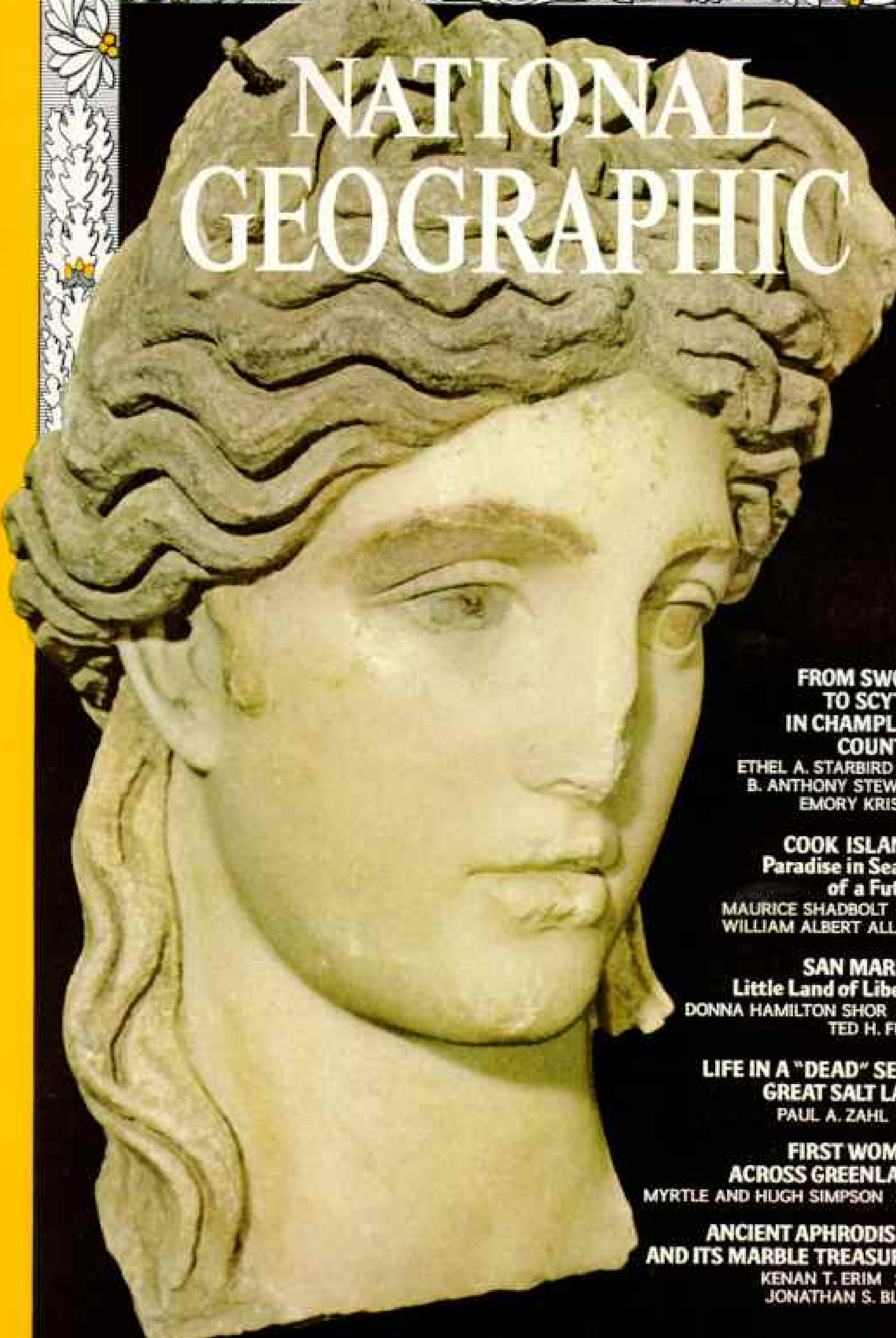


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NATIONAL GEOGRAPHIC



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A GAPING SWORD CUT slashes the land—the lush, lake-filled valley of Champlain country. For more than 200 turbulent years this was a valley of decision, and many a sword and tomahawk flashed here in bitter battle.

To control Lake Champlain was to hold sway over the water route between Montreal and New York City (maps, pages 158-9). Battles here helped determine the fate of our Nation, perhaps the fate of all North America.

When Samuel de Champlain in 1609 slew three chiefs of the Iroquois beside the lake that bears his name, that fateful blast from his arquebus turned the powerful Five Nations against the French. The Iroquois never forgot an injury, and 150 years later they helped the British win the French and Indian War, which ended forever France's hope of dominating the continent.

When a Continental Army defeated the British at Saratoga in 1777, the victory convinced the French that the Americans had a chance to win and brought France actively into the war. Without such help, the American Revolution could have ended in disaster rather than in triumph and independence.

By Slow Boat to Lake Champlain

Long a corridor of conflict, this is a peaceful valley now, shared by New York State and Vermont. A more beautiful part of the world would be hard to find. In verdant summer, painted autumn, and increasingly in glittering winter, thousands come to its lakes, streams, and mountains, its ski slopes, and its brooding scenes of battles long ago.

Champlain country is my country, though my work in recent years has limited my time there to brief visits. Now I was coming home once more, this time traveling the final miles by boat for a leisurely look at my native land.

"Low bridge! Stand clear below," Capt. Wally Waxin warned as we floated down the main street of Whitehall, New York (pages 156-7). From the foredeck I watched his wheelhouse sink in its elevator shaft to avoid the oncoming span, then surface again on the other side. Along the Champlain Canal, a man-made waterway connecting the south-flowing Hudson River with north-flowing Lake Champlain, bridges don't budge. So tugs like the *Sheila Moran*, which I had ridden from Troy as a guest of the Moran Towing & Transportation Company, are rigged to duck beneath them.

Wally threaded 300 feet of tandem boat and oil barge into the needle's eye of Lock



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From Sword to Scythe in Champlain Country

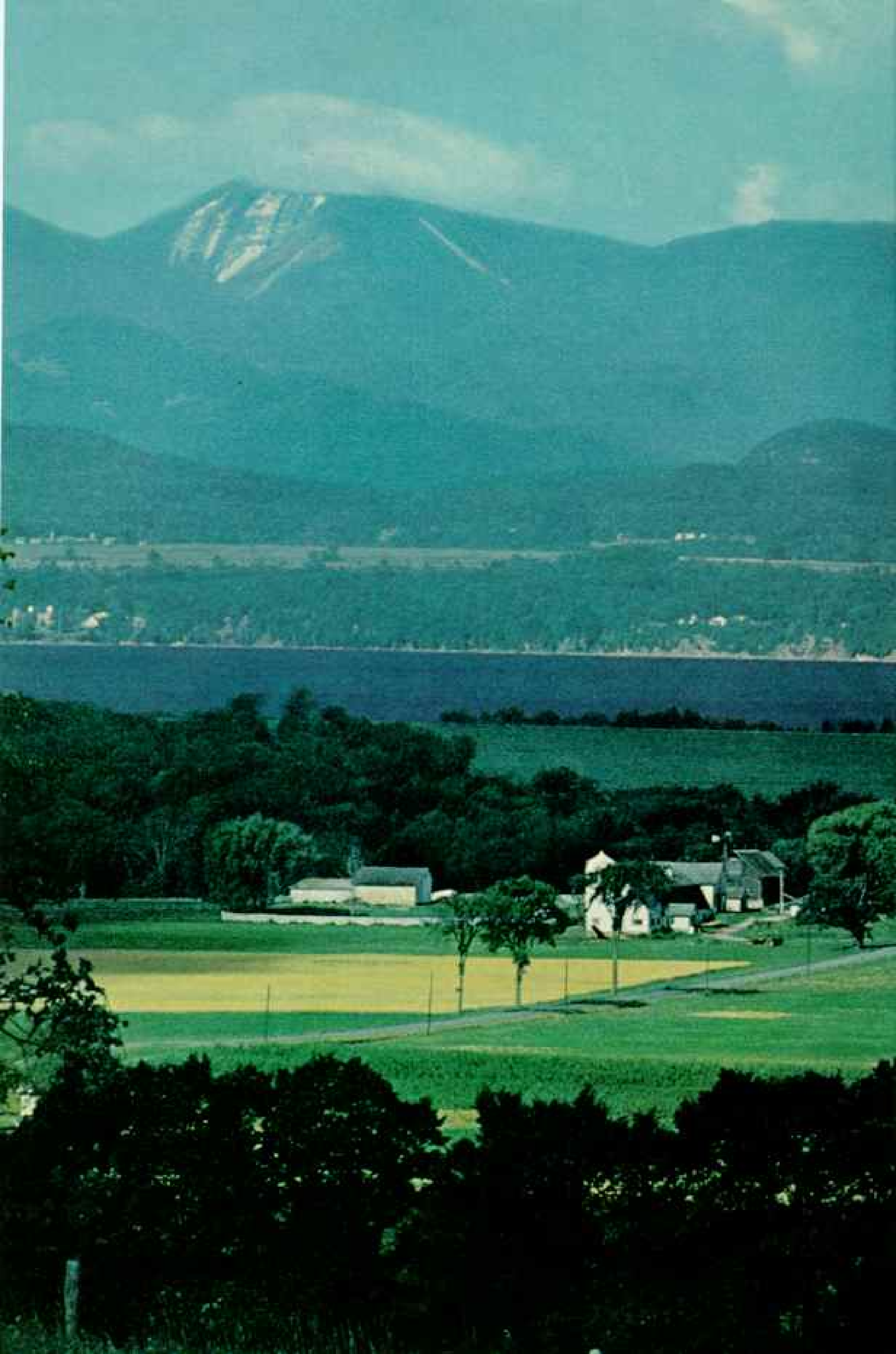
By ETHEL A. STARBIRD

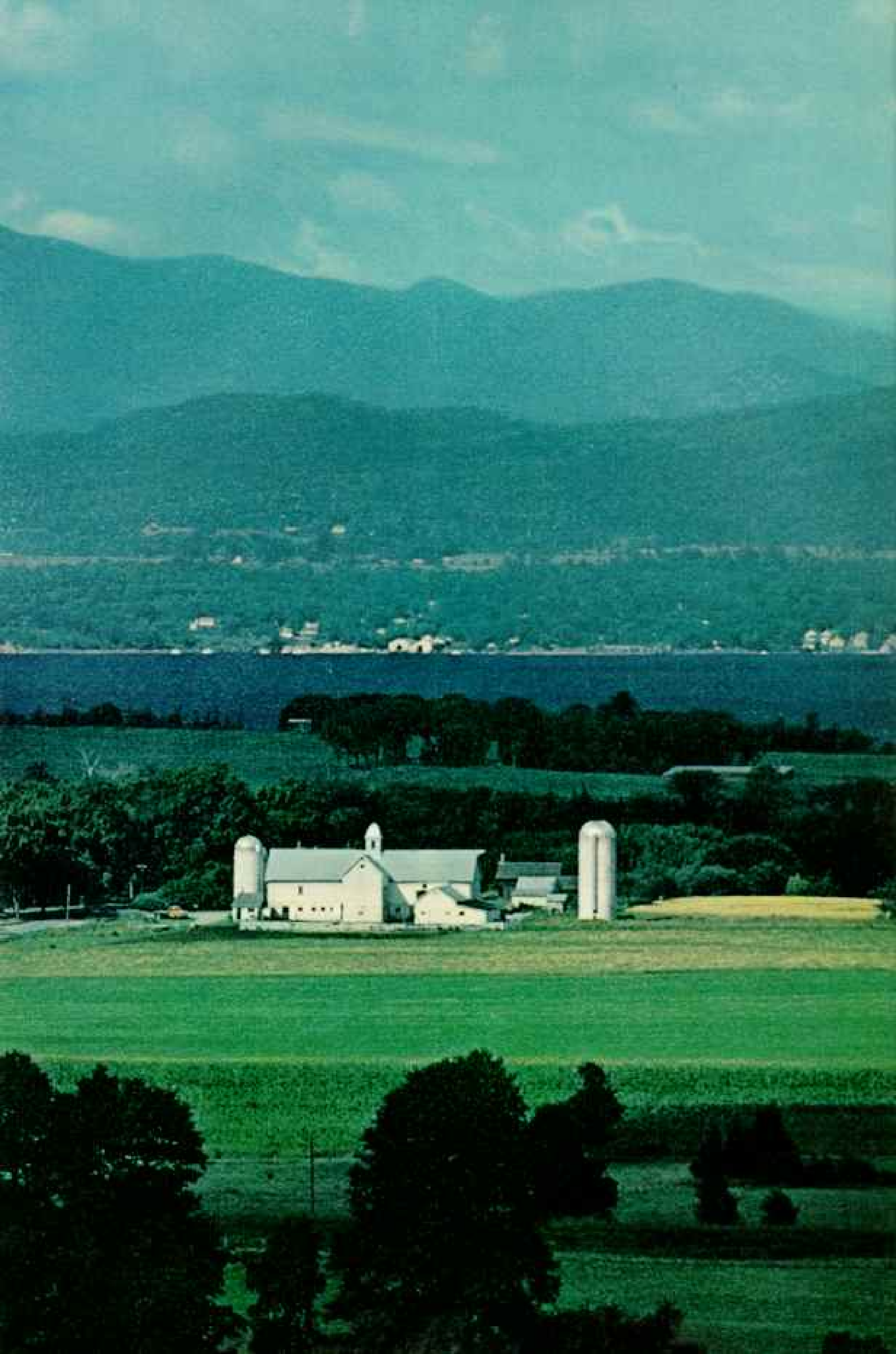
Photographs by
B. ANTHONY STEWART
and EMORY KRISTOF

All National Geographic Staff

Tranquil lies the land that in colonial days heard the withering fire of Frenchmen and Indians, Britons and Americans. Camera's long lens telescopes the five miles between hillside farms near Charlotte, Vermont, and the western shore of Lake Champlain. Rock-scarred Giant Mountain, 4,622 feet high, pushes skyward amid other peaks in New York's cloud-capped Adirondacks. This summer visitors in record numbers, en route to Montreal's Expo 67, motor through the region, sampling its pastoral beauty and the hospitality of its people, and paying homage at its historic shrines.

FOODCHORE BY B. ANTHONY STEWART © N.G.S.





Lights shine on through a rain-washed dawn at Whitehall, New York, where Champlain Canal empties into the lake. Day and night during ice-free months, oil barges and pleasure craft by the hundreds pass through Lock No. 12, beside the cascade of a dam. Boatmen on regular runs pick up their mail from boxes beneath the bridge.

Firing a shot that echoed for centuries, French explorer Samuel de Champlain aims an arquebus charged with lead balls at Iroquois warriors, killing three chiefs with a single blast. The bloody meeting took place near Ticonderoga in 1609, shortly after Champlain discovered the lake to which he gave his name. He accompanies a war party of Algonquians—hereditary enemies of the Iroquois, who consequently sided with the British and fought for them through 150 years of conflict with the French and their Algonquian allies.



No. 12, last in a stile-like series that had lifted us out of the Hudson in the night and dropped us on the very doorstep of Lake Champlain.

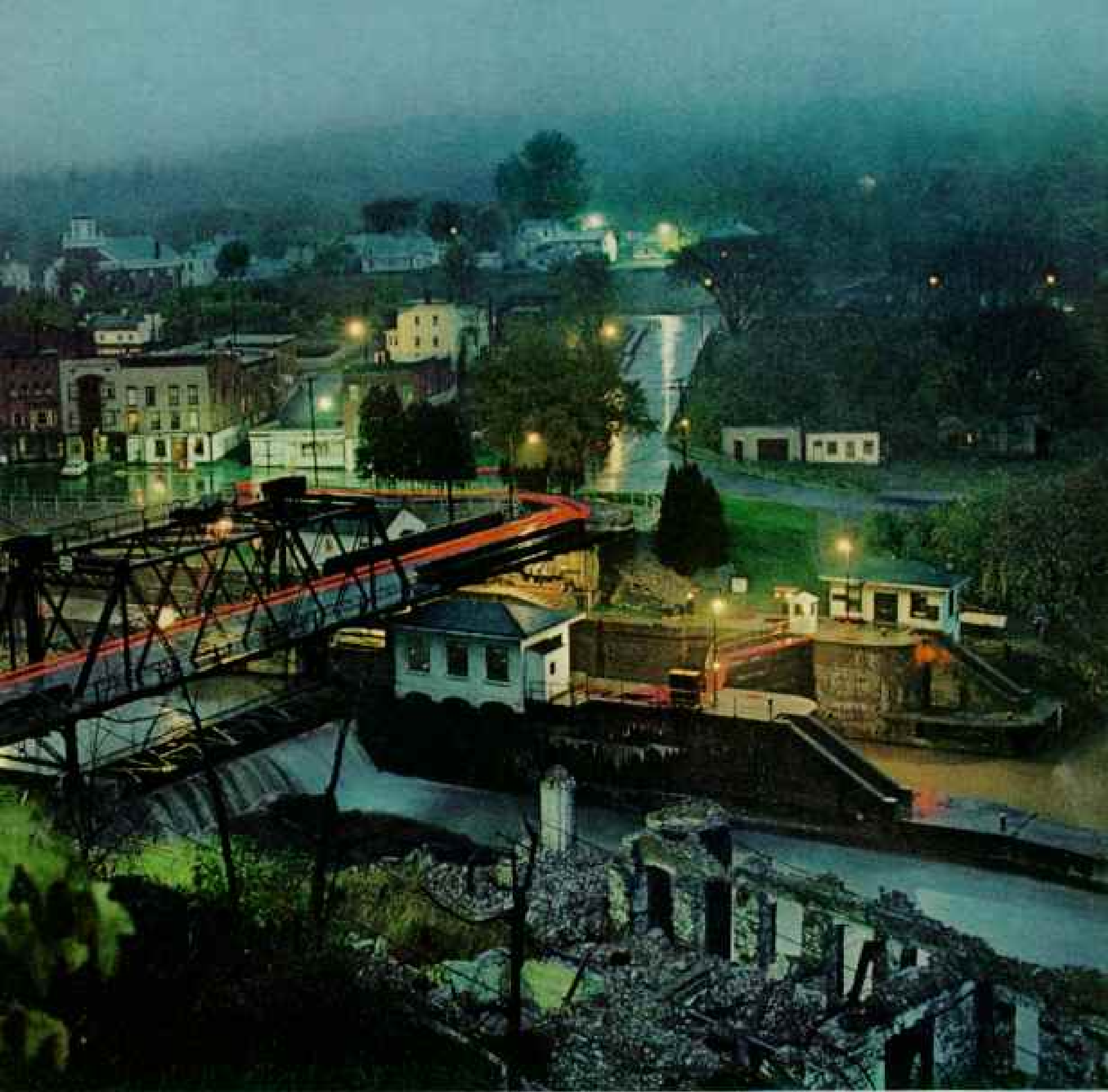
Ahead lay a long, spectacular valley of lake and land. Shaped like a lopsided funnel, it begins in the bottleneck of Lock No. 12 and spreads northward in an ever-widening V, to end just north of the Canadian border, 107 miles away. Its dominant feature, Lake Champlain, runs the entire length of the basin between bold and beautiful mountains—New York's Adirondacks on the west and, to the east, the Green Mountains of Vermont.

The area covers no more than 2,000 square miles, but within its perimeter are people and panoramas that have been calling me back for 20 years.

The valley owes the variety and magnifi-

cence of its scenery to millions of years of geological ups and downs. Several times it has felt the weight of ice and seas, always to emerge again. Glaciers carved great gorges in the mountainsides and scoured out lakebeds. Ages of weathering gave the valley rich soils that now feed sleek cows and produce bumper crops of McIntosh apples (pages 168-9).

