Perched above the clouds, a solitary

HOWARD LA FAY
National Geographic Magazine Staff

DEW Line

Sentry of the Far North

BY LATE AUGUST the brief, riotously beautiful northern summer is over. At Point Barrow, Alaska—334 miles inside the Arctic Circle—the thermometer dips toward zero, the wind whistles in from the Arctic Ocean, and flurries of wet snow whip across the sky.

On such a cold, gray August day last year I stood outside Point Barrow's only store talking to an old Arctic hand—Alexander Malcolm Smith.

Now a vigorous 96, Sandy Smith emigrated from Scotland at the age of 18 and has been trekking the northland ever since. During the 1897 gold stampede he dog-sledged 1,500

Western Electric Co. for U. S. Air Force

outpost crowns a wind-scoured plateau on Baffin Island, DEW Line's eastern anchor

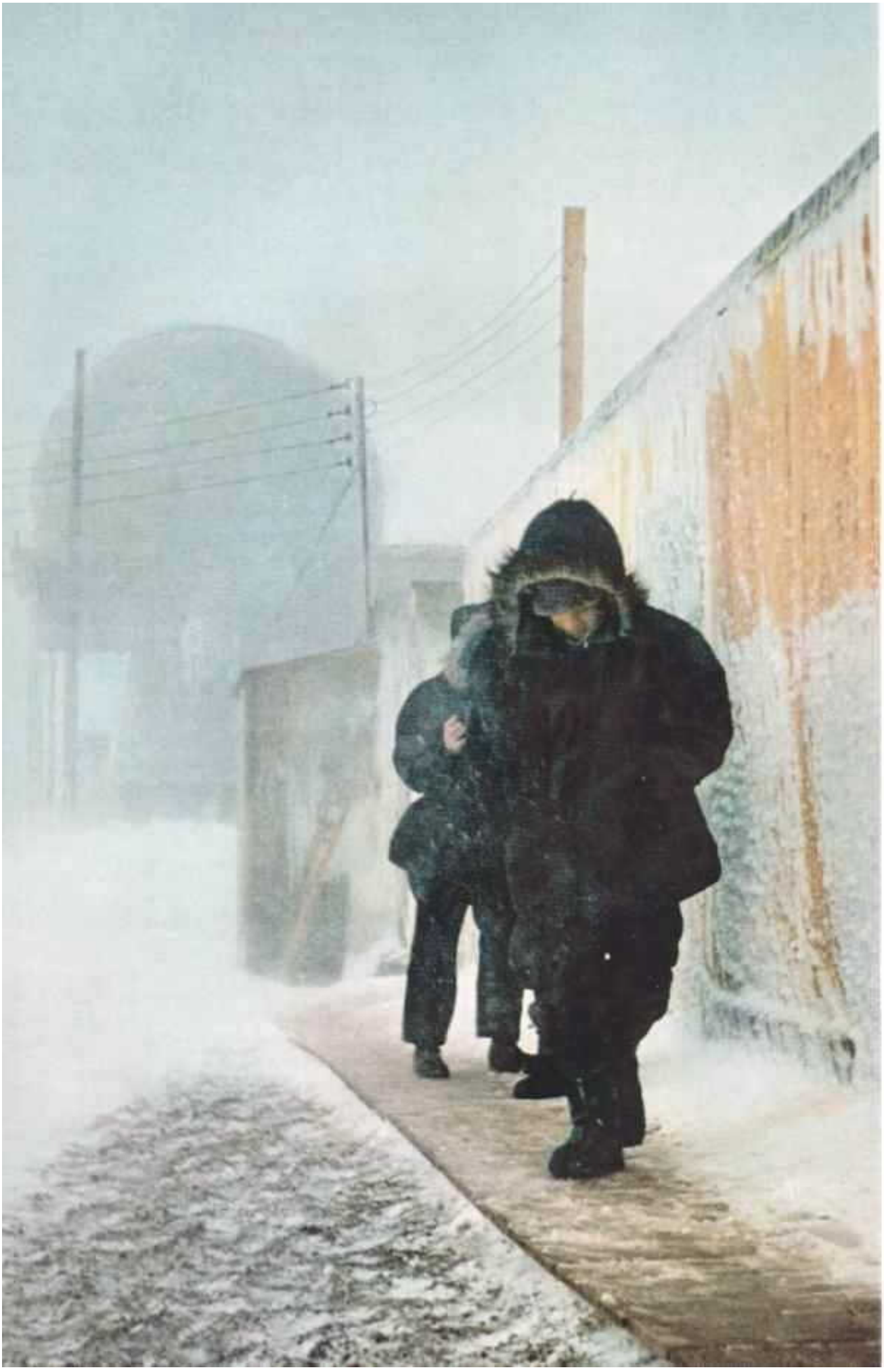
miles from Edmonton to the Klondike. He once took a boat down the Yukon River system, portaged it over the brutal heights of the Brooks Range, and sailed out into the Beaufort Sea. As we talked, Sandy cocked an eye toward an immense plastic dome beyond the village.

"They've changed everything by building that," he said. "The Arctic will never be the same again."

The dome, housing a search radar antenna, loomed above a strange H-shaped building that marked the western nerve center of the Distant Early Warning Line—DEW Line for short. Some 50 similar stations now dot the frozen Arctic in a 3,000-mile arc from western Alaska to Baffin Island (map, page 137).

In the event of an enemy attack across the polar ice, the DEW Line will flash instant warning to the joint Canadian-U. S. combat operations center at Colorado Springs, Colorado. The time thus gained could spell the difference between national life and death for Canada and the United States.

Traveling at the speed of sound, jet bombers would require more than an hour to fly between the DEW Line and the closest of their probable targets. During this crucial interval, interceptors would take to the air, retaliatory bombing would commence from bases around



the world, and the civilian population would take cover.

But DEW Line is far more than an elaborate defense installation. As Sandy Smith said, it has indeed "changed everything."

Already the DEW Line has brought 215 miles of roads where none existed. It provides reliable communication where no radio had ever functioned effectively. Now, simply by dialing a number, a man at Point Barrow can speak to another on Baffin Island, an entire continent away. DEW Line airstrips furnish a sure artery of Arctic transportation; already two airlines operate schedules linking Canadian stations.

"Auxes" and "I-sites" Fill In Gaps

Each of DEW Line's six sectors covers roughly 500 miles. Administrative and communications center of each is a main station—hangar, garage, and storage facilities huddled around a radome. Some 40 civilians staff a main station, plus a USAF complement charged with evaluating radar findings.

