no loss of life or serious injury.

2-NATION RESEARCH SET

U. S. and Chile to Work on Joint Antarctic Projects

The New York Times.

WASHINGTON, Dec. 11 — The National Science Foundation announced today a cooperative program of Antarctic research supported by the Governments of Chile and the United States. Five United States scientists are scheduled to leave Valparaiso tomorrow aboard a Chilean naval vessel for the Antarctic to begin the program.

The United States will help Chile establish a geomagnetic program at her President Gabriel González Videla station on the Palmer Peninsula by providing geomagnetic observing equipment. Chile will help a United States research expedition on the peninsula by providing transport and helicopter support through the present Antarctic summer.

The foundation has granted \$12,500 to the Coast and Geodetic Survey, Department of Commerce, to provide magnetic observing equipment for the Chilean station.

CHILE GROUP DEPARTS

Polar Expedition Will Study Seismic Phenomena

The New York Times.

SANTIAGO, Chile, Dec. 16 — A special mission from the University of Chile departed for South Pole regions today to carry out scientific studies for one year in Chile's Antarctic bases.

Four Air Force officers complete the expedition, which is taking more than 200 tons of equipment.

The expedition's plan to concentrate on seismic investigations is prompted by the disastrous earthquakes and tidal waves that hit southern Chile last May. Studies will also be undertaken in ice-pack displacements, geological and insect life and weather forecasting for the continent.

Russian Joins Trek

LONDON, Dec. 19 (AP). — A Soviet scientist has joined a team of United States explorers in a two-month hike from McMurdo base to the South Pole. Radio Moscow identified the glaciologist only as Yevseyev.

Antarctic Mountains Found

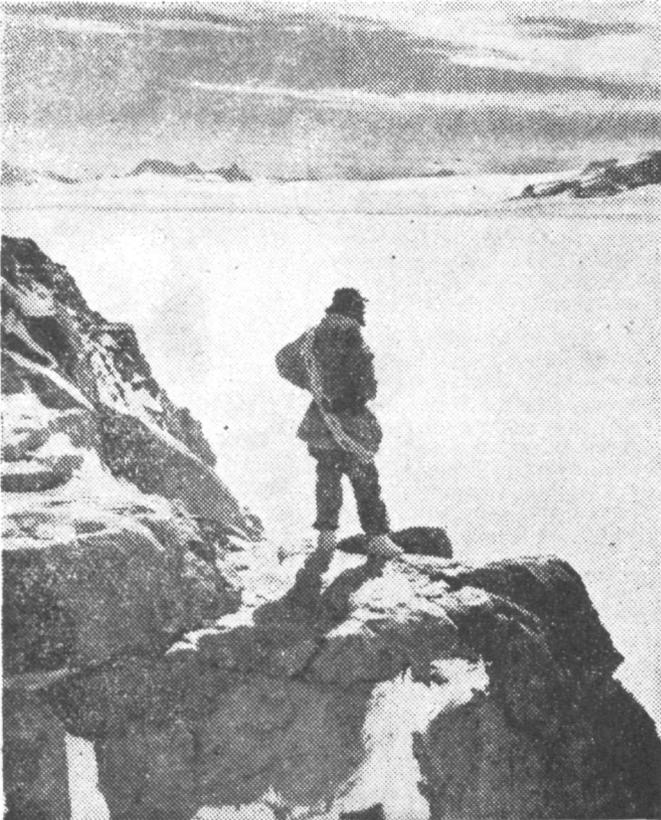
BRUSSELS, Belgium, Nov. 5 (AP). — A Belgian Antarctic mission says it has discovered a thirty-seven-mile-long chain of mountains that will be named in honor of Belgium's Princess Paola.

Estimated by the specific gravity of ice, only one-ninth of icebergs seen at sea is above the surface.

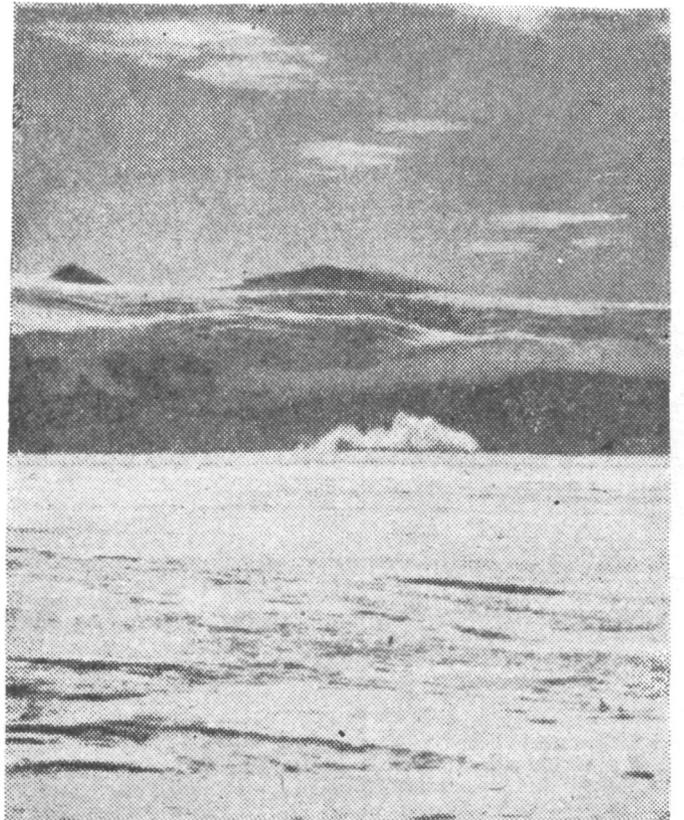
Remains of Aquatic Animals Discovered on Ice Surface in Antarctica



Dr. Donald E. Wohlschlag, left, head of biological laboratory at McMurdo Sound, Antarctica, and David G. Darby, University of Michigan graduate student who made the find on the Ross Ice Shelf, with some of the fish remains.



VASTNESS OF ICE—Dr. Swithinbank looking over glacier from an outcropping of rock.



CHANGING FACE OF ANTARCTICA—Avalanches may be seen in the distance across Mulock Inlet