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Alaska Map Supplement in Ten Colors

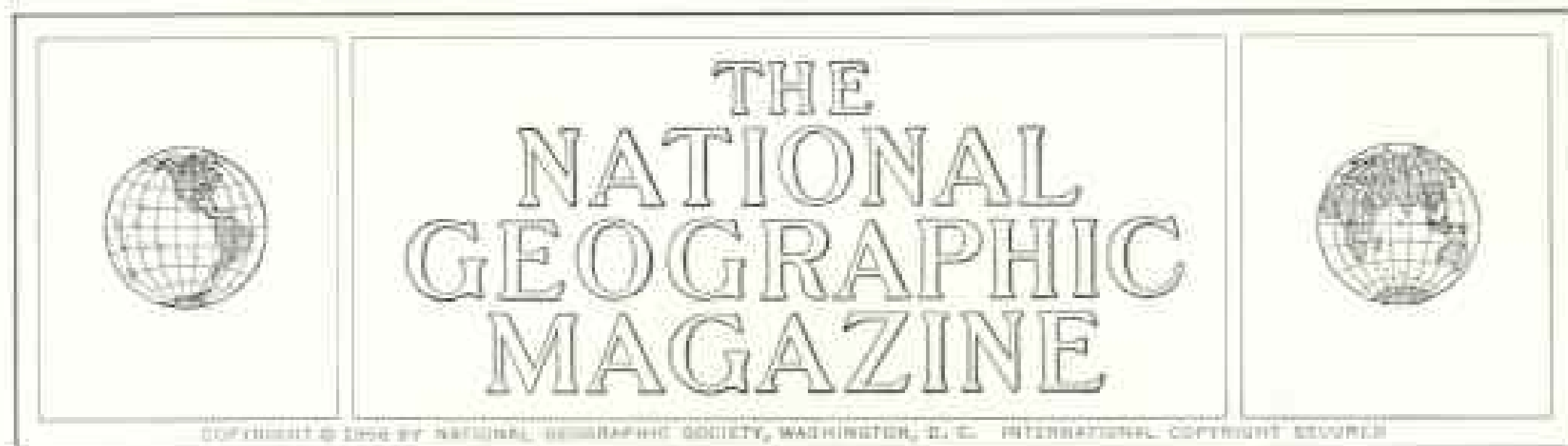
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Alaska's Warmer Side

737

BY ELSIE MAY BELL GROSVENOR

"WHERE will you go next?" friends asked after our African trip—a 30,000-mile journey by air. About this time a friend, Dr. Charles Cole, President of Amherst College, wrote my husband:

"I have just visited Lake Grosvenor in Alaska. It is a very beautiful lake; the fishing is excellent, the accommodations are good, and it is easy to reach by air. You really should go and see the lake that was named after you in 1919."

The idea was intriguing. We knew a great deal about the area from the many expeditions that Dr. Grosvenor, as President and Director of the National Geographic Society, had sent to explore the Alaska Peninsula. It was here, in 1912, that one of the greatest volcanic explosions in history took place. Only the eruption of Krakatau in Indonesia (1883) is known to have surpassed it in violence.*

Society-sponsored explorations of the Katmai area discovered the Valley of Ten Thousand Smokes and several beautiful lakes. One was named for my husband; another, Lake Coville, for the then-chairman of The Society's Research Committee, Frederick V. Coville.

Eventually the land around Mount Katmai was set aside as a national monument. It now covers 2,697,590 acres—more than twice the size of Delaware and larger than any other United States national monument or park.

For years the only way to reach Lake Grosvenor was on foot, a long overland trek, and you had to carry your own camping equipment. Now, we learned, there are comfortable fishing camps on the lakes and frequent plane flights from King Salmon airport.

So Katmai and Lake Grosvenor became next on our schedule.

We started by taking the Alaska Steamship Company's *S. S. Aleutian* from Seattle to Seward, through the famed Inside Passage along Canada's rugged west coast. This narrow channel, which winds between mountains and rocky islands, is so treacherous that a pilot must be on the bridge at all times to guide the ship. Our ship, besides her own Capt. Elmer Joost, carried two such pilots who had made the run many times; one of them also had a captain's license.

Through the Rainy Inside Passage

Occasionally the vessel wound its way through narrow inlets where the tidal current was so strong we hardly moved. At one place we passed a small tugboat towing a long raft of lumber, and so narrow was the channel that it almost raked the side of our ship as we steamed by.

Rain and mist often veiled the passage, for Alaska's southeast coast gets an average of 150 inches or more of rainfall a year. In fact, Alaskans here say they measure their rain not in inches or feet but in fathoms. By

* See "Eruption of Krakatoa," by Sir Robert Ball, NATIONAL GEOGRAPHIC MAGAZINE, JUNE, 1902.

Editor's Note

Mrs. Grosvenor, wife of Dr. Gilbert Grosvenor, Chairman of the Board of Trustees of the National Geographic Society, is the author of two earlier articles in The Magazine: "Safari Through Changing Africa," August, 1953; and "Safari from Congo to Cairo," December, 1954. She is the daughter of Alexander Graham Bell, inventor of the telephone and second President of The Society. Dr. Grosvenor, many of whose photographs illustrate this article, was President of the National Geographic Society from 1920 to 1954 and Editor of its Magazine for 55 years.



S.S. *Alutian* Cruises the Inside Passage, a Watery Maze Through Alaska's Panhandle

Two skilled pilots and modern radar equipment helped the ship's captain navigate the tortuous channel. Swift tides sometimes slowed the big vessel to a crawl; rain and mist often obscured the view. Lofty snow peaks, islands, and glaciers line the fiord-indented passage. Approaching Juneau, these railside passengers watch the parade of spectacular scenery along Gastineau Channel. Shuffleboard players enjoy a rare bit of sun.



Mount Juneau, Snow-flecked in Late Spring, Crowds Its Namesake City to the Sea

Standing on a shelf scarcely 900 yards wide, Alaska's capital can expand only by erecting taller buildings or digging into the mountainside. Once a gold-rush town, Juneau now depends for income on government, fishing, canning, and shipping. Though direct passenger ship service from the States has been discontinued, Canadian National Railways and Canadian Pacific both run Inside Passage cruises from Vancouver.

contrast, much of Alaska's interior has only 10 to 15 inches of annual precipitation.

Temperatures in this southeastern area are relatively mild, much like our northwest coastal area. Ketchikan, our first port of call, has a year-round average of about 45° F. and rarely sees zero weather. Temperatures in the interior, on the other hand, go down to minus 70°. Often the areas with the coldest winters also have the hottest summers—up to 100°. Thus, parts of interior Alaska may have a temperature range of 170°.

Ketchikan's Tides Rise 20 Feet

We reached Ketchikan in the pouring rain at midnight—still daylight this far north in June. In the harbor, fishing boats floated next to piers which towered high above them. Tides here rise and fall as much as 20 feet (page 744).

Ketchikan, as you can see on The Society's new map of Alaska, a supplement to this issue, is Alaska's southernmost city and also its farthest east. Even so, it lies 500 miles nearer the Orient than any part of the continental United States.

A modern city of 7,500, Ketchikan stands with its back against a 3,000-foot mountain. Its stores were filled with souvenirs and fine clothes of the latest style. The souvenirs we saw most were small copies of totem poles made by the Haida and Tlingit Indians.

Some of the finest totem poles to be found are in Ketchikan City Park and at Mud Bay, about 11 miles from the city. There we also admired a big Haida communal house richly decorated with symbolic designs.

Besides visiting the Indian park, we took a drive with the Mayor of Ketchikan, Mr. George H. Beck. Looking down over one side of the road into a wooded stream bed, we saw a little Sitka black-tailed deer standing motionless. We stopped and looked more closely. There, half buried in the shrubbery, stood a tiny spotted fawn.

Although it was still raining hard, Mr. Beck got out of the car and climbed down the side of the ravine. He lifted the fawn and brought it to the road for Dr. Grosvenor to photograph (page 743). It lay quietly in his arms, its great eyes staring at us. The photograph taken, Mr. Beck replaced the little animal where he had found it. As we drove away, we saw it following its mother into the deeper woods.

We toured a giant new pulp mill which had

started operations the week before we arrived. The mill's formal opening, with dedication by Gov. B. Frank Heintzleman and others, was not scheduled until a month later. It marked a milestone for Alaska—the start of a new year-round industry.

The mill, one of the world's biggest, cost \$52,000,000 and covers 53 acres. Owned jointly by the American Viscose Corporation and the Puget Sound Pulp and Timber Co., it is the last word in design, with push-button controls and a recovery system which uses its own waste products, including tree bark, as fuel. The mill uses 50,000,000 gallons of water a day, all of which is purified to prevent pollution.

As we watched, long steel fingers lifted giant logs out of the water onto a runway leading into the mill. A huge circular saw cut them up into 20-foot lengths. Then, to remove the bark, they were sprayed by tremendous streams of water at a pressure of 1,400 pounds to the square inch. This method can strip a log in 15 seconds.

Next, the logs pass into the chipper, where whirling blades cut them into small chips. Conveyor belts move the chips to other machines which cook and bleach them into pulp. Eventually they emerge as pressed sheets, packed in bales.

Bales are shipped in freighters to ports all over the world, or ferried in railroad cars to the Canadian National Railway's railhead at Prince Rupert, B. C., 90 miles away. All of the pulp is used to make rayon and paper.

Sixteen Million Acres of Trees

Wood for the mill is cut, under U. S. Forest Service supervision, from the Tongass National Forest, 16 million acres of trees stretching 400 miles along Alaska's lower coast. As we climbed up and down four stories of iron stairways to see the process, we wondered how long even this vast forest could last, with mills like this (and another, even bigger, to be built at Sitka) capable of turning out 400 tons of pulp a day.

But we were assured that, thanks to the heavy rain and mild climate, forests regenerate so quickly that several such mills can work indefinitely without depletion. In fact, the forest is improved by scientific cutting.

From Ketchikan our ship carried us north to Juneau, Alaska's capital (page 738). Our visit here was brief, but especially pleasant because we carried a letter of introduction



Totem Poles Served Indians as Storybooks, Coats of Arms, and Grave Markers

Carved from cedar in the round, the poles ranged from a few feet to 80 feet high; only the finest trees were used. The poles symbolized victories, family histories, defeat of rivals, even unpaid debts. Their stories are always "read" from top to bottom. Here, in Juneau's Alaska Historical Museum, a visitor inspects a small Tlingit totem. Honk-nosed monster on the wall is the Thunderbird, a friendly spirit.



Mendenhall Glacier's Blue-white Ice Stretches 17 Miles Deep into the Mountains

The author visited the glacier with Alaska's Gov. B. Frank Heintzleman and Mrs. Helen Monsen (right), then owner of Juneau's *Daily Alaska Empire*. Mr. Heintzleman, born in Pennsylvania, came to Alaska in 1918 with the U. S. Forest Service and served as regional forester from 1957 until his appointment as Governor in 1953. His efforts to attract lumber and pulp industries to Alaskan forests were largely responsible for construction of Ketchikan's huge new pulp mill (page 740).

to Governor Heintzleman. The Governor himself met us at the pier. With him was Mrs. Helen Monsen, then owner of a Juneau newspaper, the *Daily Alaska Empire*.

Mrs. Monsen, daughter of a former governor of Alaska, has lived in the Territory all her life; between them, she and Mr. Heintzleman gave us much interesting information about Juneau and its history.

Gold Mines Built Juneau

The capital's past is well summed up by one word: gold. Even its name comes from a prospector, Joe Juneau, who with a partner found gold there in 1880. In the city's boom days there were gold mines all around, but the biggest and last, the Alaska-Juneau, closed down 12 years ago. We saw its deserted buildings from our ship as we approached the harbor. Situated on a mountainside, its shafts run up instead of down.

With Mrs. Monsen and the Governor we drove to see the Mendenhall Glacier (above). It measures $2\frac{1}{2}$ miles of blue-white ice across the front and about 17 miles in length. It is one of a number of glaciers that flow from the Juneau ice field, which covers the mountains all the way to Skagway, about 90 miles away. Governor Heintzleman told us that within his memory the glacier had receded five feet every year.

On our return to town we saw modern Juneau, with its seven-story Baranof Hotel and the governor's mansion, the latter designed, surprisingly, in colonial style. Like Ketchikan, the town is crowded between mountains and water. Its tall buildings show that its future expansion must be chiefly vertical, not horizontal. We admired its schools, library, and finally the Alaska Historical Museum.

The museum displays mounted specimens of Alaska's birds and animals; exhibits of

ore, including gold, silver, and platinum, Eskimo and Indian artifacts, jewelry, and religious objects (page 741).

There is a photostatic copy of the \$7,200,000 United States Treasury warrant to Russia in payment for Alaska. An odd-shaped piece of white fawn skin edged with fur turned out to be an Eskimo baby's diaper; in use it had a disposable lining of dried moss.

Most interesting, to me, were the Attu baskets, woven by Aleutian women on the island of Attu. No basketry in the world exceeds the Attu in fineness. The baskets are woven of wild rye grass, and the makers employ no tools except an ordinary knife and their fingernails, which they use to split the fibers. Only the lower blades, white because they receive no sunlight, are used.

Bones of prehistoric animals on exhibit, many of them dredged up in gold-mining operations, include those of the mammoth, mastodon, bison, horse, and camel (page 785).

Scientists believe that in past ages these animals, as well as primitive man, migrated over a broad plain connecting North America and Asia across part of what is now the shallow Bering Sea.* With peoples the movement was probably eastward, but some scientists believe that horses and camels originated in North America and migrated to Asia.

Cordova Waits for the Future

We were disappointed on leaving Juneau to find that our ship could not go close enough to shore for a good view of the great Columbia and Hubbard Glaciers. A National Geographic Society expedition named the latter in 1890 for my grandfather, Gardiner Greene Hubbard, first President of The Society.†

But glaciers are receding in Alaska, and as they melt they drop huge icebergs into the water (page 804). It is dangerous for a ship to be near when one of these great frozen chunks falls.

We visited Cordova, near the mouth of the Copper River. Through this town, from

1911 to 1938, passed well over \$100,000,000 in copper from the Kennecott mine, a mountain of copper some 200 miles upstream in the Wrangell range. A railroad, now abandoned, ran from town to mine (page 791).

The rich copper ore ran out in 1938, ending Cordova's heyday, for the time being at least. When we saw it, it was a quiet, beautiful village with a lovely lake, high mountains, fine roads, and houses with blue and yellow flowers growing down to the street. Happy, healthy-looking children watched us with interest as we wandered through town.

A new era of prosperity may be coming to Cordova. Geologists believe that prospecting will find more copper, and probably other minerals, in the near-by mountains.

Oil companies are drilling in the area, and there are plans for a new road to link the village with the Alaska Highway. A large

*See "Exploring Frozen Fragments of American History," by Henry B. Collins, Jr., NATIONAL GEOGRAPHIC MAGAZINE, May, 1939.

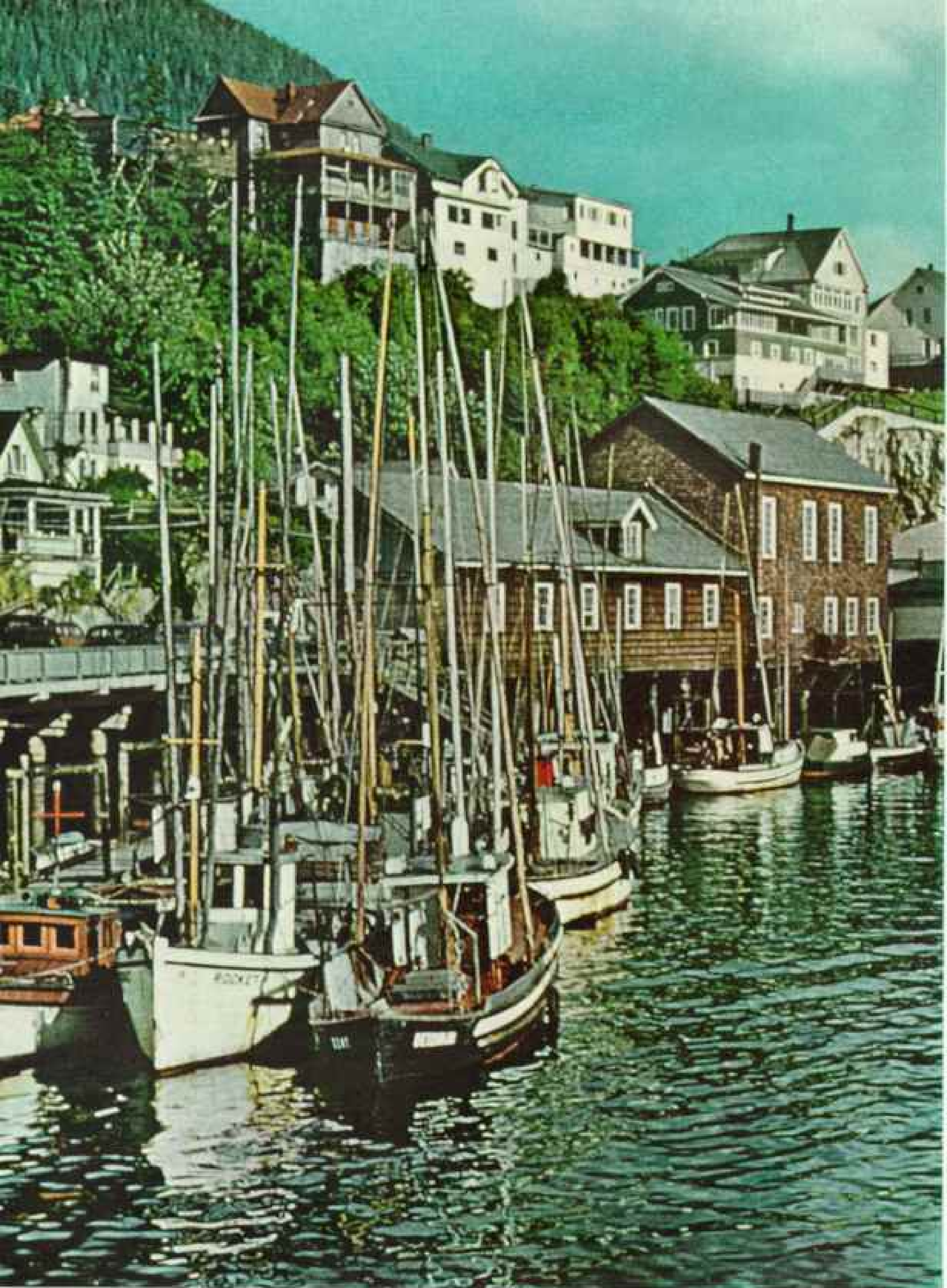
†See "The National Geographic Society's Alaskan Expedition of 1909," by Ralph S. Tarr and Lawrence Martin, NATIONAL GEOGRAPHIC MAGAZINE, January, 1910.



A Sitka Black-tail Fawn Snuggles → Fearlessly in a Friend's Arms

Deer in Alaska are native only to the southeastern area. When heavy demand for hides threatened to wipe out the black-tails, authorities imposed hunting restrictions to save the species.

George H. Beck, former Mayor of Ketchikan, holds this youngster, found beside a road. He returned it to its mother a moment later (page 740).



Ketchikan Harbor: Docks and Buildings Stand on Stilts to Escape 20-foot Tides

The city is Alaska's southernmost. Like Juneau, it perches between mountains and sea, and many of its sidewalks are steep stairways. A viaduct (left) carries traffic to the city's new \$57,000,000 pulp mill.



Fishing Boats Bristle with Trolling Poles in the World's Salmon Capital

At sea, poles fan out on both sides of the boat, trailing hooks baited with herring. Power scows collect the catch from boats far from port. Ketchikan's 12 canneries pack some 24,000,000 cans of salmon a year.



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Robert F. Griggs

↑ A Society Expedition Camps on Baked Mountain in the Valley of Ten Thousand Smokes

Prior to June, 1912, this was a fertile green valley. Then vents in the floor burst open and shot forth a river of incandescent sand, burying the valley many feet deep. Tens of thousands of fumaroles still smoked when Dr. Robert F. Griggs, leader of five National Geographic expeditions, discovered it four years later. Today only seven large ones remain active (page 749). Camp above served as headquarters for the 1919 expedition. The Society's flag flies beneath the Stars and Stripes. Glaciers cover the flanks of Martin Mountain in the background.

↓ As Dr. Griggs first saw the Valley of Ten Thousand Smokes: "It was as though all the steam engines in the world, assembled together, had popped their safety valves at once and were letting off surplus steam in concert."



airfield has already been built. So Cordova is waiting for the wave of a wand to spring into activity once more.

We felt abundantly rewarded for our trip through the Inside Passage, even though the weather hid some of the magnificent mountain scenery. As we sailed along, we were often interrupted by calls to look at a spouting whale or to watch the black-footed albatross—the "gooney bird"—which had taken the place of the sea gulls that followed us during the first part of our trip. The albatross reminded us of an earlier journey; in 1937, when we flew across the Pacific in Pan American World Airways' *China Clipper*, we had seen these birds nesting on Midway and Wake Islands.

Approaching Seward, chief port of Anchorage, we passed Green Island and sailed into a beautiful harbor surrounded by glaciers and mountains. At the dock we could see railway cars drawn up to carry us north across the Kenai Peninsula to Anchorage.

We found the train surprisingly comfortable, with huge picture windows, a dining car, and a buffet car where magazines, hot dogs, and soft drinks were sold. Through the windows we saw more glaciers, some of which seemed almost to touch the train as we passed.

This is a fine game country, where moose, bear, caribou, and Dall sheep can be seen. The Dall sheep was named for a famed scientist, Dr. W. H. Dall, an old friend of ours who did much exploring in Alaska. This large, beautiful sheep with its huge horns reminded me of the bighorn sheep of the Rocky Mountains. As we looked out the window, a moose suddenly appeared, speeding away over the plain.

Where Captain Cook Turned Back

After several hours' run we reached Turnagain Arm off Cook Inlet, named by the famous Capt. James Cook in 1778 when he was seeking a northwest passage across North America. When he could no longer make his way up what he thought was a river, he had to "turn again," and so the name.

Anchorage is Alaska's biggest city. Its stores, movie theaters, and other conveniences are like those of a modern city in the United States (page 806). For instance, our hotel had a self-service elevator, many rooms with baths, and telephones in all rooms. Meals were served in a coffee shop with curved counters like those in our drugstores.

We were surprised to see open cans of milk on all the counters. We realized why when we drove around the town and saw grocery signs advertising "air-fresh" vegetables and milk—most of it flown in from Seattle (page 748). The milk was priced at 60 cents a quart!

We made Anchorage our headquarters for trips to several parts of Alaska. One was to a project which became famous during the 1930's, the Matanuska Valley farm colony. With Mr. and Mrs. Robert Atwood—he is the publisher and editor of the Anchorage *Times*—we drove to see the valley as it is today, a prosperous agricultural community.

Matanuska's Farms Are Thriving

The Matanuska Valley experiment began in the last great depression. Starting in May, 1935, the U. S. Government moved some 200 families from worn-out farms in the mid-western United States to this fertile but still heavily wooded land near Anchorage. The pioneers had a hard time at first, and some gave up and went home. But those who stayed finally got the land cleared and learned what crops would grow in the short season.

Much of Matanuska Valley is still in forest. Clearing by bulldozers costs about \$200 an acre, but when it is done the land is practically stoneless and very fertile (page 792). The farmers have a ready sale for all they can grow, at markets in Anchorage and at Army and Air Force installations. Dairy farmers, we were told, may gross \$15,000 a year; potato farmers, \$8,000. Marketing center of the valley is the town of Palmer.

Red Danes and Holsteins are the preferred dairy breeds (page 791). We visited a dairy farm owned by a Miss V. Louise Kellogg, originally from Chicago. When she heard that I was the daughter of Alexander Graham Bell, inventor of the telephone, she remarked at the coincidence: her grandfather invented one of the earliest telephone busy signals.

Miss Kellogg has more than 100 acres cleared on her 560-acre farm. She grows her own silage—peas, oats, and vetch. Local hay costs her \$55 a ton, but it is scarce—and imported hay is \$100 a ton. Eventually she hopes to clear enough land to raise all her feed.

Her dairy is ultramodern, with milking machines and a barn built of concrete and glass blocks. It has a big central room where the door is kept open so the cows can go in



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W. Robert Miles, National Geographic Staff

↑ Cottages and Gay Gardens Spring Out of the Bush Near Anchorage

Dr. Laurence Irving of the Arctic Health Research Center owns this new cedar bungalow. Like many Alaskans, Mrs. Irving holds down her grocery bills with a green thumb. Here she tends her flowers.

↓ Fast Air Freight Brings Fresh Vegetables Daily from the States

Last winter this Anchorage supermarket advertised airborne tomatoes at 55 cents a pound, carrots at 25, and celery at 27. These prices are considerably higher than those usually paid by housewives in the States.



and out at will. This surprised me, for I had expected to see cows in Alaska kept in stanchions in a heated barn.

We passed one fine farm where a dentist, Dr. Lee McKinley, lives with his large family. He pilots his own plane to his office in Anchorage and also flies to neighboring towns to hold clinics.

Farmers must have special know-how to make a success in Alaska and enough capital to clear and prepare the land and buy stock and equipment. Lack of both was among the troubles that plagued the first colonists in 1935. Of the original group, only 29 families remain here today, but more than 500 new families have moved in. Where only about 600 acres were cleared in 1935, more than 10,000 acres are now in pasture and crops.

Explosion That Blacked Out the Sun

Our main object in going to Alaska, of course, was to see Lake Grosvenor and the Mount Katmai region. There, in an area roughly 20 by 80 miles, 15 volcanoes have erupted in recent years—more than in any other place in the world of comparable size. The volcanic belt that girdles the earth seems to concentrate here.

In 1912 the area was practically unknown, inhabited only by a few Indians and Eskimos. Early in June of that year a series of earthquakes and deep rumblings frightened the natives, and they packed up their belongings and left. A little later a great stream of hot, glowing sand burst from the earth and covered 53 square miles of the valley floor.

Beginning June 6, the top of Mount Katmai blew off in a series of catastrophic explosions. A great cloud of ash and dust darkened the sky. So dense was the fallout on Kodiak Island, a hundred miles away, that the people had to shovel ashes off their roofs to prevent cave-ins. Ships in the harbor were loaded down with dust, and sailors shoveled continuously to keep them from sinking.

The whole atmosphere was filled with volcanic debris, and even in far-off Cape Breton Island, on the other side of North America, we did not see the sun for nearly 40 days. All around the world there were evidences of dust filling the air—gloomy days and beautiful sunsets.

The National Geographic Society sent out five expeditions under Dr. Robert F. Griggs to explore the region. They discovered that where once had been a beautiful, fertile valley

there was now a desolation of sand with thousands of fumaroles pouring out smoke and hot gases. They named it the Valley of Ten Thousand Smokes, and it became a national monument and one of the wonders of the world (page 746).*

As for Mount Katmai, to which all this was due: 1,500 feet of its top had disappeared and left a yawning crater. Dr. Griggs and other scientists finally concluded that in the terrific explosion the peak had simply disintegrated into the ash that was floating in the upper air. A curious aspect of the dust cloud was that, while it completely devastated one side of the mountain range, because of the prevailing wind it left the other side almost untouched.

Having been so closely connected with the area's exploration, we had for years wanted to see it ourselves. In Anchorage we met Mr. Ray Petersen, a former Alaska bush pilot who is now president of Northern Consolidated Airlines, Inc. This line serves Katmai National Monument and also operates fishing camps there. Mr. Petersen invited us to go with him to visit his family at the camp on Lake Grosvenor.

We took off from Anchorage in one of the big, luxurious Northern Consolidated Airlines planes. We flew down the Alaska Peninsula, past the quietly smoking volcano of Iliamna.

About a year earlier, the pilot told us, flyers had reported smoke coming from another "quiescent" volcano, Mount Spurr, which had never erupted before in modern times.

On July 9, 1953, Spurr suddenly exploded a mushroom cloud of ash and steam more than 13 miles into the air. Anchorage, 80 miles away, was plunged into total darkness at midday and covered with a quarter-inch of dust. Yet geologists flown in by helicopter reported that snow fields two or three miles in the opposite direction were not even discolored—again because of the prevailing wind.

Eskimos with Outboard Motors

On the plane with us rode men going to work in the fisheries and salmon canneries near Bristol Bay. The canning companies pay the passage of men from even as far away

* The eruption of Katmai and the subsequent discovery and exploration of the valley were described in a series of six NATIONAL GEOGRAPHIC MAGAZINE articles, beginning with "Volcanoes of Alaska," by Capt. K. W. Perry, August, 1912. In September, 1921, Robert F. Griggs made a final, comprehensive report: "Our Greatest National Monument."



◀ Family Car in Alaska
Is a Pontoon Plane;
This Party Goes Fishing

Spread over half a million square miles and largely undeveloped, Alaska looks to the air for transportation.

Flying boxcars deliver everything from tractors to prefabricated houses. Doctors fly to patients, women to the hairdresser, lawmakers to the legislature, fishermen and hunters to their sport. Already the Territory has 250 airfields and 40 seaplane bases.

Floatplanes line up on Lake Hood, near Anchorage, like automobiles on a parking lot. The lake provides mooring for 166 planes.

◀ Page 750, lower: Though snow still clings to the mountains, temperatures on Lake Spennard beach reach the 80's.
▼ Pilot Ken Loken unloads supplies on Twin Glacier Lake after a hazardous landing in floating ice. East Twin Glacier (background) is an arm of Juneau ice field.

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W. Robert Moses,
National Geographic Staff,
and (below) David L. Dudley

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Hot Ash and Steam Billow Skyward as Long-dormant Trident Volcano Reawakens

This photograph was made from a Navy plane one mile away, six days after the sleeping giant had erupted anew on February 15, 1953. A half-mile-wide flow of lava sizzles down the snowy southwest slope.

as San Francisco and the outer Aleutian Islands to help in the short salmon season.

In a good season a fisherman can make \$2,000 to \$10,000, but the schools of fish have been growing smaller in recent years and the catch declining. The summer we were in Alaska, in fact, the U. S. Fish and Wildlife Service had to limit fishing in Bristol Bay to three days a week.

The decline meant particular hardship for the Eskimos, who depend on salmon for their cash income. They could still hunt seal in their skin-covered umiaks—some of which are now equipped with outboard motors instead of paddles—and trap and fish for their subsistence. But the Eskimos have grown used to the white man's way of life and for this they need money.

Our first stop was at King Salmon, near the western edge of the Katmai monument.

Here we left our airliner to board a small twin-engine floatplane. It would carry us over tundra and lake country to our camp.

We had as fellow passengers the two younger Petersen children, aged 3 and 5, with their nurse, and Mrs. Sydney Laurence, widow of a well-known Alaskan painter. We had seen one of Mr. Laurence's masterpieces in the museum at Juneau, and we learned that another, of Mount McKinley, is now in the Smithsonian Institution in Washington.

Mrs. Laurence was loaded down with bundles.

"What have you got in there?" I asked.

"Some spices and other condiments I always like to add to my cooking. I knew Mrs. Petersen wouldn't have them at the camp, so I brought them along."

Mrs. Laurence's hobby—besides painting

(Continued on page 761)



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Illustration by Gilbert Grosvenor

↑ **Floatplane Lands the Author on the Pebbly Shore of Lake Grosvenor.**

Named in 1919 after Gilbert Grosvenor, then Director of the National Geographic Society, the lake stretches 19 miles through Katmai National Monument. Northern Consolidated Airlines maintains five fishing camps in the area. Dr. and Mrs. Grosvenor (below at center and right) visited one as the guests of Ray Petersen, airline president. Here Mr. Petersen and family welcome the author; pilot John Walatka (in sunglasses) looks on.

↓ The lake teems with fish—salmon, pike, and three kinds of trout. One angler the author met had flown 3,600 miles from New Orleans to fish here. Charles Petersen holds a trout he caught. Mrs. Petersen stands at left.

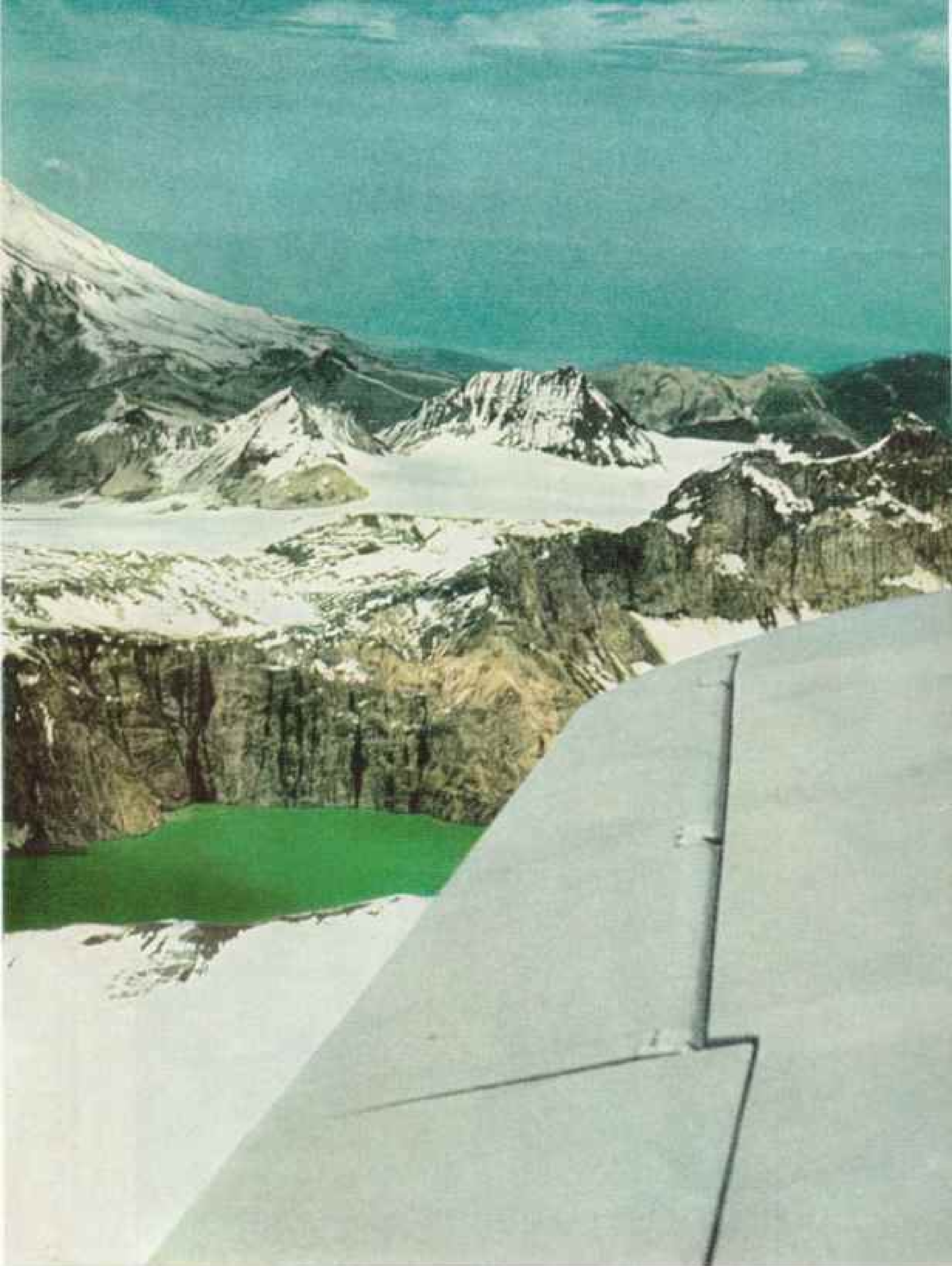
Ray Petersen





Knife Peak's Snow-mantled Cone Rises 7,600 Feet in Almost Perfect Symmetry

Highest volcano in Katmai National Monument, Knife Peak still rambles and steams at times. It is one of 15 recently active volcanoes in a 70-by-80-mile area, one of the most eruptive in the world. After a series of National Geographic expeditions had explored the region, President Wilson in 1918 proclaimed it a national monument.



A Jade Lake Laps Katmai Crater, Created by One of Earth's Most Violent Explosions

Catastrophic eruptions blew off more than 1,500 feet of Katmai's top in 1912. Two cubic miles of rock disintegrated into dust and ash, which clouded the air and dimmed the sun as far away as North Africa. Nearly a foot of ash fell on Kodiak, 100 miles away. The crater lake never freezes, evidence that fire still smolders below.

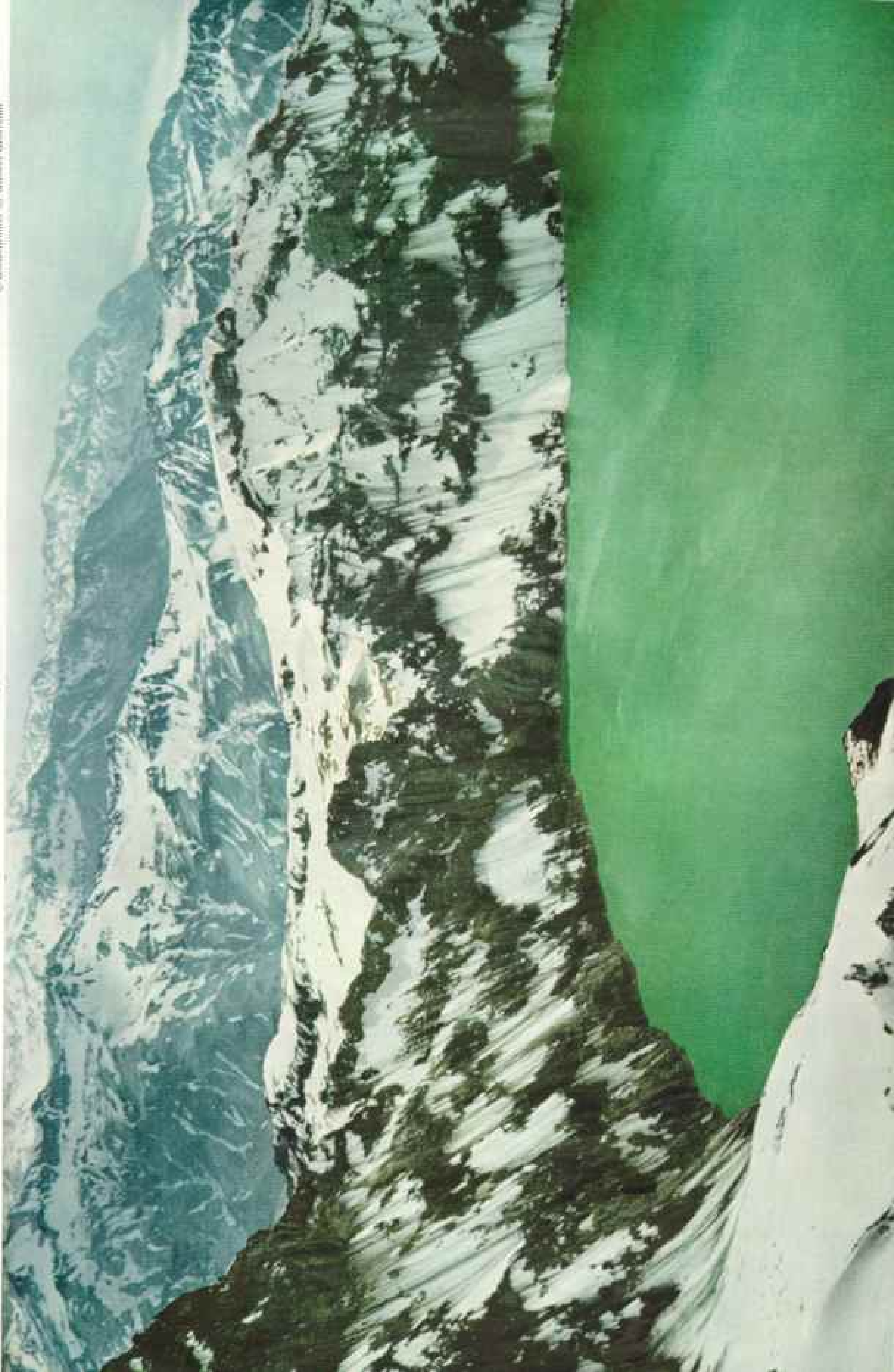


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↑ **Miniature Cone Juts from the Mirror of Kagoyak Crater**
This quiet lake, near the northeast corner of Katmai National Monument, is a recent discovery. A remnant of winter ice floats in the blue water.

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↓ **Snows of Many Winters Drape Katmai Crater's Jagged Walls**
The volcano's explosion left a vast hollow 7.5 miles across, 3,700 feet deep. Minerals in the water cause the lake's green color.



**Violent Explosions
Transformed a Fertile
Vale to This Forbidding
Wilderness 44 Years Ago**

Primeval forests once lined these shores, and lush grass supported herds of caribou. Natives trapped fox and otter.

Earthquakes in 1912 drove the Indians from their homes. Mount Katmai, 25 miles distant, erupted a few days later, spewing ash across the valley. Half-buried log huts beside the winding Savonoki River (left) mark the site of an abandoned village.

Mount Ikatulik (right) shuts out the Valley of Ten Thousand Smokes. Mount La Gorce (foreground) is named for the President of the National Geographic Society. Both peaks stand in Katmai National Monument.