At approximate 100-mile intervals between main sites stand smaller auxiliary stations. About 20 technicians and mechanics man each radome-crowned "aux."

Finally, three-man intermediate stations, called "I-sites," fill in all gaps in the line. These possess no search radar equipment, but transmit a semiradar signal that will bounce off any object that crosses its beam and sound an alarm at the nearest main or aux.

DEW Line radar cannot presently cope with intercontinental ballistic missiles. However, military realists believe that—at least until 1960—manned bombers will remain the chief threat. Meanwhile, researchers are already working on a long-range radar system adapted to the missile age.

While detection of 16,000-mile-per-hour ICBM's will offer a warning margin of mere minutes, even this would permit the Strategic Air Command to swing into action. Ultimately, these precious minutes might also allow antimissile devices to smash hostile projectiles in flight.

The early-warning line was conceived in 1952 by a group of scientists meeting at the Massachusetts Institute of Technology's Lincoln Laboratory. Reasoning that the Nation was most vulnerable to a transpolar air raid, they recommended a radar alarm net across the Arctic.

Approving the plan, the Defense Department engaged the American Telephone and Telegraph Company to build and operate an experimental radar chain across Alaska's northern coast. AT&T delegated the role of prime contractor to its jack-of-all-trades subsidiary, the Western Electric Company.

While a prototype DEW Line station was building at Streator, Illinois, Bell Telephone Laboratories joined forces with the Lincoln Lab to perfect an absolutely reliable communications network, first requisite of an effective warning line. Because of violent storms and assorted magnetic disturbances, the Arctic had always been a communications no man's land. Static blotted out conventional radio signals as often as not; vital messages occasionally were delayed for days.

The scientists' solution to this problem was the revolutionary Forward Propagation Tropospheric Scatter—a new form of ultra-high-frequency radio. A huge parabolic antenna throws up a concentrated cone of signal, most of which passes out into space. But, much as a powerful searchlight beam will partially reflect off a low cloud, a small proportion deflects downward from the troposphere, to be trapped by another carefully sited parabolic antenna.

"Tropo" has a range up to 400 miles; the signal may then be relayed still farther, and it is immune to virtually all known atmospheric phenomena.

Weather Undoes Man's Work

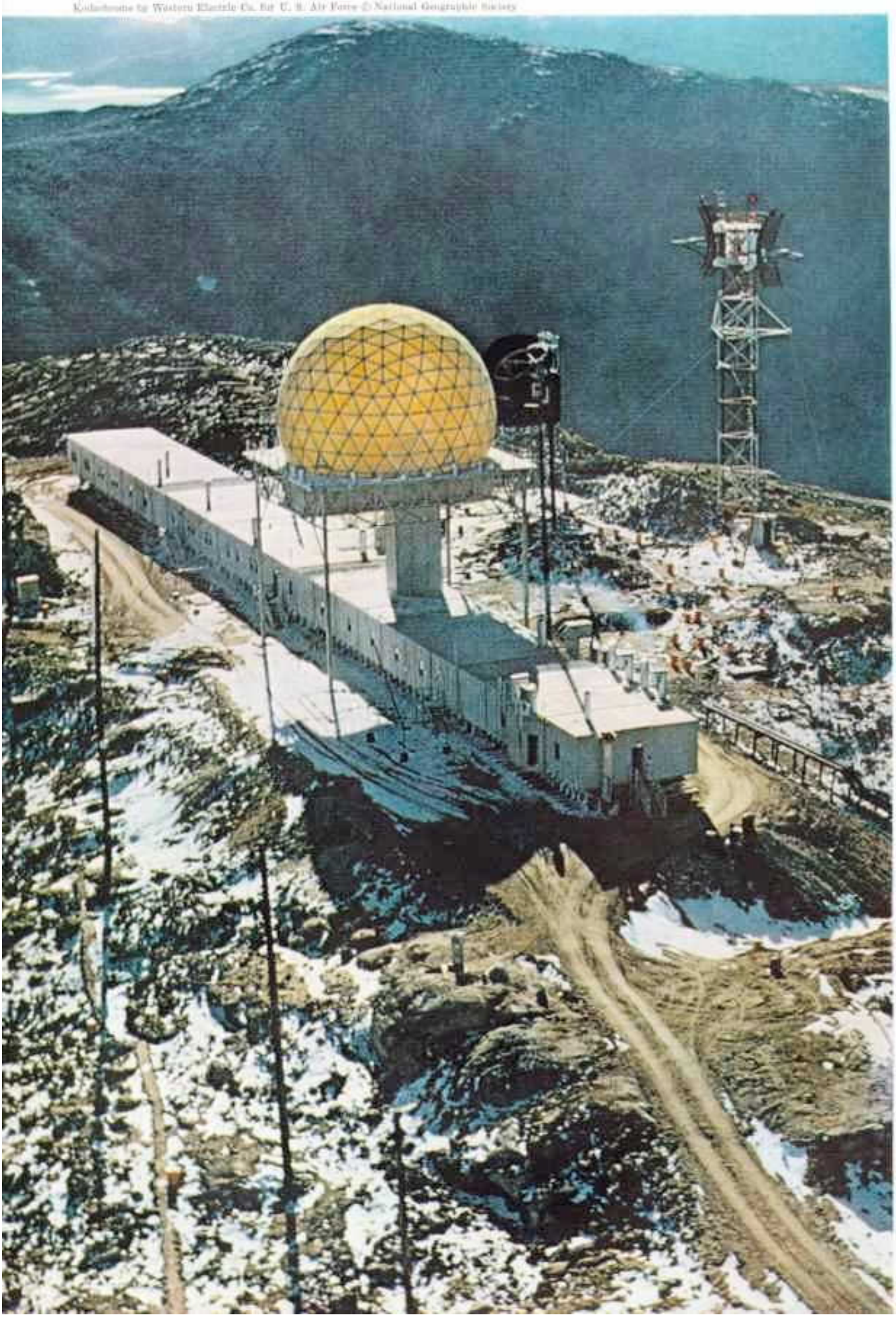
While scientists were eliminating final bugs from the electronic equipment at Streator, Western Electric mounted its initial engineering assault on the Arctic. Intensive study led to the selection of Barter Island—a dot of land off the northern Alaska coast some 70 miles from the Canadian border—as the nerve center of the experimental line.