As the draining lock lowered us to lake level, deckhand Russ LaBombard and I swapped tales about the vast amount of history written on these waters. Whitehall, for example, proclaims itself the birthplace of the United States Navy, for here were built some of the vessels that Benedict Arnold commanded in the Americans' first major naval battle. Although Arnold lost the 1776 engagement near Valcour Island, his stubborn stand forced the victorious



PAINTING BY B. L. DARLING, COURTESY FORT TICONDEROGA MUSEUM, EDSCHROMY BY NATIONAL GEOGRAPHIC PHOTOGRAPHER CHRIS KRISTOF © N.G.S.

British to withdraw to Canada for the winter, giving the Colonials time to build up their strength.

Of French-Canadian ancestry, Russ took pride in the fact that the valley's long career as a corridor of conquest really began with a Frenchman. "It all started almost 360 years ago, where the lake empties into the Richelieu River," he said. "When Samuel de Champlain paddled past Rouses Point, he became the first European to set eyes on the lake."

Champlain Makes Foes of the Iroquois

After Champlain had traveled some 80 miles farther south, he and his Algonquian guides had their tragic meeting with the tribe's old enemy, the Iroquois. Months earlier he had pledged to aid the Algonquians

against their traditional foe; now his guides waited expectantly for him to keep his word. Champlain advanced and faced the Iroquois.

"When I saw them making a move to shoot at us," he wrote, "I rested my arquebus against my cheek and aimed directly at one of the three chiefs. With the same shot two of them fell to the ground, and one of their companions, who was wounded and afterward died. . . . The Iroquois were much astonished that two of their men had been so quickly killed. . . . Our savages also killed several of them. . . ."

Following this unfortunate encounter, Champlain returned to Canada. Had he continued south, he might have met another great explorer, Henry Hudson, who less than two months later sailed upriver as far as Albany—two tiny bands of Europeans alone

Champlain Country

ONE OF THE MOST fought-over areas in North America, the Champlain Valley saw Algonquian and Iroquois Indians battle for the right to fish and hunt long before European explorers arrived.

On his journey of discovery, Samuel de Champlain carried French claims as far south as Ticonderoga. Once in 1755—the second year of the French and Indian War—and twice in 1757, French forces clashed with the English at Lake George and at last defeated them, destroying Fort William Henry.

The French failed to push their advantage, withdrawing instead to Ticonderoga, where they had built a massive stronghold. Counterattacking, the British gained possession of the valley by 1759.

The chesslike game to win the region resumed 16 years later—this time between British and Americans. Moving first, Vermonter Ethan Allen seized Fort Ticonderoga for the patriots. Its big guns, dragged overland (below), helped drive the British from Boston. Several months later, Benedict Arnold's American fleet met a British squadron near Valcour Island. Although he lost, his stubborn stand gained valuable time for the Colonials.

Hauling artillery to the crest of nearby Mount Defiance, the British forced the defenders to abandon Ticonderoga in 1777. But after the tide-turning Battle of Saratoga that same year, the big fort no longer menaced the American drive for independence.

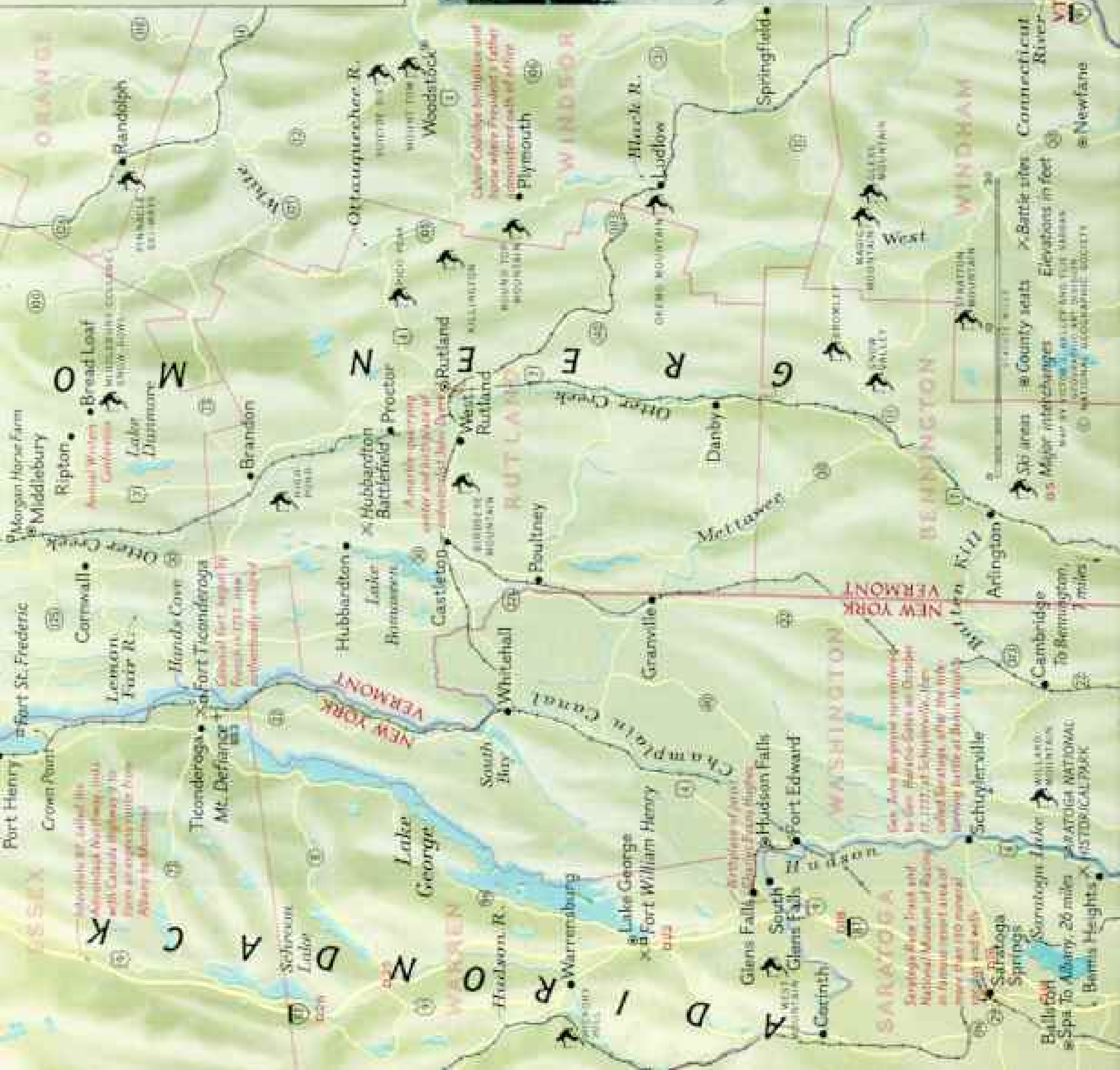
Champlain's waters again boiled with battle in 1814, when the American fleet defeated the British near Plattsburgh, a decisive victory in the War of 1812.

Only one skirmish has since disturbed the land. In October, 1864, a handful of Confederate soldiers, infiltrating from Canada, raided St. Albans, Vermont. Now peace has prevailed for a century. Dairy farmers tend their herds, and the throb of machines supplants the whine of musket balls.





Illustration at top right: Robert Rine-Hildebrandt; Art: Collette





Swinging on the village green, youngsters strive to touch the sky on a balmy June day in Bristol, Vermont. As in many New England communities, a white clapboard church with lofty spire dominates the scene. Bristol nestles beneath the western heights of the Green Mountains.



PHOTOGRAPHER: BY V. ANTHONY STEWART (ABOVE); BILL EWING KRISTOF © N.Y.S.

Hurling over drifts at Colchester, Vermont, a snowmobile almost flies. Its top speed: about 45 miles an hour.

in the vastness of unexplored America, neither knowing that the other was there.

For 35 miles north of Whitehall, Lake Champlain seems a sluggish river, with only a thin navigable channel cutting through thick marshes of the narrows. At Crown Point it widens slightly. But not until the lake passes the palisades and Split Rock on the New York side does it really break out of a trough. The broadest reach, at Burlington, measures 10 miles.

North of this point, the lake flings two arms wide to embrace the floating farms and villages of Vermont's island county, Grand Isle. The northern two-thirds of shallow Missisquoi Bay, which nowhere exceeds 14 feet in depth, overlaps Canada. Otherwise the lake lies wholly within the United States.

Red Straw Hat Signals Sunshine

In late afternoon we debarked in Burlington, where the barge pumped off its cargo of oil. The contrail of a B-52 from Plattsburgh Air Force Base draped a fringe across a magnificent Champlain sunset.

My jeep was at the dock, and I drove the last few miles to my farm in Jericho, a hamlet hidden in the skirts of Vermont's highest mountain, Mansfield.

A city dweller with a country place usually has a host of friends who want to visit. But my caretaker, Albert Schillhammer, is a friend who wants to work





RECHROMED BY EMMY BRISTOL (ABOVE) AND D. ANTHONY STEWART © R.S.S.





Camouflaged by clouds, ice-sheathed Lake Champlain spreads below a Boeing B-52 bomber. Flying out of Plattsburgh Air Force Base in New York, the Strategic Air Command plane soars 24,000 feet above Maquam, Vermont, and the snow-dusted fields encircling the village. The big jet's wings span North Hero Island. Northern New York lies beyond.

His house travels with him as a fisherman sleds his shanty onto frozen Lake Champlain at Thompson Point, where ice flutes the high banks.

Out on the lake, the angler piles snow around his shack and lights the oil stove inside. Even at subzero temperatures he stays snug while fishing for smelt and perch through holes in the ice. In some places like fishermen must let out 200 feet of line to reach depths where the fish are biting.

(page 200). When I awoke next day, he was laying a new floor in my back barn.

"Morning, Albert," I hailed him from an upper window. You don't overdo a reunion with Albert. "How soon can you tell me what the weather will be like today?"

"Tomorrow," he said, and went on sawing.

I need not have asked. I have learned through long association with Albert that his hats express his expectations. Red straw—fair. Blue beret—overcast, chance of rain. Hunter's cap—look for frost. Ear flaps down—sure to snow. Albert was wearing his straw.

With this assurance, I decided to go exploring with Ted and Hope Riehle, one of many young couples who have migrated to Vermont in the past decade.

Navies That Never Saw the Sea

Traveling with Ted and Hope is a family affair. With their three-year-old son stretched across my lap and a golden retriever named Ginger snuffing in my ear, we rose above a runway at Burlington Municipal Airport. Hope, at the controls of their Cessna 185, swung out across the lake.

"People in Boston wonder why we came up here to live," Ted shouted. "They'd know if they were sitting where we are now."

I could understand his point of view. The wind-crinkled surface of Champlain unfolded below us, a flowing length of gray-green crepe. To the west, the Adirondacks tumbled and tossed all the way to the horizon. Beneath our starboard wing tip, Lake Champlain's three major islands—South Hero, North Hero, and Isle La Motte—marched off to the north toward Montreal.

We were approaching the fourth largest island—Valcour. It lay like a detached piece of picture puzzle just south of Plattsburgh.

On October 11, 1776, fifteen vessels commanded by Benedict Arnold lay anchored behind Valcour's sheltering screen. For a year the Colonials had controlled the lake, but now a British invasion force led by 29 armed vessels was sailing south from Canada. Arnold let the British pass, forcing them to beat back upwind to attack him.

But the British guns were far heavier, and the Americans took a drubbing in the Battle of Valcour Island. Arnold, however, lost only two boats the first day—the schooner *Royal Savage* and the gundalow *Philadelphia*. Raised in 1935 with her mast still erect, the well-preserved *Philadelphia* now rests in the Smithsonian Institution in Washington.

Arnold and his remaining ships slipped out

Blue bubble afloat in a world of white, a gondola nears the top of 4,013-foot Lincoln Peak in the Sugarbush Valley resort area of Vermont. At the lift terminal, riders step out into bright, bracing air and snap on skis. With a final look across to Lincoln's neighboring peaks—Cutts and Nancy Hanks—they swoop past snow-smothered pines and pylons and curl down the four-



mile Jester Trail to the valley floor, with its cluster of lodges, restaurants, and shops. Sugarbush, one of half a dozen multimillion-dollar ski resorts in the Green Mountains, offers 32 runs, ranging from ski-school nursery slopes to Olympic testing trails. Beyond Lake Champlain's western shore lie the ski resorts of New York's Adirondacks, the most famous being Lake Placid.

ADIRONDACKS BY B. ARTHUR STUART, NATIONAL GEOGRAPHIC STAFF © N.G.S.





Fingers of fire work their magic; muscles slowly relax and boots warm for the next run on Mount Mansfield, Vermont's highest peak. At the Round Hearth dormitory in Stowe a painting on the fireplace hood portrays the hamlet that calls itself "Ski Capital of the East."

Badge of the beginner on his trousers, a snow bunny at Stowe learns what all ski novices soon discover: So easy to fall, so hard to rise. But persistence pays off, and back up the slope he goes to try again.

KODACHROME (MODEL BY S. ANTHONY STEWART); ETACHROMES BY JIM FROTE © N.E.S.





of the enemy's grasp that night, only to be overtaken two days later near Split Rock. To avoid capture, he burned most of his remaining fleet in a Vermont cove now called Arnold Bay.

British and American warships met again near Valcour in the War of 1812, and the battle helped decide its outcome. This time the American fleet, commanded by a brilliant young U. S. naval officer, Thomas Macdonough, soundly defeated the British in the Battle of Plattsburgh (pages 174-5).

Island Owners Commute by Plane

Champlain's islands come in many shapes and sizes. Few of the larger ones are individually owned. An exception: Savage Island, a mile-long sliver lying halfway between South Hero and the Vermont mainland. It belongs to the Riehles. We bounced in for a landing and picnicked on the sandy beach along the island's western shore.

By boat and car it takes the Riehles more than an hour to reach their island retreat. Flying from South Burlington, where they live, they arrive in minutes.

"You certainly didn't import your tractor, horses, and building materials by airlift," I said to Ted.

"No. We wait till winter to bring out our bulkier supplies," he replied.

The Riehles, like generations before them, use the frozen lake as a heavy-duty highway. The ice, often two feet thick by February, can safely support a small bulldozer.

On the way home Hope swung a wide arc over the lake. July had carpeted the surrounding fields with the plush pile of grass, the looser loop of knee-high corn, the two-tone weave of grain and flowering chicory. Billowing triangles of white flecked the placid waters of Malletts Bay, hub of serious sailing. A crowded ferryboat crossed between Burlington and Port Kent.

Mount Mansfield's supine profile—Forehead, Nose, and Chin—silhouetted the eastern sky. Ted's mention of winter reminded me of how much that one mountain had contributed to the growth of American skiing and to the valley's present-day prosperity. Hope nosed the plane toward the



4,393-foot peak, and we were soon over Stowe village and the area where I had learned to ski, back in the 1930's.

In those days I was trying to impress a member of the Dartmouth College ski team, so winter weekends were spent climbing the mountain's four-and-a-half-mile motor road with him—a task that took some four hours of herringboning—then trying to master simple turns on the 20-minute descent.

In 1940 Stowe gambled on the east coast's first chair lift, which still carries passengers up Mansfield to a 3,600-foot elevation in only 12 minutes. The boom was on.

Today 29 trails score the eastern face of

Mount Mansfield and southerly exposures of neighboring Spruce Peak. Seven lifts whisk as many as 7,000 people an hour up the two mountains during peak weekends of the skiing season. Once-fallow farmlands near the runs bring as much as \$10,000 an acre for hostels and homesites. The adjoining Madonna Peak ski area provides additional facilities.

Brand-new Bolton Valley development, southwest of Mansfield, already operates three chair lifts on Ricker Mountain and has elaborate plans for an aerial tramway that will swing skiers from the present base lodge to other heights.

Bolton Mountain was once as familiar to



me as Mansfield, for it served as an alternate trail for my early experiments in skiing. In those days only the whisper of skis and wind disturbed the stillness. A shack for summer hikers provided the sole shelter; few tracks except mine and an occasional rabbit's ever marked the snows.

Now discotheque music beats from the lodge basement all winter, while upstairs a floor show entertains guests. The dining room caters to Continental tastes, the sauna to aching muscles. A day nursery provides care for the pre-ski set.

"Have a try at our slopes," owner Ralph DesLauriers urged me during a visit last winter.

VOICED BY E. ANTHONY STEWART © S.A.S.



"Not me," I replied. "I haven't been on skis for 20 years."

Despite my protest, he outfitted me for a two-hour lesson, and I joined a throng of apple-cheeked youngsters in the beginners' area. Under patient instruction I progressed from a near-constant horizontal position to the point where I decided that perhaps I'm not too old for the sport after all. My non-professional teacher admitted to being 65.

Land Flowing With Milk and Maple

Although cash from skier and sightseer swells its coffers, Champlain country is basically farm country, where prices of milk, maple, and apples still sway the economy.

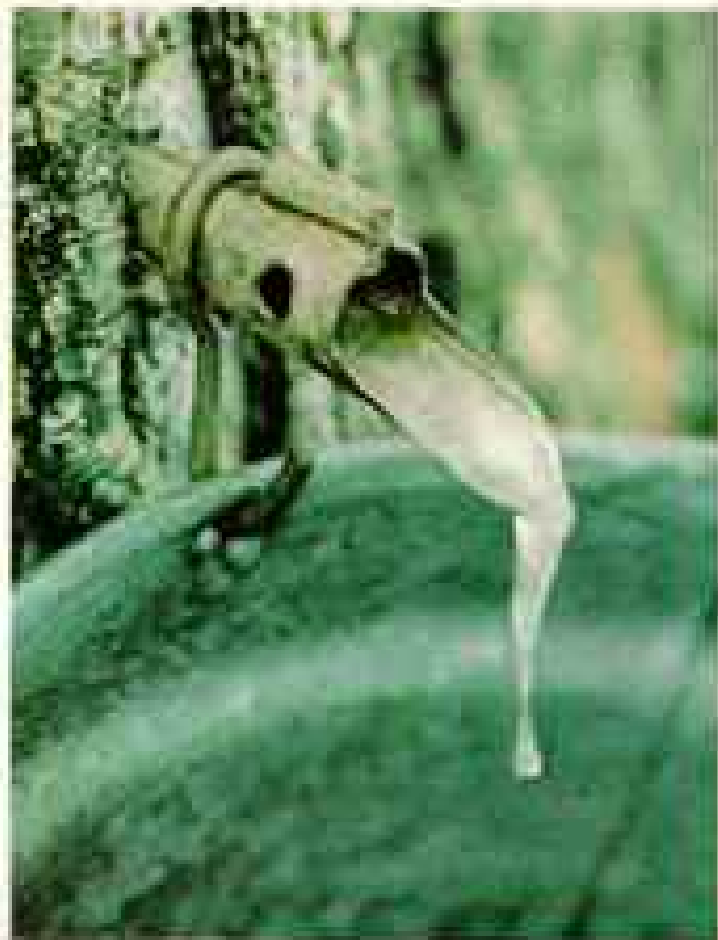
Guernsey, Jersey, Ayrshire, and Holstein graze its upland meadows and intervalles (pages 178-9). Topography limits the tillable acreage of most farms and favors dairying. But, with strong sons seeking greener pastures elsewhere and few hired hands to replace them, the small dairyman is leaving the land. His successor is the large-scale owner who may operate half a dozen farms, and can thus invest in the expensive equipment so necessary now to profitable farm management.

A "loner" who survives, Alden Bryan of Jeffersonville, Vermont, did so by branching out in several farm-related directions. Still regarded as an outsider—Alden has been here only 25 years—he markets milk from his herd and bread from his bakery. Surpluses from dairy and bakeshop he simply plows into the excellent meals he serves at his Windridge Inn. Here, behind a glass wall at the far end of the dining room, laying hens scratch and roost within full view of patrons.