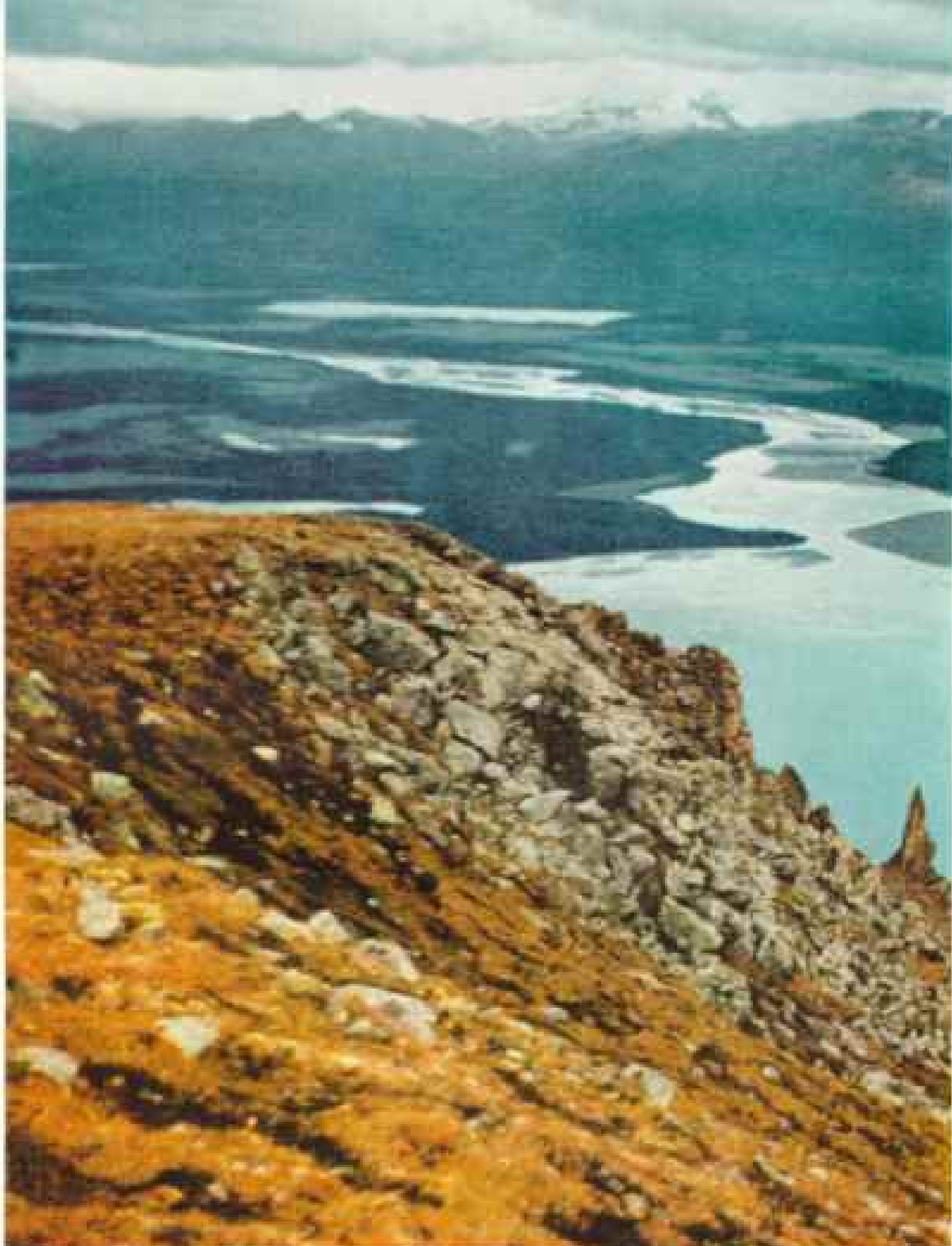
↓ **Scientist Feeds
a Friendly Red Fox**

National Park Service scientists in 1953 made extensive studies of Katmai's volcanoes, geology, archeology, and wildlife. Below, pathologist Everett Schiller (right) and pilot Donald Williams feed a red fox, father of a litter born near their camp on Kukak Bay.

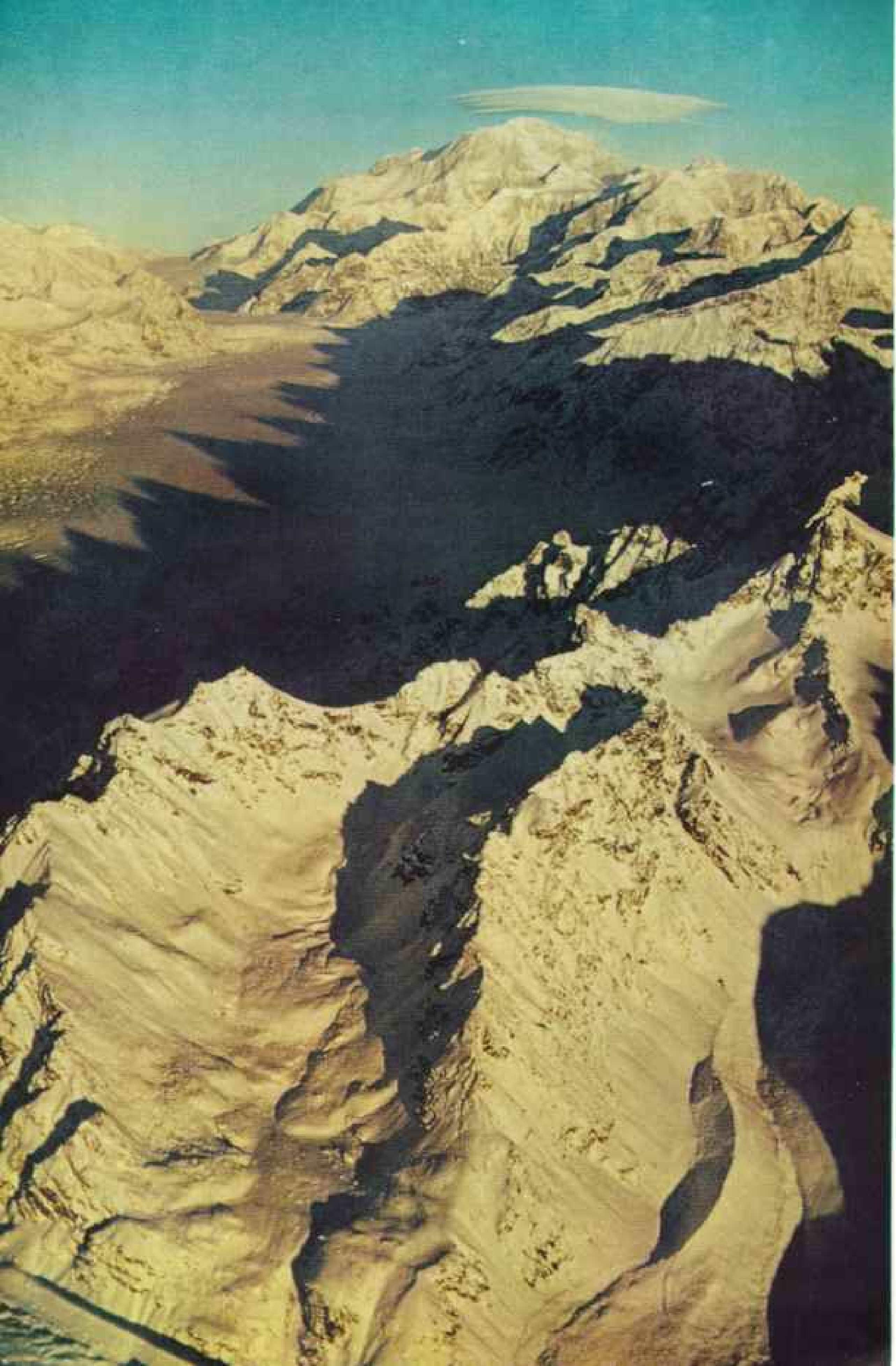
→Page 759, lower: Biologist George Schaller leaps the north fork of Knife Creek.

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National Park Service-Victor H. Catalano

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flowers—is cookery. Later, after we tasted her delicious trout and special oatmeal soup, we were glad she had brought her bundles along!

Sleeping Bags and Rainbow Trout

From the floatplane we had a more intimate view of the ground and the scenery in general than from the big plane. We were watching it all through the windows when someone pointed to a sparkling lake ahead and said:

"That's Lake Grosvenor."

A few minutes later our plane settled on the water. We were welcomed by Mrs. Petersen and a dancing, excited group of children (page 753). The camp, on a neck of land between Lake Grosvenor and Lake Coville, has a gorgeous view of bright-blue water and lofty mountains, still snow covered in late June.

Mr. Petersen and the other guests wasted no time admiring the view, but started fishing immediately. In a short time Mr. Petersen pulled out a beautiful 16-inch rainbow trout, while his small son showed us with pride a two-foot trout he caught.

The camp was simply furnished, but comfortable. We lived in individual canvas-covered rooms; our beds were sleeping bags on cots. There was no electricity in the sleeping tents, but we had a lantern—and, of course, it stays fairly light all night in June this far north.

A short walk through the brush and a pause to watch the children playing badminton (without a net) on the gravel beach brought us to the communal dining tent. Our delicious meal would be spread out on planks set on wooden horses, with the inevitable canned milk on the table. I think every time I see a can of milk now I shall think of Alaska.

I knew this was brown-bear country, so I asked Mr. Petersen:

"Do bears ever bother you here?"

"Not this year," he replied, "but last spring one broke into the camp. He tore the canvas

walls to pieces, searching for something to eat. He found only soap flakes, which he mistook for food—with disastrous results for him and for us, because we spent days cleaning up after him. He never came back!"

Two of Mr. Petersen's camps have such luxuries as running water, toilets, and shower baths. But in ours the lake offered the only bathing. The children found the swimming all that was desirable, but the snow on the mountains and a brisk bite in the air chilled our ardor!

Plane Skims over Craters

We were invited to tour Katmai by air; our guide would be the chief ranger at Mount McKinley National Park, Mr. Oscar Dick, who was making an inspection of the monument.

The pilot was our friend Mr. John Walatka, who has been flying ever since he was 17. He handled the plane so well on our three-hour flight that we felt it was almost a part of him, and we had no fears when he circled the volcanoes so closely that we were able to peer over the sides into the crater lakes.

Our route took us down Lake Grosvenor, past Mount La Gorce (page 758), and completely around the 4,215-square-mile monument. In the northeastern section, near Shelikof Strait, we looked into a crater only recently discovered. In it stands a beautiful bright-blue lake with a little island in the middle (page 756).

From here we flew above Devils Desk (6,411 feet), Mount Denison (7,500 feet), and Snowy Mountain (7,090 feet), staying just high enough to clear the tops. As we approached Mount Katmai, we had a spectacular view of Knife Peak, which rises in a cone almost as perfect as Mount Fuji (page 754).

We circled Mount Katmai several times, looking into its green crater lake, strikingly different in color from the blue one we had just seen (page 757). Evidently Katmai still retains some heat, for its lake never freezes. There is a glacier on the crater wall, however, creeping down to the water. Born following the 1912 eruption, it is the only glacier in the world whose approximate age is known.

In the cabin of our small plane were Mr. Petersen, Mr. Dick, and Mr. Richard Ward, ranger in charge at Katmai, Mr. Walatka, Dr. Grosvenor, and I. I was the only one without a camera, while most of the gentlemen had two or three. They were continu-

Page 760

← Sunset View of Mount McKinley Was Taken at High Noon on December 30

In midwinter Alaska sees the opposite of the midnight sun: the midday sunset. Here the sun, low on the horizon at noon, tints the fresh snow a pale gold; jagged peaks cast long purple shadows across a glacier. A cloud halo floats over Mount McKinley's 20,320-foot peak, highest point in North America.

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Ernest Gruening,
former Governor of Alaska



← Winter Dictates Fashion on Campus: Snowshoes, Ski Pants, and Parkas

Students at the University of Alaska, world's farthest north university, brave temperatures that plunge to 60° below zero. Dry and windless, the cold invites winter sports. Hockey teams work out for Territory competitions on the school's outdoor skating rink. Skiers flock to near-by slopes, and hikers tramp on snowshoes through encircling forests.

Here, near Christmas time, deep snow covers the campus, and icy needles make lacework on the branches of evergreens.

↓ An Electric Hitching Post Keeps Autos Warm

At Eielson Air Force Base near Fairbanks, a driver "ties up" for the night to a headbolt heater. Current pours into a heating coil in the engine water jacket, warming radiator fluid and allowing easy starting. A radiator with 17-quart capacity requires some 12 quarts of permanent antifreeze for central Alaskan winters.

This post also serves to light a Christmas tree.

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National Geographic Staff

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Tented Against Chill Wind and Rain, the Author Crosses the Kuskokwim River

The river separates Bethel, a trading center near the Bering Sea, and its airport.

"I put a blanket over my head and huddled in the bow with only my eyes and nose out," reports Mrs. Grosvenor (page 766).

Alfred Grosvenor

ally jumping up to take pictures, and I tried to make myself as small as possible while peeking over their shoulders. Flying at 10,000 feet in an unpressurized cabin, we all grew rather breathless.

The men kept begging Mr. Walatka to go nearer and tilt the plane so that the wings would not obscure the view. But the pilot could not be persuaded to take any risks. Some of the photographers may have been disappointed, but I, at least, was just as glad he went no nearer. He told us we had had one of the clearest views of the mountains he had seen in his many flights.

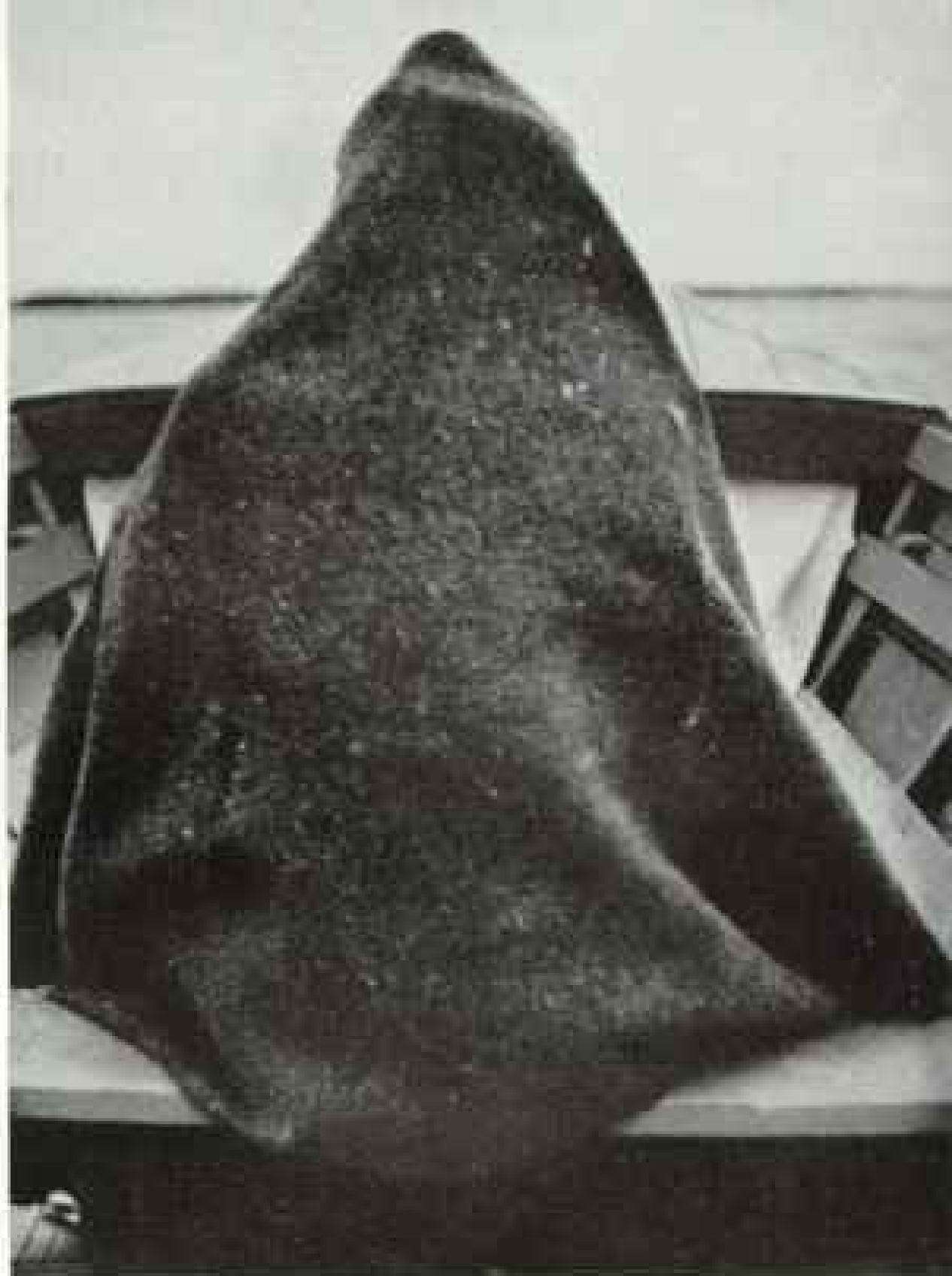
On our way back to camp we looked down on the Valley of Ten Thousand Smokes, now almost entirely quiescent. Only seven large fumaroles remain of the original thousands. Down the whole long valley not a green thing was visible, and not a sign of life until we came to a small stream. Then Mr. Walatka excitedly pointed out a big brown bear making its way down the stream bank.

Near Katmai rises Trident Volcano, also presumed dead until it suddenly erupted in 1953. It was still throwing out sulphurous fumes, and big black lava flows smoked as they crept down its side (page 752). Across from Trident, Martin Mountain, its crater mouth yellowed with sulphur fumes, was also emitting nasty odors. All the volcanoes gave us the impression of being sleeping giants ready to roar into action at any moment.

When we returned to camp from our crater-viewing trip, we heard that a pioneer, Mr. Roy Fure, had rowed 10 miles from his cabin on the Bay of Islands just to see us. He lives alone all year, probably the only man in miles during the dark winter. He has several radios and keeps a log of everything that happens, the birds and animals he sees, and a daily temperature record.

We paid a return visit to his cabin and saw piles of well-thumbed NATIONAL GEOGRAPHIC MAGAZINES on his table. He has been a member of The Society for years.

Our time in Alaska was all too short, and after a few days we were obliged to leave Lake Grosvenor. With regret we said goodbye to our friends and returned to King Salmon.



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On our way back we flew over the Naknek River and saw hundreds of whistling swans dotted along the water below. Vast numbers of these birds breed in Alaska in the summer. Those we saw were bachelors or swans under three years old; the rest had already paired and were nesting in the tundra. It was a wonderful sight, and we were eager to get near enough to take pictures.

Eskimo Girls with Familiar Names

When we reached King Salmon, where we were to spend the night, we decided to try to drive to the riverbank for a closer view. Taxis were hard to come by, but finally we hailed an Eskimo driver. He had his wife, his mother-in-law, and children in his car, taking them off for a visit. But we induced him to drive us to the river, and we crowded in, surrounded by Eskimos.

The wife and her mother were good-looking women, dressed in store clothes, and the children keen and bright-faced, with the small shoe-button eyes characteristic of Eskimos. They all spoke English.

"What are the little girls' names?" I asked.

"The older one is Maryland."

"Why, that's the name of our home State!" said I. "And the other little girl's name?"

"Carol."

"That's the name of one of my daughters!"

We drove along at a good clip, passing



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↑ Midday at Ladd Air Force Base: Hovering on the Horizon, the Sun Streams Gold

↓ A B-66 arrives at Eielson Air Force Base for Arctic testing. Crewmen connect a compressed-air unit (far left) to keep engines turning and blow out remaining fuel. An electric generator (center) feeds current for checking the instrument panel. This light jet bomber is capable of speeds up to 700 miles an hour.





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W. Robert Moses, National Geographic Staff

↑ **School Children Recess for Lunch Beneath a Twilight-blue Sky Stained with Ice Fog**

Below, right: Flames melt ice from a taxi apron at Ladd Air Force Base near Fairbanks. A rotary brush beneath the front bumper scatters powdery snow. During the summer the machine burns weeds. In the background two F-89 Scorpions, jet interceptors, prepare for take-off in the nightlike gloom of early afternoon.



through a big station the Civil Aeronautics Administration has built at King Salmon to house airport and airline personnel. Hostesses, pilots, and others between flights here enjoy nightly dances and moving pictures.

Finally we met an automobile coming the other way. Our driver hailed it and at once entered into conversation about the swans. The other driver was discouraging; he said we would have to walk miles to reach the river, and then the swans would be half a mile away. He advised us to ask the King Salmon airport agent if he wouldn't take us out in his launch.

So we turned back. On our return to the airport we asked the Eskimo:

"How much for the drive?"

"Nothing at all," he replied, "I didn't get you there." And he drove off without giving us a chance to expostulate.

The station manager of the airline agreed to take us in his motorboat to see the swans. This time we had slightly better luck. We got within half a mile of the birds before engine trouble developed. Another motorboat came roaring up to us, and the birds took to the air. They looked almost pink as they flew off into the dusk.

Not until months later, back home in Maryland, did we get close to the whistling swans. We went with our grandson, Lt. Grosvenor Blair, U. S. N., to a duck blind on Chesapeake Bay, where the swans spend the winter. There we had a much better look at them.

Winds Howl Through Bethel

Next morning at daylight we left King Salmon and took off for Bethel, near the Bering Sea, getting a good view of rugged, snow-covered mountains before the mists and clouds settled down.

Finally, flying blind, we came down through the soft, downy clouds to the Kuskokwim River, the second largest river in Alaska, and landed at Bethel Airport. It was a bleak outlook, without a tree in sight, and the winds howled and blew the rain in fine mist. To get to the town, we had to cross the river in a small motorboat (page 763).

There was hardly a green thing in the whole village, and it was now nearly summer. The brightest spots were pots of fuchsias in a restaurant window, many different kinds blooming gaily in the wintry spring.

When we stopped for a cup of coffee, we met two United States Army sergeants—one

from Virginia and the other from Ohio—who were there as advisers to an Eskimo National Guard unit.

"We do most of our drilling in the winter," they told us, "when the snow is hard packed. The Eskimos make fine soldiers, and they're very good shots."

Alaskans like and respect the Eskimos; they have a high I.Q. and become good mechanics, drivers, airplane servicemen, and even pilots. Eskimos are believed to have been the last wave of Asiatics to enter America across Bering Strait. From studying prehistoric dwelling sites, scientists have learned that Eskimos knew the use of iron 1,000 years ago—long before white men came.

Dr. Ernest Patty, President of the University of Alaska, later told us about a scientist who flew some instruments to the Arctic Research Laboratory at Point Barrow on the Arctic Ocean. An Eskimo helped him unload the plane and expressed interest in all the instruments, asking what each was for. But when a tape recording machine was brought forth, the Eskimo exclaimed proudly:

"I have a wire recorder." He used it, he explained, to record songs at local Eskimo dances. Then he charged his neighbors 50 cents apiece to hear a playback.

A little later the scientist asked the Eskimo to pose for pictures against his sod house. When it was over, the Eskimo said:

"Now won't you let me take your picture?" And disappearing into his house, he emerged carrying a Leica camera, with which he photographed the scientist and his plane.

Working at Point Barrow, the Eskimos receive good salaries from the Navy. Dr. Patty told us. But money as such means nothing to

Page 767

This Radio Telescope Captures Signals → Reaching the Earth from Outer Space

To study the ionosphere, the upper layer of earth's atmosphere, scientists at the University of Alaska's Geophysical Institute collect radio waves from outer space on saucer-shaped parabolic antennas. Such waves are emitted by the sun and other celestial bodies. Normally they are constant, but when sunspots or auroras disturb the ionosphere, waves passing through it may be absorbed or deviated. Such disturbance also affects man-sent radio signals.

Here the antenna is focused on the most intense radio star known, in the constellation of Cassiopeia. Counterweights hang off the rotating frame. A hut in the tower houses ultrasensitive receiving equipment. Research is done under U. S. Air Force contract.

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↑ University of Alaska
Boasts a 4,000-acre
Campus near Fairbanks

Here some 500 undergraduates work toward degrees in the arts, sciences, mining, business, education, agriculture, and wildlife management.

→ The author was a house guest of the university's President and his wife, Dr. and Mrs. Ernest Patty (page 771).

Warm summer sun floods the veranda of their new, ultramodern home.

← The university's Agricultural Experiment Station tests crops to determine their adaptability to Alaskan weather. Five-year tests with this Edda barley, bred from a Scandinavian strain, raised the yield to 55 to 60 bushels per acre—10 to 25 bushels higher than other barleys. Today Edda accounts for 90 percent of all barley grown in the Territory.

W. Robert Moore, National Geographic Staff (above), and Gilbert Grosvenor





them, so they are likely to send for a Sears, Roebuck catalogue and order anything that strikes their fancy.

At Bethel we had a happy visit at the home of Moravian missionaries, the Reverend and Mrs. Ferdinand Drebert, members of the National Geographic Society who had been in Alaska for 40 years and were preparing to retire to Nazareth, Pennsylvania.

The U. S. Government and the Territory run small schools all through Alaska to educate the Indian and Eskimo children. There are also Public Health Service hospitals, one of which we visited in Bethel.

We found the medical officer in charge, Dr. John Ferger of Allentown, Pennsylvania, holding a medical clinic by radio with villages and outposts on the Bering Sea. He held such clinics daily, receiving health reports and giving advice. If someone needed hospitalization, a plane brought him in; in critical cases Dr. Ferger often flew out himself.

We inspected the new two- to four-bed wards, all with foam-rubber mattresses, electric lights, and walls of soft old rose or gray.

There were two complete heating and lighting plants in the building. If anything happened to a heating plant in the dead of winter, Dr. Ferger explained, it would be almost impossible to make repairs with the thermometer way below zero, and the patients might freeze to death in the meantime. In winter





the snow piles up almost to the second-story windows, and a plow is kept busy clearing it away to let in the dim Arctic light.

From wind-swept Bethel we turned east to Anchorage, then north to Fairbanks, one of Alaska's busiest and most crowded cities.

Fairbanks, named for Charles W. Fairbanks, Vice President under Theodore Roosevelt, has a population of some 35,000, if its suburban area is included, and is growing fast. It has modern apartment houses, stores, clubs, and churches, but during our stay was rather deficient in hotels, one of the biggest having burned down not long before. Some fine new motels then under construction, however, have since opened. Meanwhile, hundreds of new residents were pouring in via the Alaska Highway and, lacking other accommodations, were living in trailers.

The city was having a building boom: new houses were going up everywhere. At the Army and Air Force stations—chief causes of all the expansion and crowding—construction crews were rushing dormitories, barracks, schools, and hospitals.

At Ladd Air Force Base we saw a huge airfield, with 9,000-foot runways—big enough to handle fighters or medium bombers. Auxiliary heaters stood ready to warm up jet planes so they could take off in minutes. Even in winter, with -40° F. temperatures, jets are kept ready to take to the air, with pilots close at hand (pages 764, 765, 806).

On Sunday in Fairbanks we attended a small Presbyterian chapel where the two regular morning services had grown so crowded that a drive was under way for funds to build a bigger church. The young preacher, the Reverend Victor Afsen, a New York television scenery artist before he entered the ministry, had a splendid voice and manner.

The church had almost as many clubs and circles as our church in Washington. The Eskimos are good attendants, and special serv-

ices are held for them in the afternoon, with hymns in the vernacular. There seems to be a great revival of religious interest in Alaska.

On a 4,000-acre campus a few miles from Fairbanks stands the University of Alaska, northernmost in the world (page 768). It opened its doors in 1922 as a land-grant agricultural college and school of mines. In 1955 some 500 undergraduates studied courses in literature, arts, music, sciences, business, education, engineering, and wildlife management as well as mining and agriculture.

New Crops for Arctic Farms

The university has recently opened community colleges in Anchorage and Ketchikan. Its summer sessions attract teachers and other students from all over Alaska and the States and even foreign countries. Additional thousands take its extension courses.

We were particularly interested in the work of the university's Agricultural Experiment Station, which is constantly working to find crops suitable to Alaska's short Arctic summers and 24-hour daylight.

We saw an experimental field of Edda barley, derived from a Swedish strain (page 768). It grows quickly and prolifically, ripening easily in the 14-week season, but cattle do not like its prickly awns, or outer husks. Scientists are working to breed off these awns.

They were also experimenting with potatoes, which grow well in Alaska. We were surprised to see men covering one row with black cloths—"putting the potatoes to bed," they told us. This was a test to find out the effect of the prolonged sunlight on growth. The covered potatoes were getting the same amount of sun as do State of Maine potatoes; the uncovered rows were getting the midnight sun as well.

We were fortunate during our stay in Fairbanks to be house guests of the university's President and his wife, Dr. and Mrs. Ernest Patty. Dr. Patty taught in the School of Mines when it first opened in 1922. Later he went into business as a mining engineer. He was called back as president in 1953.

The Pattys' house was new and ultramodern (page 769), with every labor-saving device from dishwasher to electric stove. One reason is that with Alaska's labor shortage domestic help is hard to find. So Mrs. Patty, besides her social duties as a university president's wife, at that time was doing all her own housework.

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◀ Alaskan Brown Bear, Northland Monarch, Stands Ceiling High, Weighs 1,500 Pounds

Earth's largest land-dwelling carnivore, the Alaskan brown bear roams the Territory's peninsula and Kodiak Island. Matchlessly strong, it can carry the carcass of a moose. Acute senses of smell and hearing compensate for poor eyesight. The bear is normally mild-mannered and flees at the sight of man, but fights fiercely when cornered. This furry giant in the University of Alaska Museum stretches nine feet high.

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W. Robert Moore, National Geographic Staff



↑ Dancing to Drum Rhythm,
an Eskimo Tells the Story
of a Whale Hunt

Each Fourth of July the Eskimo village of Kotzebue revels in daylong festivities. For a dance contest, drummers pound the underside of seal skin stretched over wooden hoops. Women (back row) chant.

Sundays, the bell on the stand summons worshipers to church (upper right).

← A youngster on Kotzebue beach samples *muktuk* (skin with a layer of blubber) from a freshly killed beluga, or white whale (background). Stretching the *muktuk* between teeth and fingers, he slices off a bite with his knife.

Eskimo men, hunting in outboard motorboats, drive belugas into shallow water and shoot them with rifles. Women and children butcher for meat and oil, staples of their winter diet.



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A Bouncer Walks on Air → After Being Fired from a Blanket Catapult

This woman contestant sailed aloft when men on the ground snapped a walrus skin taut. An expert, she stood upright throughout each bounce. She keeps her balance by treading air.

Besides the dance contest (opposite) and blanket toss, Kotzebue's Fourth of July features foot and boat races, baby and beauty competitions, cracker- and muktuk-eating matches (page 775).

Earlier, in an "Arctic Baby Buggy Race," mothers (foreground) ran with infants tucked in the backs of fur-trimmed parkas. Woman at left wears a cotton dress over her parka.

Alaska's Eskimos once lived partly underground in sod huts. Now many build frame bungalows.



Our last and in some ways loveliest trip in Alaska was to Mount McKinley National Park, second largest of U. S. national parks (after Yellowstone), covering 3,030 square miles. Its superintendent, Mr. Grant H. Pearson, started working at the park as a ranger in 1926. Now he runs not only McKinley but also the Katmai National Monument.

The McKinley Park Hotel, where we stayed, is modern, very comfortable, and open all year round. Teachers and students from Alaska and from all over the States come here during their summer vacations to work as hostesses and waitresses.

Mount McKinley Hides Its Head

At present the park can be reached by air and rail but not by car. A connecting road to the Alaska Highway is under construction, however, and camping sites are being prepared for an expected influx of visitors.

The park is famous for its mountain scenery, including Mount McKinley, highest peak in North America (page 760). Its altitude is 20,320 feet; this is a new figure, based on information supplied by various expeditions sponsored by the National Geographic Society and U. S. Government agencies.*

We saw Mount McKinley above the clouds at evening from Anchorage, 140 miles away. But when we were in the park there was just enough mist to hide the mountain. We drove to Wonder Lake, where one can usually get the finest view of the peak, but even there it was obscured.

On the drive we observed wild flowers and animals we had never seen before. With binoculars we watched a flock of Dall sheep on a mountainside, and on another mountain we saw grizzly bears, a mother and her little one playing together. In one of the upland ponds we saw several loons with a checkerboard pattern, different from our striped Nova Scotia loons. We also watched porcupines, beavers, and a variety of ducks.†

Our particular thrill was a covey of ptarmigan in the road in front of us—a cock and hen and about a dozen chicks. We stopped the car and Dr. Grosvenor and Mr. Pearson got out to try for a picture. The male bird pretended he had a broken wing and flopped down in the middle of the road, the sickest looking bird you ever saw. The mother and little ones wandered off to the other side.

Dr. Grosvenor got out his camera and Mr. Pearson assured him he could get quite close

to the cock without frightening him. Hardly had he spoken when the ptarmigan flew up in my husband's face.

"You have had a unique experience," said Mr. Pearson, "to be attacked by a ptarmigan. I've never seen it happen before."

Before we took the park bus for the station, Mr. Pearson introduced us to the superintendent of a mixed school for Eskimos and white children. The Eskimos, he told us, are very bright and interested in their studies. Some of the girls who were preparing to attend boarding school at Sitka would walk miles in winter at -40° F. just for a couple of hours of evening tutoring.

From McKinley we took the train back to Anchorage. The engineer hospitably invited us into the cab of the train for a better view of the beautiful mountain scenery. Every now and then we passed a lonely station where families waved to us from cottages with neat grass plots bordered by flowers.

Homeward Through the Inside Passage

From Anchorage we regretfully headed south, leaving Alaska, as we had entered it, by ship through the Inside Passage. So much had we enjoyed this cruise, in fact, that we took the same ship and the same stateroom we had occupied on the trip north. We were extremely sorry to hear later that passenger service on the Alaska Steamship Company had been discontinued. Happily, both Canadian National Railways and Canadian Pacific offer cruises over this route from Vancouver.

Our visit to Alaska was primarily a pleasure trip. We made some new friends and saw much that was interesting and exciting, including magnificent scenery. But we made no real attempt to cover the whole Territory, and most of what we saw basked under a warm summer sun.

Mr. W. Robert Moore, who followed us on a separate assignment for the NATIONAL GEOGRAPHIC MAGAZINE, traveled to the Territory's northernmost outposts and also had a taste of some of the worst winter weather civilized Alaska has seen in recent years. His account of some aspects of Alaska that we did not see begins on page 776.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Mount McKinley Conquered by New Route," August, 1953; and "Over the Roof of Our Continent," July, 1938, both by Bradford Washburn.

† See "Wildlife of Mount McKinley National Park," by Adolph Murie, NATIONAL GEOGRAPHIC MAGAZINE, August, 1955.



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↑ Kayak Paddlers Skim Past a Floatplane

Sealskin covers the wooden frames of these Eskimo canoes. Once kayaks were the chief means of transport during the summer. Now planes such as this Norseman regularly fly passengers, mail, and supplies between Kotzebue and outlying communities.

These men rest on their paddles after a grueling kayak race. Kotzebue needed no floodlights for the 10:30 p.m. event. In early July the sun dips only briefly below the horizon.

Chunks of Muktuk → Make an Eskimo Pie

This smiling entrant in a muktuk-eating contest relishes the skin and blubber of the bowhead whale as much as youngsters in the States enjoy brick ice cream.

The photographer found that the taste and texture of boiled muktuk resembles coconut meat. Pickled muktuk has the flavor of pickled pig's feet.

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Alaska, the Big Land

Airplanes, New Industry, and Military Defense Speed Progress
in the Far North, Where Men Once Struggled for Gold and Furs

BY W. ROBERT MOORE

National Geographic Magazine Staff

CHRISTMAS decorations spangled the Top of the World Club at Ladd Air Force Base. Small groups of off-duty enlisted men lounged in deep comfortable chairs talking, reading, or playing chess. Others clumped in from the outdoor darkness and threw back parka hoods, eager to enjoy a cup of hot coffee. The jukebox blared "Baby, It's Cold Outside."

It was cold outside—46° below zero. And no one had to dream of a white Christmas next day. Deep snow blanketed the ground; every tree and bush flaunted a mantle of snow or stood lacy white with icy-needled hoarfrost.

Out on the airplane runways scrapers and rotary snowplows still grumbled at the job of clearing away the latest snowfall. Flames of a snow melter glared at the end of one of the taxi aprons (page 765). And abruptly above the other sounds came the blowtorch roar of a jet fighter-interceptor, an all-weather F-89 Scorpion, returning to base.

In downtown Fairbanks neon signs and Christmas lights cast a rosy glow on the streets and against the ice fog hanging overhead. Clouds of vapor rose from automobile exhausts. The snow creaked under the tread of crowds hurrying to finish holiday shopping.

This was Christmas Eve in Alaska, where I had come to see what winter was like.

Fairbanks 92° Colder than Antarctica

A few nights later I heard a radio news item on Operation Deepfreeze, in Antarctica, where two of my National Geographic colleagues—Andrew Brown and Jack Fletcher—were at work. The temperature at the South Polar ice airstrip, said the newscaster, was 39° above. The Fairbanks thermometer that night skidded to 53° below zero—92° colder than at Antarctica!

While Antarctica was enjoying day-round summer sunshine, we in Fairbanks saw the sun only about four hours each day.

"I've seen it as rough back in Montana and Wyoming," said an Air Force captain at Ladd. A sergeant from Hawaii remarked: "It's not bad here. I don't mind the winter. But

once in a while I get to wondering what a palm tree will look like again."

"When I came up here," a young Fairbanks housewife, a former fashion model, told me, "I was sure I wouldn't like the winters. I couldn't picture myself all bundled up in layers of bulky clothes. But I like it here, better almost in winter than in summer. In winter you get an intimate community feeling; friends become like a close family circle. If my parents ever visit us, I want them to come in winter."

Winter, I found, generates friendliness and humor. When cars won't start and one is late for an appointment, everyone understands. It always amused me when tires froze stiff and remained flattened where the weight had rested. And embarrassed though I was one day at skidding into a snowbank, I saw the humor of the situation when a dog team helped pull me out.

Alaska Twice the Size of Texas

But Alaska is by no means all ice and snow. Last summer I spent nearly three months traveling through the Territory. Days were long then, and the land luxuriated under life-radiating sunshine. North of the Arctic Circle days or weeks passed with no nighttime at all. Central Alaska even had a heat wave, with temperatures climbing into the 90's.

Alaska is big, more than twice the size of Texas. Its very name derives from the Aleut term *alashka*, translated variously as "big land" or "mainland." Before the airplane, Alaska's size was a handicap.

"Years ago I traveled by dog team between Nome and Fairbanks," said Mr. Grant Jackson, president of Nome's Miners and Merchants Bank of Alaska. "It took me 23 to 25 days to make the trip one way in winter. Now look at it—only three hours by plane."

Alaska, admittedly, is a rugged land, a bold country to pioneer. Within its 586,400 square miles are lofty glacier-ribbed mountains and vast reaches of tundra, spongy wet in summer and frozen stark in winter (page 799).

Yet the Territory has rich bounties. More



Eerie Flares of Aurora Borealis Light Up Alaska's Night Sky in Autumn

Geophysicists at the University of Alaska chart the patterns, intensity, and associated magnetic effects of these northern lights (page 784). Star trails caused the tiny white streaks in this 30-second exposure.

than one billion dollars in gold, copper, silver, coal, lead, tin, platinum, and mercury have been extracted from its soil. Gold-rush days are gone, but gold still yields more than \$8,000,000 each year—more than the purchase price of Alaska from Russia in 1867.

The Territory's furs and the fabulous salmon catches taken from its waters earn additional millions of dollars. The vast forests of southeast Alaska, green as the Prophet's banner with dense stands of hemlock, spruce, and cedar, only now are coming into use.

And Alaska is people—more than 208,000 of them. Many are newcomers, for the population has nearly tripled in the last 16 years.

Here, as elsewhere, wealth is where you find it, and optimism flowers as brightly as Alaska's wide-ranging fireweed in summer.

Take the old-timer I met at the sagging inn in the ghost town of McCarthy. I had flown

from Anchorage to the base of the Wrangell Mountains to visit the once-rich Kennecott copper mines, abandoned nearly two decades ago (page 791). The old-timer had a vigor and brightness of eye that belied his 80-odd years. His recital of McCarthy's early boisterous days immediately captured my interest.

"Did you work at the Kennecott?" I asked.

"No. I was on my own—dug for gold, not copper. I only came into McCarthy for supplies."

"A sentimental visit this time?" I suggested.

He shook his head and gestured toward the rain-streaked window. "Just waiting for this fog and rain to clear so we can get off by bush plane. My pal and I have a little job prospecting up beyond here. There's gold there yet; only the surface has been scratched."

Time and again as I traveled about Alaska I heard the old-timer's phrase repeated in



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↑ **Fort Yukon, Population 500, Is a Metropolis in the Wilderness**

Alexander Murray, a trader for the Hudson's Bay Company, established the settlement on the Yukon River in 1847. The town was the first inland settlement in Alaska by English-speaking people. Only the graveyard remains of the original post.

Gold was discovered near Fort Yukon in the 1850's, but the town's chief interest has always been trapping. As a trading and transport center for the mainland's northeast section, it serves 60,000 square miles stretching north to the Arctic Ocean. Trappers rush in with pelts of mink, marten, ermine, fox, beaver, and muskrat.

Climate runs to extremes. Fort Yukon has experienced Alaska's highest official temperature, 100° F., as well as the Territory's lowest—78° below zero.

This log post office is popular with travelers, who like to mail letters home from north of the Arctic Circle. The sign says 8 miles, but latest surveys place Fort Yukon only a mile north of the Circle. Moose antlers top the roof.

← Kotzebue's prettiest girl won the title of Miss Arctic Circle at last year's July Fourth celebration (pages 772, 773, 775).

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one form or another. Optimism about the Territory's richness is not confined to such rugged veterans; I heard it from alert businessmen, geologists, oilmen, timber experts, hydroelectric engineers, and agriculturists.

Besides the minerals now being worked, three extensive iron deposits are under active survey. Men search the countryside for uranium; test drilling of one ore deposit already has begun on Prince of Wales Island.

U. S. Navy research in the Far North, near Barrow, revealed good prospects for oil and natural gas. Eight major oil companies, as well as small Alaskan firms and individuals, have leased 4,000,000 acres in Alaska for exploration.

Virtually all southeast Alaska is forest reserve—the 16-million-acre Tongass National Forest. These partially overripe stands are being leased for pulp cutting. More than half a billion board feet of timber can be cut from them every year on a sustained-yield basis, the U. S. Forest Service estimates.

"Hemlock used to be the orphan of the forest products industry," said Al Anderson, executive director of the Alaska Resource Development Board, at Juneau. "Now it is the darling of the pulp and paper industry. An ideal mix for pulp is 80 percent hemlock, 20 percent spruce. And that, curiously enough, is almost the ratio of our forests, if you take away the small amount of cedar."

The Ketchikan Pulp Company began operating in 1954. Last summer another contract was signed on a 7½-billion-foot tract of timber. This wood will feed a pulp and newsprint mill to be located near Juneau. A third tract, leased in January this year, will supply a pulp mill at Sitka, soon to be built. Other mills produce lumber and plywood.

U. S. Builds Radar Defense in Far North

No sooner had I landed at Fairbanks than I became aware of Alaska's vital role in strategic defense.* In the airport I met a construction crew about to take off for the Far North on "Operation DEW Line," that Distant Early Warning chain of radar "eyes" the United States and Canada are stringing across the top of the continent.

