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SEPTEMBER, 1957

Ten-Color Supplement Map of Antarctica

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THE NATIONAL GEOGRAPHIC MAGAZINE

Nomad Sails Long Island Sound

A 40-foot Ketch Cruises Storied Waters of Connecticut and New York Renowned for Yachts and Pirates, Whalers and Oyster Beds

BY CAPT. THOMAS HORGAN, USNR

BRENTON Reef Lightship was rolling in the swell a few sea miles astern when my chance came.

I let the wheel up four spokes, *Nomad's* bow responded to meet the white-crested comber rolling in from the North Atlantic, and—thump! A bucket-sized chunk of cold salt water leaped the rail to catch John Trueman in the chest. What didn't remain in John's canvas shoes cascaded aft to the break of the house and set the scuppers spouting.

"It had to be, sailor," I called forward. "Green water on deck and a crew well salted. Now the cruise has really begun."

And so it had.

We were two hours out of Newport, Rhode Island. All plain sail, as windjammer men used to put it, was set. Jib, main, and mizzen bellied aloft in those flat curves so sweet to the sailorman's eye. Wind of the north, laden with the tang that tells of kelp at low tide, of barnacled rocks, and of shoals of flashing fish, heeled the little ketch to just the right angle.

First Port of Call: Block Island

The cheerful smell of strong coffee came from below, along with the sound of galleyware clattering on the bulkheads. A porpoise leaped near the bow. Always happy in a bobble of sea, *Nomad* reached steadily toward Block Island's snug harbor, first port of call on a long-awaited cruise (map, page 300).

You may already know *Nomad*. She is my able Massachusetts-built, 40-foot auxiliary ketch, and she has made two previous cruises for the NATIONAL GEOGRAPHIC MAGAZINE. One took her to the rugged Maine coast; the other laced the historic New England shore.* Now she was beginning her third cruise under the same auspices, this time to Long Island Sound.

Search for Mackerel Yields a Wife

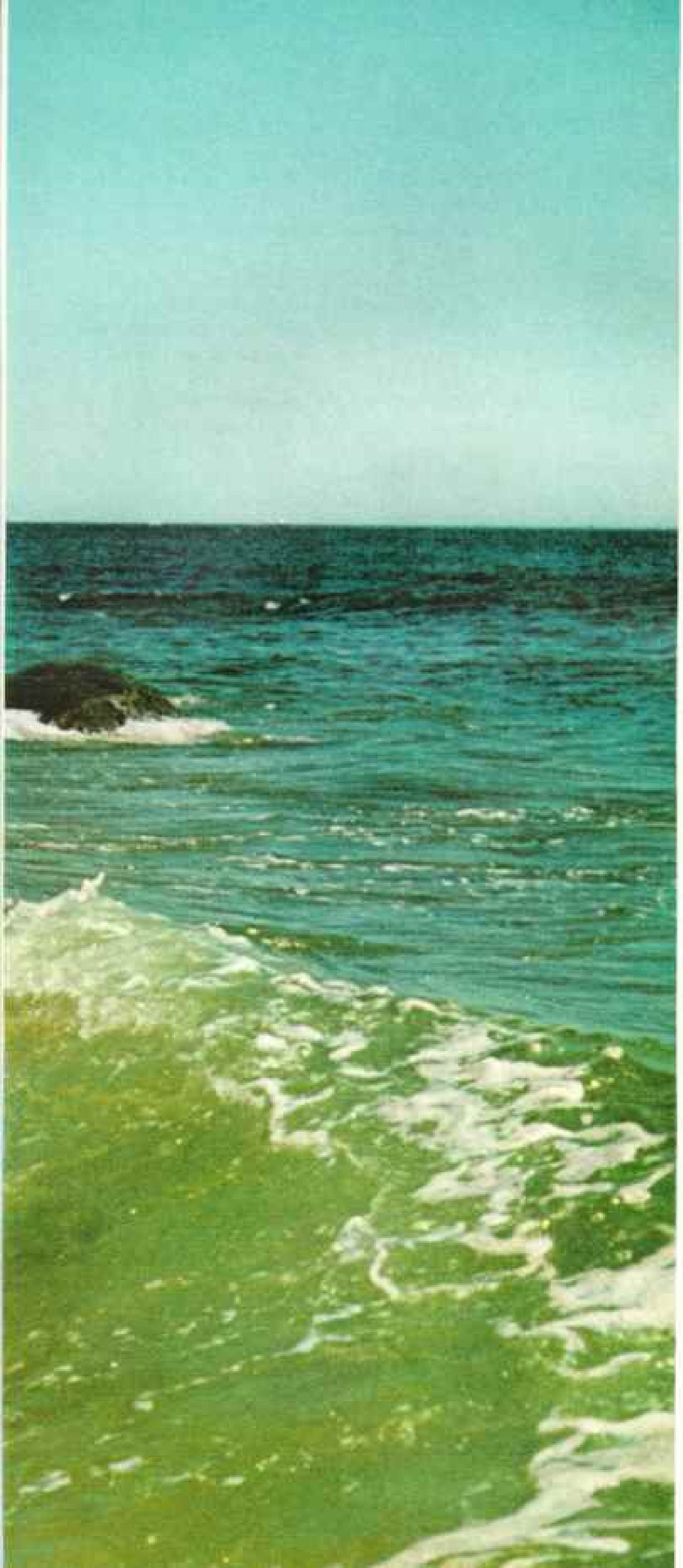
While *Nomad* is driving seaward, I will introduce the ship's company. I myself am a bachelor, a Bostonian, a writer for the Associated Press. John A. F. Trueman, whom I just wet down, is a Boston engineer, a capable shipmate on *Nomad's* cruise to Maine and Canada the year before.

From that trip John had brought back a souvenir. A bit unusual for a cruise trophy, it was a wife named Priscilla, who at this very moment is brewing the coffee that smells so good.

I remember the circumstances well. We were fogbound in Cutler Harbor, Maine, and John went off in the dinghy "to look for mackerel." He came back with Priscilla, her mother, and her aunt, who were cruising aboard their family powerboat. Deciding Priscilla was keeper size, he returned only the mother and aunt.

While Priscilla tends the coffee, Betty Jane Farnsworth is rearranging the gear in *Nomad's*

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Windjamming Around New England," August, 1950; and "Down East Cruise," September, 1952, both by Comdr. Thomas Horgan, USNR.



Fisherman Pulls a Striped Bass from the Surf at Montauk Point, Long Island's Rocky Tail

Ages ago, glaciers dumped Long Island's 120-mile-long spit of sand into the Atlantic. There it lies like a huge fish at the door of New York State.

Vast housing developments extend from teeming Brooklyn and Queens across Long Island's head; villages and farms fan out to its tail. The Atlantic on the south and Long Island Sound on the north offer a spacious playground for the millions who live near by.

Henry Hudson, first European to set foot on Long Island, landed in 1609, probably at the present Coney Island, and there caught "ten great mullets, of a foote and a halfe long a peece." With this promise of abundance, Hudson opened the door to Dutch immigrants. Shortly after, English colonists settling the eastern end of the island fell heir to some of the best fishing grounds, those off Montauk Point.

These waters remain among the Nation's finest for sport fishing. On summer weekends hundreds of anglers pour out of New York City by automobile and railroad. In power cruisers they head for the depths where broad-billed swordfish, tuna, and marlin play (page 302). Bluefish and weakfish rise to lures in more sheltered water; striped bass strike in the surf.

This fisherman, braced against the breakers, captures a 22-pound striped bass. Behind him pile the rocks of a craggy eminence that Walt Whitman, a native of Long Island, pictured in these lines:

I stand as on some mighty eagle's beak,
Eastward the sea absorbing, viewing, (nothing but sea and sky,)
The tossing waves, the foam, the ships in the distance,
The wild unrest, the snowy, curling caps—that inbound urge and urge of waves,
Seeking the shores forever.

Kodachrome by Robert F. Sisson, National Geographic Photographer

cabin in such a way that your narrator will not be able to find anything for the balance of the cruise. Betty Jane has temporarily deserted the advertising business in New York at the urging of us superstitious mariners, who know that a lone woman aboard spells disaster.

Finally, Bates Littlehales, National Geographic photographer, is breaking out light meters, cameras, film, and other mysterious appurtenances of his calling. Trained in sail on Chesapeake Bay, he promises to be an excellent *Nomad* hand.

Salt Pond Provides Safe Haven

As for our destination that bright day, Block Island lies some 20 nautical miles from Long Island Sound, but sailors consider its waters part of the sound's cruising grounds. Our plans specified a call to this virtually treeless, boulder-fringed island, and here we were, sweeping toward the entrance of Great Salt Pond.

Etched against the sky loomed a forest of masts and lines, the outriggers of sport-fishing powerboats come to hunt the great swordfish and tuna for which Block Island waters are famous.

Nomad was moving too fast through the narrow channel. My insurance company frowns upon cutting down $35,000 yachts, even though they be unable to use God's good winds for locomotion.

"On deck and douse the sail!" I roared down the companionway. Up came the crew and down came the mainsail with a rattle of blocks. *Nomad*, easy under jib and mizzen, rounded to a precise, tidy anchorage. We looked around us.

Neighbors Helped Build "Cowhorns"

Great Salt Pond almost cuts Block Island in two. Less than 200 yards of land separate it from the rough Atlantic. Once it was a true landlocked pond. But a channel was cut from Block Island Sound, and now the island has a snug basin, superior in every way to the exposed harbor that used to be its chief anchorage.

Everywhere ashore lie small ponds. Once, say the islanders, there were 365, one for each day of the year. Clarence E. Miller, head of the geology department at the University of Rhode Island, says the count now stands at about 300.

On the island were built the "cowhorns," vanished double-ended sailing boats of the last two centuries. Seaworthy two-stickers, they rested only briefly over their chips, for neighbors pitched in to help finish them, as in a Pennsylvania barn-raising.

Block Island, named for the 17th-century Dutch navigator Adriaen Block, was once a fashionable vacation spot and still lures mainlanders who are seeking to escape from summer's heat. To a less degree it carries on as a fishing port.

That fact deeply affected the balance of *Nomad*'s cruise, for John Trueman is a Fisherman, spelled with a capital F. The sight of all the fishing equipment on and around Great Salt Pond kindled a fire in Fishing John's soul. Early next morning, as we powered cautiously into a fog so dense I could not see the bow from the cockpit, strange skittering things came drifting backward past me and vanished into the mist-shrouded wake.

They were John's trolling lures. The Fisherman had not only rigged lines to port and starboard but had set up harpoon gear, all under cover of the fog lest I keep my promise, made on the wharf at Newport, to curb his activities.

The Fisherman Snags a Trophy

No broadbill loomed out of the gray pall, but John soon caught a fish. This was something highly unusual for him. His screams of "Priscilla, get the gaff!" while reeling it in drowned the groans Bates was pumping out of the foghorn.

Finally the game came alongside, a foot-long thing foul-hooked amidships. John's trophy remained unidentified until we reached Montauk in the afternoon, when we were told somewhat scornfully that it was a menhaden.

Though rarely eaten, these fish are taken commercially in great numbers because they contain much oil. Menhaden will not take a hook, but they run in such thick schools that snagging one while trolling is nothing unusual.*

Montauk's harbor, like Block Island's, was once a fresh-water pond. The charts mentioned possible shoaling in the anchorage; *Nomad* is a long-legged girl, drawing almost seven feet, so we ran under power to the

* See "Menhaden—Uncle Sam's Top Commercial Fish," by Leonard C. Roy, National Geographic Magazine, June, 1949.

Heeling to Breeze, *Nomad* Begins Passage on Long Island Sound

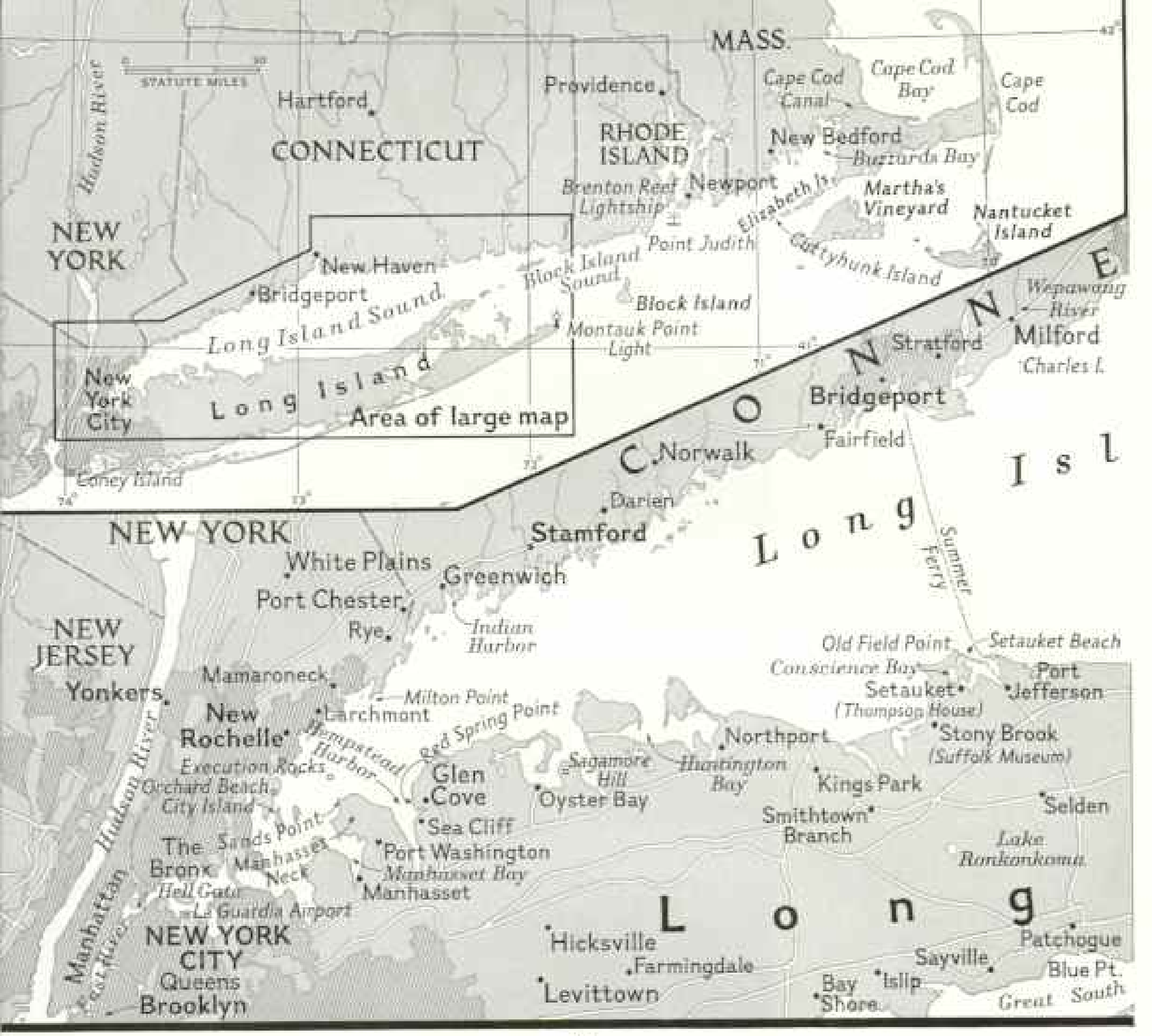
Three and a half centuries ago a small ship named *Restless* set out from Manhattan Island on a voyage of discovery. Her Dutch skipper, Adriaen Block, sailed through the whirls and eddies of the East River, which he called Hell Gate, and emerged onto the sound. Furrowing its waters from end to end, Block was the first to recognize Long Island as an island and drew its first map.

In *Nomad*, a 40-foot auxiliary ketch, the author and five crewmen set out to rediscover Long Island Sound. Sailing in the wake of *Restless*, they made Block Island their first port of call.

Thereafter *Nomad* wandered with the wind, one of a ceaseless stream of ships to follow the Dutch explorer. Everywhere the legacy of countless voyages had changed the face of the land. Only the sea remained constant.

Skipper Tom Horgan plots the course as John Trueman picks out channel markers with binoculars. Priscilla Trueman takes a turn at the wheel.

Tree-topped cliffs of Long Island's north shore wall the sound in background.



dock of the Montauk Yacht Club, which is really a fishing club (page 302).

Since we simple wind sailors had not even a yachting cap among us, we planned to linger only briefly in this place of shining brass and thundering motors. However, fate and Horgan luck took a hand: in full view of an assembled multitude I performed a split between boat and pier while trying to get ashore.

A fast leap kept me out of the drink but sprained my back. The commodore of the yacht club kindly passed the word that I should remain until recovered, which took overnight. *Nomad's* people profited by the layover each in his or her way.

The Fisherman had himself photographed with his battered menhaden. For background he selected a huge scoreboard on which were posted weights of the season's record fish.

Bates and the girls took a taxi out to Montauk Point Light, which since 1797 has been warning seafarers to keep clear of the eastern tip of Long Island and the dangerous Shagwong Reef a few miles beyond in Block Island Sound.

Past fields where Theodore Roosevelt's Roughriders camped in 1898 on their return from Cuba, my crew drove swiftly on a wide boulevard that runs the entire length of the big island.

Island Shaped Like Giant Fish

From a balcony atop the lighthouse they could see far into the huge breakwater that is Long Island. Appropriately named, it extends 120 miles from tip to tip, larger by far than the whole State of Rhode Island.

The map portrays it as a gigantic fish trying to ram the northern shore of New Jersey. Brooklyn forms the fish's head. The southern fork of its tail ends in Montauk Point. The northern winds up at Orient Point,

which aims across tide-racked Plum Gut to Plum Island. Between the island and the Connecticut shore to the north lies Long Island Sound.

All of this country, the water and the land, reflects a steady change of character. *Nomad* and I had come here once before, to take in the World's Fair in 1939; I cannot say that the one previous trip qualified me as a possessor of great local knowledge, but I could see the differences brought about in less than 20 years.

Urban Tide Sweeps Eastward

Long Island today is less green, more urban. The hum of traffic, where once were only the call of bird and shrilling of insect, comes across the water.

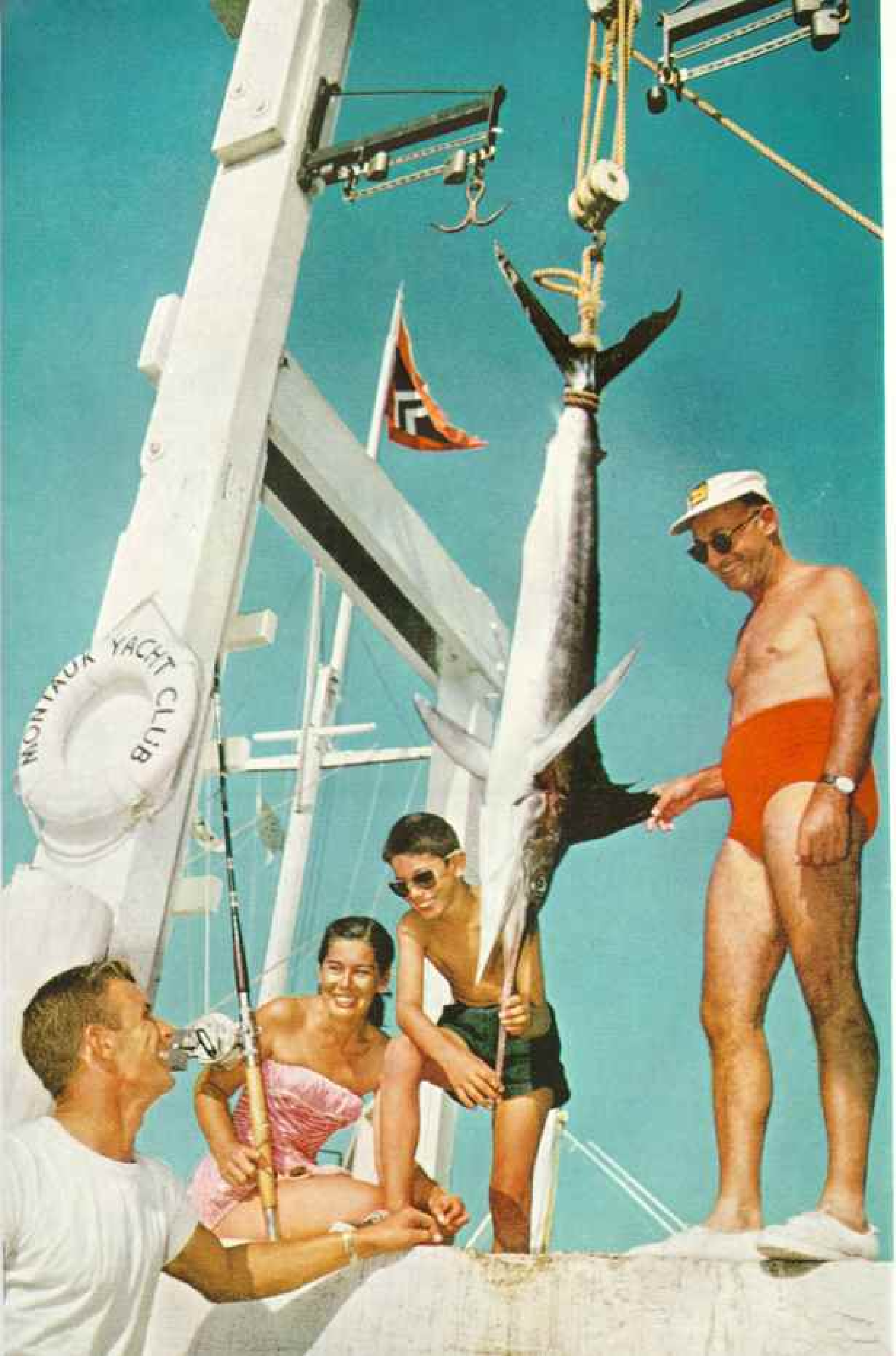
Rarely on my previous cruise did lights shine after midnight from the darkness hiding the land's central reaches. Now rushing headlights, brightly lighted windows, and the neon signs of night clubs outline the shore.

The farther west one goes, the greater the congestion. New York City is reaching out to swallow Long Island. Rows of rambler homes march relentlessly into fields that once grew potatoes or rang with the thwack of polo mallet on ball. Green frogs have fled the swamps ahead of the bulldozer blade. Even Coney Island's gimcracks are ringed by the moving tide of apartments.*

Offshore there is also change. Swarms of buzzing outboards and stock-model cabin cruisers replace the stately yachts of yesteryear. Many who can still afford to keep larger craft no longer base them at Larchmont and Manhasset Bay, but have moved farther out along the Long Island and Connecticut shores.

Happily, sailing appears to be in no danger

*See "Long Island Outgrows the Country," by Howell Walker, NATIONAL GEOGRAPHIC MAGAZINE, March, 1951.


MONTAUK YACHT CLUB

← **A 70-pound White Marlin Weighs In to Prove a Happy Fisherman's Story**

Carl Graham Fisher, founder of Miami Beach, built Montauk Yacht Club, which today caters to deep-sea anglers. Last year, in a field of 79 boats and 333 contestants, the club's team won the United States Atlantic Tuna Tournament off Point Judith, Rhode Island.

↑ **Swimmers Explore Waters off *Nomad*, Moored for the Day in Montauk Harbor**

↓ Captain and crew shuck scallops in the ship's cabin. Betty Jane Farnsworth (left) sails on holiday from a New York advertising job. Mr. Trueman (right), a Boston engineer, met his wife on an earlier cruise in *Nomad* along the Maine coast.

Robert F. Hixon, Staff Photographer

Sand Brought from Other Shores Fills the Crescent of Orchard Beach, the Bronx

This year 3,000,000 New Yorkers disported on the mile-long strand. Parking lot holds 7,500 cars.

of dying out, partly because the fuel is free and partly because the sport is the best of tonics for nerves twisted taut in office grind and traffic thunder.

Potatoes, Ducks, and Baby Oysters

Literally thousands of Penguins, Comets, Stars, Thistles, and other classes of small racing sailboats dot waters where giant America's Cup defenders once had room to maneuver. Every sound port is home to cruising windjammers, plenty of them bigger and fancier than *Nomad*, but many smaller.

And there are still wide-open spaces to the east on Long Island. About 50,000 acres of land still yield potatoes, and 5,500,000 domestic ducks grow up here every year—two-thirds of the United States production. Oyster culture occupies some 50,000 watery acres.

The sound produces mainly "seed," baby oysters transplanted to cold, clear Great Peconic Bay or Gardiners Bay after they are a quarter-inch or so in length. When they reach market size, these original inhabitants of Long Island Sound are savored even in the raw bars of Baltimore and Wash-

ington hard by the Chesapeake, a great natural producer of oysters.

Since it is August, we find no oysters on the Montauk Yacht Club menu, and *Nomad* this fine morning dances to the tune of the hurrying tide, seemingly determined to chafe her dock lines through if we do not soon cast them off. We oblige.

The breeze is light but out of a quarter that lets us lay N by W. We coast the northeast shore of wooded Gardiners Island, five and a half miles long and of irregular width. It looks like the feudal domain it is.

For well over three centuries the Gardiner family has owned the island. Captain Kidd paid them a visit one June day in 1699 and buried a treasure in "Kidd Valley." The hoard was recovered and turned over to the Crown, while the Gardiners continued to live quietly on their wooded retreat. They gave the Nation one of their most beautiful daughters as First Lady when Julia Gardiner became the bride of President John Tyler.

The island is now a game preserve abounding in deer and waterfowl. Through field glasses we saw many ospreys. Fisherman John, trolling unsuccessfully as usual, groaned with envy when he saw one dive into the water and come up with a good-sized fish in its claws.

Between Gardiners Point and the island itself lurks a mile-and-a-half-long reef that likely was land until erosion sank it. On the point the crumbling ruin of an ancient fortification lies partly awash in the sea.

The United States Coast Pilot notes the point as an airplane bombing target. Several planes circled in the general vicinity, so we left enough water between us and the ruins to allow for those "near misses" mentioned in the war communiques.

Pogy Boats Crowd Greenport Harbor

We started sheets and paid off into Gardiners Bay, bound for Greenport, where we were to pick up the final member of the crew, Col. William H. Speidel, USA(Ret.), the highest brass *Nomad* ever had for a cook.

Gardiners Bay, within the forks of the fish's tail, is still not Long Island Sound proper, but sound cruising grounds. Greenport, on the north fork, survives as one of the few old-fashioned commercial fishing ports left on the island.

The big white powerboats that filled nearly every slip in the harbor, we learned, were menhaden, or pogy, boats, which seek at sea the same kind of fish that John caught by accident two days ago. With nets they surround vast schools of menhaden, also called mossbunkers, and dip them into their holds by the millions.

Menhaden oil is used, among other things, for paints; the residue becomes fertilizer. The fishery ranks as the largest in the United States with respect to weight of catch.

With malice aforethought, the girls badly undermined what little reputation the yachting fraternity had among Greenporters. Whenever two or three salty characters gathered to look *Nomad* over, Priscilla and Betty Jane would start referring to the cockpit as the back porch and to the dinghy as the station wagon.


Holmes & Coutts

← **Farm Hands Ride in Comfort as They Set Our Cauliflower Plants**

With New York's insatiable market near by, Long Island devotes many of its flat, fertile acres to assembly-line production of vegetables. This truck farm near Orient, on Gardiners Bay, covers a mere 50 acres, yet is worth an estimated $250,000.

Men riding the planter distribute seedlings along the furrow. Tank behind them waters the newly planted row.

"Run downstairs and close that little front window, will you?" one would innocently ask the other. Such sacrilege was not taken lightly, I can tell you, in a town with the salt-and-Stockholm-tar flavor of Greenport. It took some explaining before I could even get the time of day from a local inhabitant.

Gunkholers Explore Uncharted Waters

With a day to kill before "Speedy" Speidel was due aboard, we went "gunkholing" over on Shelter Island. Cruising folk know what this is: you anchor off, take your small boat and go exploring shallow creeks and devious waters not described on the charts.

It is glorious fun. Ten minutes from civilization and you lose yourself in the wild; you are an explorer, an Indian hunter, or a pirate. You swim from a sandy beach on which no one may ever have set foot before. Tiny wild creatures in this miniature world are as fascinating as the huge denizens of the deep in their great one.

John, naturally, went fishing. Hook and line failed as usual, so he turned to a fish spear, which likewise failed.

Shelter Island was settled in 1652. Later it became a refuge of Quakers fleeing persecution, but that fact apparently did not give rise to the name. More likely it survives as an abbreviated translation of the original Indian name, Manhansack-Ahaquatuwamock, or "Island Sheltered by Islands."

← **Village Store at Stony Brook Keeps the Flavor of a Bygone America**

In the early 1940's Ward Melville, a shoe manufacturer living in Stony Brook, set about to realize a family dream—the reconstruction of the village as it might have looked in 1800.

Here, at a re-created general store in Suffolk Museum, Margaret V. Wall portrays a housewife from the past; Stony Brook merchant Horace Fulford plays grocer. Only the peppermint sticks are for sale. Occasionally the museum grinds coffee beans in the mill to give nostalgic visitors an aromatic treat.

It had a heavy growth of good oak, and shipbuilding developed. One Shelter Island vessel, the *Paragon*, ran Napoleon's attempted blockade of England to deliver 1,000 barrels of sorely needed flour.

Back in Greenport that pitch-black night, Speedy Speidel came aboard. *Nomad* was tied off a few feet to keep clear of bolt-studded pilings, and Speedy stepped into the harbor.

It has to happen once on every cruise, and Speedy, a good swimmer, was in no danger. However, it was embarrassing, especially when a voice called from a near-by pogy boat:

"Haul him into the station wagon. The back porch is too high."

We sailed out of Greenport next morning as nonchalantly as we could. Destination: Sag Harbor, with a valid claim to whaling fame despite its lack of a Herman Melville for publicist.

The gasoline wharf to which we tied up in Sag Harbor serves small, brightly colored pleasure craft owned by summer residents. In the early 1800's, docks in this same harbor had accommodated whaling ships that plied the earth.

"Whale Off!" Signaled a Sea Chase

Indians taught early white settlers the art of small-boat whaling. The first organized whale fishery, started in the mid-1600's on Long Island, was conducted from the shore. Whaleboats were kept ready on the sea beaches, to be launched when a lookout on a high sand dune gave the traditional call—not the "Blo-o-w! Ah! blo-o-w!" of the deep-water blubber hunters, but:

"Whale off!"

Whaling was an industrial mainstay of Southampton. Shore whaling reached its peak early in the 18th century, but gradually the much-sought mammals warily left the Long Island coast.

Ships capable of long voyages were needed, and Sag Harbor became the prosperous home port for a growing fleet. From 1820 to 1850, oil and bone valued at nearly $15,000,000 came ashore here from 490 Sag Harbor vessels.

Tradition ascribes the most spectacular run of oily luck to the whaleship *Helen* in 1846. Returning with full casks from a three-year voyage, she was rounding Montauk Point when two more whales were sighted. *Helen* lowered and took them, and sailed into port

Colonial Days Survive in the Air and Aspect of the Thompson House, a Setauket Restoration

This scallop-shingled salt box, so named because of its shape, hugs the ground as naturally as the old-fashioned thyme, sage, and lavender that grow at its doorstep. The structure, one of Long Island's oldest, was built about 1700. Historian Benjamin F. Thompson was born here in 1784.

Ward Melville restored the house a few years after the reconstruction of near-by Stony Brook (page 306). A wing serves as headquarters of the Society for the Preservation of Long Island Antiquities.

Splint basket (left) once held geese as they were plucked so the feathers could be saved to fill beds and pillows. The well's wooden arm, pivoted on the center post, counterbalances the bucket.

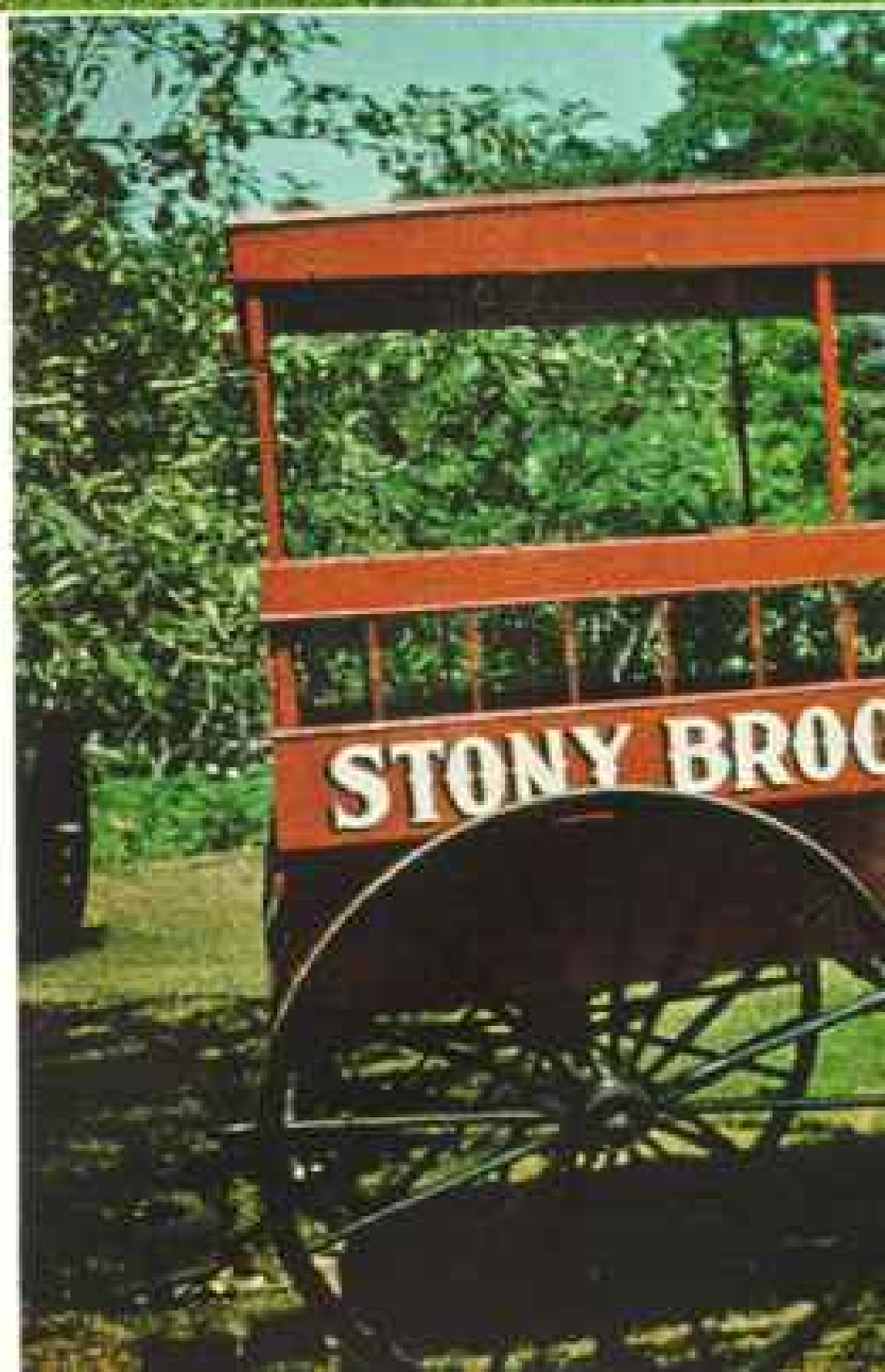
Opposite, above: Earthenware dishes dry in an antique rack, now preserved in the Thompson House.

Stony Brook Blacksmith Finishes a New Wheel →

Charles Conklin (right) has been the area's blacksmith for half a century. He now works chiefly in the stables of near-by estates.

The station wagon, built about 1900, occasionally gives visitors a rolling tour of the village. Old-time harness makers used the wooden horse as a dummy on which to fit and display their wares.

Robert F. Sisson, National Geographic Photographer




K TO DEPOT

with the surplus blubber piled on deck and hanging in the rigging.

Now, as in the New England whaling ports, all that remains of this once-great industry reposes in the local museum.

We relived Sag Harbor's whaling days in the museum, toured the town, then returned to find that *Nomad* had a dockmate. It was the sailing yacht *Xanadu*, of Stamford, Connecticut, owned by George Arents, Jr. A symphony in teak, she was built at Yokosuka, Japan, from plans by New York naval architect Philip L. Rhodes. A pair of exquisitely carved dragons grimaced on either side of her bowsprit.

Xanadu Dims *Nomad*'s Splendors

We were invited aboard, and the magnificence below did little for the morale of *Nomad*'s crew, especially the girls. *Xanadu* had hot showers, a galley like a dining-car kitchen, even a tiny Japanese shrine where one professing the Shinto faith might worship. It had not been used, the owner told us, since the builders went off!

In vain did I point out to Betty Jane and Priscilla next day that we were not exactly the hair-shirt type of sailors ourselves; that we ate ashore in good restaurants almost every night; that a foully swearing Horgan had not once laid a cat-o'-nine-tails across their pretty shoulders. *Xanadu* still cost me reproachful looks each time poor *Nomad* ran out of ice or the galley stove acted up.

We entered Long Island Sound through Plum Gut. There are two other entrances from the east: Fishers Island Sound, between Fishers Island and the Connecticut mainland, and The Race. Widest and most important, The Race is well named, for at times the current streams through at plus five knots.

Plum Gut can also produce its share of swirls and rips. A roistering westerly funneled through it as *Nomad* stood in for her transit. The tidal current poured in against the wind, the water leaped and boiled like a river in flood.

It was a wet thrash but a thrilling one. The ketch lay over until her lee decks vanished beneath foaming water. Catching a nap below, Speedy was rolled out of a high-side bunk to land under the table. But *Nomad* beat through as sturdily as a Bluenose schooner, while behind her a glittering power yacht soon had enough and put back to await a quieter day.

Long Island Sound, spanning more than 80 sea miles, once was an important highway of commerce. After the decline of sail, steamers furrowed its waters, particularly in the coastwise trade between New York and New England ports.

Now even the melodious whistles of the Fall River Line steamers are memories. Colliers and tankers trade to sound ports, and a few stubby ferries ply busily between the Long Island and Connecticut shores.

On regatta weekends strings of barges—sometimes a quarter mile long—ofttimes provoke anguished screams from racing sailors. It is a hard thing to get boxed off the course by those impassive monsters and watch your competitors, who barely cleared the "baggy-wrinkle" fender on the tugboat's stem, drive merrily for the finish.

The westerly held true as we cleared the gut. Although it blew from dead ahead, it gave us the best day's sail of the cruise. Sails were sheeted home hard, *Nomad* leaned to her work, and we beat along the bluff shore with the wind whistling in the rigging and the salt spray driving aft to the wheel.

I knew the sound could be much rougher than this. Severe storms have lashed it many times. One was the great hurricane of 1938. In December, 1811, a historic northeaster blew for 24 hours, wrecking almost every vessel from Hell Gate to Montauk. And a freak thundersquall on July 4, 1949, strewed the waters with capsized sailboats.

Stew Kettle Lands in Skipper's Bunk

Today's blow was friendly, although it kept John from fishing and cost us the hot lunch for which it had first whetted our appetites. Priscilla had courageously volunteered to make stew. She was braced in the topsy-turvy galley when *Nomad* essayed a leap from the top of a "seventh wave," one of those real giants that a kettle of stew or a crock of soup always seems to whistle up out of the deep. Crash! The pot leaped the stove rail and flew into the starboard, or Horgan, bunk.

The aroma lingered long. For the rest of the cruise I got hungry every time I hit my sack.

In late afternoon we picked up the tall radio towers that told us we were nearing Port Jefferson, our destination. The Radio Corporation of America has here some of the

(*Continued on page 319*)

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↑ Shore Dinner Is a Work of Art at the Riviera on Manhasset Bay

To enjoy the specialties of this Port Washington restaurant, many patrons arrive by sail or motorboat, docking at the Riviera Marina (background). Others come by air, landing at a seaplane base next door.

Here a waiter tempts appetites with a two-and-a-half-pound bluefish decorated with olives, leeks, and carrots. Shrimp, oysters, soft-shelled crab, tomatoes stuffed with whole mushrooms, and baked potatoes flank the centerpiece.

Guests on the glass-enclosed Marine Terrace dine before a panorama of Manhasset Bay, one of the finest harbors on Long Island's north shore. Four yacht clubs and several commercial marinas berth hundreds of pleasure craft.

➔ Lobsters caught in Long Island Sound off East Marion bring a smile of delight.

Photographs by Robert F. Sisson, National Geographic Photographer

↑ **Front Yards Rim the Briny Playground of Conscience Bay**

Once whalers, schooners, and white-winged clippers, newly built at Port Jefferson, paraded near-by waters on their way to the sea. This family lives within sailboat reach of Setauket Beach (right) and Old Field Point (left).