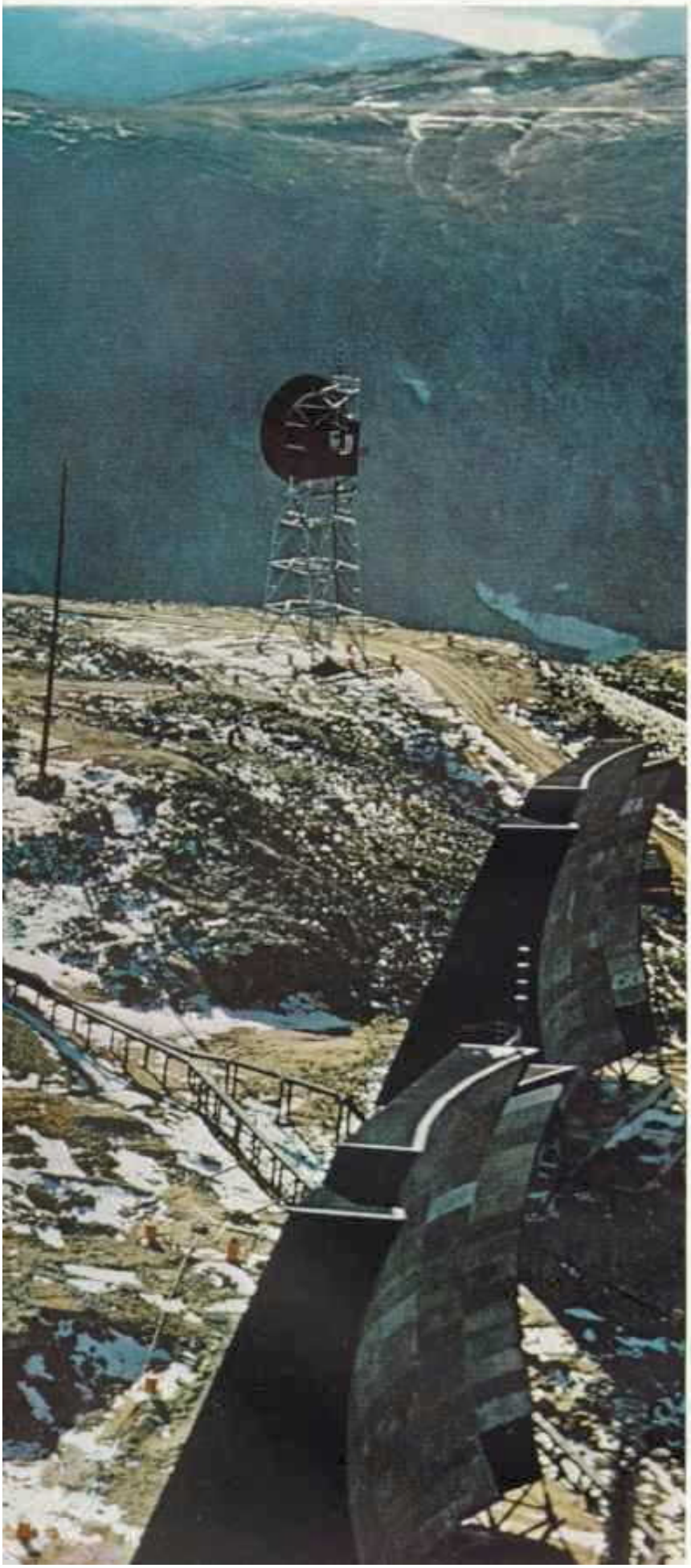
Men of the Bell System scoured the coast by air and by land to choose sites for the in-

Stinging Snow, Driven by Gale Winds, Lashes DEW Line Builders

To erect a string of radar stations across the Arctic, workmen invaded an icy wilderness that few but Eskimos had penetrated. Life for DEW Line construction workers was hard and lonely. Isolated by minus-50-degree temperatures and blinding white-outs, they lived in tents, slept in their clothes, battled polar bears that invaded their camps. More than 35 men lost their lives erecting the $600,000,000 alarm system, which stretches in a 3,000-mile arc from western Alaska to Baffin Island.

Kodachrome by Western Electric Co. for U. S. Air Force © National Geographic Society





Radar Dome, Like a Golf Ball on a Tee, Scans the Northern Sky

Why a distant early warning line? The elaborate electronic fence across the roof of North America may one day spell the difference between life and death for the United States and Canada.

Enemy jets, traveling at the speed of sound, would require more than an hour to fly between the DEW Line and any major North American city. Warned of their approach, the civilian population could seek cover while interceptors took to the air. At the same time, retaliatory bombing could commence from bases around the world.

Conceived in 1952 by scientists meeting at the Massachusetts Institute of Technology, the DEW Line was built by 23,000 U. S. and Canadian construction men directed by the Western Electric Company. Project 572, as it was called during four years of construction, recruited skilled man power from all divisions of the vast Bell Telephone System.

Here the slanting rays of the Arctic sun burnish a lonely auxiliary station on Baffin Island—one of 50-odd DEW Line sites. Crisscrossed dome of waterproof plastic houses the search radar antenna, heart of the warning system. Prefabricated buildings, end to end like railway cars, sit atop pilings to let wind-driven snow sweep through.

Other antennas—some shaped like drive-in movie screens, some like giant dishes—sprinkle the bleak plateau. Using a new form of ultra-high-frequency radio, they relay messages to the next station beyond the mountains.

dividual stations. Engineers whose only acquaintance with snow had been at the other end of a shovel suddenly found themselves battling white-outs and polar bears.

"On certain overcast days," Superintendent of Operations Robert A. Sidur told me, "there was nothing but a dazzling whiteness enclosing you on all sides. I've fallen flat on my face into snowdrifts without ever seeing them."

When a Western Electric man opened his tent flap one morning, a polar bear lumbered in. Snatching a knife, the man cut his way out the back of the tent just before the bear swiped at him with a powerful paw. At another site a polar bear broke into a building and besieged two workers in an inner room. Fortunately they were imprisoned with a radio transmitter and could send for help.

But the worst tribulation was the wind that lashes the tundra, reaching velocities of 130 miles an hour (page 130).

"Once," Sidur recalled, "I was in a bush plane when we landed against a wind that almost matched our air speed. The plane rolled less than six feet after it touched the ground."

The wind tore tents from their stakes, undid the work of weeks by piling deep snowdrifts across freshly cleared airstrips, and reduced human efficiency to near zero. But, somehow, the work went on.

Barter Island Eskimo Installs TV

Meanwhile, relays of airplanes flew in tons of construction material from the United States. Navy convoys brought in additional supplies. Tractor-drawn sleds—construction men call them "cat trains"—hauled critical gear hundreds of miles across the frozen tundra to the actual building sites.