World War II dramatically emphasized Alaska's strategic position; in the ensuing cold war the United States has expanded its military defenses here. Today jet fighters, bombers, and far-ranging weather planes streak Alaska's skies with gleaming vapor trails.

Big Elmendorf Air Force Base, headquarters of the Alaskan Command, and the Army's Fort Richardson spread near Anchorage. Fairbanks is center for two other airbases—Ladd, just outside town, and Eielson, at Mile 26 on the Alaska-Richardson Highway. Each base is a small city in itself, with stores, theaters, houses, and hospitals. At Fort Greely, near Big Delta, 100 miles to the southeast, the Army maintains an Arctic test base and Arctic indoctrination school. The Navy has installations at Kodiak.

Fairbanks Like a Midwestern City

Arriving at Fairbanks in June, I had difficulty realizing that I had traveled 1,500 miles northwest from Seattle and was near the Arctic Circle. Spruce, birch trees, and grass shone vivid green in the sunshine; the air had the soft caressing warmth of springtime.

Fairbanks did not even look far from home. It struck me as if some Midwestern city had been snatched up at random and transplanted here beside Chena Slough.†

Familiar two- and three-story glass-fronted shops, cafes, motion-picture theaters, a First National Bank, hotel, and drugstores that sell everything from aspirin to zippers flank Second Avenue, the short main street.

Today Fairbanks has a skyline—an eight-story apartment building, another 11 stories high, and two tall television towers.

Newest addition to town is an ultramodern hotel, completed in December. Built around a large central parking courtyard, it features touch-button lighting, couch beds, and built-in radios. If you ask for an early-morning call, the office not only awakens you but pops on your bathroom lights. The parking court provides electrical connections for head-bolt heaters to keep automobile engines warm for easy winter starting (page 762).

But in many respects Fairbanks still bears the marks of a pioneer town. Log cabins rub elbows with clapboard homes. Eskimos and Indians pass on the streets.

Here, too, one finds the quick, open hospitality of the frontier. Cordiality even extends to the police—if you can believe the words "Free Pickup and Delivery" painted

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Strategic Alaska Looks Ahead," by Ernest H. Gruening, September, 1942; and "Our Air Frontier in Alaska," by Maj. Gen. H. H. Arnold, October, 1940.

† See "Busy Fairbanks Sets Alaska's Pace," by Bruce A. Wilson, NATIONAL GEOGRAPHIC MAGAZINE, October, 1949.





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↑ **Snorting and Bellowing,
Walrus Churn Toward
Rocky Twin Islet in
Bleak Bering Sea**

Old Norse sailors called the ungainly mammal *hvalross*, or whale horse. Eskimos esteem its dark flesh, carve curies from the ivory tusks, and cover boats with the split hide.

Walrus drift south with the ice into Bering Sea in autumn and swim back to the Arctic Ocean in spring. Every second year, in April or May, mothers give birth to single pups.

Although a strong and fairly rapid swimmer, the walrus cannot swim indefinitely. When tired, it must find ice or land, or drown. It often attempts to frighten away enemies, such as the killer whale and the polar bear, by trumpeting loudly through the nostrils. The normally sluggish and inoffensive animal becomes a ferocious adversary when molested.

← **Massive Bodies Flop Ashore**

An adult male measures 10 to 12 feet and weighs more than 2,000 pounds. Tusks run 14 to 26 inches long and weigh 6 to 9 pounds. Walrus use them to fight and to dig mollusks on the floor of the sea. Flippers are too short to reach the mouth, so food is scooped in with the bristly muzzle.

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Mar's Photo Service



on the patrol wagon. The sign painter put the phrase there in jest, and the police have not had it removed.

In summer I saw an unusual number of streets torn up and later learned that the city was installing 14 miles of new water mains. Frank Mapleton, manager of the Municipal Utilities System, explained the Fairbanks water system is "tailor-made" to withstand the winter cold; the research was done at Washington State College in Pullman.

Pumps circulate the water through the mains. Take-offs to houses are not single straight pipes but loops that return to the mains. Special connections keep water moving through these loops to prevent freezing.

Distance Raises Cost of Living

Store and restaurant prices remind you how far you are from trade centers.

"Prices generally run about one-third higher than in Seattle, though individual costs vary," said C. W. Snedden, publisher of the lively *Daily News-Miner*, America's northernmost daily. "Newsprint, for example, is \$130 a ton; to get it to Fairbanks, we have to pay an additional \$77 freight."

Yet here, within 125 miles of the Arctic Circle, the *Daily News-Miner* presses turn out more than 10,000 papers a day. They carry the same instant wire-service news that appears in stateside city papers, and editions often contain three- and four-color photographs and advertisements.

The Alaska Highway, built in the emergency of war, and the expanding territorial highways have done much to eliminate Alaska's isolation. Today trucks and passenger cars whirl over the Alaska Highway from the States.* Alaska Freight Lines operates its own rapid barge-truck service from Seattle. Loaded trailers roll aboard barges at Seattle and off at Valdez, Seward, or Anchorage, where trucks again take over and speed the cargoes along the Glenn and Richardson Highways to Fairbanks.

The airplane has reshaped Alaska's life to an even greater extent. Planes have become as common to the Eskimos as kayaks or dog sleds. Cargo planes now put down bulldozers, mining machinery, and other equipment in hitherto inaccessible places.

At Wien Alaska Airlines I talked with the Wien brothers, Noel, Sig, and Fritz, who pioneered here with flimsy planes in the 1920's. Today Wien Alaska Airlines serves

some 250,000 square miles of northern Alaska.

"Put your finger on any northern village on the map of Alaska and we have a scheduled service to it," said Jack Whaley, former pilot and Wien's traffic vice president. "We run daily schedules to the main centers—Fort Yukon, Kotzebue, Nome, and Barrow. Bush flights radiate from those centers to other places."

"If people need groceries or other supplies, they can have them sent by mail," Noel Wien said. "Supplies go at surface parcel-post rates, though delivered by air." The Post Office absorbs the difference in cost, because there is no other way to deliver them. Many Eskimos and miners would have to move to larger centers if it weren't for this plane service (page 751).

Later I took several bush flights. On some we went by pontoon aircraft, putting down on rivers and lakes. By landplane we bounced on and off tiny bush clearings or sand bars. In winter, planes take to skis.

Winter bush flying has its problems. When idle, planes have to have sticks thrust under the skis to keep them from freezing to the snow; engines must be drained of oil. Oil and engines must be heated for restarting.

"Heating is usually an hour's job," Jack explained feelingly. "Then if the engine doesn't kick off the first try, it has to be heated all over again. By that time there may not be enough daylight left to complete the flight, so it's wait until next day."

The men listed the items bush pilots must carry on winter flights: motor cover, fire-pot heater, a 5-gallon can of gasoline, 30 days' food supply, sleeping bags, snowshoes, tent, and stove. "That doesn't leave much room for passengers and cargo," Noel Wien said.

"If temperatures drop near 60° below zero, we have to quit bush flying. The snow becomes like gravel, and skis won't slide."

Golden Heart of Alaska

Gold discovered in the locality by Felix Pedro in 1902 gave birth to Fairbanks. Almost half of Alaska's gold production still comes from the Fairbanks region.

"Virtually all Alaska's gold comes from placer mining." I was told by James Crawford, vice president and general manager of the Alaskan Operations of United States

* See "Alaskan Highway an Engineering Epic," by Froelich Rainey, NATIONAL GEOGRAPHIC MAGAZINE, February, 1943.

King Crabs Weigh up to 20 Pounds; One Leg Makes a Meal →

Before World War II Japan's fishing vessels and floating canneries monopolized the canned-crab-meat industry off Alaska's shores.

Today Alaskan fishermen are dredging the depths for these crustaceans. The yield is lucrative.

Sometimes a single adult king crab will fill a dozen 6½-ounce cans. Each crab yields 25 to 30 percent pure meat, the legs supplying twice as much as the body. Dried, pulverized shells go into fertilizers and poultry-feed mixtures. An adult king usually sheds its shell once a year.

Since king-crab seasons occur earlier or later than the salmon runs, some salmon canneries process the crabs.

This man, who works in a cannery at Homer, holds two giants captured off the Kenai Peninsula. A record specimen taken near Kodiak Island weighed 22.2 pounds; its leg spread was 7 feet.

↴ Cannery girls pack the cooked flesh, sandwiching white body meat between pinkish leg meat. Machine in background caps the cans.

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Smelting Refining and Mining Company, largest miners in the Territory.

"We have eight dredges in the Fairbanks area, two at Nome," he said. "Right now we are moving another dredge over to the Hogatza River, a branch of the Koyukuk, about 250 miles northwest of here. To get it there, we have to divide it into sections, truck it overland about 70 miles to Fairbanks, float it 800 miles by water, and again haul it overland some 20 miles to the operating site."

He smiled when I commented on the labor involved.

15 Years to Reach Gold

"That's a relatively small job," he said. "Our big job is getting to the gold. It is concentrated mainly at the base of stream bed gravels that may be covered by an overburden up to 150 feet thick. In one operation we had to remove 150,000,000 cubic yards of earth—more than the Panama Canal's biggest cut.

"And remember, much of it is in permafrost," he emphasized. "The overburden must be thawed and washed away. Dredging is almost incidental; the main work and manpower go into preparation. On some gravels we're now dredging, we started stripping operations 15 years ago."

I visited two of the placer mines. In one valley men directed powerful jets of water against a wall of slimy black earth to sluice away the few inches that had thawed during the previous 24 hours. A behemoth floating dredge, tall as a three-story building, gulped up mouthfuls of gravel and within its maw screened out the particles of gold.

Ahead of the dredge spread a network of pipes, some thrust vertically into the gravel beds. Water is forced into these to thaw the gravels down to bedrock.

The surface mucks overlying the gravels have proved one of the world's richest hunting reserves for Pleistocene mammals. Within these soils, in permanent deepfreeze, lie the remains of animals that perished 25,000 to 50,000 years ago.

Glaciers did not cover this central portion of Alaska in the last great period of ice expansion in North America. While much of New England was buried under ice, an "ice-free corridor" remained between the northern and southern ranges, following roughly the same direction as the Yukon River Valley.

At the University of Alaska, four miles outside Fairbanks, I sought out Otto William

Geist, hunter extraordinary of the ancient beasts that roamed this corridor (opposite). In 20 years, Otto has collected some 200 tons of bones and tusks. He has shipped about 50 tons as museum specimens.

At the university museum and in his workrooms Otto showed me some of the "game" he has captured—mastodon, woolly mammoth, super-bison, short-faced bear, saber-toothed cat, musk ox, the horse, camel, saiga antelope, elk and giant beaver, as well as wolves, foxes, wolverines, rabbits, ground squirrels, mice, lemmings, and birds.

The skull of one woolly mammoth has near-record tusks, one 13 feet 7 inches long, and the other 13 feet 5 inches. Rarest prize of all, however, is the almost perfectly intact head, trunk, and foreleg of a baby mammoth, now in a refrigerator at the American Museum of Natural History in New York.

At the university I called on Dr. Charles E. Bunnell, president-emeritus, and Dr. Ernest N. Patty, now the president, who had entertained Dr. and Mrs. Gilbert Grosvenor during their visit (page 769).

Dr. Patty commented on the research being done in the university's Geophysical Institute and there put me in the good hands of Dr. C. Gordon Little. For the next hour I had a seminar on the aurora borealis and the propagation of radio waves in the Arctic.

Northern Lights Can Fool Radar

Dr. Little showed me sequences of photographs of the aurora made by Dr. Christian T. Elvey, director of the institute. Dr. Elvey also studies these fantastic northern lights by photoelectric cells, spectroscopy, and radar to chart their patterns, intensity, and magnetic effects (page 777).*

"Does the aurora affect radar?" I asked.

"A great deal," Dr. Little replied. "Radar of certain wave lengths gives echoes of the aurora itself; the patterns show even in daytime. This naturally interests the military. They now use frequencies which do not show aurora patterns; obviously, they don't want to send out aircraft to shoot down an aurora!"

Dr. Little's special field is radio research. In the Arctic radio signals may become completely absorbed. Dr. Little's job is to study this absorption, measure it, and find out what takes place in the lower atmosphere, the ionosphere, and regions beyond (page 767).

* See "Unlocking Secrets of the Northern Lights," by Carl W. Gartlein, NATIONAL GEOGRAPHIC MAGAZINE, November, 1947.

To see other parts of Alaska, I flew first to Fort Yukon, oldest English-speaking community in the interior. Built as a fur-trading post by the Hudson's Bay Company in 1847, it stands at a bend of the Yukon River just north of the Arctic Circle (page 778).

When I arrived, the village was experiencing one of the busiest days it had known in a long time. A construction crew had just flown in to begin work on the airstrip.

The river boat *Tanana* had arrived on its

first upriver trip of the season from its port of Nenana, near Fairbanks, pushing two heavily laden barges. Bulldozers, trucks, and prefabricated housing materials crowded the decks above the spring supply of groceries and goods for the trading post.

The church of St. Stephen's Mission was in the midst of a week of special Bible classes. Practically all the Indian youngsters were gathered in their bright costumes, red cheeks aglow with fresh scrubbing.

Gold Seekers Bared the Crescent-shaped Tusk of a Prehistoric Mammoth

Frozen soil covering gold-bearing gravels yields the remains of mastodons, short-faced bears, saber-toothed cats, and other extinct animals. On a field hunt for the University of Alaska, Dr. Ivar Skarland (left) and Mr. Otto William Geist inspect this preserved ivory near Fairbanks. Hydraulic jets will wash it loose. Masses of ice mixed with dirt form shiny chunks in the overburden.

Charles Kuhn





Though trapping in Alaska has dwindled, Fort Yukon Indians still bring in furs.

"We buy about \$90,000 worth of furs a year," said Harry Cheek, agent of Northern Commercial Company, the main trading store. He showed me pelts of ermine, mink, fox, lynx, beaver, and wolf.

"How do you like this?" he asked, running his fingers over a soft blue lynx fur. "Other lynxes are common, but not these. We got eight last year."

Wolfskins Bring \$50 Bounty

I asked about a front leg bone I saw dangling from each of the wolfskins.

"Oh, those," he said. "The leg bone must remain attached for the trapper to collect bounty. He gets a \$50 bounty on wolves in addition to the pelt's value."

When I returned to the roadhouse where I was staying after a sunny morning of picture taking, the manager smiled at my enthusiasm over cloudless skies.

"Our rainfall around Fort Yukon," he said, compares with that of a desert—only about 6 or 8 inches a year."

Hardly had he finished speaking when a thunderstorm rolled in, soaking the "desert" with a torrential downpour.

Next day the skies still dripped. When I enplaned for Circle Hot Springs, the cloud ceiling hung so low we could not land there. I had to wait till later to see this resort with its warm swimming pools, therapy baths, and lush vegetable gardens growing in its springs-heated soil.

From Fairbanks I headed next to Kotzebue and Nome. Flying northwestward across the Yukon, Koyukuk, and Selawik River valleys, I looked down upon miles of green tundra. In many places I saw the land marked by a series of polygon patterns. These formations,

typical of permafrost regions, are caused by the earth cracking under the tension of extreme cold.

Forbidding though this northern tundra can be, it also has rare beauty in summer. Here flourish some of the same flowers Mrs. Wells has photographed in southern Alaska (pages 810-823). But most grow only in midget size.

Had I not looked at a map, I should have believed that Kotzebue occupied an island.* We crossed an inlet, and in the sea distance beyond I saw pack ice gleaming. Actually, the frame-house village stretches for a mile or more along the point of a peninsula.

Here I soon realized how closely the Eskimo's life is linked to the cold Arctic waters. Walking the length of the village, I saw almost no men around. They were out hunting seals on the ice pack or searching for belugas (white whales) in the open waters.

All along the waterfront main street, drying racks hung heavy with reddish-black whale meat and linked squares of light *muktuk* (whaleskin with an inch-thick layer of blubber). Women were boiling *muktuk* or rendering blubber in kettles and oil drums.

White Whales Are Plentiful

"Many belugas this year," a busy Eskimo woman told me. "All the families got plenty."

But even Eskimo tastes vary.

"I'm an Espenberg man, not from Kotzebue," said one hunter after he and his companion landed their boat through the heavy swells with a load of eight bearded seals, or *oograk*. "We Espenbergers grew up on *oograk*; we like it better than beluga."

In his spare time my Espenberg acquaintance carves ivory. He drew from his pockets several bracelets made from lustrous white walrus tusk and fossil mammoth tusk.

Many Alaskan Eskimos carve ivory to supplement their cash income. They fashion bracelets, cribbage boards, chess sets, and animal figures, some of remarkable grace.

In summer Kotzebue's population of about 1,000 is swelled by families from Little Diomedede Island and Cape Espenberg. During my stay several motorboats arrived, loaded not only with parents and children but dogs, kayaks, stoves, blankets, skins, and the tents they summer in. From the boats also came sealskins bulging with seal oil ("Eskimo but-

*See "North Star Cruises Alaska's Wild West," by Amos Burg, NATIONAL GEOGRAPHIC MAGAZINE, July, 1952.

← The Silver Horde Is Running! Salmon Arrive at a Kodiak Cannery

Salmon, not gold, provides Alaska's chief source of revenue, but cannery output has declined sharply in the last 20 years. The 1953 pack totaled fewer than 2.4 million cases, compared to 8.4 million in 1936.

For three months each year—during the salmon runs—coastal canneries hum around the clock. Seasonal workers from the States stream in by the thousands. Barges with bulging holds pull into the wharves, unload cargoes, and hurry back to the fishing grounds.



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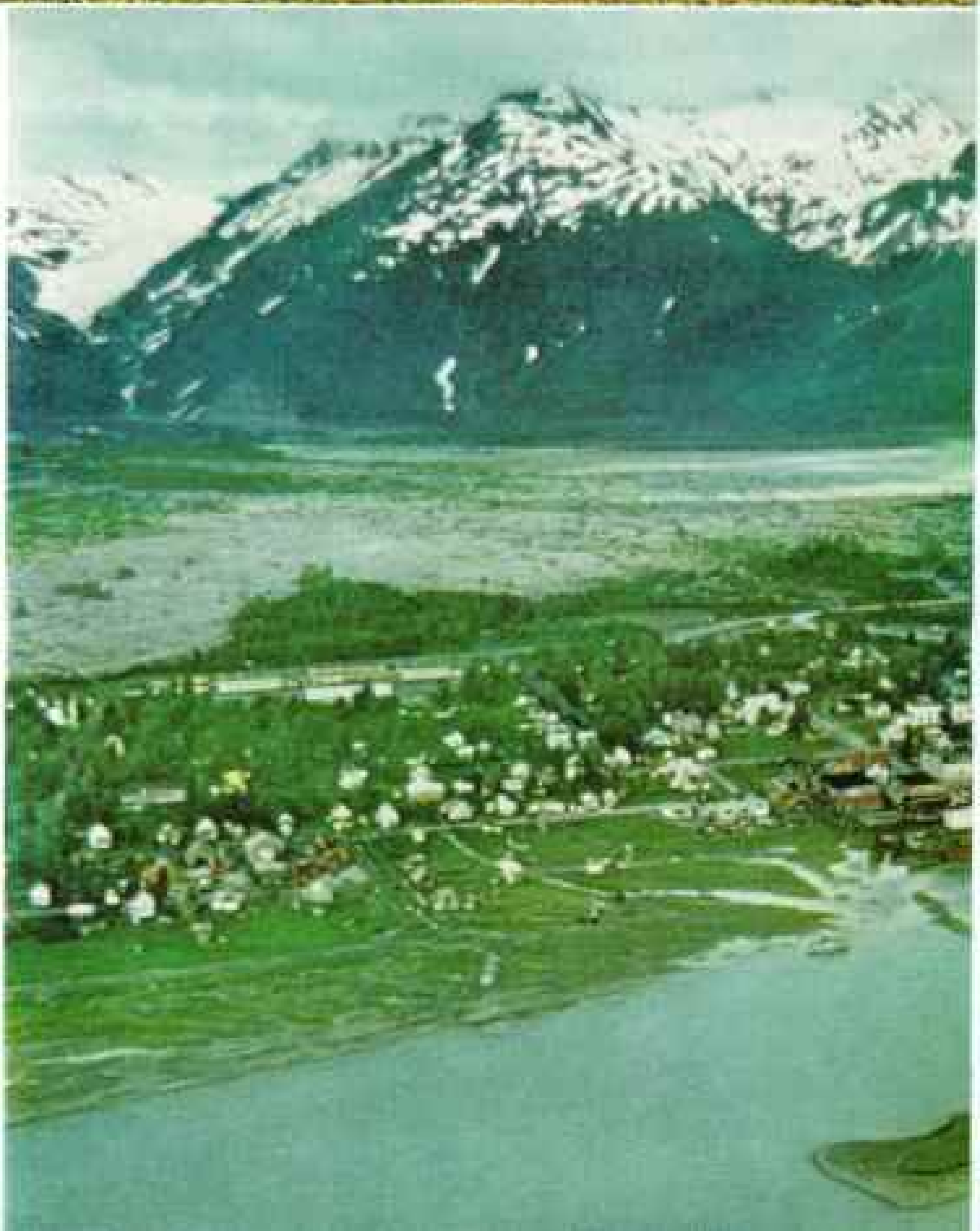
**Gold Stampeders Put →
Valdez on the Map;
Its Ice-free Port
Serves Interior Alaska**

Thousands of prospectors arrived in Valdez at the turn of the century. They climbed Valdez Glacier north of town to get to the Klondike and Fairbanks gold fields.

In 1909 gold was discovered near the town itself, and Valdez boomed. With rising costs during and after World War I, the gold fever subsided. Ocean freighters bypassed Valdez for Seward, coastal terminus of the new Alaska Railroad.

Then, in the '40's, Valdez sprang to life again. The Richardson Highway, Alaska's longest road, linked the town with Fairbanks. Today ships frequent the harbor, North America's most northerly ice-free port. Truckloads of food and supplies roll north to the interior.

Valdez nestles on the edge of a vast glacial moraine on an inlet of Prince William Sound. Receding Valdez Glacier appears through a gap in the Chugach Mountains at extreme left. Snowfall is heavy here, averaging 22 feet a year.





← **Onion Domes
of the Orthodox Church
Remind that Kodiak's
Founders Were Russian**

Kodiak bills itself as "the oldest town and newest city in Alaska." It lies on sheltered St. Paul Harbor near the northeast corner of 100-mile-long Kodiak Island, a home of the world's biggest bears (page 770). Shelikof Strait separates the island from the Alaska Peninsula.

Russian fur traders settled here in 1792. For a decade the post served as headquarters of the Russian Empire in the north Pacific.

Japanese activity in the Aleutians in World War II pointed up Kodiak's strategic value. The U. S. Navy built a base on Womens Bay (far right), and the Army erected Fort Greely, now abandoned.

Today the town functions mainly as a fishing center and outfitting point for hunters. An estimated 1,670 brown bears still roam the island. Laws limit the hunting season to prevent extinction.

The south portion of Kodiak Island boasts good pasture land, but the bear population rules out any large-scale livestock industry.

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Kodiak scenes by Steve McCutchen,
Mar's Photo Services



ter," an old Eskimo facetiously called it), and driftwood, valuable in this treeless tundra.

I spent the Fourth of July in Kotzebue. It was a day to warm the soul. Most of the men had come back from the sea, and old and young turned out in their brightest Sunday best to parade in the sun.

Children ran foot races and chewed their way through cracker- and muktuk-eating contests. Adults danced and played the blanket-tossing game. Young men or women were thrown high in the air from a walrus-skin blanket, showing great skill in landing upright from each soaring bounce (page 773).

Mothers paraded their infants for judges to decide which of the small moonfaces peeping from fur garments was the prettiest, healthiest baby in the village.

Solemn judges selected Miss Arctic Circle. But what a contrast to the beauty contests of Atlantic City or Florida! Here the girls were muffled in heavy fur parkas (page 778).

Nome Bank Will Cash a Poke of Gold

When I flew from Kotzebue to Nome, I thought the flight had affected my vision. Wooden sidewalks waved unevenly and buildings seemed to reel. Even the substantial post office and court building was askew.

But it wasn't my eyes; the uneven settling of the permafrost soil beneath their foundations had set them awry.

Visiting the local bank, I found a surprising survival of Nome's gold-rush days.

"If you have a poke of gold you want cashed," said Grant Jackson, the bank president, "we'll do it for you."

In a tiny back room he showed me crucibles, chemicals, and a small gasoline furnace.

"We've assayed gold ever since the bank started," he explained. "When I came to Nome, there were three banks. Now we're the only bank here."

Since the discovery of gold at Anvil Creek in 1898 some \$100,000,000 has been dug from Nome's stream beds and the ancient beaches that lie inland from the present shore line.

"We have other minerals than gold," said veteran Charles Jones, member of the first Territorial Legislature in 1913. "The Seward Peninsula has tin, copper, scheelite, coal, asbestos, graphite. Come and see."

At his house he showed me numerous sample ores. He drew curtains and turned on an ultraviolet light. Tungsten ores glowed with eerie fluorescence. "There is good

Dairy and Truck Farming Prosper → in Fertile Matanuska Valley

Twenty years ago the U. S. Government transplanted some 200 volunteer farmers and their families from the Midwest to colonize this fertile valley in south-central Alaska.

Today more than 500 families have about 10,000 acres under cultivation. The Matanuska Valley Farmers Cooperating Association sells \$2,000,000 worth of produce annually.

Peaks of the Chugach and Talkeetna Mountains rise above the homesteads.

George E. Allen

tungsten in the hills. Men will start mining it one of these days," he said optimistically.

At the main-street offices of the *Nome Nugget* I dropped in for a chat with its editor, Mrs. Emily Boucher.

"We're Alaska's oldest newspaper still being published," she said. "The *Nugget* started in 1899 as the *Nome News*, along with another paper, the *Weekly Gold Digger*. The *Nugget* is the only one to survive.

"We're not big. We publish an edition of 600 copies three times a week. But it is rewarding," she added with a smile.

"A subscriber in the village of Unalakleet sends us a king salmon every year. Another subscriber in Shaktoolik pays us with low-bush cranberries. And from Igloo we get a nice hindquarter of reindeer."

Though Nome faces the sea, it does not boast about it. The shallow water offshore affords no safe anchorage. All goods have to be lightered half a mile or more between ship and shore. Until Nome built a \$1,056,200 sea wall in 1950-51, mountainous seas sometimes threatened to wash the town away.

From its gold-boom crowds of 12,500, Nome's population has dropped to 1,900.

Page 791

Kennecott Copper's Ghost Mill → Cascades Down a Mountainside

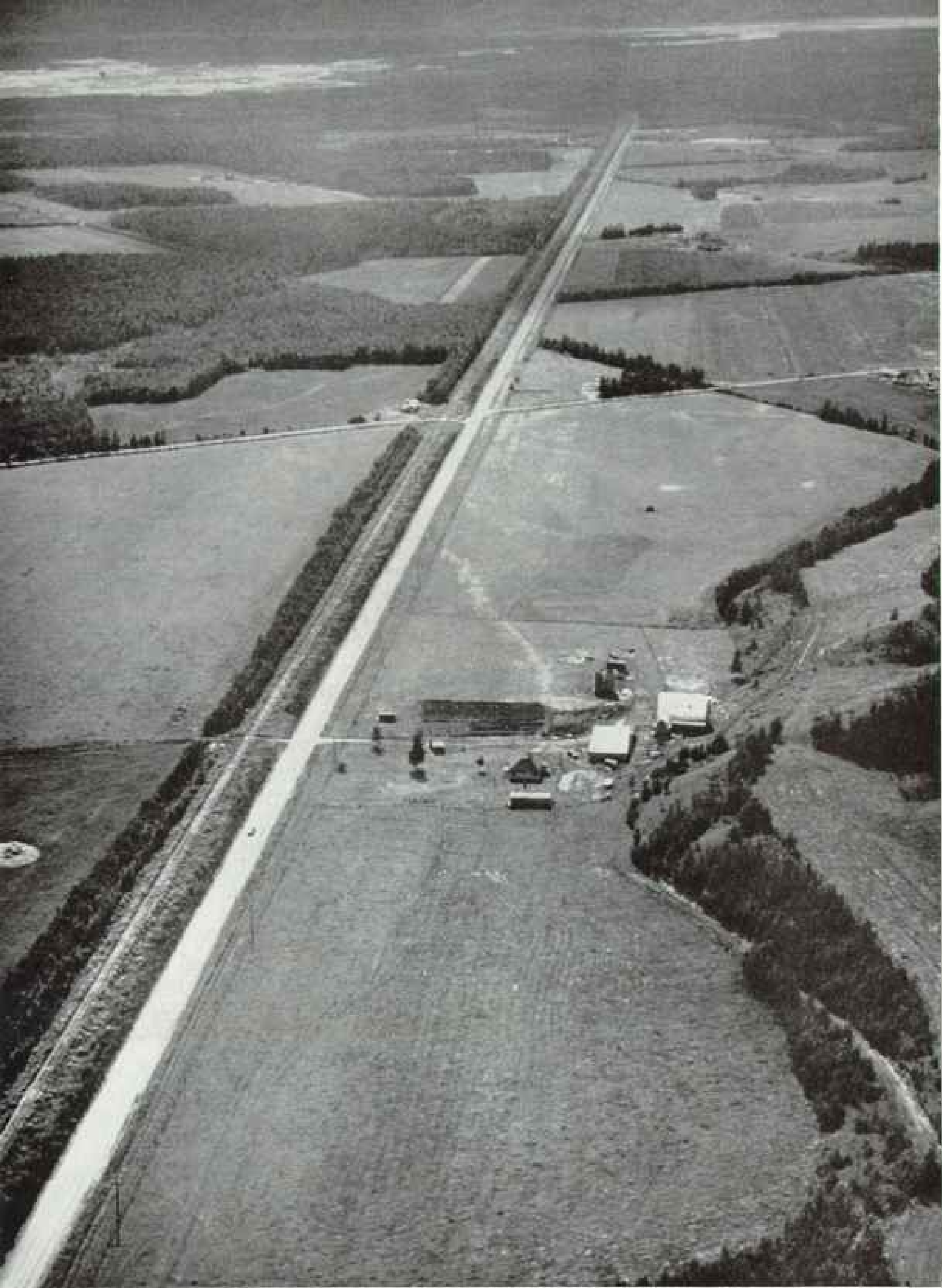
At its peak in 1916, copper mining earned more than gold in Alaska. Much of the ore came to the Kennecott mill by aerial cableway from hill diggings. Here nearly 1,000 miners hauled out carloads of ore 60 to 70 percent pure.

When the ore ran out in 1938, the Kennecott mill and the neighboring town of McCarthy were abandoned. An Anchorage airline now flies two-day excursions to the area. A Model T (right), converted to rail use, transports visitors from McCarthy to the mine over the last remaining segment of a railroad that once ran to Cordova, 200 miles distant. Dodge car at left carried President Harding when he toured Alaska just before his death in 1923.

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W. Robert Sherris, National Geographic Staff





Ruler-straight Road and Railway Cut Side by Side Through Matanuska Valley

Fertile farmlands supply fresh vegetables and dairy products to near-by Anchorage and other Alaskan towns (page 747). The highway connects Wasilla and Palmer. This branch of Alaska Railroad leads to coal mines at Eska.

About 1,000 have Eskimo blood. Summer brings more Eskimos from King Island, 85 miles away.*

Back in Fairbanks, I bought a ticket for an afternoon flight to Alaska's farthest north, Barrow. At the airport there was a delay.

"You'll Get to Barrow Before Sunset!"

"They are stowing some special cargo," the girl at the desk explained. Then with a puckish grin she added, "But you'll get there before sunset!" I hoped so. At Barrow the sun does not dip below the horizon for about 80 days in summer. "Sunset" was nearly a month away.

Flying northward in clear weather over the Brooks Range, I had a good view of the Nunamiut Eskimo encampment nestling at the foot of Anaktuvuk Pass. Beyond, flat tundra lands spread toward the Arctic Ocean. Though this far north has little rain, the ground is spotted with lakes, ponds, and twisting watercourses. Permafrost underneath prevents water from draining away.

Near Barrow we ran into sea fog and plunged into a twilight gloom. Descending, we glimpsed ice floes uncomfortably close beneath us. The pilot could not find the airstrip, so back we went to Umiat, a military airstrip an hour's flight away, to try again the next day.

When we finally landed at Barrow, I discovered not one settlement but three edging the gravelly shore a few miles short of Point Barrow. So loose is the gravel here that airplanes land on steel matting. Trucks and jeeps are fitted with fat airplane tires to keep them from bogging, and caterpillar weasels are the best means of transport.

The main village of Barrow is purely Eskimo. Eskimos run its hotel, restaurant, and cooperative trading store. Adjacent Browerville, too, is Eskimo, but originated as a concession granted to Charlie Brower, an American whaler who left his ship, married an Eskimo, and settled here.

I just missed the end of Barrow's whaling season and was too late for *nalukatuk*, the feast dance to celebrate the catch of 17 large bowhead whales. But I saw icy underground storage caves filled with meat, blubber, and muktuk. Many of the men had now taken jobs as truck drivers or construction workers.

Barrow's Navy-built quonset town near the airstrip housed technicians during the 1944-53 oil explorations. Before the project halted,

two oil fields were brought in. The natural gas they tapped now heats the camp.

The Office of Naval Research established a laboratory at the camp soon after drilling started, and here a remarkable variety of basic Arctic research is conducted. The workers come mostly from universities scattered throughout the States. The establishment, known as the Arctic Research Laboratory, is operated under contract with the University of Alaska, and the Arctic Institute of North America assists in carrying out the scientific program.

Dr. G. Dallas Hanna, the director, introduced me to a number of the scientists.

"Do lemmings rush into the sea and commit suicide as in Europe?" I asked Dr. Frank A. Pitelka, professor of zoology at the University of California, engaged in a long-term study of these hamsterlike rodents.

"Students of Alaska lemmings don't believe that they jump into the sea and vanish. Some may get stranded on beaches or on the ice, but that is mostly accident," Dr. Pitelka said. "The lemmings are vegetarians and spread over the tundra seeking food. They breed in cycles, and during periods of high density they attract a large number of owls, jaegers, weasels, and foxes. Feasting on the lemmings, the predators themselves increase greatly in numbers."

Dr. Robert L. Usinger, also from the University of California, is seeking the bedrock source of Alaskan amber. An entomologist, he is interested in finding amber not for itself but for the insects entrapped in it perhaps 60 million years ago.

Fish That Freezing Won't Kill

In another laboratory I met Father Joseph Hanzley and associates from Catholic University of America, in Washington, D. C. They were studying the tissue chemistry of the Alaska blackfish (*Dallia pectoralis*), which inhabits tundra lakes and ditches. The fish are remarkable for their ability to revive after having been frozen. Thawed out, they become as lively as ever. Eskimos catch them for dog food.

Other university scholars are investigating mollusks, migrant birds, tundra vegetation, micro-organisms, and insects in this frigid land. Dr. Elvey, of the Geophysical Insti-

* See "Cliff Dwellers of the Bering Sea," by Juan Muñoz, NATIONAL GEOGRAPHIC MAGAZINE, January, 1954.

**Antlers White in the Sun, →
Bull Moose Browse on Scrub
in Mount McKinley National Park**

The Alaska moose ranks as the largest member of the deer family. The bull stands 6 to 7 feet at the shoulder and weighs more than 1,400 pounds. Antler spread may exceed six feet.

Next to the giant brown bear, the moose is Alaska's most prized hunting trophy.

Half a century ago, unrestricted hunting threatened the moose with extinction. Protective laws have since brought their numbers higher in some areas than ever before.

Moose frequent the lowlands and forested lower slopes in winter; in summer they range up to timber line. Leaves and twigs of young willows, aspens, and birch furnish a year-round diet.

These males feed near Igloo Creek. Shortly after this picture was made, the pair locked antlers in a joust.

→Page 795, lower: Salmon live in the sea but spawn in fresh water. Homing instinct drives the fish upstream through rapids and over falls to their birthplace. There spawning completes the life cycle and the salmon die.

This red salmon, still in silvery pre-spawning garb, hurdles Brooks Falls en route to upper Lake Brooks.

**↙ Strange Scent and Sounds Alert
Red Fox Pups at Play**

Foxes in four other color variations—white, blue, black, and cross—thrive in Alaska. Reds are most abundant. These pups frolic near their den at Sable Pass in Mount McKinley National Park.

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Illustrations by Warren F. Stettin and (inset, below) Ward W. Wells





tute, also studies magnetic disturbances and aurora displays here.

I learned that icy Arctic waters produce several times more marine life than tropical waters. Species are fewer, but numbers of shrimps, crabs, clams, and other forms that do exist here are greater. The sea teems with plankton, a prime food for whales.

"Cold waters are a better solvent for life-giving oxygen than warm waters near the Equator," Dr. Hanna explained.

Summer Heat Wave Hits Alaska

From Barrow's near-freezing fog I returned to Fairbanks's 81° F. weather. A few days later the electric temperature sign on the First National Bank flashed heat-wave figures—93°! Fort Yukon sweltered at 98°.

Often in Fairbanks I looked southward toward the Alaska Range, with its snowy peaks of Deborah, Hess, and Hayes. On a few occasions I saw distant Mount McKinley, or Denali, as Alaskans call it. To see this 20,320-foot monarch at closer range, I flew by bush plane to Kantishna, a tiny airstrip just north of the boundary of McKinley National Park. The mountain's crystal-clear glacial crown served as guidepost during the flight (page 760).

Returned to Fairbanks, I took the train southward to the Matanuska Valley and Anchorage.

Anchorage, to me, came as a surprise. I felt almost like the country boy in a big city. In the last five years Anchorage and its suburbs have tripled in population. Today it is Alaska's biggest metropolis, home to an estimated 60,000 persons, exclusive of the thousands of military personnel and their families located at adjacent Elmendorf Air Force Base and Fort Richardson.

Tall apartments, the large Alaska Native Service Hospital, railway headquarters, concrete office buildings, and new suburban homes make Anchorage appear more permanent than most Alaskan towns.

Anchorage Folk Holiday by Air

The number of private airplanes surprised me. Few places in the world can match the number of private floatplanes gathered at Lake Hood (page 750). During summer, planes are moored almost wingtip to wingtip around its shores. On week ends particularly they dip and soar above the canal between Hood and Lake Spenard like the hungry sea

gulls that range Anchorage's waterfront (page 802). Merrill Airport, across town, is home base for small land craft and contract planes.

People in Anchorage pack their planes and take off for an air trip as casually as most folks in the States hop into the family car for a Sunday drive.

Today, with this local flying and the five major commercial airlines that use International Airport, Anchorage ranks as one of the busiest air centers on United States soil.

My trip into Kenai Peninsula would have been memorable even had its mountain views not excited my interest. At Lawing, beside Kenai Lake, I met Mrs. Nellie Neal Lawing, better known as "Alaska Nellie."

A pioneer in true Alaskan tradition, Nellie has cooked for railway construction crews, mushed through snows with dog teams, hunted bears, moose, and wolves, and entertained dukes, duchesses, governors, even a president (Harding). Nellie, more recently an author, is a sprightly 84.

In a log roadhouse, now converted into a museum, she showed me her memory treasures and game trophies. She stopped to pat a huge bearskin. "When this old fellow started to maul me, I got kinda angry," she said. "I grabbed my rifle and put five bullets into him."

In her house across the way, Nellie proudly pointed to stacks of NATIONAL GEOGRAPHIC MAGAZINES dating from 1916. One pile lay beside her easy chair. "I get in a lot of travel during our Alaskan winters," she said.

Homer Catches King-size King Crabs

Across the Kenai Peninsula, at Homer, I came upon two flourishing local industries. One is canning king, or deep sea, crabs.

Truly king size, some king crabs weigh 15 to 20 pounds, with a leg span of 4 to 6 feet. A single leg section makes a full meal.

"We send out about 15,000 pounds of fresh crab by air every week," said the manager of the Homer cannery. "We expect to up it soon to perhaps 40,000 pounds. We also can 6,000 to 10,000 cases a season."

On the windy pier I watched a boat unload 500 crabs. "All males," the skipper explained. "Females are small. We throw them back to save the breeding stock."

I followed the catch to the near-by cannery to see the crabs butchered, put in wire racks, and plunged into the cookers. Women workers removed the cooked meat from the shells



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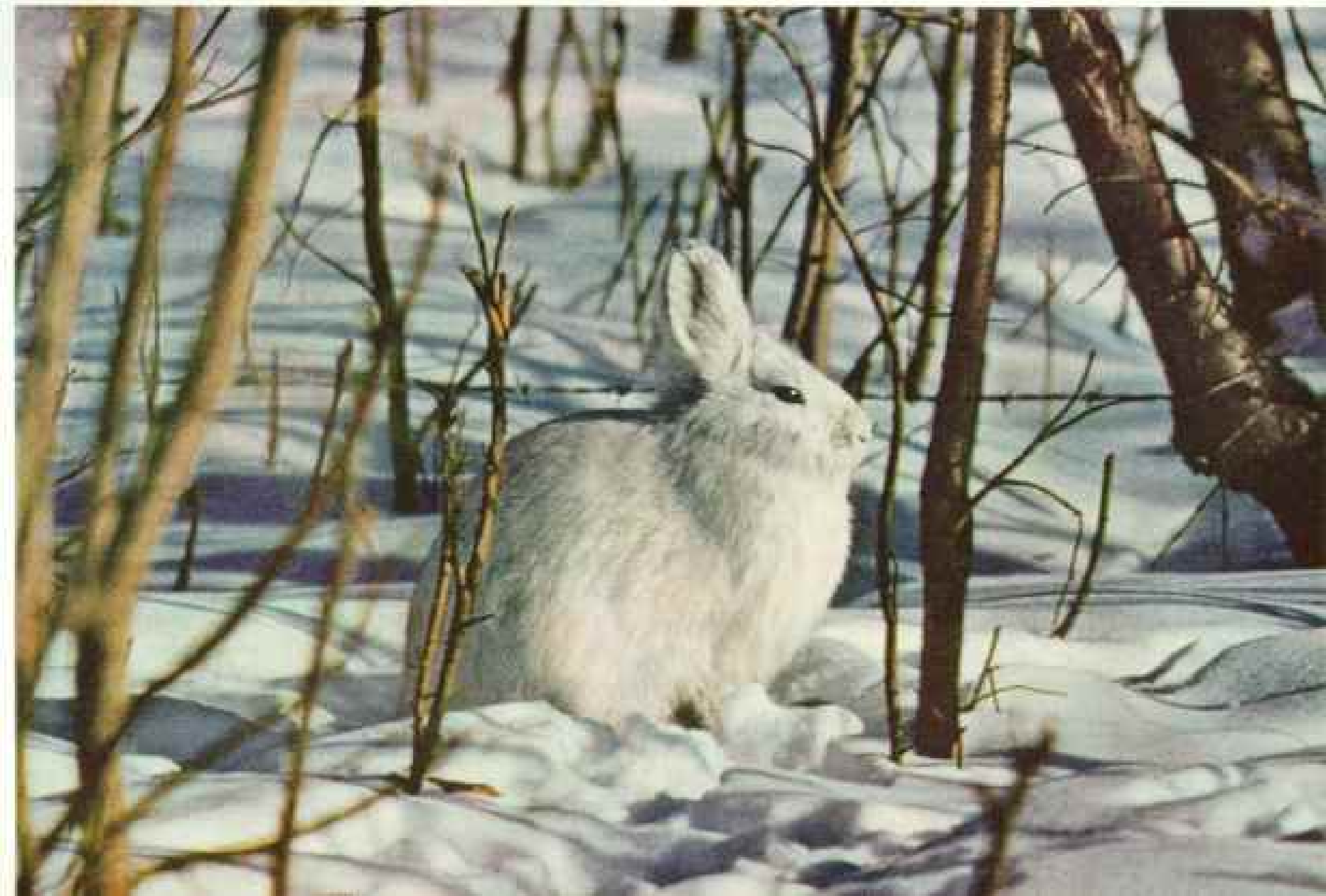
Warren F. Hoesbergh

↑ A Hoary Marmot Surveys His Domain

In summer this stocky, short-eared rodent sheds its gray coat for a brown one. Alpine flowers carpet its lookout post on windswept Polychrome Pass in Mount McKinley National Park.