Remembering the choose-your-trout tanks of France, I asked my host whether this display served a similar purpose. I could see selecting eggs for an omelette, but not a live chicken for *coq au vin*.

Lacery of new blossoms presages a bountiful apple crop in the Johnson orchards near Ticonderoga, New York. Owner Donald Johnson threads the rows of McIntoshes with a speed sprayer, misting them with a fungicide. His 6,000 trees bear some 80,000 bushels a year.

The Champlain Valley fruit belt annually produces more than a million bushels of apples, mostly McIntoshes, a hardy Canadian import ideally suited to the climate.



"Not at all," Alden answered. "This is a quiet place, and I thought it needed a little window dressing. Besides, a hen's life is pretty dull. So I rotate my flock for a bit of people-watching. I bet I have the most contented chickens in the valley."

Sugaring: Early Rite of Spring

Between late-winter fence mending and spring planting, the Champlain countryman keeps his calendar clear for sugaring (above). By early March maple trees bristle with buckets. The run depends on warm days and freezing nights; when nights grow warm, both flow and flavor suffer.*

The season may be over in two weeks or it may span six. While it lasts, the whole family works overtime. Collecting the sap keeps the men busy in the snowy woods; boiling it down confines the women to the steam-room heat of the sugarhouse.

One recent April I stopped at a roadside stand near home to buy my annual supply of new syrup. The price, six dollars a gallon, seemed high, and I said so to the farmwife who answered my horn. Instead of a rebuttal, she extended an invitation.

"Run's almost over. Be a pleasure to have you drop by tomorrow for sugarin' off."

I accepted with pleasure. Many years had passed since my last visit to one of the weather-beaten huts where the traditional Vermont sugaring-off party takes place. It features waxy, snow-cooled syrup (which New Yorkers know as jack wax), fresh doughnuts, hot coffee, and plump sour pickles to offset the sweets.

Clouds of steam were already pouring from the vented cupola of the sugarhouse when I arrived next morning.

"You're just in time," my hostess greeted

*Stephen Greene wrote of "Sugar Weather in the Green Mountains" in the *GEOGRAPHIC* of April, 1954.



REPRODUCED BY R. ANTHONY STEWART (OPPOSITE COVER) AND ERNOY BRISTOL © R.G.A.

me. "We can use an extra hand." Now she made her rebuttal to my remark about the cost of syrup, but in work, not words. From then until midnight, when the last 40 gallons of sap had simmered down to a single gallon of syrup, I chopped wood, fed fires, skimmed the thickening fluid, and scalded myself several times in the process. I no longer complain about the price of pure maple syrup.

Pioneer French Left Their Mark

Throughout Champlain country rural mailboxes carry such names as Abair, LaRocque, Bourdeau, and DeForge. Many a family proudly claims French-Canadian ancestry.

Among the earliest French arrivals were priests who came to convert the Indians. Missionaries and military men founded the valley's first white settlement at Isle La Motte in 1666, then abandoned it a few years later. A lovely little shrine to St. Anne, built on the

It's sugaring time! For two to six weeks during late winter and early spring, farmers in Champlain country tap the sugar maple, state tree of Vermont and New York. Each trunk averages 15 gallons of sap, a yield that boils down to less than half a gallon of syrup. His horses hitched to a sled, a Vermonter makes the rounds of maples interspersed with beeches to set out sap buckets.

Tappers drill a hole in the trunk, insert a spout, hang a bucket, and cover both bucket and spout with a lid to keep out dirt and rain. One tap suffices for younger trees like the one behind the dog; giants in the thick grove in right background may take two or more. A combination of warm days and freezing nights produces the best run. Frozen icicle of sap at upper left awaits the warmth of day.

In the sugarhouse, the sap bubbles in an evaporating pan above a roaring fire. Excess water passes off as steam and escapes through a vent in the roof. The end product: pure, sweet maple syrup.



SPINNAKERS (RIGHT) BY B. ANTHONY STERN; KIDS/BOYER BY ERIC KRISTOF © N.Y.C.



Spinnakers flying as they run before the wind, 19-foot sailboats race a four-mile triangular course in Malletts Bay, where members of Lake Champlain's largest sailing club compete on summer weekends. Before the race, a young crew member straightens the halyards on her craft (left).

Reefed in a brisk breeze, a broad-reaching sloop drives toward Stave Island, west of Malletts Bay. Skipper Lewis Wetzel knows well how unpredictable Champlain weather can be, especially the sudden shifts of wind that raise a chop and spice the sailing.





VT 3273 A



Cannon booms across Lake George from reconstructed Fort William Henry, in Lake George village, New York. Here British forces held off the French until 1757, when the fort fell to the Marquis de Montcalm, who burned it.

Murderous cross fire cripples the British flagship *Confiance*, center, on Lake Champlain during the War of 1812. Fresh from victories over Napoleon, a British army of more than 10,000 had pushed south from Canada with a small navy protecting its flank. At Plattsburgh, 4,000 American troops blocked the invaders. Master Commandant Thomas Macdonough awaited the enemy fleet in Cumberland Bay, and defeated it on September 11, 1814.

Relic of turbulent times, this unexploded eight-inch shell lay off Valcour Island until divers recovered it last year. Bearing the mark of Crown property, it may have gone to the bottom during the British-American naval battle on Lake Champlain in October, 1776.





ENGRAVING BY BENJAMIN TANNER, 1815, AFTER A PAINTING BY W. BENVOLLE, COURTESY THE NEW-YORK STATE HISTORICAL SOCIETY

same site in 1893, annually attracts more than 60,000 pilgrims.

Soldiers streamed southward to claim the entire corridor for New France. Control it and the Hudson River, they reasoned, and the British, holding only the Atlantic seaboard, would pose no threat to French expansion.

But the British had ambitions of their own, and for decades raids and counterraids rocked the area. The Treaty of Utrecht, signed in 1713, halted hostilities and recognized British supremacy over Iroquois lands, whose traditional northern boundary was Split Rock.

Fishermen Applaud Freezing Weather

Less than a mile of open water separates Split Rock from Thompson Point, a lobster claw of land on the Vermont side. Here Champlain reaches its maximum depth—about 400 feet.

Several months after the point's summer people shutter their cottages, a new colony springs to life offshore. Fishermen skid their shanties down the bank and angle for perch and smelt through holes cut in the frozen lake (page 162).

A few winters ago I counted 40 huts and a hundred open-air fishermen out on the ice. Although the temperature was well below freezing and a sharp wind knifed out of the north, I was the only one wearing gloves. It takes bare hands to feel a nibble on the end of a 200-foot line. Mr. and Mrs. Henry Bousquet had already filled a pail with silvery smelt.

"You must like them," I said to Henry as he rebaited his hook with the eye of a fish and a slab of smelt. In water the combination looks and behaves like a live minnow.

"No, I don't care for them too much," he answered. "We'll probably give most of these

away to friends." Which is true of most ice fishermen I know—they simply do it for fun.

Frozen and free flowing, the waters beneath the Bousquets' boots provided the main highway for French forces as they pushed south.

Ignoring the boundary at Split Rock, they had advanced 20 miles beyond by 1731 and constructed Fort St. Frederic at what is now Crown Point. Firmly wedged between Acadia and the Alleghenies by 1755, they threatened the heart of British-held America. If they could not be dislodged by a brave band of Colonials, who had advanced to the south end of Lake George, the French might reach the Hudson and sweep the seaboard. Thus the campaign for Champlain country became a critical one.

The Fort St. Frederic commander learned of the threat posed by the British force and dispatched 1,500 French and Indians to rout them. Gen. William Johnson, Irish commander of the Colonials, had other ideas.

Detecting the French approach, Johnson immediately ordered wagons overturned and trees felled. From behind this makeshift barricade the Colonials, with Iroquois help, beat off a determined assault. After the French withdrew, the defenders built a permanent fort called William Henry, after a grandson of George II. Johnson, founder of Johnstown, New York, became Sir William, receiving a baronetcy for his part in the victory.

Within Fort William Henry's wooden walls, a Colonial force withstood a second attack in March, 1757. But resistance crumbled the following summer under a sustained siege by the Marquis de Montcalm. The original fort was destroyed. Another, a faithful reproduction, stands on the site today (page 174).

Lake George: Gem of the Mountains

When Montcalm returned to his base at Ticonderoga, the French were putting the finishing touches on a massive stone bastion there. They named it Fort Carillon for the tinkling sound of the waterfall where Lake George tumbles into Lake Champlain. The Marquis was confident that both lakes, so fortified, would remain under French control.

From the 853-foot crest of Mount Defiance,

a bald, rocky height rising above the village of Ticonderoga, I could trace the French invasion route through Champlain's milky narrows to the shallows of South Bay. Directly below me and stretching southward for 32 miles lay the British warpath of the period—Lake George (map, pages 158-9).

Loyal as I am to Lake Champlain, I bow to Lake George, with its precipitous shoreline, sapphire depths, and pine-studded islands, as the most beautiful body of water I have ever seen (pages 190-91). To judge its merits by Lake George village alone, where the facsimile of Fort William Henry stands, is an error made by many motorists—including me. Not until I took to a canoe did I realize that many of the lake's scenic and recreational attractions can be reached only by boat.

Rogers' Rangers Become a Legend

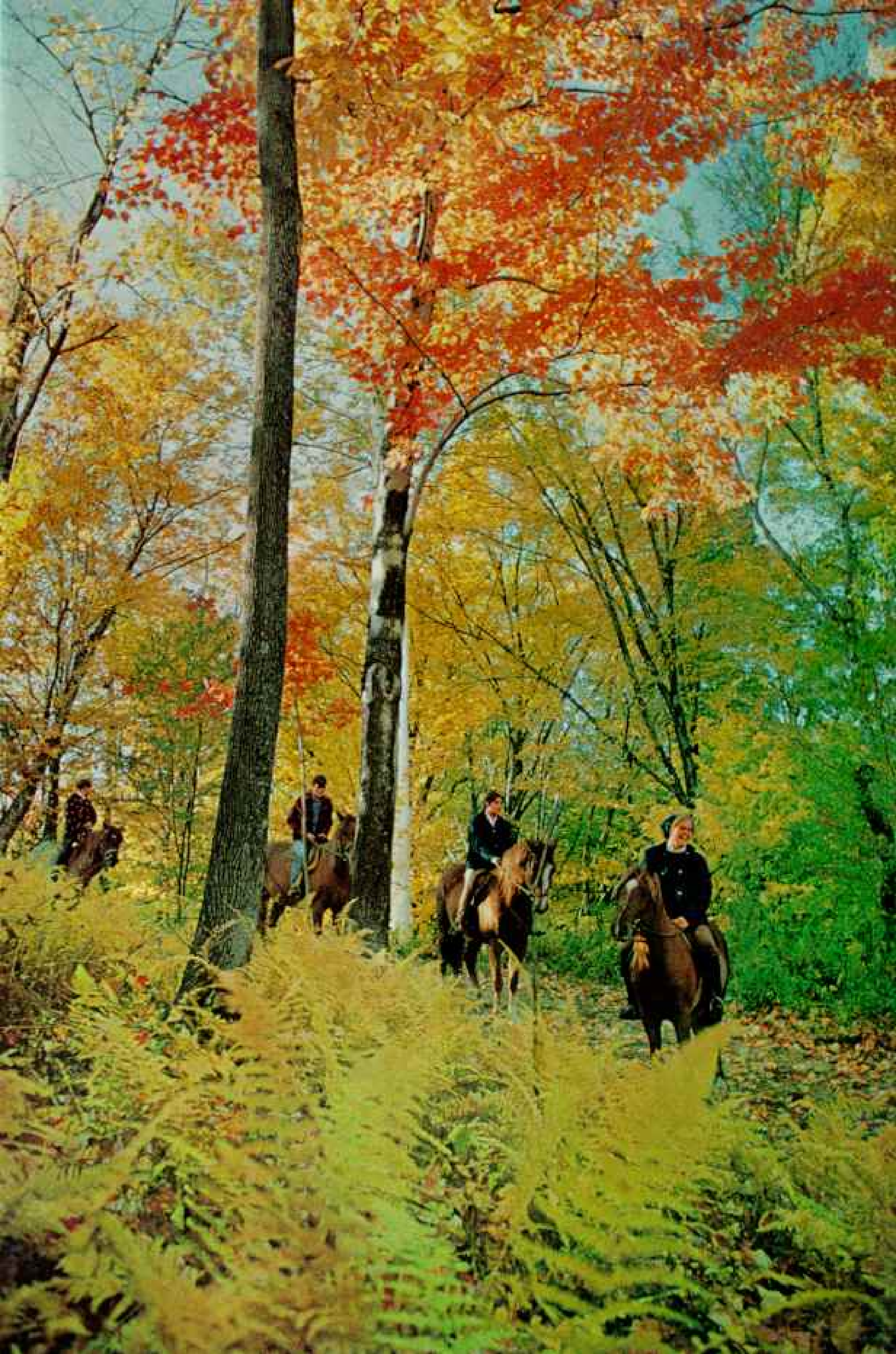
Canoes, still a popular means of Lake George travel, have been gliding over its sparkling surface for centuries. The first carried Indians. Then came Father Isaac Jogues, a French missionary later canonized, who discovered the lake in 1646. Within a few months he had been brutally murdered by Mohawks he had hoped to make his friends.

The lake's most famous canoeists, Robert Rogers and his Rangers, were patrolling its waters as British scouts while Montcalm and his men rested on their 1757 laurels at Ticonderoga. The rugged frontiersmen knew well the ways of Indian warfare—keep out of sight, travel light, strike without warning.

Such tactics, and a sense of humor, made Rogers' Rangers legendary. On one patrol, their leader crept close enough to the fort at Ticonderoga to kill some of the Frenchmen's cattle and set fire to their woodpile. To the French he penned a note and spindled it on a dead cow's horn: "I am obliged to you . . . for the repose you have allowed me . . . I thank you for the fresh meat . . . present my compliments to the Marquis de Montcalm."

Meanwhile, the British regrouped, then struck. Their first attempt to seize Carillon failed. But a 1759 expedition, under Gen. Jeffrey Amherst, succeeded. The departing French blew up the powder magazine, paused

New England woods put on robes of autumn glory, turning a fern-fringed trail into a tapestry of russet and gold. Second girl rides a Morgan, Vermont's state animal and the first horse breed developed in the United States. Gentle, well-mannered, and sturdy as the hills of their home, Morgans stem from a common ancestor foaled in 1789, the almost legendary Justin Morgan—only horse to give his name to a breed.





at Crown Point to fire their Fort St. Frederic, then left the valley forever.

The British, now in possession of Carillon, renamed it Ticonderoga, for an Iroquois word meaning “at the branching of two waters.” The fort’s walls would rise twice again—first to fill a military need and, finally, to fulfill a young man’s dream (pages 188-9).

General Amherst immediately ordered the ramparts rebuilt, and 16 years passed before another foe entered Ticonderoga. By 1775, the British had a new adversary, the Americans.

Boston was in full revolt against the British, and the patriots there sorely needed the arms held at Ticonderoga. They dispatched Benedict Arnold to capture them, but an audacious Vermonter named Ethan Allen had already decided to take the fort himself.

Arnold met Allen at Hands Cove, Vermont,

near Ticonderoga, and claimed command of Ethan’s Green Mountain Boys. But the troops refused to follow anyone except their big, humor-loving leader, a man renowned for his unquenchable thirst, picturesque cursing, and prodigious brawn. People said he could lift a bushel bag of salt with his teeth and throw it over his shoulder. Certainly he was no man to tamper with. Arnold accepted joint command.

Although more than 200 men had gathered for the attack, with the coming of dawn only Allen, Arnold, and 83 others had been ferried across the lake. Realizing he could wait no longer for reinforcements, Allen gathered his small group around him and said:

“Friends and fellow soldiers. . . I now propose to advance before you, and in person conduct you through the wicket gate; for we must this morning either quit our pretensions



KODACHROMES BY E. ANTHONY STEWART © W.B.E.

More cows than people: The old, oft-quoted saying about Vermont no longer holds true, but bucolic beauty still abounds. Near Shelburne, sister and brothers of the Ludger Guillemette family tend the herd.

Dancing clown in a collection of mechanical toys at Shelburne Museum evokes mirth today, as he did a century ago.

Spreading across 45 acres, the complex at Shelburne contains an outstanding collection of Americana. Exhibits include a reassembled covered bridge, blacksmith shop, pharmacy, Victorian railroad station, and the 220-foot side-wheeler *Ticonderoga*, last of Lake Champlain's big steamboats.

to valor, or possess this fortress in a few minutes; and inasmuch as it is a desperate attempt which none but the bravest of men dare undertake, I do not urge it on any contrary to his will. You that will undertake voluntarily, poise your firelocks."

Every man responded.

Ethan's Brash Tactics Startle the British

As the daring band followed Ethan through the wicket gate, one sentry fled; another surrendered when the towering Allen clouted him with his sword.

Bellowing "No quarter! No quarter!" at the top of his voice, Ethan dashed up the stairs to the commander's quarters and pounded on the door.

"Come out of there, you damned old rat!" he roared.

A startled officer stepped out (page 188). "By what authority," he asked, "do you enter His Majesty's fort?"

"In the name of the Great Jehovah and the Continental Congress," Ethan thundered in reply. (At least that is what he later claimed to have said.) The fort fell without resistance.

When Ethan was at Bennington a few weeks later, he attended a church service where Parson Jedediah







Dewey prayed long and loud in thanks to God for the victory at Ticonderoga.

"Parson Dewey," Allen sang out, "please mention to the Lord about my being there."

"Ethan Allen, thou great infidel, be quiet!" boomed the preacher.

Two years after Ethan's escapade, in 1777, Gen. John Burgoyne retook Fort Ti for the British, but following his defeat at Saratoga, the fort lost its strategic importance. The same year the last British garrison marched away, and Ticonderoga, once "key to a continent," had come to the end of the glory road.

As for Ethan, he launched an ill-fated attack against Montreal in the fall of 1775 and was captured by the British. While he was imprisoned in England at Pendennis Castle, a local visitor asked him his occupation.

"In my younger days I studied divinity," replied Allen without a smile, "but I am a conjurer by passion."

"You conjured wrong at the time you were taken," his caller commented.

"But I conjured *you* out of Ticonderoga," Ethan replied.

Historic Ruin Rises to Its Former Glory

Stephen H. P. Pell was only a small boy when he found an antique flint box amid Ticonderoga's ruins in the early 1880's. A flint still inside kindled a burning ambition in the boy: Restore the fort to its former grandeur.

The Pell family had occupied the land since shortly after the Revolution and had tried to preserve the garrison area. But early home-builders had hauled away much of the stonework once standing above ground.

The family bought the property in 1820, and when Stephen Pell decided almost a century later to restore the fort, he found that virtually nothing was disturbed beneath the earth. Enough original rock remained to reconstruct most of the defenses; similar stone was found to piece out the rest. The painstaking Stephen insisted that the same wood, the same clay, be used to match existing beams and roof tiles.

I followed a guide in colonial uniform through the main archway that led to the

Racing the setting sun, the diesel-powered *Adirondack* pulls away from Burlington and pulses toward the distant New York mountains whose name she shares. One of several ferries that ply Champlain, the streamliner will nose into the pilings across the lake at Port Kent, 10 miles and 60 minutes away, to unload her passengers and cars.