An enormous surprise to the Western Electric crews was the relative sophistication of the Alaskan Eskimos.

"I still remember," an electronics engineer told me, "how a couple of Eskimos turned out with movie cameras to photograph the first people to fly into Barter Island aboard a C-124."

Wherever possible, Eskimos were hired—at prevailing union wages—for DEW Line construction jobs. With overtime, some skilled workers earned staggering sums.

By mail order, one newly rich Barter Island Eskimo purchased a TV set, a washing machine, and a full-size electric organ, installing them proudly in his packing-crate home. There was only one drawback: the Barter Island Eskimos had no electricity.

Western Electric patterned the first DEW Line structures after those developed by the Air Force for its northernmost stations. Built of prefabricated metal-clad panels, they comprised a long central corridor from which several wings extended at right angles.

Experience soon proved this design totally unsuitable for DEW Line use. The metal sides introduced noise into the electronic circuitry; ceilings tended to leak at the joints. And there was the snow.

Snow and Permafrost Harass Engineers

"North of the Brooks Range, you know," explained a Western Electric engineer, "Alaska can be called a desert. There's only about 26 inches of snow a year—the equivalent of less than five inches of rainfall. But it's hard, granular snow. The treads of a 23-ton tractor bite into it to a depth of less than an inch. And the wind keeps whipping it across the tundra. Eventually, 20-foot drifts bury the buildings. And when the snow is good and hard, it could even crush the metal sides."

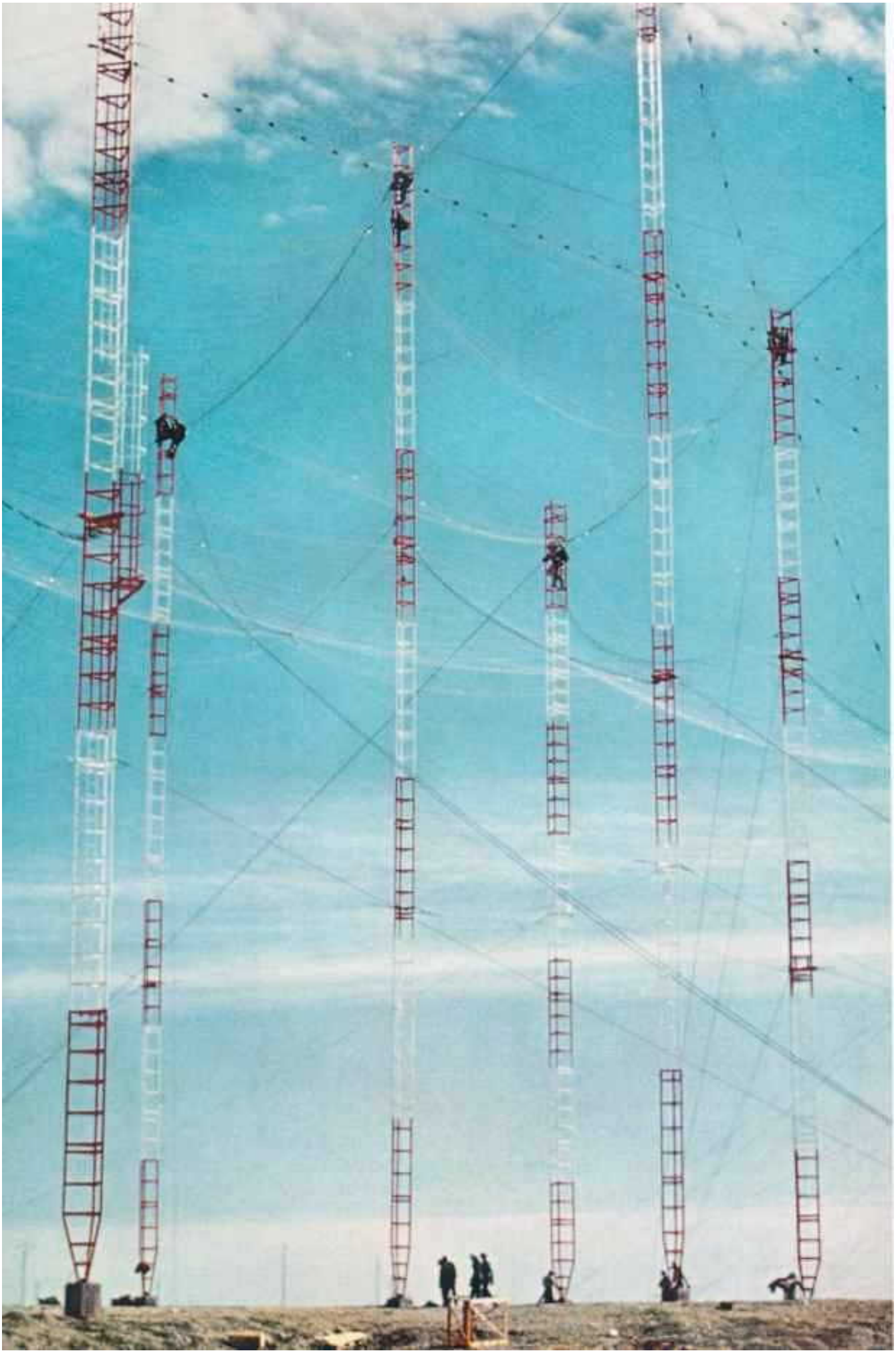
The construction men also had to conquer the ever-present permafrost. This layer of perennially frozen ground covers the Arctic to fantastic depths. In summer the top few feet thaw into a liquescent marsh that all but precludes cross-country travel. Wild flowers carpet the tundra, and in certain areas—reminding one of an insanely displaced Dixie—a species of wild cotton nods in the 24-hour daylight.

During World War II the Navy had drilled a producing gas well at Point Barrow. When Western Electric engineers drilled a second well to obtain sufficient gas to heat the entire Point Barrow construction camp, they had to penetrate 970 feet of permafrost!

The nature of the permafrost, as well as the difficulties it presented, varied with its soil components. Where the frozen layer comprised a large proportion of pebbles or rocks, it offered a tricky, but usable, building base.

Daredevil Riggers Spin a Web of Wire at a DEW Line Main Station

Reflector towers, strung with gossamer, relay warnings to listening posts far to the south. These antennas will flash the warning should blips on DEW Line radar screens reveal enemy planes attacking across the Arctic. Though the system cannot now protect against long-range missiles, military and research specialists are confident that it can eventually become an integral part of America's rocket defense.