↓ Snowshoe Hare Sits Statue-still

Outsized feet, shaped like snowshoes, enable this hare to outdistance predators in deep snow. Against a wintry backdrop, it often escapes detection by remaining motionless. In summer it grows a brown coat.



Selawik Village Hugs a Waterway → Winding Among Vast Tundra Plains

Here, north of the Arctic Circle, winter's extreme cold cracks the ground in polygon patterns (left). In summer the tundra turns spongy; pathways connecting the houses are made of planks. Eskimos beach boats at their front doors.

W. Burrell Moore, National Geographic Staff

and packed uniform amounts of leg sections, body meat, and tips into cans (page 783).

Homer's second industry, Alaska Wild Berry Products, grew from a kitchen hobby. Mrs. Kenneth Heath, who operates this flourishing home industry with her husband, urged me to taste some of the 22 kinds of jams, jellies, sauces, and syrups they make.

"We specialize in airmail gift packages. In a season we process about two tons of wild berries, plus gooseberries, rhubarb, and strawberries grown by the homesteaders. We have our own plane we use in prospecting for berries and on picking trips."

Kodiak Once a Russian Town

From Homer I flew south to Kodiak, an island home of the world's biggest bear—and onetime home of that Russian bear, Alexander Baranof, pioneer of Alaska.

Baranof founded a fur-trading colony here in 1792, then established other posts along the coast and made Sitka his "capital" of Russian America. Baranof also visualized permanent Russian settlements in California and the Hawaiian Islands.

Friends showed me iron rings in Kodiak's old sea wall to which Russian ships once tied up. A fourth of the town's residents reflect the intermingled blood of early Russian fur traders and native Aleuts. An onion-domed Russian Orthodox church stands on the site of an earlier one that burned (page 788).

Aside from these few links with the past, Kodiak is modern, wide-awake, growing. A U. S. Navy base, built here during World War II, has stimulated its expansion.

Fish was the main topic of conversation while I was in Kodiak. Barges and fishing boats returned to port bulging with salmon. Canneries hummed. Kodiak enjoyed a bumper fishing year, packing more than half a million cases (page 786).

From Kodiak I turned back to Anchorage and headed for Juneau. I know of no more spectacular air ride than this route skirting the south coast of Alaska. Along its wide-sweeping arc rears a barrier of lofty snow peaks, glaciers, and eternal snow fields that



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seem to deny that Alaska is anything but an impenetrable land of ice.

Through two breaks in the wall east of Anchorage men have probed routes to the interior, at Valdez and Cordova. Sourdoughs landing at Valdez clambered up the glacier to get inland. Now they could whiz up the asphalt highway threading the gorges and passes.

In 1925 the United States Government set apart a 3,554-square-mile section of the glacier and mountain fiordland, 60 miles northwest of Juneau, as Glacier Bay National Monument. I spent several days aboard the little M. S. *Nunatak*, of the National Park Service, cruising this wonderland (page 804).

Glaciologists estimate that as recently as 250 years ago Glacier Bay was solid ice. Today its 50 miles of open water are flanked by retreating glaciers. One, however, is advancing. A few years ago, Great Pacific Glacier at the head of the bay was entirely



in Canada; now it has invaded Alaska more than a mile.

Ranger Bruce W. Black told me sizable remnants of ancient interglacial forests had been found within the monument area.

As I roamed the southeast Alaska panhandle, I was struck by the contrast of its spectacular jigsaw pattern of islands and inland waterways to the main body of the Territory. Hemlock, spruce, and cedar clothe lower slopes of the snow-crowned mountains.

Hills and Sea Hem Southeast Towns

Towns, typically short on space, crowd narrow waterfronts and cling against the mountains that rise sharply from the sea. In Juneau and Ketchikan, particularly, stair-stepping is not just picturesque description but leg-challenging fact. Homes perch on terraces, reached by concrete or wood stairways. Waterfront buildings and even some

streets stand spindle-legged on piles above the high rise and fall of the tides (pages 739, 744).

When I first visited Juneau, in late July, I found almost no one who had time for an interview. Lapel badges told the reason: "Going Fishing." And across streets spread huge banners: "Salmon Derby, July 29-30-31."

For three days butchers, bakers, and the capital's business makers closed up shop and went fishing. Young and old, housewife and typist joined in.

Record catch was a 46½-pounder, a mere fingerling compared with the champion king salmon taken from Alaskan waters—126½ pounds. But derby prizes attested the enthusiasm for the sport. First prize was a new automobile; others included an outboard cruiser and transportation-paid tickets to California's Rose Bowl game.

With Fish and Wildlife Service inspectors

(Continued on page 805)



Snowdrifts Half Bury a Trapper's Camp on Frozen Sucker Lake

Winter fur trapping occupies 15,000 Eskimos, Indians, and Aleuts, and 5,000 whites. Pelts bring about \$2,000,000 annually. Authorities close a district whenever overtrapping threatens to wipe out the fur bearers.



Tom Krause Snowshoes Lakeward to Greet an Airborne Visitor

Mr. Krause, a veteran of the wilds, traps in winter and fishes in summer. Two Malamute dogs share his isolation. Pilot friends often fly in to fish through the ice. Food caches stand on posts, safe from animals.



Sea Gulls Swoop Down on Ship Creek and Gorge on the Waste from a Salmon Cannery
Chutes in the floor of a near-by cannery dump salmon entrails into this stream. Birds ride the swift current past the mud flats into Knik Arm. Snow-covered Alaska Range looms faintly across the inlet.



Fishing Boats Float 30 Feet Below the Wharves at Low Tide in Anchorage Harbor

Salmon taken in waters as far as 100 miles away are rushed here for canning. The fish must be processed within 48 hours after being caught. Tides rise and fall 25 feet or more a day in this area.



← An Ice Cliff's Sheer Face Calves Bergs into Glacier Bay

Page 804: This spectacular waterway in Glacier Bay National Monument, 60 miles northwest of Juneau, lies between the lofty Fairweather and St. Elias ranges. Rivers of ice thousands of feet deep grind down the mountainsides into eight fiordlike inlets.

Upper: Reid Glacier dwarfs the 50-foot motorship *Nunatak*, which carries rangers studying the ice flow.

Lower: The outgoing tide stranded this translucent blue iceberg on a gravel bar in Reid Inlet.

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W. Robert Mears, National Geographic Staff

I crossed to Admiralty Island to see a different kind of fishing derby—bears catching salmon that fought their way upstream to spawn. The salmon themselves were the prizes, and the bears had rollicking fun plunging into the pools to scoop up the fish.*

Flying to Sitka, on Baranof Island, I found the town virtually deserted of men except for those in the Alaska Pioneers Home. Again it was salmon derby time, also opening day of the hunting season. Almost everyone was out wetting a line or tramping the mountains for wild goats and deer.

Though Sitka is bigger now than during its youthful days under Russia or when it served as capital prior to Juneau, it has lost much of its earlier importance.

Here once was the busiest port of the entire west coast of North America. It had a flour mill, tannery, brickyards, and shipbuilding when San Francisco was only a small adobe presidio.

Bells cast at a foundry near old icon-filled Cathedral of St. Michael were shipped south to ring in California's missions. To California also went plowshares, spades, and shiploads of ice.

Out of the town's turbulent youth came the term "hooch," from a villainous drink called *hoochinoo* the Indians distilled from molasses. And here, so a scholarly resident told me, originated the expression "on the water wagon." As punishment, U. S. Marines and Navy men had to haul the water-delivery wagon around town.

In Sitka and elsewhere throughout southeast Alaska I talked with many Indians. Today the young girls garb themselves in pedal pushers, slacks, and bobby socks in typical American-girl fashion. Boys wear blue jeans and gay shirts. Older folks dress like other townspeople. Yet they stem from tough,

fighting Tlingit who once jealously guarded their lands and tribal ways.†

In 1802 the Tlingit (or Kolosh, as the Russians called them) fell upon the Sitka settlement, burned buildings, and massacred many of the Russian traders and Aleut fur hunters and enslaved the women. But their efforts to drive out the Russians failed.

Hard by Wrangell's totem-studded island I chatted with 72-year-old James Bradley, who was putting nets aboard his fishing boat.

Fishing Better than Being Chief

"I am Indian," he said. "My people have thought to make me chief, but there's no money in it. I keep to fishing." His face crinkled with satisfaction. "Yesterday I made \$146 from my catch. Life is pretty good not being chief. I have good daughters and sons; one daughter is nurse in the hospital."

Though most Indians are integrated with the other residents, Alaska has an Indian reservation on Annette Island, a few miles south of Ketchikan. Here live Tsimshian people, who in 1887 came from Canada.

Under the energetic guidance of William Duncan, a lay preacher, they built a new model community of Metlakahla, with comfortable homes, sawmill, and a large church. There is also a salmon cannery, and a school built by the U. S. Government.

The morning I visited Metlakahla boats crowded the harbor. Men busily stowed their fishing gear; the year's salmon season was just closing.

World War II invaded Annette's privacy when the Navy built a long airstrip there. Pan American World Airways and Pacific Northern Airlines now use the runway, with Ellis Air Lines providing the link with Ketchikan. And from here, having come to Alaska's southern tip, I took off to return, as Alaskans say, to the Outside.

Looking back at the snowy crests, I recalled the words I had seen beneath a photograph of Mount McKinley at the Fairbanks airport. They seemed to embody Alaska's challenge:

"Bring me men to match my mountains."

* See "When Giant Bears Go Fishing," by Cecil E. Rhode, NATIONAL GEOGRAPHIC MAGAZINE, August, 1954.

† See *National Geographic on INDIANS OF THE AMERICAS, A Color-illustrated Record*. This new 433-page book is available only from the National Geographic Society, Washington, D. C. Price, \$7.50 postpaid in U.S.A. and possessions, \$7.75 elsewhere.

Alaska's "Great White Way": →
Neon Lights and Christmas
Trim Brighten Anchorage
in Midafternoon Dusk

When construction of the Alaska Railroad began in 1915, workmen set up shops at a wilderness site between Seward and Fairbanks. A tent town known as Anchorage soon sprung up. Today some 28,500 live in bustling Anchorage, almost triple the number in any other Alaskan city. About 60,000 live in the greater metropolitan area.

Hotels, office buildings, and 14-story apartment houses give the city a 20th-century skyline. Night clubs, four theaters, two daily newspapers, and radio and television stations add a cosmopolitan touch.

Flights from Seattle arrive daily at new International Airport. Airliners wing in from Minneapolis and take off for Tokyo.

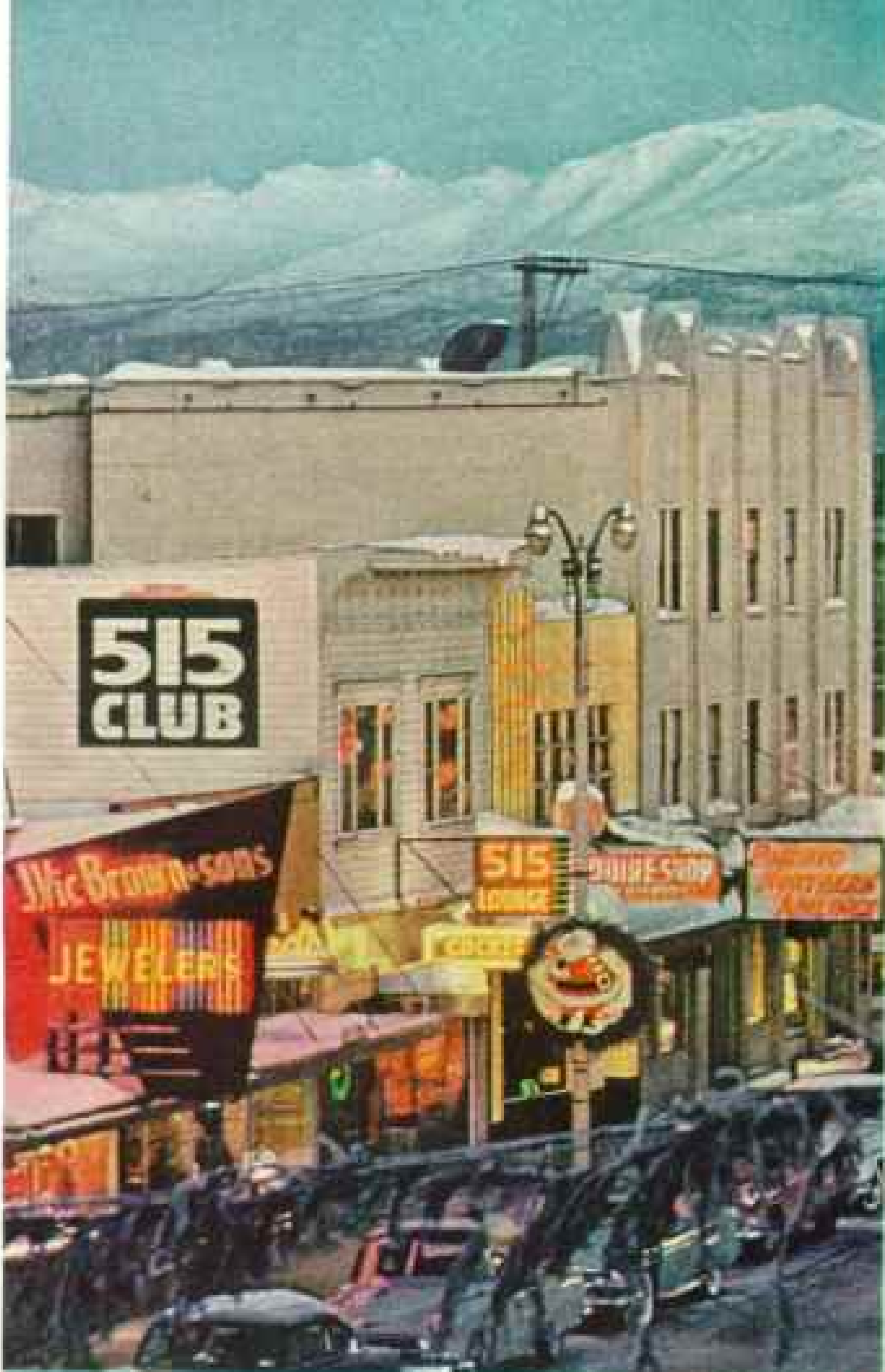
Anchorage spreads over a flat plateau at the head of Cook Inlet. To the east rise the Chugach Mountains.

Anchorage Fur Rendezvous attracts many visitors to the city each February. Dog team races, a fur-fashion show, and a gala ball feature the annual affair.

→ Page 807, lower: Officers and their families dine in the Vista Room at Fort Richardson, Alaska's largest Army post, just outside Anchorage. A December storm has blanketed the base under two feet of snow.
↓ F-89 Scorpions from Elmendorf Air Force Base fly past Mount McKinley. Colored wingtip pods carry rockets; black underwing tanks store extra fuel.

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W. Robert Moore, National
Geographic Staff, and (below)
U. S. Air Force, Official





New Alaska Map Portrays a Far-north Frontier



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THE fastest-growing portion of the United States lies not within its mainland boundaries but 1,000 miles to the north. In 1940 Alaska had 72,524 people. In 1956 it has more than 208,000—and plenty of room for more. While the States average 54 people per square mile, Alaska still boasts a reverse ratio: 2.8 square miles per person. Much is frozen wasteland, but rich forests, farmlands, fisheries, and untapped resources of oil and minerals abound in this Territory which has long awaited Statehood.

A new 10-color map of this far-northern frontier goes to the more than 2,150,000 member families of the National Geographic Society with this issue of their Magazine.* It supplements, in the same issue, three articles and 91 photographs on Alaska today.

Based largely on new aerial surveys, the map charts Alaska with accuracy and detail never before possible. Especially in the rugged region of Mount McKinley, North America's tallest peak, and in the vast glacial wilderness around Mount St. Elias, the map owes much to the National Geographic-sponsored flights and explorations of Bradford Washburn. The Air Force helicopter above, near Mount Brooks, brought his party to the base of Mount McKinley.

Large insets show Alaska's long panhandle and the Aleutians. A smaller inset shows its four Judicial Divisions. Another illustrates the size of the Territory by superimposing it on a map of the United States. Two more

dramatize Alaska's strategic importance: across the Bering Sea the mainland of Asia reaches within 55 miles of North America, and in the Diomedes only 2½ miles of water separate Soviet from United States soil.

Red lines trace a growing network of roads, including the war-built Alaska Highway. Good roads, however, are still largely confined to the southeast corner of the Territory. Travel elsewhere is almost entirely by air. Red stars mark 235 airports with scheduled service. Even these only hint at Alaska's airmindedness: bush pilots touch down with pontoons or skis in remotest lake or field.

Bush pilots, incidentally, helped National Geographic cartographers clear up many puzzles. Buckland, on Seward Peninsula, has 108 Eskimos in winter. Visit it in summer and you will find none: everyone moves north to Elephant Point to fish. Small open circles indicate such seasonal or deserted settlements, and ghost towns of gold-rush days.

From northern pilots, too, comes new information on the "tree line," used by flyers for visual position checks. The red line marking "limit of wooded country," moved as much as 50 miles in some areas, reflects their observation that forests are slowly extending.

*Members may obtain additional copies of the Alaska map (and of all standard maps published by The Society) by writing to the National Geographic Society, Washington 6, D. C. Prices, in the United States and elsewhere, 50¢ each on paper; \$1 on fabric. **Indexes to place names, available for this and most other maps, 25¢ each.** All remittances payable in U. S. funds. Postpaid.

Photographing Northern Wild Flowers

Traveling by Plane, Car, Canoe, and Afoot, an Adventurous Amateur Captures the Beauty of South-central Alaska's Natural Gardens

BY VIRGINIA L. WELLS

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"I AM going to photograph the wild flowers of Alaska."

That was my ambitious and naive statement in the spring of 1947, when my husband and I moved to Anchorage. Now I smile at such a dream, for, although that goal is not impossible, I shall probably be a very old woman by the time I have reached it.

For years now I have been photographing wild flowers in south-central Alaska, one-eighth of the big Territory. Fortunately, my husband and I both love the out-of-doors. So we spend every summer week end we can in search of natural gardens where beautiful flowers in wild, unsullied surroundings await my camera's quick eye.

Last summer we visited Katmai National Monument, which the National Geographic Society helped establish. In wild anticipation I took every piece of photographic gear I own.

From Anchorage we flew southwest across Cook Inlet toward the snow-covered Aleutian Range, skimming close enough to Redoubt Volcano, it seemed, to reach out and scoop a handful of snow from its gleaming flank.

Where Rocks Float and Wood Sinks

Across green and rocky fingers holding fast to blue inlets we scudded, passed Iliamna Volcano, which puffed steam at us in warning that the old fires were not yet dead, and headed toward Augustine Island, a perfect cone of a mountain, aloof and alone in the sea.

Turning inland, we approached a rolling plain dotted with lakes and interwoven with tiny threads of streams. To the right I could see bottle-green Iliamna Lake; to the left, the glitter of Lakes Coville and Grosvenor.

After a brief stop at King Salmon, we boarded a small floatplane and 20 minutes later swooped down on Naknek Lake and came to rest at Brooks River Camp.

"Brooks Camp is known for rocks that float and wood that sinks," John Walatka, the manager said, showing me some beautiful petrified wood and pointing out pumice stones, lighter than water, that littered the beach.

It was too late in the afternoon for pictures, but I could not resist searching for flowers on

the beach. Near high-water mark I found the small lavender beach pea—but not a single other flower!

After breakfast next morning we set out on a path that led through patches of scrub willow, open places of shoulder-tall grasses, spruce woods, and at times along the riverbank. There I saw red, or sockeye, salmon by the thousands, darting from hole to hole. Occasionally the river's soft singing would erupt into a wild thrashing, and I could see dozens of the big fish rolling and flashing in the shallow water.

Country for Huge Brown Bears

At every grassy place I felt a small nudge of fear at what the trail's next turn might bring. A river full of salmon is sure-fire attraction for bears. I could just imagine a huge brown carnivore rising suddenly out of the tall grass to tower over me with paw raised for the fatal blow (page 770).

Suddenly, from the top of a small hill, Brooks Falls burst into view. The water broke into white foam against the rocks, making this giant watery step look like a white ribbon pulled across crumpled green cellophane. The falls would win no prize for size, but I was impressed by their symmetry and the wild beauty of the setting (page 814).

Several fishermen in bright jackets were casting flies into deep pools below the falls. Near by I found a Fish and Wildlife Service man checking the salmon in the fish ladder, built to help the fish climb the falls.

"The salmon gather below the falls by day," he told me, "and try to jump them in the evening or at night. Making a six-foot vertical leap up a tremendous current is no simple feat, so most of the fish eventually find their way up the ladder."

At noon hunger drove us back to camp, but later we started again for the falls. I was a little depressed, having seen only some lavender Jacob's-ladder, common around Anchorage (page 816). What flower photographer wouldn't be?

We entered the spruce woods Indian-file. Suddenly my husband stopped and pointed.





Wild Flowers Turn Alaska into a Garden

Summer in the Territory arrives on the heels of winter, with scarcely a pause for spring. By midsummer the sun shines almost around the clock. Watered by melted snow and warmed by nearly constant light, wild flowers in marvelous variety bloom across the land.

Upper left: A blue fox pup curls up on a bed of yellow arctic poppies (*Papaver*) and pink lousewort (*Pedicularis*). Disregarding the sun's overtime, some poppies keep their own schedule, opening blooms around 5 a.m. and closing them about 7 p.m.

Upper right: Impish monkey flowers (*Mimulus*) congregate before author Virginia Wells.

→ *Mimulus* ("little mimic") in close-up shows its fancied resemblance to a monkey's mouth. Two petals make an upper lip; the other three a lower lip.

← Page 810: Spring beauties (*Claytonia*) open delicate faces only in bright light. Indians eat the starchy corms.

© National Geographic Society
Virginia L. Wells and (upper left) Victor B. Scheffer





Shy Wood Nymph Keeps Its Head Bowed
Single-flowered *Monarda* thrives in mossy glades.

There I saw on the forest floor, caught in a web of sunlight, a group of lovely wood nymphs, each head shyly bowed. All the joy of finding the long-sought came to me with the sight of the wood nymphs standing quietly in their puddle of light.

Our return to Anchorage took us through the valley of the Tlikakila River. Gradually it narrowed until I feared our plane's wings would scrape the mountains on either side. Looking up, I saw the blue tongues of glaciers stretching down from between the peaks.

Suddenly we reached valley's end and found it blocked by a wall of ice. As our plane lifted, I saw that here several glaciers, pouring out of the mountains, had joined forces on their march to the lowlands.

When I stepped from the plane at Anchorage, I was momentarily disconcerted at being thrust into the everyday busyness of civilization. It seemed a thousand years since I had left and that I had been in paradise.

Alaska's spring is reluctant to arrive and quick to depart. Our days begin to get noticeably longer in February, and by the middle of March we have from 10 to 12 hours of sunlight. But the snow stubbornly persists.

April has long, warm days, but spring still dawdles. By May 1 most of the snow has given way, so every morning I tour my wooded back yard area eagerly seeking some sign of renewed life in the perennials or some tiny sprout of a seed. But the time between the snow's going and the first tender leaflet seems to stand still; the earth is neither dead nor alive. I can feel the promise of spring but find no evidence of its fulfillment.

But one May morning I will see yesterday's black net of birch branches etched against a pale-green mist and then, in my walk through the woodland, I will find a tiny violet as white as the recent snow.

Following the miracle of the violet, spring may stay as long as a week, then suddenly leave us with summer. My back yard woodland whitens with creeping dogwood (opposite) and Labrador tea, and I begin my war against the fireweed.

Often I feel a catch in my throat at the beauty of the fireweed as we travel highways through aisles of its six-foot magenta spires (page 817). I even feel grateful to the flower when I find it masking fire-burned areas with vivid color, as if embarrassed by man's carelessness. But, along with its good and beautiful works, fireweed is a notorious gadder.

From early spring, when I pull the young fireweed's red rosettes, through a summer spent digging its roots and plants, until August, when I stand helpless while the flower's myriad airborne seeds cavort around me, I wage unceasing war against this invader of my garden. But I fight a losing battle.

Bog Photography Has Its Hazards

I find the many bogs and marshes around Anchorage fascinating places. Covered with short, scrubby growth—mosses, cinquefoils, Labrador tea, and bog rosemary—they are whiskered with gawky black spruce trees, which remind me of witches' brooms.

I discovered the hazards of bog photography the first time I tried it. I had started to photograph a fine clump of bog rosemary, whose tiny bells tint the marshes pink. Suddenly I felt a cold wetness around my feet and found I had sunk into the dry-looking moss until water covered my shoetops.

The bog was like a huge sponge. If I walked quickly, I kept relatively dry; but when I paused for only a moment, I began to sink into the apparently bottomless mass of water-soaked moss. Since then I use a telephoto lens or wear rubber boots when making bog pictures.



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↑ **Irises Flood a Plain with Purple**

Noting that in different species these flowers display nearly every color, botanist Joseph de Tournefort named the genus *Iris* after the Greek goddess of the rainbow. One variety probably inspired the fleur-de-lis, French royal emblem. Theodora, the Byzantine empress, bore the device in her crown.

Near Anchorage the author here singles out one bloom from thousands. Blossoms range up to four inches in diameter (below).

← Greenish flowers of creeping dogwood (*Cornus*) cluster in a wide white collar of petal-like bracts. In autumn red bunchberries replace the blooms.

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Virginia L. Wetts





The Anchorage-Seward Highway and the connecting Sterling Highway on the Kenai Peninsula present a wealth of Alaskan plant life. One trip along these highways brought me enough memories and color slides of wild flowers to keep me busy a whole winter.

July Best for Wild Flowers

We chose July, when most flowers are in their prime and the chance of clear weather is far better than later in summer. We packed our car, strapped our aluminum canoe on top, and started away on one of the world's most beautiful drives.

After passing through marshland, the highway veers toward Turnagain Arm and follows it for 50 or 60 miles. Where the Arm cuts through the mountains, the road is overhung by rock cliffs on the left as it skirts the turbulent water. As we drove, I caught glimpses

of small saxifrages, snug and complacent in cliffbound niches.

We parked near a waterfall where gay yellow monkey flowers (page 811) grinned and nodded from their spray-wet rocky home. Kinnikinnick covered most of the cliff crests with dark glossy green, daubed here and there with scarlet columbine or lavender-blue wild geranium (page 823). I clambered up the cliff past gravity-defying sea thrifts perched smartly on vertical slabs of rock, and past Jacob's-ladder and pussytoes playing hide-and-seek among jagged boulders. At the top I found a fabulous rock garden neatly clipped by the sharp south wind.

Wild geranium, usually two or three feet high, stood barely four inches, but the blossoms' size and depth of color took my breath away. Tiny white chickweed arranged itself around forget-me-nots like fairy bridal bou-



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quets, and creeping hemlocks sunned themselves on the rocks.

Walking over a little rise, I saw below me a small depression filled with scrubby willow and tall, lush grass. There I came upon rein orchis and pale pink fleabane all but smothered by rank undergrowth.

As we drove on, the cliffs and mountains moved back from the road. We were beginning to cross the tidewater flats at the end of the Arm and the deltas of the glacier-fed rivers draining into it.

At intervals along the foot of the mountains we saw huge inverted fans of plant-covered rocks and dirt caused by thundering spring snowslides. Besides goatsbeard, a sedate plant with three- to four-foot creamy plumes held above reddish foliage, there were elderberry, devil's-club, and grasses—vegetation so thick that the mountains appeared to be wear-

← Fly Rod Anglers Cast for Red Salmon at Brooks Falls

During the summer run, thousands of salmon gather here. By day they roll and flash in deep pools below the falls. In the evening they attempt to leap the six-foot barrier to reach upstream spawning grounds (page 795). Many fail and resort to the man-made ladder edging the bank at left.

Ward W. Wells

ing green-scalloped skirts that dragged in the tide pools of the Arm.

We made a side trip to Portage Glacier, approaching it over a big gravel bed gaudy with the green and magenta of broad-leaved fireweed. This dwarf is kin to the tall fireweed, but has a neat, bushy habit and bears its flowers in clusters rather than in spires. Broad-leaved fireweed shows self-restraint in staying home on gravel bars and glacial moraines instead of gadding about like its tall cousin (page 817).

I climbed the glacier's moraine and found that it contained a lake a mile or so long. The ice mass at the far end, glittering blue in the sun, emitted creaks and groans and an occasional sharp bark as ice split away from its face. Blue weather-sculptured icebergs, sailing lazily in circles, filled the lake.

Though the afternoon was warm, I felt as if I were standing before an open refrigerator. Apparently indifferent to the chill, willow trees snuggled along the bank and Alaska cotton waded in shallow ice water (page 822).

From Portage Junction the highway crosses upper Turnagain Arm valley, then begins to climb. Suddenly we entered a summit vale rimmed with sharp-shouldered mountains. The bottom of the huge bowl lay as smooth and green as a well-kept golf course, with bubbly brooks forming natural hazards. For me it was love at first sight.

Wild Flowers in Colorful "Convention"

We camped by an icy stream and set out in the morning to explore the valley's floral treasures. Never had I seen such glorious company. Looking back, I feel as if I had attended a flower convention, for it seems incredible to me that millions of flowers would crowd the valley for less than some special occasion.

Handsome false hellebore towered above me, and at each step I crushed a bouquet of violets. Pinkish-purple *Pedicularis* (page 810) rubbed shoulders with charming alpine asters, which in turn trod on the toes of brown rice lilies. Wild geranium, forget-me-nots,



← **Jacob's-ladder Bears
a Tassel of Blue Bells**

This graceful plant, its leaves arranged like the rungs of a ladder, is a member of the pioneering *Polemonium* genus. Members of the hardy tribe spring out of rocks, hang off cliffs, and endure merciless wind and sun.

Jacob's-ladder marches across Alaska's northern coast, invades the interior, and scales lofty peaks. *Warren F. Stenburgh*

**Fireweed Lifts Magenta Spires →
Along the Shores of Auke Lake**

Nature's plastic surgeon, this member of *Epilobium* arrives first on the scene after a fire. It covers gaping burn wounds with acres of rose-red blooms and willowlike foliage. Seeds on feathery wings are so buoyant the slightest breeze can waft them abroad.

In England fireweed leaves steeped with tea make a tangy beverage. Boiled, they may be eaten as a vegetable. Young shoots substitute for asparagus. Siberians on Kamchatka Peninsula ferment beer and vinegar from the pith. *Ray Norton*

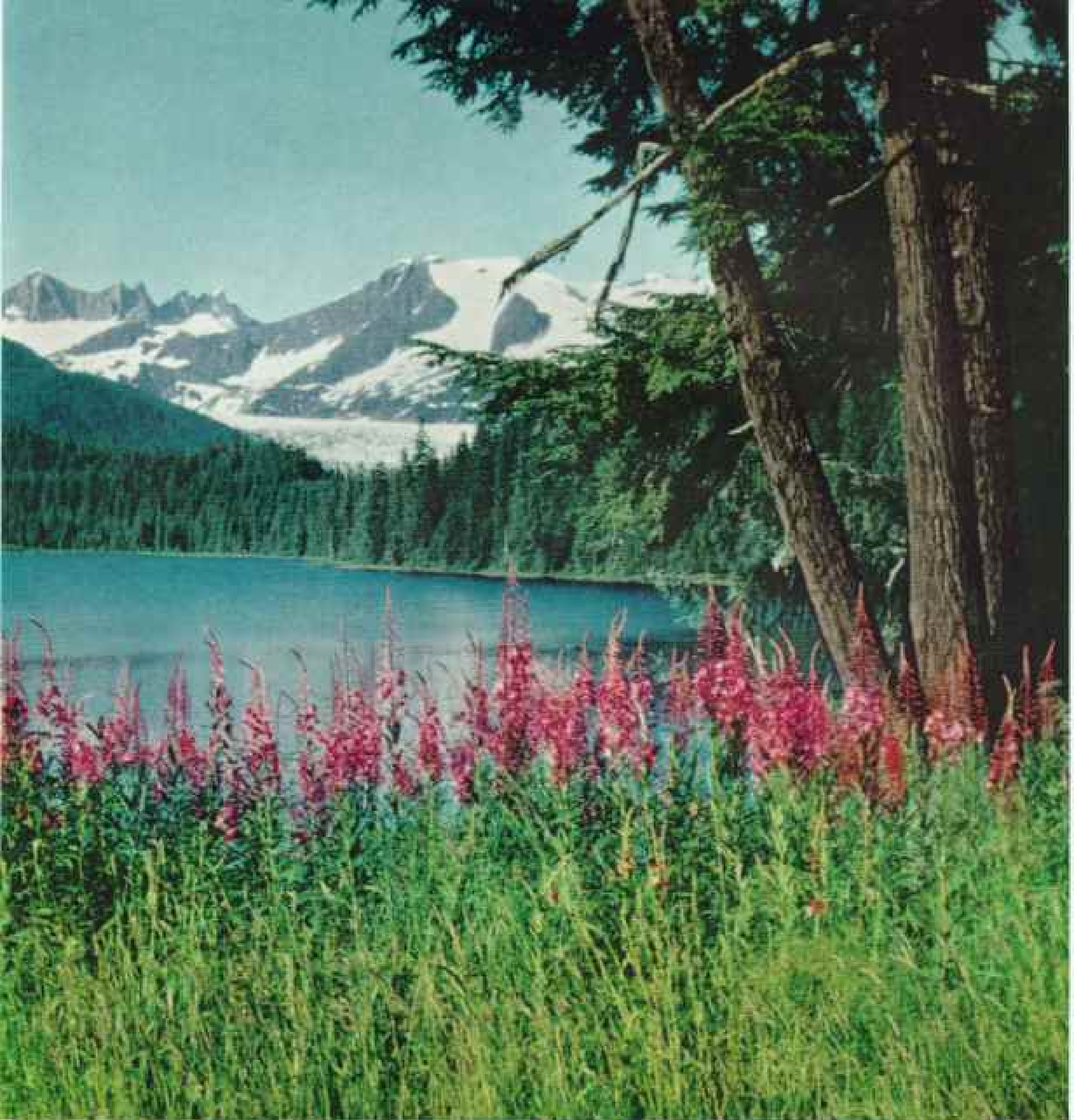
Page 817, lower: Dwarf fireweed grows thick gray-green leaves (left) and orchid-tinted blossoms (close-up, right). Another name for the plant, river beauty, derives from its preference for gravelly stream beds and lake beaches of Alaska's interior.

Virginia L. Wells (left) and Christine A. Heller

↓ The author and her mother examine fireweed blossoms picked on a fishing trip to Hidden Lake. *Virginia L. Wells*

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↑ **Breakfast Sizzles over an Open Fire at the Author's Moose River Camp**

"Sleeping outdoors must be one of the rewards for living," says Mrs. Wells. "You awaken in the morning to the crackle of a campfire and the wonderful aroma of good coffee."

The author and her husband usually combine fishing and photography on their summer camping excursions. In fair weather they bed down in sleeping bags under the stars. Tent in background shelters them during rainy spells. Menu for this breakfast featured bacon, eggs, and potatoes.

← Conical shape and pitted head distinguish the morel mushroom. Since Roman times it has ranked among the finest of edible mushrooms. It grows profusely in orchards and meadows, but attempts at artificial cultivation have been unsuccessful.

Sautéed in butter, these specimens added a touch of finesse to an otherwise undistinguished camp supper, the author reports.

In Alaska, as elsewhere, great care must always be taken to avoid poisonous species of mushrooms.

Photographer and Camera Dip Low → to Film Wild Chives on Skilak Lake

Green spears of wild chives, topped by flower balls, spike this stony beach on the Kenai Peninsula.

To make close-up color pictures, Mrs. Wells uses an Exakta with extension rings. Rolleiflex on ground is reserved for black-and-white pictures.

Ward W. Wells



wild celery, columbine, pyrola, and twisted stalk all vied for a place in the sun.

Descending from the mountains, we left the Seward Highway for the graveled Sterling Highway, along which I saw a series of old beaver dams. Pond lily pads and their golden flower cups, a food of the beaver, covered the water, and buck bean grew all around the margins. For the next two hours I gloried in roadside gardens of purple lupin and lavender Jacob's-ladder, the ubiquitous fireweed, daisies, vetches, and marsh plants.

Late that afternoon we drove onto the beach of Skilak Lake. The setting sun plated the water with gold and sent shafts of light through the tall virgin spruce along the beach. By some miracle a great forest fire had left these trees untouched, a green necklace rimming the lake.

At first glance the beach seemed to produce only round gray stones. I strolled along the shore. The lake was silent and, in some mysterious way, seemed to absorb all sound. But suddenly, as I rounded a point, a cascade of notes from a thrush shattered the silence, opening the gate to the garden of the lake.

Color spattered the beach: golden fleahanes, whose petals seemed to shine from within, and

Jacob's-ladder, glowing like clusters of lavender pearls. Mouse-eared chickweed glistened as it trailed over the beach stones between brilliant clumps of broad-leaved fireweed. Green spikes of wild chives impaled the opal balls of their lavender flowers; I could taste, as well as smell, their pungent odor (below). Where bogs drained into the lake I discovered old friends—bog rosemary, cinquefoil, and rice lily (page 823).

Flowers in Bloom Under Water

It was after midnight when we reached Moose River, but the silver-bright northern sky warned us that we must hurry if we were to be in our sleeping bags before the sun rose.

After breakfast we loaded our canoe for a trip upstream. At some of the shallower places where Moose River meanders through a huge swamp area, I saw small white star-shaped flowers blooming under the water.

Later I noticed some of the same plants growing near shore with their flowers above water. I think now that the river must have been higher than normal and the flowers involuntarily submerged.

It seemed we had paddled miles when rapids halted us. Here grew all the lovely flowers





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Vicent R. Schaffer

↑ **Alpine Forget-me-nots, Here Lifesize,
Hug the Ground**

When Adam and Eve were expelled from the Garden of Eden, one legend tells, all plants shrank from them in disapproval except a tiny blue flower that called out, "Forget me not." This species of *Eritrichium* wears the fanciful name but is only a look-alike of the true forget-me-not, *Myosotis*, Alaska's official flower.

↓ **Dandelion, a World Traveler, Sprinkles
Alaska with Gold**

Taraxacum conquers everywhere because its deep roots usually escape heat, cold, and drought. Hollow stalks bend harmlessly before the strongest winds. Browsing animals disdain the stems' bitter juice, but man extracts a medicine from the roots, vitamins from the leaves, and wine from the flowers.

Bradford Washburn



that carpet Alaska's damp upland meadows: wild geranium, bog orchids, buttercups, larkspur and monkshood, fireweed and heliotrope. The sunny afternoon rewarded me with some of my finest pictures, and in the evening the river yielded a good catch of trout.

On the way home, admiring the lushness of Alaska's wild gardens, I recalled the day we spent at Thompson Pass, over half a mile high in the Chugach Mountains. There, if anywhere, should have been a flowerless region.

Our destination was Valdez that first week of August. We had dallied along the highway, enjoying ourselves camping out and photographing the unmatched scenery and the wild flowers that edged the highway: fireweed and aster, gentian and grass of Parnassus, goldenrod, marsh plants, and vast fields of larkspur, monkshood, and wild celery.

Enchanted Valley of Jewel-like Lakes

We arrived at the summit on one of those rare days full of sunlight and fluffy white clouds to find the mountaintops not so jagged as I had thought from a distance. The ridges were weather-worn, and any sharpness that remained was smothered by small alpine plants.

Here the plants stood only three or four inches high. Dropping on hands and knees, I soon lost myself in the world of miniatures.

As I gazed at the tiny plants, I felt that perhaps I, like Alice in Wonderland, had grown proportionately immense while the flowers remained normal in size. Wandering thus, with my nose to the ground, I came upon clumps of hairy saxifrage like clusters of crimson-centered silver stars, creamy-yellow alpine marigold, tough green heather with shiny white bells, and alpine harebells with flowers as long as their wiry stems.

My wandering led me to a brook tumbling down a short-flowered cliff. At the top I gazed spellbound at the enchanted valley before me.

The valley made no more than a dent in the mountaintop, but it held a string of miniature lakes, like jewels in a giant's hand, which reflected the sky and the alpine flowers encircling their fluted borders.

I saw a clump of arnica sitting on a pile of pebbles in one of the pools, bowing their heads the better to admire their reflections in the water. Pink fleabane flirted with the wind, while the bright-red polka dots of rose campion competed with the blue alpine pools for brilliance and beauty. King's crown and

chickweed played tag on the valley's protected slope, where alpine marigolds basked serenely in the sun.

I wandered on toward Worthington Glacier past small beds of tiny blue and pink forget-me-nots, mixed with silver-gray lichens, and past heath mounds four and five feet across.

The glacier is receding, and as it crawls ponderously back into the mountains it leaves a path of smooth gravel behind. Again on hands and knees to appreciate the small flowers, I found many saxifrages on the moraine, but most seemed afraid of the aged glacier. Only a few brave ones approached to within a few hundred feet of it.