Tiny computer parts go under a magnifier at the International Business Machines plant in Essex Junction, Vermont. An inspector has rejected one defective module on the conveyor belt. The miniaturized printed-circuit units will now move into a furnace that bakes on the design. Two of the dime-size units (below) do the same job as all six tubes in the bulky 1952 model in background.

IBM's expanding operations reflect the recent industrial boom in the Burlington area. Myriad recreational opportunities help lure skilled workers.



Burrowing more than a mile into the earth, a shaft at Mineville, New York, four miles west of Lake Champlain, leads to one of the few underground iron mines still being worked in the United States. The train pulls its load along a horizontal passage to a storage area, where special lifts called skips hoist the ore to the surface. There conical heaps of tailings, appearing as high as the surrounding hills, lump the face of the land.

As early as 1765, miners dug ore from a bed at nearby Crown Point, and small mines soon opened all along the lakefront. Most ceased operation after discovery of the huge Mesabi deposits in Minnesota, but Republic Steel Corporation continues to draw high-grade magnetite from this mine.



ACQUAINTANCE BY ENOCH ARISTOF © NATIONAL GEOGRAPHIC SOCIETY

Place d'Armes, the central court where soldiers of three nations had mustered. A lifelike sergeant of the guard, molded in wax, let us pass. It was impossible to believe that the buildings and bastions around me had once been little more than rubble.

The stairway up which Allen roared to demand the fort's surrender angled across the face of the ivy-clad West Barracks. In an outstanding little military museum in the rebuilt South Barracks, I found the flint box that had inspired Stephen Pell's efforts.

Here, too, are bullets deep-etched with marks made by the teeth of wounded soldiers biting on them in the agony of amputation.

One hollow silver bullet displayed nearby knew agony of another sort. Its two halves fitted together, leaving space inside for a message. A British courier swallowed bullet and contents when the Americans captured him. After he refused to take an emetic, they threatened to "rip his bellie open." He gave in, but was hanged for spying anyway.

When Mr. Pell died in 1950 at the age of 76, he had lavished 40 years of love and life and

much of his private fortune on the fort. But his dream had come true; experts consider the restoration, accomplished entirely with private funds, one of the finest in the Nation. A nonprofit corporation headed by his son John continues to protect the landmark.

Fort Blunder Could Use a Champion

No one seems to want to save the valley's northernmost fort. Officially called Montgomery, it was nicknamed Fort Blunder even before it was completed because of an error in surveying. The discovery in 1818 that the site was actually on Canadian soil caused an immediate halt to construction. Not until an 1842 treaty with Great Britain relocated the boundary was work resumed. Never garrisoned by more than a token force, Fort Montgomery was abandoned in 1908.

Americans seem determined to forget the whole affair. When I asked the tolltaker at the Rouses Point Bridge how to reach the fort, which loomed above the lake only a few hundred yards away, he said he didn't know.

By crossing a boggy pasture and circling a

swamp, I finally stood beneath its crumbling sally port. This great, gray ghost never fired a shot or felt a shell, but today only the south wall with its empty gun-port eyes stands erect. With a flashlight I probed what remained of the bakery, the gun room with its cannon tracks, and a few vaulted chambers I could not identify. Tumbled rocks barred access to other Stygian apartments. I climbed to the parapet and flushed a partridge from the

wilderness of weeds and brush growing there.

Decrepit as it is, Fort Montgomery serves as a monument to more than 150 years of peace between neighbors.

Fences Set Limits for Cows and Men

In the northeast corner of Champlain country, a county called Franklin spills down the Green Mountains, its fertile farmlands rolling all the way to the lake front.



In Franklin County good neighbors make good fences. Neat rows of stone, stump, and split rail hemstitch the hillsides, telling a man how much he owns and a cow how far she can go. Many have stood since pioneers first tilled the land.

Back roads wind into worlds of hidden delight. A dusty track may suddenly descend a century or more into the past—as in Montgomery, easternmost township in the valley, where I counted six covered bridges still in use. Or north of East Fairfield, where a deserted byway led me unexpectedly to the 1830 birthplace of President Chester A. Arthur.

Civil War Violence Reaches Vermont

St. Albans, Franklin County's shire town, as Vermonters call a county seat, began as two rival villages. A bay settlement on the Champlain shore served lake traffic, while another, three miles inland, catered to the turnpike trade. The latter won out.

This tree-shaded waystop between Burlington and Montreal is best remembered for a cloudy day in October, 1864.

The threat of rain had slowed business. The few people stirring talked of Civil War battles raging around Atlanta. But events so far south seemed too remote for deep concern.

The railroad was a different matter. Passenger traffic was growing, and travelers meant money to the town. At least 22 had come down from Canada in the past few days, and were still spending freely along Main Street. The train had brought most of them.

Then suddenly these same welcome strangers—Confederate soldiers in civilian clothes—robbed three local banks at gun point, terrorized the townspeople, and rode off to Canada on stolen horses with more than \$200,000 in currency. They also tried to burn the town, but fortunately this effort failed. Unsuccessful, too, was another purpose of their mission: to divert Union troops to the border.

The Canadian Government, viewing the raid as part of the war, refused to return the Rebels for trial, but did restore \$88,000 of the loot. The rest was never recovered.

When I returned to my farm after touring Franklin County, I found Albert shoring up my sagging woodshed. Albert, at 72, is a source of knowledge about many things, so I asked him a question that had been bothering me.

"Why is it," I said, "that so many one-room schools were built opposite cemeteries?"

Albert pounded another stone into the shed's foundation. "Some of our students were kinda slow," he said.



PHOTOGRAPH BY CHRYSTAL BRIDGES © W.A.S.

Muscles bulge, sawdust swirls as David Geer slices an eight-inch spruce in the buck-sawing contest at the Lumbermen's Round-up. His time—49.1 seconds for four cuts—earned only third place, but he won log-chopping and chain-saw events, and the title of best lumberjack in the show. The annual roundup beside Vermont's Lake Dunmore attracts the Nation's top woodsmen.

Ten minutes to curtain! All hands pitch in to ready the cast for *The Comedy of Errors* during last summer's Champlain Shakespeare Festival at the University of Vermont. Burlington girls assist bewigged and bearded Charles Faranda, who played Egeon, as he aids a fellow performer.

Founded in 1791 and built on land donated by Ira Allen, brother of Ticonderoga hero Ethan Allen, the University of Vermont is the Green Mountain State's largest institution of higher learning, with an enrollment of 5,000. From its shaded hillcrest campus, the university dominates both Burlington and its cultural affairs.





GLAZED BY SUMMER'S SUN, Lake Champlain reaches northward like a peaceful river meandering between the rich farmlands of Vermont, right, and New York. On the promontory, star-shaped Fort Ticonderoga – which takes its name from the Iroquois word meaning “at the branching of two waters” – commands the passage south to Lake George.



Audacity of a dawn raid by Ethan Allen and his Green Mountain Boys so surprised the British that they surrendered Fort Ticonderoga on May 10, 1775. Allen recalled that "the capt. came immediately to the door with his breeches in his hand . . . I ordered him to deliver to me the fort instantly . . . in the name of the Great Jehovah and the Continental Congress."

The citadel appeared impregnable (below). But in 1759, soon after the French completed it, the British overwhelmed the fort. They took it again in 1777, this time from the Americans. Peace brought ruin; settlers dismantled stone walls for their homes. Acquiring the family property, Stephen H. P. Pell lavished a fortune on reconstruction, beginning in 1908, and his descendants continue the work.

Guide in cocked hat leads visitors through the history-haunted fort, which flies the Grand Union, predecessor of the Stars and Stripes, and a French regimental flag.

Not all of them. Emma Hart Willard, early advocate of learning for young ladies, taught in Middlebury, where she founded her first girls' school. John Dewey, prophet of progressive education, was born in Burlington and graduated there from the area's largest college, the University of Vermont.

I know the Dewey place well; for 15 years I lived just a block away. Grace Goodhue, later Mrs. Calvin Coolidge, grew up in a house between. I never met the famed philosopher or the President's wife, but all of us, while attending the university, struggled up Maple Street, a tilted thoroughfare better suited to bobsleds (which often ran its course) than to sleepy students with early-morning classes.

Burlington climbs a tree-clad hillside from industrial lakefront to college green. Midway, a shelf of land accommodates a modest business district. Then the terrain shoots up again, at an even steeper angle.

Wager of \$50 Costs Colonel \$12,000.

Fortunes made along the shoreline in the 1800's—in transportation and lumber—built mansions on the heights and inspired an era of elegance that lasted to the turn of the century. One home, a gem of Victorian architecture, belonged to my good friends Col. and Mrs. H. Nelson Jackson. Soldier, doctor, banker, publisher, and, above all, rugged individualist, Colonel Jack did things with a flair. In 1903 a San Franciscan bet him \$50 he could not drive a car across the continent. At that time no one had. It cost the colonel \$12,000 to win, but he and a Winton motorcar did it, west to east, in 64 days. He returned to Burlington in triumph, only to be arrested for speeding up Main Street at more than six miles an hour!

Burlington's inner city looks much as it did when I lived there 30 years ago. Big elms shade spacious lawns; handsome 19th-century houses preserve the dignity of bygone days. A great deal of neon ornaments her outskirts, but otherwise Vermont's Queen City grows old with grace.

Long the valley's major marketplace and leading cultural center, Burlington is also the largest, fastest-growing





PHOTO COURTESY FIRST TLINGIT NATION MUSEUM. EXCHROMIC (ARINE) BY © ANTHONY STEWART; KODACHROME BY EMORY KRISTOF © NIA 3



community in Champlain country. For years it rested on a plateau of prosperity and unchanging social structure. A few established families owned the banks and other businesses, held public office, ran civic affairs.

With World War II, the pattern changed. Drove of out-of-staters discovered the valley and selected Burlington as the most promising place to settle. Excellent opportunities for education and recreation attracted two corporate giants: General Electric, which makes a rapid-fire gun for the Air Force there, and International Business Machines, which manufactures computer components in nearby Essex Junction (page 182).

In recruiting personnel for its Essex plant, IBM recently advertised an unusual fringe benefit—skin-diving for Revolutionary gunboats in nearby Lake Champlain.

Such inducements obviously work. In 20 years Burlington has grown from 33,000 to 40,000—twice the state's pace—and the com-

muter fallout radiates for more than 40 miles.

Newcomers contribute substantially to Burlington's boom. Jay Wulfson, youthful President of Vermont Railways, reactivated freight service on 122 miles of idle track and now schedules daily runs to Bennington.

It's Fun to Run a Railroad

We were rolling south on one of his trains when I asked what brought him to Burlington.

"Always wanted to own a railroad," he explained. "This one had failed, and no one else seemed to want it. So I leased the most productive stretch, bought myself some boxcars and an engine, and went into business. Even if we weren't making money, which we are, I'd at least have a diesel to drive."

Happily seated at the controls, he greeted a group of front-porch fans with a wave and a whistle toot.

"I can tell you one thing," he smiled. "I never had this much fun in New Jersey."





In the leisurely pursuit of pleasure, campers ride air mattresses in Lake George (above), while others cruise amid the almost 200 piney islands dotting its waters (below, left). Nestled in the Adirondacks, the 32-mile-long lake shimmers with alpine beauty comparable to the lofty lakes of Switzerland. Some among the 48 islands that New York State reserves for campers are only large enough to accommodate a single family.



EXTRACTION (ABOVE), AND RODRIGUES BY S. ANTHONY SIMART © N.Y.S.

Accent on action: Run through rapids climaxes a boat ride for visitors to New York's Ausable Chasm. Before passengers board the bateau, manned by bowman and steersman, they may stroll for a mile along the 200-foot gorge that the Ausable River has carved in 500-million-year-old sandstone.



Water travel, too, has experienced a revival since three new Burlingtonians, Lewis Evans, James Wolcott, and Richard Wadhams, bought the Champlain Transportation Company in 1948. The firm then had only two outmoded ferries left on the lake; today it runs six diesel-driven streamliners that annually carry more than half a million people and their cars across Lake Champlain (page 180).

Ferries from Port Kent, traveling the longest of three company routes, dock at the foot of King Street. Here in 1808, just a year after Robert Fulton's *Clermont* made history on the Hudson, John and James Winans launched the first commercially successful lake steamboat, the *Vermont*.

Harnessing steam to paddle wheel started a new struggle in the valley, this time for control of the lake's commercial carriers. Tactics ranged from purchase to outright piracy. Champlain Transportation finally won. Packets flying the company ensign once called at every port between Whitehall and St. Jean, Quebec, and put passengers ashore to patronize rambling hotels with broad verandas.

Ti's Last Voyage Lies Overland

When the iron horse came charging through the valley, the steamboat's days were numbered. When the automobile arrived, those days were done.

The *Ticonderoga*, last of the lake's great



Whirlwind warrior, Maj. Gen. Benedict Arnold flings militia and buckskin boys against German mercenaries near Saratoga, New York, on October 7, 1777. A shot fractures Arnold's left leg, but the American victory ends the British sweep through Champlain country and helps win France as an open ally. Following Saratoga, the patriots lost their hero. Angered by his superiors, the impetuous Arnold espoused the British cause.

Monument to a wounded leg, but not to its owner: At Saratoga National Historical Park a relief of Arnold's boot and epaulet omits his name, an American synonym for traitor.



luxury fleet, finally tied up in 1955—not on the water, but on the grounds of a remarkable museum in Shelburne, Vermont.

The old side-wheeler was headed for the scrap heap when author Ralph Nading Hill of Burlington talked the late Mrs. J. Watson Webb, founder of the Shelburne Museum, into buying it. She continued to run it on the lake for three seasons, then had it moved two miles overland by rail to her museum.

As soon as Mrs. Webb purchased the 220-foot boat, she began worrying about how her husband Watson would take the news.

"Pa," she told him timidly that night, "I've just bought the *Ticonderoga*."

Watson peered over his newspaper and

thought a moment: "Makes a darn sight more sense than some of the things you've bought." He was thankful, perhaps, that she had not purchased the Pell family's fort.

From the *Ti's* afterdeck, Ralph Hill and I looked out upon the wonderful world of yesterday created by Webb family wealth and the good shopping sense of Electra Havemeyer Webb.

"It must be stimulating," Ralph mused, "to have a wife who brings home old lighthouses, covered bridges, sawmills, and 19th-century jails. Not to mention a blacksmith shop, a ten-wheel locomotive, and a brick schoolhouse."

Mrs. Webb bought vintage structures wherever she found them and moved them to her



Town-meeting day: Trudging past snowbanks in blustery March weather, citizens of Richmond, Vermont, gather at their 150-year-old church for the traditional once-a-year, all-day discussion of town affairs. Sitting in box pews (below) and warmed by pot-bellied stoves, they debate the need for school and town improvements and the taxes they entail. LeRoy D. Ware, in the pulpit, respected by fellow townsfolk for his fairness, has served them as moderator for 15 years.

Local tradition tells that in 1812-14 a 17-man crew raised the nondenominational Old Round Church; 16 men built a side apiece and the 17th added the belfry.

museum piecemeal or intact. They look as settled in Shelburne as on their original tracts. Some hold period furnishings dating from the early 1700's; others house priceless collections of American folk art (page 179).

"To Mrs. Webb," Ralph explained, "folk art meant just about everything our ancestors made with their hands—tools and toys, furniture and figureheads, hardware, utensils, and cigar-store Indians."

Because valley people are saving people, the museum has acquired many gift items from the dusty attics, barns, and sheds of Champlain country. The outbuildings on my farm turned up 39 antique implements now on display.

Egyptian Mummy Rests in Yankee Ground

As omnivorous a collector as Mrs. Webb (though on a smaller scale) was Henry L. Sheldon of Middlebury, Vermont. This Jack-of-all-trades hoarded what others discarded—mostly household furnishings—and filled his Park Street home to overflowing. In 1882, he hung up a sign: "Sheldon Art Museum, Archaeological and Historical Society." Mr. Sheldon died in 1907 without witnessing any rush to examine his collection. But yesterday's trash has become today's treasure, and the Sheldon Museum now enjoys an enthusiastic patronage.

Still sorting through Henry's possessions in 1945, museum directors discovered the badly deteriorated



mummy of an ancient Egyptian moldering under the eaves. A kindly citizen, George W. Mead, made room for the stranger's cremated remains in his personal burial plot at West Cemetery. A visitor who does not know the story finds the headstone quite a shock: ASHES OF AMUN-HER-KHEPESH, AGED 2 YEARS, SON OF SEN WOSET 3RD, KING OF EGYPT, AND HIS WIFE, HATHOR-HOTPE, 1883 B.C.

West Cemetery adjoins the lively campus of Middlebury College. When Emma Hart Willard, crusader for women's education, arrived in 1807, the college was open, but not to women. In 1814 Emma founded her first female seminary right across the street. Middlebury repealed its all-male policy in 1883, and the present enrollment of 1,400 is more than one-third women. In July and August the main campus belongs exclusively to six graduate language schools: French, German,

Italian, Spanish, Chinese, and Russian.

At Bread Loaf, Middlebury's mountain campus 10 miles east of town, the college conducts summer courses in English. The season ends with the Bread Loaf Writers' Conference, famed for such lecturers as the late Robert Frost, who lived in nearby Ripton, and such listeners as Truman Capote.

Colonel Loved Horses, Hated Cars

Bread Loaf classes convene in and around a sprawling Victorian inn once owned by wealthy Joseph Battell of Middlebury. Colonel Battell thought highly of horses but hated horseless carriages. To keep those snorting monsters from his door, he sent horses to fetch motoring guests the final three miles.

Battell couldn't do much about the motorcar, but he did a great deal for the Morgan, the first breed of horse developed in the Nation.





KIDACHIMINES BY G. ANTHONY STEWART © 1988

All Morgans stem from Justin Morgan, a broad-chested bay that trotted around Randolph, Vermont, in the late 1700's. A century later, Justin's descendants numbered in the thousands (page 177). Nonetheless, Colonel Battell attempted to trace the lineage of every purebred and published the first Morgan register, still the bible of the breed.

Battell gave his farm in Weybridge, two miles northwest of Middlebury, to the U. S. Government for perpetuation and improvement of Morgans. The University of Vermont carries on this work under direction of Donald J. Balch, Associate Professor of Animal Science.

With Leonard Wales, a trainer at Weybridge and a Morgan breeder in his own right, I perched on a paddock rail to watch a horseman exercise a tawny gelding. A crowd kept us company, while another throng admired the mares and foals in a neighboring pasture.

"I don't know how these people find us," Mr. Wales said. "We're way off the beaten track, yet we had 40,000 visitors last year."

Had the recent rebirth of riding in the United States affected the Morgan, I asked.

"I'll say," he answered. "Why, if we had them, we could sell twice as many Morgans as we do. And our horses don't come cheap—they average about \$2,000 an animal."

More visitors find Weybridge, I am sure, than find the Hubbardton Battlefield, scene of the only Revolutionary War action fought on Vermont soil. The Battle of Bennington, usually associated with the state, took place in nearby New York. Colonials defending Bennington's military stores stopped the attacking British in the countryside to the west.

A ridge road out of Middlebury runs south through Cornwall, a cameo town set in a necklace of emerald hills, to Lake Bomoseen. At Hubbardton a small sign pointed east.

Macadam merged into dirt, and I was soon on a steady upgrade. Goldfinches darted in the sunlight, and milkweed, heavy with dusky pink blossoms, nodded as I passed. A regular summer boarder, the monarch butterfly,

Slice of a mountain, a slab of marble leaves the Imperial Quarry at Danby, Vermont, to beautify the façade of National Geographic Society headquarters in Washington.

A man-made cave, 16 acres in area and tunneled almost horizontally into the mountain, yields the choice stone that adorns the U.S. Supreme Court Building and hundreds of other structures in the United States and Canada.