Mid-Canada and Pinetree Reinforce DEW Line; Radar-equipped Ships and Aircraft Protect the Flanks

Role of the radar fence across Canada's heart is to confirm DEW Line's preliminary alert; Pinetree, in operation since 1935, will provide data on height, speed, and direction of enemy bombers. Information from any link in the 15,000-mile land-sea-air warning chain encircling North America is relayed to centers where electronic computers digest facts and issue combat instructions. Alert, Eureka, Resolute, and their far-northern neighbors (square symbols) are weather stations (See "Weather from the White North," by Andrew H. Brown, NATIONAL GEOGRAPHIC MAGAZINE, April, 1955).

But wherever it consisted only of silt and water, problems multiplied.

Foremen then had to place foundations with exceeding care, since surface disturbance may magnify with time. Once the permafrost's thin, insulating coat of moss is stripped away, the underlying thermal balance alters. Tractor ruts may gradually deepen and widen until they become impassable ravines.

DEW Line builders placed a bed of gravel beneath most stations. This not only insulates the permafrost from the heated buildings, but also keeps it from melting in the Arctic summer.

"We crushed, graded, and rolled almost ten million cubic yards of gravel," remarked C. W. Walker, in charge of construction and siting. "Roads, airstrips, building pads—everything depended on its availability."

Building Units Joined in "Trains"

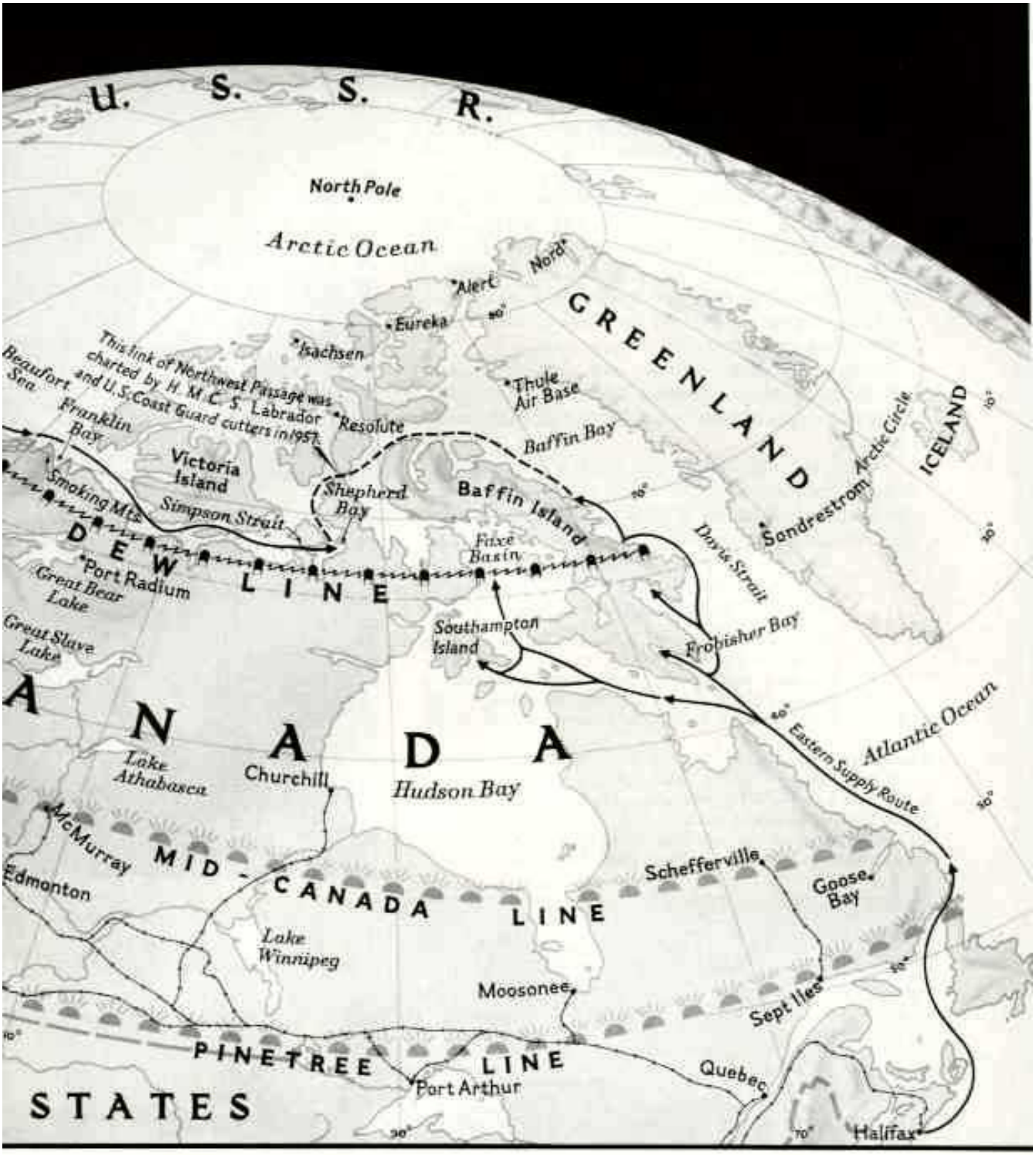
From experience gained on the experimental line, Western Electric engineers made several key modifications in the blueprints of the future stations. They shifted to wooden panels to eliminate electronic interference and insure waterproof joints. They also devised a modular type of building.

The basic unit, or module, is a cubicle 16 feet wide, 28 feet long, and 10 feet high. Doors are so arranged that units can be fitted end-to-end in a weather-tight "train" (page 132). A main station consists of some 50 modules mounted in two parallel trains joined by an enclosed catwalk. The design proved so sturdy that one station withstood a three-day beating from 130-mile-per-hour winds, suffering only two broken windows.

"The first thing we learned is that you can't fight the Arctic and win," Chuck Walker said. "So we decided to roll with the punches. We mounted the module trains on long sills raised above ground to leave a big blow space beneath. We also oriented them with the prevailing winds. As a consequence, we had no trouble with drifting snow. It just whistled under and kept going."

Housing the search radar antenna posed a knotty problem. The heart of the warning system, it had to be protected from the elements at all cost.

The Air Force was then testing a rigid radome for Arctic use. Unable to await the outcome, Western Electric engineers crossed their fingers and, working with the experimental sphere's manufacturer, developed a 361-piece prefabricated version (page 140).



While these improvements were being planned and executed, Western Electric crews manned the experimental line, checking and rechecking the performance of electronic equipment. By the end of 1954, experience in Alaska proved conclusively that an Arctic warning system would work.