I had left the cowardly saxifrage behind and was crawling close to the glacier over a seemingly barren gravel heap when suddenly, from behind a tiny pebble, I was confronted with a truly bold little yellow flower. It resembled a microscopic dandelion. Then I saw there were quite a few of them, all slyly crouched on the warm side of small stones. I had to laugh at the thought of these tiny flowers chasing the huge blue ice mass back into the hills where it was born.

Some wild flowers, besides delighting the eye, are delicious and nutritious as food. Dandelion, twisted stalk (also called "wild cucumber"), and wild chives are wonderful additions to a spring salad; lamb's quarters and the stinging nettle make good cooked greens. Rose hips, rich in vitamin C, are a fine Alaskan substitute for expensive oranges and lemons when used in jellies, jams, and catsups (page 823).

In late summer and fall we go berry picking for serviceberry, red currant, nagoon berry, raspberry, blueberry, and low-bush cranberry.

Only a Few Plants Poisonous

With the exception of some mushrooms, there are comparatively few poisonous plants in Alaska. The most dangerous is water hemlock, which grows profusely in the bogs of the south-central region. The danger lies in its resemblance to wild celery, which is edible.

I consider myself fortunate to live in Alaska, where I can easily find so many kinds of wild flowers. Alaska's population is growing fast, and with that growth many meadows, forests, and bogs may be destroyed as a home for wildlife. So, while I can, I shall record on film the wilderness splendor, that I may remember and others learn that Alaska has some of America's most beautiful wild gardens.



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Alaska Cotton, Sporting Fluffy White Balls...

Bog-loving *Eriophorum*, or cotton grass, erects rushlike stems, each crowned with a flower head of silky bristles. After blooming, the fiber tufts serve as parachutes in distributing the seeds. Here, near Juneau, photographer Maxine Williams picks plants to decorate her home.

Maxine Williams

← Skunk cabbage, whose close relatives live in Malaya, apparently came to America over a land bridge. Its Greek name, *Lysichiton*, means "loose cloak," for the yellow spathe hooding the flower clusters.

Christine A. Heller

↓ Pasqueflowers, pellets of gold in purple cups, take their name from the French word for Easter because they bloom so early. Fur-backed sepals protect *Pulsatilla* blooms from early-season chill.

Warren F. Stenrooth





823

... Gives a Southern Look to a Northern Land

Since alpine flowers survive in cold climates, many people believe them hardy enough to grow anywhere. Actually snow protects such plants, providing an even temperature during early growth.

Upper right: Buttercups push a fragrant bouquet through an icy blanket. *Ranunculus* is one of the most primitive of flowering plants. *Margaret Williams*

Center: To keep rain out of the nectar, *Geranium* wears a woolly eyelash at the base of each petal. *Mar's Fota Beechey*

Lower right: Fruit of the wild rose (*Rosa*) gives Alaskans a citrus substitute. *Virginia L. Wells*

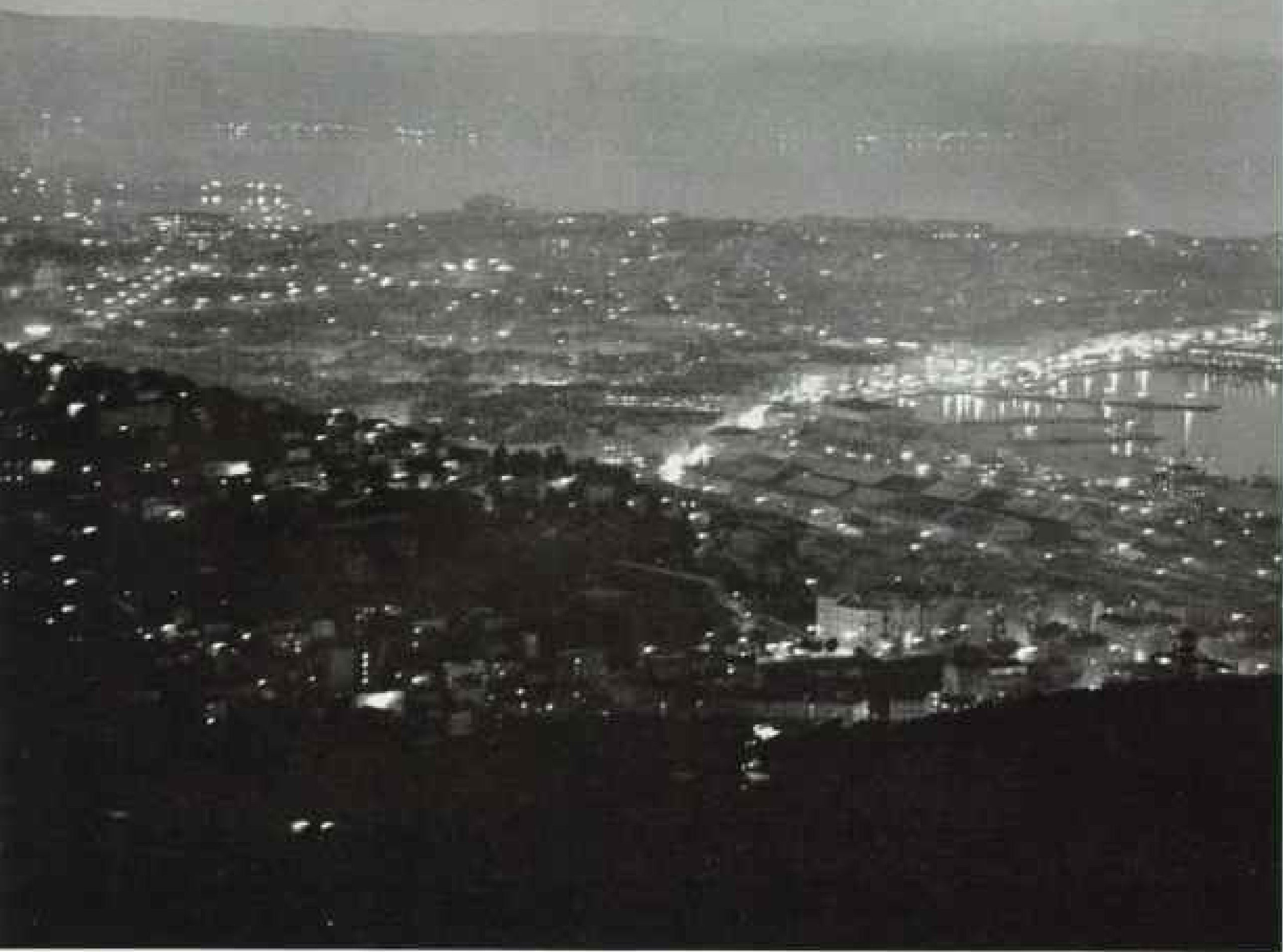
✦ Where the rice lily (*Fritillaria*) abounds, Indians grind the bulbs into flour for bread. Ricelike bulb-lets inspired the name. *Virginia L. Wells*

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Trieste – Side Door to Europe

BY HARNETT T. KANE



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With Illustrations by National Geographic Photographer B. Anthony Stewart

“JUST consider us.” The sun-tanned girl, with short-cropped hair, well-scrubbed face, and a look of the Mediterranean, smiled as she indicated herself and the dark, easy-mannered youth beside her in a tree-bordered square of Trieste.

“First, we’re Italian, *signore*, and we’ll fight anybody who says we aren’t.” Then she raised a heavy eyebrow. “But I have a Slavic grandmother, and so has Paolo here, and also a Greek ancestor way back. Papa speaks wonderful German, and for a good reason: our families lived 500 years in this place under Austria. Practically all my friends have that kind of mixture. It makes us what we are, like nobody else on earth—Triestini!”

The brown eyes of this 20-year-old government clerk went from the sunny plateau beyond us to the slowly washing waves of the Adriatic, several squares to the front. It was a setting of serene splendor—streets and houses built into an irregular amphitheater rising to the soft green of pinewoods and the rocky outposts of earth against a pale sky.

Before us ships of half a dozen countries raised flags against the sun. Sitting with several of my Trieste friends in the open-air cafe under gay-colored umbrellas, I heard four or five languages around me and saw faces that seemed English, Italian, Spanish, Slavic, German, French, Oriental.

One of the young men of Trieste caught my



glance. "Ah, that's one advantage of being at this 'side door to Europe.' Nobody can say we're not in touch with the world."

His girl gave a wry laugh. "Sometimes too much in touch. We're a popular spot. Everybody's wanted us, and practically everybody's come here to see if he can take us." She shrugged, and her good humor returned. "Still, we survive and go on being ourselves."

She was right, I thought. Here is a place of Latin vitality, of continental wit, but, not least, a tough resilience. The Triestini are Italians with a difference. They have little of the Sicilians' traditional languor or the slow calm of the hill towns of Tuscany. As a sage English acquaintance assured me, "The Triestini act with what I'd call, in another part of the world, Yankee energy."

Over our coffees that afternoon we talked of Trieste's strategic location at the "meeting place of Italy and the Balkans," inside a long upper bend of the Adriatic. This is the point of southern Europe into which the sea probes most deeply; Vienna, city of worldly charm, lies in the great Danubian basin only 220 miles away. Along the eastern Adriatic looms the world of the Slavs—until recently in the dim background, but today ever more steadily in the forefront (map, page 834).*

History, we agreed, has brought Trieste more than its share of turmoil. During most of its 2,200 years tribes have raided it, great

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Occupied Austria, Outpost of Democracy," June, 1951; and "Yugoslavia, Between East and West," February, 1951, both by George W. Long.



Adriatic Breezes Flutter the Tricolor of Italy and the Blood-red Flag of Trieste...

Once middle Europe's chief port and long a disputed prize, Trieste is Italian again after agreement with Yugoslavia. These holidaymakers celebrate the anniversary of the Italian Republic, 10 years old this June 2.



...While Youngsters Feed Pigeons and Chase Balloons in the Piazza dell'Unità

Festive occasions focus on the busy waterfront square, onetime parade ground for Austrian soldiers. Government and shipping offices border the piazza, scene of concerts, election speeches, and lovers' rendezvous.

nations stormed its walls. The legions of Rome, the glittering doges of Venice, plunderers by land, corsairs by sea, Napoleon, Hitler, and Tito—all reached for it. In the name of Trieste thousands have died. No wonder the Triestini I met last July were finding it strange—but pleasant—to accustom themselves to the first period of peace that many had seen in their lifetimes.

We finished our coffee, and the government girl rose. "Let's walk," she suggested.

With my new acquaintances I strolled along Corso Cavour, one of many streets that point like arrows toward the city's true center, the waterfront. I halted, as I had a hundred times, at the sight of one of Europe's most magnificent harbors (page 838).

To left and right, arms of the land reached out as if to welcome the Adriatic. Through the midafternoon haze came a buzz of activity from long quays thrust into the water, from loading platforms and warehouses. In the distance we could discern the cranes and gray spires of seaside industries that have turned the city into a wharf for world trade.

Just ahead, a sailing vessel skimmed in until its masts seemed about to crash into a near-by building. When I blinked, one of my companions chuckled. "Oh, they've never hit yet." Nevertheless, ships moored along the quays appeared ready to invade the lobbies of the hotels and offices crowding the harbor. In few places that I have seen does the sea come so close.

Triestini Expect Fish in Heaven

"*Gelati, gelati!*" The smiling vendor held out ice cream on sticks. Scooters, bicycles, and small Italian automobiles swept by. Sicilian sailors, whose ships stop often at Trieste, ambled past shawled women. In a huge leather purse a boy carried a squealing pig.

From a dozen restaurants along a single street rose the warm mixed scents of oils and cheeses, and especially the seafood that is a major item of Trieste's diet. At outdoor tables families of a dozen or more members swallowed spaghetti and shrimp, fried squid, or *zuppa di pesce*, the fish soup into which the Triestini drop anything from the sea with scales or claws, with superb results.

Nodding at the fisheaters, one of my companions smiled. "They say that when a Triestino gets to heaven, he asks first for *pasta* and then for broiled fish. If he can't get them, he tries to get out of there!"

A crowd gathered about a sailor with a tiny monkey from the Tropics, and a school-girl shrieked when the animal leaped on her shoulder. Staring in amusement was an old man with a leathery face, squatting beside several grandsons. They were sorting fish brought in after a family trip to the well-stocked waters. A few feet away on the deck of their small vessel his daughter casually bent over a frying pan, while men of the family washed their faces at the water's edge.

Two youths nearing shore in a boat hailed us, and the man beside me helped them dock. The boys explained that, having nothing else to do, they had gone for a sail. "No special place; we let the breeze take us."

An old Trieste habit. As one of the city's architects told me, "If a day passes and I don't see the sea, I feel something's wrong."

Roman Ruins Jostle Skyscraper

We moved on, going inland past solid steamship company buildings and commercial offices, and again I marveled at the clean wind-swept streets. Skirting Trieste's 12-story skyscraper, I recognized the 18-centuries-old remains of the Roman theater (page 835).

In the middle of a teeming area of apartments, shops, and swift traffic, the open-air amphitheater sat stranded, engulfed. Grass grew between sloping tiers; an irregular upper wall barely separated past from present.

"Unless you know this spot, you cannot know Trieste," the government girl murmured, and I understood. Down through the generations the Roman era has subtly molded the city's life.

With the firm handclasp of goodbye that is a ritual among Italians, my young friends left. "*Arrivederci, arrivederci!*"

Page 829

The Sea Pokes a Long Blue Finger → Toward the Church of St. Anthony

Though bearing little resemblance to watery Venice, Trieste does boast a 200-year-old canal running several blocks into the city's market center. Years ago sailing vessels unloaded cargoes directly at canal-side. Today the waterway serves as a marina for small craft, while trucks carry produce to ground-floor warehouses bordering the canal.

An inboard motor powers the incoming boat. The fisherman uses his sweep as a rudder.

St. Anthony's, a Roman Catholic church, and St. Spiridion's, the domed Serbian Orthodox church at right, reflect Trieste's historic position as a meeting ground for Italian and Slav.



Sitting on a ledge, I watched the shifting light upon the theater. Above rose Trieste's main hill and the slopes occupied by primitive tribesmen until 178 B.C., when conquering Romans swept over the Istrian peninsula.

There had followed the old miracle of Roman colonization. The hill became a fort, then a "little Rome" as the legions from beyond the sea fixed their imprint. This afternoon hundreds of townsmen were moving up the roads that wind about the big hill; I followed.

"Ah, San Giusto! Si, just up that way, San Giusto."

Like Rome itself, Trieste acquired an early martyr, who preferred death to conformity with pagan edicts of Roman Emperor Diocletian. San Giusto's body, weighted by stone, was hurled into the sea. But the meek have inherited; the hill dominating Trieste now honors the city's spiritual protector, San Giusto.





Flanked by Mighty Derricks, Trieste-born Tankers Hit the Water

Trieste has always considered the Adriatic a canal linking it with the world's ports. Above: Down the ways of the San Marco yard slides the 31,500-ton *Mare Adriaticum*. Opposite: A smaller tanker gets its baptism of salt.



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Cinderella in Her Coach † Beams on Refugee Children

Years ago Trieste saw thousands emigrate from the Austro-Hungarian Empire to New York. More recently the Adriatic city has played host to Italians fleeing Yugoslav rule and to escapees from behind the Iron Curtain.

Trieste's San Sabba Camp helps those awaiting resettlement abroad. Aided by Italy, the U. S., and private American welfare groups, they learn new languages and trades. Exiled parents built and decorated this school for their children.

"This Is a Fork" →

Page 833: Girl in center trains for domestic employment in Australia; her companion hopes to go to Pennsylvania.

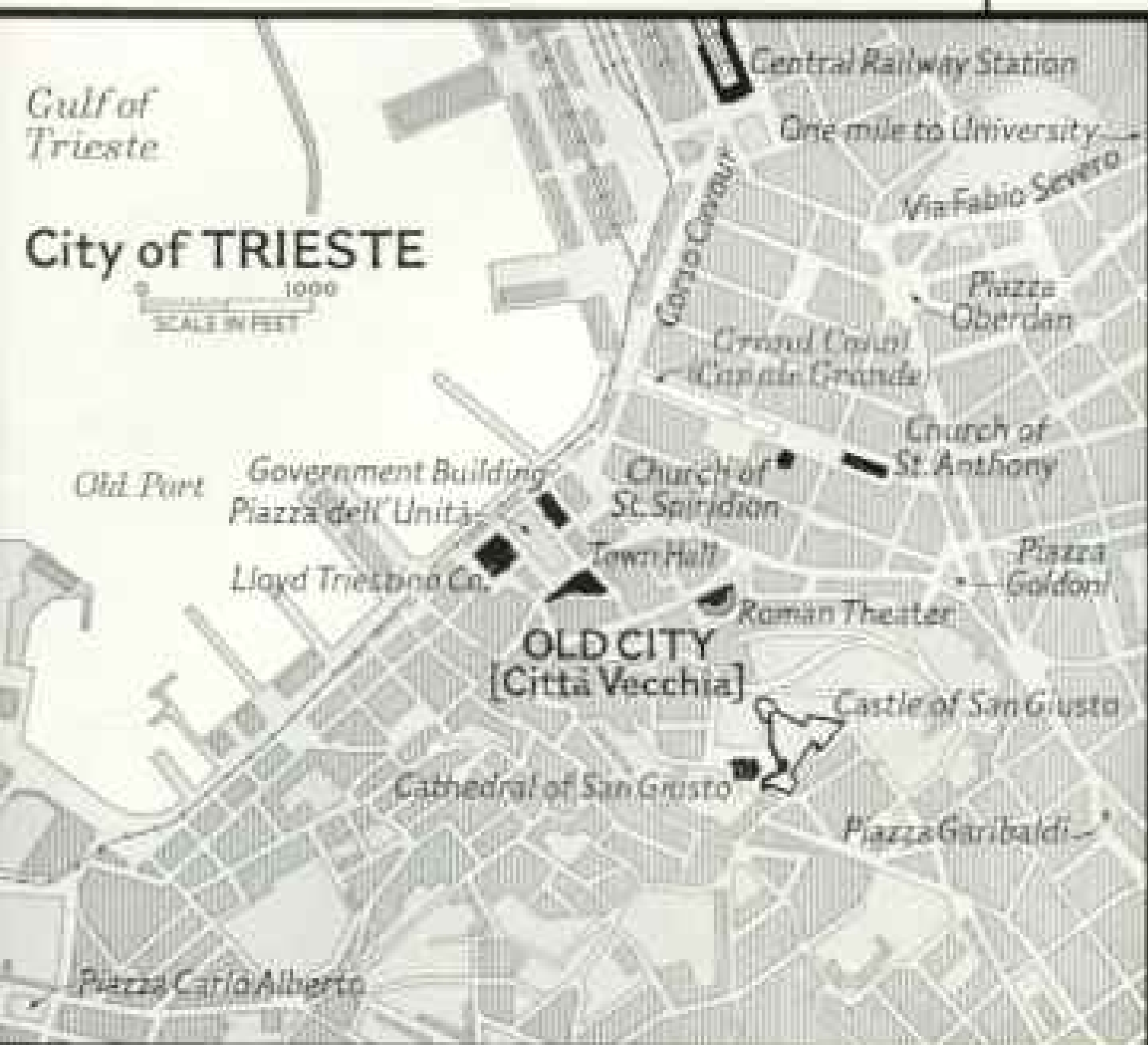
← Father Spiridon Efimov, himself a refugee, serves the camp's Orthodox chapel.

Upper: A farmer who lives near Trieste stops at the bakery on the way to sell his bread-crusted chicken. Triestini are used to signs in both Slovene and Italian.



Italian Territory Now Embraces Trieste, Strife-torn Cockpit of the Adriatic

Bored guards today patrol boundaries where, three years ago, armies waited tensely for hostilities. Prolonged negotiations, climaxed in 1954 by a Memorandum of Understanding, gave Italy most of Zone A (heavy dashed line), with the city and harbor, and awarded Yugoslavia Zone B (lighter dashed line), largely populated by Slavic farmers.



834

Reaching the crest, I paused. About us were vestiges of Rome's long rule—a line of broken weatherworn marble columns, in what had been a forum (page 841). To one side had stood a temple of Jupiter, Juno, and Minerva. Ultimately a Christian church replaced it, but imbedded in the newer walls and open to view are the ancient pagan columns.

At several points were signs of another martyr, who gave Trieste its coat of arms: the patrician Sergio of the Roman legion, a man who had grown to love "the strange beauty and wildness of the country." Won to Christianity and aware that he might die for his beliefs, Sergio, departing from the city, promised to send a sign of faith to fellow Christians in Trieste.

At the moment that Sergio's head fell, says the legend, his bloody halberd dropped from the skies into the forum. Today, as it has for centuries, a silver halberd shines against a blood-red background on the flags and banners of Trieste.

Certainly, the Castle of San Giusto which

now crowns the hill epitomizes in stone much of the city's many-shaded history. After the Romans, successive invaders pounded in—Goths, Lombards, Charlemagne's Franks. For a long time Trieste's own bishops ruled. Ships from Venice swept in during wars that lasted generations. Finally Trieste, seeking a protector, placed itself in 1382 in the hands of Austria's Hapsburgs.

On this hill the Austrian emperor in 1470 ordered a triangular fort built on the earlier fortifications as a defense against invaders. Some 40 years later the ambitious Venetians

© National Geographic Map
Drawn by John W. Cothers



835

Roman Amphitheater and Modern Apartment Make Strange Neighbors in Mid-town Trieste

This open-air playhouse was excavated in the 1930's. In ancient times it lay so close to the harbor that actors had to shout their lines above the surge of the sea. Today many blocks of buildings, erected on reclaimed land, intervene.



Flower Displays Brighten Piazza Garibaldi, Shaded by a Canopy of Plane Trees

Market stalls open early in the morning and vanish at siesta time. By midafternoon the empty square is holed and tidied for evening's promenade. Chairs beyond the pedestrians belong to an outdoor cafe.

snatched Trieste from the Austrians and continued the fort's construction, adding several rounded sections in their own style. Returning, the Austrians finished their work.

When Napoleon's French took the city, they too occupied the castle. Austria returned; then came the Italians, eventually the Nazis; and at the end of World War II, New Zealanders liberated the old fortifications.

Today at last the castle is a place of peace. The former courtyard of the guards has become an open-air theater, capable of holding 10,000 spectators for operas. And on the Bastione Fiorito (flower bastion) Triestini sit at tables and dance under the stars, with the panorama of the port twinkling in the dark below them (page 824).

Italy Plus a Touch of Old Vienna

Below San Giusto Hill lies the Città Vecchia, Trieste's Old City, with its narrow passages, alleys, and streets that drop downward and sideward. Like other places around the Adriatic, the city's arched corners and façades still reflect, though slightly, some influence of Venice's winged lion.

Here I found an earlier Italy, a plainer Italy, with clotheslines hung across tiny streets, and brawny youths enjoying a siesta in the doorways. Around a fountain imbedded in a stone wall, five women filled bottles while one, hands on hips, retailed the neighborhood news. At a once-elegant window an old man bent over a newspaper with a magnifying glass. A cobbler nailed shoes at his doorstep, and the owner of a *tabaccheria* talked politics with a customer.

Cake shops, wine shops, hat shops, glove shops. . . . A few occupied narrow openings in buildings that had been the homes of better-to-do families. These families had quit the Città Vecchia for new apartment structures with severe modern lines, pink and blue fronts, and unbroken rows of windows.

A wide avenue, a two-minute walk, and I moved from ancient Trieste to the newer. Soon afterward I reached what was to become my favorite part of the city—the wide, sun-splashed central square, lined with imposing buildings on three sides.

I might almost have come to another country, another civilization; despite its name, this Piazza dell'Unità is Austria-in-Trieste, focal spot of the long era which drastically altered the city's fortunes (page 826). For five centuries the city served as vital "lung,"

principal port of the widespread Hapsburg realm.

From one of a line of open-air cafes facing the square came the music of a Strauss waltz. As I took a place, the couple beside me asked for beer and *Wurst*. When I ordered coffee, the waiter responded with a Latin bow, but what he said was "*Ja, mein Herr!*"

From the next table a plump, philosophic-looking gentleman with narrow white mustaches guessed my thoughts. "If you had been here only 40 years ago, sir, you would have thought it even more Austrian."

My elderly Italian neighbor, a retired professor, began to talk of his youth, when this square resounded to marching feet and there was the flash of official dress.

"It was the Austrian parade ground," he explained. His eyes softened as he recalled the uniformed balls, the gaiety, the reflection of Vienna, city of light and music.

Austria had begun with a light hand, allowing a measure of self-management; then slowly it exerted a stronger control. Under the Hapsburgs, Trieste became part of an extraordinary organization of peoples and philosophies: Germans, Magyars, Slovenes, Poles, Czechs, Serbs, Croats, Rumanians, Ukrainians. . . . Christians, Moslems, Jews.

My philosopher-companion spread his hands. "It was autocracy, but generally enlightened; bureaucracy, but efficient bureaucracy." He stared at the walls about us. "They have seen so much of good and bad. . . ."

Maria Theresa's Canal Still in Use

In 1719, a happy year for Trieste, Charles VI declared it a free port, to serve as the empire's outlet to the world. Charles's daughter, the shrewd, doughty Maria Theresa, went further, slashing duties, improving the harbor, pulling down old city walls, encouraging the coming of Greek and Jewish merchants to expand the port. Later, to make it easier to unload ocean vessels, the Empress ordered the digging of Trieste's Canale Grande, a waterway reaching into the city.

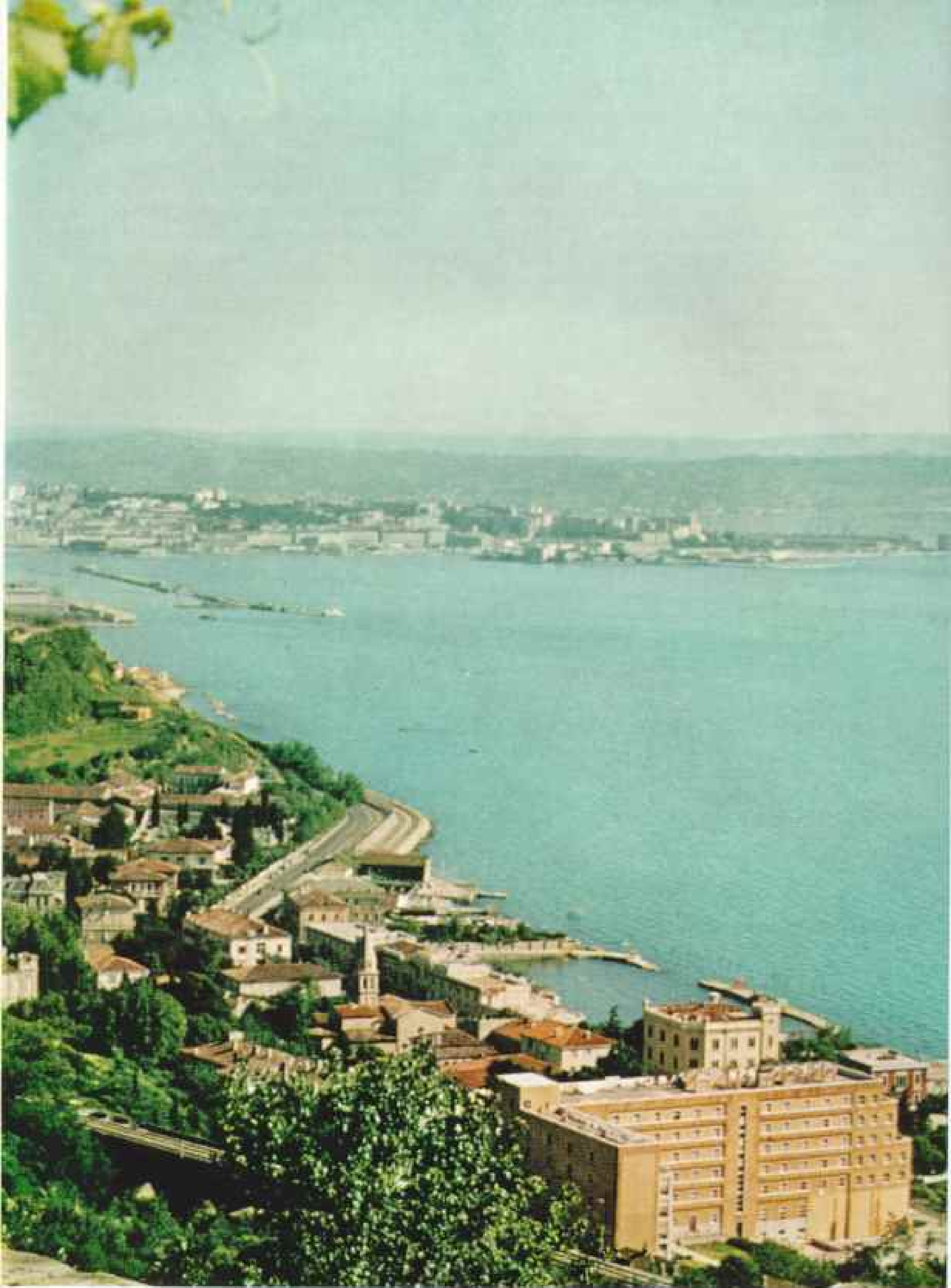
A few squares away from us, that Grand Canal continued, still useful, still ornamental. Though reduced in length, it was lined with many-colored small boats, busy with men shifting nets and sails between dawn and dark. In the quiet waters were reflected the neoclassic pillars and high dome of the Church of St. Anthony (page 829).

Austria's long rule was interrupted only



Grapevines Frame Trieste: Panorama from the City's Northern Limits

James Joyce began work on *Ulysses* while living in this lovely setting. Victory Lighthouse (World War I) winks a nightly beacon. The famed Simplon-Orient Express rolls daily across the arched railroad bridge.



839

The City Opens Arms Wide to Embrace the Sea, Source of Its Livelihood

Shipping made Trieste; loss of inland ties brought a decline in traffic and prosperity. The postwar hotel (at lower right) housed families of United States occupation officers; now it serves as police barracks.

briefly by the French, who arrived twice, to stay about 13 years in all. Back in Trieste after the Napoleonic interlude, the Austrians went to work to make it more important than ever. The port handled an increasing trade in the African, Levantine, and Oriental markets. Shipyards expanded; Trieste became one of Europe's leading maritime insurance centers. Its shipping companies acquired world fame.

The professor sighed. "Everything seemed to conspire to help Trieste." The Suez Canal, opened in 1869, proved a bonanza, putting Trieste in closer touch with Asia. "And railroads. Austria gave us direct contact with Vienna, and countries east and west, which made Trieste a great south European hub."

As he spoke, I saw around us evidence of Hapsburg stability. The massive buildings along the piazza still had a mellowed Teutonic aura: the Town Hall, the palace of the Lloyd company (now Lloyd Triestino), the balustraded government building with lightly hued mosaic patterns that shine in the sun.

Even the Pigeons Were Patriotic

Dusk was falling; in the violet light I accompanied the old professor for some blocks. As we approached a congested new quarter, his cane indicated its title: Piazza Oberdan.

"Oberdan . . . a name we Italians know well. The Austrians knew it even better, after they executed the man.

"In my boyhood," the professor went on, "Italian patriotic slogans would have been *verboten*. It had to be Austria everywhere, though in most hearts it was *Italia, Italia*."

The professor pointed to a distant building.

"One night I went to a dance there, and the little band suddenly burst into an Italian national song until it was pounded into silence." He smiled: "Another time, at the opera house, a signal came in the middle of an opera, and people let dozens of pigeons loose, carrying Italian flags!"

But there were darker occasions, none more crucial than the affair Oberdan in 1882.

When the Austro-Hungarian Emperor Francis Joseph planned a trip here, a bomb killed two people. Police arrested Guglielmo Oberdan. Found guilty of conspiracy, he died with the cry, "Long live free Trieste!"

The Austrians countered by favoring Slavs in the coastal areas and in Trieste itself. Playing one element against the other, the Hapsburgs continued to rule.

"That was the source of many troubles we've had since then." And with a handclasp and a shake of his head the professor left.

Today's visitor to these Adriatic shores finds many reminders that Latin, Slav, and Teuton here met on common ground. Germanic influence lingers mostly in Trieste itself. In many of the neighboring villages street and store signs still give names in both Italian and Slovene (page 832).

Mr. Stárec and Mr. Vecchi Are Brothers

I talked to a man who turned out to be Slav, with a Latin next door and another Slav on the other side. Wandering about farmhouses dug into the rocky hillsides, I chatted with roughly dressed country people.

"Si, it is hard to grow things here," said a red-shirted grower of vegetables. "Still, we Italians are used to bad soil."

"Da," a farm wife frowned as she rubbed a bright handkerchief to her flushed cheeks. "But we Slovenes can coax green things out of nothing."

The lines are not always so sharply drawn.

"Sometimes it isn't easy to tell here who or what is Italian or Slovene," an American in the office of the United States Representative told me.

Later that day I understood when I met a Mr. Jurisich, possessor of a distinctly Slavic name, who turned out to be an ardent Italian. An hour later I shook hands with Mr. Salvemini, who could not have been more Slavic.

My American friend and I took another trip to a village and read its name in a Slavic tongue. "It's been changed twice to my knowledge. First it was Slovene, then Italian, now Slovene again."

He introduced me to an uncommunicative Mr. Stárec and an equally untalkative Mr. Vecchi. "They're brothers," he added. "Both

(Continued on page 849)

Page 841

Weathered Columns of a Roman Basilica → Guard the Castle of San Giusto

Pigeons sit as if carved on the columns. The tall fluted sentinels date from the second century after Christ, when the city was Roman Tergeste.

Austrians founded San Giusto castle in 1470 as a bastion against Turk and Venetian; it has also served as a fortress for Napoleon, a Nazi antiaircraft post, a prison, and barracks. The castle now houses a museum of armor, weapons, tapestry, and furniture, and an open-air theater and restaurant.

Two women offer scarfs and jewelry for sale.







Fishing Craft Crowd Muggia Basin Like Toy Boats in a Bathtub

Muggia, a town just south of Trieste, once served as a border outpost of the powerful city-state of Venice. It remains Venetian in architecture and dialect, and differs in atmosphere from Trieste, which reflects a Teutonic influence from five centuries of Austrian rule.

Many of Muggia's people, mostly Italians, live by fishing. Here a Sunday afternoon finds the quay virtually deserted. Clock tower identifies the Cathedral of Saints John and Paul, the town's protectors.

Industry fills the area between Muggia and Trieste (upper left). Oil refineries, steel mills, shipyards employ many of Trieste's nearly 300,000 people.

Bald, bleak hills of Yugoslavia rising beyond the town offer the farmer scant return,

✦ Net-mending Fishermen Need Educated Toes

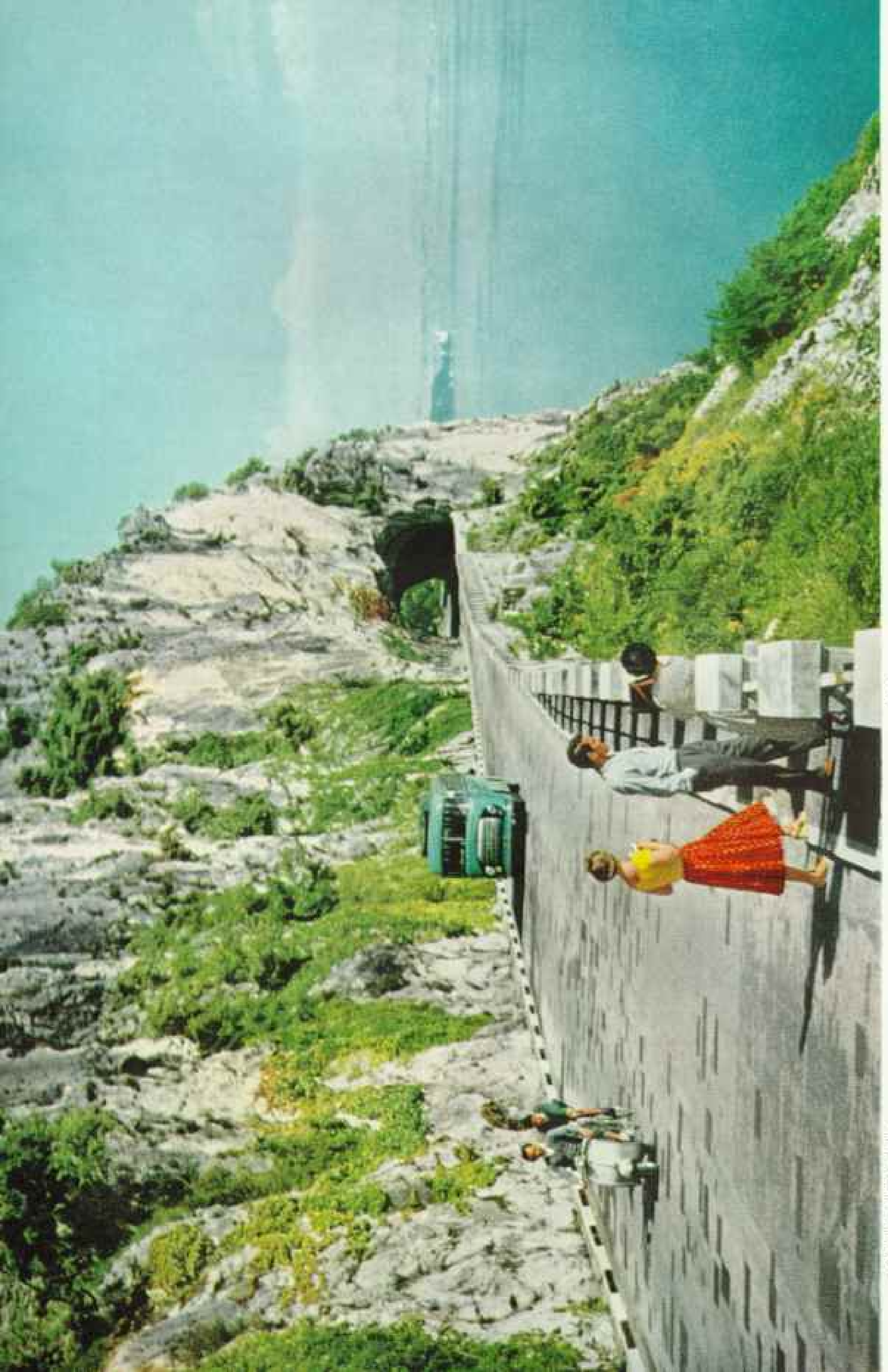
Adriatic fishermen say their fish are the finest in Europe, and many gourmets agree. In summer Trieste's fleet works close to home, fishing by night. In winter deep-sea craft move to North African waters. City schools train navigators, fishermen, and seafood processors.

One of these sailors holds a bone-needle in his mouth.

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♣ **Scenic Route 14 Rides a Cliff Face Above the Adriatic**

This dramatic road connects Montalcone with Trieste, seen here on the horizon. Miramare Castle tips the distant promontory. (page 846).

845

♣ **Racing Sailboats Hit the Starting Line in the Bay of Muggia**

Speleators line the quay at a Muggia yacht club to watch a regatta. Trieste industries loom across the water behind the Star and Snipe class sloops.

© National Geographic Society



Miramare Castle Has Seemed a Curse to Its Royal Tenants

A century ago Archduke Ferdinand Maximilian of Hapsburg, admiral of the Austrian Navy in the Adriatic, built this reproduction of a medieval baronial castle for his bride, Princess Charlotte of Belgium.

Workmen carted tons of soil to the rocky bluff jutting into the sea near Trieste and planted cedar, pine, willow, and palm as backdrop for white-walled Miramare. The Archduke imported Sphinxlike sculptures from Egypt, doorways from Tyrolean chalets, and other rich decorations.

Maximilian enjoyed his dream castle only briefly, for in 1864 he sailed to become Emperor of Mexico. Three years later he was executed by rebel patriot Benito Juárez. Charlotte lost her mind from grief and shock.

The fate of the ill-starred prince seemed to haunt succeeding occupants.

Empress Elizabeth of Austria and her daughter-in-law, Princess Stephanie, were frequent visitors. The Empress was assassinated in Geneva by an Italian anarchist. Stephanie's husband, Crown Prince Rudolph, was found shot to death at Mayerling beside the body of the Baroness Vetsera.

Archduke Francis Ferdinand was the last Hapsburg to live in Miramare. His murder at Sarajevo touched off World War I. Italy's Duke d'Aosta, who took over the castle, died a war prisoner in Africa in 1942.

Hitler's governor of Trieste lived here and came to a violent end.

When the Trieste area became a free territory administered for the United Nations, the castle served as headquarters for the American general and his staff until the northern zone in which it lies went to Italy in 1954. The first United States general to occupy Miramare died in Korea.

Miramare, owned by the State, opens its doors daily to the public (page 846).







Carved and Painted Cherubim Decorate a Sumptuous Bed at Miramare

Legend falsely attributes the bed to Louis XV's mistress, Madame du Barry. Actually, it may once have belonged to the Duc de Berry. Maximilian acquired it about 1860. Eagle-and-serpent motif denotes his brief rule in Mexico.

names, in English, would be the same—Olds. Each man has been under a different influence. Sometimes it's like trying to separate the yellow from the white in a scrambled egg."

The start of the 20th century found Austrian, Slovene, and Italian watching one another with growing tension. When World War I came, Italy joined England and France against Austria, and with the crumbling of the old empire the Italians received Trieste as part of their reward.

Italian between wars, Trieste fell under the heel of the Nazis during World War II. When the Nazis drew back in the spring of 1945, the Yugoslavs and New Zealanders marched in. The Yugoslavs ruled the city 40 days.

War seemed imminent more than once during the tense months and years of military occupation, endless negotiations, and stalemate that followed. Finally compromise came.

Trieste and its vicinity would be Italian, with Yugoslavia promised free passage for trade. Yugoslavia would get lands lying directly to the south (map, page 834).

"I Have Lived for This Hour!"

On a rainy October day in 1954, Trieste shifted hands. Departing U. S. troops received tributes of flowers, kisses, and tears; arriving Italians were hailed with trembling delight. Thousands lined up hours in advance to greet the feather-hatted Bersaglieri—Italy's elite troops. A cry rang out: they had crossed the border! Through Trieste ran an electric joy.

"*Italia, Italia!*"... "*La Patria!*..." Old men jumped on the trucks, tore feathers from soldiers' hats for souvenirs; boys all but threw themselves under the wheels. Out of hiding came treasured flags, and impromptu parades began. Youths stamped along, 10 abreast, and their seniors joined them. Automobiles, scooters, wagons rocked by, and always the banners rose in the damp air. Old women cried, "This is the happiest day of my life." ... "All my life I have lived for this hour; now I am willing to die."