Fragrant bales of new-mown hay strewn fields of Windy Top farm near Charlotte. The fodder will feed dairy cattle and horses during the long, snowy Vermont winter.



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would soon arrive to lay eggs upon its leaf.*

On such a day in 1777 Colonial forces—driven from Ticonderoga by “Gentleman Johnny” Burgoyne—straggled up this same hillside toward Castleton, seven miles away.

As the land leveled and trees thinned, the battlefield spread before me, an unexpected island of grass in a stormy sea of mountain-tops. I had the place entirely to myself.

At Hubbardton the rear guard of American Gen. Arthur St. Clair’s force was overtaken by British troops and German mercenaries. Green Mountain Boys and New Hampshire and Massachusetts regiments under Col. Seth Warner offered fierce resistance. Then the surviving Americans faded like shadows into the wilderness. The British, victorious but exhausted, gave up the chase, and the Continentals lived to fight another day—at Saratoga.

The triumphant Burgoyne did not tarry at Ticonderoga. He continued on south, believing British reinforcements were sweeping north up the Hudson and east through the

Mohawk Valley to meet him. When joined, the three forces would isolate New England, a maneuver sure to speed the submission of the rest of the rebellious Colonies.

But help never came, and Burgoyne found himself near Saratoga, with his troops low in spirit and strength. As his fortunes faded, the Americans’ rose.

Saratoga Dooms British Domination

On September 19 the two armies clashed at Freeman’s Farm. Although Burgoyne held the field, his assault was stopped. The Yankees collided again with the British on October 7 at Bemis Heights, rallying behind Benedict Arnold, whose personal bravery in battle cost him a serious leg wound. This time the red-coat line crumbled. Burgoyne retreated, and on October 17 surrendered at Saratoga.

France, impressed with this victory, entered

*The insects’ migratory habits were described in “Mystery of the Monarch Butterfly,” by Paul A. Zahl, NATIONAL GEOGRAPHIC, April, 1963.



Sport of kings—Thoroughbred racing—draws trophies of champions to the National Museum of Racing at Saratoga Springs, New York. Director Elaine E. Mann displays the Saratoga Cup won by Exterminator in 1919. Statuette memorializes the illustrious Cavalcade, victor in many stakes. Works of Edward Troye, noted 19th-century painter of racehorses, hang in one of the nine galleries.

Hoofs pound past the half-mile pole at Saratoga as America's oldest operating track, opened in 1863, stages its August meet.

the conflict on the American side. The road to Yorktown was open.

At the base of a towering monument in Schuylerville stand statues of three American heroes of the Saratoga campaign—Generals Horatio Gates and Philip Schuyler and Col. Daniel Morgan. A niche earned by Benedict Arnold remains unfilled, testifying to his later role of traitor. There is a battlefield monument to his wounded leg, but not to him (page 193).

Sudden Storms Make Boaters Wary

For a more intimate look at Lake Champlain than either tug or plane provides, James Starbuck, a lifelong friend from Westport, New York, had suggested a speedboat trip. He called me one blustery morning in late August and said his launch could take a little chop if I could.

As I turned out of the driveway, I discovered Albert up on the ridgepole, fishing a bird's nest out of the chimney. A line storm, passing through during the night, had combed long parts in the ripening timothy and left a slight feeling of fall in the air. Albert knew without my saying so



that I would soon be using the fireplace.

Valley people learn to take weather as it comes. Although the day was slate gray, it might be the best for weeks. Skippers like Jim must know Champlain's many moods and recognize the danger in sudden squalls that slip over the mountains to strike without warning. For safety's sake, sailing enthusiasts shun the open lake, preferring sheltered waters like Malletts Bay, where a summer Sunday may bring out 300 boats (pages 172-3).

Jim was at the marina behind Westport Inn, reminder of a day when resort life revolved around wide porches and plush-filled parlors.

Swinging south along the New York cliffs, we crossed to Vermont over the lake's mile-width at Port Henry. A lone goose flapped above the marshes of Dead Creek, one of three large waterfowl management areas fringing the Vermont shoreline.

North of Arnold Bay, where divers still raise an occasional Revolutionary cannonball, Otter Creek, Vermont's longest river, flows into the lake. Down it in 1814 sailed Tom Macdonough's tough little fleet, destined for Plattsburgh and his decisive naval victory over the British in the War of 1812.

Ships Built Swiftly for Brief Battle

When this second war with England began, Champlain country prepared for an inevitable invasion from Canada. Armed Americans gathered at Plattsburgh to defend the land. To protect the lake, Macdonough assumed command of a fresh-water navy that hardly existed. Without additional boats the squadron was too weak to be effective, so the Americans became boatbuilders at Vergennes, eight miles up the meandering Otter. There, by hard work and ingenuity, skilled craftsmen

EXTRACHROME (OPPOSITE) AND MONOCHROME BY E. ANTHONY STEWART © N.Y.S.





Quiet strength and self-taught skills make Albert Schillhammer, a retired farmer, the man in demand around his hometown of Jericho, Vermont. Hands that for years guided a plow now help neighbors at many chores: shoeing a horse, reroofing a house, mending a broken doll—and a little girl's heart.

September frosts tint the hardwoods framing St. Thomas Catholic Church in Underhill Center, Vermont, below Mount Mansfield. Like a sunset's flare, autumn in Champlain country imbues the land with one last burst of brilliance before the snows of winter.

took only a month to transform valley trees into fighting ships. A battle-worthy flotilla took shape.

As our speedboat breasted a north blow, little Four Brothers islands seemed to sail toward Plattsburgh just as Macdonough's ships had on that September day more than 150 years ago. The battle raged for only two hours and 20 minutes, but it left the British fleet a shambles. The enterprising Macdonough had so placed his flagship that, by hauling on its anchors, he could swing the

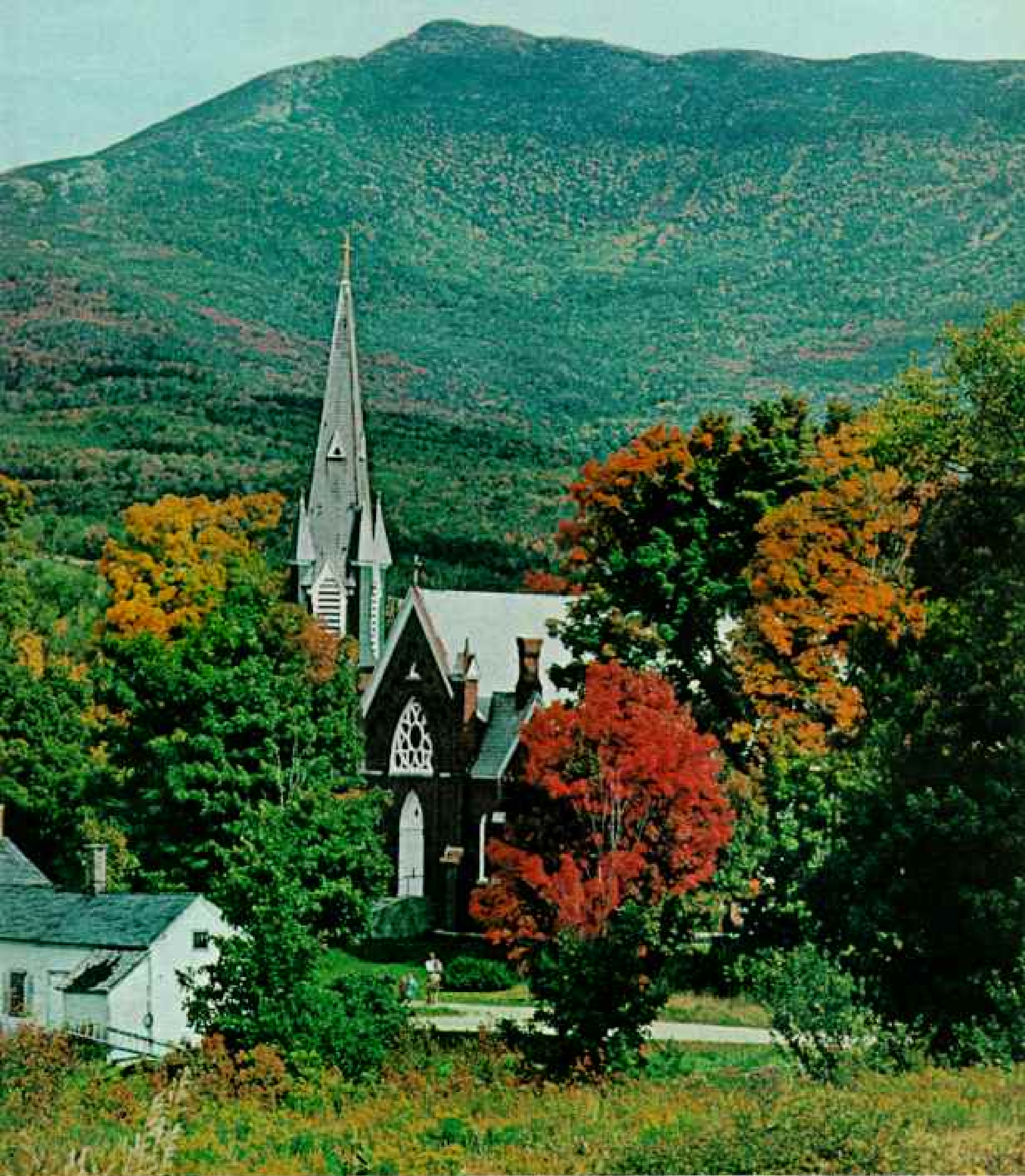


ship and fire first one and then the other broadside (pages 174-5).

The Americans had finally achieved permanent possession of Champlain country.

Along the shore on our way back to Westport, splashes of red in the maples told the nearness of fall. It was almost county fair time—time to end my visit. Solemn judges would soon gather in fairground stables, sheds, and exhibition halls to choose the best cooks, gardeners, and cattle breeders in the county.

Albert's wife Lillian raided the garden every



STAYACHPERE (ABOVE) BY G. ANTHONY STEWART; BODACHPERE BY EMORY KRISTOF © N.S.A.

day, picking the mainstays of her prize-winning pickles and preserves. Albert faithfully turned his squashes, hoping to add enough color and girth to bring home a blue ribbon. He dropped by with some cookies from a batch Lillian would enter in the bakery division. Today he was working as town lister, reappraising property for tax purposes.

We discussed the mounting costs of country living and the difficulties of his job.

"You should have heard one taxpayer holler," he said, "when I put a fair price on a

piece of her property. Claimed it wasn't worth near what I decided."

Albert took a long pull on his pipe and went on: "I admitted it was kind of brushy for cattle and maybe a mite too rocky for a homesite. But I told her she should look at it this way—it was holding the world together."

No one will ever put a better value on a plot of ground. I am obliged to Albert for saying so well what everyone knows who owns a share of Champlain country.

It's holding the world together. THE END





NEW ZEALAND'S COOK ISLANDS

Paradise in Search of a Future

By MAURICE SHADBOLT

*Illustrations by National Geographic
photographer WILLIAM ALBERT ALLARD*

TAKE A MAP and jab a pin into the heart of the Pacific south of the Equator, and with very good luck your pinprick might demolish one of the 15 tiny islands of the Cook group. Scattered thinly over 13 degrees of latitude, between the Samoa Islands and Tahiti, they're easy to lose.

Europeans began this lottery in 1595, discovering islands and losing them, and taking 228 years to find them all (map, page 208). Centuries earlier, Polynesian voyagers found new islands by losing others, eventually settling them all like wind-sown seed.

"You can sail past one in the night and never know," the skipper told me. We stood on the bridge of a tiny trading vessel, peering into a moonless night, almost a week from last sight of an island. "It's done often."

Charts told us we were near Manihiki, in the Northern Cook Islands, but we drew a blank from the dark ocean.

"Here," he said, and handed me binoculars. "You try. First focus on a faint star. Then look at the horizon for a shape, something that might be land."

He signaled half speed to the engine room, while my eyes grew used to the feeble starlight and then searched the murk of the sea.

Something seemed to be out there. A black cloud—or could it be Manihiki?

"We'll see," said the skipper, and reduced speed still further. He took his turn with the binoculars, squinting into space and then concentrating upon an ocean which seemed almost as vast and empty.

"That's it," he said. "That's Manihiki. You know how to find a Cook island now."

But I had to wait upon morning for sight of one of Polynesia's

Splintered gold of sunset silhouettes young anglers on a wave-lashed reef of Rarotonga in the Cook Islands. Their sea-scattered homeland—once a stranger to time, an idyll in the dreams of Western man—now experiments with self-government. New Zealand, which extends citizenship to the islanders, supports the brave new venture of its long-time territory.



Sign of changing times, a scooter proclaims the affluence of a Rarotonga family. But few in the Cooks could afford such a luxury without the aid of New Zealand, which provides more than half the islands' income.

loneliest outposts. Sunrise gave color and texture to that anonymous shadow in the night.

Surf flickered along a reef where flying fish skipped. Sinewy coconut palms rose in dense green tangle above a long, low shore of pink sand and pale coral. Here and there, where palms thinned, a calm lagoon glimmered.

In a clearing stood village homes. Dark figures were shouldering boats to the surf, calling across the water.

For a moment I might have been back in

The Author: Gifted young New Zealand writer Maurice Shadbolt has contributed to the *GEOGRAPHIC*: "In Storied Lands of Malaysia," November, 1963; "Western Samoa, the Pacific's Newest Nation," October, 1962; and "New Zealand: Gift of the Sea," April, 1962. He and another New Zealander, Olaf Ruhén, are now at work on a new *GEOGRAPHIC* book, *Isles of the South Pacific*, to be published in February, 1968.



AGACHPHOTOS © N.I.S.T.

Past churns with present as partners throw a bit of twist and frug into the traditional *tamure* at a Rarotonga dance hall. Garlands of frangipani, called *eis* by the islanders, jiggle in rhythm.

the oldest Polynesia, where virgin islands could still surprise the voyager. The haunting Polynesia of Western dreams, of the writer Melville and the painter Gauguin; the Polynesia of Rousseau's "noble savage," heaven-sent for philosopher, poet, and adventurer.

I had been under no such delusion, a week or two earlier, when radar-guided aircraft—swift jet and lumbering DC-3—winged me by stages across the Pacific to Rarotonga, major island of the Cook group.

I had, besides, some modern, down-to-earth questions on my mind: Can these out-of-the-way islands—around the corner from nowhere—survive? Can their meager resources provide a livelihood for a people bent on tackling the problems of the 20th century? If the questions themselves should surprise, then it is a measure of the tenacity of Western dreams—dreams of sunny islands garlanded



With warlike chop, a cricketer furiously swipes at a ball. Tensions that build up in insular life—once vented in almost continual strife—find release in hotly contested games of cricket, rugby, and tennis.

with the fantasies of writer and film-maker.

For the fact is, the Cook Islands—now crossing the threshold of self-government—face hard political and economic problems for which there are no easy answers.

Yankee Lies at Avarua's Doorstep

The questions slipped from my mind when Moana-nui-o-kiva, the "Great Ocean of the Blue Sky" that Polynesians made their own in times remote, tossed green, surf-edged Rarotonga like a gift upon the horizon.

Pale transparent lagoon and long bright beach soon slid below (pages 206-7 and 219). Next came neat coastal villages and plantations and beyond them high dusky-green slopes, densely forested ridges climbing to sky-needling volcanic peaks long cooled. There was a silvery flash of falling water. The old navigators might have traded half their



ENTERTAINMENT WEEKLY (LEFT); ANIL REDDACHROM (©) N.S.S.

Skull session gives a student firsthand knowledge of tooth and jaw formation in Rarotonga's dental clinic. In less enlightened times, jawbones hung from canoes; battle trophies of cannibal islanders,

precious rigging for my view. Then I had to come to ground, as they to shore.

Lying off the main shipping lanes, the Cooks are only fitfully served by sea. And new international rules, which forbid the flying of DC-3's more than 90 minutes from base, have ensured that now even my engine-straining, seven-hour flight from Samoa is no more.

One of the southern volcanic islands, Rarotonga receives a monthly trading ship from New Zealand, a few cargo boats, and brief-calling tourist vessels. The rest of the group's 13 inhabited islands, especially the Northern Cooks, exist in seldom-disturbed isolation.

From the airport I traveled a smooth black-top highway into the overgrown village of Avarua, administrative center for the Cook Islands (inset map, page 208). The route cracked and snarled with motor scooters. Beyond the coconut palms lining the road,



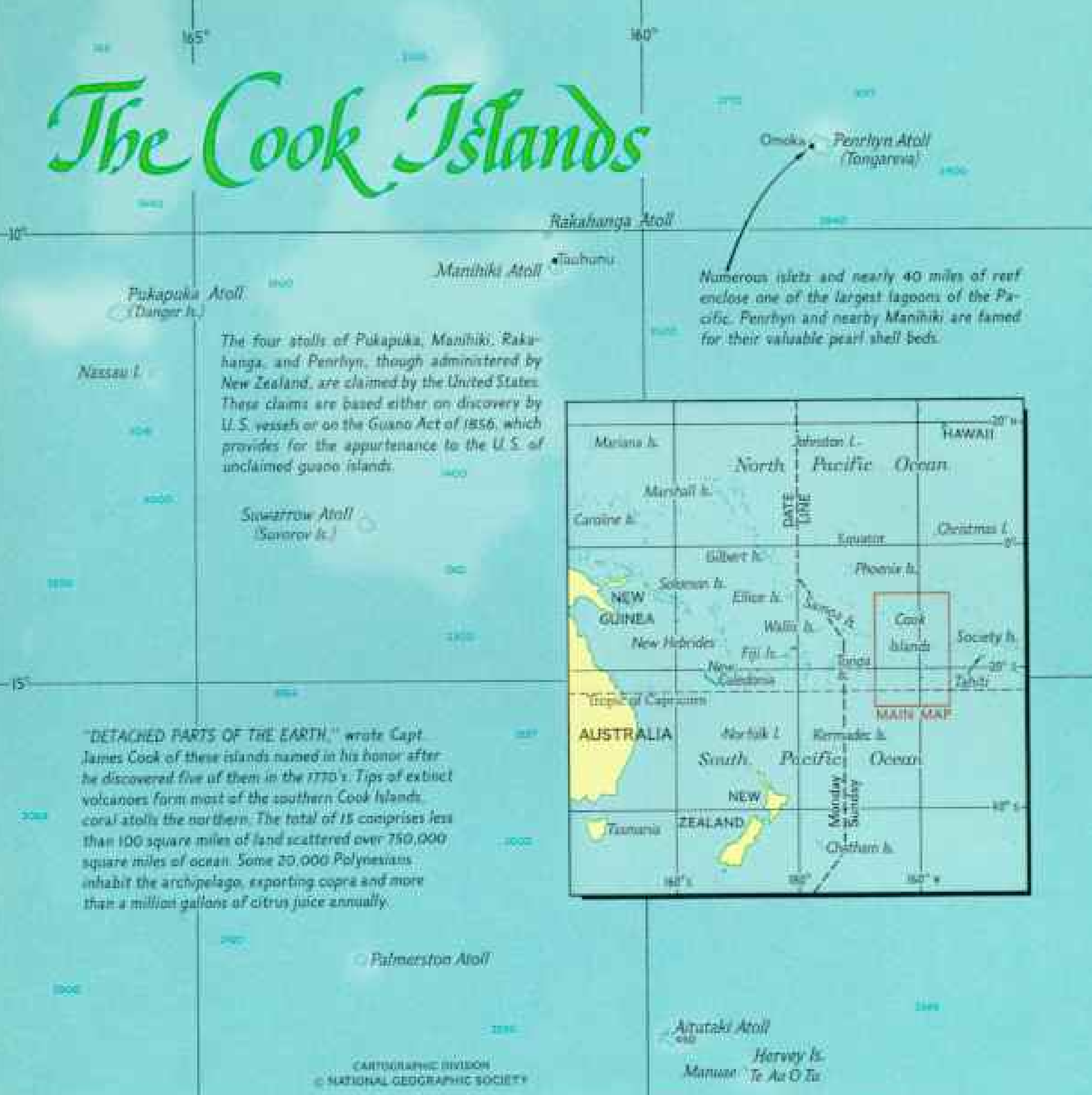
Proud peaks mantled in green and a strand of pearling surf beckon the seafarer to Rarotonga. According to island tradition, mutineer Fletcher Christian and his commandeered *Bounty* stopped briefly here in 1789 to trade, perhaps leaving Rarotonga's first



ETCHING BY ROBERT S. JOHNSON © S.E.E.

orange seeds. Like a ghost from the golden age of sail, the brigantine *Yankee* lies in the clutch of coral off Avarua, the islands' seat of government. Former sailing home of GEOGRAPHIC author Irving Johnson, *Yankee* under new owners swept to disaster in a 1964 gale.