Cooperating closely, the United States and Canada decided to extend the line across the remainder of the continent. Once more Western Electric was assigned the job of building it. And the Air Force imposed a time limit: an incredibly short 32 months. Delivery of the completed operational line was scheduled for July, 1957.

The man whose responsibility it became to accomplish this herculean task was Vernon B. Bagnall, a Bell System communications engineer who had received his Arctic baptism on the experimental line.

"Vern Bagnall," said Chuck Walker, "was the kind of fellow you imagine Caesar or Napoleon to have been. He had tremendous drive and confidence. Yet he used to speak so softly that a Western Electric official—whose hearing is no worse than mine—had to

buy a hearing aid just to hear him in conferences!"

Once the Canadian-American defense board had approved a tentative line across the Arctic, Bagnall's teams swung into action. Flying from one proposed site to another in ski-equipped planes, they fought minus-50-degree temperatures and 100-mile-an-hour winds as they surveyed and laid out the ground. To simplify problems of logistics, the engineers pinpointed each station as close as possible to the coastline. They planted small red flags to mark future buildings, and charted the locations of airstrips, water supply points, and oil storage areas.

Siting was fraught with its own peculiar hazards. For instance, anyone peering too closely through a theodolite might find his eyelid frozen fast to the metal eyepiece.

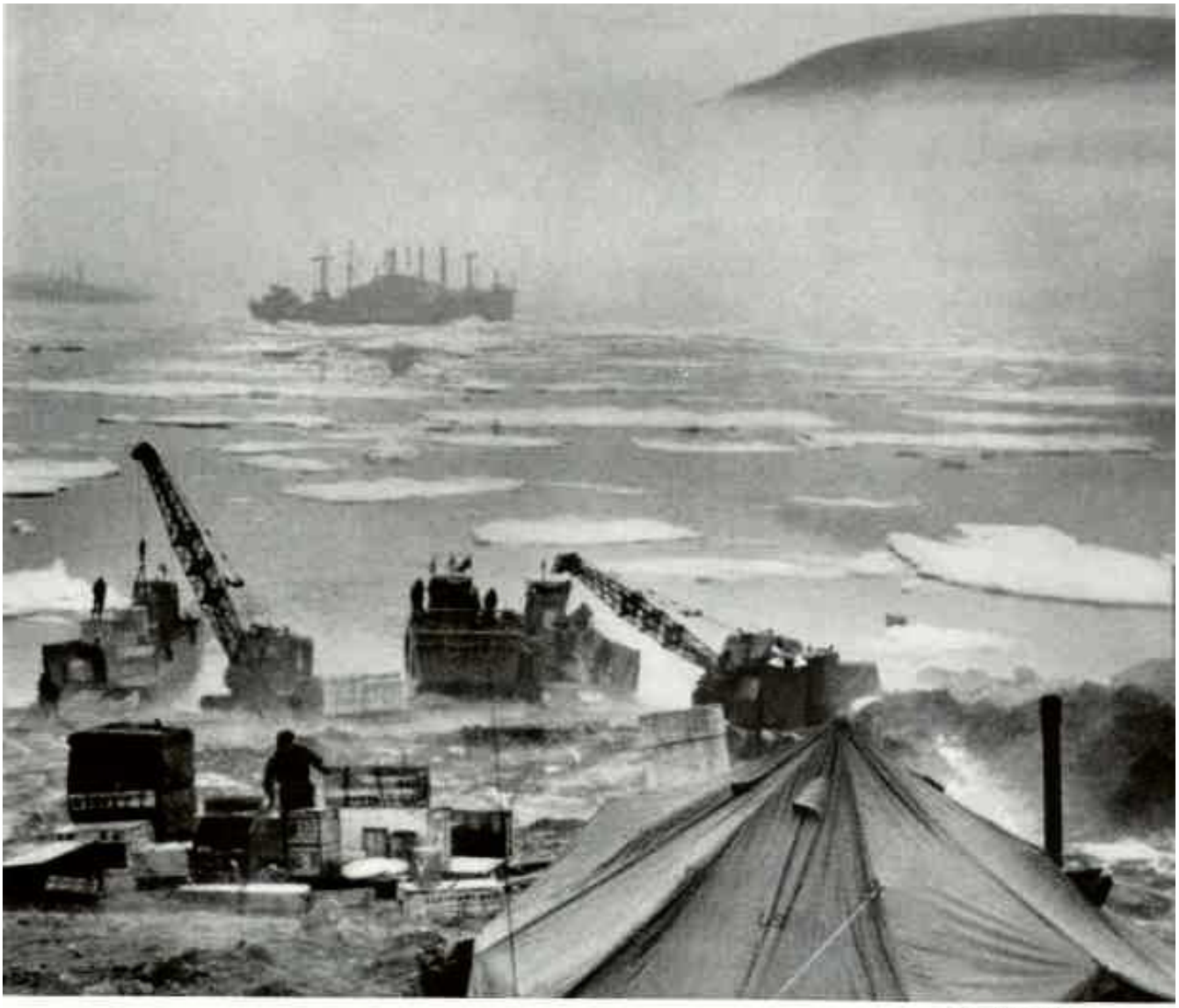
Slowly, but inexorably—one week at this site, ten days at the next—the surveyors hopscotched across the Arctic, planting the all-important red flags. And their laconic reports poured into project headquarters:

Navy LCM's Spill Supplies on Baffin Island's Ice-choked Shores

Operation Sealift—some 120 ships sailing in twin convoys—delivered mountains of material. DEW Line sites used 46,000 tons of steel, more than enough to build the U.S.S. *Forrestal*, 75,000,000 gallons of fuel, 22,000 tons of food, and 12 acres of bed sheets.

Globemaster disgorges delicate electronic gear on a DEW Line runway. Winter airlift logged thousands of flights in bitter cold, fog, and snow. More than 60 planes crashed; 26 airmen lost their lives. This Douglas C-124 unloads in minus-47-degree weather after a nonstop run from Dover Air Force Base, Delaware.

U. S. Air Force Official



Gene Gaines, Pix

"Temperature this a.m. 40 below." . . . "Got lost . . . passed over lots of wolf tracks; no gun along." . . . "Before daylight this morning one of the tents in the other party burned to the ground." . . . "My right ear froze, even under parka." . . . "Can't find trail. Visibility down to just a few feet." . . . "C-47 . . . landed at camp. Right ski broke and ship nosed along snow. Airplane is complete wreck."