↓ **An Executive Commutes by Plane to His New York City Office**

Edward Oelsner, Jr., takes off from his Oyster Bay home in a single-engine Cessna. He will put down at the foot of Wall Street. The trip from breakfast table to desk takes only 40 minutes; a train would require twice the time.

Robert F. Sisson, National Geographic Photographer

"At Sagamore Hill We Love a Great Many Things . . . Books . . . Children . . . the Joy of Life."

Here in the North Room the Nation's 26th President appears in a portrait copied from an original by Philip A. de Laszlo. Gutzon Borglum sculptured the American eagle. Mr. Roosevelt's Presidential flag hangs above.

Wrote Theodore Roosevelt of His Rambling Home at Oyster Bay, Now a National Shrine

Mr. Roosevelt bagged the jaguars in South America, the bison in Idaho. When they disbanded in 1898, his Rough-riders gave him Frederic Remington's "Broncho Buster," the bronze figure on the mantel (left).

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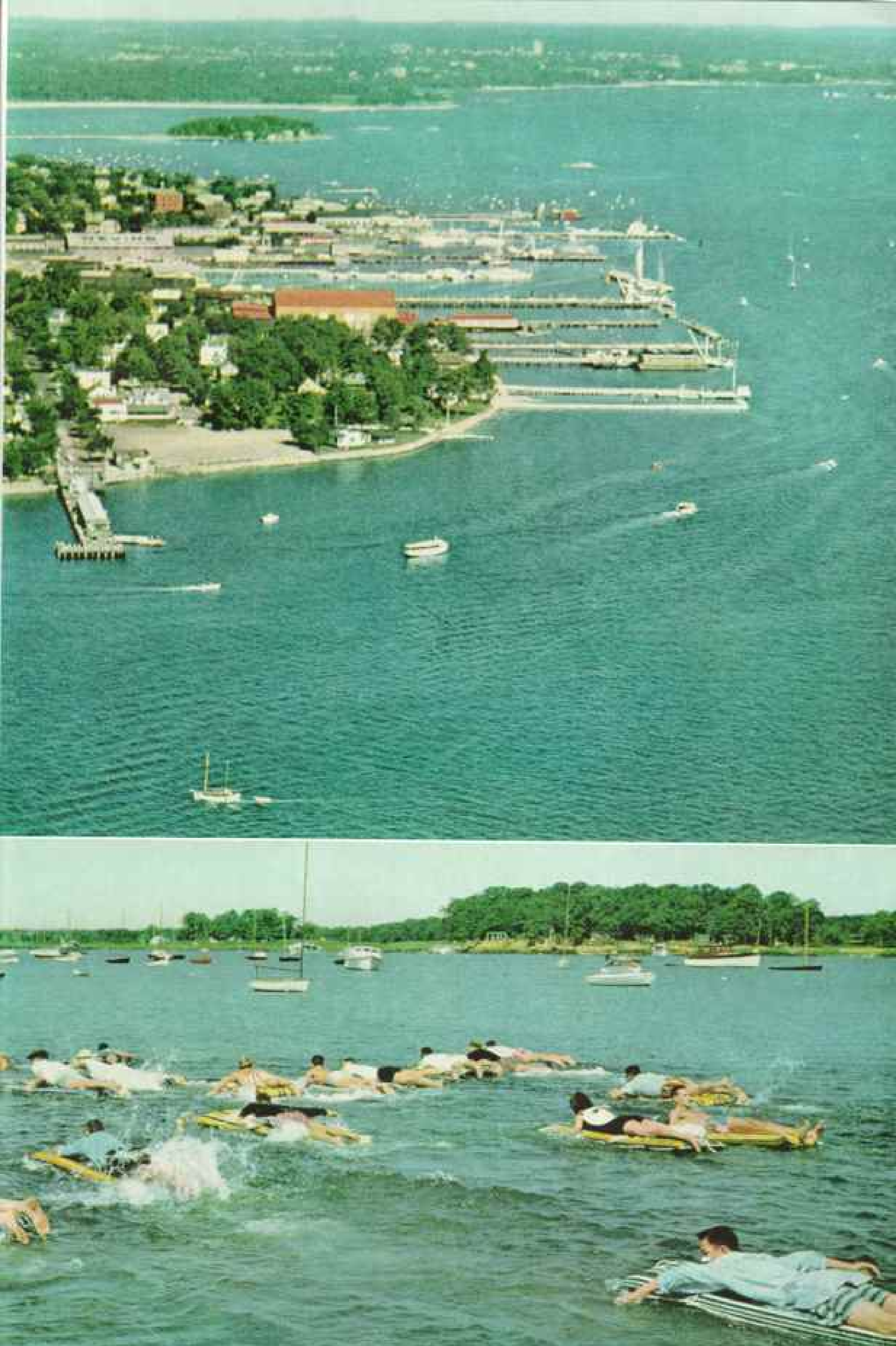
↑ Piers Radiate from City Island Like Compass Points

The wooded islet serves as a center for New York City's yacht-building and repair industry. Here eight shipyards, including the well-known Nevins Yacht Yard (center), cater to myriad craft that swarm across the sound in summer like flights of white birds. City Island offers a breath of salt air and a Nantucket-like view within subway reach of Times Square.

Rubber Mattress Skippers Race Across the Sound →

This adventurous group strikes out from Milton Point near Rye. Their objective: Red Spring Point at Glen Cove, five miles away.



most powerful radiotelegraph stations in the world.

We were tired. Even to those accustomed to it, the constant, unnoticed effort you make to keep yourself trimmed to the motion of a small boat in a seaway is extremely wearing. We decided to lay over a couple of days and rest up. The decision gave opportunity for shore excursions.

Ship's Carpenters Built Setauket Church

We went to near-by Setauket and saw Caroline Church, built in 1729 and named for George II's Queen. Sunlight streamed through stained-glass windows onto cushioned pews and hassocks. In a less sumptuously appointed gallery, slaves once worshiped.

Setauket Harbor has shoaled since the days it held fine sailing ships. The carpenters who built them may also have built the church. Nautical craftsmanship is evident in hand-hewn rafters and knees.

At Stony Brook we saw the Suffolk Museum, which exhibits a whaleboat abandoned in the Arctic in 1872. Men of the U.S.S. *Polaris* expedition, whose steamship was crushed and sunk, left it in Greenland. Robert E. Peary, discoverer of the North Pole, found it in 1905 at Newman Bay.

Stony Brook is itself a museum: many of its buildings are reproductions of late 18th-century architecture (pages 306, 308). But 20th-century ways will not be denied. Bowling alleys and a television-repair shop hide behind dignified Federal façades.

Nomad found another good breeze the day we headed out of Port Jefferson bound for Manhasset Bay. This time it was on a quarter, perfect for passage making.

Had I not amended my itinerary, that wind would have swept us on past Manhasset and winged us through Hell Gate into the maelstrom of New York City's East River. But a paragraph in the United States Coast Pilot gave me pause:

"The great velocity of the current, the crooked channel, and crowded traffic in Hell Gate require extra caution . . . to avoid accident or collision, and make it dangerous for sailing vessels. Strangers in low-powered vessels should never attempt it."

The last sentence seemed to be aimed directly at our auxiliary engine, which has just about enough muscle to bring us home when the wind fails. So we decided not to risk *Nomad's* joining the British Army pay ship *Hussar*, which sank in Hell Gate during the Revolution.

We made sail for Manhasset Bay. No sail drill was in prospect. The Fisherman rigged his lines. The rest of us sprawled on deck in the sun. It was Saturday, and the sound teemed with pleasure craft.

Orange Crate Fools the Fisherman

In the distance a sailing fleet boomed downwind behind billowing spinnakers of blue, green, white, or red nylon. A sloop wearing Canadian colors beat out so smartly I could not resist dipping *Nomad's* Stars and Stripes to her.

The Fisherman had a smashing strike but failed to connect. Wild with excitement, he showed us a heavy hook completely straightened out.

"Why did you spin the wheel up a minute ago?" Betty Jane asked me.

"Sh!" I replied. "We almost hit a submerged orange crate."

Forefoot chuckling and burbling, *Nomad* slipped past some of the most inviting yacht harbors in the world—Huntington Bay, Oyster Bay, and long, narrow Hempstead Harbor.

At Oyster Bay the Theodore Roosevelt estate, Sagamore Hill, awaits in dignity the day when it will be entirely hemmed in by lesser construction (page 314). Glen Cove and Sea Cliff overlook the outer reaches of Hempstead Harbor.

Then came Sands Point, with Execution Rocks just offshore. Westward bound, as we were, you see the lighthouse on the rocks and the celebrated Manhattan skyline at about the same time.

The light warns mariners off a grim spot.

← **A Snowy Cloud of Canvas Dries After a Scrubdown at Ratsey & Lapthorn**

The Ratsey family began cutting sails in England shortly after the American Revolution. They joined forces with their competitors, the Lapthorns, about a hundred years later. The partners achieved fame as sailmakers to many of the noblest yachts in the United States and Great Britain.

Early in the 20th century Tom Ratsey came to City Island with a few sailmakers. With window frames still empty and snow on the floor, work began on sails for Commodore J. Pierpont Morgan's *Corsair*. Today Ratsey's on City Island is one of the world's largest and most modern lofts.

Here a carpet-cleaning machine lathers a blue sail.

W. E. Garrett, National Geographic Staff

A Man Can Be King of His Own Isle in The Thimbles, Rocky Outcrops off Connecticut

Mounds of shells testify that Indians once held oyster feasts on these wooded dots. Today summer residents maintain cottages on 23 of the 100 rocks.

Rogers Island (upper center) supports an English manor house with formal garden. On another island, a house built in Civil War days shelters descendants of the original family. By tradition, Captain Kidd buried treasure on Money Island (center). Pine Orchard lies in the distance (page 338).

A Delegation of Ducks→ Meets *Nomad*

Convoyed by a flotilla of waterfowl, the ketch beat into the Wepawaug River at Milford, Connecticut.

"Those birds were about as wild as the pigeons of Boston Common," the skipper recalls. "They laid alongside clamoring for handouts."

← Capt. Orlando Bradley, who feeds the ducks, splices a line.

Bates Littlehales, Staff Photographer

I think the rocks were named because they took such a toll of shipping, but there are other stories, one of which was told us by Mr. Thomas M. Fraser, member of an old family at Port Washington, overlooking Manhasset Bay:

"My grandfather, Thomas Mott, told me that during Revolutionary days the sound was infested with local pirates. When they were caught red-handed, the captors did not always bother to send them to New York for trial before the English governor.

"Instead, the pirates were taken out to these rocks, actually a reef, at low water. With legs shackled to the jagged stones, they were left to drown as the tide came in."

Nomad Beats for the Wrong Berth

As we approached the harbor mouth, *Nomad's* people combed their hair and otherwise spruced up. I had promised them the red carpet would be spread for *Nomad* by her friends at Manhasset Bay Yacht Club. They had done this for her when she came to the World's Fair, and I had thoughtfully telephoned ahead from Port Jefferson that she was due in a second time.

We swept expectantly through a moored fleet of yachts. Three turns through the fleet —and still no Manhasset Bay launch with welcome committee aboard. It charged to-

ward us on our fourth circuit. An excited individual in the bow seemed to be waving us angrily off.

"Well, Admiral," said Priscilla, "you fixed up a fine welcome, all right. What sterling exploit of yours do they remember here since 1939?"

The launch slowed alongside.

"You Boston bonehead!" shouted Bill Taylor, Manhasset member and managing editor of *Yachting* magazine. "You're in the Knickerbocker Yacht Club anchorage! Bring her over quick before they spot you and kidnap you away from us!"

That night *Nomad* rode to a guest mooring while her complement sat down to a sumptuous dinner—and no check overhauled the party from astern, either. Horgan was reestablished as jolly skipper of a happy ship, and *Nomads* was not mentioned again.

Manhasset Knew Colonial Cowpunchers

Next day, Sunday, we stayed on by special invitation to watch the Manhasset Bay Junior Series for youngsters from all the yacht clubs on the sound. Boys and girls of all ages raced everything from tiny Penguin dinghies to 22-foot-8½-inch Stars. There was a capful of wind but no capsizes, not even among the small fry bulky in their brilliant orange life jackets.

On Monday morning we ran under power across to City Island on the other side of the sound, only slightly more than a mile wide at this point. Here is the famous Nevins Yacht Yard. The firm's brass name plate on the bulkhead of a yacht bespeaks quality to such an extent that a friend of mine, following extensive repairs by Nevins to his boat built elsewhere, asked Nevins to saw one of their plates in half and put it in his companionway!

Here too is the Ratsey & Lapthorn sail loft. Members of the Ratsey family were cutting sails in England long before there was any organized yachting in this country (page 318).

Spreading *Nomad's* jib on a vast, clean, hardwood floor, Ratsey craftsmen plying shining needles repaired a heel stretched out of shape by several seasons of hard use. The same skilled hands had made sails for winners of the Bermuda race, defenders of the America's Cup, and—*Nanadu!*

Nomad came back into Manhasset Bay just as the sun went down. Manhasset Neck

Hoisted Cylinder on the Committee Boat → Calls a 210-class Sloop to Race

Boating is enjoying a tremendous upsurge all over the United States; last year one of every six citizens was a part-time sailor.

In all this salty congestion, Race Week at the Larchmont Yacht Club is Long Island Sound's premier nautical event. During a recent Week 2,126 yachts of some 25 classes took part in races.

Its flag flying, the club's Race Committee anchors at the starting line. Roman numerals on the board indicate the race divisions; letters show course to be sailed. Club's burgee waves from the bow.

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lay to port. Owners of the peninsula's attractive homes might be surprised to know it was once called Cow Neck and that cattle roundups were held there every year.

Colonial Americans hustling their herds inland may well have driven them over the site of modern Manhasset's "Miracle Mile," a row of most up-to-date stores. Many are branches of well-known New York establishments. Our girl sailors lingered long before a window displaying evening gowns fresh from Paris.

Manhasset was to be the turning point of our cruise: we had sailed west on the Long Island side of the sound and now would go back along the Connecticut shore. Clearing the bay, we slanted away for Greenwich on a heading somewhat east of north.

Town Site Bought from Indians

Greenwich is an old town, settled in 1640 by Capt. Daniel Patrick and Robert Feaks, who bought the site from the Indians. Local tradition claims that a Revolutionary War cannon ball still lies imbedded in the chimney of the Ray W. Mead house, which was built about 1700.

The harbor seemed almost too well marked. When aids to navigation are abundant, it is difficult to keep track of them all. But many markers are a necessity on this whole north shore of the sound. Rocky islands are everywhere, guarding a coast pierced each few

(Continued on page 331)

A Capsized Lightning Dumps Its Crew; → Boats on Their Feet Run Free to Finish

Sailors are in no danger in the cold, rough water so long as they cling to the floating sloop. One youngster tries to lower the sails; another stands on the centerboard. Photographer Sisson, following the race in a launch, went into the water to help right the boat.

 Robert F. Sisson, Staff Photographer

Larchmont's Race Week Gets Under Way with Pennants Flying and Sailors Waiting on the Quay

Five young boatmen founded Larchmont Yacht Club in 1880 and called the first meetings in a church. The rental: $1 a year. Now more than 800 members use this rambling Victorian mansion and its 11 acres of grounds.

The club held its first Race Week in 1895; it has been an annual event since. These enthusiasts wait for a club launch to take them to the boats. Bags hold sails.

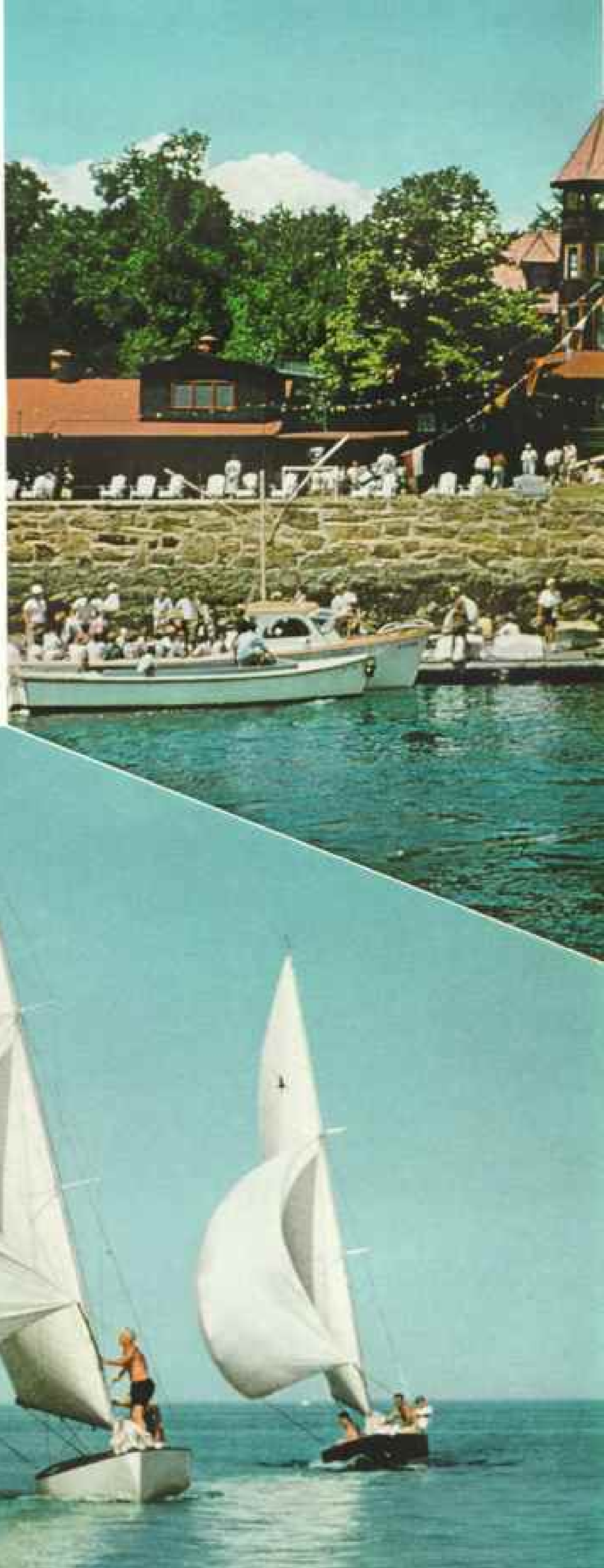
Below: Spinnakers ballooning, three Ravens and a Star head for home after rounding a buoy. Catamaran with barber-pole sails gets a ringside view.

Lower right: Sitting to leeward in a close-hauled Lightning, twin sisters Carrie and Connie Neher take a yachtsman's holiday from duties as sailing instructors.

Pages 326 and 327: Driving to windward, Internationals jockey for a start in a Larchmont race. Norwegian-designed and all built from the same plan, they carry practically identical rigging and Dacron sails.

 Kodachromes by Robert F. Sisson, Staff Photographer

Page 328: Kodachrome by Morris Rosenfeld




YALE
FISHING
CLUB

←Mako Shark Bares Teeth in a Yale Laboratory

Lying at the university's back door, Long Island Sound offers a wealth of sea life to the Bingham Oceanographic Laboratory in New Haven, Connecticut. Here ichthyologist Edward C. Migdalski shows how a mako can be identified by the shape and arrangement of its teeth. Though sharks enter the sound, this species ranges farther out.

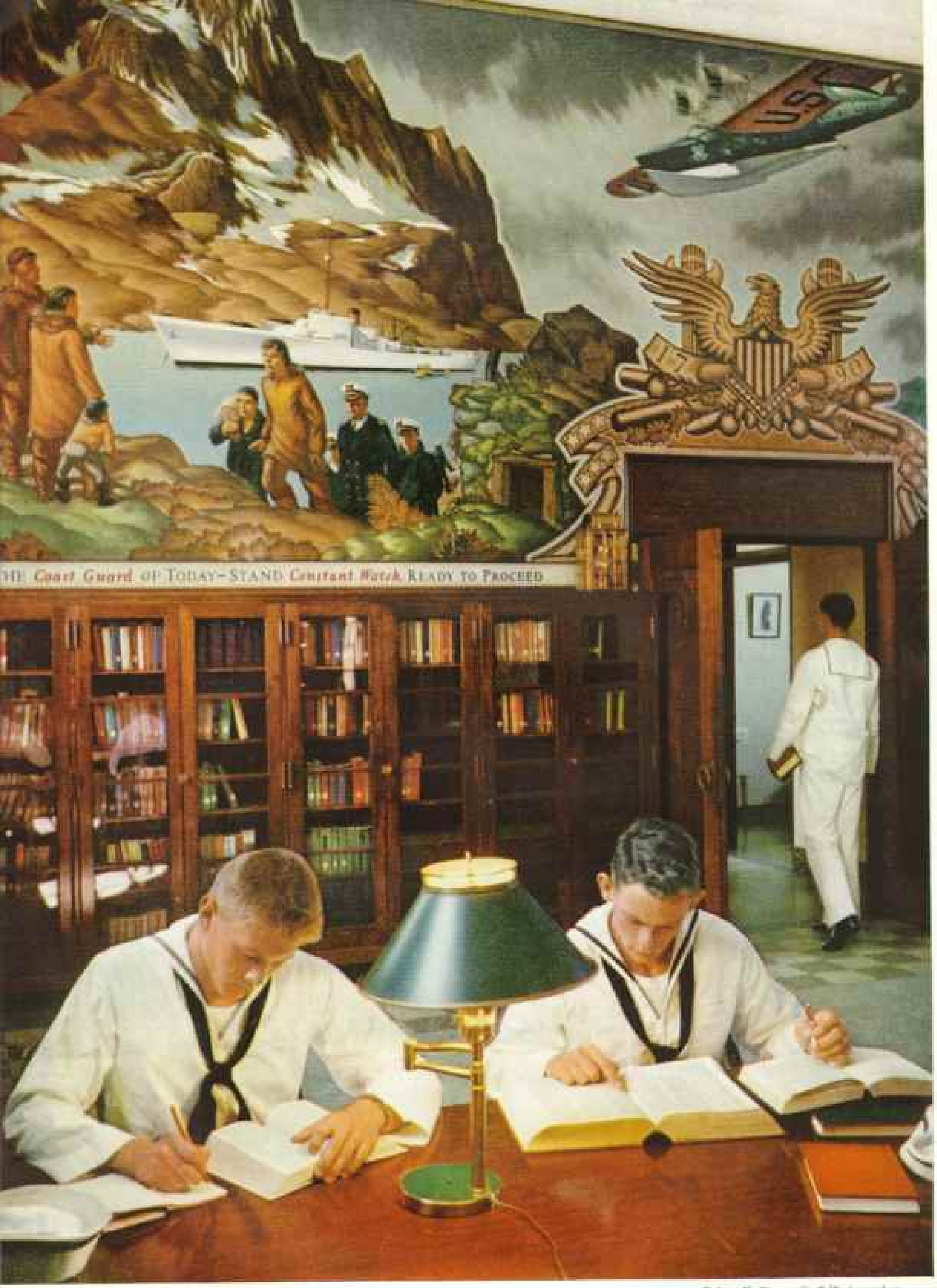
Specimens on the wall await display in the laboratory's new quarters, to be completed next year.

Students are members of the Yale Fishing Team. In 1956, off Nova Scotia, the team captain boated a 630-pound bluefin tuna to take top prize in the world's first intercollegiate big-game fishing match.

†Harkness Tower Sings the Time of Day for Yalemen Perched on the Fence, Long the Campus Forum

←Members of Yale's Elizabethan Club, sharing with Ben Jonson the belief that "speech is the only benefit man hath to express his excellency of mind," gather daily for talk over clay pipes and tea.

Volkmar Wentzel and (above) J. Baylor Roberts, Staff Photographers



Robert F. Sisson, Staff Photographer

Coast Guard Cadets Study Under a Mural That Foretells Their Future in the Service

The U. S. Coast Guard Academy, at New London, Connecticut, graduates about 100 officers a year. Mural shows a cutter bringing mail and medical aid to Eskimos, one of the peacetime activities of the service.

miles by a bay, a headland, or the mouth of a stream or river.

In making directly for Greenwich, we had reluctantly passed up the New York shore with all its fine yachting centers—New Rochelle, Larchmont (pages 323-325), Mamaroneck, and the like. To savor them all, we would have needed more time than any of us could spare.

Gulls Spurn Fisherman's Lures

So the anchor went down off the quarters of the Indian Harbor Yacht Club at Greenwich, and out came the club tender in response to three blasts on the foghorn. Ferrying us ashore, it carried us past banks of soft greenness shaded by tall trees through which the light of the setting sun shone with an eerie, misty quality.

The girls were enchanted with the setting until it presently dissolved into rain, which drummed steadily on decks and cabin top until dawn. Then a cold, clear nor'wester blew the wet clouds away.

Putting out for Milford, we had the romping nor'wester as a quartering breeze. John's shiny trolling baits leaped from wave to wave like jingling flying fish. They interested only gulls mewing in the wake; the birds, fortunately, recognized them as inedible.

Factory chimneys could have served as navigational signposts to Stamford, Norwalk, and also to Bridgeport, chief industrial city of Connecticut. Each with its good harbor, the cities streamed past to port as we moved on for quieter anchorage in the little Wepawaug River.

Nomad Greeted by Duck Flotilla

No sooner had we rounded Charles Island, guardian of the river mouth, than the wind veered to north. Not fancying a beat up the narrow dredged channel to Milford, I pressed the auxiliary starter button. Battery wiring had gone adrift; there was no response.

So I beat in under all sail, the crew on the windward side, and it came off all right. As they do for every boat that comes in, Capt. Orlando J. Bradley and his flotilla of wild ducks met *Nomad* and escorted her to a mooring (pages 320, 321).

Wild ducks? These were as wild as the pigeons of Boston Common. Fearing charging *Nomad* not a whit, they laid alongside clamoring for handouts. The captain told us they had long ago forsworn migration, remaining the year round near the corn bin he maintains for their benefit.

Oyster farmers live in Milford. I said "farmers": here on the sound, oysters growing in their underwater beds are regarded as crops and are tended as carefully as any strawberry or asparagus patch ashore.

Science goes out of its way to help such progressive tillers of liquid soil. Primarily concerned with the discovery of basic scientific truths, the United States Fish and Wildlife Service laboratory at Milford freely advises on local oyster problems.

Among its many services are warnings of the appearance and movements of oyster enemies, such as the starfish and the snail-like drill. It tells oystermen when and where to expect oyster "set"—attachments of oyster larvae to underwater surfaces.

Algae Promise Abundant Food

The laboratory takes particular pride in its experiments with algae, which it grows on a large scale to be used as food for experimental animals. Its director, Dr. Victor L. Loosanoff, agrees with other scientists working in this field that algae may one day be important even as human food.

In a laboratory outbuilding I looked with Dr. Loosanoff into a shallow wooden tank filled with 2,000 gallons of a clear, blue-green liquid.

"It's almost pure Chlorella," said the scientist. "An acre of sea water, used to grow these one-celled algae, could produce far more protein than you can get from an acre of land, even with soybeans.

"Think what that could mean to some parts of the world! It would eradicate starvation."

Visitors come from far and near to see this mass culture of protein-rich Chlorella, among them scientists from the Carnegie Institution of Washington and the Tokugawa Institute for Biological Research of Tokyo.

Next morning the breeze was down and the thermometer up. The tide was unusually low, thanks to the nor'wester's forceful scouring of the water from the sound's north shore.

From pools in the rocks and bubbling salt marshes came a delicious essence of the sea.

"Ugh!" said Betty Jane. "What an awful fishy smell."

We caught the swift tail of the ebb out of harbor. A noble fleet of ducks, led by Captain Bradley in his battered little rowing

scow, convoyed us as far as the river mouth flasher, where we made sail.

Soon after passing New Haven, at the head of its wide bay, we altered course to bring The Thimbles close aboard. There are about 100 of these rock islets, all shapes and sizes, scattered off the coast southeast of Branford (pages 320 and 338).

Summer Cottages Stud The Thimbles

The last time I had seen The Thimbles they looked like desert isles unchanged since pirate days. Inspecting them through the glasses this time, I found many more decorated with summer cottages.

Sirens inhabited these places. Interrupting sunbaths on the rocks, they waved cheerily at *Nomad*. One was actually swimming.

"That reminds me," said Bates. "I saw three seals in the water near here last April."

All of us were incredulous except John, who overhauled his harpoon gear and took up station on the bow.

Later we talked with lobsterman Harold Griffin of Guilford. Bates had indeed seen seals, he told us.

"They tear up our lobster pots, even the deepest ones, to get the flounder we use for bait. Quite a few of them hang around here."

They are harbor seals, which range the Atlantic coast as far south as North Carolina. Sometimes the voracious animals are plentiful, Mr. Griffin told us, appearing in September and often staying until May.

Part-time Lobstermen Work in Factories

We had met Mr. Griffin in his husky, well-kept 28-foot powerboat just before we reached Sachem Head; he was gesticulating furiously at two subdued youngsters in a bobbing skiff. Surmising he had something to do with the maze of pot buoys through which we had been moving, we handed the mainsail and came alongside to buy lobsters.

"You can have some if these derned summer people have left me any," the fisherman growled. "I just caught those kids hauling a pot. But they're not really thieves—just curious city folks."

Lobstering on Long Island Sound is a small industry. The lobstermen sometimes are part-timers, who hold factory jobs ashore and tend their pots in the evenings and on weekends.

We were bound for Old Saybrook at the mouth of the Connecticut River. Leaving Sachem Head, named for an Indian chief killed in the Pequot War of 1637, we passed inshore of Falkner Island with its old white lighthouse, one of the most important on the sound.

Then we ran still farther to the south so as to clear Long Sand Shoal, a stretch of hard-bottom bar on which *Nomad* could conceivably stub her toe. The course took us close to red-painted Cornfield Point Lightship, the only one in the sound.

At Old Saybrook we visited Tom Wadlow, an old friend of my Navy days. In Tom's genial company we toured a local yacht yard that may stand on a historic site.

Saybrook tradition holds that here was launched the first American submarine—David Bushnell's *Turtle*, which went down the ways in 1775.

Turtle Loses Tiff with *Eagle*

The strange man-powered wooden contraption was given orders to sink Admiral Howe's flagship *Eagle*, a 64-gun man-of-war, in New York Harbor. An Army sergeant, Ezra Lee, became the world's first military submariner when he attempted to carry out the assignment.

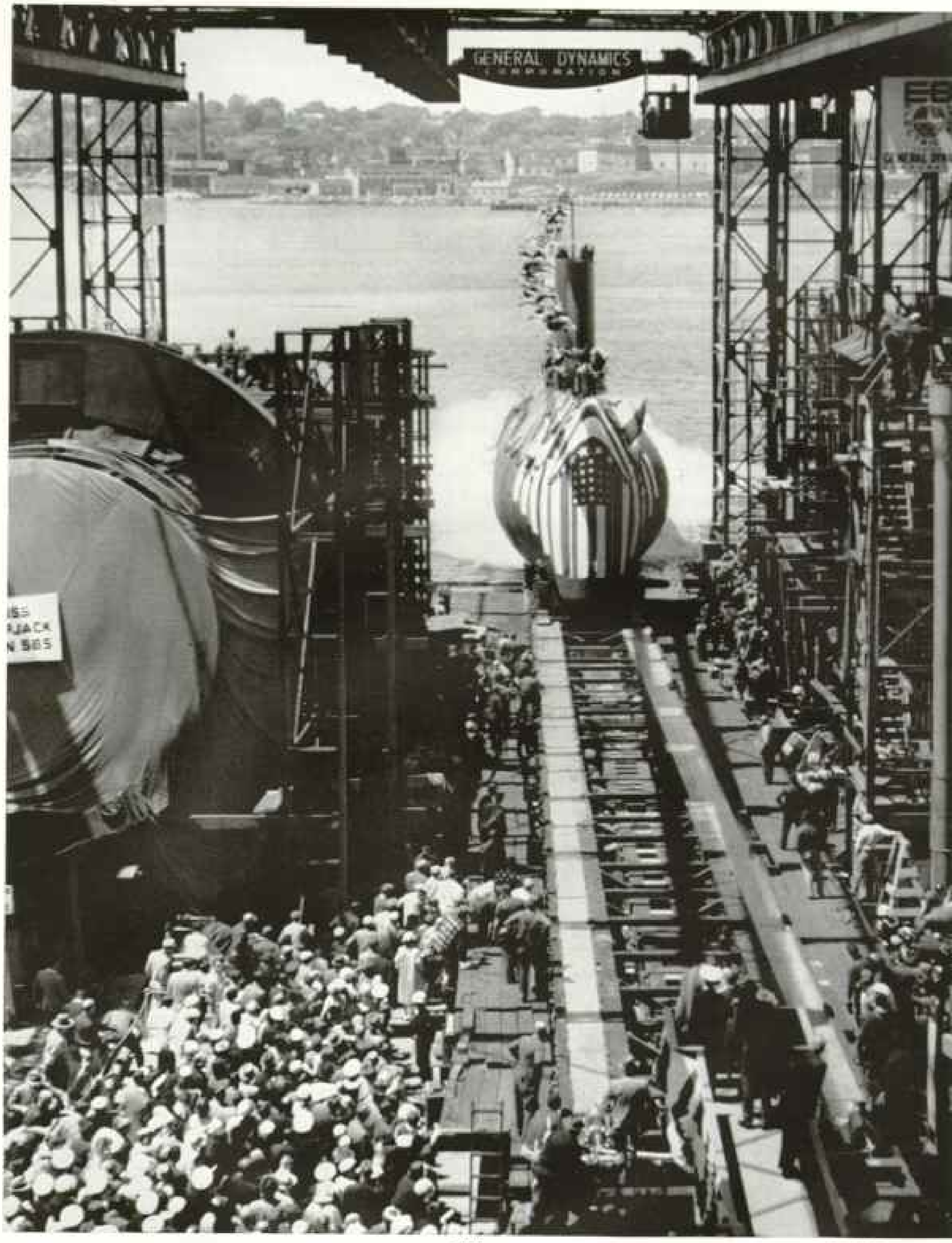
"His plan," Tom told us, "was to maneuver his submarine under the warship's wooden hull, drill a hole, and attach an explosive charge that would be detonated later by a clockwork mechanism."

The sergeant got under the *Eagle*, all right, but when he tried to bore into her hull he struck metal. Then the submarine began to drift. Finally he jettisoned the explosive charge and headed for shore.

"An hour later," said Tom, "there was a tremendous, but harmless, explosion in the water. It astonished and bewildered the Britishers."

Saybrook was named for Lord Brooke and Lord Saye and Sele, who in 1635 sent Lion Gardiner, first owner of Gardiners Island, to build a fort here. The Collegiate School of Connecticut, now Yale University, was established in 1701 and soon began classes in Old Saybrook. In 1716 it moved to New Haven 30 miles away (pages 328-329).

Everybody knows the city harbors the famed institution of higher learning, but few recognize it also as the seat of a tremendous "kindergarten" for oysters. New Haven oystermen, like their colleagues in the Milford, Bridgeport, and Norwalk areas, produce countless thousands of seed oysters, to be



Skate, the Nation's Third Atomic Submarine, Slides off the Ways at Groton

Here on the Thames River in Connecticut, General Dynamics Corporation's Electric Boat Division sends to sea the first nuclear-powered submarine designed for assembly-line production. One-fourth smaller than pioneer *Nautilus*, she is expected to be as fast and far-ranging. *Skipjack*, at left, is still under construction.

planted later along both sides of Long Island Sound.

We went up the Thames River to New London under power. Haze shrouded the river. Through it we could hear and now and then see submarines, like gray sea monsters, feeling their way downstream toward their maneuver grounds in Block Island Sound. The big Navy base from which they came is at Groton, across the river from New London.

The deep water of the Thames has made New London an important port since earliest days. Settled in 1646 by John Winthrop, son of a Massachusetts governor, it became a headquarters for privateers during the American Revolution. Benedict Arnold burned the town in 1781.

New London Still Looks to the Sea

Early in the 19th century, New London flourished as home port to a whaling fleet outranked in importance only by those that sailed from the American whaling capital, New Bedford, and from Nantucket. A New London shipmaster, Capt. Moses Rogers of the *Savannah*, first took a steam vessel across the North Atlantic.

The stirring days of windjamming are past, but New London still sends to sea young men skilled in the bluewater profession. They are the graduates of the beautifully appointed United States Coast Guard Academy, which is to the Coast Guard what the Naval Academy is to the Navy (page 330).

Most popular Coast Guard classroom is the square-rigger *Eagle*. Built in Germany in 1936 as the training ship *Horst Wessel*, the handsome 1,900-ton steel bark came to this country as a prize of war.

Coast Guard Cadets Train Under Canvas

Cadets cruise to far ports in the *Eagle*. The Coast Guard subscribes to the theory that the best seamanship is that learned under a press of snowy canvas.*

After New London, *Nomad*'s itinerary listed but three more calls at ports geographically within Long Island Sound. These were Fishers Island, Mystic, and Stonington.

Deciding to make the island first, we slipped downstream on a sunny morning with a convoy of small fishing craft bound for Block Island waters. At the river mouth they held on due south for The Race, while *Nomad* altered to the eastward for West Harbor on Fishers Island.

Lying only two miles off the Connecticut shore, the island nevertheless belongs to New York State. Thanks to its isolation, it threatens to supplant Newport as a smart summer resort.

A short sail back across Fishers Island Sound and we were at Mystic Seaport, the Marine Historical Association's famous restoration (opposite and page 336).

Walking along a cobblestoned street flanked by chapel, schoolhouse, countinghouse, sail loft, ropewalk, and the shops of sail-age artisans, *Nomad*'s crew could almost imagine themselves living in the parlous times of 1812-14, when nettled British officers referred to Mystic and Stonington as a "cursed little hornet's nest" of rakish privateers.

Mystic Seaport preserves a remarkable variety of nautical relics, some of which are too large to be placed under a roof. These include the *Charles W. Morgan*, last of the New Bedford whalers, and the square-rigged *Joseph Conrad*, built at Copenhagen in 1882 as the *Georg Stage*.

* See "Under Canvas in the Atomic Age," by Alan Villiers, National Geographic Magazine, July, 1955.

Mystic Re-creates the Age of Sail with Seaport, Ships, and Souvenirs →

Connecticut's Mystic River men have been building ships and sailing them since the 1600's. Earliest shipwrights farmed in summer; in winter they took home-made sloops and schooners on West Indies trading voyages. By the 19th century sealing expeditions beat all the way to Cape Horn; Capt. Nathaniel B. Palmer has been credited with discovering the Antarctic Continent in the Mystic-built sloop *Hero* on one such passage.

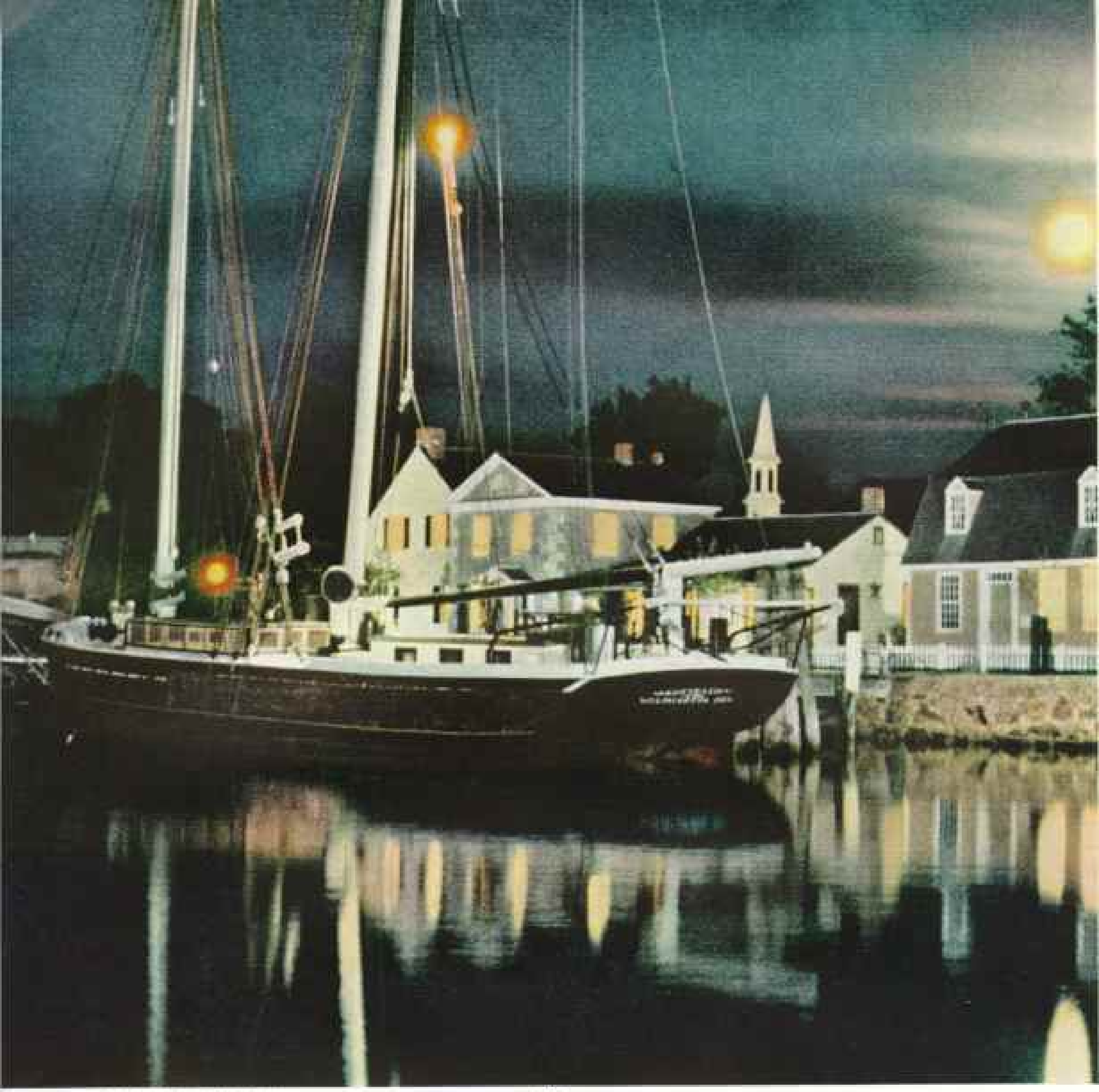
As decades passed, whalers slid off the ways and returned with fortunes. Mystic's clippers set speed records going around the Horn, and its sailing yachts, such as *Dauntless*, made the fastest Atlantic crossings.