The Cook Islands



The four atolls of Pukapuka, Manihiki, Rarotonga, and Penrhyn, though administered by New Zealand, are claimed by the United States. These claims are based either on discovery by U.S. vessels or on the Guano Act of 1856, which provides for the appurtenance to the U.S. of unclaimed guano islands.



"DETACHED PARTS OF THE EARTH," wrote Capt. James Cook of these islands named in his honor after he discovered five of them in the 1770's. Tips of extinct volcanoes form most of the southern Cook Islands, coral atolls the northern. The total of 15 comprises less than 100 square miles of land scattered over 750,000 square miles of ocean. Some 20,000 Polynesians inhabit the archipelago, exporting copra and more than a million gallons of citrus juice annually.

CARTOGRAPHIC DIVISION
© NATIONAL GEOGRAPHIC SOCIETY

RAROTONGA



Rarotonga, administrative center and largest of the Cook Islands, supports nearly half their population. Sections of Polynesia's oldest highway, coral-paved Ara Metua, still survive here. The "Old Road" circled the island a thousand years ago.

0 100 200
STATUTE MILES

Elevations in Feet Soundings in Fathoms

Coral Reef [Symbol]

though, I glimpsed fishermen in outrigger canoes bobbing near the reef.

Outrigger and motor scooter, Polynesia old and new, the contrast was immediate and everywhere. Palm-thatched, log-framed huts rose beside concrete-block cottages roofed with corrugated iron; sometimes a shiny tractor stood idle in the back yard. And the slanting late-afternoon light made golden the masts of the wrecked brigantine *Yankee*, which once took crews of young sailors to adventures in paradise.* It lay hurricane-tumbled on the Avarua reef (page 206).

Maoris Embark on New Adventure

Avarua, with the untidy wood-and-iron atmosphere of a South Sea trading post, illustrates Western impact. Beached canoes may still be strewn among seafront ironwood trees, but across the road are a department store and coffee bar. A large old church tells of London Protestants who made a missionary kingdom of the Cooks in the 19th century. The collapsing palace beside it was once the home of tribal chiefs.

The heyday of the Western beachcomber may be over, but adventures are not. The Cook Island Maoris have embarked together on the greatest of them all, that of taking their destiny back into their own hands.

For in 1965 the 20,500 people of the Cooks, after 65 years of missionary lawmakers, then another 77 of paternalistic British and New Zealand rule, took over the business of governing themselves again. They elect their own legislative assembly, their own premier. Though they retain New Zealand citizenship, military protection, and financial help, their internal economic and political problems are now their own to solve—if they can.

*After many adventurous voyages around the world—and through the pages of the *GEOGRAPHIC*—the *Yankee* was sold by Irving and Electa Johnson in 1959. Sailing with new owners, she was wrecked in the Cooks in 1964. The Johnsons have since purchased a new, smaller *Yankee* for cruising the Nile and Europe's inland waters.

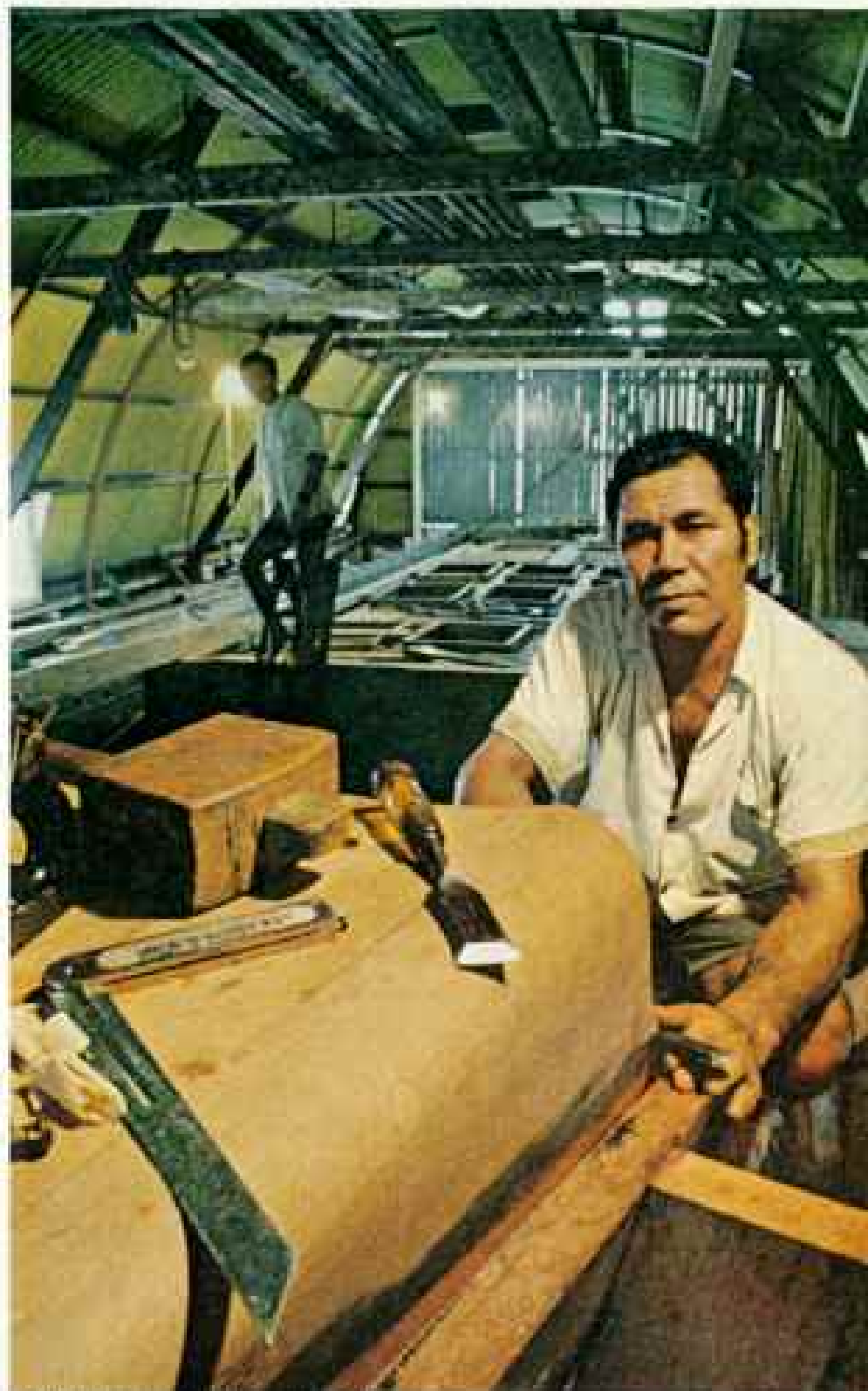
Hand-shaped section of a 55-foot fishing boat bears the hallmark of Rarotonga shipwright Uapa Marsters, descendant of an English sailor who settled on Palmerston Atoll a century ago. Built for the Cook Islands Government, the boat will explore deep-sea fish resources. By going beyond lagoon and reef—overfished in recent years— Islanders hope to fill the home demand for seafood, chief source of protein in the Polynesian diet. Fish now must be imported from New Zealand to supplement local catches.

Thus began a dramatic race against time, for islands are emptying all over the Pacific, and the Cook Islands are no exception. An estimated 8,000 younger Maoris, more than a third of the total population, have already left for New Zealand's urban lights.

They leave behind them the question which began again to puzzle me as I walked in Avarua: Can island communities so tiny, scattered, and loosely linked survive in the 20th century?

To move, as I did, among Rarotonga's exploding population of 10,000 is to know people of the entire Cook group, for outer islanders come here in ever greater numbers from their ancestral homes. But seldom to prosper. I found immigrants from remote Pukapuka, 820 miles away, still practicing fast-vanishing island crafts. Others from Manihiki Atoll, 760 miles north, work as factory hands, fish an overfished reef, and grow a little taro on land they can lease but never own.

"Don't you want to go home?" I asked.



EXARCHADINE BY WILLIAM ROBERT ALLARD © W.A.S.





Naked to the waist, the muscular fisherman from Manihiki unshouldered the paddles of his canoe. "Of course," he said. "And one day I might, for a visit. Up there I have family land, but good only for growing coconuts. And there is no high school—not enough people. So I brought my children here. Now we're used to Raro. Some of my children have gone to New Zealand and send back money. We get along."

A typical story, yet cheerfully told.

"Promise me one thing, though," he said as we parted. "Promise you see Manihiki, the most beautiful of the Cooks. Ride out across the lagoon—and taste the Manihiki coconut crab."

His eyes were wistful as I promised. It is that faint wistful gleam which distinguishes outer islanders from the Rarotongan: a yearning for lost islands their children may never see.

Politics Cloaked in Flowers and Hymns

Yet this is still Polynesia, and unhappy faces are few. Anything can be a joke; everything can become a festival.

There was the political meeting to which I went as observer. Serious? Of course; this time most ukuleles were left at home. But the thousand-odd Maoris who trooped in from the villages were tangled brightly with fresh blooms. Flowers and passionate hymns transformed Western-style politics into something peculiarly Polynesian.

Though grievances can kindle local problems to the boiling point, internal self-government came quietly to the Cooks. There were no street demonstrations, no riots.

"I don't think we could manage a real riot," a young Rarotongan said with a smile. "Someone would be bound to start playing a ukulele, and that would be the end of it."

I took to a motor scooter to see Rarotonga.

Kiting over a spun-silver sea, tuna fishermen from Penrhyn Atoll sail to the strum of wind filling patchwork canvas. Superb sailors, Polynesians of old threaded vast Pacific reaches in outriggers and double canoes, guided by stars, prevailing winds, and charts made of shells laced to grids of pandanus. Such intrepid adventurers settled the Cook Islands, which later sent out Maori colonizers to New Zealand.

Lost in an infinity of sea, a star glows in the Pacific firmament—Manuae Atoll, or Hervey's Island, as discoverer James Cook called it. Surf breaking over the coral reef frames copra plantations. To harvest the crop, some twenty men sponsored by the Cook Islands Cooperative Bank sign up for one- or two-year stays on the otherwise uninhabited atoll.

RECORDED BY ROBERT E. JOHNSON (BELOW) AND WILLIAM ALBERT ALLARD © R.E.J.



A 20-mile road circles the island; inland lies a curious and narrow coral-paved route named Ara Metua (Old Road), built a thousand years ago. Once tribesmen lived on the inland side of this road, but missionaries insisted they move to church settlements along the coast.

Today only eroding stones along this route tell of a vanished and complex Rarotongan civilization. When missionaries directed destruction of all graven images of ancient belief, Polynesian gods were vanquished forever.

Or were they?

Old Gods Await a Change of Faith

At affluent Arorangi village, home of the island's best agriculturalists, I paused astride my scooter. Beyond the neat Protestant church and bell tower rose the flat summit of bulky 1,165-foot Mount Raemaru.

"Up there," a Rarotongan friend explained, "is where the old gods went when the Christians came. They said they would wait there until people tired of Christianity. And they would always be there for whoever needed them. You will find a track worn to the summit by feet, human feet."

The plateau on top of Raemaru seemed an entirely proper place for gods to wait, and the tradition had echo in a conversation later with Pastor Bill Marsters of the London Missionary Society. Mr. Marsters is a member of a clan famous in the Pacific. It descends from an English sailor who settled on tiny and lonely Palmerston Atoll in the Cooks a century ago. Members of the family today number more than a thousand.

He told me, "I'm afraid Christianity no longer has so strong a hold. The example of the *papaa*—the white man—has not always been good. After all, the *papaa* brought Christianity; yet the Maoris see many white men whose behavior is far from Christian. And then, of course, the original fervor for Christianity has almost gone, and often there is a reversion to old belief, old superstition."

Though nominally one hundred percent Christian like the rest of the Cook Islands, Rarotonga is also typical in its superstitions. *Tupapaku*—ghosts—can roam the night under the star-studded Pacific sky.

At Ngatangia village, still on my scooter, I met one of Rarotonga's *papaa* characters. The lean and crisp-spoken English author Ronald Syme fell in love with the island and what he calls its "wild and lovely" people at the age of 17. He returned later in life to make a home near the pale water and palm-fringed islands of Muri lagoon.

"Legends?" he said. "This place is thick with them, old boy. Take this village, Ngatangia. It means 'the people of Tangia,' a Tahitian who went out exploring and ran across a Samoan named Karika in mid-ocean.

"They would have fought there and then, except there were no spectators to applaud a victory. So they voyaged together, discovered Rarotonga, conquered earlier arrivals, and divided the island between them. Tangia lived here, and his descendants still do."

Syme's village, on the east side of Rarotonga, is historic on another account. It was here the first Europeans made recorded contact with the island's Maoris.

Oddly, despite its size and beckoning peaks, Rarotonga was one of the last islands to be fished from the Pacific by Europeans. Capt. James Cook, for whom the group was named, missed it. Tradition has *Bounty* mutineers trading here in 1789. Then a tantalizing glimpse from a passing vessel in 1813 led speculators in Sydney, Australia, to dispatch a ship to the island. They were searching—in vain, as it turned out—for sandalwood.

Islanders Surprised by Visitors' Garb

Under a captain named Goodenough, the *Cumberland* glided gently up to Ngatangia in 1814. From this encounter probably came the Maori word for European, "*papaa*," which means "four layers." It records the Rarotongans' surprise when they learned that the strangers wore several layers of clothing.

The *Cumberland* expedition was a complete disaster. Not only was there no sandalwood, but five of the ship's complement were slain and eaten by Rarotongans. One was Captain Goodenough's mistress, the only known European woman to fall victim to cannibals in the Polynesian Pacific. Today a dense-branching tree overgrows the spot

Dignity outraged, a pint-size patient dangles from scales at a children's clinic on Rarotonga. All citizens receive free medical and surgical treatment from the islands' Public Health Services, financed by New Zealand. A medical officer resides on each inhabited island and specialists make periodic visits. A sanatorium on Rarotonga cares for patients with tuberculosis, the Cooks' most prevalent disease. ILLUSTRATION BY WILLIAM ALBERT ALBERT © 1967





FRANCIS & TAYLOR

Left alone without a middle generation, the very young and the very old cope with problems of life on Penrhyn. Many young adults forsake their homes for better jobs on other islands or in New Zealand, leaving offspring with older relatives.

where she perished, and there, on nights of full moon, Rarotongans say her restless spirit still cries for help.

Late one afternoon I set out to visit a relic of pagan Rarotonga. Following Syme's lovingly precise directions ("Very few people go there, old boy"), I skidded my way along a rain-slippery stretch of the inland Ara Metua, gloomily overhung with huge old trees. I came to a grove of tall coconut palms, exactly as he had described, their tops still lit with vagrant gleams of sunlight.

Before me lay Marae Arai-te-tonga—a square paved with volcanic rock, with an altar and coronation stone. This open-air temple, the most sacred on the island, was reserved for investing and anointing Rarotonga's high chiefs by the *ta'unga*, or priest.

For a long moment, in my imagination, it

didn't matter that weeds now sprouted in the courtyard, that the stone seats reserved for the noblemen were tumbled and spotted with lichen. All might have been fresh again, waiting for the sacred rites that would herald a new ruler. The silent valley might still have rung with the sound and song of Polynesian civilization. In quiet and seclusion the marae had survived missionaries and vandals. I moved slowly over the courtyard in the leafy green light.

Then a voice. I froze.

But it was only a middle-aged villager. He stood stripped to the waist, a little distance away, machete in hand and probably fresh from his banana plantation. All the same, I felt uneasy. Was I transgressing some ancient law, some still unlifted *tapu*?

Then he struck his machete into a tree and smiled. "*Kia orana*—may you live long," he said. "You are interested, I think, in our old ways. As you can see, this place of our forefathers is still tended, or it would have been long overgrown."

Who tended it? He shrugged. "It is done by those who still have respect. These young people today, with movies and motor scooters and money in their pockets, despise the old things.

They turn away from their proud past into emptiness. In my heart I cannot ignore the old greatness. A people with no past is nothing."

He led me along a muddy track to ground densely overgrown. More stones, clearly foundations. "Here," he said, "was the home of the *ta'unga*. And there the house where the young people grew up. And this"—he halted before a large rock—"was the stone of execution, where offenders against the law had their brains dashed out."

In fast-dimming light, I bent to examine the stone grained with the blood of centuries. But I was careful not to touch it; I have lived too long in the Polynesian Pacific not to respect *tapu* when it stares me in the face. Then the villager, approving my interest, steered me back to my scooter, where we shook hands. He vanished quickly into the dusk, for no

Maori remains near the temple after nightfall.

My scooter, when I kicked the engine into life, sounded painfully loud. My headlight flickered over orange groves, ripening fruit strung like lanterns in the trees, and I was abruptly back in the Cook Islands' present.

For the citrus tree is increasingly the money crop of the volcanic southern islands of the Cook group. It is alien to Polynesia; possibly the first orange trees grew in Rarotonga from seeds left by *Bounty* mutineers.

New Crops Transform Island Economy

Next day I traveled out among the citrus plantations, which now green most of the island's 5,500 arable acres. Pickers were harvesting tangerines and oranges—the best for shipment fresh to New Zealand, the rest destined for Avarua's expanding fruit-juice cannery. Started in 1961, Cook Islands' fruit-juice exports now approach a million gallons annually. Agricultural experts, looking be-

yond the time when the New Zealand market is saturated, foresee possible markets in Europe. Pineapple growing, too, has been boosted by the cannery's presence.

"You can tell the money that's coming into the islands by the number of motor scooters," a young and alert grower named Motu told me. We sat in a sunny and fruit-bright orchard sampling the finest tangerines I have ever tasted. "My wife's a nurse, gone off to New Zealand to study, and she wants me to join her down there. But I reckon we can do better for ourselves here now. There's good money, if you're prepared to work."

Elsewhere I found villagers punching tomato plants into rich black soil. The tomato thrives in the relatively cool winters, when temperatures drop as low as 48° F. from a warm annual mean of 74°. Improved shipping in recent years makes the perishable tomato another profitable export.

In the evenings, with work done, villagers

Hungry for knowledge of the outside world, a Rarotonga teen-ager bikes home from the public library with treasured books. New Zealand provides free primary and secondary schooling for all Cook Islands youngsters. Bright students may pursue higher education in New Zealand under government sponsorship.

STITCHMORE © A.S.S.





like sitting outdoors, as they have for centuries, to sing old love songs and watch old drum dances. At Ngatangia I dropped in on rehearsals of the village dance team.