The engineers lived in tents, slept in their clothes, ate what and when they could. They worked seven days a week, and in good weather they labored around the clock. Setting foot on terrain that had never felt even the mukluk of an Eskimo became an everyday occurrence.

After the last site had been surveyed and marked, husky ex-Marine James D. Brannian, assistant superintendent of siting engineering, told me simply but fervently, "I'm certainly proud to have been part of it. But frankly, if I had it to do over again, I wouldn't!"

On the heels of the siting crews came the first wave of construction workers. The usual sequence of events saw a skeleton crew landed by ski-equipped plane. With them came a small tractor. The men would use the tractor to clear a landing strip on the sea ice. Globemasters of the U.S. Tactical Air Command would then bring in more men and heavier equipment; these aerial behemoths made more than 700 landings on ice strips during that fateful spring of 1955.

Heavy Gear Parachutes to Ground

On Baffin Island the terrain was so rugged that the first tractors had to be dropped by parachute. With heavy equipment on the spot, the men would build a permanent airstrip; then came a gravel road from the strip to the site itself.

To expedite construction, Bagnall had split the line into three segments. An American firm contracted to build the Alaskan link, while two Canadian companies worked on the central and eastern sectors. Men and

Gene Gallin, Phi

Radar Dome's 361 Plastic Panels Lock Together Like a Giant Jigsaw Puzzle

Skilled crews have raised the 55-foot bubbles in as little as 12 hours. The translucent diamonds, bolted together, permit free passage of radar beams. Assembled dome can withstand winds of 100 miles an hour.

supplies poured into the north on commercial aircraft, while giant Globemasters continued to roar in with heavy cargo. Bush pilots ranged the length of the line, making impossible landings and even more impossible take-offs as they transported men and gear from site to site.

Meanwhile, far to the south, ships were gathering in Atlantic and Pacific ports for a voyage that would make or break the project. Their assignment: to converge on the DEW Line from east and west, delivering 200,000 tons of essential cargo. For a few fleeting weeks in late summer, the northern waters would be navigable. The ships, hulls reinforced against floes, would have to operate on a terrifyingly tight schedule.

Early in July, 57 ships steamed out of Seattle, Washington, and headed north. Their holds were jammed with gear for the western and central sectors. The Navy used every cubic inch of shipping space; LST ballast tanks carried aviation gasoline instead of water.

A month earlier another fleet had sailed from Halifax, Nova Scotia, to complete the gigantic pincers movement. H.M.C.S. *Labrador*, a Canadian icebreaker that in 1954 had become the first deep-draft ship to sail through the Northwest Passage, pioneered the way in the east.

For more than two months prior to joining the convoy, *Labrador*, carrying three helicopters for reconnaissance, had ranged the ill-charted waters of the Foxe Basin, setting up temporary navigational stations. So clogged with ice was the south of the basin that *Labrador*'s frogmen had to blast a way through. After surveying the northward route and charting the waters, *Labrador* headed south to rendezvous with the supply convoy.

Supply Fleets Make Midsummer Run

On an overcast August morning the ships left from the rendezvous point at Southampton Island. An American icebreaker, U.S.S. *Edisto*, shared the lead with the *Labrador*. Progress through the jammed ice was tortuously slow. Day by day, weary mile by weary mile, the ships bucked their way north. At night the ice would freeze them in; every morning saw the icebreakers cutting the ships free.

The reports of Capt. O. C. S. Robertson, *Labrador*'s commander, tell the story:

"Icebreakers got under way at 0600 with column moving by 0700. Ships repeatedly got stuck and had to be cut out. Stopped to examine sick man in *Craig* [a freighter]. Stopped for the night at 2200, after which rounded up stragglers. Made 8.9 miles.

"Under way in fog at 0515. Stragglers were rounded up and the ships got under way in small groups and remained under way during night to maintain position against currents of . . . 4 knots. Made 8.1 miles."

Buffeted and wounded by the ice, the convoy fought on. As the ships peeled off at their destinations, frogmen scouted the beaching areas (page 143). Tirelessly the divers blew up underwater obstructions so the landing craft could shuttle cargo ashore.

Meanwhile, the western supply ships had steamed through Bering Strait and on into the Beaufort Sea. Like great seagoing cornucopias, they emptied their treasures on gravelly beaches as far east as Shepherd Bay.

Ships Freed by Shifting Wind

On shore the construction workers labored prodigiously all across the line. At a Frobisher Bay supply base steelworkers built a 3,200,000-gallon storage tank in an eye-bugging 10 days to meet an off-loading schedule.

"If you didn't develop a heart attack or an ulcer on that job," Chuck Walker said, "it was a sign that you weren't working hard."

Their task magnificently performed, the ships headed home. As the western convoy approached Point Barrow, the ice pack closed in. It ground against the reinforced hulls, snapped propellers, flooded the engine room of one vessel. For days the fleet stood immobile as the situation steadily worsened. Then, just as the convoy's skipper was on the point of ordering the ships to prepare to winter in the Arctic, the wind shifted, driving the ice pack northward.

Icebreakers in the van, the fleet smashed its way to the open sea. But the toll was heavy. Of the 57 ships in the western convoy, only four escaped serious damage.

In the wake of the sealift, Bagnall's construction teams worked at fever pitch. A total of 7,000 workers flooded the area. They came from Canada, the States, Australia, Asia, and half the nations of Europe. The one thing all seemed to have in common was an abiding interest in the day-to-day temperature.

A Western Electric engineer tells of rigging a tower with a Scottish steelworker one subfreezing day. Over and over the Scot kept asking him if he knew the temperature. Finally, in exasperation, the engineer managed to locate a thermometer. He and the Scot

U. S. Coast Guard, Official

Four Tons of Concrete Blocks Smash the Ice in Simpson Strait

Seeking a safe deepwater route for supply convoys, three United States Coast Guard vessels and a Canadian icebreaker last summer charted a Northwest Passage amid desolate Arctic islands. Here, strung with life lines and armed with axes, men dangle from the prow of the U.S.C.G.S. *Spar*. Blocks are dropped onto the ice to smash a passage through the floes or used as anchors to warp the ship free when it becomes fast.

Arctic Trail Blazers, Coast Guard Ships Crunch Through Floes

Storis (W38), *Bramble* (W392), and *Spar* (foreground) steamed out of Seattle last July on the annual supply run for far northern bases. The trio, joining the Canadian icebreaker *Labrador*, became the first U. S. ships to thread the Northwest Passage.