On the site of the Greenman Shipyard, where 100 vessels were launched in the first half of the 1800's, the Marine Historical Association maintains a living museum. Outside the windows of the Stillman Building lies Seaport Street with its old-time countinghouse (left), apothecary shop, chronometer shop, packer shed, and firehouse. Bowsprit of the *Charles W. Morgan*, sole survivor of New England's whaling fleet, juts above a dry berth at harborside.

Lower: Museum restorer touches up a sculpture that once rode before the mast of the New England ship *Abigail*. Warrior figurehead (left) sailed on *Orlando*, a British sloop of war retired a century ago.

To learn seamanship, Girl Scout Mariners live aboard the museum's *Joseph Conrad*, a square-rigger built in 1882 as a training vessel for Danish merchant marine cadets.

Kodachromes by Robert F. Sisson (above) and Bates Littlehales, National Geographic Photographers



For the convenience of visitors the 116-year-old *Morgan* rests in a bed of gravel and sand beside a wharf. The *Conrad*, still floating, went around the world in 1934-36 with her owner Alan Villiers in command.*

Sailormen Emigrate Before the Mast

Stonington, like neighboring Mystic, flourished as both shipbuilding center and whaling port. Descendants of Portuguese whalemen took *Nomad*'s lines as she nosed in to the town's harbor to tie up.

These gentle fisherfolk, who man one of the best commercial fleets in sound waters, told us how their forebears came from the Azores and the Cape Verde Islands:

"Life was hard there, and on top of that, there was the period every young man had to serve in the army far away in Portugal. So the young men had the *saudade* bad—the blues, we Americans say; and when the Yankee whalers called in the islands looking for crews, they found plenty of strong hands to sign on. That way they came to America before the mast."

We were nearing the end of the cruise. As it turned out, however, we were to make one more harbor before reaching the western entrance to the Cape Cod Canal, through which we would pass before setting off on the last leg of our passage back to Boston. Fog forced the call.

A real pea-souper came down on us off the mouth of Buzzards Bay. Groping our way,

* See "North About," by Alan J. Villiers, National Geographic Magazine, February, 1937.

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Australia Returns in Her Old Age to a Setting of Her Youth

Now a Mystic exhibit, this oldest American schooner afloat served as a Confederate blockade runner. Later *Australia* sailed Chesapeake Bay, hauling sand, watermelons, oysters, and coal. Mrs. E. Paul du Pont presented her to the museum.

Robert F. Sisson, Staff Photographer

pumping the foghorn, and listening between blasts for answers, we came suddenly upon a luxurious power cruiser circling aimlessly.

"Hey!" hailed a nattily clad figure from her wheelhouse. "Which way to Newport?"

We gave him the compass course and wished him well.

Island Historian Shops for Fish

Sensibly, if unvalorously, we felt our way into Cuttyhunk, a salty little island lying between Martha's Vineyard and the Massachusetts shore. Fortunately it was Mrs. George W. Haskell's day to shop for fish on the docks.

A schoolteacher on the island for nearly a quarter of a century and author of her own textbook on Cuttyhunk history and geography, Mrs. Haskell stopped to look *Nomad* over and was soon engaged in telling us about her home.

A fort built by navigator Bartholomew Gosnold on Cuttyhunk, she said, was the first structure raised by the English in New England. Erected in 1602, it antedates Plymouth by 18 years. A 50-foot-high monument marking the site of the fort now serves as an important navigation aid.

Westernmost of the Elizabeth Islands, Cuttyhunk has only 50 year-round residents. Many ships have been wrecked here. One was the bark *Wanderer*, last square-rigged blubber hunter to leave New Bedford on a whaling voyage. And a short voyage it was. Anchored off Cuttyhunk, she dragged, struck, and was broken up by the sea.

Nomad Greeted by Homing *Yankee*

Boisterous Buzzards Bay set little *Nomad* to dancing next morning. A big white windjammer wearing the rig of a staysail schooner came up from astern, plowing through the chop as steady as a table.

It was Irving Johnson's *Yankee*, home from one of her globe-girdling cruises.* Actually a brigantine, she shucks her square sails in narrow waters for handier fore-and-aft canvas.

A wild shout rang out from *Nomad*'s bow.

"Flying fish, millions of them!" screamed John. "Quick, Priscilla, the net!"

The identification was correct, even if the numerical estimate was a trifle awry. Flying fish are sighted every now and again in Buzzards Bay by local watermen; the "winged" creatures stray into the bay when inshore waters become unusually warm. *Nomad* flushed just one of the little creatures with her curling bow wave.

I only hope *Yankee*'s people were not using their field glasses while John was lashing the water with a crab net, vainly seeking the rest of the covey. I wonder what they would have thought was going on aboard Horgan's pride and joy!

* See, in the National Geographic Magazine: "*Yankee* Roams the Orient," March, 1951; "The *Yankee*'s Wander-world," January, 1949; "Westward Bound in the *Yankee*," January, 1942, all by Irving and Electa Johnson.

↑ Sailboat Replaces the Family Car Between The Thimbles and Mainland

This rocky islet near Pine Orchard, Connecticut, is only slightly larger than its cottage. Some Thimble Islanders use kerosene lamps and catch water in rain barrels. A motorboat delivers groceries. During squalls the sea beats like rain against the houses.

↓ Spray Flying, a Speedboat Planes Past the Beach at Stony Brook

With bow out of water, the Century can race at 45 miles an hour. Half flying, it creates a minimum of wash, the bane of near-by sailing craft. Burgee on the nose proclaims membership in the Stony Brook, Long Island, Yacht Club.

Year of Discovery Opens in Antarctica

Daring Scientists of a Dozen Nations, Pooling Knowledge and Resources, Launch Man's Most Ambitious Assault on the White Continent

By David S. Boyer

Foreign Editorial Staff, National Geographic Magazine

With Photographs by the Author

EIGHT thousand feet below us the world's most powerful icebreaker, U.S.S. *Glacier*, battered and twisted her way across the Ross Sea, a dark beetle struggling through endless chunks of drifting ice.

Within minutes our Air Force C-124 Globemaster had passed her. Compared with *Glacier*'s jarring, bucking journey, our way of reaching Antarctica was smooth and effortless. But it had its own chilling aspects.

Air-sea Invasion of Antarctica

Off our starboard wing rose the Prince Albert Mountains, stark and jagged, ribbed with glaciers flowing down to the icy sea. Somewhere ahead, in a thickening white haze, lay the only airstrip for big planes within 2,000 miles. We had passed the point of no return; there was no longer enough gasoline to get us back to New Zealand.

Lashed to the floor of the plane's cavernous belly were 27 tons of priority equipment to help build an outpost for science at the South Pole.* Aboard the *Glacier* rode more supplies and men for the second year of Operation Deep Freeze, the United States' part of a giant international assault on the cold, silently resisting emptiness of Antarctica.

In the southern summer to come, 46 scientific stations would dot the continent at the bottom of the world, all part of the 1957-58 International Geophysical Year for the study of the earth and its environment.† Other stations on outlying islands and neighboring continents bring to more than 60 the total of points from which scientists will probe the secrets of Antarctica. (See the supplement map, "Antarctica," mailed to members with this issue of their Magazine.)

The United States already had built two bases, one in McMurdo Sound at the edge of the Ross Sea, the other 450 miles eastward at Little America V on Kainan Bay.‡ United States scientists and servicemen of Deep Freeze II had orders to install and man six new outposts, sending 12 ships and 44 planes south for the job.

The *Glacier*, 8,625 armor-plated tons and 21,000 horsepower, was smashing her way through the Ross Sea ice pack in October, earlier in the antarctic year than any other ship in history. Overhead, Navy and Air Force planes were already proving that a 6,000-foot landing strip carved on McMurdo ice had brought the formidable Antarctic Continent into commuting distance of sunny New Zealand, 2,400 miles away.

I flew into Antarctica on one of these first aerial "milk runs." It was beginning to look like a flight through milk itself. To starboard the frozen mountains had begun to blur into whiteness. Beneath us veined patterns of dark-green open water, twisting and writhing among the floes, faded and became white too. Below, above, on all sides, milky whiteness closed us in.

Flight into Unknown Weather

The forecast for our flight had been based on meager information. McMurdo weather was good when we took off. Now, even should conditions there have changed, it was too late for us to turn back. There was no direction to go but onward.

Then a static-broken voice crackled into our radioman's earphones. Radar landing equipment at McMurdo, he deciphered grimly, was not operating.

Maj. Jesse T. Jumper checked his fuel supply. We could circle for three hours if necessary. After that . . .

Skittering back to mind came the words of a radio dispatch sent from McMurdo a week earlier:

"The first Navy plane crashed Thursday

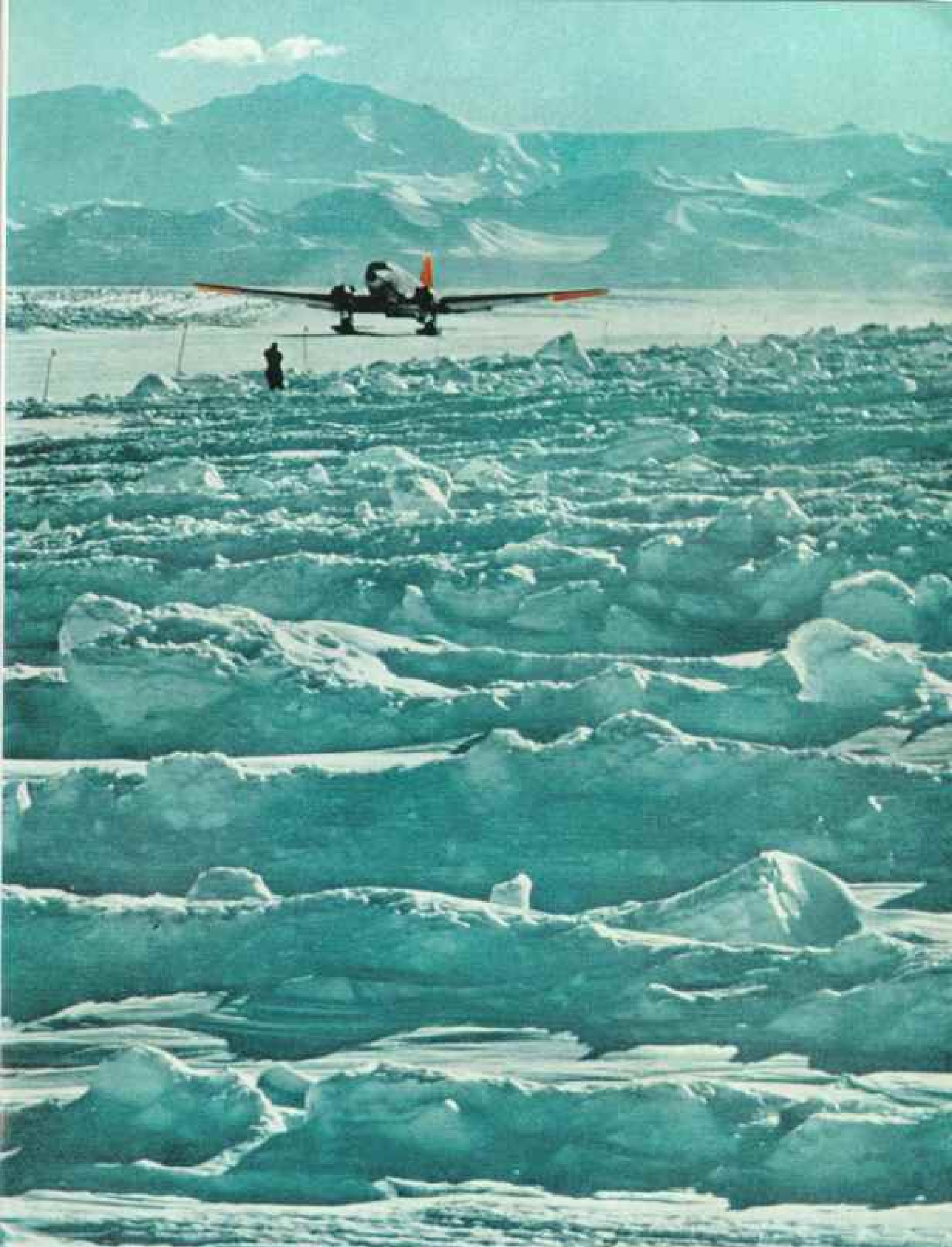
* See "We Are Living at the South Pole," by Paul A. Siple, National Geographic Magazine, July, 1957.

† See "The International Geophysical Year," by Hugh L. Dryden, National Geographic Magazine, February, 1956.

‡ See "All-out Assault on Antarctica," by Rear Admiral Richard E. Byrd, National Geographic Magazine, August, 1956.

Roaring Down a Runway of Ice, a Pole-bound R4D Takes Off from McMurdo Sound

Last year Navy men wintering over at McMurdo cleared 10 feet of snow from the bay ice for this 6,000-foot airstrip. Working under floodlights in the 24-hour darkness, they logged more than 100,000 man-hours in temperatures as low as 60° F. below. The McMurdo base is one of 46 IGY stations now dotting Antarctica; in these lonely outposts scientists of 10 nations probe the secrets of the vast, ice-cloaked continent.



341 Kodachrome by David S. Boyer, National Geographic Staff

Red Trail Flags Edging the Strip Guide Pilots Through a Sea of Frozen Whitecaps

Navy and Air Force transports flew into Antarctica via Honolulu, Canton Island, Fiji, and New Zealand. This was the only airfield on which the big planes could touch down once they passed the point of no return on the 2,400-mile flight from New Zealand. Sometimes they landed in near-zero visibility, with peaks of the Royal Society Range (background) obscured by blinding storms. Bay ice is 14 feet thick, frosted with ridges of bulldozed snow.

while maneuvering to land in poor visibility. Three men were killed instantly and another died later."

Antarctic weather, however, is as changeable as a woman's mind. As we let down over McMurdo Sound, the white continent did us a ladylike favor. For those crucial few minutes the milky haze cleared and the ceiling hovered between heaven and ice.

The pilot, tight-lipped in anticipation of a touch-and-go landing, flew low once across the sea-ice runway. It looked white and rough and, to me, just as fearsome as did the snow-covered ice for miles on either side. Two insignificant rows of red flags, whipping on bamboo poles in a cross wind, were all that designated the one safe place on the entire continent for us to land (page 340).

Flaps down, the Globemaster circled fast into her approach. Then, wings crabbed rakishly into the wind, the big plane seemed to stretch its landing gear, groping to touch solid footing. Never did a bumpy landing feel so good.

Almost before we had taxied to the parking strip, the sky closed down again and a whistling blizzard blanked everything out. Lady Antarctica was showing what she might have done to us.

The U. S. Naval Air Facility at McMurdo Sound was already functioning as the nerve center of American air operations in the Antarctic. Over the long, dark winter night, 93 men had staffed it and built the runway we had just landed on; 73 more occupied the secondary base, Little America V, all winter.

Beachhead for Polar Invasion

Ten days earlier Rear Adm. George J. Dufek, commanding U. S. Naval Task Force 43, had flown to McMurdo on the first flight of Deep Freeze II. From here he would direct the job of installing the six new U. S. stations. One was to be at the South Pole, one in the featureless heart of Marie Byrd Land (see page 383), one at Cape Hallett in Victoria Land, one on the Budd Coast of Wilkes Land, one at the foot of Liv Glacier, and the last one on the shore of the Weddell Sea in Edith Ronne Land.

At McMurdo, it was obvious, I was to have a beachhead seat for the invasion of the last large unexplored area on the face of the earth.

Since the seventh continent was discovered 137 years ago, nearly two dozen U. S. expeditions, as well as those of many other nations, have probed Antarctica. Yet detailed knowledge is still scant about this land that lives in the Ice Age.

United States, British, Norwegian, French, Russian, Australian, New Zealand, and other expeditions find even today that forcing this frozen continent to give up its jealously guarded secrets means struggle, hardship, suffering, and sometimes death.

Two Globemasters Crash-land on McMurdo's Perilous Ice Strip →

To set up Amundsen-Scott Station, airlift planes shuttled 84 times between McMurdo and the bottom of the world. Two ski-equipped R4D's landed the advance party and these dogs within eight miles of the Pole. The animals remained at the station during construction to lead rescue operations in the event of a crash. Fortunately no plane was downed.

When the *State of Washington*'s nose wheel collapsed, the 80-ton plane skidded halfway down the frozen runway. Three tractors pulled it onto this parking area, where the sledge dogs wait to board their flight.

Lower: Returning from an airdrop mission in grim weather, the *State of Tennessee* misjudged the runway, plowed through a six-foot snowbank, and slid 1,500 feet on its nose. Navy and Air Force men work feverishly to clear the field.

"Toughest Operation . . . in War or Peace"

Under the late Rear Admiral Richard E. Byrd and the Navy, aerial exploration embraced about 2,600,000 square miles of Antarctica—half of the entire continent (map, page 380).* Now the United States was throwing 3,525 men into the job of setting science up as big business on the desolate ice. Admiral Dufek called it "the toughest operation I've ever seen, in war or peace."

Like any tenderfoot on a first polar expedition, I clambered off Major Jumper's Globemaster dressed to the teeth. Over long underwear I wore ski pajamas, ski pants, woolen shirt, flight boots, down-lined parka, and foul-weather trousers.

It was well that I did. The temperature was a mild 3° above zero, but a 38-mile-per-hour wind was screaming, and it was cold!

A two-mile run on an open sledge brought me to McMurdo's barracks. I brushed off a powdery veneer of wind-blown snow. One of the first hands held out in welcome was that of the McMurdo base leader, Lt. Comdr. David W. Canham.

(*Continued on page 351*)

* See "Admiral of the Ends of the Earth," by Melville Bell Grosvenor, National Geographic Magazine, July, 1957.

↓ Norwegian Sealers off Queen Maud Land Berth Beside a Floating Ice Shelf

Fourteen men wintering on this ice barrier will measure temperatures and magnetism and study the aurora. They plan to explore mountains southeast of the base, the first Norwegian expedition into the interior since Amundsen's trek to the Pole in 1911. Though unaccustomed to visitors, penguins pose willingly.

Harald U. Sverdrup

Japanese Ministry of Education

↑ Nipponese Scientists with Tractor and Sled Haul Supplies Across Rough Bay Ice

Japanese explorers early this year made their first visit to Antarctica since 1912. Here leaders of an 11-man advance party head toward camp on a rocky island (extreme left) off the Prince Harald Coast.

Below, right: Soya Post Office is named for an expedition support ship. Postmaster cancels his mail out of doors.

Japanese Embassy

Steam Boils from the Snowy Crater of Mount Erebus, Antarctica's Only Active Volcano

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↑ Soviet Village of Mirny Stretches More than a Mile Along the Davis Sea Coast

Transport planes parked in the snow field stand by to support Russian scientists in their attempt to establish inland stations at the south geomagnetic pole and the "area of inaccessibility," the interior point most remote from the coastline. Light enters flat-roofed huts through portholelike windows.

Lena Carried U.S.S.R. Supplies

Mirny marks the first Russian activity in Antarctica since 1819-21, when Admiral von Bellingshausen circumnavigated the continent.

Russian Meteorologist Braves Icy Winds

Three women scientists are quartered on a research ship at the U.S.S.R.'s Mirny station. The Soviet camp reportedly has carpets and dial phones.

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↑ Rear Adm. George J. Dufek (Left), Commander of Task Force 43, Briefs the Press

Newsmen dubbed their headquarters "Bullheim." Correspondents and cameramen for the United Press, Associated Press, *Time*, *Life*, *The New York Times*, the NATIONAL GEOGRAPHIC MAGAZINE, and other publications played a vital role in relaying news of IGY activities to millions of readers around the world. *New York Times* correspondent Walter Sullivan (center) wrote a best seller on Antarctica, *Quest for a Continent*, earlier this year.

↓ IGY scientists from the University of Wisconsin set up these instruments at McMurdo Sound to make gravity observations in Antarctica. Measurements of the earth's pull at far-flung spots help determine the globe's exact shape, a key factor in establishing precise distances between continents.

Padded case at left contains two delicate quartz pendulums whose rate of swing varies from place to place with differences in gravity. Pulses of light reflected from the pendulums' mirrored faces are converted by a photomultiplier (center) into electronic signals and recorded by the time-interval counter at right.

Here Robert M. Iverson and bearded Dr. John C. Rose take a reading. Infrared lamps, used to bring room heat up to 60° F., shed a red glow. Pendulums will not operate accurately when room temperature is too low.

"They say it snows here only 15 inches a year," he said, laughing, "but, as you can see, every inch of it goes through McMurdo 115 times!"

Behind the next big outstretched hand was the man who would be scientific leader at the South Pole, Dr. Paul A. Siple, one of the world's most distinguished experts on Antarctica. He had a twinkle in his eye and a ready smile of large, evenly spaced white teeth. With a beard and costume, I thought, he might make a good stand-in for Santa Claus. It did not take long to learn to call this friendly man by his first name.

Chapel Provides Bunk Space

Even before I had my camera cases unloaded, I sensed the urgency that charged the air. Work was going on in spite of the blizzard. The opening gun in the invasion of the polar continent was about to be fired.

McMurdo was bulging at its prefabricated seams. Crews of three Air Force Globemasters, waiting to begin airdrops of supplies for building the South Pole and the Marie Byrd Land stations, had flown in from New Zealand. A fourth would come soon, to replace a C-124 seriously damaged in landing on the McMurdo ice strip. Navy crews of four twin-engined Douglas Skytrains, for landing personnel at the Pole, and of two larger Douglas Skymasters, for long-distance reconnaissance, had arrived.

Major Jumper, officers of his crew, and I set up army cots in McMurdo's quonset-hut chapel. There was no other space available.

Over coffee at the mess hall and in barracks-room bull sessions, we listened to stories of antarctic hazards and airplane crashes, of struggles for survival by explorers stranded on the unforgiving ice. But when Admiral Dufek and the flyers who would attempt the first landing at the Pole were within earshot, such tales were muffled.

Then the weather cleared, and on October 31 the admiral took off southward. Prayers of 285 McMurdo-Americans flew with him.

At 8:34 that evening, the admiral and his crew landed at the bottom of the world. They stayed there, 9,200 feet above sea level on the bleak polar plateau, only 49 minutes. Then it required 15 JATO (jet assisted take-off) bottles to blast the two-engined transport into the air again.

News of Admiral Dufek's success flashed out by radio. Russian explorers and scientists at the Mirny station, 1,600 miles away on the Queen Mary Coast of Wilkes Land, radioed their congratulations (page 348).

At McMurdo the South Pole landing monopolized all conversation. The outside world was concerned that week with troubles in Hungary and in Egypt. But just as the South Pole must have seemed a long way off to outsiders, so to us Budapest, Suez, even the United States during election week seemed far away.

To walk out across the antarctic snow was to feel like an earthling dropped on the moon. The very silence was overpowering. An infinity of nothingness seemed to eclipse reality.

In the knifing cold, doing a job became an all-consuming occupation. Everybody was working 12-hour shifts. With cold hands, aching muscles, and nothing to look forward to but food, sleep, and more work, we had little inclination to speculate about troubles halfway around the globe.

Men did their jobs. I came to realize, from doing mine, from walking hours on the lonesome snow to make a picture, that the reasons for doing a job soon faded out. It was enough to get it done. Antarctica had retaken possession. It alone was real. Our talk was 95 percent about the white continent.

Life on Ice Stresses Human Values

Admiral Dufek had decided to wait for warmer weather at the Pole before sending Dr. Siple, 23 Navy men, and one Air Force sergeant to construct the station. Globemasters returned to New Zealand, taking with them some of the polar party for an eleventh-hour holiday.

I was able to move from the chapel into a barracks. I could even choose between top and bottom bunks. One could perspire on the top bunk with no covers, or, down below, just above the cans of ginger ale and beer we kept sparkling cold on the floor, one could bundle up in two or three blankets. I chose the top, despite the shock of coming down each morning with bare feet.

During my stay in the chapel I had become friends with Father John C. Condit, McMurdo's chaplain, who had wintered over with the base party. His conversation, too, was bounded by Antarctica.

"A year down here has made the younger men older and the older men younger," Father Condit philosophized. "Hard life put 10 years of maturity into the boys. And it subtracted

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↑ **U.S.S. *Glacier* Crew Men Release a Balloon over the Ice-choked Ross Sea**

Instruments track the red bubble as it climbs, thus determining wind velocity and direction.

Glacier, Navy's newest and largest icebreaker, can crush solid pack ice 15 feet thick. Here she leads three cargo ships into McMurdo Sound anchorage.

↓ **Frigid Antarctica? Navy Weatherman Enjoys a Sun Bath as He Works**

Balloon-borne transmitters send back data on temperature, pressure, and humidity. Such information, radioed to Little America V, is broadcast internationally.

Inside this plastic dome at Little America, John W. Harper records meteorological data.

Rawin Set's Big Ear Listens to Signals from High-flying Weather Balloons

United States stations in Antarctica use these radio direction finders to pick up messages from weather balloons. The shieldlike parabolic reflector tracks the gas-filled bag from ground level to bursting altitude and intercepts data flashed by the balloon's radiosonde transmitter. Ribbed dome of translucent plastic permits free passage of transmitter's signals. Electronics technician Paul K. Barger services this unit at McMurdo Sound.

10 from the cynical older men who believed they had life all figured out. Human values, they discovered, were really the essence of everything.

"Down here you have to find something good in a man or it becomes unbearable. You just can't live with someone this closely and keep on hating him. It takes too much energy."

Already I knew what the chaplain meant. Day after day (and night after night, for with the sun shining 24 hours a day we paid little attention to which was which) we ate, worked, and talked with the same people. And, since Operation Deep Freeze was for the sake of science, we talked science.

Often the press correspondents huddled around Paul Siple, listening to his informed explanations and speculations about technical matters.

With 12 countries spending several hundred million dollars for research in Antarctica, the correspondents wanted to know what IGY experts hoped to discover.

"We just don't know," Dr. Siple would say. "Into the IGY are being telescoped decades of normal research. It is difficult even to conceive the range of remarkable things that applied science may do with the facts we hope to bring to light. Certainly the IGY findings will affect the lives of people all over the world."

Antarctic Geologically Unexplored

Are there valuable minerals in Antarctica, a correspondent asked. We knew that Russian scientists had already announced they would make a geological map of antarctic mineral deposits. We knew also that Australians, from their main base, Mawson, on the Mac-Robertson Coast, planned to explore the newly discovered Prince Charles Mountains. Unlike most of Antarctica's ice-swathed mountains, the Prince Charles range is largely exposed rock; it thus presents good opportunities for prospecting.

Yes, Paul answered, explorers had found traces of a number of metals in Antarctica—gold, copper, lead, chromium, molybdenum, antimony, zinc, and tin.

But none has yet been found in exploitable quantity or quality. Dr. Laurence M. Gould, director of the United States IGY antarctic program, believes the frozen continent contains the largest coal deposits in the world, though probably of poor grade. But even if it were good, ice and cold, distance and expense would prohibit profitable mining.

"The plain fact is," Paul Siple concluded, "that we haven't touched Antarctica geologically." Geological exploration, he told us, is not even officially part of the IGY program. Many decades may pass before there is real knowledge of Antarctica's mineral wealth.

Polar Cold Affects World Climate

Less exciting but probably more significant, he explained, is the prospect that during the IGY, for the first time, the world may obtain an understanding of the weather that flows out of this antarctic refrigerator.

There is no question but that antarctic cold affects the climate of southern continents. Because exchange of atmosphere takes place globally, it may affect even the Northern Hemisphere. Soon science may know how much.

All 46 IGY stations in Antarctica will eventually radio weather reports to the meteorological center at Little America, for rebroadcasting to the rest of the world. These reports will make possible the first coordinated weather picture of the Southern Hemisphere.

The IGY is taking place during a cycle of peak sunspot activity. Antarctic studies of auroras, geomagnetism, cosmic rays, ionospheric physics, and meteorology may bring important new advances in our understanding of the weather and of the celestial forces affecting the earth.

Three weeks after Admiral Dufek's landing, construction of the South Pole Station began. U. S. Navy planes put an advance party of eight men onto the high polar plateau. Two days later the ground party located the Pole, eight miles from the landing point.

Pilots Pretend to Ignore Danger

Air Force Globemasters began parachuting building materials and supplies. Paul Siple and the Navy construction crew landed and erected a base where 18 men would live through the fearful cold of the Pole's six-months-long winter night.

Flying to the Pole never became routine. A Globemaster smashed its landing gear as it undershot the McMurdo airstrip in poor visibility after a Pole flight. Another C-124, coming in with repair parts from New Zealand, landed short and became a total casualty (page 343). But jaunty American pilots pretended not to contemplate the danger and

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U. S. Navy, Official

Seabees Seize a Beachhead from an Army of Penguins at Cape Hallett

Black basalt cliffs rise almost straight from the sea at the tip of Victoria Land. Navy construction men detailed to build an IGY station found the narrow pebbled beach already occupied: Adélie penguins nested on virtually every inch of level ground (next two pages). To clear a site, the builders fenced off several acres and removed 7,800 birds. When the last Adélie had been evicted, a storm blew down the fence, and the colony swarmed back. Scientists had to repeat the laborious move before the joint U. S.–New Zealand wintering party could move in.

Station personnel gather squawking chicks in boxes, crate parents in nets, for transport to new homes.

Nesting Penguins Pepper Ice-blocked Cape Hallett Beach

misery they would face should they be forced down anywhere along the desolate 850-mile route:

"You just fly straight to the Beardmore Glacier," they said, "and then bear right."

The Beardmore was the treacherous road of Britain's Captain Scott and four companions on the tragic journey that took them to the Pole and from there to their deaths in 1911-12. Three years earlier, Sir Ernest Shackleton's party had climbed this 120-mile stairway of gaping crevasses and cascades of descending icefall, only to turn back 112 miles short of their goal.

Now dozens of Americans considered the Beardmore Glacier an old friend. It marked the flight path through the Queen Maud Range from McMurdo to the Pole.

The Beardmore in places is 30 miles across, wide enough to make the Mississippi River look like a trout stream. Tributary glaciers from the vast central sea of polar ice swell the flood from either side. Their currents are marked by sinuous lines of moraine, dark rock scraped from the eroding mountains.

The glacier flows relentlessly downward until it reaches the Ross Sea. There it joins forces with other ice rivers to flood out over the sea, covering it with a vast slab of ice.

Icebergs Bigger than Connecticut

The Ross Ice Shelf, extending north and south 500 miles, is 700 feet thick at its edge. From time to time great chunks of it, some larger than the State of Connecticut, calve and float to sea as icebergs.

But ice is not all that flows down the canyons to the sea. Torrents of wind, leaving the plateau's cold-air reservoir, sweep down these natural funnels. Gravity accounts primarily for the winds, among the most violent on earth.

Cold, heavy air naturally seeks a way downward. Polar atmosphere, flowing beneath warmer air masses elsewhere, drains northward, perhaps ultimately to affect even the coasts of California and the Mediterranean.

The Beardmore Glacier is a thing of awesome beauty, but the ice plateau beyond is sheer monotony. For a thousand miles ahead lies a lifeless sheet of white. Flying over it, even in a huge Globemaster, made me think of a fly crossing the flats of Great Salt Lake.

After conquering the Beardmore, both Shackleton and Scott slogged toward the Pole across this gently rising plain. Scott in his diary described the region in these words:

"We see only a few miles of ruffled snow," he wrote, "bounded by a vague, wavy horizon, but we know that beyond that horizon are hundreds and even thousands of miles which can offer no change to the weary eye. . . . One knows there is neither tree, nor shrub, nor any living thing, nor even inanimate rock —nothing but this terrible limitless expanse of snow. It has been so for countless years, and it will be so for countless more. And we, little human insects, have started to crawl over this awful desert. . . . Could anything be more terrible than this silent, wind-swept immensity . . . ?"

Two Miles of Ice Supports Station

No one knows how deep the ice of the polar plateau really is. Until recently glaciologists estimated that the antarctic ice averages about 5,000 feet in depth. But the suspicion grew that Antarctica's great icecap may have depressed the underlying earth far below sea level.

At the Marie Byrd Land station on the Rockefeller Plateau early this year, IGY scientists believe they may have confirmed this speculation. From a spot on the ice plateau 5,000 feet in elevation, echoes of dynamite explosions recorded by seismographs indicated solid land 9,750 feet below the surface—nearly 5,000 feet below sea level!

Paul Siple and glaciologist Edward W. Remington hope to determine the thickness of ice at the South Pole. Russian glaciologists are sounding the icecap at their base, Pionerskaya, 200 miles inland from Mirny; they plan similar readings at stations they hope to establish at the south geomagnetic pole, 791 miles from the geographic Pole in the direction of Australia, and at the remote and unknown "area of inaccessibility," 600 miles away in the direction of Arabia.

Should the great antarctic ice dome prove to be deeper than once believed, scientists may have to revise drastically their estimate of the amount of water frozen at the bottom of the world.

I flew to the Pole with Air Force Capt. Leland S. Bearskin, a Wyandot-Cherokee Indian, who banked his flying leviathan as if it were a Piper Cub so I could make pictures.

As we neared the Pole, pilot Bearskin kept adjusting his course to comply with his navigator's readings of sun elevations. Mile after

(Continued on page 367)

↑ Weddell Seal, Dozing on an Icy Pillow, Blithely Ignores Visitors

The aquatic mammals frequent ice-covered bays and inlets along the antarctic coast. During the bitter winter they stay below the ice, breathing through holes gnawed with their teeth. A full-grown specimen may weigh nearly half a ton. Members of Operation Deep Freeze II rouse this drowsy hulk at McMurdo Sound.

↓ Elephant Seal Bellows at Intruders on King George Island

"Sea elephants," giants of the seal family, come ashore only to mate and to molt. Their gross bodies suggest jelly quaking in huge leather bags. This cow summers with a harem in the South Shetlands near a United Kingdom IGY station. Stains and scars blemish her rough hide; her bark sounds like faulty digestion.

Kodachromes by David S. Boyer, National Geographic Staff (above), and Lt. Barry C. Bishop, U. S. Antarctic Program

Argentine Base Hugs a Rocky Finger in Paradise Harbor on the Palmer Peninsula

Almirante Brown station, named for a naval hero, is one of the nation's eight year-round antarctic outposts.

361 Kodachrome by Lt. Harry C. Bishop, U. S. Antarctic Program

Miniature Icebergs, Calved from a 150-foot Cliff, Sprinkle a Sapphire Sea

Radio masts link the base with Argentina's other stations. An eight-man staff studies weather and tides.

↑ Australian Explorers Ride Weasel and Sledge Back to Mawson Station

In February, 1954, ten Australians set up a permanent base on the antarctic mainland and named it in honor of the Australian explorer, Sir Douglas Mawson.

In addition to carrying on a full IGY scientific program, Mawson has surveyed more than 1,200 miles of hitherto unmapped wastes. These men, after 87 days in the field, move across an azure ice field beneath Mount Henderson, 12 miles inland from their base.

Sledge Dog Swings Aboard the Ice Ship *Kista Dan* →

Mawson has grown into an observatory of 20 separate buildings, housing everything from cosmic-ray apparatus to photographic darkroom. A radio center keeps in constant touch with Australia, 3,000 miles away.

Early this year Australia established another coastal station, Davis, in the Vestfold Hills east of Mawson, where some 300 square miles of ice-free rock lie like an oasis on the fringe of the antarctic ice desert.

Here at Mawson, *Kista Dan* loads supplies for the new base. In midsummer only a few snow patches whiten the rocky slopes.

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Emperor Penguins Gather Round a Swimming Hole

Many ornithologists regard the penguin as the most primitive of living birds. Incapable of rising into the air, the yard-high emperor "flies" under water with sufficient speed to catch fish.

The emperor is as dignified in stature and demeanor as the name implies. An adult male weighs about 75 pounds.

Reversing the normal migration pattern, emperors head toward antarctic rookeries in the fall. The female lays a single egg. For two long foodless months on the ice her mate incubates it, tucked between insteps and abdomen.

This open water occurs on the frozen Weddell Sea.

←Navy Ships Tie Up to an Ice Shelf on the Weddell Sea

To establish Ellsworth Station, one of eight United States IGY bases, these vessels wormed their way through the ice pack in a nightmarish, month-long battle. Heavy floes damaged both the cargo ship U.S.S. *Wyandot* and the icebreaker U.S.S. *Staten Island*.

When Capt. Edwin A. McDonald, the task-group commander, moored here, the antarctic summer was already waning. Newly formed bay ice threatened to trap the ships. Working in stinging blizzards and plunging temperatures, crews unloaded 7,000 tons of food, building materials, and supplies in 12 days.

Roadway in the snow leads from the *Wyandot* (left) to the 18-building station at upper right. There, two miles from the edge of the massive Filchner Ice Shelf, 39 men are spending the polar night.

Captain McDonald made this picture during a reconnaissance flight. Wing of his de Havilland Otter dips low at right.

← Portable Radar Rides a Sledge at Britain's Station on Halley Bay

Royal Society scientists named the near-by inlet on the eastern coast of the Weddell Sea for Edmund Halley, best known for the comet that bears his name.

Man on the anemometer mast at right checks wind instruments.

Lower: Supplies for the station come ashore in the lee of sheer 100-foot ice cliffs. Here *Magga Dan* unloads a drum of cable that will carry power from the generator hut to other buildings.

monotonous mile of sastrugi patterns, wind-blown ruffles on the polar snow, streamed by beneath us.

Then, by a navigation miracle I little understood, a black spot appeared in the nothingness ahead—the South Pole camp. We dropped our load of lumber onto a cloth-marked drop zone. Presently Paul Siple was on the radio from the ground.

Summer weather down there, he said, was delightful: 5° above zero, with no wind. He had been laboring in his undershirt, digging airdropped supplies out of the snow.

Maj. Murray A. Wiener, at that time Air Force representative on Admiral Byrd's staff, explained to me that Paul was simply following one of the basic rules for keeping warm. If he worked bundled up, he would risk the danger of freezing in his own perspiration.

Now that it is winter, Dr. Siple seldom ventures outside at all. He and his 17 colleagues are experiencing the coldest weather ever recorded by man. As early in the winter night as May, temperatures had plunged to 100° below zero.

Captain Bearskin's Globemaster had completed five Pole missions and was headed back to New Zealand for maintenance. If I flew with him, I could just catch the icebreaker *Glacier*, making her second voyage to Antarctica during Deep Freeze II. *Glacier* was to run interference for five ships bringing supplies for McMurdo and Little America and equipment to build bases at Cape Hallett and on the Budd Coast.

Glacier Bucks Eight-foot Ice

Riding the *Glacier* into the Antarctic was far rougher than riding a Globemaster. Yet banging into eight feet of ice 24 hours a day is considered sport by some people.