Turepu, young schoolteacher and guitarist-coach of the team, was forthright about the difficulty of being an educated Rarotongan. He wanted to study anthropology as a career. "But how can I give my whole mind to study," he asked, "when all around me are young people who only want to be happy?"

I left Rarotongan problems behind when I boarded the midget 200-ton trading ship *Akatere*. I had a promise to keep, to a man from Manihiki. Ahead was a 1,600-mile round trip

through northern atolls of the Cook group to pick up copra and deliver mail and supplies.

"We go up when the copra makes it worthwhile," Archie Pickering, the Fijian skipper, told me. "They don't see us often—maybe three or four times a year. Our top speed is seven knots. That makes it a long haul."

We stood together on the bridge as the *Akatere* made ready to depart Rarotonga. Ashore the crowd was thick and noisy. People flung or exchanged garlands. Deck passengers were northern islanders, often elderly, returning perhaps forever to their native atolls. Younger people who had chosen life in Rarotonga or New Zealand said farewell.



EXTACHHOME (REVUE) AND MISIONERONG BY WILLIAM ALBERT ALLARD © 1972.

Late for church, a young girl peers anxiously inside. She missed the parade and band concert that preceded the service. Churchgoing has long played an important role in island life. As early as 1823, the London Missionary Society sent its first evangelist, the Reverend John Williams, to Rarotonga. Until the southern islands became a British protectorate in 1888, missionaries virtually governed the entire area. Today the religious community also includes Roman Catholics, Seventh-day Adventists, Congregationalists, and Latter-day Saints.

Catholic mission-school student (right) awaits a race on an interschool sports day.

Brothers and sisters, parents and children—many were unlikely ever to see each other again. The first tears seeped, the last line dropped.

Then it came, a rumble rising to a roar—what I can only call the grief of the Pacific. The grief it has known since the first Polynesians crisscrossed their way, canoe after canoe, through its far-scattered islands, leaving friends and families behind.

With soul-shaking cries, face after face crumpled in despair and dismay, now the tears gushed as the churning *Akatere* pointed its nose toward the Equator. A wake of flowers, falling garlands, marked our way through the gap in the reef.

We were out on the loneliest of oceans. The first day we sighted a yellow Japanese fishing float, the second day a piece of driftwood. On the third day, rolling through fine weather at six knots, *Akatere* was joined by the first sea bird since Rarotonga.

Sea birds supposedly guided the old Polynesians to their islands, so I consulted my map and found that over the horizon lay Russian-named Suwarrow Atoll, uninhabited but storied nonetheless. Piracy, buried treasure, strange European ruins, flintlocks in the sand, hurricanes, and hermits constitute its





legend. Some 15,000 gold U. S. dollars were supposedly lifted from its sands in 1872.

The fourth and fifth days were empty of all but brilliant sunsets. Tiny trading ships which ply these unpredictable, hurricane-haunted waters are hundreds of miles from help. Without radar, ships depend on their skippers' instinct, and reefs grow rich in wreckage.

Over the Reef to Manihiki

On the sixth morning the thud of the engine was muted, the ship drifting. I scrambled to the rail to see the sun rising beyond the palms of Manihiki Atoll, which I had helped find the night before. Tiny flares of red and yellow sunlight exploded through the trees, lighting whitewashed homes. Ashore there was noisy

excitement: We were the first visitors in two months. Boats swarmed to the *Akatere*.

I found myself in a slender and delicately balanced longboat, shooting the seething water of the reef. My first shoot, the first of many. "*Ariana*—Wait a moment," called the steersman, watching for the right wave. Then "*Oe!*—Pull!" when he saw our moment. Oars flashed as we hurtled forward on a high breaking wave, over perilous coral, to the safety of a pale and lovely shore.

Most of the atoll's 650 population seemed on hand to greet us. A village girl danced forward to drop an *ei*—equivalent of the Hawaiian lei—about my neck. But this one was different. It told the story of the people who, over generations, have adapted to the



ENTRANCE TO AVA AVAROA PASSAGE AND APPROACHING CLIFFS BY ROBERT D. JOHNSON, PHOTOGRAPH BY WILLIAM ALBERT ALLARD © U.S.S.

demands of life on these infertile coral isles.

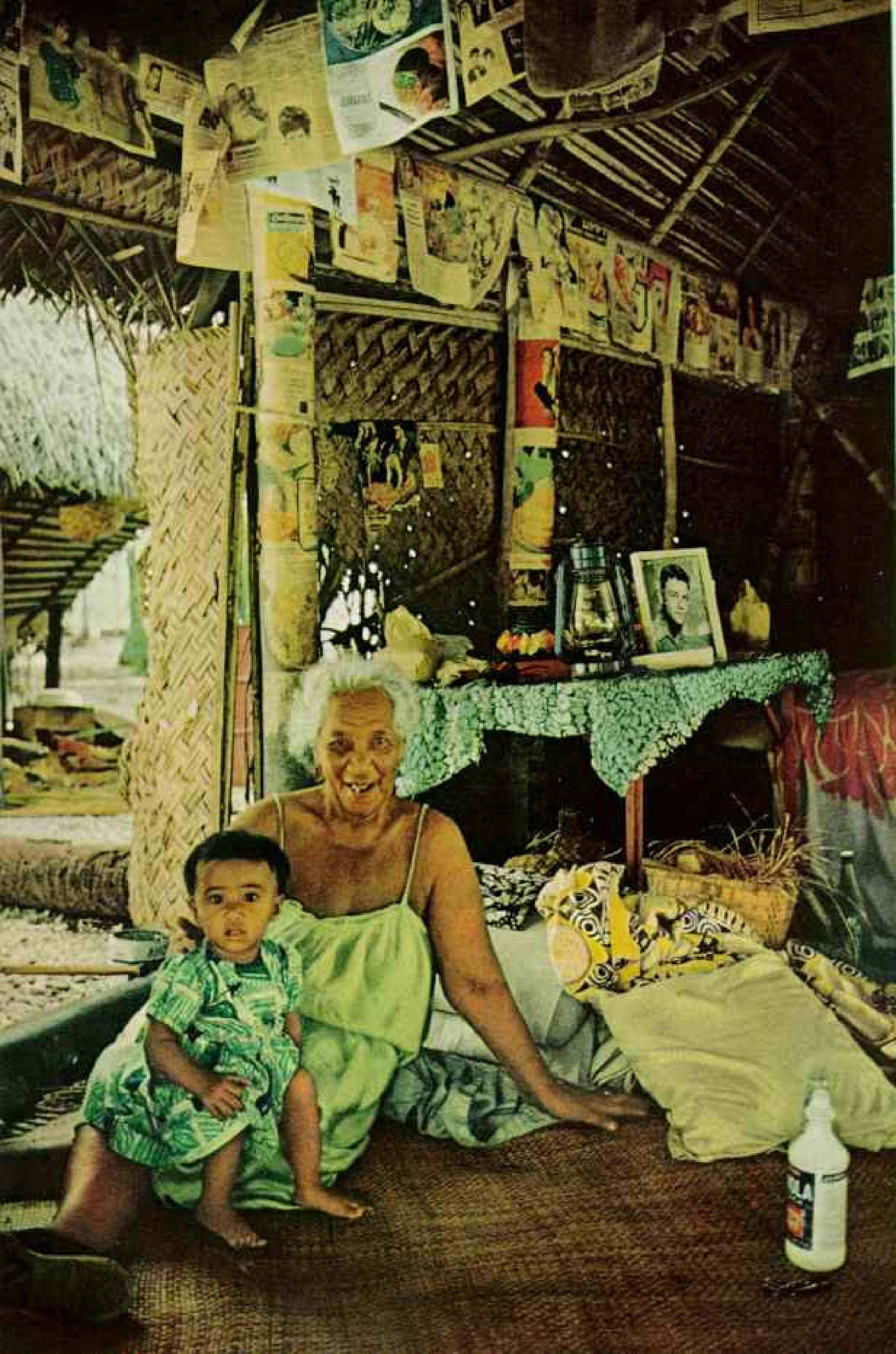
Inhabitants of this 1,350-acre atoll have learned to live without the flowers and fragrance of the green volcanic islands to the south. But imagination and patient hands had conspired with ancestral memory to create the Manihiki *ei* I was wearing: tiny shells of the shore were shaped into a marvelous and perfect illusion of blossoms.

I barely had time to get my breath before I was in another longboat on the other side of the land, this time with an outboard motor cutting a wake across Manihiki's wide lagoon, peaceful and luminous in the early light. Manihiki, like most atolls, is in fact many islands: a necklace of 39, most small, strung about a deep, reef-protected (and thus

Feathery fronds of coconut palms bend over a white-sand beach on Rakahanga, where men wade the shallows to load a boat.

Coral heads that can tear open a boat's hull pepper Aitutaki's reef. Rapidly multiplying colonies of polyps extract lime from sea water to build rock-hard skeletons. Each generation of tiny animals adds a layer to the growing domes.

"Deepest and most treacherous of all channels," Irving Johnson called Avaavaroa Passage (above). It slices the reef beneath the knitted brows of Rarotonga's loftiest peaks: 2,140-foot Te Manga, background, left, and 2,095-foot Te Atukura, center.



shark-safe) lagoon. I was in distinguished company, for Manihiki's pearl-shell divers are famous. The local record is 180 feet—without scuba equipment. Eighty to 120 feet is considered nothing spectacular.

In mask and flippers I could hope only to accompany them a few feet of the way down. With goggles distorting their faces, the divers shot past me, down, down, among pinnacle and crevice of bright coral, among disintegrating rainbows of tropical fish. In this shimmering world my companions grew small as they glided with incredible leisure over the lagoon floor far below. They paused and plucked and then, fast soaring, surfaced with handfuls of pearl shell to gasp precious air.

Though the market fluctuates, and the lagoon is occasionally closed for shell regeneration, mother-of-pearl has for years been a major money-maker for Manihiki; the other is copra. But where shell diving is a matter of individual skill, coconut gathering for copra is strictly a family business. So I discovered next day, when I was again escorted across the lagoon by a group of genial islanders. Each family knows its traditional land, despite lack of markers, down to the individual palm tree. Men gathered and husked the nuts, and bagged them for return to the village for sun-drying; women gathered fronds and wove baskets. Even the children helped.

After work came the best part of the day. I joined the laughing hunt for coconut crabs which hide under

Old-style living in a thatch-roofed *whare* affords many comforts for this woman and child on Manihiki, a northern atoll. Walls woven of palm fronds and supported by coconut trunks let in cooling breezes. All the floor's a couch with wall-to-wall straw mats. Rafters make handy hangers for decorative newspaper and magazine pages. Convenient but separate, a cookhouse lies beyond the door.

Succulent coconut crabs roast on a bed of hot stones at a feast in the Manihiki manner. Hunted by night, the creatures defend themselves with massive claws that can easily sever a finger. Diners prize the fat of the tail, which they eat with baked breadfruit,

coral rubble. The fugitives, often lobster-size, were prodded from their holes, claws clashing. Cooked on fire-heated stones (below), they were delicious. *Paua*, large clams from the lagoon, spiced the feast. I was keeping my promise to the man from Manihiki.

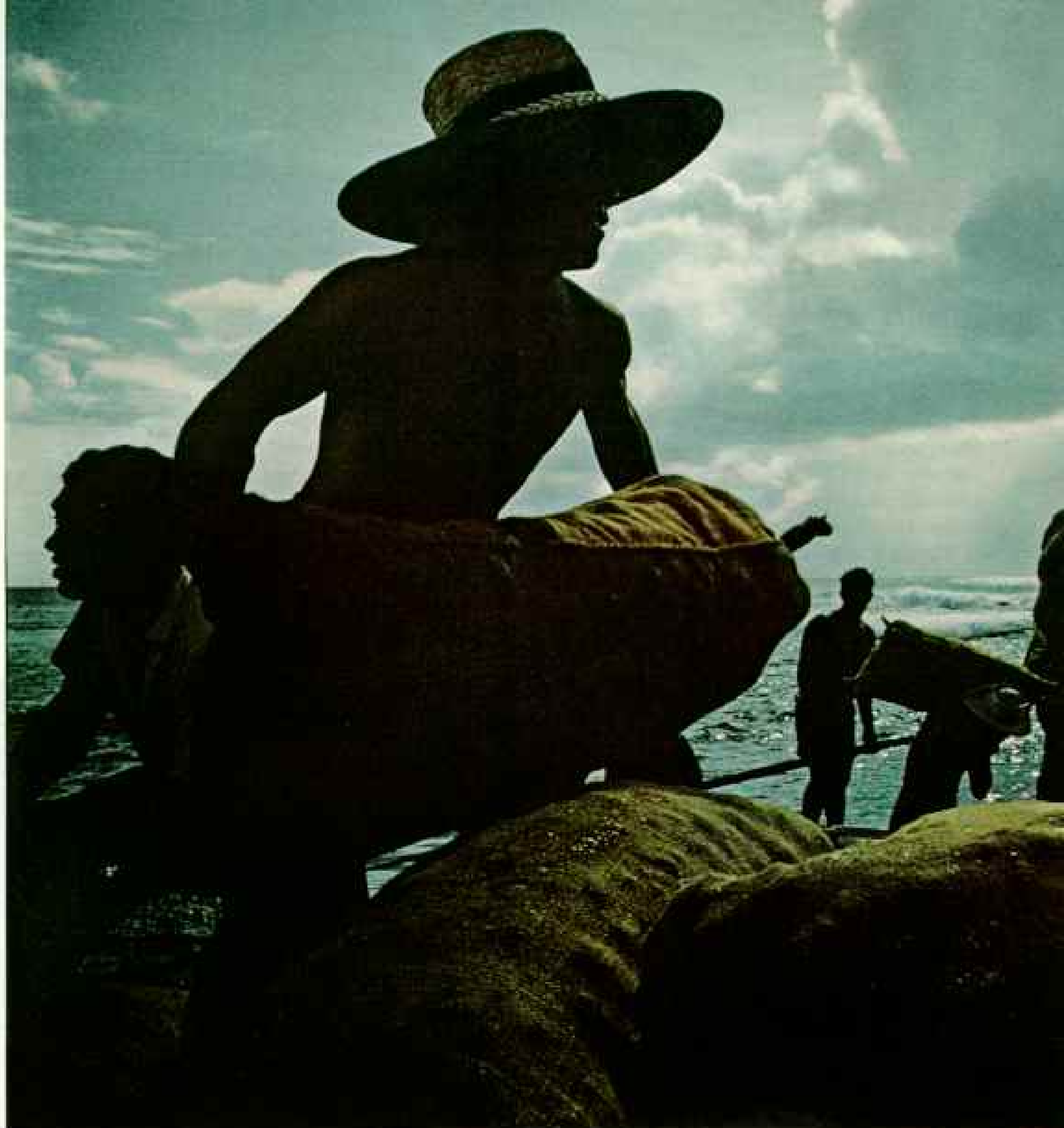
All Hope Goes With Islands' Young

Back at the neat, clean village of Tauhunu on the main island, I saw the longboats bounce across the reef to *Akatere*, loading some 30 tons of copra to boost the island's income by about \$4,200. We were also taking aboard another major Manihiki export: young men and women, people in the 20-40 age group.

Trader George Ellis lamented the fact to me as we sat on his stilted veranda above the lagoon: "If the young people go, everything will go. For who will there be to learn to weave the coconut frond in Manihiki style?"

REPRODUCED BY WILLIAM BLESBY BLAND © N.S.P.





Who will learn to fish the Manihiki way? All custom, all tradition, will die."

I learned about Manihiki fishing that evening, on the ocean side of the island. Our quarry was *koperu*, silver mackerel-like fish that abound at dusk—but deep. The divers, their mouths crammed with shredded coconut, went fathoms down to feed the fish, tempting them nearer the surface. Soon the *koperu* started to spiral up, climbing the coconut trail.

Then the fishing began. The men dived, carrying rods, and literally fed coconut-baited hooks to the eager *koperu*. The hunt, a fathom or two down, assumed a weird, balletlike quality, men swirling amid silver swarms of fish. Then they surfaced and flipped their catch into the boats.

Was George Ellis right—would this grace-

ful skill perish too? Surely the human race would be poorer if Manihiki, plucked from the Pacific by Spanish explorers in 1606, became one more empty name, one more uninhabited island.

Next morning we were at Rakahanga, 25 miles from Manihiki, taking aboard more copra (above). Legend has it that the two atolls were once one, together part of a great fish hauled from the sea by the mighty Polynesian folk hero Maui. It was Maui who, when the world was still young, brought fire to earth and snared the sun—and fished up islands in the great Polynesian triangle, from Hawaii in the north to New Zealand in the south and lonely Easter Island in the east.

Once the people of the two atolls were certainly one, sojourning in each alternately, but



EDUCATION © N.A.S.

missionaries halted the annual migration, arguing that sea travel was too costly in life.

It still is. A few years ago a boatload of Manihiki men, returning from a visit to Rakahanga, was blown 2,100 miles to the New Hebrides. Only three of seven survived the two-month ordeal. I asked one what he remembered. "Hunger and terrible thirst," he said. "And seeing land we were always too weak to reach." And what kept him alive? "Faith," he answered. "Only faith."

Today fewer than 400 people inhabit Rakahanga's one village. Without pearl shell, they rely on copra for cash. But there is some compensation in other crops from the island's thin soil. I walked past flourishing taro patches and banana plants on my way to the village school, but was stopped short by Rakahanga's

Hefting sacks of copra, islanders load lighters beached on the shore of Rakahanga. Coconut plantations cover more than half the Cooks' arable acreage, but the crop yields small returns. A ton of dried coconut brings only about \$140. In the southern Cooks, farmers are finding a better living growing citrus fruits, pineapples, and tomatoes.

strange cemetery. Again I faced an obdurate and ancient custom of the islands.

Each grave was roofed, like a dwelling. And many, I soon saw, *were* dwellings, with blankets, water jugs, and lanterns; dwellings for the living as well as the dead.

"We believe," explained a Rakahangan, "that the dead must always be appeased by the company of the ones closest to them. Otherwise they might return in anger as ghosts. So mothers sleep out at night with dead children, husbands with wives." For how long? "Perhaps five years. It depends." But I saw older graves where the living still slept.

The living are healthy enough. In an empty dispensary the visiting doctor from Manihiki told me cheerfully, "Not much business here." And at the school I watched sturdy children at study and play. They studied English arduously, sometimes by radio from Rarotonga, for a future still obscure. The brightest would go south to Aitutaki Atoll and then to Rarotonga for further education, perhaps eventually to New Zealand universities. But how many would ever return?

Ghostly Flames Light Penrhyn Lagoon

Now *Akatere* was on the last leg of its northward journey. A night and a day after Rakahanga we came to Penrhyn, northernmost of the Cook group, nine degrees short of the Equator. An urgent message had come through even before we'd left Rarotonga. Without a ship for four months, Penrhyn islanders were out of canned meat, sugar, rice, flour, tobacco, and soap.

So we weren't surprised, when we stood off the entrance to the lagoon after nightfall, to see lights of island sailboats bobbing out toward us. "Ataava—cigarettes" was the call as their occupants scrambled aboard.

But there was a sobering note. The night before, the inexplicable "ghost fire" of Penrhyn had been seen burning in the middle of the 108-square-mile lagoon. Fluttering unpredictably several times a year, the fire is firmly believed to herald death—and that night a year-old sick child had died on the island.

Archie Pickering told me that U.S. Navy



men, during World War II, crashed a PT boat on a submerged reef while seeking the source of the fire. It remains unexplained.

In the morning we were piloted into the great lagoon. To sail into remote Penrhyn, up to the crowded wharf at Omoka village, is still like sailing into a collection of Gauguin portraits. There were the stolid Polynesian women, squatting heavily or standing flat-footed, exactly as the artist painted them in Tahiti 70 years before.