Yet for many on either side of the line, the repartition of territory has brought not happiness but sorrow, posing the tragic choice between one's nation and one's home.

I trudged about the gaunt countryside and watched men fill cardboard cartons with their life's possessions, preparing for a moving day they had never anticipated.

"*Signore*, I was born here. I brought up my

three boys and my girl here," one moist-eyed elderly man said. "Now we will go."

I heard of instances in which official surveyors split family fields, even farmhouses—a parlor on Italy's side, a kitchen for Tito.

A man smiled wanly. "It seems that my cows may be Italians, my chickens Slavs."

Refugees Prepare to Face a New Life

In Trieste itself, relief and resettlement agencies struggle to care for the thousands of uprooted persons who have crossed to the Italian side of the line. Here these refugees merge with others who have come still longer distances from Russian satellites. Trieste is a way point in one of history's most tragic progressions—the flow of men, women, and children from troubled areas farther east.

Temporary camps or barracks are found for these escapees; in a few cases, homes of relatives. Still more people have crowded in daily, with less work and space than ever for them. Yet when I visited several of the camps I found hope and bravery among the sufferers.

Inside cramped rooms old and young were learning new skills or refreshing old ones. Carefully they explained: "Once I finish this, I will know how to make a gas heater."... "That is a dress pattern my mother used in Czechoslovakia."... "*Da*, one more month and I call myself an electrician."

At San Sabba Camp I beheld a bitter irony. This place, in which hundreds work to escape the shadows of a new tyranny, is a former Nazi concentration center. Col. A. D. F. Thomason, senior field representative of the World Council of Churches, showed me the remains of torture chambers and a crematorium in which hundreds—perhaps thousands—were burned.

Out of old despairs, a fresh life. As we left the dark cells, children ran past in a laughing game of tag. On the outer walls we made out flowered designs and the faces of Mickey Mouse and Donald Duck. And in an adjoining building I studied maps of a gaily ornamented world, a world such as these children and adults had never known—oil derricks in Texas, kangaroos in Australia, the design of the better life for which they yearned. "*Quo Vadis?*" asked a caption, and drawings showed smiling people striding out of Trieste.

"How many will do that?" I asked.

"Some. And that will make all we do here worth while" (page 832).





United Press

↑ Strategic Trieste Felt the Fury of World War II Bombs

A port of movement for Axis supplies, Trieste suffered heavy losses. The region's oil refineries and industrial plants were virtually wiped out. At war's end the wrecks of 101 ships choked the near-by waters. Here the Italian luxury liner *Rex* (right), sunk in an RAF rocket attack, lies off Koper, south of Trieste.

Page 850

← Triestini Digest Sunday-morning News at Cafe Tables in the Piazza Garibaldi

On workdays men stand at the bar for coffee; sitting costs more, so it is reserved for leisure time.

Heavily shuttered windows of apartments across the way keep out the summer sun and protect against the *bora*, the fierce northeast wind that blasts the city in winter. Umbrella advertises Cynar, an aperitif.

Lower: Trieste gourmets select their dinner from a choice variety of Adriatic seafood.

© National Geographic Society

The Trieste of today has evolved through a near-miracle of reconstruction. The Allies, arriving at the end of World War II, found the city half stunned, its economy all but shattered. Ten heavy air raids left oil refineries and industrial plants ripped or smoldering; the heavily mined port and approaches were studded with scores of derelicts—warships, passenger liners, merchant vessels.

One port official explained: "Your troops had to unload their first supplies at a public bathing beach."

Relief funds prevented starvation and epidemics. Work started at once to restore and modernize the port and its industry. Low-interest loans helped rehabilitate factories. Trieste became a vital port for UNRRA, Marshall Plan, and other aid to the Balkan and neighboring areas. From 1948 to 1951



Fingers Race with Tongues as Knitters Gather for the Post-siesta Hour

Like other Italian cities, Trieste observes the siesta. Shops close at 1 o'clock and employees go home for a leisurely lunch and nap until 4. Women often use the next hour or so to catch up on visiting.



853

Rose Arbor and Wading Pool in Piazza Carlo Alberto Make a Happy Playground

Trieste presents a clean and modern appearance. Airy plazas and spacious avenues grace the city. Dark and narrow streets and cramped squares are confined to the ancient town, of which only the center remains.



854

Stone-eyed Merchants Guard San Giusto's Threshold

The Barbio family were prosperous Triestini centuries ago. A slab from their tomb forms this doorpost at the cathedral.

the United States earmarked nearly \$38,000,000 in direct aid for the Trieste area.

Trieste quickly came back, in some ways surpassing its old achievements. "I don't think I've ever seen such application and such spirit," one American observer said.

How do the Triestini feel about this aid? One native spoke with feeling: "You Americans made it possible for us to live again."

Today Trieste, a city of nearly 300,000 peo-

ple, hums with much of its old zest. I saw thousands at work in the shipyards, oil refineries, machine shops, iron and steel works, paint factories. And pulsing with activity were the port facilities that extend on both sides of the city, with their rows of warehouses, clusters of tracks, and lines of busy cranes.

Nevertheless, peace has brought or crystallized new troubles for Trieste. Millions of dollars in payrolls disappeared with the departure of the Allied missions, which had made heavy use of the harbor, spent lavishly, and created jobs for thousands.

The Iron Curtain cuts off much of Trieste's former trade, and Yugoslavia is developing a rival Adriatic port in Rijeka, formerly Fiume, once in Italian hands.

For Trieste's fishermen, territorial change has raised difficulties, closing certain coastal waters. Also there is little exchange of trade and foodstuffs, and guards stand on constant duty at the borders.

Bora's Blast Chills Triestini

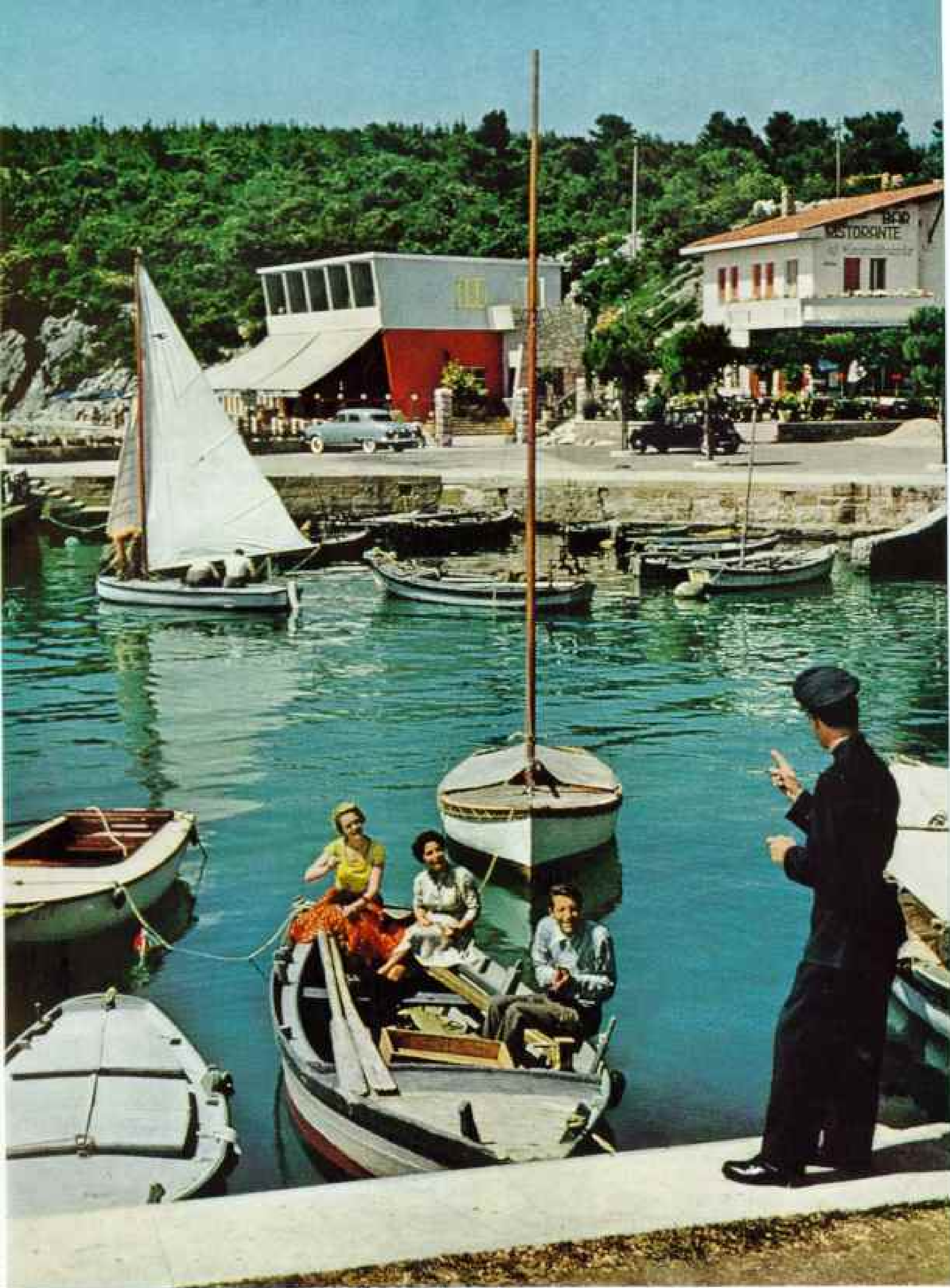
"We'll still manage," a businessman said to me. "It's like our *bora*. At times we think we cannot live through it. But we always do."

He spoke of the wind under which Trieste has long shivered, the cold, dry winter gale from the northeast which blasts Trieste like the *mistral* of the French Mediterranean. The *bora* may roar for days, making Triestini cling to ropes across exposed points. Actually people have died of injuries suffered when the 80- to 100-mile-an-hour winds sent them spinning against a wall or battered them with flying debris.

The people of Trieste are not likely to let either their *bora* or their problems conquer them. And certain recent developments are definitely encouraging.

The Italian Government has assigned funds for local improvements, public works, shipyards, and other construction. A 1955 agreement with Austria is expected to bring back a larger share of that country's trade.

With peace, visitors are flocking to Trieste. Last year saw 178,772 tourists, a third more than in 1954. The Italian Line's famous trans-



"Does the Fisherman Know You're in His Boat?" Policeman Keeps Tab in Duino

Triestini like to motor 14 miles north to this seaside retreat. Here in an old castle lived the British commander during the United Nations administration. Restaurants face the harbor.



856

↑ "Waiter! That Fish!
Must I Catch
It Myself?"

Many a Triestino would be speechless if handcuffed. But it would take more than that to quell his appetite for superb Adriatic seafood.

→ Safe from traffic, skating youngsters roll up mileage on these playground ramps on the flank of San Giusto Hill.

atlantic liners *Vulcania* and *Saturnia* are back in the Trieste service.

As one Triestino told me: "We think ours is a beautiful place, and you don't have to be rich to enjoy it."

I found much to support that view, coming upon unexpectedly magnificent stretches of coastline, with miles of gray palisades against the clouds, and half-hidden coves and inlets. To the north of Trieste a sweeping coastal highway cuts now and then through overhanging rock, and small flowering squares jut toward the sea (page 844).

Many times I stopped with friends at bathing resorts along this "little Riviera of the Adriatic." Favorites are

Sistiana and Grignano among the stonies and green hills. Near Sistiana towers historic Duino Castle, and near Grignano stands beautiful Miramare, the castle where Maximilian and Charlotte once dreamed of imperial glory (pages 846 and 848).

South along the Istrian coast we found settlements like Muggia reflecting the influence of Trieste's former rival from over the water—miniature Venices, complete with arches, colonnades, and the winged lions of the Queen of the Adriatic (page 842).

And behind Trieste rises the gaunt gray Carso, a limestone plateau honeycombed with dramatic caves, dimly lighted, eerie in their



formations, and underground rivers that break without warning into the open air.

In the city itself, roads cut swiftly upward past stately buildings like the gleaming white University of Trieste, and villas half hidden in the pines. Here red and yellow blooms flare vividly in plantings that defy the inhospitable terrain.

Modern life shows nearly everywhere—big American cars, new apartments, shops, and movie theaters, neon signs, the bustling annual Trieste Fair with glittering exhibits from many lands. And always the cosmopolitan city carries on its tradition of official receptions, formal events, and banquets.



857

† "But How Beautiful!"
Expressive Hands Accent
a Triestina's Delight

Trieste's people reflect the distillation of a dozen civilizations. Romans, Goths, Byzantines, Lombards, Franks, Venetians, French, Austrians, Italians, Germans, and Yugoslavs have all ruled the city and left their imprints. Yet the Triestino remains himself: brisk, genially pessimistic, and determined to enjoy life between recurring crises.

Yet only a short distance outside of Trieste many villagers may still be seen bartering produce as their grandparents did. On my last day in the region I saw a demonstration of the way the old continues alongside the new.

I had clambered down from a bus with an Italian friend when we saw a neatly dressed, well-coiffured young woman having trouble getting off. With her she had a large bag of cement.

Like Southern gentlemen (one from the Deep South of the United States, the other from southern Europe) we bent forward to carry it for her. We could barely budge it. She laughed and pointed to her head.

"It goes up here."

With many grunts we lifted it there. She gave it a pat and went off, balancing it with ease.





Bills Aloft, Two Hooked Sailfish Tailwalk on the Edge of the Gulf Stream
A charter boat off Florida plays a double-header, but slack line may let one prize throw the hook.

National Geographic Society—University of Miami Scientific Studies
Reveal Minute Forms from Which Gulf Stream Giants Grow

BY GILBERT VOSS

Research Assistant Professor of Marine Science,
The Marine Laboratory, University of Miami

*With Paintings by Craig Phillips, Curator of the Miami Seaquarium,
and Photographs by B. Anthony Stewart, National Geographic Staff*

"SAILFISH behind the port outrigger!" The cry from the flying bridge galvanized the *Dream Girl's* party into action. All eyes focused on the mullet bait skipping over the blue Gulf Stream waters.

A purple shadow shot up behind the dancing mullet.

"He's coming up on it now!" I shouted to the sportsman, already seated in the cockpit's fighting chair. A magnificent blue sail broke the surface. Amid a swirl of water a slender bill slashed at the bait.

Sea Battle Begins

"Strike!" came the cry as the mullet disappeared. The line pulled free from the outrigger's clothespin with a startling snap. For a moment it ran slowly off the reel, then a sudden spurt showed that the fish had turned with the bait. The angler threw on his reel drag and struck hard to set the hook.

Even as the reel screamed and the rod bent under the strain, the giant sailfish broke water. Again and again he leaped, sail showering spray as he tailwalked across the water. Brilliant blue back and silver sides and belly sparkled in the afternoon sun.

For a quarter of an hour the battle went on. With every roll of the boat and pull of the rod the sweat-drenched angler reeled in, fighting always to keep the linen line taut.

It was a tense moment when the big fish came alongside, for the sharp bill, backed by 40 or 50 pounds of bone and muscle, is no mean weapon. But for this sleek fighter there was no question of boating. Today's conservation-minded sportsmen usually cut free their catch, and the majority of clubs now offer tournament prizes not to those who bring in the most but to those who release the most sailfish!

I seized the leader wire and clipped it with a pair of cutters. For a moment the big fish lay motionless, then with a savage shake of

its head swam slowly into the depths. As it disappeared, the captain broke out a triangular red flag, which flapped on the outrigger in eloquent testimony of a battle won and a gallant foe freed to fight another day.

I have experienced this excitement many times as angler and as charter-boat mate and skipper. I myself have boated a sailfish 8 feet 8 inches long—close to maximum size for the Atlantic species. But my greatest thrill came the night I caught three sailfish hardly an eighth of an inch long.

This time we were fishing with long silk nets from the *Megalopa*, a research vessel of the University of Miami's Marine Laboratory. It was near Cat Cays in the Bahama Islands, over the "dropoff" edging the deepwater canyon of the Gulf Stream. The night was still, with hardly a ripple on the water. A phosphorescent streak astern marked the position of our net, cutting along at two knots.

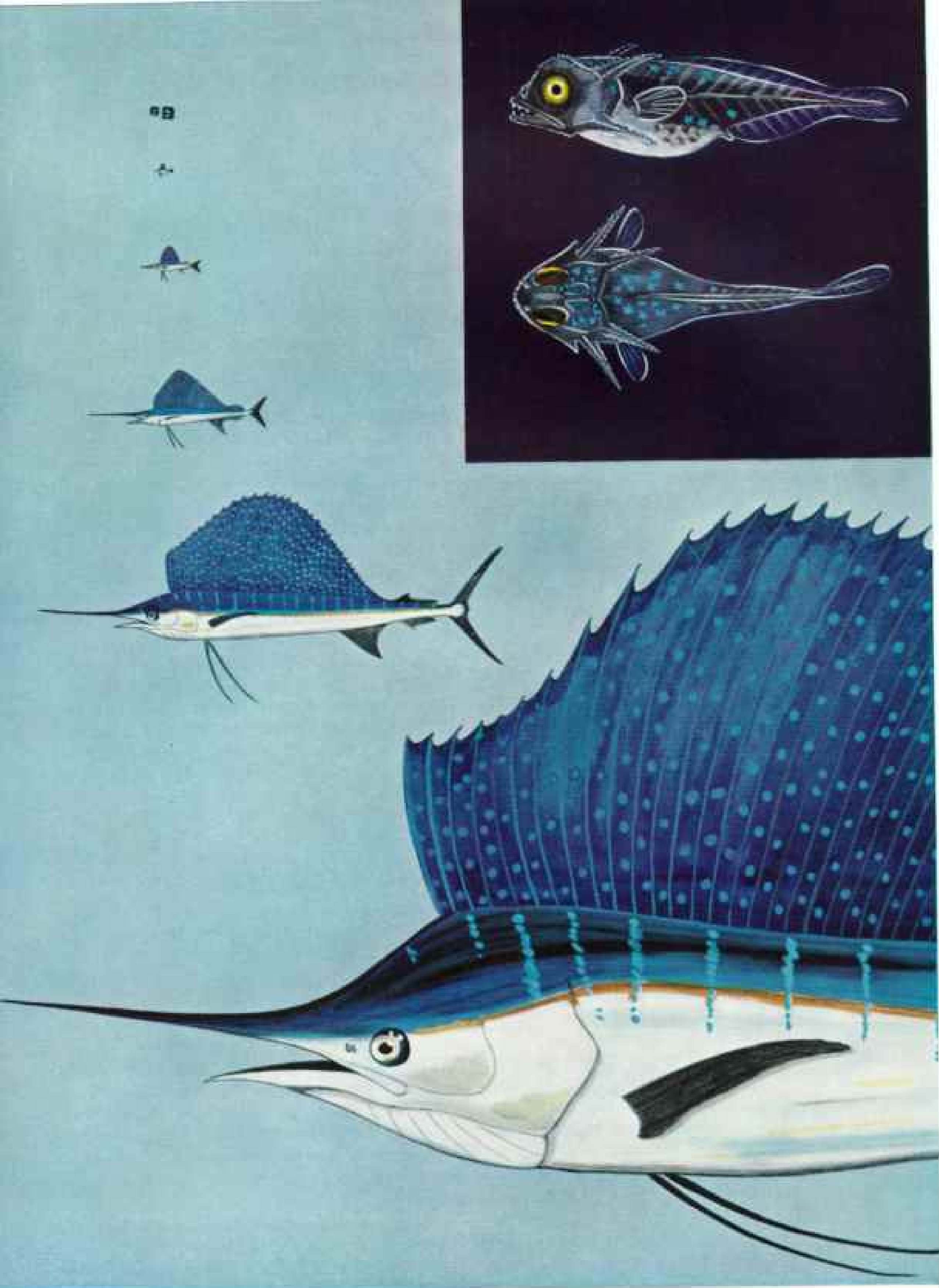
Night Haul Yields Strange Creatures

At the run's end we cut the throttle and hauled in the net. Gently we lifted over the side the glass jar at its end. Under the cabin light we saw innumerable forms dart about the container of sea water—arrowworms, comb jellies, siphonophores, medusae, and the transparent larvae, or very young, of fish.

There at the bottom, just as we were about to add preservatives and store the haul away, three tiny creatures caught our attention. They were fish we had never seen before—steel blue in places, transparent elsewhere, with short, broad snouts and toothed spines projecting from their heads.

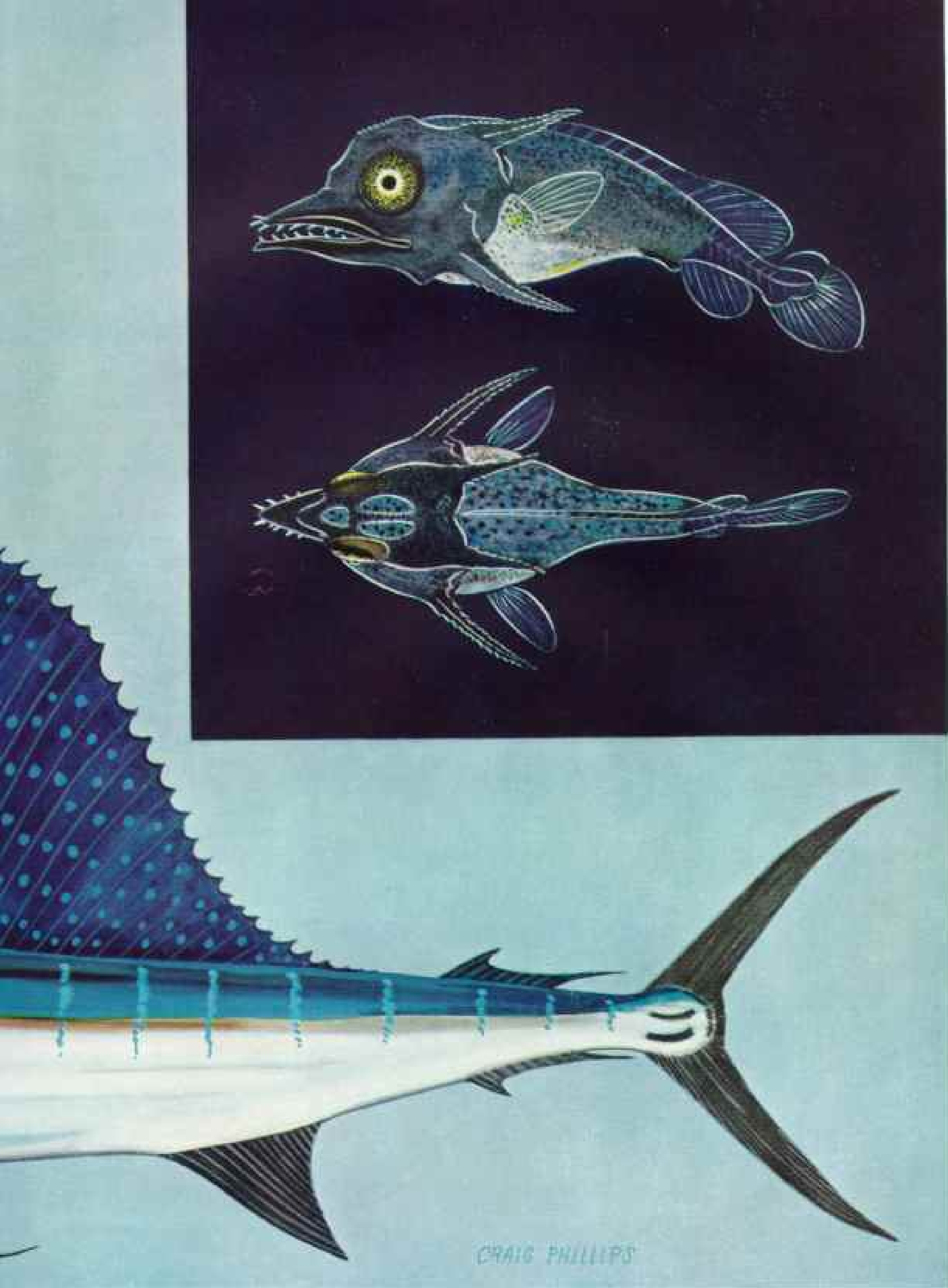
They bore no resemblance to the lean greyhounds of the sea we all knew so well, yet they closely fitted the tentative description of infant sailfish made years ago by the famed Danish ichthyologist, Christian F. Lütken.

Excitement soared. Were we at last on the track of sailfish young? For months we had



The Atlantic Sailfish Begins Its Career as a Grotesque and Awkward-looking Larva...

Tiny, semitransparent larvae three and five days old (top left) show enlarged in the inset boxes. The smaller specimen, about $\frac{1}{8}$ inch long, lacks sail and bill but exhibits teeth and spines. Bill shows at five days; sail appears at 10 days, and its peak gradually moves off. If the 3-year-old, weighing 80 pounds, were in scale, it would extend 8 feet.



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...That Bears No Resemblance Whatever to the Elegant and Mighty Greyhound of the Sea

Gilbert Voss, working on a project sponsored by the National Geographic Society and the University of Miami Marine Laboratory, cracked the secret of the Atlantic sailfish's life history by tracing its metamorphosis from infant to adult. Craig Phillips painted these specimens and others in the series for the NATIONAL GEOGRAPHIC MAGAZINE.

sought these elusive larvae but despaired of ever finding them.

The search had begun in January, 1953, when the National Geographic Society and the University of Miami's Marine Laboratory, under the directorship of Dr. F. G. Walton Smith, embarked on a study of the life histories of sport and food fishes of the Florida Current, a major spawning ground for many fishes of the western North Atlantic.

We wanted to learn where and when they spawn, how long before they reach maturity, what their numbers are, and how heavily they may be fished without upsetting the balance of life in the sea. Such knowledge is invaluable to conservationist, sportsman, and commercial fisherman alike.

Few Ocean Fish Have Known Pedigrees

"But aren't ichthyologists already familiar with these facts?" you might ask. The truth is that, while we have learned a great deal about fresh-water fishes, our knowledge of their marine cousins can at best be considered a scientific Swiss cheese, full of blank spaces. It is estimated that we can sketch the life histories of fewer than one out of a hundred of all ocean fishes.

"But why is it so difficult to tell the species

of a larval fish?" you persist. "A little baby looks like a human and a little pig like a pig. No one would mistake one for the other."

That's just it. Baby pigs *do* look like grown pigs, but tiny fishes, when they first hatch from the egg, bear little or no resemblance to the adults. Fins are undeveloped, scales often lacking. Heads are enlarged and equipped with gigantic eyes.

The first larval sailfish we examined, for example, was only about three-sixteenths of an inch long and resembled an adult sailfish as little as a goldfish does a whale shark (page 860). It carried long toothed spines on the head but bore no trace of the bill and sail that have made this fish so famous. Further, the potbellied little fellow could hardly swim.

In this larval stage fishes are usually part of the plankton—the sea's drifting plant and animal life—and they exist in a very different fashion from their parents. As they grow, they lose their larval form and the first adult characters appear. They are called juveniles when they resemble their parents in all but size.

Tracing the life history of a fish, one must collect all stages from hatching through adulthood so that the whole picture of change may be shown. Each history represents months, sometimes years, of patient investigation.

To realize the magnitude of the task ahead, we had only to think of Johannes Schmidt's classic study of the European eel. Schmidt knew that in early spring swarms of tiny eelers, closely resembling the adult eel, enter river mouths and work upstream to Europe's lakes. But whence did they come?

Dolphin's Stomach Yields Baby Fishes

Fish larvae provide food for nearly everything that swims. A search of the stomachs of fish brought in by sportsmen and commercial craft often turns up baby specimens in perfect shape for laboratory study.

Author Voss (left) and taxidermist Al Pflueger open a 12-pound dolphin on the docks at Bakers Haulover north of Miami Beach.





Juvenile Sailfish Prey on Plankton and Small Fry Under a Canopy of Sargassum Weed
Crab, shrimp, and sargassum fish with climbing fins blend into the vegetation. (About natural size.)

The Danish biologist also knew of an odd, transparent little fish called *Leptocephalus* (small-headed), discovered in the Mediterranean and once thought to be an adult. Could this be the larval stage of his eels? He began a systematic study of plankton tows taken by vessels all over the North Atlantic.

After years of comparing the tows there emerged this picture of the marvelous migratory cycle of the eel: Returning to the deep ocean after several years of fresh-water life, the adult eels stream across the broad Atlantic to congregate southeast of Bermuda in the Sargasso Sea. Here they spawn and die.

Billions of larvae emerge from the eggs and soon develop into leptocephali similar to those first taken in the Mediterranean. Currents carry them toward the coasts whence their parents came. Near the end of a 2½-year journey their thin bodies transform into the elvers Schmidt had seen entering the rivers of his native Denmark.

American eels were found to make a similar one-year migration and to spawn near European eels in midocean. How American eels find their way to America and European eels to Europe without mixing their directions has comprised one of Nature's most fascinating riddles.

A difficulty ichthyologists face when trying to link the very young with their adult forms is that most ocean fishes lay their eggs in

open waters and swim unconcernedly away to let them hatch as best they can.

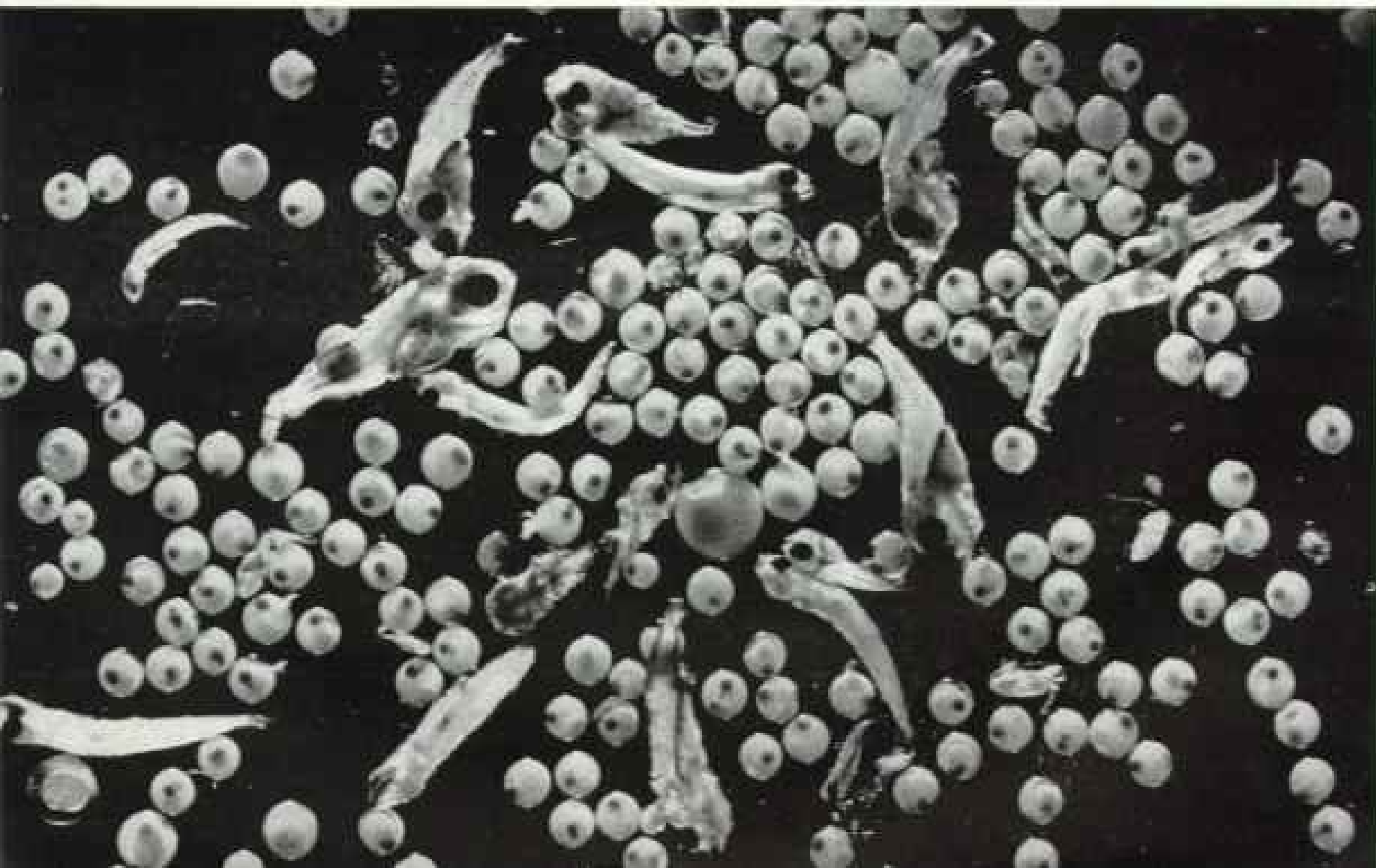
If the young could be spawned and raised in an aquarium, as has been done with fresh-water species, identification would present no problem. But few open-ocean larvae can be kept alive more than a few hours or days, partly because of the difficulty of supplying them with their natural microscopic food. And it is harder still to obtain eggs from the female and fertilize them in an aquarium.

Fishing 1,200 Feet Below the Surface

So when the National Geographic Society-University of Miami larval fish project got under way, we had to go to the plankton itself and search out the baby fish among myriad other creatures. We already knew much about life in the Florida Current from a two-year study in cooperation with the National Geographic Society, and this earlier work prepared us for difficulties we now faced.*

We combed the 60-odd miles of water between Florida and the Bahamas, searching figuratively for needles in a haystack. Day after day our hydrographic vessel rolled in the ocean swell while we lowered silk plankton nets on steel cables to depths of 1,200 feet and more. Current, wind, and jagged bottoms complicated our task.

* See "Strange Babies of the Sea," by Hilary B. Moore, NATIONAL GEOGRAPHIC MAGAZINE, July, 1952.





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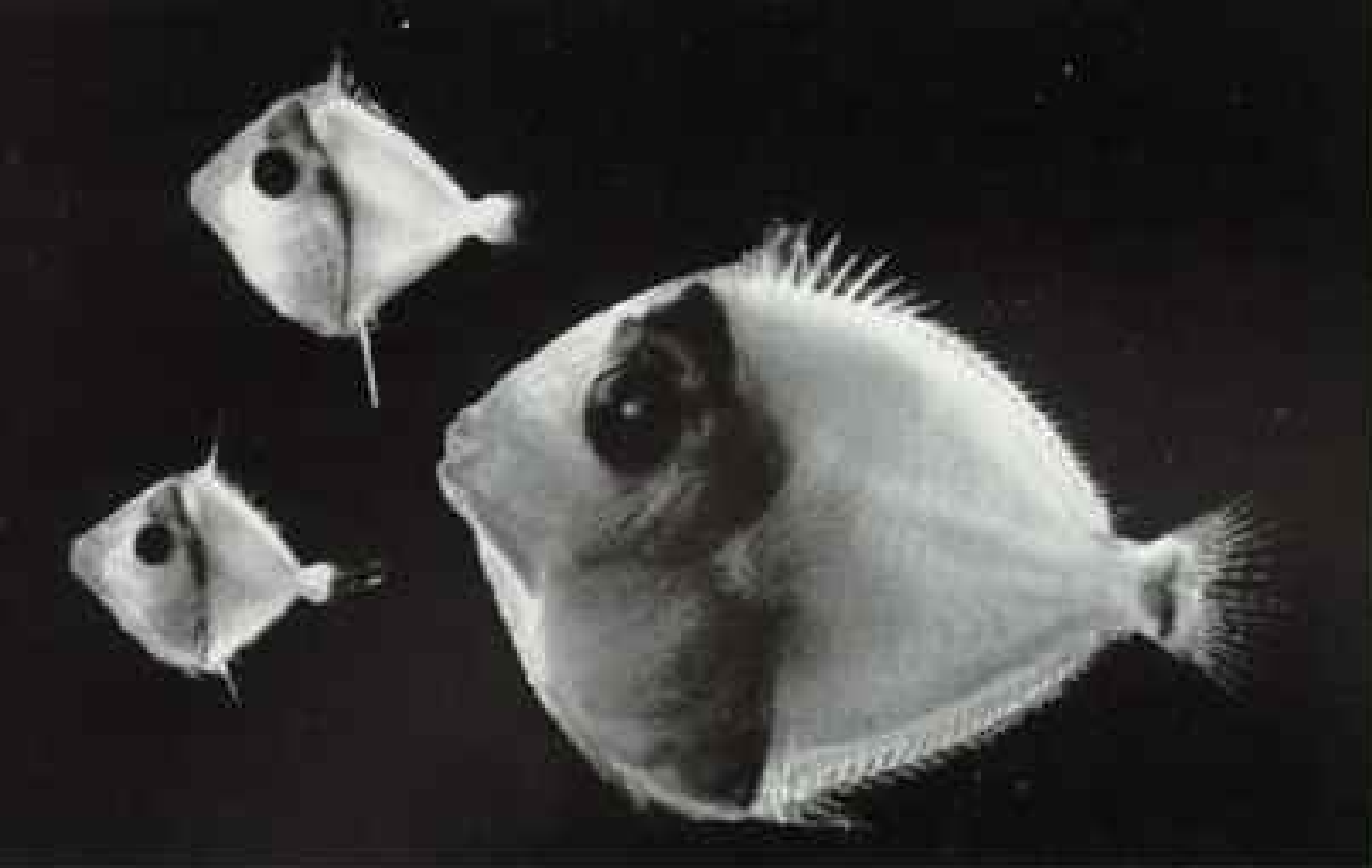
↑ Scientists Troll for Fish Larvae

In the larval, or infant, stage, fishes are usually part of the drifting life of the sea, the plankton. Here aboard the research vessel *Gerda* in the Gulf Stream, marine biologists gather plankton in jars at the end of long silk nets.

→ The microscope enlarges a hatch of plankton five times. Directly below a round sargassum weed "boat" is an oel larva, flanked by a polychaete worm (left) and a shrimplike euphausiid. Below are a young flatfish and (extreme right) a nearly transparent sailfish larva sporting long spines.

← Newly hatched fish larvae and eggs of unidentified species are fresh from the Gulf Stream. Oil droplets dot the eggs. Embryonic fish coil within some of the balls, here magnified five times.





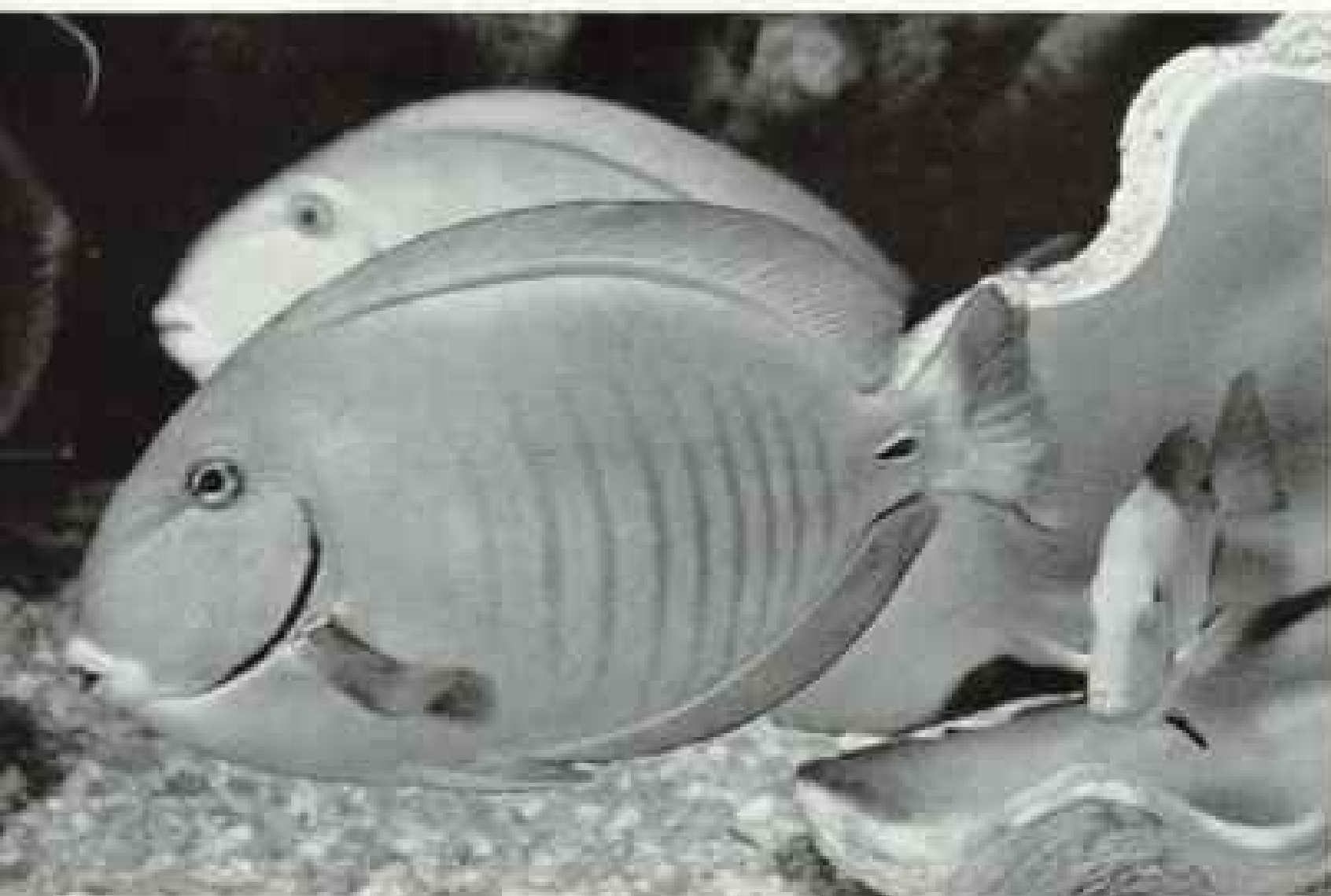
◀ Stubby Baby Surgeons Lack the Sleekness of Their Elders

Three larval stages of *Acanthurus hepatus*, magnified five times, carry long spines that will disappear at full growth. Heads and eyes are disproportionately large.

The baby surgeonfish spends its larval life among the plankton. Later it undergoes an abrupt change, assuming the adult's appearance in miniature within a few hours' time.

Below: Adult surgeons swim in a tank at the Miami Seaquarium. Scalpel blades which open like jackknives on either side of the tail give the fish its name. These knife-edged spines are used for defense only.

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ator of the Gulf Stream's edge (page 862).