We arrived at McMurdo Sound and chopped a channel 10 miles long, allowing our cargo vessels to approach the shore closely enough to off-load heavy equipment on strong, thick ice. For 96 hours the *Glacier* smashed, lurched, and screamed with metallic protest against the stubborn bay. Charging up and onto stubborn stretches of ice to crush them with her own great weight, *Glacier* would come to a shuddering halt, then jerk backward. It felt like a marathon ride on a Manhattan subway. I was always clutching for a swinging strap that was never there.

At 4 o'clock one morning I stood on the bridge with Comdr. B. J. Lauff, USN, skipper of the *Glacier*. He had just calculated that the icebreaker in four days had chiseled out 32,844,000 tons to be blown away northward.

Commander Lauff pointed out to me how we had carved, by sections, a long triangular cut. Then, with a gleam in his eye, he looked at his chart.

"You know," he said, a little fiendishly, "all we would have to do now would be to make two more long straight cuts. This entire new triangle," he pointed out on the map, "would be cut free and drift to sea. In two strokes we could move another 33 million tons!"

"But, captain," I protested, "the harbor is as large as we want it. We really wouldn't be doing ourselves much good, would we?"

"No," he admitted, a little sadly. "But it sure would be fun!"

Zoologist Plans to Dye Birds Red

On the McMurdo Sound ice a day or two later I met a man with a net. He was not, however, after butterflies but was stalking skua gulls, the unpopular birds that make a living stealing penguin eggs and chicks from under the beaks of their parents.

Zoologist Carl R. Eklund was to be scientific leader of the U. S. Wilkes Station at Vincennes Bay on the Budd Coast, 2,400 miles around the perimeter of Antarctica in the direction of Australia. Carl had just reached McMurdo aboard the U. S. Coast Guard icebreaker *Northwind*, to transfer to the *Glacier* for the trip to the station site.

He and his assistants were creeping up on skuas as the birds devoured choice morsels from the carcasses of seals killed for sledge-dog food. Caught and banded, the big gulls were set free again, to serve as winged tracers in a study of Antarctic bird life.

"I have a cannon-fired net for catching larger numbers of birds at Wilkes Station," Carl told me. "We're hoping to dye some

adult skuas scarlet, and thus trace their flight. Some may turn up as far off as the Russian base at Mirny, 500 miles away."

What a find for a Russian scientist, I thought—red gulls in Antarctica!

Carl told me too that during the dead of winter at Vincennes Bay he hoped to reach an emperor penguin rookery at nesting time. Their eggs are kept warm resting on the feet and sheltered by a fold of skin on the parent's abdomen. Somehow or other Carl intended inserting a tiny temperature telemeter into an incubating egg. He would tune in to the instrument by radio and record the level of warmth broadcast from inside the egg.

What use, I asked Carl, would it be to know the temperature of an incubating penguin egg?

"Well," he replied, talking like a true scientist, "polar explorer Fridtjof Nansen had an answer for that. It is to no purpose, he believed, to discuss the use of knowledge; man wants to know and when he ceases to be curious, he is no longer man."

Carl planned also to inject pink or purple dye into penguin eggs. When the chicks hatched, their odd-colored down would make them easy to keep track of in behavior studies.

Unmated Penguins Vie for Chicks

When an egg hatches, an emperor chick's troubles have just begun, colored or no. Not only is it a likely lunch for a skua gull: it must beware of its own kind as well.

Even unmated penguins want to assist in the brooding of any available chick. Sometimes half a dozen adults may scramble for the privilege of taking care of one youngster. So eager are these do-gooders that the little fellow is lucky if he isn't squashed in the confusion.

Seabees building the joint U. S.-New Zealand station at Cape Hallett on the Ross Sea coast got into a contest of their own with Antarctica's penguin citizens.

The only level ground against the sheer cliffs of the Admiralty Range was already occupied by some 200,000 Adélie penguins. A rookery had stood on that same spot, rent-free and unchallenged, probably for centuries.

To make room for the 15-man winter camp, several acres of penguins had to be evicted. The birds elected to stand, on the theory that possession is nine points of the law.

Though the penguins squawked and resisted, they were moved outside a fenced area. The Adélies called up the wrath of the Antarctic in their hour of battle. A furious storm came down from the mountains. The U. S. cargo ship *Arneb* was badly holed and dented by driving ice floes. The icebreaker *Northwind*, attempting a rescue, broke a propeller blade in the churning ice. When the storm cleared, the fence was down, and the Adélies held the ground.

Science and the U. S. Navy, however, were adamant. By the time the birds headed north for the winter, fifteen lonesome men, includ-

Sailors and Scientists Sit Down to Their First Meal at Ellsworth Station

Crew men of U.S.S. Wyandot and Staten Island helped Seabees erect this IGY base on the Weddell Sea. Snowdrifts were already piling up outside the huts when the vessels departed last February, leaving 39 men.

U. S. Navy, Official

ing three from New Zealand, were firmly entrenched in a corner of the nesting ground (pages 355-357).

Next month, when Air Force and Navy planes fly from New Zealand back to McMurdo Sound, this weather station will be broadcasting from its strategic location on the Ross Sea coast. It will be an invaluable aid in forecasting flying weather.

Tragedy Strikes at McMurdo

Now, in December, summer had invaded the Antarctic. Temperatures soared above the freezing point. The five miles of ice separating McMurdo base from the U. S. supply ships became a morass of slush and deep melt holes. No tractor driver dared stray from the trail marked safe.

A scientist remarked grimly, "Driving over this ice is like playing Russian roulette—sooner or later somebody is bound to cop it."

Then somebody did.

A weasel, a light, tracked snow vehicle, suddenly disappeared through the ice with five men aboard. Fighting desperately, four forced their way through narrow escape hatches and swam to the surface. Ollie B. Bartley of Slaughters, Kentucky, failed to get free. Hours later Navy divers, wearing specially insulated suits, recovered his body.

Safe unloading of supplies was not all that was at stake in the antarctic heat wave. McMurdo's airstrip was pockmarked with melt holes deep enough to somersault a plane. Globemasters, evacuated to New Zealand, could not return to continue airdrops at the Pole and at the Marie Byrd Land base.

Admiral Dufek, now directing operations from aboard the *Glacier* in McMurdo harbor, stalked the bridge in the small hours of the

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Flag Raising Officially Opens Scott Station, New Zealand's First Antarctic Base

United States and New Zealand scientists work together closely; a joint party operates the Cape Hallett camp (page 355). Scott Station lies less than two miles from the U. S. Naval Air Facility on Hut Point; both are on ice-locked Ross Island. Here Admiral Dufek (fifth from left) participates in the dedication ceremonies last January. Flagpole is a relic of the base Scott used in 1902-04 and 1910-11.

← U. S., British Leaders Consult at Shackleton

Dr. Vivian E. Fuchs (center) heads the 16-man wintering group at this Commonwealth station on the Weddell Sea. During the forthcoming antarctic summer he will lead a trek across the polar continent (page 376).

Capt. Edwin A. McDonald (left) flew in from Ellsworth Station, 70 miles west.

Here the groups exchange information about the crevassed and mountainous terrain south of the two bases. Field parties will explore the area in the spring.

➔ Capt. Finn Ronne (left), leader of the Ellsworth wintering party, and Captain McDonald (right) helicoptered to the British base at Hailey Bay last December.

They found the camp built astride an ice shelf overlooking the Weddell Sea. Walls of snow protect the barracks from cruel winds lashing the coast.

U. S. Navy, Official

morning. An American ice physicist, Dr. Andrew Assur, had flown to New Zealand from the northernmost tip of Greenland and arrived by ship at McMurdo in response to the admiral's S O S.

Dr. Assur put tractors to work on the airstrip, crushing thousands of tons of ice into slivers. Shoveled into melt holes, this slurry of chopped ice and slush smoothed out the surface. Ice concrete, he called it. We waited for the temperature to fall.

Many of the melt holes had started where a blob of oil or a piece of paper had collected heat from the sun. Admiral Dufek hopefully inspected the newly smoothed airfield: "If anyone so much as walks on that new strip with dirty shoes," he said, "I'll have him court-martialed!"

The weather turned cold. The airstrip froze. Globemasters returned, and the South Pole and Marie Byrd Land stations were completed and manned in time.

Meanwhile I went off to visit a group of New Zealanders, valiantly working 18-hour days to build a base of their own at Pram Point. They had named it in honor of Britain's Captain Robert Falcon Scott, who started from near by en route to the Pole. New Zealand claims the McMurdo Sound region, with most of the Ross Sea coast, as part of a pie-shaped wedge of Antarctica it calls the Ross Dependency.

Preparations to Cross Antarctica

In the wake of the Deep Freeze task force, a little wooden ship named *Endeavour* had sailed into McMurdo. It carried the personnel for a New Zealand IGY base and support for an even more daring operation—the first overland crossing of Antarctica.

On the Weddell Sea, 2,000 miles across the silent, windswept polar plateau, a party under Dr. Vivian E. Fuchs, leader of the British Commonwealth Trans-Antarctic Expedition, was completing another base, named for Sir Ernest Shackleton. From there, in November, a 16-man team—12 Britishers, two New Zealanders, one Australian, and one South African—will start across the virgin continent in light, fast, four-tracked Sno-Cats,

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Jacques Mahieu

France's Dumont d'Urville Station Clings to the Gale-swept Adélie Coast

Commonwealth Bay, close by, is the world's windiest place. Frigid blasts careen off the ice at 200 miles an hour. Emperor penguins dot rocks; the region supports one of their half-dozen known rookeries.

supported by aircraft (pages 370 and 376-7).

About the same time, from McMurdo Sound, New Zealanders led by famed Sir Edmund Hillary, conqueror of Mount Everest, will trek inland to meet them. If all goes as planned, the two parties will shake hands on the polar plateau in January, 1958.

Taking seismological readings as they go, to test the thickness of the antarctic ice dome, these Commonwealth explorers will cross areas of the white continent never before seen by man. Their 2,000-mile jaunt from the Weddell to the Ross Sea has been called man's last great land journey.

The day I visited Scott Station on Pram Point, the first trail party of the Trans-Antarctic Expedition struck out by dog team across the Ross Ice Shelf for the Skelton Glacier. Their aim was to find a sledge route to caches of food and fuel established by small planes for the 1957-58 journey.

I photographed the dog teams and their drivers as they started off (page 376). Then I climbed a high hill to watch while they

inched their way out across the blank whiteness of the Ross Ice Shelf toward infinity.

From the Weddell Sea, by air, Dr. Fuchs and his colleagues had already selected a route up a glacier from the Filchner Ice Shelf to the polar plateau. By plane, too, they had established an advance base, called South Ice, 270 miles inland and at an elevation of nearly a mile. Three men had volunteered to make scientific observations and play gin rummy there over the winter night.

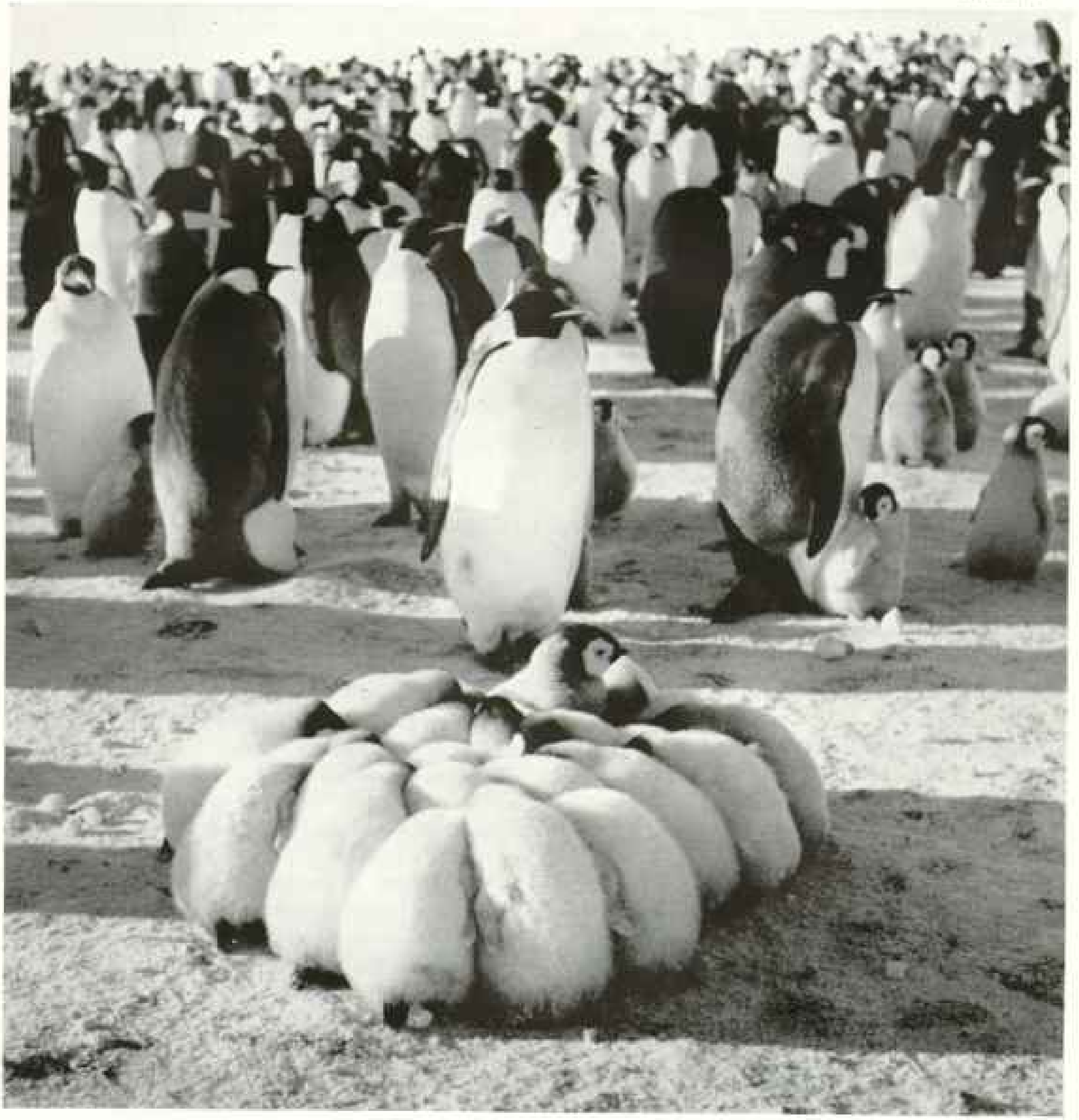
While work went on at McMurdo Sound, the icebreaker U.S.S. *Staten Island* and the cargo ship U.S.S. *Wyandot* steamed into the Weddell Sea, at the frozen foot of the South Atlantic. Their goal was to establish Ellsworth Station on Cape Adams, at the base of Palmer Peninsula, a point never before reached by ship.

Shackleton Adrift for 15 Months

Historically, the Weddell Sea ice pack is the most treacherous of the entire Antarctic. There, in 1915, Shackleton's *Endurance* was beset and finally crushed. He and his men, after drifting for 1,500 miles and nearly 15

Fuzzy Emperor Chicks Hide Their Heads Like Football Players Huddling for Signals

Jean Pierrot



months in the ice, at last took to small boats and reached Elephant Island in the South Shetlands. Thence, in one of the most dramatic voyages in Antarctic annals, Shackleton sailed another 800 miles in a 22-foot whaleboat to South Georgia Island, and brought back rescuers.

Breaking through this great pack along its eastern fringe, the two United States ships, under Capt. Edwin A. McDonald, USN, eventually sighted the high, solid continental ice shelf at Cape Norvegia and turned westward into a thin channel of open water.

Ice Traps Ships in Giant Vise

A south wind would hold this channel relatively clear, but a steady north wind might drive the ice pack closed like a giant vise. Three times the ships were caught, for five, eleven, and three days respectively. *Wyandot*'s hull was holed by ice, her frames bent, and the tips of all four of her propeller blades sheared off. *Staten Island* lost an entire blade.

Battling along the continental rim for 1,000 miles, they reached Cape Adams, but found no landing place on the wild, forbidding shore where chocolate-colored peaks of naked rock thrust from the snow and ice. There was little time, so they backtracked along the ice shelf.

Ellsworth Station was finally established on the ice rim itself (page 365). In less than a month, orange buildings and observation towers mushroomed. One of the first signs to go up, Captain McDonald told me later, read "Housemaid Wanted—Inquire Within."

Capt. Finn Ronne, USNR, and 38 men went ashore for the winter night. As strong north winds threatened, the Stars and Stripes went up hastily on a bamboo pole and the ships sailed out to safety. Captain Ronne, as both scientific leader and military commander, was left to study the land he had discovered a decade before—Edith Ronne Land, beyond the Filchner Ice Shelf.

Summer *Refugios* Dot Palmer Peninsula

Only 50 miles to the east lies Shackleton Station, from which the British Commonwealth plans to launch its trans-antarctic expedition; 250 miles beyond stands the Royal Society Station at Halley Bay. Only 30 miles away is Argentina's General Belgrano Station, a new addition to the string of seven permanent bases and many summer-season *refugios* that Argentina maintains on the Weddell Sea and Palmer Peninsula quadrant (page 360).

On Palmer Peninsula, where Britain, Argentina, and Chile support conflicting claims of sovereignty, lies the heaviest concentration of stations (see supplement map). Britain alone mans 10 all-season bases. At one of Chile's year-round bases an airstrip contributes to the prospect that Antarctica may eventually be the connecting link among the continents of the Southern Hemisphere. The first tourist flight over Antarctica was flown this year from Chile, heralding the day when the airplane may make the white continent a winter sports playground.

Though it has been 45 years since Japan's last expedition to the Antarctic, Nipponese explorers have taken up an IGY position on the most lonesome coast of the continent. Nearly 1,000 miles from Norway's Queen Maud Land Station, Japanese scientists are spending the winter night at Showa Station, off the Prince Harald Coast (page 345).

Among the last explorer-scientists to dig in for the winter night were three Frenchmen, left alone to dream of Paris at Charcot Station, 200 miles inland from their main station on the Adélie Coast, traditionally an area of French exploration in the Antarctic.

Night Descends on Ice-locked Continent

Now the time had come for Admiral Dufek, and for thousands of the men supporting the IGY science stations on the frozen continent, to retire. The winter night was closing in. Globemasters fled northward. Ships sailed for warmer waters.

I rode the icebreaker *Northwind* to New Zealand, and Lady Antarctica chased us home with a sample of her winter weather. At 70° south latitude we broke clear of the fast-freezing ice pack. The seventies were putting on their winter armor.

The howling sixties lived up to their name. Gale winds rolled the ship until her crew admitted it was about the worst weather of *Northwind*'s career. The screaming fifties were no better. The roaring forties gave us a last kick in the fantail.

Then the blasts subsided. We sailed into the harbor of Wellington, New Zealand, lush with late-summer green. Girls in billowy dresses promenaded along the quays.

Trees and pretty faces, I realized, were things we had learned to appreciate "down on the ice."

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♠ Scientists Sample Ice and Water from the Frigid Ross Sea

With the world's climate growing warmer, is antarctic ice melting more rapidly? If so, is there danger that oceans may gradually rise and flood major seaports?

Seeking answers to such questions, Dr. Willis L. Tressler (left) of the United States Navy Hydrographic Office accompanied Operations Deep Freeze I and II to the icebound continent.

Here, in a laboratory aboard the U.S.S. *Glacier*, Dr. Tressler determines the age of an ice sample by its salinity: the older the ice, the less salt it contains. Given sufficient samples over a period of years, scientists can tell how long ice stood in any spot and whether it melted and reformed each year.

Chief Quartermaster Luther F. Rochelle racks up Nansen bottles. Each contains water taken from a different depth of the Ross Sea, destined for delivery to the Hydrographic Office in Washington, D. C. Analysis will help oceanographers chart the sea's currents.

Apparatus at right measures the water's oxygen content.

➔ Rochelle and Tressler lower a current meter for a surface reading in McMurdo Sound. Their measurements will shed light on how polar ice moves about.

↑ Dogs Lead a New Zealand Party Past Buckling Ridges Edging the Ross Ice Shelf

A long-cherished dream of antarctic explorers—the crossing of the continent—may be realized next year.

British members of the Commonwealth Trans-Antarctic Expedition plan to head toward the Pole from their Weddell Sea station in November. A New Zealand party will take off later by foot and sledge from Scott Station on McMurdo Sound and establish Mt. Albert Markham Depot. The two groups hope to meet on the polar plateau in January, 1958, and complete the journey together.

Here a New Zealand reconnaissance team seeks a passageway through the ice hills. Trail tents, scientific equipment, sleeping bags, and food load the sledge. Towed wheel measures mileage.

← Sixty dogs sailed south with the New Zealand explorers. These puppies at Scott Station make picture taking difficult for correspondent Brian O'Neill of the *Christchurch* (New Zealand) *Press*.

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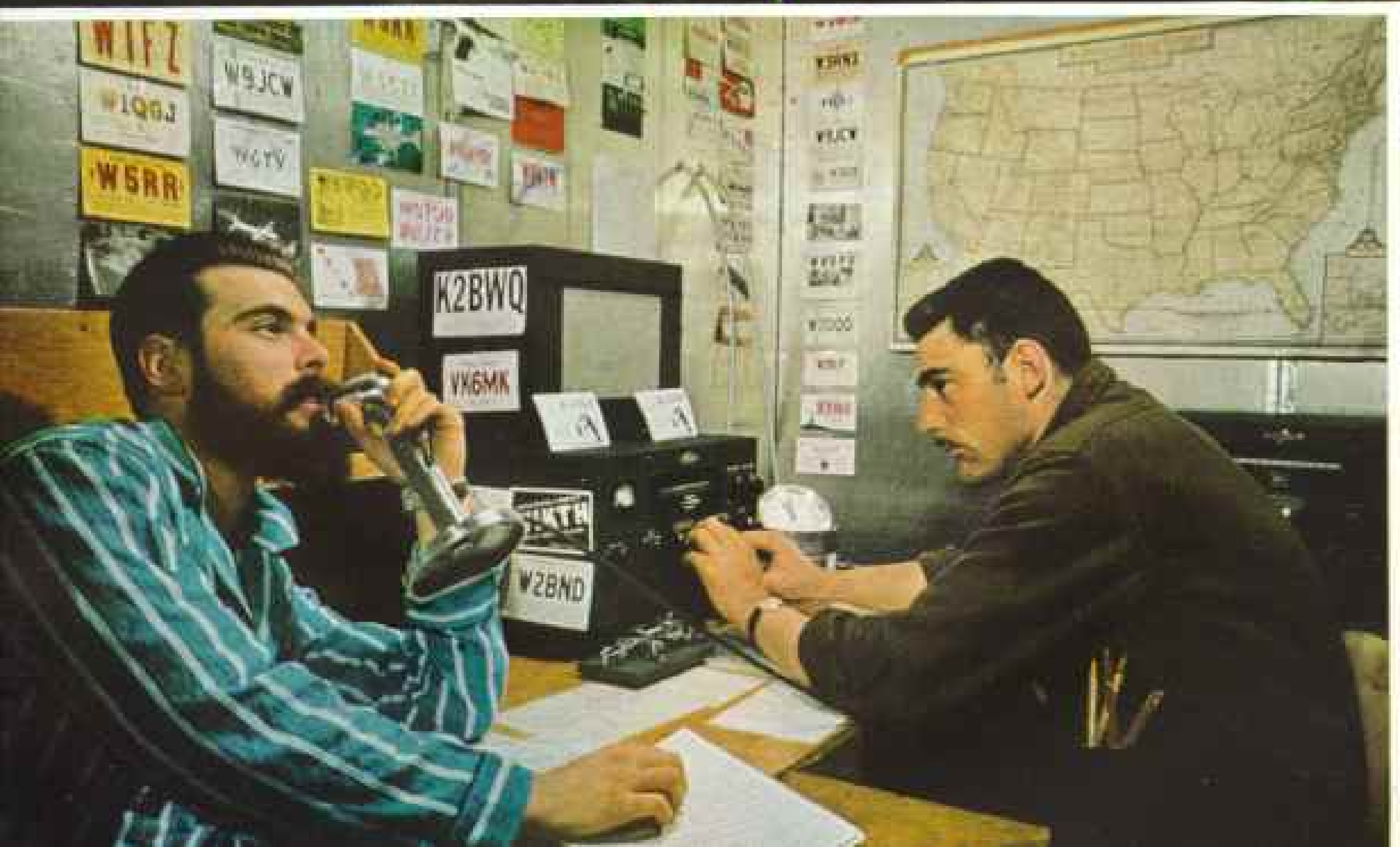
Everest's Conqueror Turns His Attention to Antarctica's Snows

Sir Edmund Hillary (center), participating in his second polar expedition, will lead the New Zealand phase of "Operation Trans-Antarctica." Under command of the famed climber, advance parties have already pushed south over 270 miles of rugged trail to set up depots for the venture. Light aircraft flew in food and fuel for the stations.

Paul-Emile Victor (right), Director of French Polar Expeditions, hears Sir Edmund and assistant Bob Miller explain their plans. On previous expeditions Victor has directed French scientists in both Greenland and Antarctica.

Kodachromes by David S. Boyer, National Geographic Staff, and (right) from Paul-Emile Victor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Navy Men at Little America While Away Leisure Hours in a Warm, Bright Lounge

To amuse some 300 servicemen wintering over in Antarctica, the United States Navy shipped tons of recreation and hobby gear to the eight U. S. stations.

Nearly 500 motion pictures provide evening entertainment. Off-duty sailors and scientists can spin more than 500 long-playing records, ranging from bagpipe bands to rock-and-roll, on high-fidelity sets.

A comprehensive library at each base contains college texts and how-to-do-it manuals as well as current fiction and nonfiction titles. Musicians keep in practice with banjos, guitars, trap drums, and concertinas.

Darts, fishing, weight-lifting, and skiing equipment are available for the sportsman. Hobby-crafters build model airplanes, ships, cars, and railroads.

As a final touch, Navy ships dispatched Fourth of July fireworks, New Year's noisemakers, Santa Claus suits, artificial Christmas trees, and 15,750 birthday candles.

Opposite, lower: Ham radio operators make contact almost nightly with the United States. Surveyor George Moss (right) operates this set in his spare time at Little America V. Each of the 73 men in camp had an opportunity to "telephone" home during the winter.

Here weather observer Charles J. Easley talks to his wife in Providence, Rhode Island. He was asleep when Moss made the midnight contact.

⬇ Navy Lt. Comdr. Conrad S. Shinn, first pilot to land at the South Pole, became the favorite amateur barber at McMurdo Sound. His specialty: crew cuts.

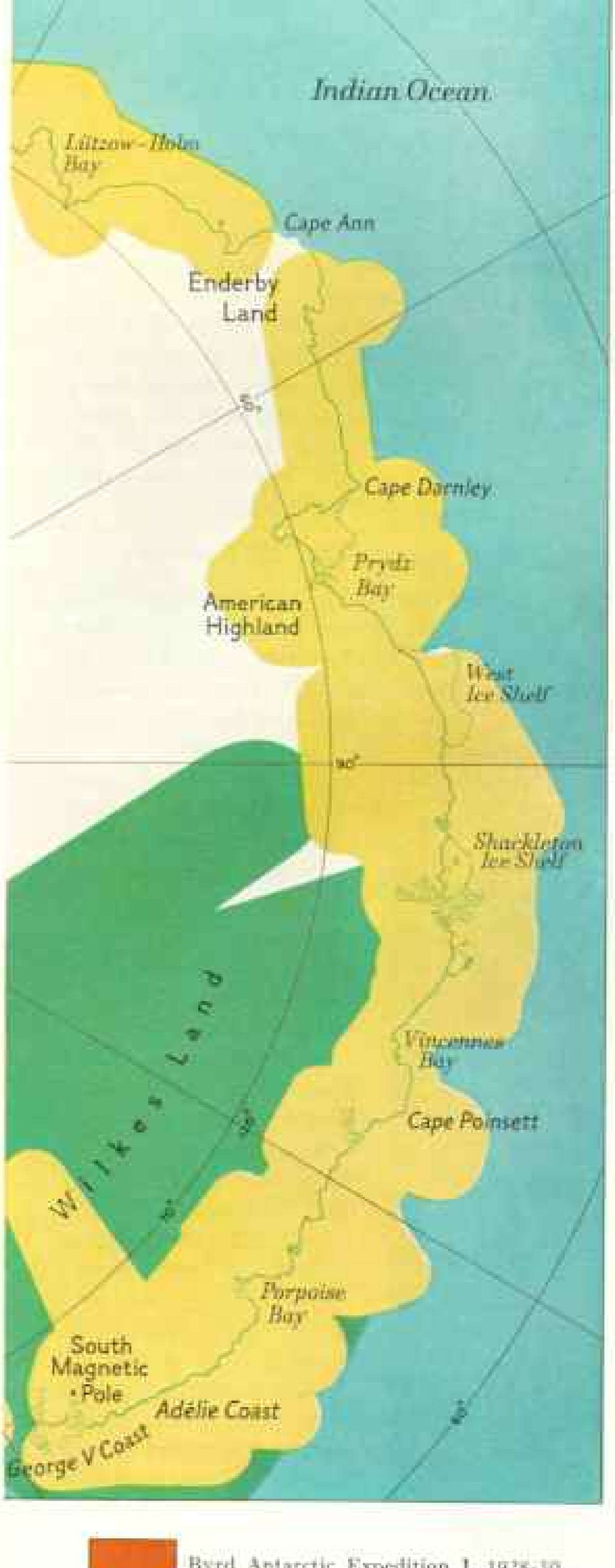
Expeditions Led by Adm. Richard E. Byrd Tore the Veil from Half of Antarctica

This map, based on official Navy logs, shows by colors how the Admiral's five expeditions, spanning three decades, successively put out exploring fingers to bare the profile of the vast white continent.

Byrd's conquest of the South Pole by air and the discovery of Marie Byrd Land climaxed his 1928-29 venture. By ship and plane, more than 450,000 square miles of land and surrounding waters were explored and mapped by the 1933-35 party. Delineation of the Pacific coastline highlighted the 1939-41 journey.

Flights during Operation Highjump covered an area more than half as large as the United States and recorded 10 new mountain ranges. Aerial surveyors with Operation Deep Freeze I swept across Wilkes Land and from the Ross Sea to the Weddell Sea—a 3,200-mile flight, the longest yet made in Antarctica.

Altitude and visibility determined the area seen by observers aboard each flight. In good weather crew men at 7,000 feet could scan the ice sheath for 100 miles on either side.



Society's New Map Updates Antarctica

THE large National Geographic map of ANTARCTICA, published as a supplement to this issue, is an accomplishment unique in the history of cartography. For the first time a general map, based on current explorations, has been completed and published swiftly enough to be used on the scene by the explorers themselves.*

Scientists and United States Navy men of Operations Deep Freeze I and II provided much of the new information on which the map is based. Next month, when ships and planes head south for Deep Freeze III, copies of the new map will go with them, an invaluable tool for further exploration.

Bright flags rim the map, representing ten countries cooperating during the International Geophysical Year in a vast assault on this last geographical unknown. In a time of tension among nations, scientists of the United States, Russia, the British Commonwealth, Japan, and other nations are working together at 46 antarctic bases and pooling their findings for the benefit of all mankind.

New Data Flashed from South Pole

As members receive their copies of the map, men of many countries living under the deep snows of Antarctica—including 18 Americans at the South Pole itself—are recording new information on temperatures, winds, magnetic storms, ice depths, and other scientific aspects of the polar continent.

While Society cartographers were compiling the map, information radioed from these antarctic bases was incorporated into its notes and physical features, sometimes within hours. A new elevation for the South Pole, 9,200 feet, came recently from Dr. Paul Siple and his men now living at the Pole.

Similarly, results of seismic tests radioed out by U. S. scientists at Byrd Station a few weeks before the map went to press show, astonishingly, that the 5,000-foot-high icecap over Marie Byrd Land is nearly two miles thick. Its enormous weight has depressed the land nearly a mile below sea level!

* Members may obtain additional copies of the new map of Antarctica (and of all standard maps published by The Society) by writing to the National Geographic Society, Washington 6, D. C. Prices, postpaid to all countries, 75¢ each on paper; $1.50 on fabric. **Indexes to place names, available for this and most other maps, 50¢ each.** All remittances payable in U. S. funds.

As part of The Society's contribution to the IGY, more than 2,270,000 copies of the map have been printed for members all over the world, to help them follow next year's exciting developments in Antarctica.

They may also read, among the map's 87 notes, the stories of earlier explorations smaller in scope and manpower than Operation Deep Freeze, but no less heroic.

A special color map (page 380) shows the areas explored during 30 years of expeditions headed by Rear Admiral Richard E. Byrd. In greater detail his discoveries and those of other explorers appear on the supplement map. One note recounts the first announcement of the continent's existence by Lt. Charles Wilkes, USN. Roald Amundsen's story is here; so is Robert Falcon Scott's.

Altogether, the historical notes contain more than 3,000 words—a total unequaled on this subject even by many encyclopedias. They tell a fast-moving adventure story, for the greatest geographic achievement of the 20th century is modern man's triumph over Antarctica's living Ice Age.

On a scale of 110.5 miles to the inch, this latest National Geographic map centers on the South Pole; it shows undistorted all directions and distances measured from that point. Each of its 1,175 place names was bought with hardship, as men labored against the world's coldest, cruelest weather.

Blank Spaces Still Call Explorers

A red line connecting Little America V with the Byrd IGY Station traces the crevasse-crossing victory of Operation Deep Freeze in carrying materiel 646 miles from the Kainan Bay base by tractor train (opposite page).

Red boundaries show the pie-shaped areas claimed by other nations—claims that one day may loom into explosive importance. The United States and Russia, however, neither make nor recognize claims here.

A measure of man's progress in the region is a comparison with the first supplement map of Antarctica published by The Society in 1899. It showed a largely bare area crossed by lines which marked routes for proposed explorations. An accompanying article by Gilbert Grosvenor gave as their object the "verification or disproof of the existence of a vast Antarctic continent."

Even today, more than 100 expeditions later, dotted coastlines and bare areas of unseen land remain, beckoning the men who will use this very map for exploration and those who would follow their adventures upon this great frontier.

For Byrd, Antarctica Was a Luring Land of Mystery

"Sirenlike, it challenges the restless, adventure-hungry postwar world," the Admiral wrote in 1947, following his fourth antarctic expedition. On this globe in his Boston, Massachusetts, office, he locates Little America.

 Ektachrome by Angelo Cavalli, Jr.

Across the Frozen Desert to Byrd Station

Tractor-borne Explorers Conquer Yawning Chasms of Ice and Snow to Set Up an IGY Outpost in Uncharted Marie Byrd Land

By Comdr. Paul W. Frazier, USN

With Illustrations by Chief Photographer Calvin L. Larsen, USN

BYRD STATION, in the white heart of Antarctica, lies in a lost world of endless snow and ice. In March, 1956, when I was ordered to blaze a trail to the site from Little America, the station existed only as a dot on the map—latitude 80° South, longitude 120° West.

To reach it we should have to penetrate the unknown and uncharted vastness of Marie Byrd Land—a frozen emptiness where the temperature may plummet to 120° below zero and winds shriek down from the South Pole at 100 miles an hour.

Actually, Marie Byrd Land is probably no "land" at all; preliminary seismic tests indicate an ice sheet two miles thick which has so depressed the underlying terrain that, if the ice ever melted, the area would lie beneath 5,000 feet of rolling ocean.

"Weather Factory" at 80° South

In ponderous but unending movement, the ice pack grinds its way toward ultimate extinction in the sea. This constant shifting of the great mass sunders the surface with yawning chasms.

Our trek would lead us 600 miles across this fantastic plateau. And we should have to cross the deadly crevasses in 37-ton tractors, hauling 380 tons of material to build the base. (See the red line marking our route on the map "Antarctica," a supplement to this issue.)

Winds had covered many of the chasms with thin crusts of snow; in some cases the mere pressure of a footstep could send a man hurtling to his death.

Our mission was one of prime importance. Scientists theorize that weather fronts forming in the vicinity of Byrd Station affect the entire Antarctic Continent and very likely influence weather throughout the Southern Hemisphere. Direct observation from the station is scheduled to be an important United States contribution to the International Geophysical Year.

Aboard the flagship U.S.S. *Glacier*, Rear Admiral George J. Dufek, commander of Navy Task Force 43, gave me my orders. "Paul," he told me, "we've got to get that base built. And the only way to do it is to haul the equipment across those crevasses with tractor trains. An airlift is out of the question; our cargo planes will be busy with the Pole station.

"I'm appointing you task unit commander. Your job is to find a safe trail and deliver that cargo."

"Aye, aye, sir," I said.

"I don't have to remind you that if we fail, the IGY program will suffer," the Admiral said. "But Paul, bear this in mind: *I don't want any more men killed!*"

Only a week earlier, the first attempt to reach the site of Byrd Station had ended in disaster. An advance party, using light snow vehicles, had penetrated 381 miles and flagged the trail as safe. But subsequently a heavy tractor crashed through a crevasse, killing driver Max Kiel.

Now it was my turn to seek out a totally new and completely safe route. Between November and the end of March we should have to break a trail and then move two cumbersome tractor trains to the site and back before darkness closed in again. It promised to be a tight squeeze.

Inter-service Team Plans Snowy Trek

Literally speaking, more was known about the surface of the moon than about antarctic geography. But 16 years of Navy experience had taught me that detailed planning is the best approach to any problem.

After a summer making preliminary arrangements in the United States, I returned to Little America in October, 1956. With me went seven men for the advance party, the best the Army and Navy could provide. All had gained considerable experience on the tricky ice of Greenland. Four Navy Seabees from the wintering-over group at Little America joined the party as drivers and mechanics.

From the beginning our operation was a model of service unification in action. Army Maj. Merle R. (Skip) Dawson headed the

advance party of trail blazers. Navy Lt. Harvey G. Speed flew our reconnaissance missions, and the helicopter of Marine 1st Lt. Leroy S. (Pete) Kenney pinpointed many a vexing crevasse. Air Force planes, piloted by Lt. Col. C. J. Ellen, supported the trail party with airdrops of diesel fuel.

Service rivalry and human nature being what they are, Major Dawson was skeptically received by the veteran Seabees he was to command. But respect quickly replaced doubt.

"If there are any 'heroes' in the crew," he greeted them, "the door is open. This is not an adventure, and there are no medals in sight. We've simply got a job to do. We're military men, and establishing Byrd Station is a military objective. Anybody want a replacement?"

All stood fast.

Aerial Survey Reveals Crevasse Belt

Our first step was aerial observation. Scheduling flights to take advantage of the varying shadows thrown at different times of day, we plotted every hint of a crevasse between Little America and Byrd Station. In all, we scanned 211,000 square miles of snow.

Studying our aerial charts, we were able to trace a seemingly safe route over most of the distance. But there was one gigantic obstacle—a band of crevasses some 200 miles from Little America.

This network of giant cracks seemed to mark the continent's ice-obscured coastline. In a slow, centuries-long movement, ice flows

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Giant Tractors Plow a 646-mile Furrow Across a Solitude of Ice

Ellsworth Highland, in Antarctica's Marie Byrd Land, rises as an eerie, uncharted ice plateau. When IGY scientists decided to establish a research station there, the United States Navy braved numbing cold, vicious winds, and blinding whiteouts to erect 14 plywood, aluminum, and glass-fiber buildings.

To deliver the required 380 tons of cargo, a team of Army, Navy, Marine Corps, and Air Force experts blazed the trail across the seemingly endless expanse of menacing ice. At one point treacherous, snow-concealed chasms, lurking beneath the surface, nearly forced them to turn back.

Behind the advance party chugged massive D-8 tractors, each hauling two cargo-laden sledges. Bulldozer blades to the fore, the tractors here move in tight formation. Ruts, about 14 inches deep, have been smoothed by runners of preceding sledges. Train commander's weasel made the tracks at right.

The time is midnight. Long shadows cast by December's endlessly circling sun tell time as accurately as a sundial.

Reproduction by Calvin L. Larsen

from the heights of the 9,200-foot-high South Pole down the Rockefeller Plateau toward the sea, where it becomes the Ross Ice Shelf. Apparently the abrupt drop where the plateau meets the sea generates internal stresses in the moving ice and causes the crevasses. Seen from the air, the belt of chasms winds and writhes like the trail of a snake as it traces the plateau's edge.

Air surveys told us that this band of visible crevasses across our projected route narrowed to a width of two-and-a-half miles compared with five or more miles elsewhere. However, only ground surveys could determine the extent of the *invisible* crevasse systems.

Detector Warns of Icy Deathtraps

On November 5 an advance party, commanded by Skip Dawson, left Little America. His vehicles included a Tucker Sno-Cat, two weasels—speedy, versatile vehicles adapted to polar operations—and two 37-ton Caterpillar D-8 tractors with 54-inch treads. These wide tracks reduced the tractor's ground pressure to the equivalent of a 160-pound man.