Sheathed in rubber suits, Navy frogmen plunged into the icy water to blow up hidden shoals blocking convoy routes. Their daring earned the nickname "madmen."

U. S. Coast Guard, Official (top); and U. S. Navy, Official

chipped away the frost and ice that coated it until finally they could read the scale. It registered 28° below zero.

The Scot's face clouded. "Ah," he said, "ye canna' trust the thing. It's in the sun."

Life on the line was hard, but it was not without its amenities. The food was universally good, and sometimes it was spectacular. W. E. Burke, Western Electric Vice President in charge of the Defense Projects Division, still recalls with astonishment his first Arctic meal, served at Barter Island. The dessert was flaming crepes suzettes.

DEW Line came closest to foundering among the towering mountains and plunging fiords of Baffin Island, the line's eastern anchor (pages 128, 132). Some of the Baffin Island sites are accessible only by air; two of them are in terrain so rugged that only helicopters can reach them; at another the airstrip ends at a 2,000-foot drop.

"Troubles?" says one worker of the Baffin Island effort. "We had nothing but troubles."

Fire Wipes Out the Labor of Months

At some exposed locations the weight of ice, coupled with high winds, toppled 100-foot temporary radio towers almost as soon as they were erected. At a station bordering Davis Strait workers blasted for a solid year to build a short road up a rock incline; two men lost their lives in the process. At a major Baffin Island installation workers watched in chagrin as a $500,000 fire destroyed the backbreaking labor of months. Nevertheless, the construction crews met the scheduled completion date for every site.

On July 31, 1957, Western Electric turned the completed DEW Line over to the Air Force, which immediately transferred custody to Federal Electric, the service division of the International Telephone and Telegraph Corporation. For almost a year Federal "radicians" — radar-technicians — had been gradually replacing Western Electric personnel at the finished stations.

A brief ceremony at Point Barrow marked the event. Vern Bagnall, however, was not among those present. He had died of a heart attack while work was still in progress.

A veteran polar explorer, Vice Adm. Richard H. Cruzen, USN (Ret.), is DEW Line project chief for Federal Electric. Cruzen was second in command to Rear Adm. Richard E. Byrd during Byrd's 1939-1941 Antarctic expedition. In 1946 he led a task force that established a weather station in northern Greenland. The admiral admits to mild misgivings about the DEW Line's transformation of the once-lonely Arctic coast.

"So many people drop in on us up here—mostly prospectors—that it's become a nuisance," he told me. "In the middle of nowhere, we're forced to post 'Keep Out' signs."

Life on the line today continues to be a battle, but its nature has shifted. Boredom and isolation are the chief enemies of the DEW Liners as they wait—through the long night, the restless winds, and the silent, drifting snow—for the ominous blip on a radar screen that could unleash a holocaust.

Their quarters are snug and clean. Each man has his own private room; modern toilet facilities, showers, electric washers, and driers grace every station. The food continues to be good—so good, in fact, that the manual presented to every new employee advises him to bring oversize clothing because "most men gain weight at the DEW Line."

Three doctors and three dentists safeguard the health of the 700 DEW Liners, while six chaplains ride a frozen aerial circuit ministering to their spiritual needs. Bush planes shuttle across the line on a regular schedule, touching down at most sites several times a week. In addition, main stations can provide immediate air service in an emergency.

Every site offers hobby shops, photographic darkrooms, high-fidelity record players, books, and three class-A movies a week.

Yet the most exciting diversion is waiting for the temperature to plummet to 52° below zero and then dashing outside to throw a glass of water into the air. The water crystallizes immediately and floats away as a cloud of ice fog (opposite).

Most DEW Line Men Are Married

The average radician is 29 years old, has undergone specialized training, and has passed a battery of psychological tests to ascertain his fitness for the emotional rigors of 15 months in the Arctic. Oddly enough, three out of every four DEW Liners are married.

Loneliness, accentuated by the sunless gloom of the long winter, lends a dreamlike quality to existence in the north. A young radician at an Alaskan site, who had left a bride in Boston, told me wistfully: "My real life seems like something somebody once told me about."

Hazards have diminished, but they have not disappeared. This past winter savage storms completely isolated a three-man I-site for 50 consecutive days. And a bush plane crashed in a white-out, killing the pilot and

Western Electric Co. for U. S. Air Force

DEW Line Diversion: At 52° Below, a Glass of Water Crystallizes with an Explosive *Phizz* 145

Western Electric Co. for U. S. Air Force

Boeing B-47, Patrolling the Northern Frontier, Streaks Above a Gleaming Radome

mechanic. A DEW Liner aboard managed to find a sleeping bag in the wreckage. It was not until 36 hours later that air search parties located him, fractured and frostbitten.

What attracts men to jobs on the line?

"Money," succinctly explains Jack Webber, Federal Electric's personnel manager for the DEW Line. "More than 90 percent of the men have a goal—to pay off a mortgage, to build a nest egg, to start a business."

End of Tour Brings a Bonus

Salaries for radicians start at $850 a month, and sector superintendents earn $17,000 a year. Food and shelter are supplied gratis. If a man fulfills his contract he receives a $1,500 bonus; if he returns for a second tour, he obtains a substantial raise in salary.

Halfway through their Arctic stint, DEW Liners are turned loose for a two week rest and recreation leave. Some men, starved for sunshine and warmth, have flown as far as Hawaii and Mexico to spend their vacations.

By proving that it is possible for man and his most complex machines to live and work in the Far North, the DEW Line has opened the door to exploitation of the region's incalculable subterranean wealth. Locked in by the permafrost is a treasure trove—coal, oil, copper, uranium, immense hoards of rare metals—that will one day flood the world.*

Geologists have barely scratched the surface. But already Point Barrow's petroleum and natural gas resources are known. Norman Wells, in northern Canada, refines oil produced on the spot, and even supplies diesel fuel to DEW Line sites. From Port Radium, on Great Bear Lake, came uranium used in the first A-bomb. The Smoking Mountains on Franklin Bay—actually a smoldering mass of sulphur and coal—have been burning, according to Eskimo tradition, forever.

Through untold centuries the Arctic slept in frozen solitude, inviolate in its chaste, cruel beauty. But man has now invaded the white wilderness in force; his technology has come to stay.

As one measure of the profound change wrought by the DEW Line, you may now fly completely across the North American Arctic without losing sight of the lights of a human habitation, and rarely being more than 25 miles from an airstrip.

* See "Hunting Uranium Around the World," by Robert D. Nininger, NATIONAL GEOGRAPHIC MAGAZINE, October, 1954.