Chicken heads tossed overboard from a ship, argonaut shells, even a set of false teeth have been found in fish stomachs. The teeth set off a row between two fishermen: each claimed ownership. Oddly enough, the teeth fitted both men equally well!

Nights I would idle the engines and we would put the big net over the side. Half-hour tows filled the big jar at the end of the 34-foot cone net with swarming planktonic animals (page 865).

Between hauls we lay motionless on the quiet Gulf Stream with a light rigged over the side. Within minutes the waters would stir as darting copepods, fairy shrimp, tiny fish, and squids flashed back and forth, drawn by the bright rays. Plying long-handled dip nets, we would catch these fantastic fast-swimming creatures which usually evaded our tow nets.*

Baby Sailfish in Dolphin's Stomach

We even do some fishing ashore. Since fish larvae are eaten by nearly everything that swims, including their own parents, we often examine at the docks the stomachs of fish brought in by fishing boats. We have obtained baby fishes in perfect shape, like the three-inch sailfish complete with bill and sail we took from a dolphin, that swift pred-

Once we safely stow the plankton, the shore scientists take over. Many times my wife Nancy and I stand fretting, our eyes on some odd fish we are eager to examine, while Joan Clancey, third regular on our team, measures the plankton in a graduated flask to determine the concentration of floating life in the sea sector we are working. She also makes note of the salinity and temperature of the water from the records taken at sea.

When Joan has finished, we pour the plankton into shallow dishes and examine it under the microscope to sort out and record for further study the tiny larval fishes and eggs (page 864). Sometimes we find weird and entertaining creatures: lantern fish with headlights to attract prey, hatchet fish flashing gold and silver sides and rows of light organs, viperfish armed with saberlike teeth. We smile when we spot an engraulid, whose hairy-appearing muzzle and floppy, earlike fins

* See "Night Life in the Gulf Stream," by Paul A. Zahl, NATIONAL GEOGRAPHIC MAGAZINE, March, 1954.

earn him the nickname Pluto after Mickey Mouse's dog in the comic strip.

One lighthearted interruption in laboratory routine occurred when our dachshund Hansel knocked over a jar of grain alcohol. The fumes made him so groggy that it took him several hours to recover.

Marine Scientists Turn Detective

The real excitement—and labor—in the laboratory begin when we discover that we have enough specimens of one family group to start intensive detective work.

Each tiny fish is studied under the microscope and a meticulous drawing made on a 4 x 6 card, on which is recorded the actual size of the specimen and when and where captured. Successive drawings record minute changes that occur during growth—length of snout, size of spines, fin development, over-all size, and other characters.

When we have 35 or 40 drawings—enough, we think, to show the full development of at least one species within that family—we

spread them out on a large table. The smallest specimens are placed at the top, in separate columns if dissimilarities suggest they belong to different species. The remaining cards are sorted until each column contains only specimens clearly related to one another, with the largest at bottom.

If there are gaps, additional examples are sought, studied, and drawn, until at last one column reveals an unbroken series in which any specimen differs from the one above or below in only slight degree—in the case of the sailfish, a chain running from tiny gargoyle to graceful adult (page 860).

Identifying the largest specimen automatically identifies every other fish in the series, thus adding the complete life history of another species to science.

At our Miami laboratory we have now examined about 25,000 larval fish and many more thousands of eggs taken by our tows. Painstaking classification has already cracked the riddle of 11 species. Some specimens that defy classification undoubtedly are new to

Marine Portrait Gallery Reveals the Chain of Growth from Infant to Adult Fish

Months of patient work come to a climax as Mrs. Joan Clancy pieces together the jack family tree from sketches of its members. She sorts magnified drawings of the larvae into columns according to their distinctive features. This discloses the stages of development linking infants and adults that may seem totally unrelated. Through such study of thousands of specimens, University of Miami scientists have unlocked the fascinating life secrets of the Atlantic sailfish and a number of other ocean fishes.





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† Cruisers Race from Palm Beach Inlet as the Silver Sailfish Derby Gets Under Way

Sailfishing ranks as a multimillion-dollar industry in Florida. Some days as many as 70 charter boats head oceanward from the Palm Beach area alone. Flags on rigging of the nearest craft tally the previous day's catch.

‡ Strike! Struggling to throw the hook, an acrobatic sailfish leaps high above the surface.

Harvey Adelson



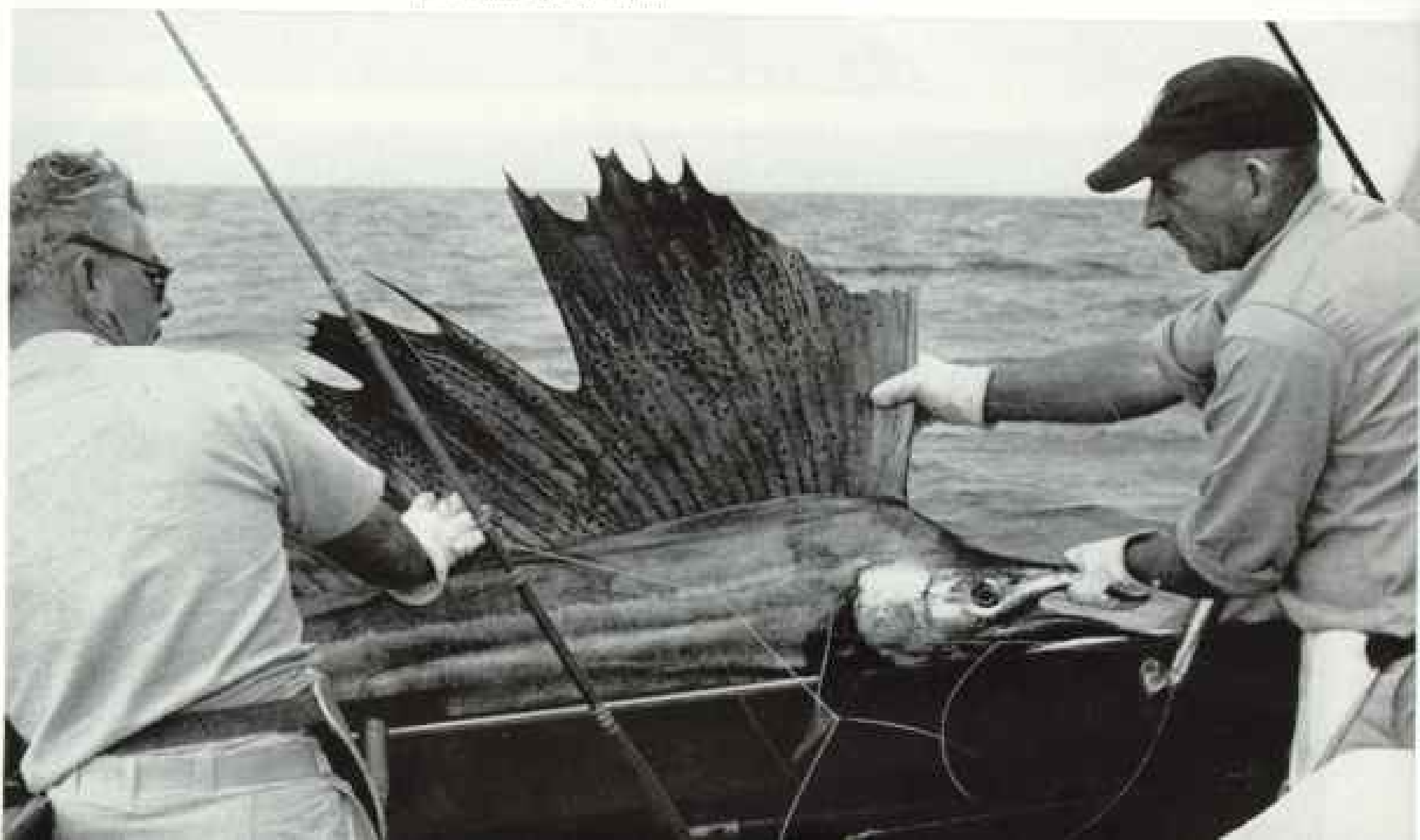


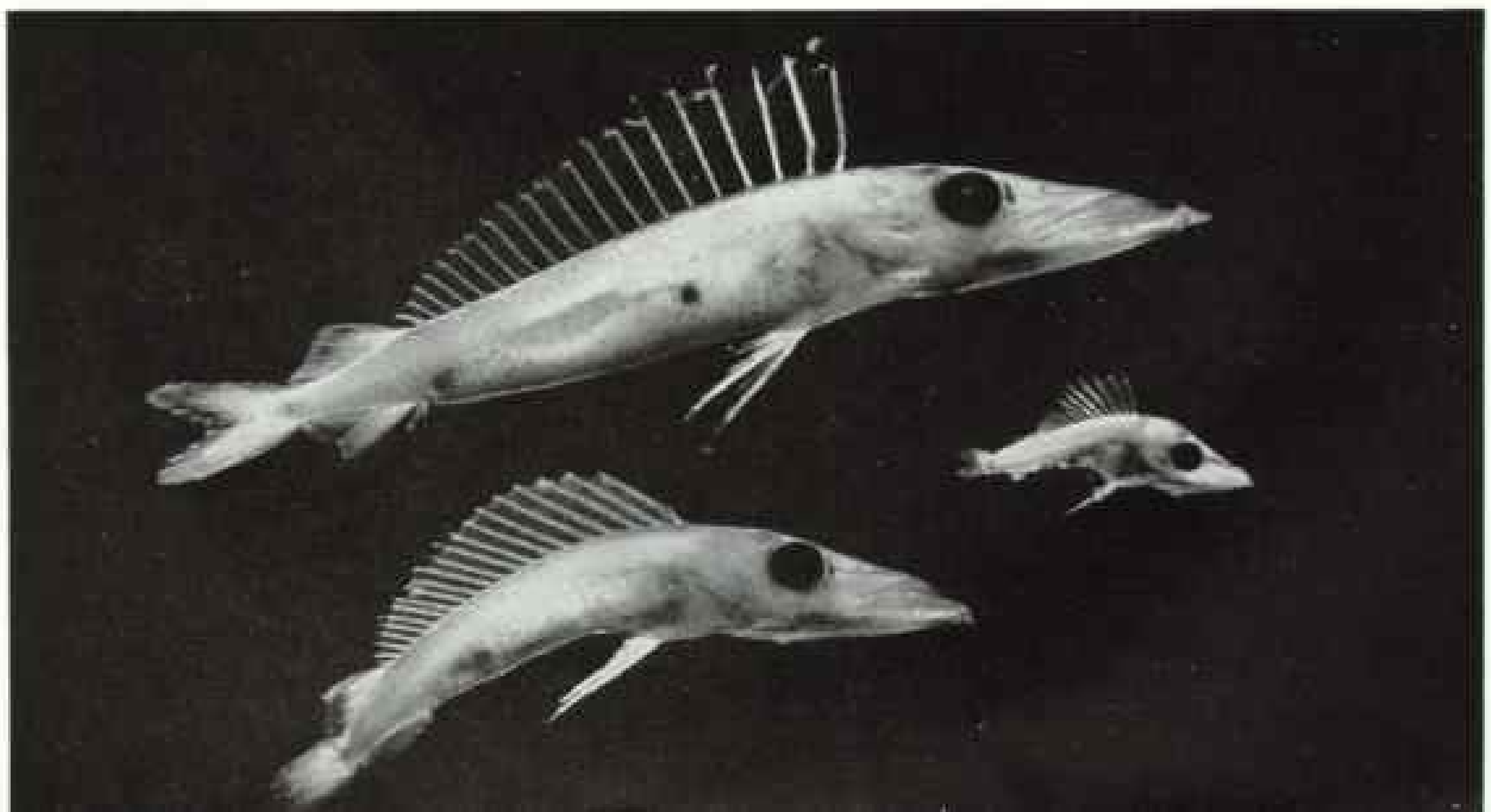
869

Tailwalking Sailfish Fights the Hook →

↓ Sporting anglers usually release their conquered sails. This 8-foot gamester is hoisted to be mounted and entered as a trophy in the Derby.

Bonnie Anderson (above right)





← Author's Wife Trains Twin Lenses on a Tiny Snake Mackerel

Page 870: Mrs. Nancy Voss sketches the minute changes that occur at each stage of growth. These portraits, larger and more detailed than the ones used for sorting (page 867), are for a published report.

Below: Larvae, enlarged five times, range from about three days to several weeks old.

science. The rest will eventually fall into place, completing other fish histories.

Although gaps remain, here is what our studies tell us of the sailfish, for example:

Florida sailfish spawn in late spring and early summer in shallow water along the Florida sands. At this period the females, heavy with roe, are sluggish fighters.

After spawning, the eggs, scattered about in the plankton, float northward in the Gulf Stream. The number of young sailfish in the oceans would be fantastically large if all the larvae survived, for Marine Laboratory investigations show that a single female may spawn as many as 4,675,000 eggs. However, countless predators feed on eggs and young as they float helplessly in the sea.

The hatchlings themselves gorge on tiny shrimp-like copepods, which have been termed the "milk" of the sea. The baby sailfish are soon sampling little mollusks called heteropods and gobbling down fish. One greedy specimen, all of three-quarters of an inch long, including bill, had a viperfish nearly as long as itself folded up in its stomach!

As they grow increasingly able to fend for themselves, the sailfish work inshore; juveniles five to eight inches long are found along the Carolina coast during summer. Cold weather and northerly winds head them south.

Within a year they have grown to five or six feet and soon are the fighting heavyweights sought by sport fishermen. Three or four years seems to be old age for them.

Sailfish Taken for Sailboat

Not until the early 1920's was the Atlantic sailfish "discovered" as one of the world's showiest and hardest fighting game fish. At first it was taken on hand lines by anglers who went out with commercial fishermen for a day's sport catching kingfish and mackerel. Today in Florida sailfishing is a multimillion-dollar industry, with hundreds of cruisers plying the blue Gulf Stream in search of the wily fighters (pages 858 and 868).

Scientists call the streamlined beauties *Istiophorus americanus*, the word "istiophorus"

(sailbearer) referring to the high dorsal fin that collapses into a groove along the back except when the fish surfaces.

The shape of this fin occasioned the fanciful tale told by Sir Stamford Raffles, of Singapore fame, "of a sailing fish, called by the natives [Malays] *Ikan layer*, of about 10 or 12 feet long, which hoists a mainsail, and often sails in the manner of a native boat, and with considerable swiftness. . . . When a school of these are under sail together they are frequently mistaken for a fleet of native boats."

The long, slender Atlantic species, silver beneath and dark blue above, often bears light-blue bars or stripes on the sides. The tissue-thin sail, supported by soft rays several feet long, is deep blue and liberally spotted with dark- or light-blue dots, according to the mood of the fish. It can change colors rapidly.

Pelicans Dive-bomb Sailfish

Cousin to the marlin and the swordfish, the sailfish shares with these giants the long spear or bill used for defense and for hunting food. I have seen a sailfish caught with the broken bill of another sailfish projecting on either side as mute reminder of a watery duel.

How well the sailfish uses this weapon I discovered one calm winter day off Stuart, Florida, when we backed our boat into a school feeding on minnows. The sailfish circled slowly, sails half raised, herding their prey tighter and tighter. First one and then another broke from the circle and swam through the milling prey, thrashing right and left with their bills. Then the predators would submerge and lazily eat the dead and stunned minnows as they drifted down.

Hundreds of sea gulls clamored overhead. Diving pelicans tore raised sails to shreds in the excitement of feeding. One sailfish, evidently angered at a gull swooping low after a minnow, lunged and knocked the bird flapping into the water.

Leaning over the side, I could touch the sails of the big fish as they milled about the boat. An excited guide on another boat gaffed one of the fish. The resulting battle taught him new respect for his quarry. I learned that respect long ago when a leaping sailfish left a narrow scar across my chest.*

* For further information on the Atlantic sailfish, see "A Contribution to the Life History and Biology of the Sailfish, *Istiophorus americanus* Cuv. and Val. in Florida Waters," by Gilbert L. Voss, *Bulletin of Marine Science of the Gulf and Caribbean*, December, 1953. Bulletin obtainable from University of Miami.

"Have you ever found a baby sea serpent?" we are often asked. The answer is "No," but that does not mean that someday we may not startle the inquirer by saying "Yes."

In 1930 the famous Danish zoologist Anton Bruun, while examining net hauls aboard the research ship *Dana* off the west African coast, was amazed to find a leptocephalus more than 6 feet long! Most of these transparent larvae are but three or four inches in length.

If babies of this size grow into eels of 4 or 5 feet, mused Dr. Bruun, then his 6-foot leptocephalus could, on the same scale, grow into a deep-sea eel 100 feet long! And who, if he saw a 100-foot eel, would ever again doubt the existence of sea serpents?

We are not certain that this gigantic larva must necessarily grow into such a monstrous adult. But who knows? It may fall, paradoxically, to students of tiny larvae to expose the fabled monster.

Eyes That Grow on Stalks

Meanwhile, the creatures we study are fantastic enough. Take the baby fish known for years as *Stylophthalmus*, whose eyes project on stalks far from the body. Small wonder that for a long time nobody recognized it as the larval stage of deep-sea *Idiacanthus*. As this odd fish grows larger, the stalks shorten until finally the eyes settle in their sockets.

Nancy has recently reported on the murderous-looking snake mackerel, *Gempylus*, whose teeth rival the barracuda's. This seemingly rare fish is found only in a few larger museums, yet the larvae are common in the Florida Current (page 870). Perhaps the scarcity of adults is due to their deep-water habitat.

Nancy is also working on the surgeonfish, which carries a sharp spine on either side of the tail (page 866). Many an unwary fisherman knows what a nasty wound this creature can inflict.

Like the sailfish, the young surgeonfish bears no resemblance to the adult. The young have long toothed spines that are lost at full growth, but no lancets on the tail. This fish spends its larval life among the plankton. Drifting into shallow water over the reefs, it undergoes an abrupt change, taking on the adult's appearance in miniature. As with the butterfly emerging from the pupa, this dramatic metamorphosis may be crowded into a few momentous hours.

The bonefish, highly prized in Florida waters because of its lightning bursts of speed when hooked, shows another amazing growth cycle. The hatchling, only a fraction of an inch long, swiftly develops into a leptocephalus differing from the eel variety only in its forked tail. In this stage the bonefish gradually attains a length of about three inches while drifting in the open ocean.

Bonefish Shrinks to Adult Form

Then growth stops. Instead of becoming larger or changing its form at this size, the larva begins to shrink, the body becomes more rounded, and adult fins begin to appear.

The fish continues to shrink until it is no more than an inch long; finally it takes on all appearances of a bonefish. With metamorphosis complete, growth begins again. After several weeks the little bonefish, now in adult form, regains its former size.

Amazing as this story is, we believe the same may be true of another prized game fish, the silver tarpon.

The little jacks I am now studying drift awhile among the plankton, then collect beneath floating clumps of sargassum weed, taking on the protective coloration of its leaves (pages 865, 867). With added growth they forsake the weed and swim to coastal waters.

While the jacks are today not considered an important food or game fish, it should be pointed out that in the last decade a dozen commercial fisheries have been based on marine life formerly unknown or considered worthless—for example, the ocean perch of New England and the surf clam of the middle Atlantic coast.

Grown Fish Stumps Larval Experts

Paradoxically, the people on our life-history project, who sort the tiny larvae under high-powered microscopes into the 87 families now in our collection, may be stumped completely by a grown-up fish.

A boy speared a four-and-a-half-foot fish in the Fort Lauderdale surf—a bluish-silver creature with thin body and narrow tapering tail—and a taxidermist sent it to us for identification.

We pored over papers and books for hours trying to track down its identity. Finally, to our chagrin, we discovered that it was a trachypterid, related to the king of the herrings—a member of a family we had long been familiar with in the larval stage!



CYPRUS

GEOGRAPHY'S STEPCHILD

by Franc Shor

"NATURE has been good to you here," I said to my Cypriote friend as we sipped thick coffee in a cafe above Kyrenia's blue harbor. "You have magnificent scenery, fine climate, fertile soil—everything you need to live well."

"True," he answered, looking across the Mediterranean toward the mountains of Turkey, hazy on the skyline, "but you overlook one thing. The very location which makes it all possible has kept us under foreign rule for some 3,000 years. We're strategically too important for our own good!"

I couldn't argue. The first mention of Cyprus in written history records its domination by the Egyptians about 1500 B. C. Then came the Assyrians, Persians, and Greeks. The Romans ruled for 450 years; then the island became part of the Byzantine Empire.

Richard the Lionheart of England seized Cyprus in the 12th century, followed by the Lusignan kings of French Crusader descent, who lost it to Venice. In 1571 Venetian rule yielded to the Turks. The British returned in the last century and remain today. Someone, it seems, always wants Cyprus.

Key Role from Bronze Age to Jet Age

Not even changing fashions in warfare have diminished the island's strategic importance. In the age of bronze weapons Cyprus was a prime source of copper, the "Cyprian metal" whose very name derives from that of the island. Cyprus furnished ships that sailed under Xerxes against the Greeks. Steam-driven warships used it as a coaling station. Today jet bombers stand wing to wing upon its airstrips, only a few minutes' flight from danger spots in the seething Near East.

Yet to think of the island solely in military terms is to misconstrue one of the most beautiful places in the Mediterranean. Third largest island in that sea, after Sicily and Sardinia, Cyprus stretches 140 scenic miles from east to west and 60 miles across its plump midriff.

The coastal cities of Famagusta, Larnaca, Limassol, and Kyrenia hold the beauty that is never absent from weathered stone, bright ships, and blue water. Tree-clad mountains rising above 6,000 feet offer pine-scented relief from the summer heat of the central plain. And everywhere, on my several visits in recent years, I found the openhearted friendliness and generosity of the Cypriote people.*

Four out of five of the half-million islanders are Greek in language, culture, and religion, the balance mainly Turkish. Marked differences show between these two groups, for no attempt has been made to change the language or customs of either.

The Turkish-speaking minority, I found, had its own quarters in the larger cities, but in the countryside Greeks and Turks farmed side by side, frequently lending one another a hand or a tool during busy seasons. Until the unfortunate clashes of early 1956, Greeks

* See "Cyprus, Idyllic Island in a Troubled Sea," by Jean and Franc Shor, NATIONAL GEOGRAPHIC MAGAZINE, May, 1952.



and Turks for the most part lived separate but amicable existences. They joined in each other's celebrations. Intermarriage, while not common, was not unheard of.

To the visitor there was little evidence of foreign control. On my last visit a Turkish Cypriote examined my bags at customs, a Greek Cypriote issued my temporary driving permit. Greek and Turkish policemen directed traffic in the tangled streets of Nicosia, the capital, waving sports cars, oxcarts, bicycles, and donkeys on with grave impartiality (pages 877, 879). The only Englishmen with whom I had official contact during my three-month stay were the director of the tourist office and the Governor himself.

Cyprus was turned over to British administration by the Turks under the Anglo-Turkish convention of 1878. In return, Britain guaranteed the Sultan's Asiatic possessions against Russian encroachment. The island became a crown colony in 1925.

News Spotlight Swings to Cyprus

Recent agitation among the more than 400,000 Greek Cypriotes for *Enosis*, or union with Greece, has changed the island's whole pattern of life and caused loud reverberations in the capitals of Britain, Greece, and Turkey, all members of the North Atlantic Treaty Organization.

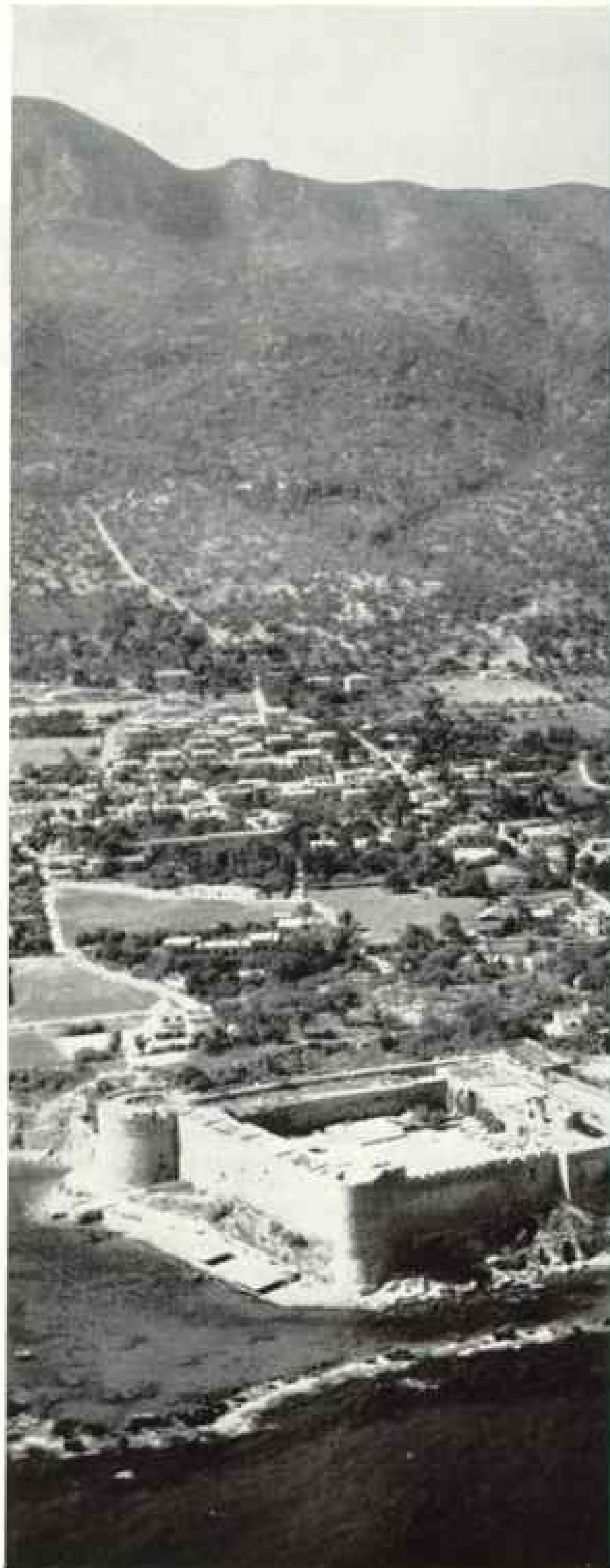
For months Cyprus has been an armed camp, with more than 20,000 British soldiers struggling to keep order. Trucks and Land Rovers roar over roads accustomed to bicycles and donkeys. Sentries patrol behind barbed wire as violence stalks the island.

The persistence of loyalty to Greece is remarkable when you consider that, unless one regards the Byzantine Empire as Greek, Cyprus has had no common sovereignty with that nation for 2,300 years. Yet Greek is the principal language of the island, four-fifths of the schools teach in that tongue, and the influence of the Greek Orthodox Church is felt in every village.

Leaders of the Turkish minority object vehemently to union with Greece. If any change is made in the status quo, they insist, the island should revert to Turkey, which ruled it for 300 years before Britain. The Turkish coast, they point out, is 45 miles away, the Greek mainland 500 miles.

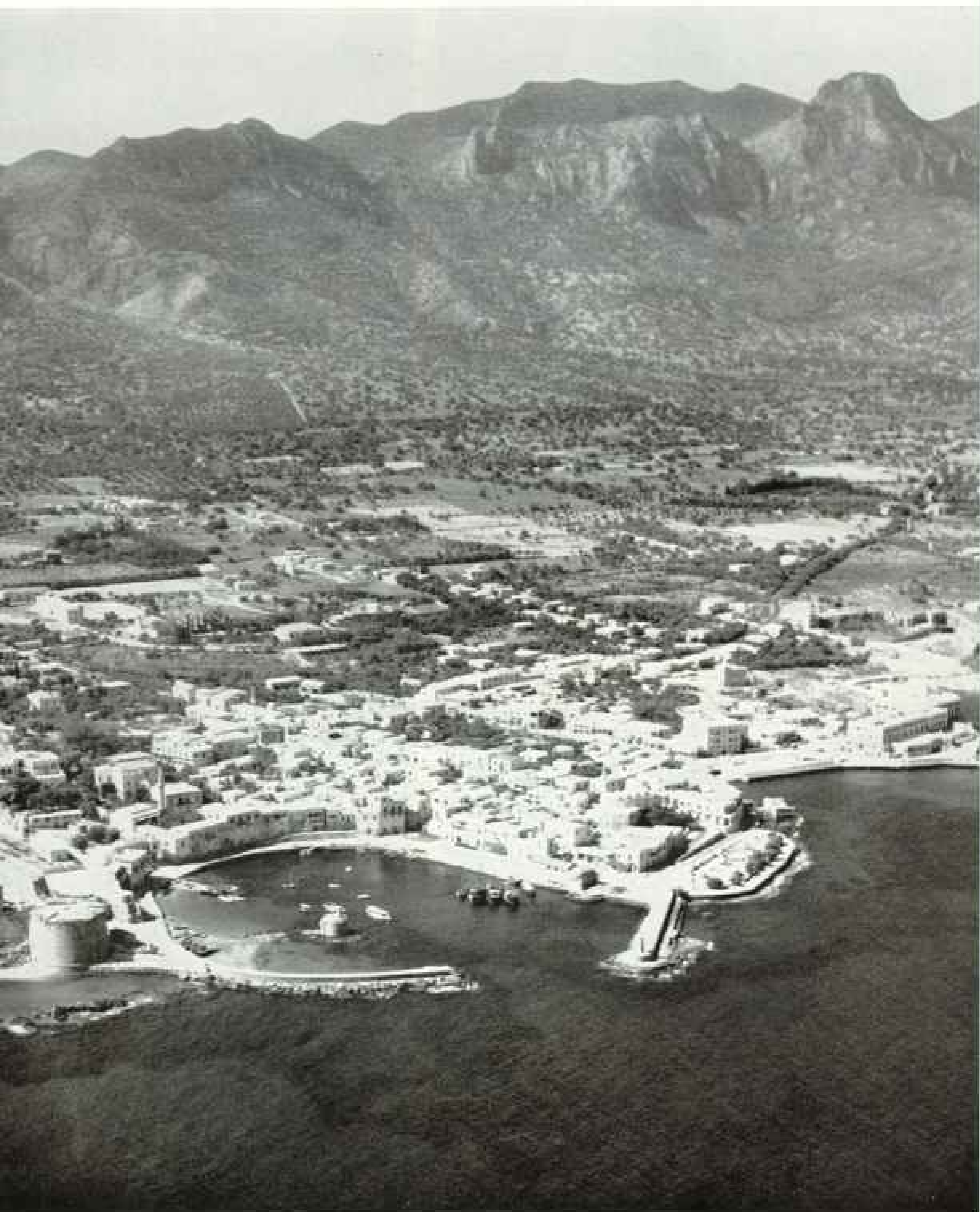
In the halcyon days before the present troubles began, tourism provided an important supplement to the island's primarily agricultural economy. Lying in the northeastern

(Continued on page 878)



On Troubled Cyprus . . .

World attention has focused this year on Cyprus, headquarters for Britain's forces in the Near East. Greek Cypriotes, in conflict with the British as well as with Turkish Cypriotes, demand union with Greece.



. . . A Crusaders' Castle Broods over the Horseshoe Harbor of Kyrenia

Cyprus, lovely Mediterranean jewel, has long been a popular vacation resort, but now visitors are few. Riots and bombings have turned the island into an armed camp and kept it in turmoil for many months. British sentries mount watch on castle walls once patrolled by armored knights. The massive stronghold, often besieged in medieval times, never was taken by storm. Kyrenia Mountains overshadow the port.

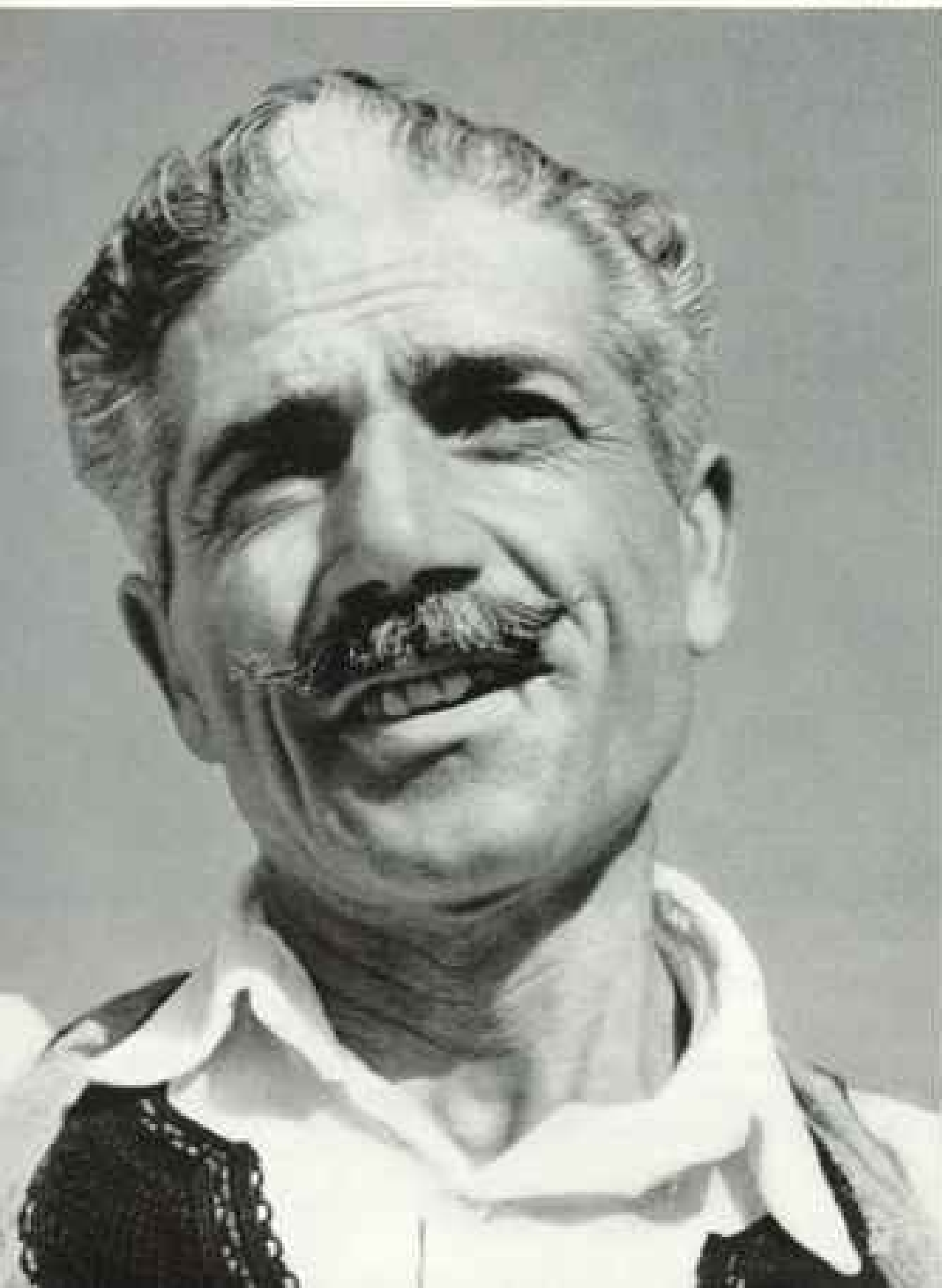


↑ **Eternal Beauty of the Classic Greek Shows in the Face of This Modern Maid**

Parthena Anastasi erects a frame on which to dry *zou-joukko*, a candy for which her village is famed (page 884).

↓ Demetris Georghiou, another Greek Cypriote, gives his hand to farming and his heart to folk dancing. He dons native costume to entertain American visitors at Limassol.

R. O. Wilcox



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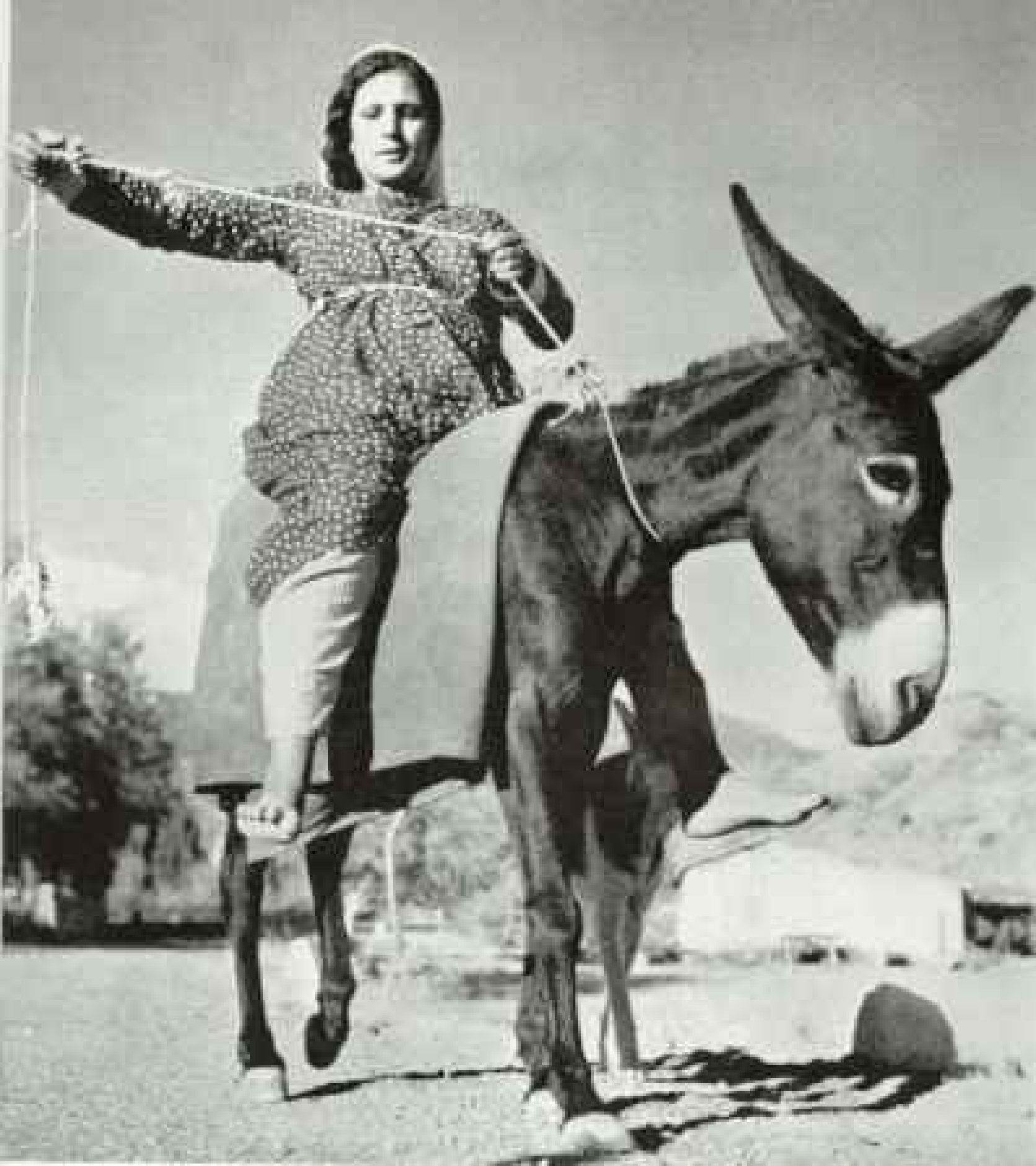
Busy Metaxas Square . . .

Cyclists in Nicosia dodge motorists; pedestrians defy both. Business establishments advertise their wares in three languages—Greek, Turkish, and English.



. . . Saw Street Riots This Spring Between Greek and Turkish Cypriotes

Cyprus, 500 miles from mainland Greece but only 45 from Turkey, has been a stepchild of geography for some 3,000 years. Nearly a dozen nations, including Greece and Turkey, have ruled the island. Turkey transferred control to Great Britain 78 years ago. Following the recent disorders, British soldiers clamped a curfew on Nicosia and barricaded the city entrances. Here pushcarts sell oranges and yoghurt in the capital.



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H. O. Wideman

↑ Gypsy Girl in Turkish Pajamas Rides a Cyprus Mile

To the Cypriote, a mile is the distance a donkey can travel in an hour. Moving from village to village, Charita Hassan knows such measure well. She makes her living telling fortunes and selling homemade kitchenwares.

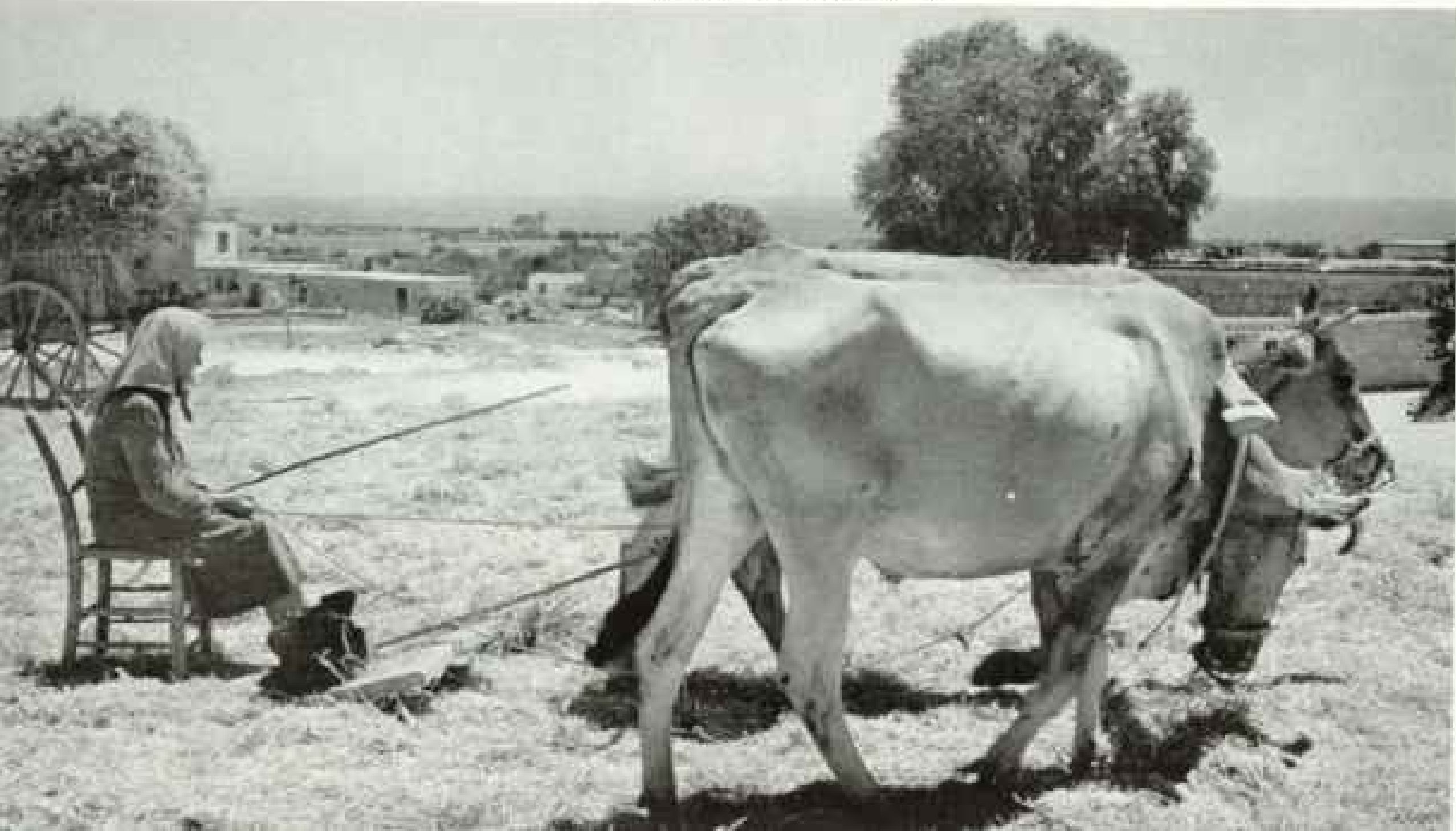
↓ Most landholders still farm with implements their ancestors used. Here grain is threshed on a stone floor. The rider's weight forces the sledlike threshing chair against the grain. Chips of flint on the bottom knock loose the kernels. Later the grain is winnowed in the wind.