One of the weasels, fitted with a device for detecting crevasses, ran interference for the party. As it scuttled warily across the ice, a redwood grid supporting its dishpan-shaped electrodes, it reminded me of an ungainly spider wearing boxing gloves (page 389).

The Sno-Cat towed two small wanigans, boxlike sleeping huts mounted on sledges (page 390). The big, slow-moving D-8's, towing the messing wanigan, drummed fuel, food, and explosives, limited Skip's caravan to a pace of three miles an hour.

The men covered the first 171 miles without incident. Then Skip radioed me at Little America that he had sighted the crevasse belt. Aerial and surface parties scouted the area for possible alternate passages; the best route seemed to lie on our left.

After the trail party made camp, men afoot probed the snow with long aluminum rods wherever the detector indicated a snow-bridged chasm. When a probing rod sank free, explosives were used to blow up the bridge. Crevasse specialists, led by Army 1st Lt. Philip M. Smith, were then lowered into the chasm to determine its extent.

Behind Smith came Major Dawson and his crew to blow the lid from the crevasse with explosives (page 388). Then snow would be bulldozed into the crack until passage could safely be made.

I sent Lt. Pete Kenney and his helicopter to help Dawson's party. Hovering overhead, Kenney was able to spot depressions and ridges invisible at ground level.

M. Sgt. James S. Fields, another crevasse specialist, became expert at dangling on a rope ladder suspended from Kenney's "chopper." Holding on with one hand, he would plant bamboo poles in the ice to mark crevasses, their direction, and the safest probable passage.

As more and more crevasses were blown open and bulldozed full of snow, an alarming pattern began to take shape. Fulfilling our worst expectations, the route became a lane 35 to 50 feet wide between the two largest cracks. Smaller crevasses which could not be detoured crisscrossed our path in every direction.

"Where we are," Skip told me by voice radio, "crevasses are long canyons. They're too big to fill with snow, and bridges are harder to find than diamonds. Incidentally, the men have christened this little playground 'Crevasse Junction.'"

So Skip's crew zigged and they zagged, narrowly skirting some crevasses and filling others that they could not detour. And the deeper they penetrated into Crevasse Junction, the more fissures they found.

To me it looked like a dead end. But we had already formed the first heavy tractor train at Little America. Vehicles and cargo were ready to go. The men, eager to start, were on 24-hour alert. Everything now depended upon Skip's breaking through.

Giant's Game of Ticktacktoe

The danger area that had appeared from our first air surveys to be two and a half miles wide now measured five miles. And ahead yawned still more and bigger crevasses.

Finally the advance stalled completely.

Up to that point the job had been difficult. But as I read Skip's daily reports, with the nagging knowledge that we were already behind schedule, it began to seem downright impossible. Intersecting crevasse systems loomed ahead of us like a giant's game of ticktacktoe. The advance party had painstakingly blasted, detoured, and filled its way five miles into the end of a V!

All of us at Little America hung anxiously on news of the trail blazers. The death of Max Kiel under similar circumstances loomed dark in every mind. All day long men poked

↑ Lunch on the Run Saves Time

Substance rather than variety marked mid-shift lunches. Menu consisted of three king-size sandwiches, cake or pie, and a quart of steaming coffee for each man. One driver, who had been marooned on the ice during Deep Freeze I, converted his tractor cab into a starvation-proof larder crammed with food.

Chief Warrant Officer Victor Young passes a lunch packet to a hungry driver.

↓ Bearded Chef Bakes on the Trail

Tractor-drawn messing wanigan served as the train's social center. Each time the tractors halted, Chief Construction Electrician William E. Stroup, here dozing, leaped out with the handsaw at left to cut blocks of snow and feed them into an exterior hopper. Exhaust heat from the generator melted the snow; the water was then piped into the tank in background. Cook Ray D. Mishler's specialties were pies and cakes.

their heads into the radio hut to ask me, "How're they doin', Commander?"

The situation grew so tense that Admiral Dufek flew in to Little America from McMurdo Sound. In the course of a reconnaissance flight I dropped him off at Crevasse Junction for a personal inspection.

Daring Idea Offers New Hope

Skip Dawson voiced his determination to press ahead, but his strained, exhausted face told the Admiral that the prospect was bleak. Lieutenant Smith, seconded by Fields, urged a radical measure. His idea was to blast open the worst crevasses, partially fill them with snow, and then run the trail along their bottoms.

If time had not been running out, the proposition would have seemed out of the question. But the party had been stalled at Crevasse Junction for two weeks. It was now or never if we were to establish Byrd Station this season.

Already some officers, reluctant to risk lives in a seemingly hopeless attempt to gain the plateau, were suggesting a substitute location closer to Little America. However, we decided to take one last gamble and give the new plan a try.

When I picked up Admiral Dufek for the

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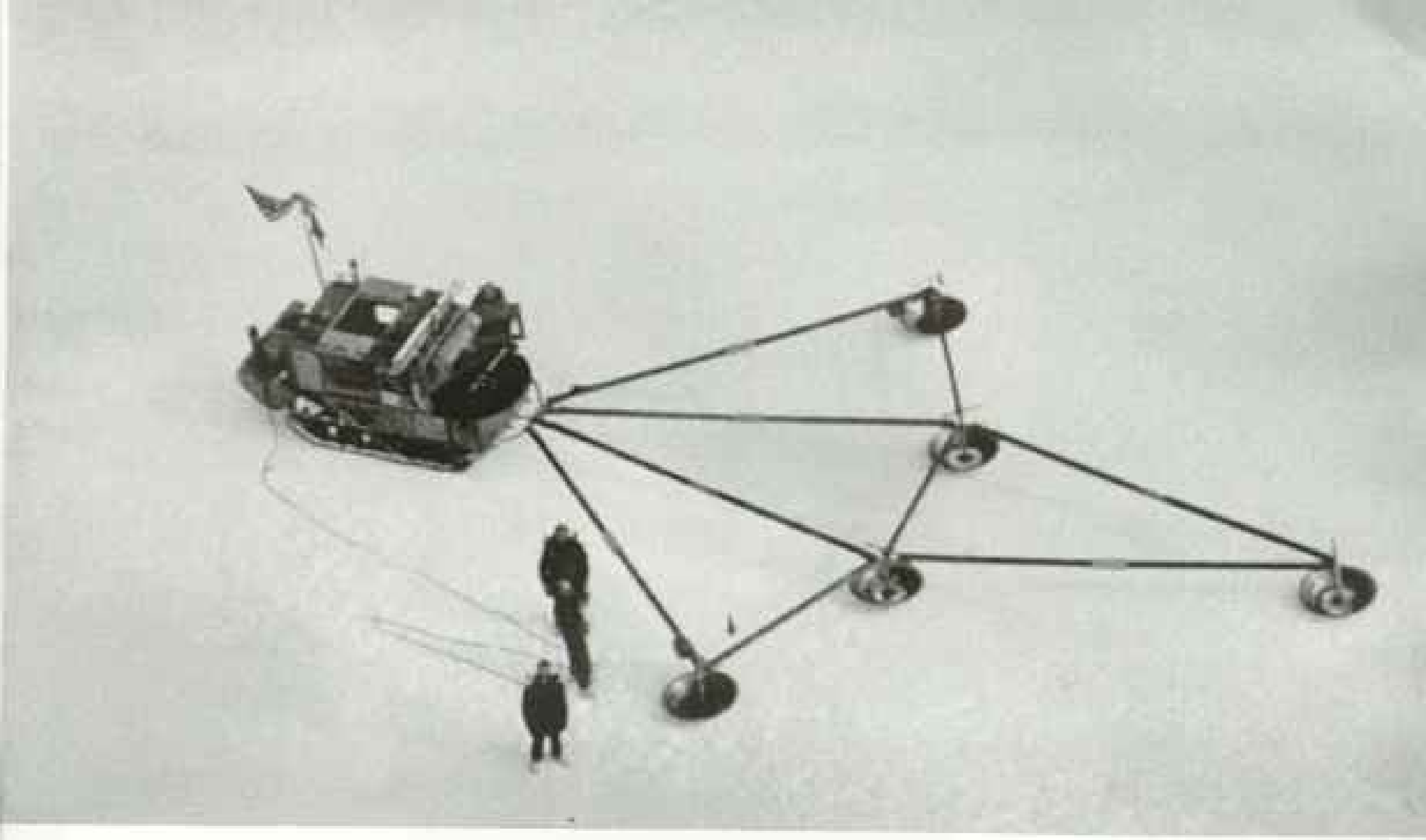
Crevasse Detector Moves on Spidery Legs

The advance party's lead vehicle pushes dishpan-shaped electrodes that transmit impulses deep into the snow. When the beam strikes a void, its altered current actuates a buzzer and a flashing red light to warn of the chasm. Secured to the weasel by a safety line, Army 1st Lt. Philip M. Smith stands by to explore concealed crevasses.

↓ Blast rips a hidden chasm exposed by the detector.



Trail Blazers Test an Ice Bridge →

The Seabees' first attempt to reach the site of Byrd Station was abandoned when a tractor plunged into a concealed crevasse, carrying driver Max Kiel to his death. Experts trained on the Greenland Icecap were assigned to spearhead the second attempt.

Having blown the top from this yawning chasm, 1st Lt. Philip M. Smith swings down a lifeline and digs a hole for another charge. Major Dawson, advance party commander (left), stands by to pass him the prepared explosive.

Walter Sullivan, Ralph Gulbransen (above), and Calvin L. Larsen

flight back to Little America, his mood reflected Dawson's critical plight. Normally jocular, the Admiral passed the flight in complete silence.

That night we were all nervous. I was in the washroom when the Admiral brought in several laundry bags. As he tossed them into the washing machine, I realized that he was washing the clothes of the men who were valiantly battling nature that very moment at Crevasse Junction. Now, sweating out their radio report, the Admiral was doing what he could for them—their laundry!

Tractors Steered by Remote Control

Meanwhile, Skip's men swung into action. They exploded hundreds of charges to remove the giant lids of the main crevasses lying in our path. Often, while moving from one chasm to the next, the tractor drivers guided their behemoths with plowlines attached to the controls. This arrangement, enabling them to walk behind the D-8's, precluded

Halting for Supplies, the Advance Party Forms an Island of Machinery in a Sea of Snow

Army Transportation Corps specialists from Greenland decked vehicles with their corps flag (background). Seabees devised their own penguin banner (page 396). In recognition of interservice cooperation, the trail from Little America to Byrd Station was christened Army-Navy Drive. Sno-Cat (right) hauls the party's sleeping wanigans.

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David S. Boyer, National Geographic Staff

Ski-rigged Otter, an Antarctic Work Horse, Keeps Engine Warm While Delivering Fuel

Without air support the trek would have been impossible. Besides scouting the route, Navy and Air Force planes delivered 50,000 gallons of diesel oil and flew in food, explosives, and spare parts. Versatile and rugged, the de Havilland Otter won its spurs as a bush plane in Canada. Picture was taken on the Ross Ice Shelf.

their being trapped in the cabs if the big machines crashed through the snow.

Knowing that success hinged upon their particular skills, Dawson, Smith, and Fields literally worked around the clock. As a result of constant exposure, the sun burned them cruelly. Their eyes swelled to narrow, painful slits. They wore bandannas bandit-style in a vain attempt to protect their seared and blistered faces from still further scorching. But not once did they falter or complain.

Hurry Call for Sunburn Lotion

Day by day the work went on. In one radio conference Skip told me that he'd advanced only 800 feet in 12 hours.

"Is there anything I can do for you?" I asked.

"Yes," he said. "If there's a flight coming out this way, we could sure use some sunburn lotion and pancake mix."

Finally, on December 2, a rein-driven D-8 hulled its way to the safety of the Rockefeller Plateau. Skip's crew, stumbling with fatigue, blinded and punished by the sun, had conquered Crevasse Junction. Behind them lay seven and a half miles of dangerous chasms and a safely marked passage!

Like the man himself, Skip's message to Little America was modest and businesslike: "Trail across crevasse area now ready for heavy sled movement."

When the message came in, I dived for the public-address microphone to make the announcement. An impromptu celebration broke out immediately. Later one of the Seabees told me, "That was our real Christmas Day, Commander."

Skip's message was also the signal for Navy Chief Warrant Officer Victor Young's loaded tractor train to hit the trail. In a final briefing to the crew, Comdr. Herbert W. Whitney, in charge at Little America, said: "Men, time is getting tight. So I promised the Admiral you'd have that base built within 30 days of your arrival."

"Can do!" shouted a Seabee. "What'll we do with the other 25 days?"

On that note, the largest tractor train ever assembled in Antarctica set out on the longest sustained over-ice cargo haul in history.

The train leader, in a weasel, shepherded

Replacement Track for a Damaged Weasel Emerges from a Navy R4D

six tractors pulling two sledges each. Only two stops a day were scheduled: one to change shifts at 7 a.m., the other to switch again at 7 p.m. Noon and midnight meals would be eaten box-lunch style under way, while breakfast for the oncoming watch and dinner for the offcoming crew would be served as the shifts changed (page 387).

The combined weight of the tractor train and its cargo approached 1,500,000 pounds. We crossed our fingers and wondered if Skip's trail would support it.

One sledge carried the messing wanigan, equipped with galley, radio gear, and table accommodations for ten men. The same tractor also pulled the sleeping wanigan with its ten bunks. Since there were 19 men in the party, this meant "hot bunking" on the trail: a driver coming off duty crawled into the berth vacated by his relief. Only cook Ray D. Mishler, by virtue of the irregular hours required to feed both shifts, enjoyed the luxury of a private bunk.

The train progressed rapidly to Crevasse Junction in spite of soft snow that frequently clogged the tractors' wide tracks and had to be punched loose with metal rods. Young averaged 45 miles a day until he reached the crevasse belt on December 9. There he halted.

I flew out to Skip's advance party, now well into Marie Byrd Land, to pick up Lieutenant Smith, and dropped him off to help guide Young's heavy D-8's through the chasms.

Skip had recommended that only one sledge be dragged across at a time and that a 12-hour interval be allowed between crossings to give the nervous snow a chance to settle.

The first sledge went across without mishap. But during the subsequent waiting period a gloomy apprehension enveloped the crew. The memory of Max Kiel's death had come back to haunt them. With mordant humor they diagnosed their symptoms as "crevasse fever."

Tax Collector Banishes the Blues

To brighten their wait, I sent out a load of mail on an Otter plane. Mishler's tape recorder played Christmas carols while the men, shirtless in the 30-degree weather, took their mail to the tops of the wanigans.

One man opened his only letter and read:

"Dear Jim: I can't seem to find the right words to say this, but I have met a wonderful boy since you left. . . ."

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Midnight Sun Warms a Seabee Repair Crew

Hard work in the antarctic summer exposes men to the risk of freezing in perspiration-soaked garments. These Seabees avoided the danger by stripping to the waist; the temperature was a windless 10° F.

Another found a huffy request from the Federal Government for $15.40.

"Provisions of the law require immediate . . . levy upon your salary. . . . *Payment in full must be made within five days.* A self-addressed envelope is enclosed for your reply."

Then and there I too contracted a debt to that zealous tax collector. For his warning, passed joyously from hand to hand, drove away the last shred of gloom. Crevasse fever departed as suddenly as it had come.

When work resumed, the second sledge crossed in safety. Encouraged, Smith decided to cut the interval between loads to six hours.

In slow, carefully timed procession, ten sledges reached the security of the plateau. Then, returning for another load, tractor driver Benjamin H. Melton, Jr., felt a sickening lunge as the surface sank beneath him. The snow bridge had cracked!

With great presence of mind Melton gunned straight ahead until he reached safety. Be-

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↑ A Driver Digs Out Packed Snow Clogging Rollers and Treads

The icy mass stretched the steel tracks to the breaking point. Frequent halts were necessary to punch away the accumulation, until a Seabee devised a way of sudden braking which freed the tracks while under way.

Specifically adapted for use on antarctic snow, Operation Deep Freeze's D-8 tractors weighed in at 37 tons each. Treads 54 inches wide distributed weight so effectively that at no given point did ground pressure exceed that of a 160-pound man. Engines were capable of starting at temperatures below minus 65° F.

One Navy man whiled away an uneventful shift by computing the number of dog teams necessary to transport the 320,000 pounds of cargo being hauled to Byrd Station by this 19-man, six-tractor train. His conclusion: 8,800 dogs, 800 drivers, 800 sledges. A second train completed delivery of the 380 tons needed for station construction.

← Mechanics dig in to free a tractor that dropped through the snow's brittle crust. Glasses protect their eyes from glare.

hind him yawned a sheer drop of 100 feet!

Smith was promptly lowered on a line to inspect the crevasse. Then, from a depth of 50 feet, his instructions were relayed to the surface by his line handler:

"Send a man with a probing rod and some poles about 10 paces toward camp . . . Have him walk a few steps to his left . . . Hold it! Plant a pole there . . . Walk slowly now . . . Probe as you go . . . There, another pole! . . . Okay, now walk again."

When Smith finally climbed out of the crater, the mystified pole planter asked, "How could you see where I was going? That snow was 30 feet thick."

Smith grinned. "From down there you looked like a fly walking across frosted glass. When your image was strong, I knew you were over thinner snow; where it grew faint, the snow was thicker. The flags mark the thickest and safest section of the bridge."

Although shaken, the tractor driver scorned plowlines for his next load. With Smith aboard to guide him, he coolly tooled his D-8 across the modified passage. The remaining sledges crossed without difficulty.

Broken Push Rod Stalls the Train

Back in Little America, I began to breathe more easily. Then, only a day beyond Crevasse Junction, a valve push rod failed in one of the tractor engines. Beneath an overcast sky the caravan ground to a halt. Young radioed me for a replacement part, but at Little America we were battened down against a three-day blizzard.

With no alternative, the stranded train prepared to wait out our storm. Finally, Chief Photographer Calvin L. Larsen suggested making a replacement part by hand. "My dad would never let his tractor stand this long in Montana during harvest just for lack of a push rod," he said.

Somebody spied one of the steel rods Mishler used to keep pots from sliding off the stove when the train was under way. While Mishler was asleep in his bunk, mechanics invaded his sacrosanct galley. Removing his pot holder, they fused onto it the usable ends of the damaged push rod. It worked!

Mishler was awakened by the lurching of the moving train. Seabees told him his pot holder had shrunk; then they replaced it with baling wire.

Soon the train approached the 250-mile point, where Navy ski planes had deposited a cache of diesel oil. But, barely 10 miles short, a track roller cracked on one of the D-8's. This time it couldn't be patched. So I received another call for air support.

Although Lieutenant Speed's plane was having ski trouble, he flew out with a load of fuel as well as the needed part. First he deposited the additional oil at the cache. When he tried to take off, the plane's skis froze to the snow. His engine strained, but the plane wouldn't budge. The "rescue party" was stranded too.

Teeth Undamaged by Steel Treads

Next day another plane brought jet assisted take-off bottles to get Speed's plane into the air and also delivered the replacement part to Young's train.

Mile after mile slipped beneath the treads. Delays became shorter and more infrequent as the Seabees' fabled dexterity with bulldozer blades solved most problems. When a sledge bogged down in soft snow, the tractor driver would approach from a right angle, work his 17-foot-wide blade beneath it, and gently lift it out of trouble.

One day we had striking proof of the effectiveness of our special weight-distributing treads. As driver Willis R. Clem leaned from his tractor to get his under-way lunch of sandwiches and coffee, a pink-and-white object fell from his pocket. As it hit the snow, the track rumbled over it.

Clem, his face mirroring pure horror, slammed to a halt and leaped out. From the churned snow in the track's wake he fished his upper plate—undamaged!

"Boy!" Clem sighed in relief. "When I saw that thing go under the tracks, all I could think of was how hungry I am and how far we are from the nearest dentist."

Tractor Train Meets "Nomads"

As the train neared its destination, the temperature dropped. Men who had sunned their bare chests at Crevasse Junction now shivered in subzero cold. But skies were clear, and driving became easier on the crusty snow. Hopes ran high. On December 20 Young radioed me that he expected to reach Byrd Station two days *before* Christmas.

By then, Skip and Army Major Palle Mogensen had verified the position of the future base by sun observations. The party erected a snow mound near the station site, and on it they placed a United States flag,

Steel Juggernauts Trimmed with Snow Rumble Across Uncharted Polar Wastes

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Flags of the United States and the Navy's Seabees Snap in the Wind

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Final Flag of the Advance Party Signals the End of the Trail

Flags, planted every fifth of a mile, helped the party maintain a straight course across Marie Byrd Land's desolate snow plain.

Byrd Station's 14 winterproofed buildings here notch the bleak horizon. From them, IGY meteorologists are already probing the polar skies to solve mysteries of antarctic weather formation.

To the station's right, Stars and Stripes flies from a snow mound erected by the advance party.

← Navy Chief Photographer Larsen, whose Kodachromes illustrate this article, records his location on a pole planted to mark the site of Byrd Station—latitude 80° South, longitude 120° West.

Young's tractor train met Skip Dawson's homebound advance party on December 21, exactly 575 miles from Little America. I expected their meeting to be the scene of great rejoicing. I also fully expected, and was prepared to approve, a request to "splice the main brace"—naval parlance for imbibing spirits after a rugged assignment.

Instead, after the briefest of greetings, both groups were under way again in minutes. Young's radioed situation report that night recorded: "Met band of nomads . . . Claimed to be Army-Navy trail party."

At 2 p.m., December 23, the tractor train reached 80° South, 120° West. Their long trek was over. They had successfully delivered four buildings, with appliances, across 646 statute miles of snow in the most unusual towing operation in Navy annals.

Basebuilding was old hat to the Seabees. Augmented by reinforcements flown in despite near-zero visibility, they completed the first building by 1 a.m. Christmas morning.

All four of the buildings in that initial load —ten more were scheduled for later erection —were stanchly in place when Byrd Station was commissioned on New Year's Day, 1957.

I can't predict what the scientists will learn from their observations at Byrd Station. I do know, however, that what the Army and Navy have learned in the art of tractor operation on snow is of incalculable value. This knowledge may someday play an essential role in the defense of our freedoms.

And, perhaps more important, the long haul provided a bitter test of the skill, courage, and resourcefulness of the men behind the machines. They were not found wanting.

Robert College, Turkish Gateway to the Future

Thanks to a Boatload of Bread, Yankee Educators in Istanbul Have Forged an Enduring Link Between Asia and the West

By Franc Shor

Assistant Editor, National Geographic Magazine

With Photographs by the Author

BESIDE the deep-blue waters of the Bosporus, East and West meet but do not touch. High above those waters, on a hill where Europe gazes into Asia, an American college draws the two together.

A boatload of bread brought about the creation of Robert College, near Istanbul, in 1863. In nearly a century of existence the college has done much to create a better understanding between the United States and the lands of the Near East. With its sister school, the American College for Girls, it has trained men and women of a score of nationalities who have returned home to lead their people into the paths of progress.

Students Come from 15 Countries

Dr. Edwin A. Grosvenor, in his monumental two-volume history of Constantinople, published in 1895, could already see the results of the college's endeavors:

"No institution was ever more opportunely founded," he wrote admiringly of Robert College, where he taught for 23 years. "None was ever planted at a point of wider and more enduring influence. . . ."

Today, 62 years after Dr. Grosvenor's enthusiastic appraisal, the twin colleges have more than fulfilled his expectations. Nearly 2,000 students of some 15 nationalities come annually to Istanbul for an education in the ways of the West. And throughout the area they serve, Robert College graduates hold high positions in government and business and are leaders in the scientific and social life of their countries.

It is no accident that the beginning of 1957 found a Robert College graduate serving as Turkey's Ambassador to the United States and another as Ambassador to the United Nations.

Praise for the college comes not only from Westerners. Fahreddin Kerim Gökay, Governor-Mayor of Istanbul and a Robert graduate, voices a profound respect for its accomplishments.

"Robert College has had a great influence on our modern Turkish culture," he told me as we sipped thick coffee in his office in Istanbul's old Sublime Porte. "And the technical skills of the graduates do much to speed the modernization that Turkey needs so badly."

Governor-Mayor Gökay, married to a former student at the American College for Girls, is an enthusiastic admirer of the work of that institution as well.

"Its graduates have been leaders among Turkish women," he told me. "They have helped bring their sisters out of seclusion and into the main stream of Turkish life.

"And the important thing is that the colleges are an integral part of the Turkish system. We have grown together, and we have both profited."

Dr. Duncan S. Ballantine, the lean young American educator who serves as president of both colleges, keeps constantly in mind this unity of growth and purpose.

"We cannot exist as an American island in a Turkish sea," he told me. "We must continue as a part of the Turkish way of life."

Seriousness of Purpose Marks Classes

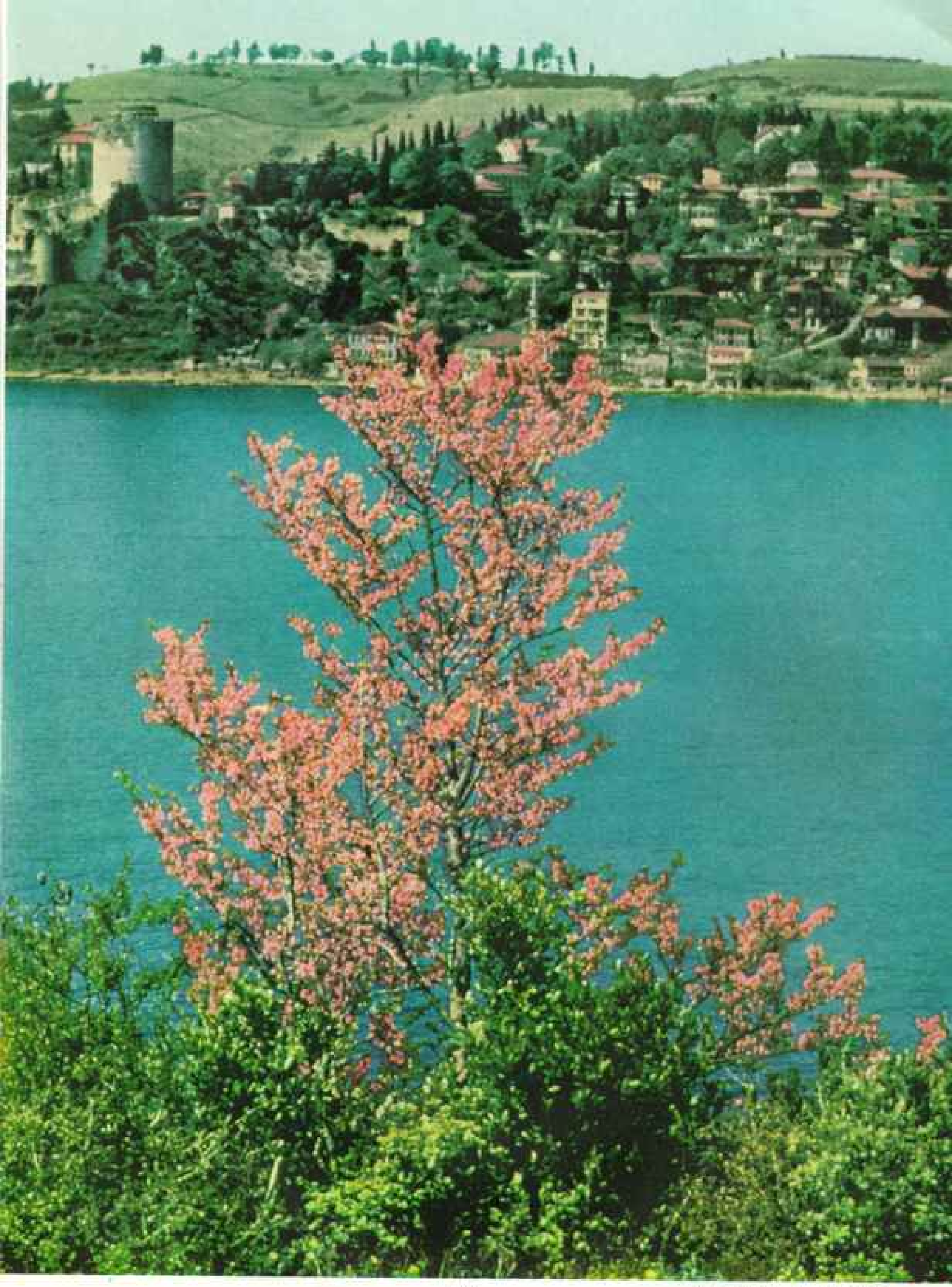
Dr. Ballantine's days are crowded with the ever-present problems of college presidents the world over—teachers' salaries, building funds, endowments—but his primary concern remains the individual student.

"We don't build dams or factories or highways or pass laws," he said. "We educate the people who do. Thus our service has a reproductive capacity. Robert College has no political ax to grind. It is an outpost of culture, not foreign policy."

There is much about life on the Robert College campus that reminded me of my own student days. Buildings are properly ivy-covered, and young men in slacks and sport shirts sprawl on the stone wall above the Bosporus. But step into a physics laboratory or an engineering classroom and you encounter an unusual seriousness of purpose.

Robert College on the Bosporus Rises Above the Towers of Mohammed the Conqueror

For nearly a century the college has served as an outpost of American learning and a monument to friendship between nations. The campus overlooks massive Rumeli Hisar, or European Castle, built in 1452 (page 416). Cyrus Hamlin, a missionary, opened in 1863 this oldest American college on foreign soil.



401 Kodachrome by Herman R. Kreidler

Turkey's Historic Waterway Joins Two Seas and Divides a Nation

Flowing from the Black Sea into the Sea of Marmara, the Bosporus Strait splits European and Asian Turkey. Turks call the six-mile-an-hour flow below Rumeli Hisar the Devil's Current. Beneath the surface of the narrows, here only 810 yards wide, a countercurrent of saltier water flows in the opposite direction.

a determination to learn well and rapidly which is not often found elsewhere.

"We're at least a generation behind Europe and America in technical know-how," an eager young junior in the engineering school told me, "and we have to catch up as quickly as possible. Those of us who are lucky enough to be admitted here can't afford to fail. We have to make every minute count."

The boys face problems which never confront American college students. Technical subjects are taught in English, but few of the students learned that language in childhood. Many first heard it when they entered English preparatory classes at Robert Academy.

"It's amazing how they pitch into a new subject," an American instructor in mechanical engineering said. "Remember that they are not only working with a strange language but with matters completely foreign to their environment. Boys who a few years ago hadn't worked with a machine more complicated than a donkey-driven water wheel strip and reassemble airplane engines and solve complicated problems in stress on bridges. They're the most determined people I've ever seen."

Airplane Engine Serves as a Working Model

Robert College, financed by New York philanthropist Christopher Robert, opened in 1863 in a borrowed building. Its faculty of five outnumbered the student body of one American and three English pupils. The school did not graduate a Turk for 40 years. Enrollment today is 90 percent Turkish.

Student (left) and teacher here examine a radial aircraft engine.

Jean and Franc Shor, National Geographic Staff

Students and graduates prize the educational aspects of their college careers, but many of them feel that the self-reliance and initiative developed under Western teaching methods are their most important acquisitions.

Campus Training Develops Individuality

Pretty Evin Duray, president of her senior class when she was graduated from the American College for Girls, summed up her own thoughts on commencement eve.

"I majored in art," she told me, "and I've been given a good education. But the most important thing I've acquired is a real sense of responsibility. We've learned not to depend on someone else to control our lives and have developed as individuals."

His Excellency Haydar Görk, who served as Turkish Ambassador to the United States until last April, looks back at his Robert College class of 1926 with a similar appraisal:

"The greatest thing Robert College gave me and my contemporaries was a sense of initiative," he said. "Those were dangerous times for Turkey. President Atatürk's great drive for speedy Westernization might have resulted in slavish imitation. But our education had given us a sense of perspective, and we were able to think for ourselves. Robert College has done a fine job for my country."

But to get back to the bread that brought about the founding of Robert College. It was an unusual loaf and it was baked by an unusual man.

Dr. Cyrus Hamlin was a missionary in the city then known as Constantinople. The sick and wounded of the Crimean War of 1854-56 filled a barnlike military hospital on the Bosporus shore. Touched by their suffering, Dr. Hamlin plunged with true missionary zeal into the task of alleviating it.

The men needed medical care, but they also needed nourishing food and clean clothing. The

An International Forum Meets on Rumeli Hisar's Lofty Battlements

Students and alumni represent more than a score of countries, several of them behind the Iron Curtain. Three Turks and a Syrian, dressed in American campus style, enjoy a superb view of the Bosporus.

↓ Senior engineers solve a problem with text and slide rule. Robert College graduates have built many of Turkey's roads, bridges, power plants, and factories. Others fill high positions in government all over the Near East.

immortal Florence Nightingale provided the nursing; Dr. Hamlin undertook to furnish the food and the laundry service.

The bread then sold in Constantinople was unpalatable to Western tastes. Dr. Hamlin wanted to produce American-style loaves but found it difficult to get proper yeast. Experimenting, he found that brewers' yeast served perfectly. The Turks called the product "beer bread," but the famished soldiers loved it. Dr. Hamlin was given a contract to supply the hospital.

American-type Bread Wins a Friend

His bakery functioning, the missionary turned to the problem of cleanliness. The soldiers' garments were so infested with lice that laundrywomen refused to touch them. Dr. Hamlin started a laundry and delousing plant to sterilize the garments. By the end of the war both bakery and laundry were thriving concerns, filling the hospital's needs and, incidentally, making substantial profits.

The military hospital lay on the Asian shore of the Bosporus, and one branch of the bakery on the European side. Daily the bread was stacked high in small boats and ferried across. In the last year of the war, one of those boats was rowed past a passenger steamer lying at anchor in the harbor.

Christopher Rhinelander Robert, a prosperous New York businessman touring the Mediterranean, gazed over the rail and was struck by the appearance of the bread, so unlike the usual flat Turkish loaves. He asked questions and learned of Hamlin's bakery and allied projects. Impressed, Robert went ashore and introduced himself to the busy missionary.

The two men became friends. Then, when Christopher Robert returned home, he received a call from two educators, James and William Dwight, who asked his aid in founding an American college in Constantinople. Robert's travels had convinced him of the need for Western educational methods in the Near East, and his conversations with Dr. Hamlin had convinced him that here was the perfect man to undertake the task.

At Robert's suggestion, Dr. Hamlin resigned from his missionary labors and came to the United States. The two men planned a campaign to raise $100,000. Robert started the drive with a gift of $10,000.

The outbreak of the Civil War doomed the fund drive to failure, but Robert was undaunted. He donated $30,000 more and instructed Dr. Hamlin to go ahead with the founding of the college. The educator returned to Constantinople and went to work.

Money wasn't the only problem, however. The Turkish Government gave Dr. Hamlin permission to build a college, but a storm of political opposition developed. Under fire from every side, the Turkish authorities explained to Dr. Hamlin that certain formalities must be completed before his permit to build could be validated. Those formalities were to take almost seven years!

Dr. Hamlin did not wait in idleness. In 1863 he started classes in a frame house in Bebek, a suburb of Constantinople. There were five teachers and only four students. But Dr. Hamlin had his college. And in

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Aya Sofya, Treasure Vault of Byzantine Art, Lifts Slender Minarets

Justinian the Great, ruler of the Eastern Roman Empire and a defender of Christianity, built Constantinople's massive cathedral in the 6th century, adorning it with marble quarried throughout the Mediterranean world. Fifteenth-century Moslem conquerors made the church a mosque and added minarets. Later sultans, obeying the Islamic injunction against pictures of animate beings, plastered over priceless mosaics.

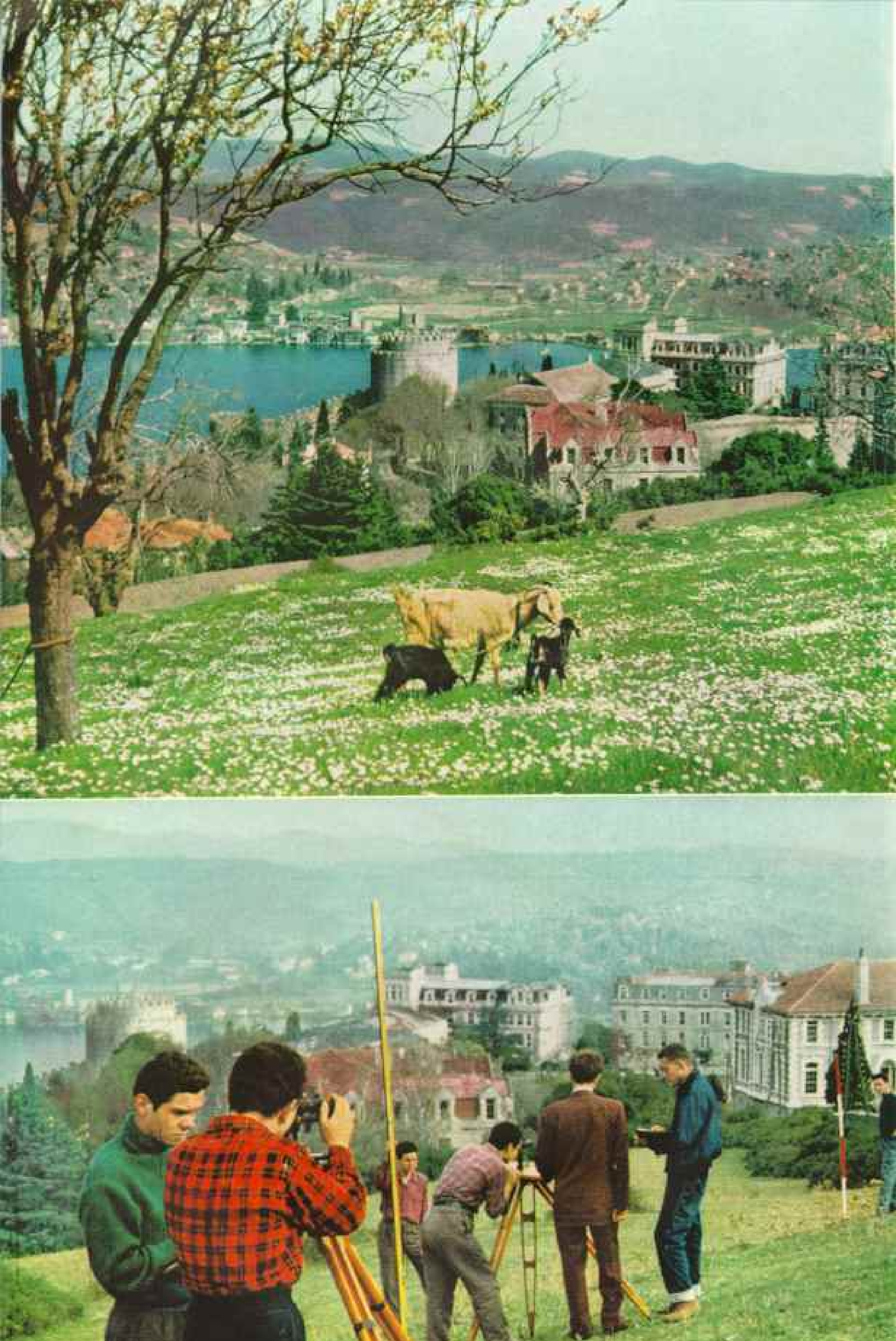
Today the building is a state museum; the privately financed Byzantine Institute of America is uncovering its mosaics. Turks call the structure Aya Sofya, from the Greek words meaning Divine Wisdom. Westerners know it as St. Sophia. This view looks northeast from the Sultan Ahmed Mosque.

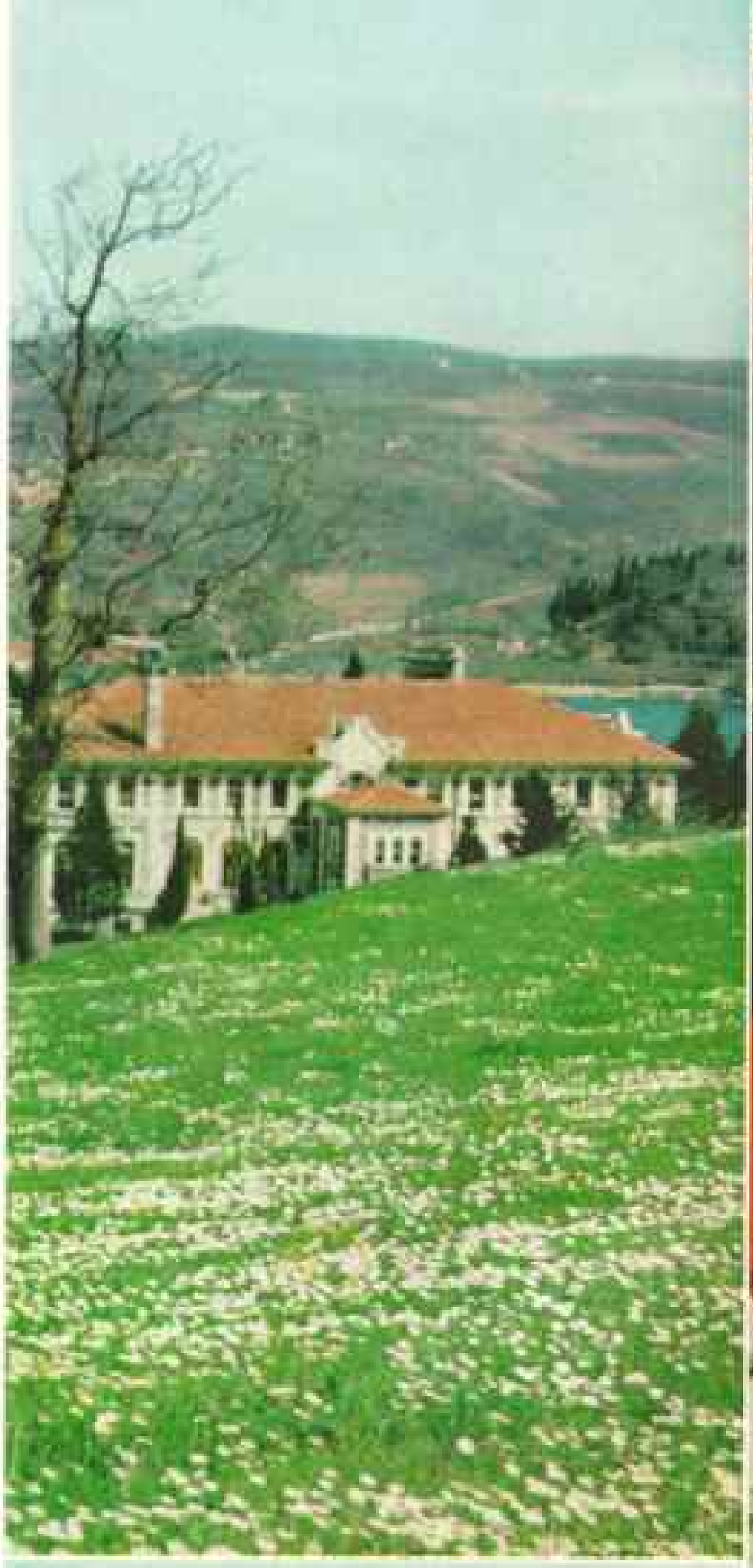
1864 the Board of Regents of the State of New York granted a charter. Robert College was in business.

Only barely, however. Dr. Hamlin had selected a magnificent site for his college, a hill towering above the Bosporus a few miles from the Golden Horn, overlooking the stone towers of Rumeli Hisar. But it seemed impossible for him to complete the "formalities" necessary for his building permit. The frame house in Bebek was getting crowded.

Then, in 1868, Adm. David Farragut of the U. S. Navy sailed into the Golden Horn on a courtesy call. Dr. Hamlin paid him a visit and explained his problems. The Admiral emphasized that he could take no official action on the matter, but added that he might mention it casually that evening at a dinner to be given in his honor by the Grand Vizier of Turkey.

Shortly after, Dr. Hamlin received his permit. Faculty members still recall with





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President and Students Share a Class Break

Dr. Duncan S. Ballantine (right), a graduate of Amherst College and Harvard University, became president of Robert College in 1955. Americans number almost half his faculty of 102. Dr. Muzaffer Yeşim, vice president, is a Turk.

Opposite, above: Goats browse amid oxeye daisies carpeting the campus in spring. Towers on the far shore mark Anadolu Hisar, or Asiatic Castle, a 14th-century companion to Rumeli Hisar. Hills of Asian Turkey rise in the background.

◆ Lebanese and Turkish engineering students plot imaginary boundaries with rod and transit.

 Kodachromes by Herman H. Kreiser (opposite, above), and Frank Shaw, National Geographic Staff

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Caps and Gowns Solemnize Robert College's Eighty-seventh Commencement

Few American ventures abroad have worked as powerfully as Robert College toward the betterment of human life and understanding. Long before the United States Government conceived technical aid and educational exchanges, Robert College with private resources was training the men who built modern Turkey.

Alfred Ogden, prominent New York attorney and president of the Robert College Board of Trustees, here addresses the class of 1955. Third from right sits Dr. Floyd H. Black, whose service as teacher, then president, of the college spanned 44 years. Portraits, left to right, show Hamlin, Robert, and Kemal Atatürk.

glee the explanation given privately by one Turkish official:

"There was a little revolution in Crete," he told the educator. "We assumed that if the permit wasn't issued promptly, the United States Navy would aid the rebels."

Founder Helped Erect First Building

Once he had his permit, Dr. Hamlin wasted no time. He designed the first college building, supervised its construction, and worked on it with his own hands. Hamlin Hall stands today as the vine-covered heart of college activities.

Back in the United States, Christopher Robert had succeeded in interesting other Americans in his crusade. Private donations began to trickle in, and the faculty was increased to keep pace with the growing student body. Hamlin remained in Turkey long enough to give the college a firm organizational foundation, then returned to the United States to campaign for an endowment fund.

His successor, Dr. George Washburn, served as president for 25 years. Under his administration much of the present plant was completed, and the little school that had started in Bebek began to loom large in the educational picture of its time and place.

The success in Istanbul of American-style education quickly bred successes elsewhere. Today U. S.-financed cousins of Robert College, scarcely younger themselves than that first American college in a foreign land, carry on in Beirut and Cairo.*

Students came from Persia, Iraq, Greece, Germany, Russia, the Levant, and the Balkans. The college became a microcosm of two continents.

There were times in that formative period when revolutions and actual warfare between some of the smaller nations caused considerable strain on relations among the students. But the administration maintained a neutral attitude in all matters of politics, and no real trouble ever occurred.

Today, principally because of the difficulty

* See "American Alma Maters in the Near East," by Maynard Owen Williams, National Geographic Magazine, August, 1945.

of transferring money from one country to another, the majority of the students are Turkish. But the colleges' *Alumni Bulletin* goes to nearly 3,000 former students in 56 lands over the face of the globe.

Robert College has on occasion offered refuge as well as education. Dr. Floyd H. Black, who served as teacher and president over a period of 44 years, told me of one particularly dramatic incident.

"A few years ago," he said, "a Russian boat passed through the Bosporus into the Black Sea. Aboard were two Albanian boys who were being taken to Russia for training as spies. They leaped overboard and attempted to swim to freedom. One was drowned, but the other reached shore and found his way to us. He became one of our best students."

Not long after, Dr. Black continued, three high-school students in a country behind the Iron Curtain determined to make their way to freedom.

"They seized a small fishing boat," he told me, "and set out on the Black Sea. For two days and two nights they sailed, with no navigational instruments, until they reached Istanbul. All three applied for admission to the college, and all three were accepted. One is now assistant professor of philosophy at a southern university, another is at Harvard, and the third is in the U. S. Army."

Dr. Black himself has become a living legend at the institution he served so long and well. He was president during the dark days immediately following World War II when money was scarce, teachers hard to find, and every aspect of college administration offered a seemingly unsurmountable problem. A veteran teacher told me of the former president's efforts to make ends meet.

"I have seen him go through the halls at night turning out lights to save electricity," he said. "No economy was too small."

I asked Dr. Black if this were true.

"Not exactly," he replied. "I used to unscrew the bulbs and take them away."

Today's Robert College student can choose from a wide variety of courses. Many are preparing for careers in journalism and teaching, and an impressive number of Turkey's leading authors and educators are graduates. Engineering, however, is the most popular course.

Robert Academy, junior branch of the college, takes students with a minimum of five years in Turkish primary schools and prepares them for college entrance. Early years are devoted to mastery of the English language; subsequent semesters bring a thorough grounding in academic work.

One-third of the students pay an annual fee of less than $1,000 for room, board, and tuition. The others make their homes in Istanbul. And some travel fantastic distances to reach their classes.

American-trained Hands Treat a Dental Patient in Istanbul

Turkish women, veiled and confined to the harem under the Ottoman regime, gained independence during the republican reforms of 1923-34. Kemal Atatürk, first President of the Turkish Republic, declared "our absolute need today is the higher education of our women. . . . Let them reveal their faces to the world." The American College for Girls answered his call, training hundreds for new roles. Dr. Ilhan Belger graduated from the college, then took postgraduate studies in dentistry at New York University.

American College for Girls Brings Western Learning to the Women of Turkey

Boston missionaries in 1871 opened a high school in Constantinople, later converting it to a women's college. Two world wars failed to close the school, affiliated since 1932 with Robert College. These students chat below Gould Hall.

I talked with a brown-eyed, round-faced youngster in the School of Engineering. One of his teachers had told me about an unusual incident that marked the boy's first year in college.

"He was obviously a bright young man," said the instructor, "but his teachers reported that he was failing in his studies. Simply didn't seem able to keep his mind on his work. So the dean of the Engineering School called him in for a chat."

The boy, the dean discovered, lived in Pendik, on the Sea of Marmara, 25 miles from the college.

"He was getting up each morning at 4 o'clock," the teacher told me, "to do his household chores and eat breakfast in time to catch a train that left at 5. He rode to the Bosporus ferry, where he spent half an hour crossing the strait. Then he took a bus for another 30 minutes and still had a 20-minute walk up a steep hill to his first class.

"At night he'd make the same journey home, and then work four hours at a part-time job to make enough money to pay for his transportation. He was traveling four hours a day, working four, trying to carry a full course of studies, and going to bed when he could spare the time.

"He wasn't inattentive in class," the instructor said, "just sleepy."

Scholarship Saves a Drowsy Student

I had lunch with the youngster in the big college dining room, where students and teachers eat together at long well-scrubbed tables. After our simple meal I asked him why he had gone to such lengths to educate himself.

"My family in Anatolia is poor," he said, "but education has always been important to us. Anatolia needs people with technical training. We can be a rich country, but we must have skilled men to develop our resources. I want to be an engineer so I can work with my own people. They need help the most."

When the young man's circumstances became known, college authorities managed to find a scholarship grant that enabled him to cut down on his outside work. Before long, he was in the upper third of his class and gaining back some of the weight he had lost during his ordeal.

Months after I left Turkey, I received a letter from him.

"At that fortunate occasion we met," he wrote, "I told you it was my ambition to take courses in nuclear physics. Therefore I have applied to some U. S. schools and am accepted by the University of California at Santa Barbara."

I am sorry Christopher Robert could not have lived to share the boy's letter with me. He must have had in mind just such a happy ending when he first conceived the idea of a college by the Bosporus linking East and West.

School Started with One Teacher

The American College for Girls is only a few minutes by auto from its brother institution, with an equally impressive vantage point above the Bosporus. Founded as a high school in 1871, with one American teacher and a student body of three, it was chartered as a college in 1890 and combined under a joint administration with Robert College in 1932.

Today more than 600 girls, nearly all of them Turkish, follow in the footsteps of some 1,500 graduates who have gone into such diverse fields as medicine, dentistry, teaching, chemistry, archeology, and law. A surprising number of them, I found, plan to go to the United States for advanced study after graduation.

Oya Kaynar, a pretty 18-year-old whose parents, too, studied at Robert College, excitedly told me that she had just been awarded a fellowship at Mount Holyoke College in Massachusetts.

"I plan to study dramatics there," she said, "and then I'd like to come back and find a place in the Turkish theater. The present attitude in Turkey doesn't encourage a girl to go into that kind of work, but it is changing. And our alumnae have pioneered in bringing women into new fields."

The American teachers who serve the two colleges are a dedicated group, working for small salaries and living under conditions far from ideal, but taking their reward in the satisfaction of a job well done. They mingle with their students, invite them into their homes, and make the colleges into giant families. They too are students, for many of them find they learn as much as they teach.

Attractive Anne Nordhus came to the college in 1952 from Muskegon, Michigan. Her first class was a group of 22 teen-age girls who were learning English.

"We started out with a get-acquainted pe-

Track Men Strain for the Tape in a 50-yard Dash

Robert Academy, preparatory school for the college, trains boys from the age of 12 through high school. Students get special instruction in English, the language of Robert College.

These runners take part in the academy's annual field day, held traditionally on the first Saturday in May.

Teams, named for American Indian tribes, compete for championships in basketball, soccer, softball, and track.

Hamlin Hall (left) was the first college building. Cyrus Hamlin directed construction and did much of the work himself. For mortar he chose a centuries-old formula used in the walls of Constantinople. Albert Long Hall (right) houses science classrooms.

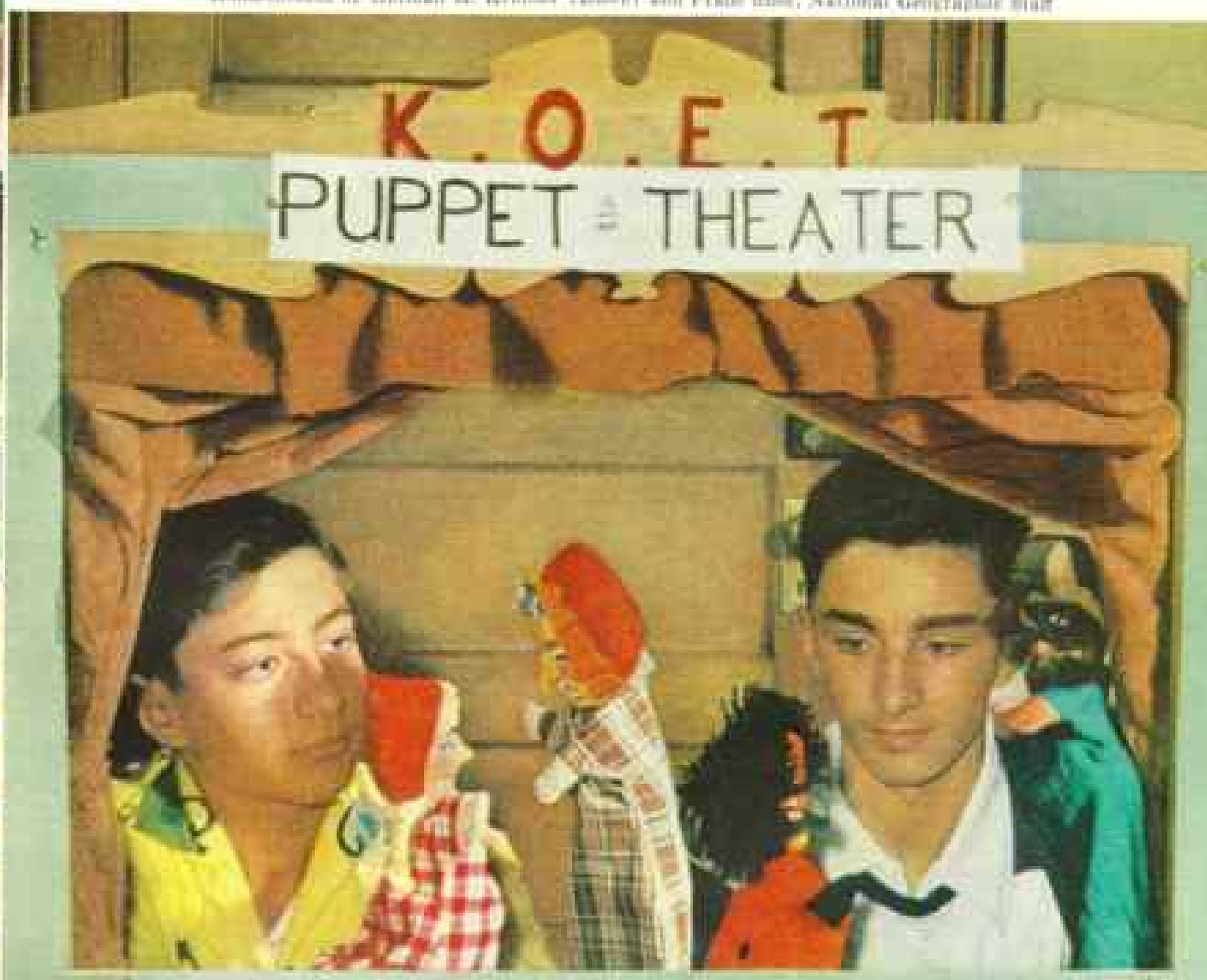
American Ballads Interest English-speaking Turks

Despite their devotion to work, students of Robert College and Academy and the American College for Girls find time to absorb jazz, folk songs, and movies from the United States. These boys browse through a book of ballads in the academy library.

Punch and Judy Tread the Boards for Turkish Masters

Ancient Moslem law forbade the making of human images. Theologians exempted puppets, "killed" by perforations for manipulating the limbs. Children of Turkey delight in the antics of Karagöz, a rascally shadow puppet related to the Italian Punchinello. These two academy students practice with the Anglo-Saxon counterparts, Punch and Judy. Puppeteers' initials appear above the stage. Turkey adopted a modified Latin alphabet in 1928.

Kodachromes by Herman R. Kreider (above) and Frank Hurt, National Geographic Staff



riod," Mrs. Nordhus said. "I told the girls about myself and my home town, and asked about their homes and families. Then, just at the end of the period, I asked if they had any questions. There was one:

"'Who is the most beautiful, Ava Gardner or Doris Day?' one of the girls asked. Then another of them had a question.

"'Doesn't Doris Day have brown spots on her face?' she wanted to know. And so the first English word I taught them that day was 'freckles.'"

More than 80 Americans serve on the administrative and teaching staffs of the two colleges. Everyone with whom I talked was enthusiastic about his or her job, devoted to the students, and bursting with plans for improvement. At a faculty meeting I heard one of them read with pride a quotation from the noted historian Arnold J. Toynbee:

"Robert College is fulfilling one of the great educational needs of our time," said the British scholar.

"Its achievement has been to provide a home of learning, kept free from the fierce political controversies of the present age, in which young men of all religions and all nationalities have been able to receive a first-rate modern education."

Alumnus Brings Progress to Home Town

President Ballantine is determined that the colleges shall continue that standard of achievement and improve upon it. Working with United States and Turkish corporations, educational foundations, and private donors, he is striving to increase endowment funds to bring even more deserving Turkish boys and girls into the college orbit.

"Our task here is a difficult one," he told me, "but the rewards are great. Only last week I visited the town of Söke. The peasant farmhouses were far above the average, and I asked how it happened. I was introduced to a Robert College alumnus who, his fellow townsmen told me, was personally responsible for their improved standard of living.

"He had introduced the use of farm tractors and improved methods of cotton cultivation. He had also established a fisheries business, was building a nine-story hotel in Izmir, and planned a tourist hotel in the charming Aegean village of Kuşadası. It's good to be part of an institution that turns out men of that caliber."

Director and Cast Confer at Dress Rehearsal →

Robert College and the American College for Girls stage some of Istanbul's finest performances. Repertoires range from modern American plays to classic Greek drama in Turkish translation. Shakespeare is a favorite.

Mrs. Anne Nordhus goes over a script with players dressed as Anatolian peasants.

Lower: Open shelves draw readers to the 25,000-volume library, one of the finest multilingual collections in the Balkans. Mary Mills Patrick, for 34 years president of the American College for Girls, wrote: "Education for women is now no longer an adventure, but a necessary element in national life and a law of the land."

Dr. Ballantine walked to the rock wall surrounding his flower-filled garden and looked across Rumeli Hisar to the shores of Asia.

"The most moving thing that has happened to me," he mused, "came last year when we offered five all-expense scholarships to students from the smaller towns of Anatolia. After the preliminary selection, 40 candidates came with their parents for examinations.

"I saw the parents that morning sitting outside Theodorus Hall while their sons were taking the examination; their feelings were written clearly on their faces. This was all they might have dared to dream of, and I knew that they were praying that their sons might do their best and be successful.

"These were the rough-hewn, simple, decent people on whom Mustafa Kemal Atatürk rested the fate of the Turkish Republic when he moved to Anatolia and began the war of independence. They are the people, I am sure, on whom Turkey's future fate will rest if its development is to be genuinely democratic."

Century of Service to Turkish People

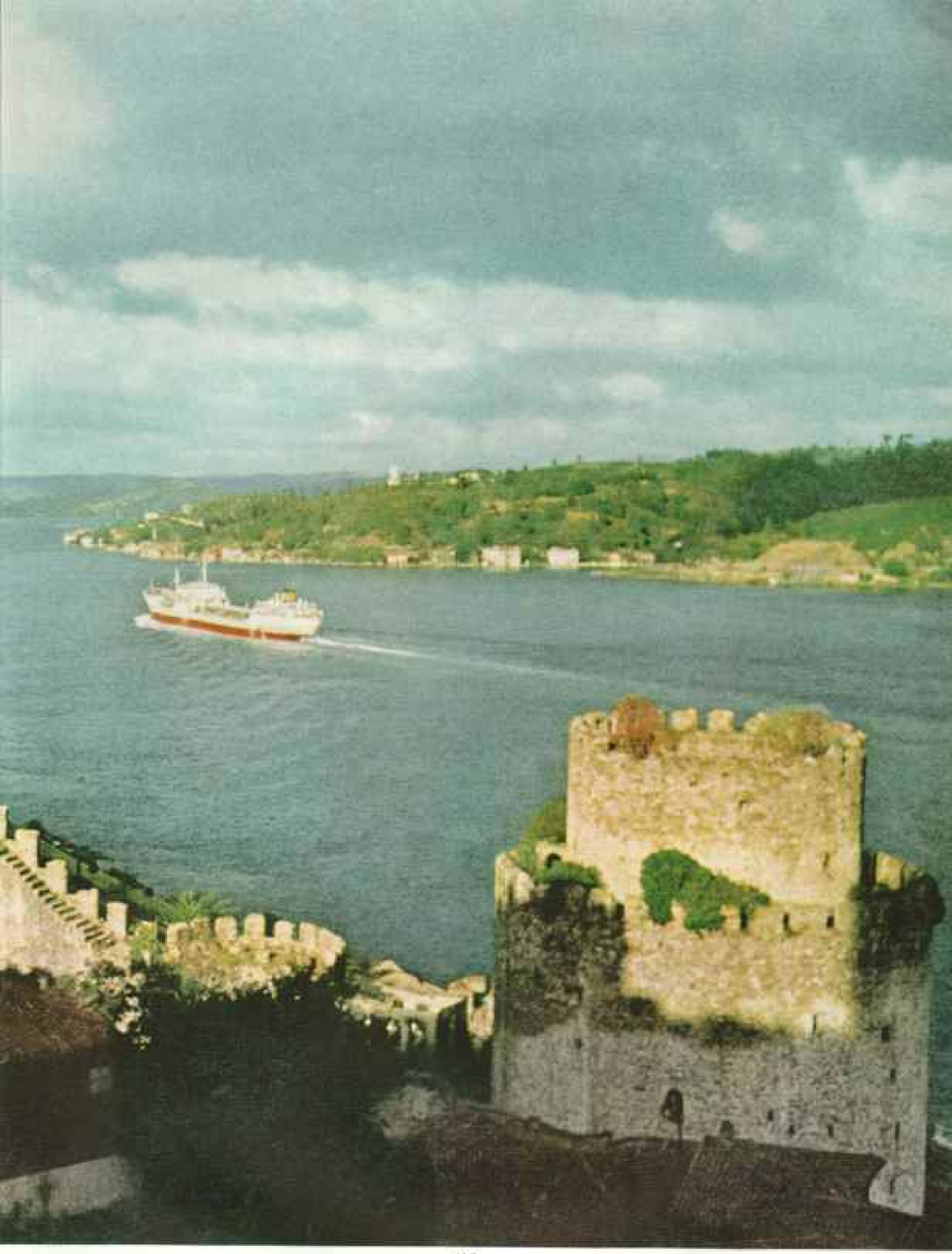
When the examinations were over, Dr. Ballantine invited the parents into the hall and explained the method of selection.

"It was hard," he said, "to face the fact that only five could be successful and that the others would have to return to their villages. When I told them that I wished I had 40 scholarships to give instead of five, I spoke from my heart. Those are the people we want to serve."

They are the people whom Robert College has been serving for nearly a hundred years. And it is a service of which Americans can be proud.

Rumeli Hisar's Crumbling Turrets Recall the Might of Ottoman Turkey

Constantinople stood for more than a thousand years as the eastern bastion of Christianity. Mohammed the Conqueror, bent on its seizure, built Rumeli Hisar in four and a half frenzied months. The city's fall, after an eight-week siege, established Ottoman rule throughout the Near East. A century later Mohammed's successors, from their capital astride the Golden Horn, controlled an empire that stretched across three continents.



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A Tanker Churns the Narrows Where Ships Hove To for Tribute

The Turks converted their sprawling headquarters into a toll station, exacting payment from all passing vessels. Vine-covered Tower of Blood (right) housed political prisoners. Abandoned for centuries, the castle walls until recently sheltered families held by tradition to be descendants of the builders. Today only an occasional visitor threads the deserted passageways. Ship heads toward the Black Sea.

Kodachrome by Frank Shor, National Geographic Staff

Ancient Turkey Serves the New: Coffee Welcomes a Guest to the Istanbul Hilton

Hostesses in Turkey's largest hotel wear the glittering brocade and heavy gilded silver ornaments of the imperial Ottoman harems. A graduate of the American College for Girls here accepts her country's thick strong beverage.

Lafayette's Homeland, Auvergne

France and the United States Together Celebrate the 200th Birthday of an Aristocrat Who Helped Win American Independence

By Howell Walker

Foreign Editorial Staff, National Geographic Magazine

With Photographs by the Author

THE year was 1777. At a French inn near the Spanish border an exhausted 19-year-old, dressed as a postilion, dozed in the stable. Just as a detachment of cavalry clattered into view, the innkeeper's daughter glanced at the young man and exclaimed in surprise. Could this be the same person she had seen only a fortnight before in the garb of a dashing nobleman?

At a sign from the aroused youth, she stifled her cry. Silently the two listened as the cavalry officer asked if anyone had seen a tall young noble traveling toward Spain. He did not add that the Marquis de Lafayette, the man he sought, had some wild notion of going to North America to fight in the Revolution. The King had ordered him stopped.

Marquis Forsakes Glittering Court

The girl did not give the disguised Lafayette away. When the soldiers had departed, he swung onto his horse and spurred toward Spain, where a ship awaited him.

Thus defying his King, Lafayette forsook the glitter of Versailles to fight for American liberty. Leaving behind his young wife and his beloved France, he crossed 4,000 miles of ocean to the bitter cold of Valley Forge, to a wound in the leg at Brandywine Creek, and to undying glory in the hearts of free men.

Among the remote mountains of south-central France, midway between Paris and Marseille, stands the Château of Chavaniac, where Lafayette was born 200 years ago this month. If he could return to his birthplace in the ancient province of Auvergne, he would see that the United States has remembered him well. During World War I Americans purchased the château and restored it as the Lafayette Memorial, a permanent shrine to the Frenchman who played such a glorious part in his adopted country's struggle for independence (map, page 422).

Last April I drove up to the gates of the old château on a windy Saturday afternoon. A caretaker told me that visitors were admitted only on Sundays, Tuesdays, and Thursdays. Then, seeing my disappointment, he asked where I came from.

"Ah, but Americans are always welcome," he said. "Come with me, monsieur."

We walked toward the north façade of the stone building flanked by two fat round towers (page 422). In the west tower on September 6, 1757, a son was born to "the very high and very mighty lord Monseigneur Michel Louis Christophe Roch Gilbert du Motier, Marquis de La Fayette, Baron de Vissac, lord of St. Romain and other places" and to "the very high and very mighty lady Madame Marie Louise Julie de la Rivière."

Next day the infant was christened Marie Joseph Paul Yves Roch Gilbert du Motier de La Fayette. All of which the highborn youth was to condense democratically to Lafayette, dropping at 33 the title of Marquis that he had inherited at the age of two.

The Château of Chavaniac lacks elegance, but makes up for it with a magnificent outlook over the sweeping valleys and volcanic mountains of southern Auvergne. Restorations have changed the lines of the rugged castle originally built in the 1300's, but its many windows face countryside that must look much as when Lafayette lived here.

Oxen Till the Fields of Auvergne

Standing at the window of his birthroom, I gazed over pastures where the brown sheep of Auvergne have grazed for centuries. I saw grainfields still worked by oxen pulling crude plows. And on the pine-forested slopes behind the hamlet of Chavaniac Lafayette I could picture the eight-year-old Marquis lugging a flintlock as big as himself in the brave hope of getting a crack at a wolf.

Though the provincial scene has altered little since Lafayette's day, one change on his estate would surprise and delight him. In 1916 the Americans founded a refuge for French war orphans as a living part of the Lafayette Memorial. Later it became a

center for sickly children from all corners of France. Today several hundred boys and girls are regaining their health where Lafayette spent his first 11 years.

His father, a colonel in the French Grenadiers, died in battle when his son was two. The boy grew up quickly. He seemed to leap from childhood to manhood, not pausing long for adolescence. Before 13, Lafayette inherited his grandfather's fortune and became one of the richest youths in France. His own military career began at 14, when he entered the King's Musketeers.

Lafayette married when he was only 16; his wife, the 14-year-old Marie Adrienne Françoise d'Ayen de Noailles, belonged to one of the most powerful families in France. The young couple lived amid the court of Louis XVI and Marie Antoinette at Versailles. But Gilbert, as his family called him, was ill-suited to court life: his dancing was so awkward the Queen herself laughed at him.

Lafayette was interested in more serious matters than dancing. He had been exposed to the revolutionary ideas of Rousseau and other freethinking French writers. Then, at a dinner party, he met the Duke of Gloucester, an Englishman sympathetic to the rebellious North American colonists. Lafayette was fascinated by stories of their struggle for independence; he resolved to join the fight.

(*Continued on page 426*)

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Lofty Chapel and Statue Crown the Plugs of a Dead Volcano, a Sight Known to Lafayette

The town of Le Puy (The Peak) lies in a bowl-like crater some 20 miles from the château where the Marquis de La Fayette was born.

On a lava pyramid rising 280 feet above the town stands the 11th-century Chapel of St. Michel d'Aiguilhe. Stairs cut from solid rock lead weary visitors to the cloister.

Another volcanic peak supports the 50-foot-high Notre Dame de France, a hollow statue cast from 213 Russian cannon seized at Sevastopol in the Crimean War.

Romanesque bell tower of the Cathedral of Notre Dame soars at right.

BELGIUM
LUXEMBOURG
GERMANY
Seine
Paris
Marne
Versailles
Château of La Grange,
Lafayette's home, 1799–1834
Loire
FRANCE
Doubs
SWITZER-
LAND
Vichy
Clermont-
Ferrand
Lyon
ENLARGED AREA
AUVERGNE
Le Puy
Aurillac
Chaudes
Aigues
Rhône
Turin
ITALY
Genoa
Nice
Monte Carlo,
MONACO
Marseille
Toulon
Mediterranean Sea
ANDORRA
SPAIN
Corsica
STATUTE MILES


Château of Tournoel
Riom
Clermont-
Ferrand
Puy de Dôme 4806
Allier
Orcival
La Bourboule
St. Nectaire
Le Mont
Dore
Issoire
Thiers
Durolle
Ambert
Mill of
Richard
de Bas
Château
of Aix
Dolore
Lempdes
Allier
La Chaise
Dieu
Brioude
Massiac
Birthplace of Lafayette
September 6, 1757
Chavaniac Lafayette
Cantal
Château of
St. Romain
Siaugues
St. Romain
Velay
Le Puy
Dore
Loire
STATUTE MILES

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↑ Ivy-clad Château of Chavaniac Memorializes a Hero of Two Worlds

Marie Joseph Paul Yves Roch Gilbert du Motier de La Fayette was born in the Château of Chavaniac September 6, 1757. At the age of 19 he served as the youngest major general in the American Revolution.

A group of grateful Americans in 1916 purchased Chavaniac as a war orphanage. Today the château is a museum, and M. Convair (in beret) is the caretaker. Separate quarters house a sanitarium for French children.

Lafayette in Bronze Stands in Le Puy →

The young Marquis returned from America an idol on both sides of the Atlantic. Throwing himself into his own country's revolution of 1789, he assumed command of the National Guard of Paris. This statue and its inscription commemorate his speech to the revolutionary Commune on July 17. Holding aloft the Guard's new red, white, and blue rosette, his own design, he cried, "I bring you a cockade that will go around the world."

← Auvergne, Lafayette's country, lies atop a massive plateau in south-central France.

Lafayette's Portrait Looks Down on the Room Where He Was Born

So devoted was the Marquis to his foster country, America, that he named Chavaniac's chambers for the Thirteen Original States. Visitors to the west tower see this room as it might have been when Lafayette's mother, "the very high and very mighty lady Madame Marie Louise Julie de la Rivière," bore her only son. Lacking the original furniture, the Lafayette Memorial purchased 18th-century pieces.

The painting is attributed to Jacques Louis David, court painter to King Louis XVI and Napoleon.

Gold Snuffbox, Brooch, and Ring Were Treasured American Mementos

The American Revolution forged a deep bond between Lafayette and George Washington, his commander. For years after the peace, gifts crossed the ocean between the two generals. Lafayette proudly sent his friend a key from the Bastille, destroyed by French mobs. Washington shipped a barrel of hams from Mount Vernon.

Other gifts shown at Chavaniac are a monogrammed pin from Benjamin Franklin (left, above) containing a lock of his hair; a ring with the hair of Washington and his wife; and a snuffbox (left) presented by the City of New York.

History Remembers Lafayette as Democracy's Champion and Friend of Presidents

Lafayette's zealous defense of the rights of man earned the esteem of seven United States Presidents and the alternate love and hatred of his own countrymen. His vast popularity emboldened him to sign an order for the arrest of King Louis XVI in the revolution of 1789.

Riots, however, disgusted Lafayette, and he ordered his National Guard to disperse the Paris mobs. Enraged Jacobins forced him to leave the country. Emperor Francis II of Austria, no friend of democracy, imprisoned him for five years.

Returning, Lafayette pinned his hopes for French liberty on Napoleon, but turned his back when the Corsican crowned himself Emperor. Lafayette forced Napoleon's abdication after Waterloo and later won acclaim as an elder statesman.

The General died May 20, 1834, at the age of 77. He lies beneath Virginia soil in Paris's Picpus Cemetery near 1,300 victims of the Jacobin guillotine. King Louis Philippe forbade demonstrations at the funeral lest the name of Lafayette evoke another revolution.

This engraving by Christophe Guérin shows Lafayette wearing the Cross of the Order of Saint Louis, the Badge of the Society of the Cincinnati, and a medal struck in honor of the fall of the Bastille.

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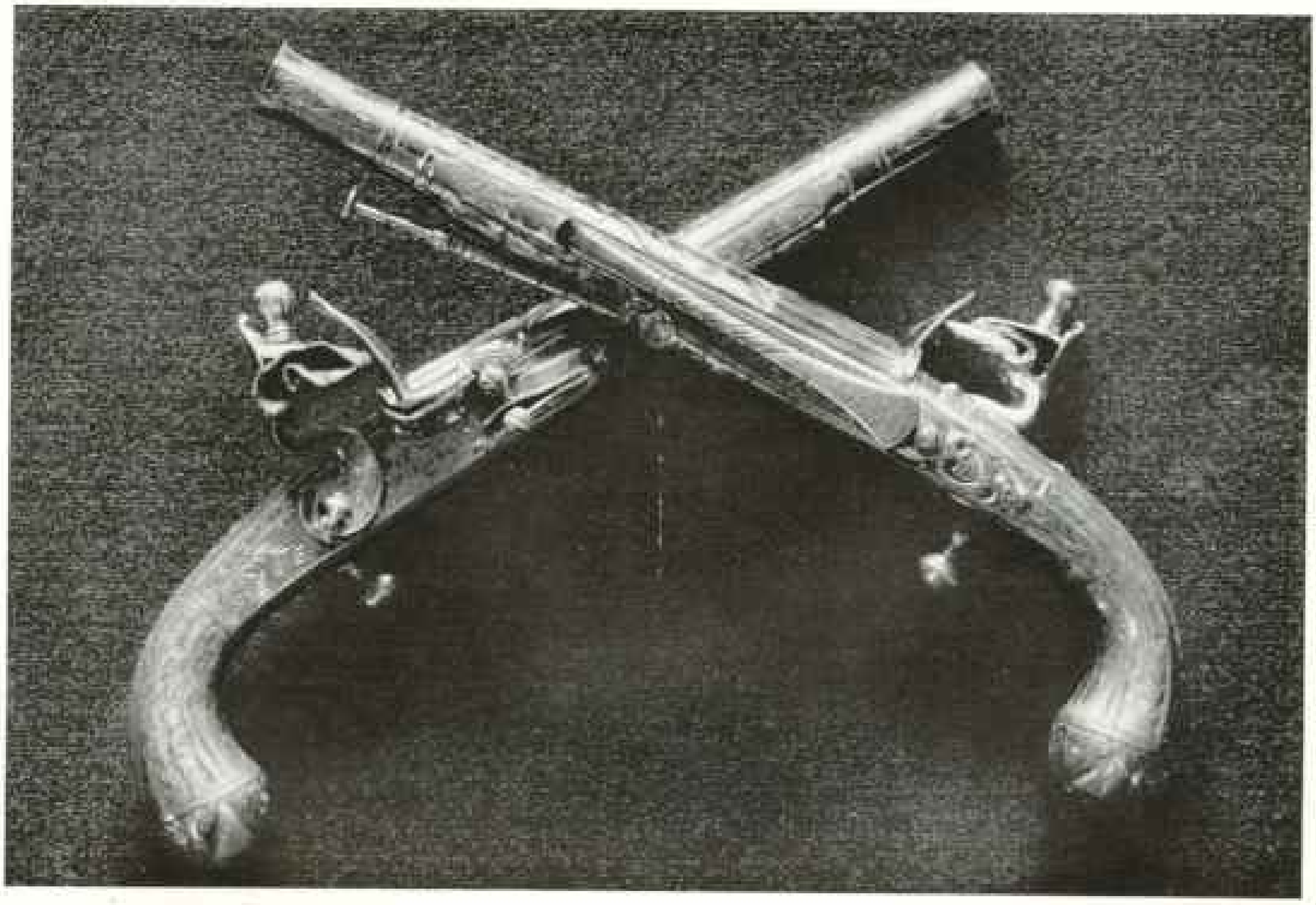
Washington's Gift to His "Adopted Son": Pistols Taken from a British Officer



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Crowds in Search of News and Bargains Fill the Streets of Le Puy on Market Day

Lafayette's influential father-in-law, the Duc d'Ayen, opposed this nonsense, going so far as to persuade Louis XVI to order the youthful noble held if he tried to leave France. But the headstrong Lafayette had already bought and outfitted a ship, *La Victoire*, and had it moved to a Spanish port. After evading the soldiers of the King, he set sail on April 20, 1777, for America.

In Philadelphia he met and won George Washington and the Continental Congress. They voted him a commission as major general—at 19.

The young French aristocrat plunged quickly into the struggle. He fought in several major battles, was wounded at the Brandywine, wintered at Valley Forge with Washington and the ill-clad Continental Army, and in four and a half years completely captured the hearts of America and France. He became the hero of two worlds.

Now in 1957 the Old and New Worlds celebrate the 200th birthday of their mutual hero; this year is "Lafayette Year."

In the United States some 50 cities and towns, 17 counties, a college, and numerous institutions all bear Lafayette's name. Many will mark his bicentenary this year. In France, pageants, banquets, and pilgrimages to Auvergne have brought into sharp focus the eventful life of this Frenchman whose liberal opinions were so far in advance of his time.

Triumphal Return to America, 1824

At an early age the young Marquis left Chavaniac for school. Never again did Lafayette live the year round in his beloved Auvergne. Most of his life after his return from America was spent in Paris and at the Château of La Grange, some 30 miles southeast of the French capital.

Always a controversial figure in his homeland, Lafayette's middle years were marred by imprisonment and exile. But one shining triumph must have made up for whatever happened elsewhere—a return visit to his adopted land. When Lafayette came in 1824

to the United States, the whole nation rose in applause. A grateful Congress voted him $200,000, the estimated amount he had spent during the American Revolution, and Maryland declared that he and his male heirs should forever be citizens.

At 77 Lafayette died in Paris. He and his devoted wife, who waited at home while her husband fought freedom's battles, lie in the tiny Cemetery of Picpus on the right bank of the Seine.

Paris may have claimed most of Lafayette's adult years, but he returned again and again to country life, both at La Grange and at Chavaniac. Like General Washington, his good friend and comrade-in-arms, General Lafayette found respite from political turmoil on his country estates surrounded by his family. He took a scientific interest in farming and early brought an expert from England to improve Chavaniac's methods of agriculture.

On one of his visits to Chavaniac, Lafayette learned that the crops in the vicinity had failed. The coming season looked hopeless, and already food was scarce. Yet the Marquis found his own granaries well filled.

"Now," said his head farmer, "is the moment to sell your grain."

"No," Lafayette corrected. "Now is the time to give it away."