Fraser Hunt, National Geographic Staff

corner of the Mediterranean, the 3,572-square-mile island is only an overnight journey by boat from Syria, or a few hours by air from Egypt, Israel, and Lebanon (map, page 873). Comfortable beachside hotels and rustic mountain inns offer welcome relief in the sweltering Near East summer. And the island is rich in historic interest.

Although today's strife makes ironic its ancient title, "Island of Love," Cyprus is the traditional birthplace of Aphrodite. On wave-dashed rocks surrounded by deep-blue pools near Paphos, in the southwest, the Goddess of Love first came to earth, legend says, borne upon a crest of foam.

Not far from that pagan shrine a marble pillar is pointed out as the place where St. Paul was tied and lashed for preaching Christianity. There the missionary converted the Roman proconsul, Sergius Paulus, thus making Cyprus the first land to have a Christian governor.





Greek Orthodox Priest Strolls the Main Street in Nicosia; Minarets Fly Turkish Flags

Eighty percent of the 517,000 Cypriotes are Greek in heritage, language, and religion; nearly all the rest are Moslems of Turkish descent. In the city's old quarter, glass-fronted shops compete with canvas-covered stalls.



Ruins of the castle of St. Hilarion tower above the seaport of Kyrenia like a fairy tale in stone. Visitors also enjoy near-by Bellapais Abbey, fine early Christian murals in tiny mountain churches, and the delicate 14th-century Gothic façade of St. Nicholas Cathedral, now a mosque, in Famagusta.

But to me the real charm of Cyprus lay in the beauty of its sun-drenched countryside and the hospitality of its people. Tiny white-washed farmhouses, set into the rocky hillsides, were opened to anyone who knocked on their faded blue doors, and the visitor was offered preserved fruit and a homemade cordial. No Cypriote was ever too busy to welcome a guest.

I stopped one day to photograph a strapping Greek Cypriote herding his fat-tailed sheep in the shade of an olive grove. Politely he suggested that we walk to his home, a mile away, for a glass of wine. When I explained that I didn't have the time, he unslung his goatskin water bag from a tree branch, carefully wiped the mouthpiece with a calloused

hand, and insisted that I drink. "It is not fitting for a guest to leave my land without refreshment," he said with a smile.

That same afternoon, in a mountain village, a Turkish orchard owner found me photographing his children as they picked lemons. He invited me in for fruit juice and sweet cakes, saying something to the children in Turkish as we entered the house. When I emerged, I found the back of my car loaded with oranges, lemons, and grapefruit.

"But you must take a little something with you," was his answer to my protests.

Visiting the remote village of Lefkara, renowned through the centuries for its lace, I found girls of 8 and women of 80 sitting side by side in blue-walled courtyards, chattering happily as their fingers worked nimbly.

The women of Lefkara make the lace, but their menfolk sell it, and I found them hard bargainers. But when dusk fell and I hesitated to drive the twisting roads at dark, the president of the Lacemakers' Association invited me to spend the night. And in the



881

↑ Famagusta's Old Wall
Overlooks the Best
Harbor in Cyprus

During the Crusades this deepwater port swarmed with knights bound for the Holy Land. When Acre fell to the Saracens in 1291, wealthy Christian refugees settled here. Famagusta became the "Emporium of the East," busiest port in the eastern Mediterranean.

Later, earthquakes and wars left the town desolate. In the 1860's Famagusta building stones were carried off for the Suez Canal.

The medieval city walls (foreground) still stand 50 feet high and 27 feet thick in places. Today they enclose only the Turkish quarter of a much larger modern city.

→ Two British girls ready the *Galway Bay*, a Firefly-class sloop, for a regatta in Larnaca Bay.

R. G. Wilton





⬆ Steep and Tortuous Lanes Link Tiers of Stone Houses in Timeless Palekhori

➔ Page 883, upper: Some 6,000 years ago a people armed only with stone and bone wrested a living from the soil along Cyprus's rim. Like their Mediterranean neighbors, they sought to promote good harvest by worshiping figurines of the mother goddess and other symbols of fertility. This soapstone idol probably inspired such rites. The necklace bears a pendant reproducing the idol in miniature.

Lower: In the Bronze Age, copper-rich Cyprus developed a distinctive civilization. This terra-cotta model of a temple scene, buried about 2100 B.C. in a tomb near Kyrenia, depicts a ritual for the dead. Bulls, symbolizing the god of fertility, await ceremonial slaughter near the entrance. Woman cradling baby at left suggests infant sacrifice. Long-necked congregation watches. A figure outside (foreground) attempts to climb the wall, indicating that the ceremony was open only to initiates. The famous model is preserved in the Cyprus Museum in Nicosia.

morning, when I left, he tried to give me a lace-edged cloth I had passed over the day before as too expensive. It took me half an hour to persuade him I couldn't accept it.

Most Cyprus farmers own their own land. Statistics show that the 60,540 holdings on the island are owned by 60,464 individuals. An attempt has been made to introduce modern methods and improved crops, but many Cypriotes cling to old customs (page 878). Village life goes on much as it has for centuries. Farm women spin and weave the woolen cloth for family garments. Girls raise silkworms with wedding dress and hope chest in mind.

I have walked beside a man guiding a single-blade plow drawn by an ox and had my conversation drowned out by jet fighters screaming overhead.

I was photographing a family winnowing their grain harvest by tossing it into a desultory breeze when a helicopter flew low across a near-by field.

"Tell him to come over here," laughed the father. "We can use some of that wind."

Much of the island produce is consumed at home, but citrus fruits, wine, vegetables, grain, and carobs (locust bean pods used as fodder) are exported in important quantities. And the American-operated Mavrovouni Mine ships some 600,000 tons of copper





Greeks and Turks, Neighbors All, Banter and Bargain at a Country Fair

Until the recent strife, Cypriotes paid little heed to national origins. Greek and Turkish farmers tilled land side by side and gathered at the same markets for pleasure as well as profit.

Here countrymen haggle over a basket of soujoukko, a stick candy made by repeatedly dipping strings of nuts in warm grape juice. Men wear the pantaloons and boots of rural Cyprus.

every year from veins first mined about 3,000 years ago.

One of the Island's leading sources of income today, however, stems from the strategic position of which my friend complained. When Britain yielded her Suez Canal base to Egypt, she moved the headquarters of her Middle East Command to Cyprus.

A \$200,000,000 construction program—airfields, administrative headquarters, housing for troops and their families—is under way. In addition, more than \$30,000,000 a year is reported spent for and by the island's troops.

Apart from the current military boom, the British point to improved living conditions during their 78 years of rule. Modern houses

of tile and glass brick rise in the shadow of ancient city walls. Malaria, once the scourge of the island, has been wiped out. Denuded mountain areas have been reforested. An excellent system of highways, with 760 miles hard-surfaced, has been built. Enrollment in Greek and Turkish schools in 1955 had climbed to more than 85,000.

And Britain holds that her military obligations in the Near East cannot be met without "assured . . . unfettered use" of Cyprus.

Thus today, as for 3,000 years, geography subordinates the destiny of Cyprus to the demands of strategy. And the Island of Love continues to play a vital role in the grim business of defense.

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In addition to the editorial and photographic surveys constantly being made, The Society has sponsored more than 100 scientific expeditions, some of which required years of field work to achieve their objectives.

The Society's notable expeditions have pushed back the historic horizons of the southwestern United States to a period nearly eight centuries before Columbus. By dating the ruins of vast communal dwellings in that region, The Society's resources solved puzzles that had puzzled historians for 300 years.

In Mexico, The Society and the Smithsonian Institution, January 16, 1949, discovered the oldest dated work of man in the Americas. This stone is engraved, in Mayan characters, November 4, 201 a. c. (Spinden Correlation). It antedates by 200 years anything else dated in America and reveals a great center of early American culture, previously unknown.

On November 11, 1935, the stratosphere flight of the world's largest balloon, *Explorer II*, sponsored by The Society and the

U. S. Army Air Corps, reached a world-record altitude of 72,396 feet. Capt. Albert W. Stevens and Orvil A. Anderson took aloft a ton of scientific instruments and obtained results of extraordinary value.

A notable undertaking in astronomy was launched in 1949 by The Society and Palomar Observatory of the California Institute of Technology. This project photomapped vast areas of stars, making available to observatories all over the world, at less than cost, the most extensive sky atlas yet achieved.

In 1948 The Society sent seven expeditions to study the sun's rays on a 3,320-mile arc from Burma to the Aleutians.

A Greek cargo ship sunk in the Mediterranean 2,200 years ago was found in 1952 and is being excavated by the National Geographic Society-Cyprus Marine Archaeological Expedition led by Capt. J.-Y. Cousteau of the French Navy.

The National Geographic Society and the Royal Ontario Museum in 1951 explored and measured newly found Chubb meteor crater, 11,500 feet in diameter, in northern Quebec.

The Society and individual members contributed \$100,000 to help preserve for the American people the finest of California's sequoias, the Giant Forest in Sequoia National Park.

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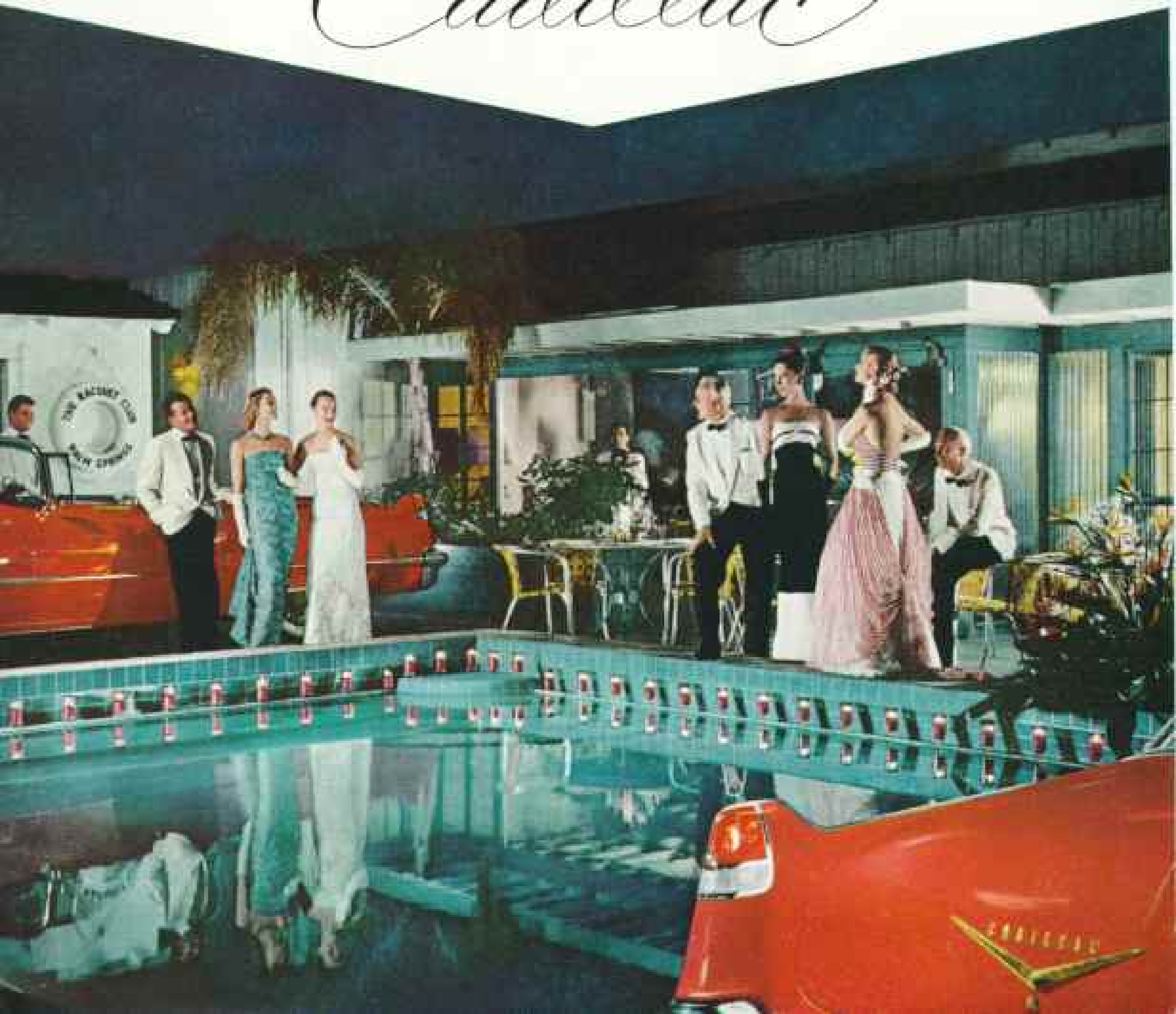
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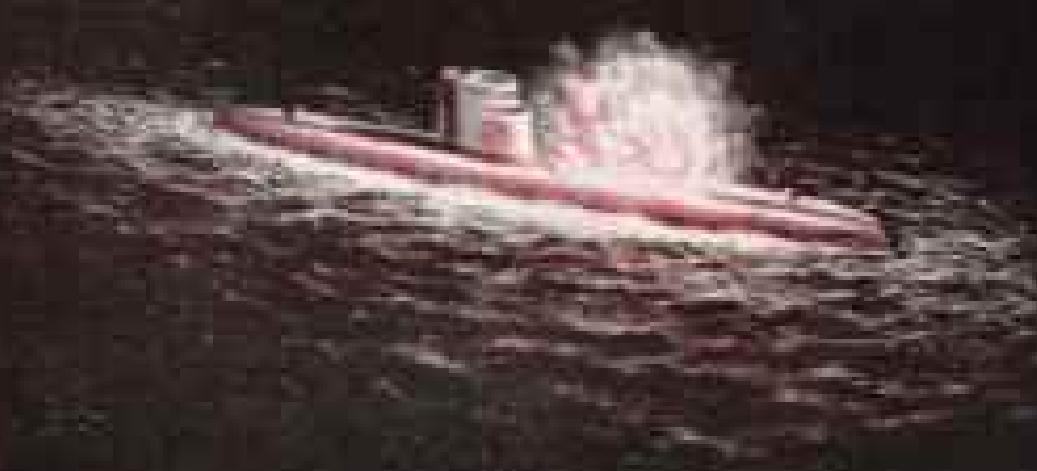


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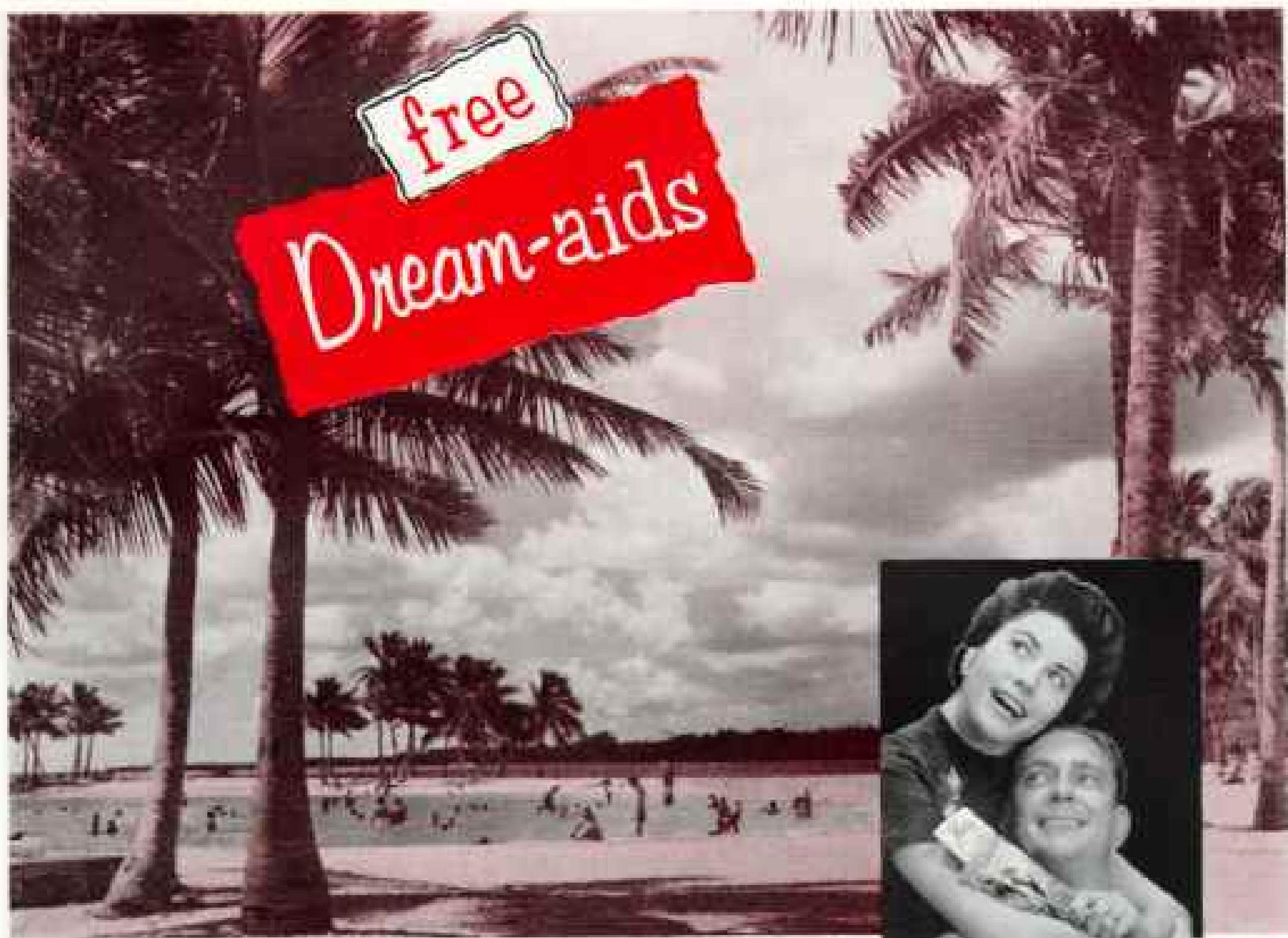


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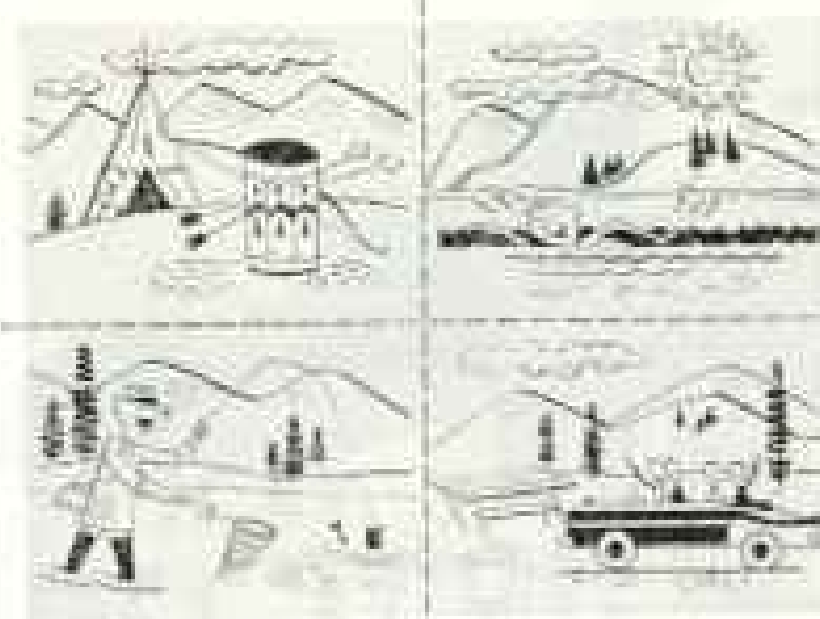
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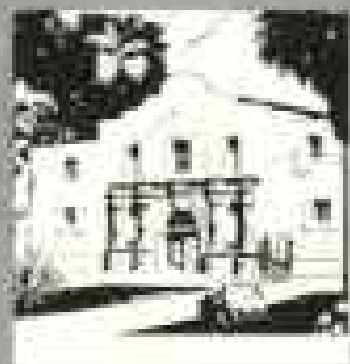
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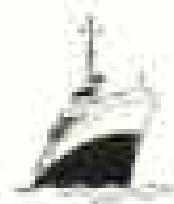
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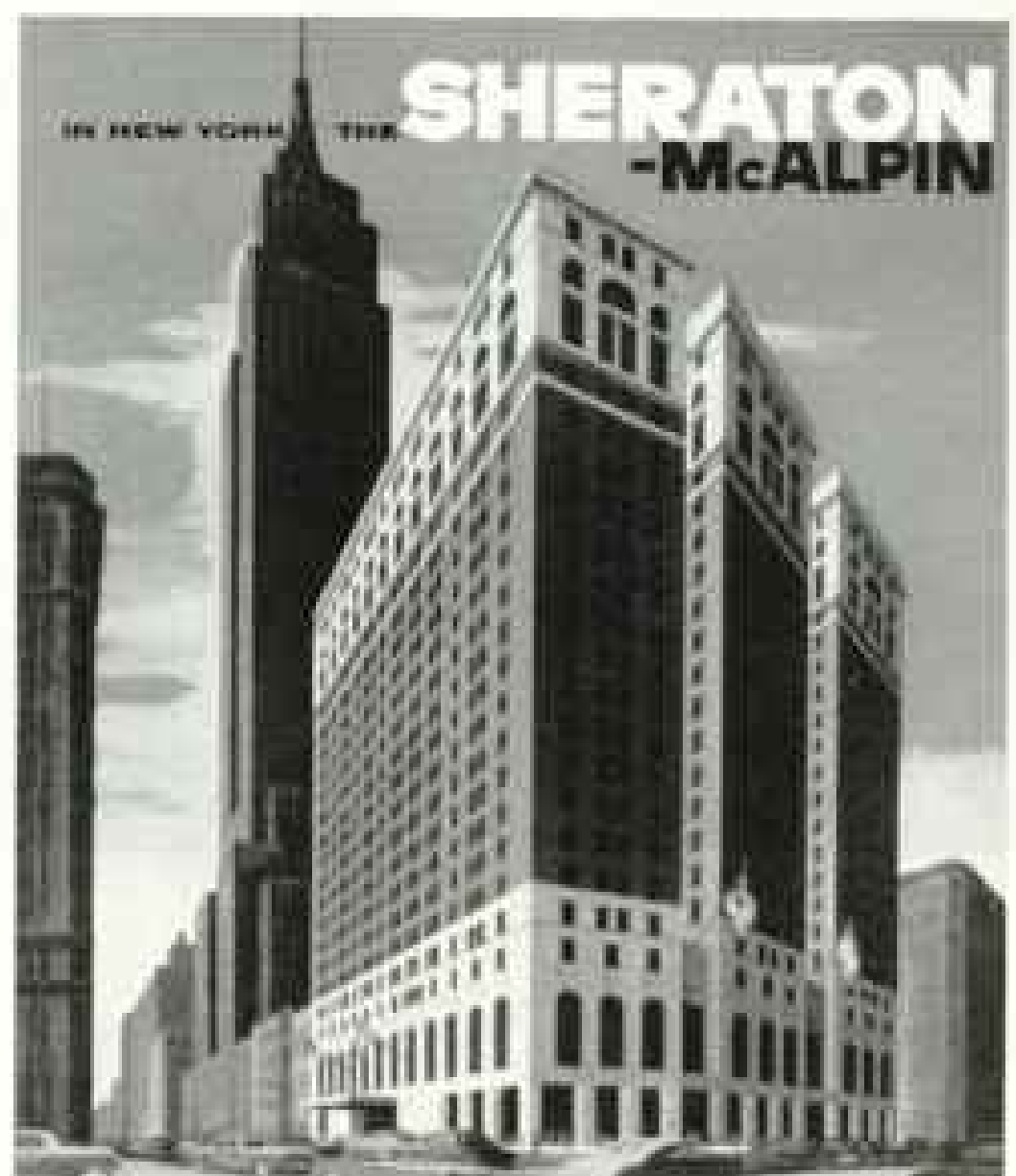
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✓ **2. Check yourself**—Research has shown that about 1 out of 14 drivers involved in fatal accidents had a physical or mental condition—such as worry, fatigue and sleepiness—that was a contributing factor in the accident. So, never drive when you're upset or tired.

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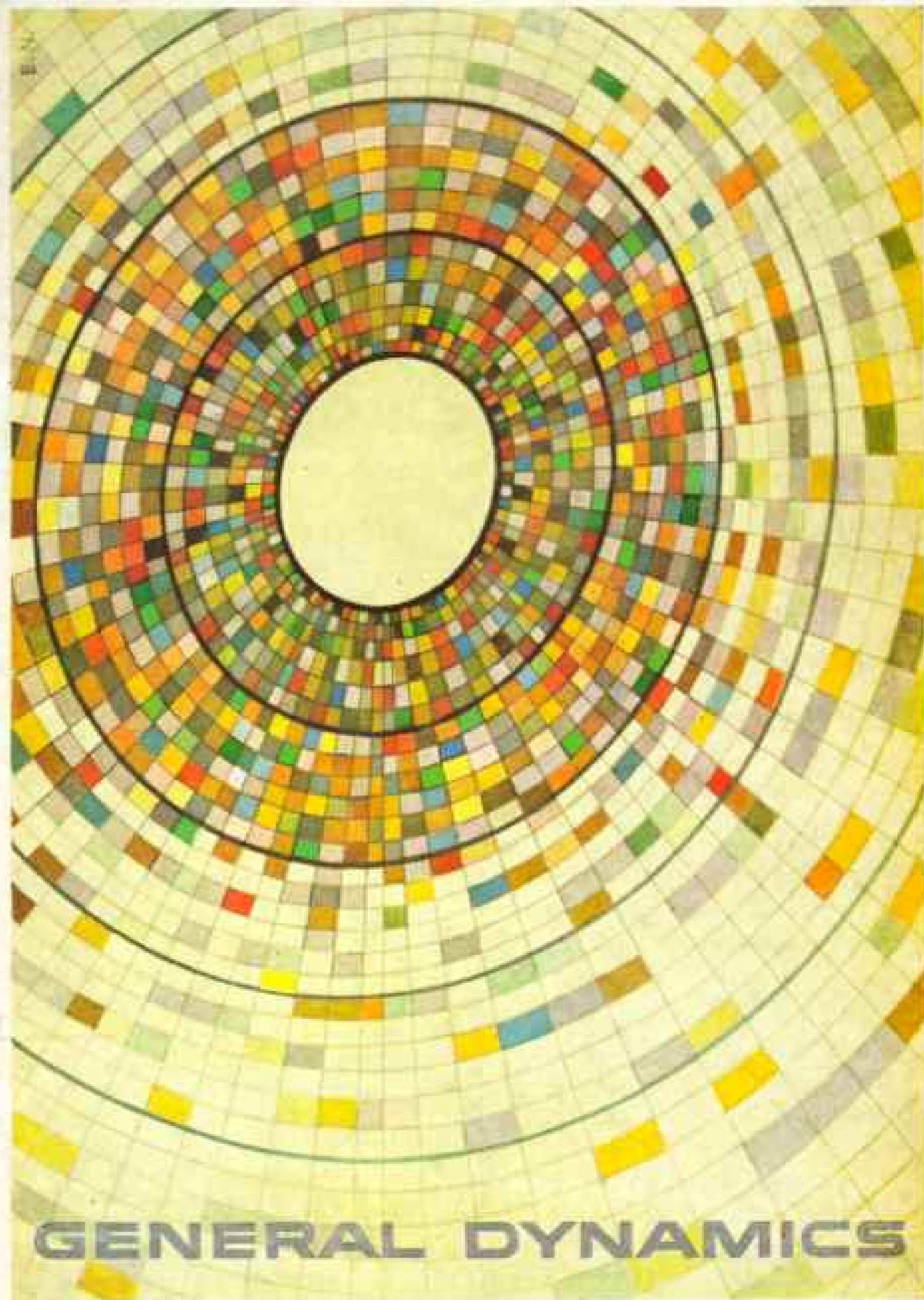
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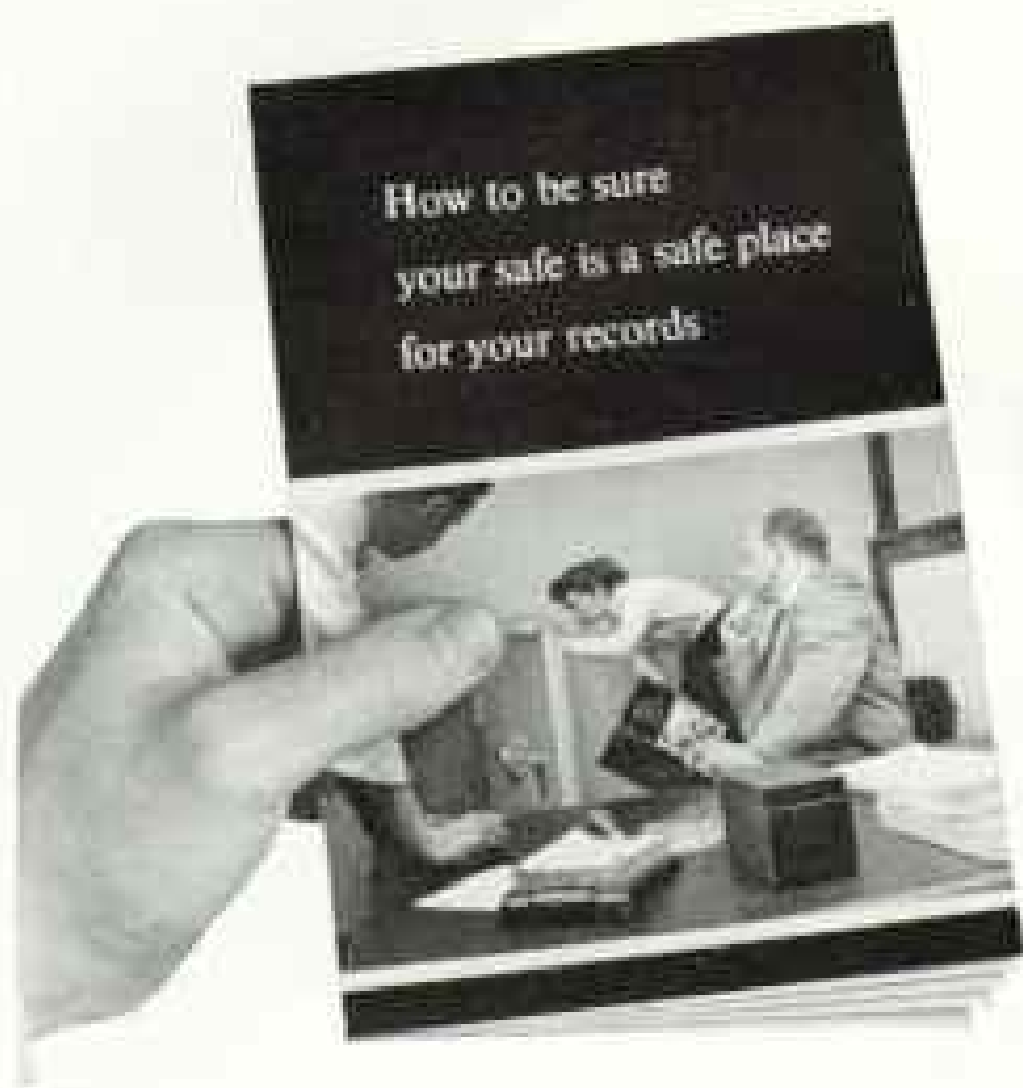
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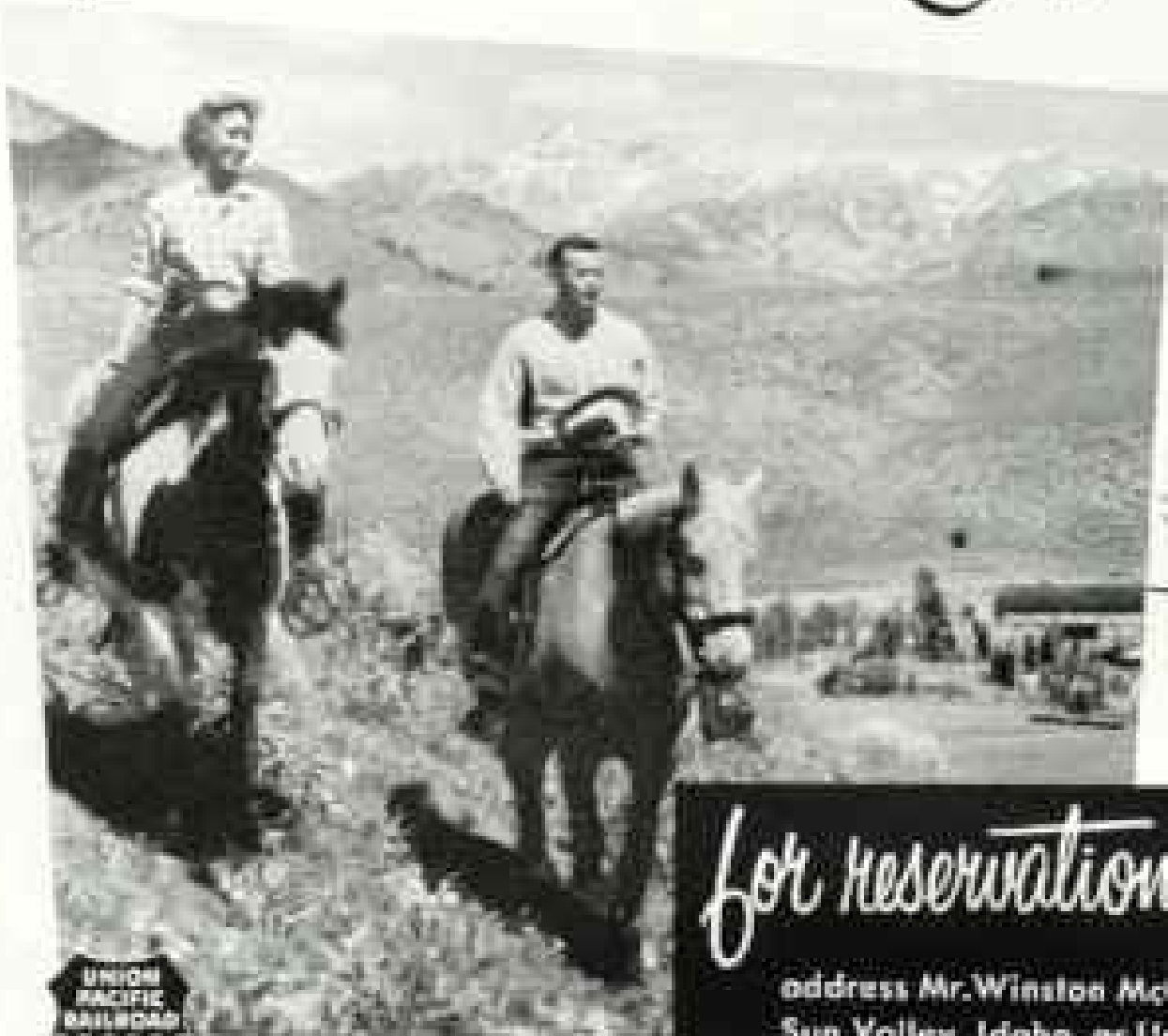
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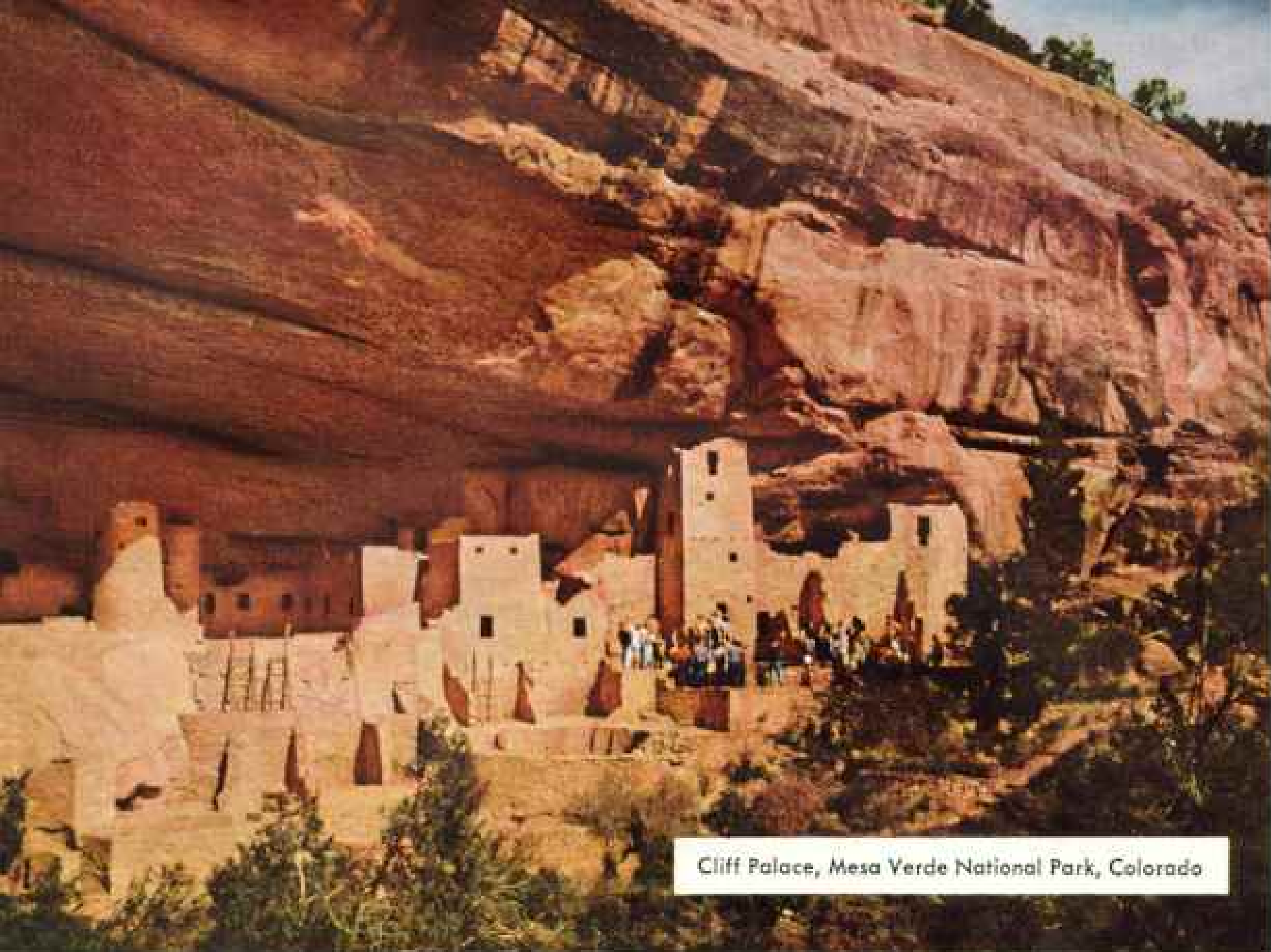
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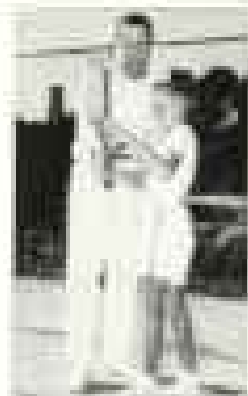
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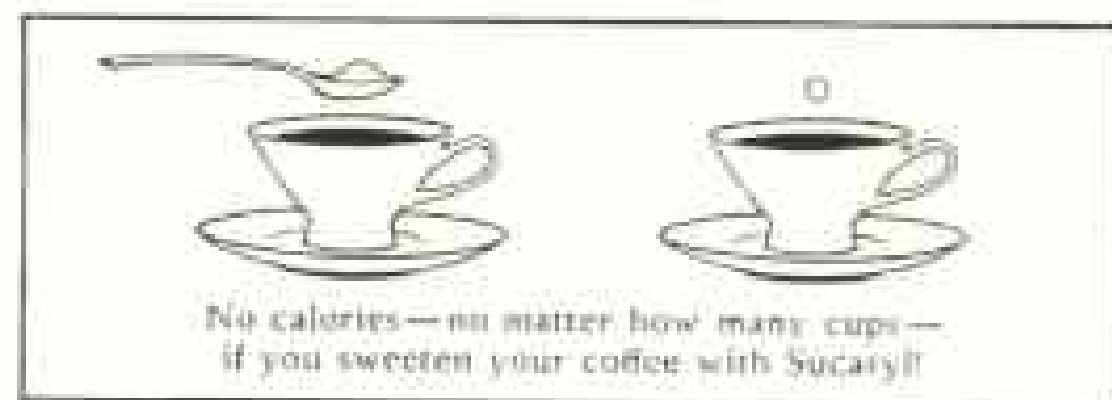
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