The act was typical of Lafayette, who had served without pay in the Continental Army. Some years later, after his own fortune had been lost in the turmoil of the French Revolution and he himself had spent seven years in prison and exile, the United States Congress voted him $24,424—his back pay as a major general.

Mountains Dominate Auvergne

The part of south-central France most intimately associated with Lafayette falls roughly within a triangle formed by Vichy in the north, Le Puy in the southeast, and Aurillac in the southwest. Through the heart of this country the Marquis often rode on trips between Paris and Chavaniac.

Auvergne is a land of massive mountains with rounded domes and jagged crags, vast valleys and sudden gorges, racing rivers, frigid trout streams, and steaming springs. Its forests and upland meadows are gay with narcissus and daffodils in spring, and smothered with snow in winter.

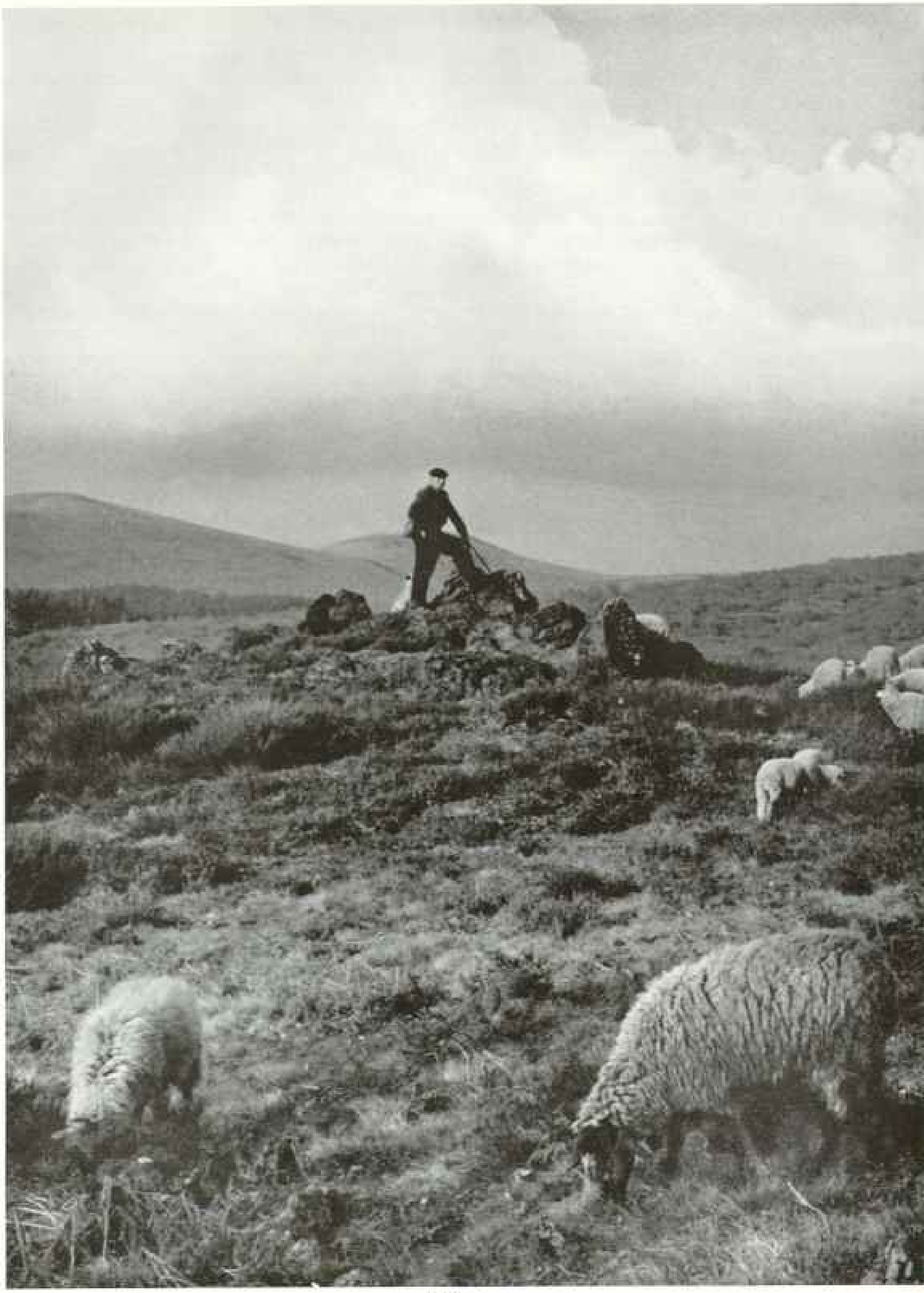
It is a land of intimate small towns, few cities, and down-to-earth folk, friendly and genuine and determinedly independent. These people may not move from the middle of the road to let a car pass, but they will go miles out of their way to do you a favor.

Auvergne is not a rich land. The Auvergnat works hard for little reward. Farmers and laborers toil until dark, and women spend hours on their knees beside rivers and streams, submerging their hands in icy water to do the family washing.

Some, however, have come round to wear-

Lacemaker's Nimble Fingers Preserve a Dying Art

Delicate lace, patiently made by hand, still comes from Lafayette's home region. This woman sets a score of bobbins flying on her *carreau*, or cushion. Factory-made lace, like that of the curtains, threatens this centuries-old craft.



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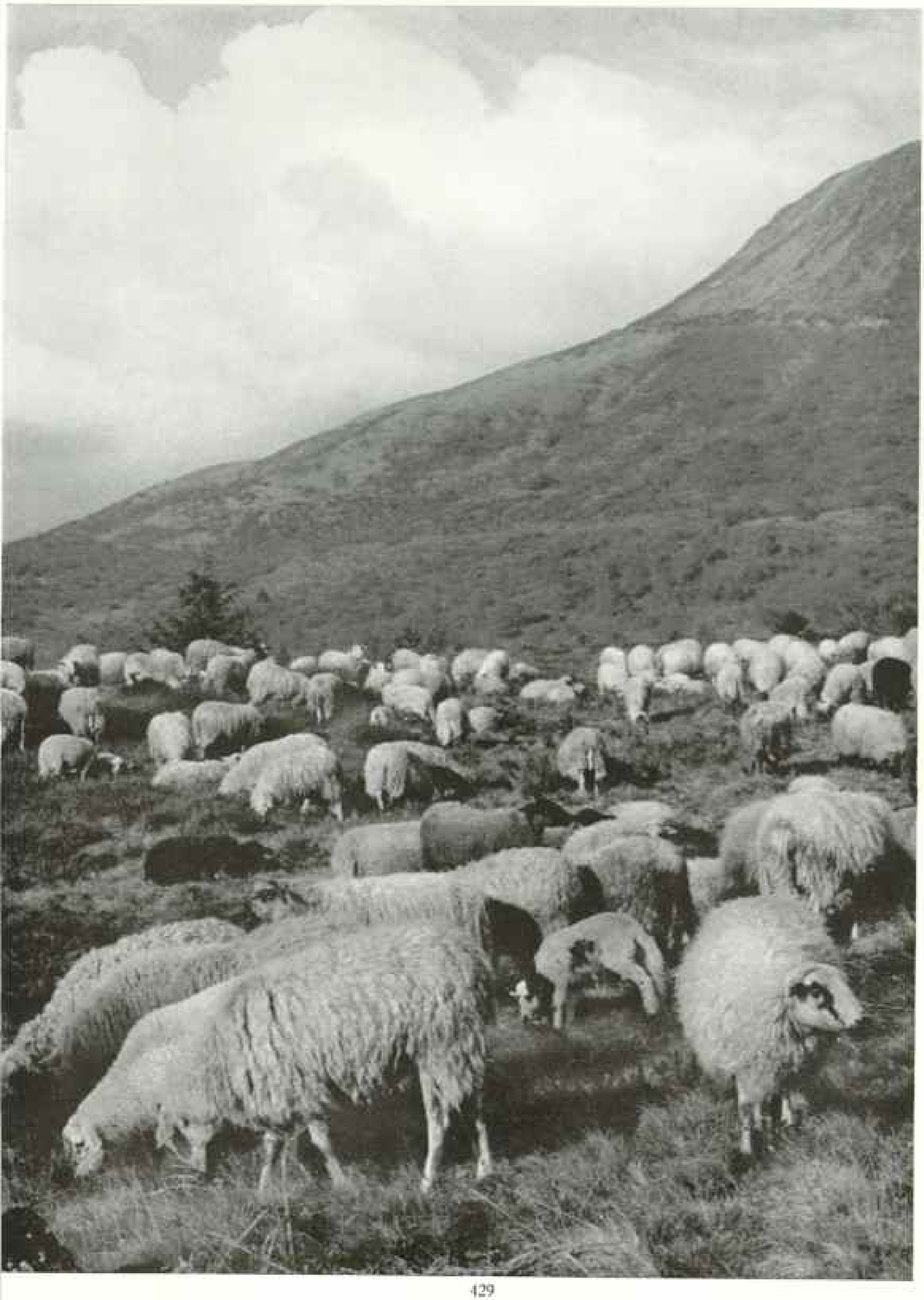
Shepherd and Dog Share a Lonely Watch Under Auvergne's Lofty Skies



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Flocks Graze Beside Massive Puy de Dôme, a Volcanic Giant Grown Cold

ing rubber gloves, and washing machines are beginning to trickle into the more progressive communities. Owners like to show them off. I saw one outside a café whose proprietress left it only long enough to serve me.

I drove over much of Auvergne, delighted with all I saw. Around almost every bend in the road I caught a glimpse of a feudal château looming dramatically on the lofty skyline.

Castles Rise from Sheer Cliffs

Castles appeared to grow straight up from basalt heights. They perched precariously atop incredible cliffs, crowned long-quiet volcanoes, dominated hill towns, and were reflected restlessly by the rivers. Many of them had been built as family fortresses in an era of seignorial jealousies when communities lived in constant danger of sudden attack. Today most have crumbled into romantic ruins.

An elderly man living among the remnants of the 14th-century Château of Tournoël met me at its fortified gate, phlegmatically collected 50 francs, and recited a condensed history of the place in a voice like a recorded weather report. Then he left me to ramble around the ramparts and rooms once inhabited by a branch of the Lafayette family.

In the central courtyard a gracefully sculptured but badly damaged nymph of unusual beauty prompted me to ask the caretaker about it. During the Revolution, he said, vandals had pulled it down and broken it. Beyond that he offered little information, and showed slight interest in the lovely life-size figure.

"I might have regarded it differently 50 years ago," he said, and for the first time I caught a glint of humor in his tired eyes.

West of the town of Ambert I turned off the paved highway onto a winding dirt road. I was looking for the Château of Aix, cradle of the earliest Lafayettes. A farmer directed me to an even smaller, rougher lane leading over a hill and into a farmyard. When I knocked at the house for information, a man came out and led me to a huge stone barn.

Apart from a handsome portal added in the 16th century, the building holds no obvious clues to a noble past. Whether or not it really was the stronghold of the first La Fayette seems debatable. All I could learn boils down to one certainty: The Du Motier family, from whom General Lafayette descended, lived in this immediate area about the year 1000 and called its castle "Villa Faïa," whence the name La Fayette.

Ancestor Fought Beside Joan of Arc

From the Château of Aix the La Fayettes spread through Auvergne. A prominent La Fayette acquired the Château of St. Romain. He, Gilbert du Motier, fought beside Joan of Arc to drive the English from France, and, again with Joan, helped put Charles VII on the throne.

To reach the ruins of Du Motier's castle, high and gaunt against the sky, I left my car at the little village of Siaugues St. Romain

Skilled Hands Create Matchless Paper

Auvergnats returning from a 13th-century Crusade introduced papermaking into France. Today French publishers use costly handmade paper only for special editions.

These workers in the Richard de Bas mill near Ambert follow a process handed down from generation to generation.

◀ Men with copper screens scoop soupy pulp from a vat. They drain the mash before it enters the press between felt pads (below). Pipe in background serves a stove that keeps the pulp at a constant temperature.

▶ Fine-grained sheets hang to dry on fiber ropes.

Like Sailors on a Capstan, Papermakers Strain at the Bar of Their Press

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Smiles Light the Faces of Auvergne

A sunny nature belies the Auvergnat's hard life wresting a living from the rugged province. This woman of La Chaise Dieu borrowed the author's address book and pen. Would he, she asked, send a copy of the photograph to her son, a soldier on duty in strife-torn Algeria.

➔ Man of Clermont-Ferrand wears a rakish beret.

and trudged a mile or so up a steep cowpath. Trees grow now within the château's medieval walls. A 500-year-old fresco in the vaulted oratory still retained some of its soft colors. Wind in the pines made the only sound, accentuating the solitude.

Near the mountain village of La Chaise Dieu, bunched beneath its enormous church, I stopped to photograph a middle-aged woman plowing with oxen. Instead of returning to her task, she settled down on the roadside bank.

"Another American came to La Chaise Dieu," she said. "It was during the war. He could not understand why such a little village had such a grand church."

"Well, why has it?" I asked.

"Because," she said, "long ago—almost 1,000 years now—a priest came here, looking for a lonely place to pray in peace. But he was so loved and respected by other men of the church that hundreds followed him and built the great abbey."

The "priest" she spoke of was St. Robert, born in Aurillac, in Auvergne, about A. D. 1000. He came to La Chaise Dieu with two companions; when he died in 1067, some 300 monks lived in the monastery he founded.

Timeless Majesty of Old Churches

More characteristic of Auvergne are its Romanesque sanctuaries like those at Issoire, Orcival, and St. Nectaire. These austere 12th-century churches have a timeless majesty. Stolid exteriors belie unexpectedly graceful proportions within.

I wished to photograph the crypt of Issoire's church, but could find no one to give me permission. The temptation to go ahead was irresistible. As I set up my tripod, the curé entered and stared, apparently astonished at my effrontery. How small I felt among those huge pillars supporting the ponderous building! I started to explain.

With admirable courtesy the curé himself stood in the picture, then personally guided me over the entire church from crypt to clock tower, from the heavy west portal to

the airy apse. The magic of vaulting lost much of its mystery as he pointed out what held up the ceiling and the elementary engineering behind it.

Among the earliest and most popular pilgrim routes of Europe was one that wound through the valleys of Auvergne. Along this sacred route, linking France and Spain, Moorish influence infiltrated into the architecture of the region's celebrated sanctuaries, notably the cathedral at Le Puy.

The cathedral took shape on the flank of a rocky height where a paralytic was miraculously cured in the 5th century. Since then, pilgrims have flocked to the spot from all parts of the country and from foreign lands. Thirteen kings of France beginning with Charlemagne, six popes, some 20 saints, and countless thousands of others have made pilgrimages to Le Puy. Not even wars have deterred the devout. On one summer day in 1942 more than 10,000 French, following the example set by Joan of Arc's mother, came here to pray for their country.

City Lives in Dead Volcano

Le Puy, principal city of the region called Velay, lies in a bowl-like volcanic crater surrounded by green mountains. Two towering pinnacles of lava jut above the rooftops. On one the Cathedral of Notre Dame rears its Romanesque bulk. Atop the other, which rises 280 feet straight up from the valley floor, spectacularly perches the Chapel of St. Michel d'Aiguilhe (page 420).

Le Puy caps its religious landmarks with a 50-foot-tall Virgin standing on the summit of the cathedral rock. This colossal statue soars 400 feet above the town hall. Cast from 213 Russian cannon cap-

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Le Puy's Ribbed Streets Hypnotize the Eye

More than one mob in Lafayette's day found cobblestone paving a convenient arsenal of brickbats to hurl at enemies.

Thoroughfares like this exclude automobiles from much of the old town.

tured by the French at Sevastopol in 1855, the monument to Notre Dame de France is hollow yet weighs 121 tons. Pilgrims and tourists can reach the very top by an interior staircase.

I first saw Le Puy one afternoon when I drove over the mountain wall west of the city. Massive clouds sailed across the sky, blanketing the valley in lavender shadow. Suddenly the sun broke through, and shafts of gold lit the chapel-capped pinnacle, the cathedral, and the Virgin. It was a startling sight, splendid and profoundly stirring.

Le Puy Keeps Lafayette Alive

After several weeks in Le Puy, I am still in the process of discovering its infinite enchantments. Each time I walk along a street new to me the city unfolds yet another fascinating aspect. The corners I thought I knew look different in different lights, delighting me even in a cold rain. I never weary of the cobbled lanes winding quietly under old iron lamps and between tilted medieval houses.

Nor can I forget Lafayette. I live in the Lafayette Hotel; cross General Lafayette Street to reach the post office; walk past the Pharmacie Lafayette; sit at a sidewalk café looking at a statue of the hero who tells his countrymen, "I bring you a cockade that will go around the world" (page 423).

Long before General Lafayette's time Le Puy and Velay produced some of the most treasured lace in France. Then came machines, and the handwork sadly diminished. But I find elderly women still patiently persevering with pieces that require weeks, even months, to complete.

They sit in doorways or close to windows, holding firm cushions on their knees and shuttling bundles of bobbins with lightning movements my eyes could not follow. Centimeter by centimeter the intricate product of their skill emerges from numerous pins stuck in the *carreau*, or cushion (page 427).

← **Arch of Notre Dame Frames a Town Beloved by Pilgrims**

Le Puy's cathedral stands on a rock that tradition names the Stone of Fevers. Here, the legend says, the Virgin Mary worked miraculous cures. For centuries pilgrims from all parts of France have come to pray and to see a slab of the stone set in the pavement of the vestibule.

Striped pattern on arch and columns reflects Moorish influence, which reached Le Puy by way of Spain.

This view looks west across the town.

And then I turn a corner and hear the drone of machinery in some factory relentlessly mass-producing lace by the meter. Through an open door I see the much coarser and far less interesting designs issuing from a metal mouth with the impersonal efficiency of an endless belt.

Le Puy is determined that the manual art shall not die. Its schools are teaching girls the traditional craft. Although the dwindling numbers of apprentices cannot compete with modern factories, Velay and Le Puy believe that hand-worked lace of artistic merit has as much right to survive as, say, painting and sculpture.

Auvergne still looks largely to the land, and farming methods and equipment have changed hardly at all since Lafayette romped as a boy over the fields of Chavaniac. Its wide valleys in the east grow grains and vegetables. In its southwestern Department of Cantal men drive cows high into the mountains to summer pasture as their grandfathers and great-grandfathers did before them.

These herders live in rustic stone huts, where they make huge rounds of the cheese called Cantal. Periodically, ox-drawn carts struggle up to the *burons*, or mountain huts, to collect the cheeses for market.

Hot Spring Heats a Town

The scattered hillside vineyards produce red and white wines little known outside the province. Poor soil and undependable climate make grape growing risky. Untimely frosts, such as I witnessed this past spring, can wipe out crops overnight. In short, farming in Auvergne is a laborious gamble.

Clermont-Ferrand, largest city in the province, has turned to big industry. With a population of 113,000, the town specializes in the manufacture of rubber products, mainly automobile tires. It has become the Akron of France and the Paris of Auvergne; yet Lafayette would have no trouble finding his way around the older sections.

Other towns like Vichy, Le Mont Dore, La Bourboule, St. Nectaire, and Chaudes Aigues trust their mineral waters and thermal springs to bring them patients, tourists, and income.

Chaudes Aigues lies off the beaten track; as the name suggests, its water is acutely hot. It flows from a spring at about 180 degrees F. and since Roman times has furnished the town with central heat.

Hydroelectricity, presently produced on a big scale in Auvergne, has taken the made-by-hand charm out of traditional industries in some towns. For example, Thiers, one of France's leading makers of cutlery since the Middle Ages, now depends more on turbines than on antique water wheels along its River Durolle.

I saw one cutler working in the traditional way, lying flat on his stomach with a dog across his legs to keep him warm. But the crude grindstone on which he shaped the hand-forged blades was powered by electricity. Today the majority of the 600 cutlery works in Thiers, plus another 600 in the vicinity, use more modern methods and equipment. One can only assume that the number of dogs in the area has decreased commensurately.

Crusaders Introduced Papermaking

In the 13th century three crusading Auvergnats returned from the Holy Land with the secrets of papermaking yet unknown to France. They started a mill near Ambert, and there the industry flourished.

In this same district I recently went through the mill of Richard de Bas where men continue to make fine paper by hand. An average day's work produces only about 400 sheets that meet the high standard of the mill (page 431).

Why spend so much time and labor to accomplish so little? One may as well ask, why persist in making lace by hand? Both industries fairly claim the same basic reason for their existence.

The millers of Richard de Bas explain: "The beauty of paper hand-fabricated sheet by sheet does not lie in the idea that we think it poetic for it to be made as of old; it is a fact that paper made under these conditions is fine and one could not make it otherwise."

The France Lafayette Loved Best

Changes, of course, have come to south-central France during the last 200 years; but it is good to find traditions and convictions that keep Auvergne individual among the provinces, and much the same as Lafayette left it.

I like to know that when I stand at the window of his room in the Château of Chavaniac, I can look onto the same scenes that persistently urged him back to the region of France he loved best: farmers plowing with oxen in the broad valley to the north; his little village beneath the wooded hills on the east; and in the west the timeless, cloud-swept mountains between him and the sea and America, the country he helped in its time of greatest need.

Twice since then America has repaid the compliment. And today the United States is proud to join with France in honoring the memory and the land of their mutual hero.

In the article "Here Rest in Honored Glory . . . ," in the June, 1957, National Geographic Magazine, the author, Howell Walker, quoted a poem read at the dedication of the Brittany Memorial to Americans who died in World War II.

Authorship was attributed to an English schoolteacher and her pupils, from whom it had been received in a letter. It proved, however, to be an inexact version of a poem by Mrs. Elma Dean, of Oakland, California, first published in *The American Mercury*.

The National Geographic is happy to print, with permission and full credit, the correct version of Mrs. Dean's poignant *Letter to Saint Peter:*

Let them in, Peter, they are very tired;
Give them the couches where the angels sleep.
Let them wake whole again to new dawns fired
With sun not war. And may their peace be deep.
Remember where the broken bodies lie . . .
And give them things they like. Let them make noise.
God knows how young they were to have to die!
Give swing bands, not gold harps, to these our boys.
Let them love, Peter—they have had no time—
Girls sweet as meadow wind, with flowering hair. . . .
They should have trees and bird song, hills to climb—
The taste of summer in a ripened pear.
Tell them how they are missed. Say not to fear;
It's going to be all right with us down here.

INDEX FOR JANUARY-JUNE, 1957, VOLUME READY

Index for Volume CXI (January-June, 1957) of the National Geographic Magazine will be mailed upon request to members who bind their copies as works of reference.

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The exclusive new Readymatic Changer in use

New Kodak 300 Projector is only 5 inches high —yet shows color slides bigger, brighter!

The new "low look" of today's cars and homes and furniture is here now in a color slide projector —the great new Kodak 300 Projector!

This compact, completely carryable projector throws *bright* screen images. Gives *big* pictures, too, even in a small room, because it has a "wide-angle" lens.

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See the new Kodak 300 Projector demonstrated at your photo dealer's. It's only $64.50, or as little as $6.45 down—and made by Kodak, so you know it's good! *Prices are list, include Federal Tax and are subject to change without notice.*

So light and easy to store. Carries like a briefcase. Measures 11 x 11 x 5 inches with matching self-covet.

Controls for elevation and focusing are right on top. You "dial" perfect pictures fast—with fingertip ease.

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NATIONAL GEOGRAPHIC SOCIETY

WHEN Conrad Wirth, Director of the National Park Service, was elected a National Geographic Society Trustee, a new chapter opened in the long story of cooperation between the organizations.

For more than 40 years the Park Service and The Society have worked together to preserve America's priceless heritage. A notable example was the 1920 contribution of $100,000 by The Society and its members to purchase 2,239 acres of California's giant sequoias, added to Sequoia National Park.

Your Society financed seven expeditions to Pueblo Bonito in New Mexico. Removal of 100,000 tons of debris revealed a massive communal dwelling, one of the most densely settled spots in pre-Columbian North America, gave new insight into our continent's history, and added an imposing relic to the national park system.

The Society pioneered in exploring Carlsbad Caverns, now also a national park. In 1910 The Magazine's editorial support helped establish Montana's Glacier National Park. A Society-sponsored expedition first entered the spectacular Valley of 10,000 Smokes, now part of Alaska's Katmai National Monument.

"The untiring efforts of The Society and its members," says Mr. Wirth, "have contributed greatly to a park system that now embraces more than 23,000,000 acres and receives 60,000,000 visitors a year."

Glaciers and deserts, mountains and caves—these are monuments marking the joint efforts of The Society and the Park Service to conserve for America's tomorrow the unspoiled wonders of a primeval yesterday.

Introducing Conrad L. Wirth, newest member of the National Geographic Society's Board of Trustees. Elected to the Board on June 19, 1957, Mr. Wirth has been associated with the National Park Service for 26 years and its director since 1951.

RECOMMENDATION FOR . . . AND INQUIRY ABOUT *Membership*

Members of The Society satisfy a curiosity about the world through its official journal, THE NATIONAL GEOGRAPHIC MAGAZINE. Their enthusiastic nomination of friends for membership tells the story of The Society's phenomenal growth. Members receive the Magazine and its 10-color maps without cost beyond their annual dues, less than non-member subscriptions.

Those interested in The Society's work and its Magazine but who do not know a member should inquire (below) concerning membership.

TO: THE SECRETARY
NATIONAL GEOGRAPHIC SOCIETY
WASHINGTON 6, D. C.

CANDIDATE FOR MEMBERSHIP (PLEASE PRINT)

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CITY, ZONE, STATE

MEMBERSHIP DUES OF $6.50 INCLUDE SUBSCRIPTION TO THE NATIONAL GEOGRAPHIC MAGAZINE

Please fill in section that applies:

☐ **I NOMINATE** for membership the candidate above. (Use separate sheet for additional nominations.)

☐ **(GIFT MEMBERSHIP)** I nominate and enclose $_____ for dues of candidate shown at upper right. Please send gift card to recipient. ☐ Yes ☐ No

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FOR CALENDAR YEAR 1958. $6.50 rate applies in United States, U.S. Poss., and Canada. Countries in the Postal Union of the Americas and Spain, $7.00. Elsewhere, $8.00. (Determined by postage differentials.) Life Membership, $150.00. U.S. funds. Make remittances payable to and send direct to National Geographic Society. 9-57

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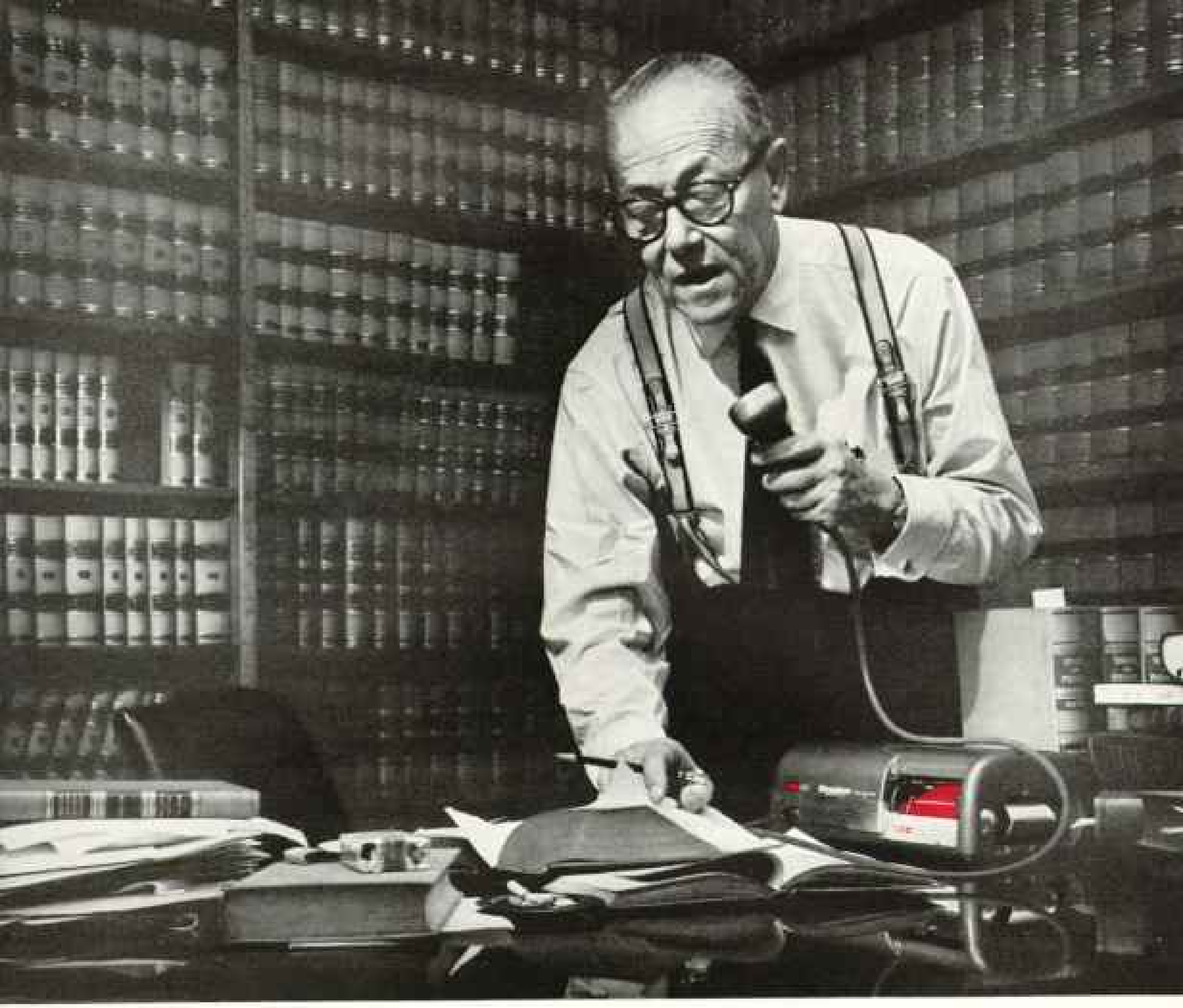
Members and others interested in The Society's work may make gifts or bequests of money, securities, or other property for "the increase and diffusion of geographic knowledge." Such gifts are deductible for tax purposes.



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Argus C-44 Color-Slide Camera $99.50 (WITH 50MM LENS)

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There's a pleasure in simply getting close to precision like this.

It looks as if it could be more than a match for any photographic situation. And it *is*—every ounce of it.

The specifications? They speak for themselves:

Cintagon f:2.8 Lens gathers the exact amount of light needed for clarity and contrast.

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Bayonet-type Lens Mount lets you switch lenses in seconds.

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Variable Power Viewfinder accessory clips on top of camera. You simply rotate knob to get a separate viewfinder for each lens.

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Eight miles higher than you stand, in the peaceful purple-blue of the stratosphere, a flawless open road is almost ready for you.

So soon now, you'll skim along this wide blue highway in the DC-8 jetliner at a pace to rival the speed of sound, with the whims of weather far below.

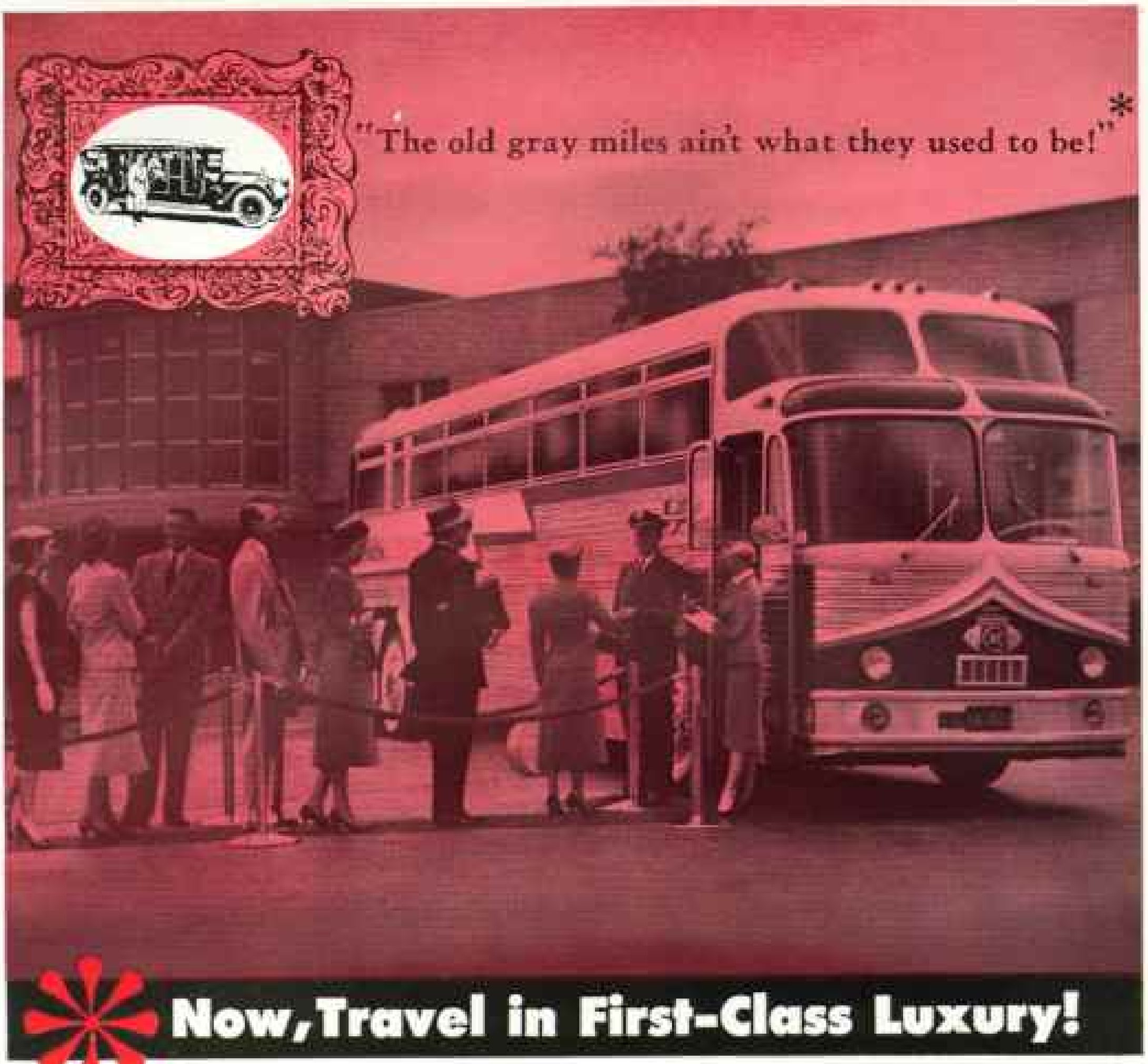
On this endlessly beautiful celestial thoroughfare in the DC-8, distance will all but surrender. The earth, so small now, will shrink a good deal more. Time will tick at a different tempo.

But your rewards in the jet age will be measured by more than time and space. Startling beauty will unfold for you . . . spectacles from the universe of stars and moon and sun, never so close to you before. And for your spirit, an unearthly sense of serenity.

It will soon be yours, this magic highway. And on its way to lift you to this thrilling new realm of flight is . . .

the Douglas DC-8 Jetliner.

These fourteen airlines already have purchased DC-8's: Delta Air Lines • Eastern Air Lines • Japan Air Lines • KLM Royal Dutch Air Lines • National Airlines • Olympic Airways • Pan American World Airways • Panagra • Scandinavian Airlines System Swissair • Trans-Canada Air Lines • Transports Aeriens Intercontinentaux • Union Aeromaritime de Transport • United Air Lines



Bus travel, as you knew it back in the "good old days," would be as out-of-date now as Grandma's old wicker suitcase!

Today you can board a luxurious Trailways Thru-liner and travel up, down, or across the continent — straight thru without changing buses or transferring your luggage. You can even ride from coast to coast and stay on the same bus . . . if you wanted to!

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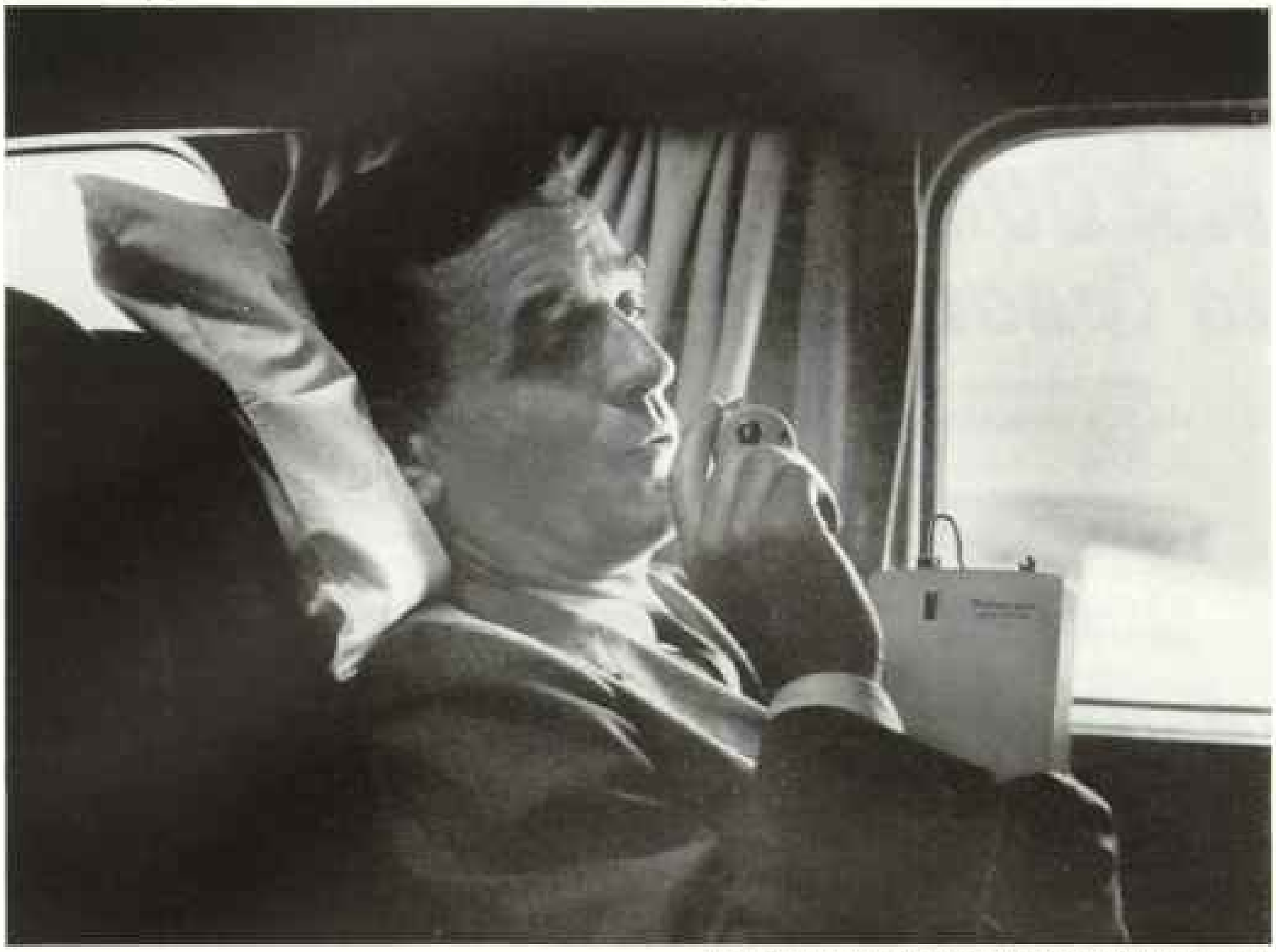
TRAILWAYS

On the move, in the air, *anywhere*—it makes no difference where you happen to be. You simply lift the mike and talk. Dictet does the rest. *No plug-in-connection needed.*



IN-FLIGHT PICTURE TAKEN ABOARD AMERICAN AIRLINES DC-7

New 3-lb. voice-recorder works anywhere

. . . needs no plug-in connection!

It's Dictaphone's new Dictet, the battery-powered voice-recorder that's portable as a camera.

The story is simply this: Dictaphone has taken the *work* out of out-of-office paperwork.

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How do you work Dictet? Simple. You pick up its mike and talk. That's all. Microphone doubles as speaker for instant playback.

Dictet is powered by small—but very beefy—mercury batteries. Recording medium: reusable tape. Tape takes one full hour of recording.

Fill in the coupon below, and we will fill *you* in with all the Dictet facts.

Weight: exactly 2 lbs., 11 oz. Dictet carries easily in its over-shoulder case, is small enough to fit in coat pocket.

With simple accessories, Dictet doubles as transcriber. Or you can buy it with matching Dictet Typer (shown above).

NEW **DICTET**®
BY **DICTAPHONE**®

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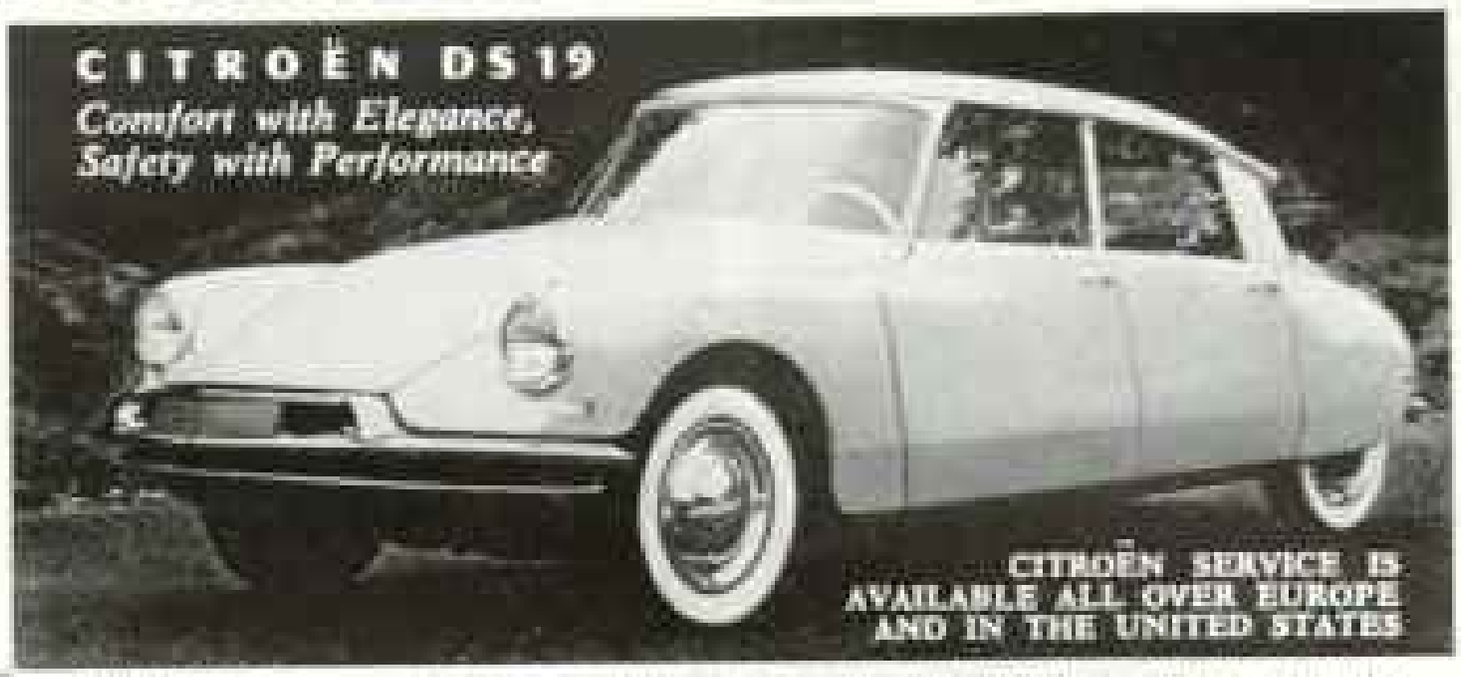

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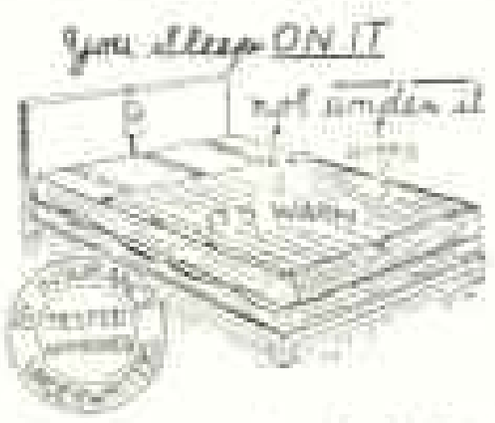

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You go for less because there's a 30% reduction in air fares to South America. And you live for less during your stay because favorable exchange rates stretch your dollars.

Day-by-day itinerary of a typical tour tells you how much you can see and do in the continent of contrasts. All packed and ready? Then let's go!

Leave New York after lunch. Fly by way of Miami to Panama. You'll be there in the late evening. You'll find a room with bath waiting at deluxe Hotel El Panama.

Next morning, a car will pick you up to drive you through Panama City, out to the ruins of Old Panama, along the seafront to Ancon and Balboa and to the Miraflores Locks in the Canal.

That night, you'll leave Panama and fly to Lima, Peru, arriving in time for breakfast. On your way from the airport to the Hotel Bolivar, you'll discover that you're in one of the loveliest cities in the world. Wide avenues with beautiful homes, narrow streets overhung with wooden balconies . . . great plazas with imposing old Spanish architecture.

Lima is exciting, and you'll be there several days. A sightseeing drive will take you to see the Bull Ring, Tomb of Pizarro, Hall of the Inquisition, mansions, suburbs and Inca Museum. You'll have extra time for golf, swimming, shopping. You'll find fabulous bargains in silver. Though in the tropic zone, Lima is cooled by the Humboldt Current, has a year-round average temperature of 70°.

On the morning of the 7th day, you wave farewell to Lima and take off for Santiago, Chile. This flight will show you some of the greatest peaks of the Andes. And after you've lunched you can watch for the first appearance of modern Santiago, nestled in a valley between walls of peaks. Streamlined houses sit in flower gardens. You'll drive from the airport to the fashionable Hotel Crillon via beautiful Avenida O'Higgins. Its name is one of many traces you'll find of British and Irish ancestry in Chile.

In the next 3 days, you'll have a sightseeing drive to see buildings, parks, gardens, the shopping district, Opera House, and to the top of San Cristobal Hill at nightfall just as the city lights go on. Another day, you'll have first-class rail tickets to Valparaiso, seaport next to Viña del Mar, the "Monte Carlo of Chile."

Across the Andes on the 11th day. You'll leave Santiago after lunch and arrive in Buenos Aires, Argentina, at dusk. This flight takes you within sight of Aconcagua, highest mountain in the New World. Crossing the Andes is the most dramatic 20 minutes you could have anywhere in the world.

Buenos Aires, called "The Paris of South America," will woo you with its beauty, gaiety, sophistication . . . and with Argentine beef that is thick, juicy, tender and costs next to nothing. Filet Mignon, 50¢; Sirloin, 47¢; Tenderloin, 45¢. You'll stay at the Hotel City for five days with time to explore on your own. And you'll have a guided sightseeing drive to the Opera House, Capitol, Casa Rosada, Rosedal, Palermo Park Racecourse, Paris-like boulevards and suburbs.

The morning of the 16th day, leave Buenos Aires and take an hour's flight over "The River of Silver" to Montevideo, Uruguay. You'll stay at the Hotel Nogaro. Sightseeing will take you along the riverfront, to Carrasco and near-by beaches, to the Capitol and the top of the hill which gave Montevideo its name. You'll have time to drive to ocean beaches.

On the 18th day, fly on to São Paulo, Brazil. You'll arrive at the Hotel Othon Palace at what you might consider dinnertime. But in South America, cocktails start about 9. And dinner can last until midnight. In the next two days, you'll visit the famous Butantan Snake Farm. And travel first-class rail to Santos to visit the Coffee Exchange, Vila dos Passaros, Orchid Farm and near-by Guaruja.

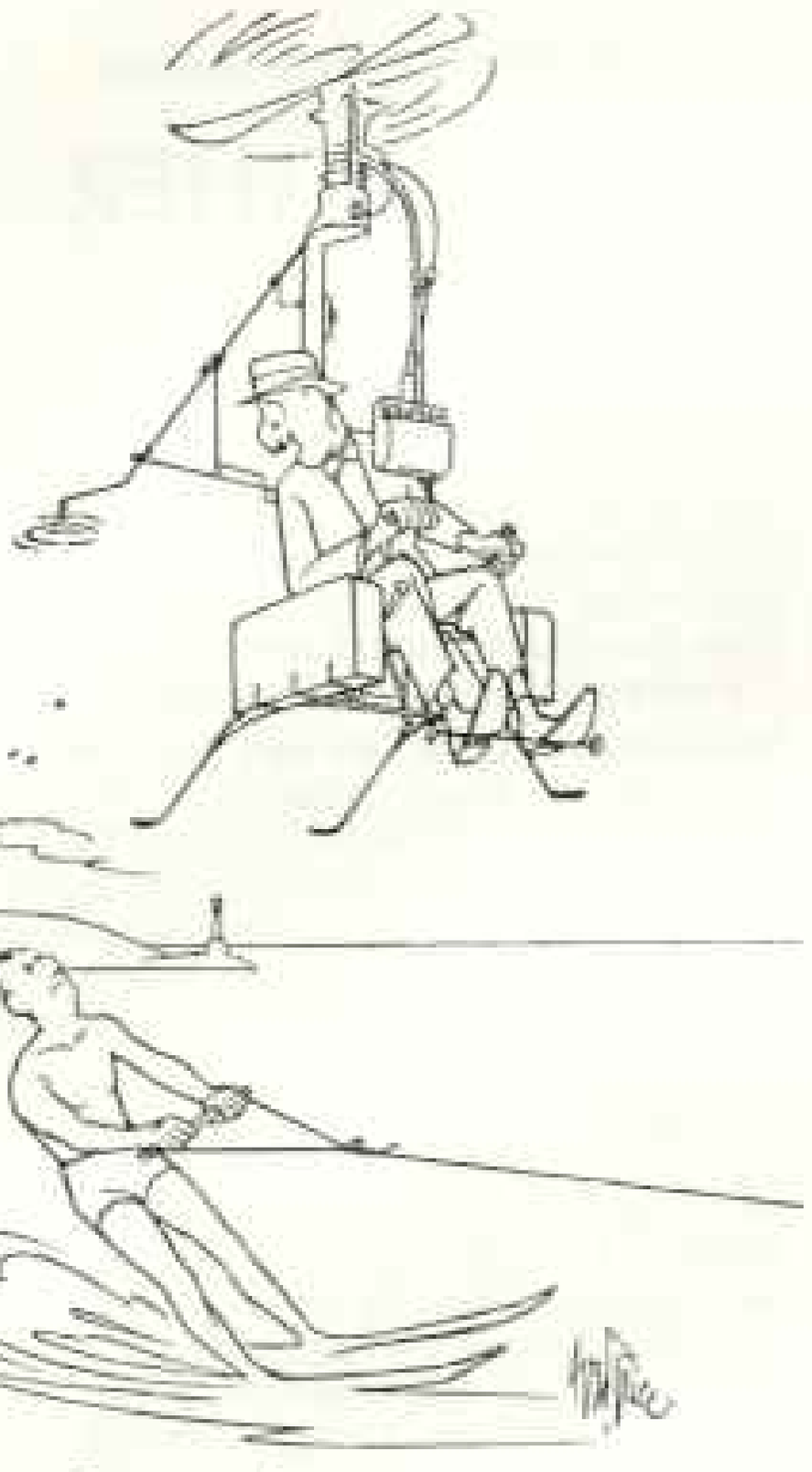
On to Rio, on your 20th day. It's an hour's flight from São Paulo. Time will race as you admire the scenic coastline and reach the climax of your flight with your air view of the heavenly harbor. In Rio, you stay at the Hotel Miramar Palace. Your sightseeing will take you to beaches, the government and residential sections, to bayfront boulevards, and to the top of breath-taking Sugar Loaf.

On the 25th day, you'll fly overnight to San Juan, Puerto Rico. You stay at the Condado Beach Hotel with two days for sightseeing—as well as a drive to Morro Castle, Marine Gardens, old Spanish sections and School of Tropical Medicine. On the 28th day you fly to New York.

This is Pan Am Holiday \$703, and from most major cities in the U. S. A., the cost is less than \$1,000. Cost includes round trip by air, hotel rooms, sightseeing.

Your flights are by pressurized DC-6Bs with Pan American-Grace Airways (Panagra) on the West Coast and Pan American World Airways on the East. All flights are radar-equipped. For slightly more, you can fly deluxe *El Inter-Americano* DC-7s.

The stops and the length of this trip are given as an example of what you can do down there with a dollar. There are many trips that you can choose from . . . guided all the way . . . or a combination of guided and on-your-own. You can get a handful of free folders and read the whole story. Ask your Travel Agent or write Mr. Don Wilson, Panagra, Room 4423, Chrysler Building, New York 17, N.Y.



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Recapture flavor this easy way!

"I completely satisfy my craving for real salt flavor by using Adolph's, the best-tasting salt substitute made. Adolph's looks, sprinkles and seasons like salt—retains its flavor in all cooking, baking and canning. The Mono-Potassium Glutamate in it accents the true flavor of all food. Now you can enjoy eating again! Ask for Adolph's Salt Substitute at your grocer's."

ADOLPH'S SODIUM CALCULATOR gives sodium content of all familiar foods in average household serving portions. Write for free copy. Adolph's Ltd., Dept. C9, Burbank, Cal.

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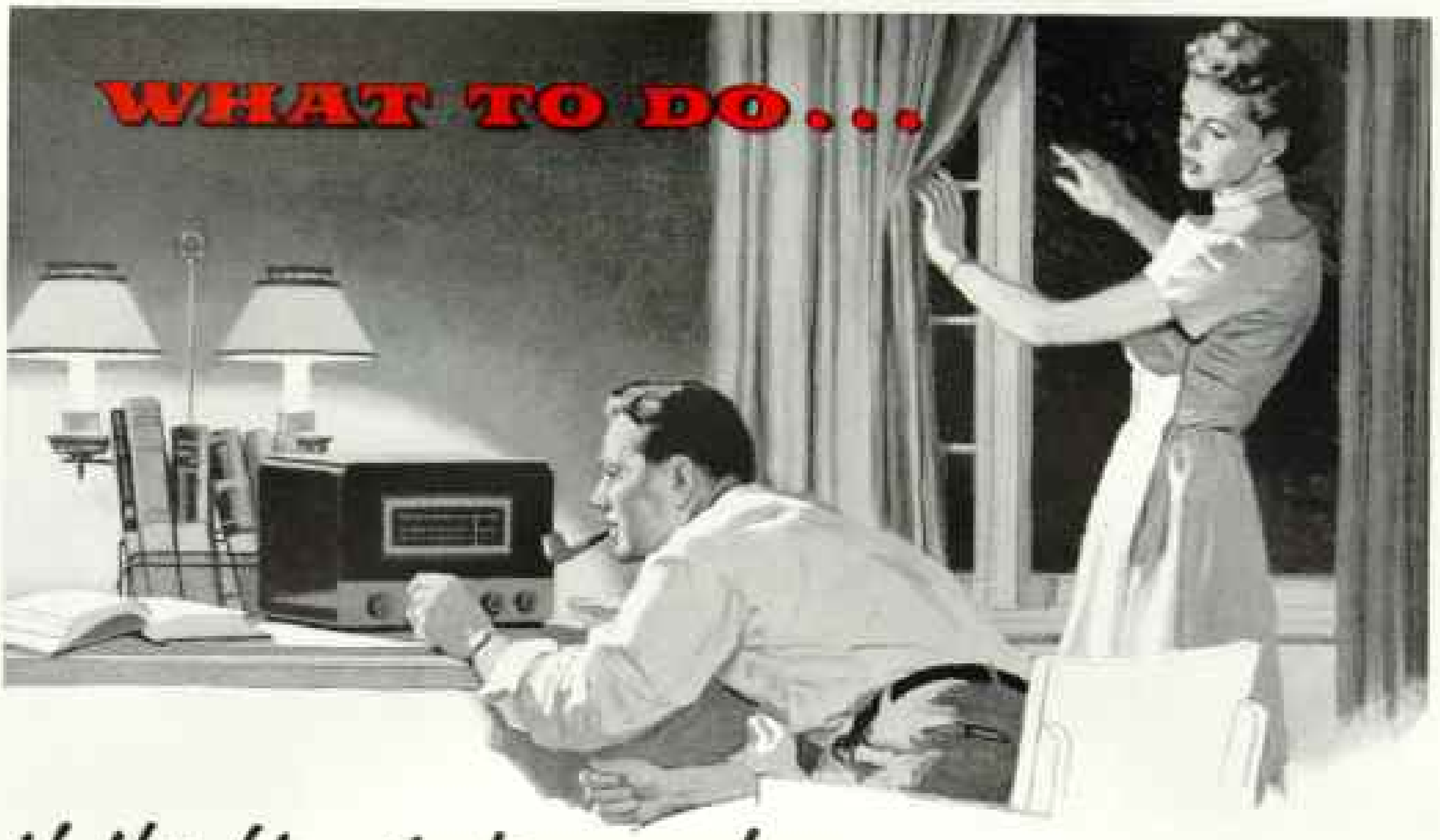
SALT SUBSTITUTE



if the big winds come!

Standing up to violent windstorms is not a hopeless task!
You can combat their destructiveness—save lives and protect property by taking these simple but effective precautions if one heads your way.

Save Lives—Avoid Injuries: Stay tuned to Weather Bureau Bulletins and follow their advice. Have on hand a flashlight, first-aid kit and instruction book, battery-powered radio, fresh drinking water, canned food and a good fire extinguisher. Get away from beach and low waterfront areas in plenty of time to avoid high water and hazardous driving.

Protect Your Property: Garage your car. Put loose or movable outside objects in a safe place. Remove tree branches that could strike your house. Secure window blinds. Board up, tape or otherwise protect your windows. Be sure that a window or door is left slightly open on the side of the house *opposite* the side facing the wind. This will relieve dangerous pressures. If, after a lull, the wind returns from another direction, change these openings accordingly. Be calm—your ability in an emergency will inspire others!

Tornadoes Are Different: They move quickly with great destructive force. Usually the path of a tornado is only a few hundred yards wide . . . and it travels toward the Northeast. If the ideal protection of a cave or underground excavation is not available, take these precautions:

In open country move at right angles to the tornado's path. If escape is not possible, lie flat in the nearest depression—a ditch or ravine. In town or city seek inside shelter, preferably in a steel reinforced building. Stay away from windows. In your home take refuge in the SOUTHWEST corner of your basement.

After The Winds: Don't drive unless necessary. Be extremely alert to prevent fires. Don't touch loose or dangling wires. Report broken power lines, sewers or water mains to authorities or nearest police officer. Be diligent and careful!

By following these precautions, you can help save lives and conserve property.

Tower Bridge, London

Two-way bridge to Britain ...your telephone

Do you have family or friends overseas? Do you have business abroad which can best be settled in a friendly, personal discussion?

A telephone call is the fast, economical way to talk back and forth across the ocean ...make plans for a trip ... close a sale. It's easy to do. Just tell the operator where you want to call.

P.S. If you're visiting Britain, remember that you can keep in regular touch with home and office by telephone.

You can cross the ocean for $12 by telephone

This is the daytime rate for the first three minutes from anywhere in the United States, not including the 10% federal excise tax. It applies not only to Great Britain, but to 27 countries in Europe. In most cases the rate is even lower at night and on Sunday.

BELL SYSTEM OVERSEAS TELEPHONE SERVICE

Soft skies smile down on this holiday isle

BERMUDA

Years ago the poet Tom Moore came to Bermuda, fell in love with this coral isle and wrote:

"You'd think that Nature
lavish'd here
Her purest wave,
her softest skies . . ."

Bermuda is still enchanting visitors. The brilliant colours of sea, sky and flowers that inspired the poet to sing will delight you too. A refreshing swim in the clear, blue water leads to a long sunny loaf on soft pink sand. Golf, tennis, sailing, fishing, cycling and picnicking are year 'round fun.

You can get to Bermuda quickly by plane or leisurely by ocean liner, for it's only 700 miles from the mainland. And Bermuda's hotels and charming guest houses are a wonderful experience in holiday living.

You'll save time and trouble seeing your travel agent. Helpful too is the Bermuda Vacation Kit which you can get by writing: The Bermuda Trade Development Board, 620 Fifth Avenue, New York 20, New York.

FREE FACTS about 27 careers for your child!

Booklets by world's leading authorities help you help him plan his future!

Here's valuable help from New York Life for parents who want solid facts to better guide their children in the selection of a career. Each of the 27 booklets was written by a top authority in his field and contains detailed information about background and preparation for each career, as well as opportunities and rewards that can be anticipated.

For any or all of these booklets, simply check the list below and mail the coupon. They're offered as a public service by New York Life and come to you without obligation.

Check the booklets you want—MAIL TODAY

New York Life Insurance Company

Career Dept. NG-11
51 Madison Avenue
New York 10, N. Y.

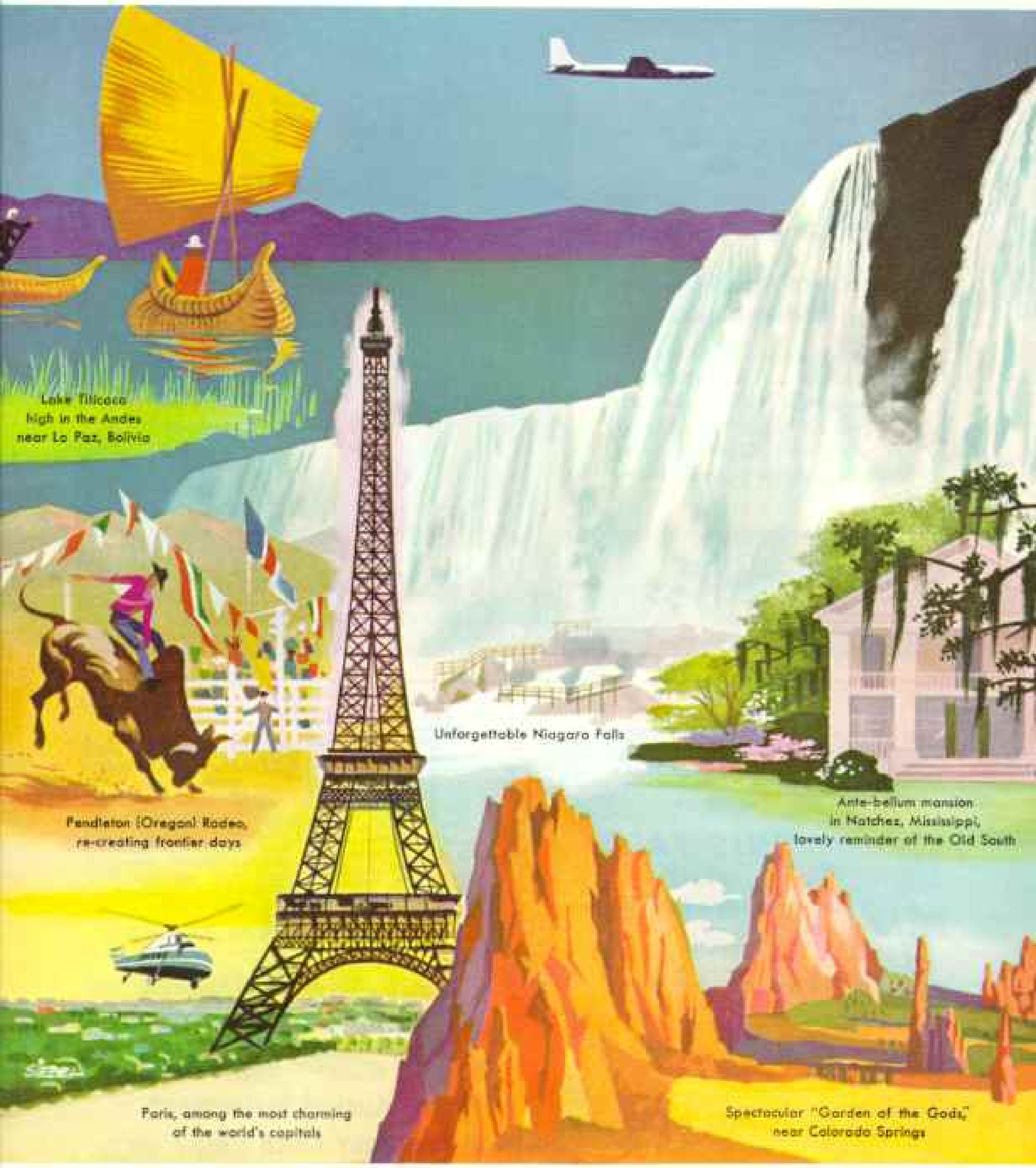
- ☐ Doctor
- ☐ Lawyer
- ☐ Chemist
- ☐ Printer
- ☐ Retailing
- ☐ Dentist
- ☐ Architect
- ☐ Nurse
- ☐ Teacher
- ☐ Farmer
- ☐ Banker
- ☐ Accountant
- ☐ Engineer
- ☐ Aeronautical Engineer
- ☐ Salesman
- ☐ Pharmacist
- ☐ Electronic Engineer
- ☐ Librarian
- ☐ Newspaperman
- ☐ Public Servant
- ☐ Home Economist
- ☐ Personnel Work
- ☐ Atomic Scientist
- ☐ Owner of His Own Business
- ☐ Mineral Engineer
- ☐ Armed Forces
- ☐ Food Retailing
- ☐ We will also send you a booklet on "The Cost of Four Years of College"

Name_____

Address_____

City_____ Zone_____ State_____

How many of these famous places have you visited?



Fast, comfortable air travel today makes it possible for you to visit the exciting vacation spots and famous places you've always dreamed about—even on a short vacation. And, wherever you want to go, the speed of modern airliners gives you more time to spend at your destination. Airline schedules are more convenient than ever before. With family travel plans or air coach rates, the cost may be less than you think.

Your airline ticket office or travel agent can offer valuable suggestions to help make your vacation this year the best ever—through air travel.

The air is yours—use it!

UNITED AIRCRAFT CORPORATION *East Hartford, Conn. • In Canada: Canadian Pratt & Whitney Aircraft Co., Ltd.*
Designers and builders of: PRATT & WHITNEY AIRCRAFT *engines,* HAMILTON STANDARD *propellers and turbine aircraft equipment, and* SIKORSKY AIRCRAFT *helicopters—for our armed forces and the finest airlines in the world*

How to help your child have a better school year

"Good-bye, Mom . . ." Mothers will hear this familiar farewell daily during the school months ahead when 38 million children leave for their classrooms. Among these boys and girls there will be 4 million youngsters entering school for the first time.

Is there anything you can do to help your child get the best possible start in school? Yes, there is. You can take him to your family doctor *now . . . before school opens . . .* for a thorough check-up.

Although your child may seem to be in tiptop physical condition, he could have some totally unexpected impairment. For example, slight defects in seeing and hearing can handicap a child in his studies and other school activities or cause unnecessary absences.

You may also find your doctor's advice helpful in improving your child's general health. Is there room for improvement in his diet? Are his habits of play, sleep and exercise all right? Parents should remember that poor health habits can lead to physical and emotional troubles and the sooner they are corrected, the better.

Protection against certain health hazards is necessary when a child starts or returns to school. So be sure to have your child's immunization record reviewed . . . and appropriate steps taken to bring it up to date if necessary.

Teen-age boys and girls, as well as younger children, benefit from regular pre-school check-ups. Physical adjustments, weight variations and emotional upsets—all these and similar problems are matters which parents may not understand too well.

So why not get your doctor's help *now?* Your child's visit to him can help assure healthy, happy school days.

Metropolitan offers two booklets on health problems of school-age children. The titles are listed on the coupon below. Check the booklet or booklets you want.

Metropolitan Life
Insurance Company
(A MUTUAL COMPANY)
1 MADISON AVENUE, NEW YORK 10, N. Y.

Metropolitan Life Insurance Company
1 Madison Avenue, New York 10, N. Y.

Please send me the free booklet

☐ *"ABC"s of Childhood Diseases,"* 937N.

☐ *"Understanding Your Teen-Ager,"* 957N.

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Vacationers enjoy scenic wonderland in Waterton Lakes National Park, Province of Alberta, Canada.

Here you'll find the peace the whole world is seeking...

Waterton Lakes National Park, just north of Montana, in the Province of Alberta, is one of a great chain of national and provincial parks stretching the length of Canada from British Columbia to Nova Scotia.

Here you'll find breathtaking mountain scenery... magnificent peaks of red, green and gold, carved by ancient glaciers and reflected in sparkling wilderness lakes. You can ride spectacular trails or motor along scenic highways and glimpse buffalo . . . grizzlies . . . Rocky Mountain sheep. There's fishing, golf and tennis . . . boating, camping and swimming in a vacationland that offers true peace and relaxation.

In a broader sense, Waterton Lakes National Park is a living testimonial to the peace and international friendship the whole world is seeking. In 1932 Waterton Lakes joined with Glacier National Park, its counterpart across the border in the United States, to form the International Peace Park, commemorating more than 100 years of peaceful relations between two great powers. Theirs is the longest undefended border in the world.

Mapmakers call it the 49th Parallel—but it actually has no parallel in the world today.

FREE Tour Information

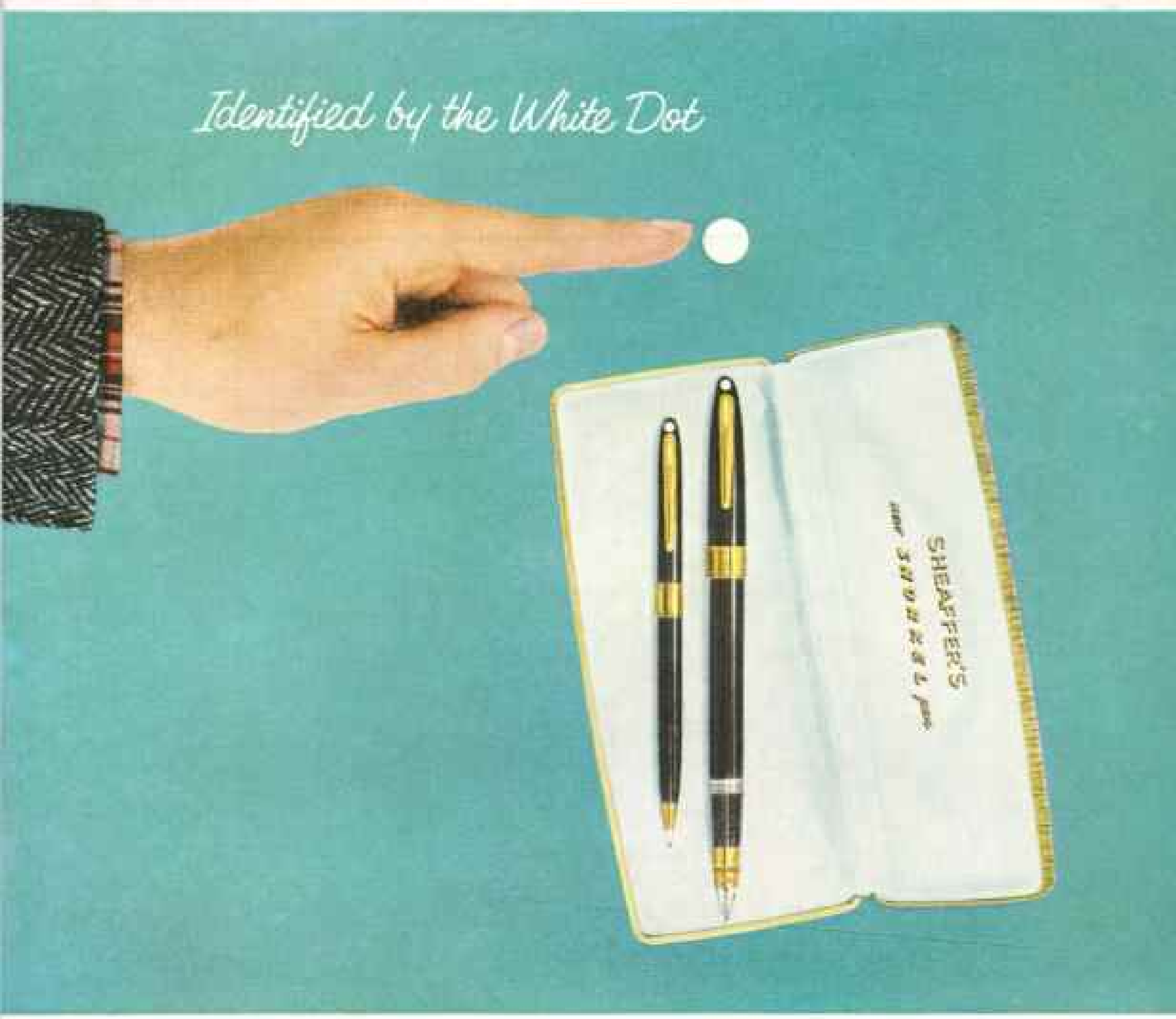
If you would like to visit Waterton Lakes, or drive anywhere in the U.S.A. or Canada, let us help plan your trip. Write: Tour Bureau, Sinclair Oil Corporation, 600 Fifth Ave., New York 20, N. Y. For more Canadian information, write Canadian Travel Bureau, Ottawa, Canada.

SINCLAIR SALUTES THE CANADIAN FORESTRY ASSOCIATION . . . for its devotion to all phases of conservation. Through the foresight and good judgment of the Canadian Forestry Association, important advances have been made in the management of forests, wildlife, water and recreation areas for the benefit of both Canadian and U. S. citizens.

SINCLAIR

A Great Name in Oil

Nothing writes like a Sheaffer Snorkel Pen



Only Sheaffer gives you every modern feature

The way it fills, the way it feels, the way it fits *you* tells you that Sheaffer provides everything that's newest and finest. And, there's something else you'll sense, but can't see. It's the pride, satisfaction, and confidence that makes your Sheaffer a warm companion through the years.

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When it comes to writing—come to Sheaffer's

Fills like no other. Precision filling tube reaches out to draw in ink. Retracts when pen is full. Point never needs wiping.

Empties, cleans, refills at a single stroke. Nothing to take apart, nothing to dismantle. Simple, sure!

For your writing style alone. The exact 14K gold point that fits your writing personality. Personal, pleasurable!

Self-adjusting interspring clip. Holds firmly on all fabrics from heavy wool to finest silk—without wear or tear.

NEW MOON

The earth's new moon, soon to rise, is only 20 inches in diameter. But its significance is immense: the penetration of the most exciting new frontier in the history of scientific research.

Plunging through silence, hundreds of miles high, circling the slow earth 15 times each day, this man-made satellite will have the universe as a laboratory . . . helping to confirm or deny age-old theories and to record a whole new world of facts to shape our future.

But faster still, a powerful IBM 704 computer, at the Vanguard Computing Center in Washington, will race through complex calculations to determine the moon's orbit, to predict its location for scientific observation and study. *You are cordially invited to see the 704 at the Vanguard Computing Center and Exhibit in Washington, D.C.*

IBM

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Enjoy the Travel Extras a Pullman ticket brings you!

Comfort and safety! Get comfortable. You have your own private quarters to enjoy. The big, wideview picture window makes sight-seeing superb. No driving tensions or weather worries to spoil your trip. And you're safer traveling Pullman than you are in your own home!

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Sleep! It just comes naturally on a Pullman. You get a full night's rest in a king-size bed. No searching for lodgings—no time-wasting steps. Pullman gets you there fresh and rested—without losing a minute of travel time.

Privacy! Every Pullman room accommodation has its own complete toilet facilities . . . individually-controlled heat and air-conditioning. And many courteous extra Pullman services are yours at the touch of a button.

Fine food! Meals served in the railroad dining car match those of finest restaurants. Enjoy a variety of foods, freshly cooked, served at your leisure. Another travel extra you get . . . when you ask for a Pullman ticket!

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YOUR LOCAL TICKET AGENT WILL HELP: 1. *Provide information on routes and fares.* 2. *Help you plan stopovers.* 3. *Furnish your rail and Pullman tickets.* 4. *Reserve a "rent-a-car" at your destination.*

YOU'RE SAFE AND SURE...

WHEN YOU TRAVEL BY Pullman

This Is Your Wife

How the telephone helps her to be five busy people

This is the pretty girl you married.

She's the family chef. And the nurse. And the chauffeur and maid. And when she's all dressed up for an evening out—doesn't she look just wonderful!

How does she do it?

Of course she's smart and it keeps her busy, but she never could manage it without the telephone.

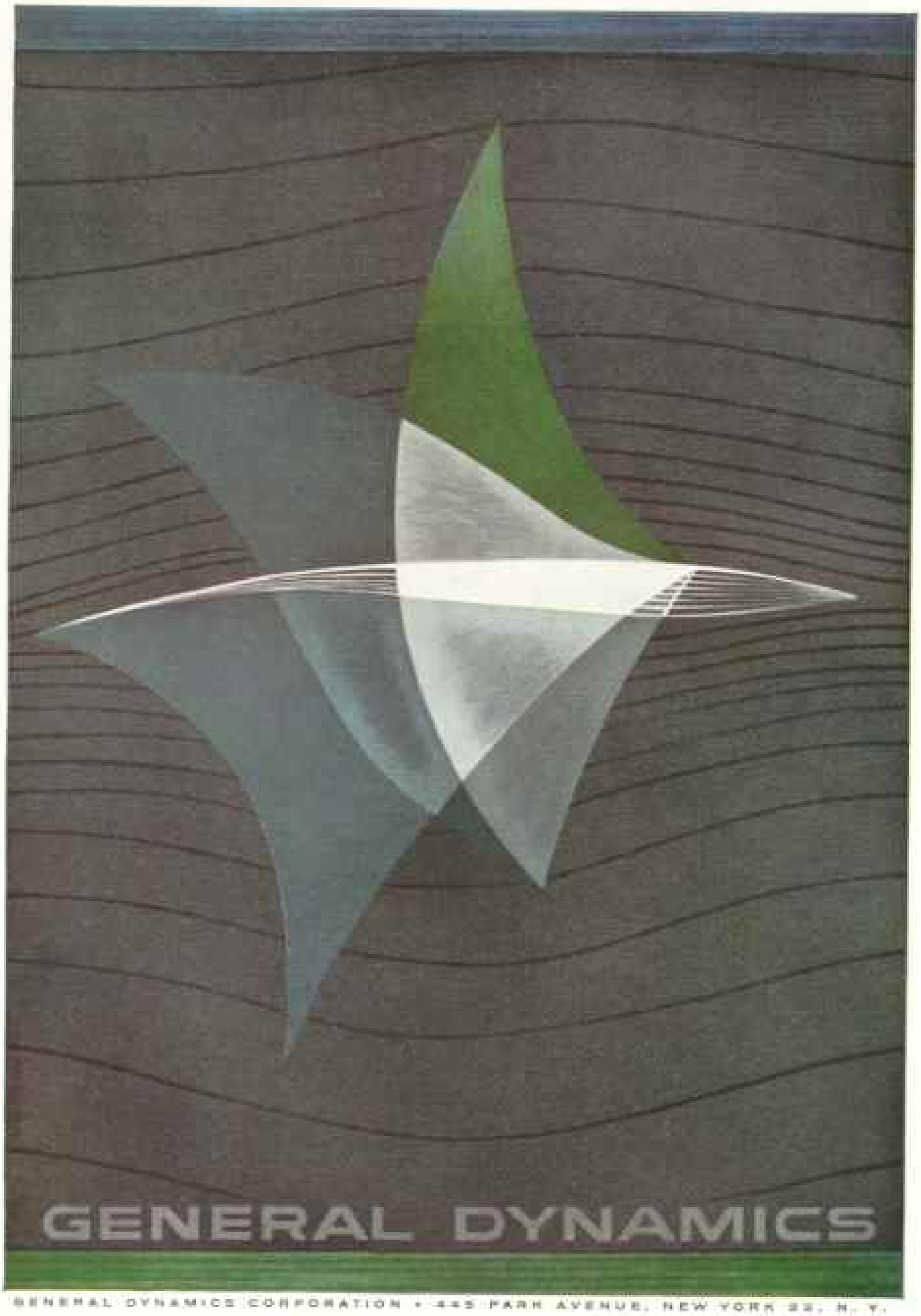
When the "chef" needs groceries, she telephones. Supplies from the drug-store? The "nurse" phones her order.

A train to be met? The telephone tells the "chauffeur" which one. A beauty shop appointment? A call from the "glamour girl" makes it easily and quickly.

Handy, ever-ready telephones—in living room, bedroom, kitchen and hobby room—mean more comfort, convenience and security for everybody.

Working together to bring people together ... **BELL TELEPHONE SYSTEM**

Exploring the Universe: First Step into Space. . . . If men are ever to journey to the planets and the stars, we shall need to know years in advance the biological and psychological effects of cosmic radiation, extreme temperature variation, weightlessness, meteoric collision, synthetic air, disorientation and illusions of space and time. New aerodynamic forms and new applications of atomic power may within the next few years make possible the sustained exploration of earth's upper atmosphere that will tell us what we need to know before our first human step into space.



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