Life on this most barren of atolls has given the Penrhyn Islander a reputation for toughness, and he looks his reputation. Today some 700 people occupy an atoll almost depopulated a century ago by Peruvian slavers. Next major contact with the outside world was during World War II, with hundreds of U. S. servicemen, when the island served as a Pacific base. Women still wear aluminum combs made from the wreckage of a Liberator bomber which gathers foliage beside a seldom-used airstrip.

Pearl Diving No Longer Pays

I looked over the faces in the crowd. There was the now-familiar selection: the very old, the very young, and few between. Children, many of them sent back to grandparents by migrant parents, swarmed over bags of copra, now the island's only substantial export.

Once it was different. Once the island was fantastically prosperous in the pearl business. There was a faint, pathetic echo of that prosperity in the islanders who shuffled up to me as soon as I stepped ashore. "Pearls," they offered, "beautiful pearls."

The market for Penrhyn pearls—high-quality natural gems—slumped before World War II, and was finished by the Japanese cultured-pearl industry afterward.

"They were great days," recalled 83-year-old Philip Woonton, onetime "Pearl King of Penrhyn," when he invited me to a cool drink on his veranda. "I remember checks for thousands of pounds passing through my hands."

Now, he told me, families hoard pearls, in the hope that the market may revive. But the

hope grows ever fainter, ever sadder. Diving gear rots in Philip Woonton's back yard, and the best divers have long since migrated.

A few still skin dive for mother-of-pearl shell rather than pearls. Manihiki divers are known for depth, Penrhyn divers for courage. A diver exchanges fear for faith in a lagoon seething with sharks.

Young schoolteacher Terepai Tutai took me out on a shell-fetching expedition with some friends. After long prayer, he observed: "Here we believe sharks only attack men of poor faith. Or those who have not paid proper attention to their prayers before diving. Now let us go over and see." He produced rubber slingshot and spear. "I will kill a few small fish to bring the sharks around."

Serenity Reigns Amid Circling Sharks

To me it seemed like an invitation to Russian roulette, but I followed him over the side. While his friends dived for shell, Terepai speared enough small fish to leave visible streaks of blood in the clear water. In moments the sharks began to gather, with flicking tails and questing noses.

I had surfaced in a wild explosion of water and climbed back into the boat by the time Terepai came up again. "Nothing to worry about," he reassured me. "They're just black-tipped sharks [left]. They very seldom attack. It is the *papera*, the black shark, you must watch. Come down again."

I dived beside him and made a rough estimate of about 40 circling sharks. Terepai's friends continued fetching shell, apparently serene in their charmed circle of faith. Terepai grabbed my shoulder and pointed.

There, beyond the black-tipped sharks, were the *papera*, more gray than black, looking efficient killers from snout to tail. Thereafter Terepai himself stayed close to our boat.

"If they attack," he gasped, when we surfaced to talk, "kick them in the nose. Not in the teeth. You can lose a leg that way."

The divers went on with their work, with an occasional glance over their shoulders. A

Diving to danger in 60 feet of water off Penrhyn, a mother-of-pearl fisherman grabs a prize oyster shell within striking range of a black-tipped shark. While the author watched from a boat, NATIONAL GEOGRAPHIC photographer Bill Allard worked amid a growing number of sharks that "seemed to be snicking and snapping all around," Mr. Shadbolt recalls. "Suddenly a deadly *papera*—a black shark—took an unnerving interest in Bill. I saw it break surface, swerve, and dive a few yards from him." Spotting the killer, Allard swam furiously back to the boat and clambered aboard just as the shark broke water behind him.



Hallelujah! Hallelujah! With unbounded enthusiasm, Penrhyn Islanders shout the night away at a *uapo*, or religious songfest. Villagers, divided into two teams, vie with each other at hymn singing, a favorite pastime since the 1830's. The people became "devotedly fond of singing," observed missionary Aaron Buracott in 1831, "and seemed to



Overcome with emotion, a hymn singer holds her head during a Penrhyn uapo.

Trooping from church, Penrhyn islanders pass the grave of Muara Woonton. Her husband, now 83, reigned as "Pearl King of Penrhyn" before Japanese cultured gems depressed the market for natural ones. Graves on Rakahanga Island often lie beneath a roof that shelters a living relative, who sleeps there to appease the spirit of the departed.



ROOCHROMES (C) H. S. L.



have no sense of fatigue. Their urgent requests to be taught new tunes often deprived our brethren of their rest. . . ."

sleek papera, perhaps bored, moved close.

Then I saw the Penrhyn instinct at work, the instinct of islanders who have lived long with sea and shark. They seemed to surface as one and climbed, unhurried, back into the boat. With a snap and crack of sail we glided to another part of the lagoon.

On Penrhyn, faith goes hand in hand with healthy respect. Though many islanders are savaged by sharks, few ever perish; five were attacked in the year before my visit, with no fatality. It takes a lot to kill a man of Penrhyn.

But life offers other pains than sharks. "We go hungry when ships don't call and the sea is too rough to fish," a young, well-educated islander complained to me. "I live with my family and earn about \$5.50 a month from copra. Just enough for tobacco. If I really worked hard, I might be able to earn \$10 a month. It's hopeless. I'd clear out on

your ship if I could, but there isn't room. There's never enough room for Penrhyn people wanting to leave."

The *Akatere* had taken its maximum of deck passengers, and I found Archie Pickering checking for stowaways. But one eluded him. She revealed herself in triumph when we were well out to sea. The woman wanted to accompany her son to Rarotonga.

Islanders Protest French Nuclear Tests

Now the Pacific turned violent. The *Akatere* grew tiny under the tremendous waves that burst over the bridge. It lifted, heeled, and crashed backbreakingly into troughs.

"One thing about this ship," said Archie Pickering dryly at the wheel, "it's hard to sink, being so small."

After six battering days we lay up in the lee of Aitutaki, one of the southern volcanic



islands and second most populous in the Cooks. Little more than a 4,461-acre hill, with an island-dotted lagoon, it is a hybrid of volcanic outcrop and atoll (pages 218-19).

Aitutaki supports 2,900 Cook Islanders, principally through citrus-growing and copra-making. But its fame is as home of the Pacific's best dancers. Year after year, at Tahiti's Bastille Day celebrations, Aitutaki dance teams have taken first prize. In 1966, however, international politics interfered.

"No," said an adamant resident of the island. "We're not sending our team to Tahiti this year. It's the only protest we can make against French nuclear testing in the Pacific. It's costing us a lot of prize money to make that protest—and people here often neglect agriculture for their dancing."

With Archie Pickering as companion and guide, I voyaged out to other southern islands.

To 4,552-acre Mauke, where poor soil limits orange production and wild growth tangles over abandoned groves. To womanless Manuae (pages 210-11), first of the islands to be glimpsed by Captain Cook, where annually handfuls of men from Rarotonga and Aitutaki isolate themselves to harvest copra, striving to earn enough to let them stake out new lives in New Zealand.

Farther south lay rugged Mangaia, "the haunted island," second largest in the Cooks, with its ancient coral burial caves. It has now barely enough able-bodied men in the critical 20-40 age group to pick and load pineapple harvests from its 12,800 acres.

But Atiu, at the very heart of the southern islands and once home of their fiercest warriors, stood apart from all the others. Here were tidy villages, cool concrete-block homes in bright flower gardens, trim and fruitful



Highlight of out-island life, the arrival of the 200-ton *Akatere* draws a crowd to the beach at Mauke. Small boats set out with crates of island-grown oranges, bound for Rarotonga's juice factory; they return with new possessions ordered months ago from New Zealand. At Manihiki, the boat yields a bonnet-shaded baby; emigrant parents often send children home to live with older relatives. Only *Akatere* and two other small craft ply this long and lonely passage to the out-islands.

SYNCHRONIZED BY WILLIAM ALBERT ALLARY © H. & B.



plantations of citrus and coffee. Together with intense communal pride, it had a surprising abundance of young people.

"Few ever leave for Rarotonga and New Zealand," community leader Vaine Rere explained. "We persuade adults to give land to their children as soon as they leave school. Children get a stake in the island, a steady income, and aren't tempted to go."

Today the fertile soil of Atiu's 6,650 acres supports a steady and mildly affluent population of 1,400. Once the terror of neighboring islanders, proud Atiuans now set an example for the entire Cook group.

I discussed their progress, back in Rarotonga, with the Cooks' gentle-spoken but vigorous 60-year-old Premier, Albert Henry. A teacher who spent more than 70 years in New Zealand as spokesman for Pacific islanders, Mr. Henry returned to the Cooks in 1965 with the advent of self-government. He took over leadership when his Cook Islands Party swept the polls.

"Atiu has set a good example," he agreed. "After so many years of paternal rule, the big struggle is to encourage the idea of self-help and personal initiative again. In the past everything has been handed out to the Maoris. Now they are learning that self-government means responsibility.

"The idea is being encouraged through a net of village committees. Behind them stand the traditional chiefs, in the new House of Arikis, which advises in matters of tradition and custom. Results—in just a few months—have been astonishing. In Rarotonga and elsewhere ground has been planted that lay idle for 50 years. There's a new spirit."

Tourism? "It might mean easy money," he said. "But tourism as it exists elsewhere could only lead Cook Islanders to bitter disillusionment. When we organize tourism, we won't have luxury hotels, night clubs, features alien to island life. I want to see simple tourist villages, each under control of an existing village. That way, everyone will gain. And the real attractions of the islands won't be destroyed."

Had self-government, I finally asked, come

too late? "It has come late," he said. "But I don't think too late. Migration hasn't been altogether bad. It's good for Cook Islanders to see something of the industrious outside world. With luck and hard work, we will entice many of them home."

After his wry and gently intelligent conversation, it was easier for me to be hopeful about the Cooks. Outside the Premier's office I ran into a papaa friend, young American Walter Hambuechen, whose story might illuminate the prospects of today's paradise-seekers. A onetime ecologist, he "discovered"

the South Pacific in the course of research, grew enchanted, and stayed. Now he lives with his Maori wife and children beside an idyllic Rarotongan beach.

But he has little time for lotus-eating. He may raise pigs and chickens, and fish the reef, but he also serves as chairman of his village committee and edits the daily *Cook Islands News*. "I'm working harder than I ever did in my life," he said, as he hustled past with a sheaf of paper. "But it usually seems worth it."

I journeyed to Ngatangia village to eat a last meal of taro and raw fish with friends, and stood a while beside lagoon waters. Ngatangia had a special meaning for me, a fair-skinned Pacific islander. For it was from here, centuries ago,

that Rarotongan Maoris began an epic 2,100-mile journey south to settle in my native New Zealand. But I felt I had been witness to the beginning of a new voyage as great and heroic in its way—that of a new Polynesian government in the Pacific.

For now only a boldness of spirit can save the dream islands of Western man from being handed back, one by one, to the waves and tides from which the fabled Maui fished them. Now only an imagination equal to that of the old voyagers can save the proud Polynesian, once noblest of savages, from becoming a soulless shell on display for tourists.

I had struck spirit, imagination, and growing hope. No new voyagers, launched upon this least pacific of centuries, could ask for much more.

THE END



Heartache of the islands: Leaving her home on Atiu, perhaps forever, a young girl (above) casts one last longing look toward shore. At another sailing (opposite), those left behind give way to sorrow even as hands go up in a brave farewell.







Ancient aerie of freedom, the tiny enclave of San Marino rises from Italy's Romagna plain. In A.D. 501, says a local tradition, St. Marinus bequeathed his mountain retreat to followers as an island of liberty in a world of tyranny. Today earth's oldest and smallest republic still clings to the slopes of Monte Titano. The Kursaal, center, houses conferences, exhibitions, and receptions.

Soviet merchant marine cadets from a ship docked at Ravenna, Italy, enjoy the 100-mile view from the height (right).

SHUTCHNER © R.A.S.



SAN MARINO

Little Land of Liberty

By DONNA HAMILTON SHOR

Photographs by TED H. FUNK

THE FIRST TIME I ever heard of the Most Serene Republic of San Marino—a 24-square-mile independent country surrounded by Italy—was in the late 1940's, on the Twentieth Century-Fox movie lot in Hollywood. Mr. Darryl Zanuck had just announced to saucer-eyed starlets (myself included) and to a waiting world that he had "rented" San Marino—lock, stock, and drawbridge—as an authentic backdrop for *Prince of Foxes*. The soldiers of Cesare Borgia, who had besieged and overwhelmed the tiny nation in 1503, were to be shown repeating the assault on film, as the men of San Marino, aided by Tyrone Power, defended their towered "Città del Monte" with pikes, cannon, and boiling oil.

By the time the picture was finished, the Sammarinesi, as the proud-spirited San Marinense call themselves, had proved they were still capable of taking the invader in stride. The actors, prop men, hairdressers, and cameramen who made up the invading Hollywood horde were confounded by the novelty of a people who accepted a smile as graciously as a tip, and seemed equally pleased by either. The Sammarinesi had invariably returned the smile, and—wonder of wonders—had even been known to return the tip as well! They were,

it seems, demonstrating the strong spirit of independence that has run unbroken through the picturesque republic's history.

They do so habitually. When I first saw San Marino, in 1951, the miniature nation was proving its independence by standing off the entire Italian Government over a political disagreement (of which, more later), and I had to run a road blockade to get into it. That was to be only the first of many visits. In later years, living in Europe as a travel writer, I went often to San Marino from nearby Bologna and Riccione (maps, page 237).

Visiting the republic this year, I recalled Mr. Zanuck's improbable arrangement and realized anew how well he had chosen. As a

functioning film set, San Marino couldn't be beaten anywhere. While he might have reproduced its turrets and towers on the Fox back lot, he never could have fabricated that view.

Independence on a Mountaintop

Imagine a mountain rising sheer-sided out of the checkerboard farmlands of Italy's Romagna plain. It looms ahead of you at the end of the broad new highway that spans the dozen miles between the republic and the seaside resort of Rimini (pages 250-51). You pass under a banner reading, "Welcome to the Ancient Land of Liberty," and realize you have left Italy behind.

Here, at a little toy-soldier guardhouse, the



tourist who gathers passport stamps may add another to his collection on payment of 16 cents. But only if he so chooses. There are normally no customs formalities.

The road rolls through the hamlets of the San Marino farmers, then abruptly narrows and rises, winding back and forth across the mountain until it reaches the three dramatic towers crowning the summit (pages 232-3). The Sammarinesi hold that their craggy peak first served as sanctuary to the Dalmatian stonecutter Marinus, a Christian fleeing the persecution of the Roman Emperor Diocletian. The little band of devoted followers he gathered about him in his mountaintop refuge increased with time, and acquired the

laws and loyalties of a nation. And eventually Marinus, who imbued his people with a devotion to liberty that they still cherish, came to be venerated as a saint—San Marino.

In San Marino the view from the top is truly spectacular. When a citizen of the republic looks down from his capital atop the heights of Monte Titano, as the hog-backed limestone ridge of rock is called, he can see his whole country, and a lot of Italy besides.

With so few square miles of surface, much of it vertical, San Marino is a tightly bound little enclave inhabited by a tightly knit little population. Its 17,000 members appear to belong to a single extended family. These people, among the handsomest and gayest I've seen in Europe, all seem related by marriage if not by birth. This is especially noticeable among the 2,600 who live in the capital, which is also called San Marino.

You're looking for a shoemaker, a hairdresser, a druggist? Stop the first person you meet: "Oh, my cousin is just the one to help you. Come along, I'll take you there." You're led off to a buzzing, cheerful family shop where everyone gathers around to solve your problem for you, and small boys are dispatched in all directions to summon aid.

What, you've smashed an earring? Cousin Arzilli will repair it, and he refuses payment with a shy smile: "For Sammarinese-American friendship, *signora*."

You've broken the strap on your suitcase? Cousin Ivo, the shoemaker, will track down *his* cousin, the dressmaker, to find thread of the right color to repair it.

But casual and personal as this consanguineous commerce may be, it remains solidly profitable—witness the 3,300 cars owned by the country's 17,000 inhabitants. Tourists provide much of the national income. Agriculture and light industry are mainstays, and postage stamps bring in a rich bonus.

Budding botanists in starched smocks learn the wonders of nature from Sister Anna Cascarano at a convent kindergarten. Although predominantly Catholic, the citizens of San Marino—the Sammarinesi—do not have their own bishop, but accept a division of religious responsibility between two neighboring Italian sees. The idea of divided responsibility also finds expression in San Marino's government. Two Captains Regent preside as the republic's highest elected officials. They are limited to six-month terms and cannot serve more often than once in 3½ years (following page).





So comfortable is the Sammarinese economy that there is only one beggar in the whole countryside. And even she doesn't quite fall into that category.

"After all," I was told, "she only comes around on Friday, collecting for the prayers she says for the departed. It would be different if she'd pray for just anybody. But she only goes to people whose cousins she liked!"

Chief Executives Come in Pairs

As if its economy weren't familial enough, even San Marino's government is run family-style. The heads of families meet twice a year to present petitions of the people to officialdom. But there are two important exceptions to rule by kinfolk.

"Judges and policemen are foreigners brought in from outside, usually from Italy," explained Professorssa Clara Boscaglia, of-

ficer of the foreign ministry of San Marino. "That way we're sure of true impartiality. If they were Sammarinesi, and local people, they'd be somebody's cousins, and that wouldn't do at all.

"Legislative power is vested in our 60-member Great and General Council," she said, "elected by vote of all citizens over 21. Government is carried out by a 10-member cabinet, presided over, as joint chief executives, by two Captains Regent."

It was this office of Captain Regent that fascinated me, especially after talking with Settimio Belluzzi, a leading lawyer of the country, who had three times held the post.

He came each evening to watch television in the Hotel Diamond, where I stayed. We sat with Signor Bosi, the manager, and his family in a dining room carved out of the living rock of Titano. Here we worked Italian crossword

SAN MARINO

OLDEST AND SMALLEST of the world's republics, San Marino scarcely equals the area of Manhattan Island. Its capital, also called San Marino, meanders around the three craggy, fortress-crowned peaks of Monte Titano. The freedom-loving nation spills down the surrounding slopes and girdles the mother mountain with a ring of fertile valley floor.



AREA: 24 square miles. **POPULATION:** 17,000, of Italian origin. **LANGUAGE:** Italian. **CURRENCY:** Italian lire. **ECONOMY:** Agriculture (grain, grapes, livestock), light industry (ceramics, furniture, textiles), stamps, tourism. **CAPITAL:** San Marino (pop. 2,621). **TOWNS:** Serravalle, Borgo Maggiore, La Dogana. **CLIMATE:** Mild; hottest summer days average 85° F.



Pageantry in miniature attends the semi-annual investiture of the Captains Regent. Flanked by the Noble Guard and followed by the Great and General Council of 60, new and old chief executives march from the Government Palace to the cathedral.

ROADSHOW BY TED H. FUNK © 1988

Enclave within Italy, San Marino welcomes visitors with token border formalities. Most come only for a day, driving over a new four-lane highway from Rimini, Riccione, and other resorts on the Adriatic. A summer helicopter service from Rimini lands passengers at Borgo Maggiore; from there an aerial cableway ascends Monte Titano.





puzzles as a group project, gravely taking turns at horizontal and vertical.

I was impressed to hear that the distinguished old statesman had served three terms as Captain Regent—until he told me his grandfather had served ten times in more than 40 years of public service.

"You see, signora," the *avvocato* Belluzzi explained, "the *Capitani Reggenti* have only a brief and limited glory. Their terms last just six months, and they are forbidden by law to serve again for another three years. It is the way we keep from concentrating power in any one person for too long.

"Of course," he continued, "they must abandon their regular profession while they are serving their country, and they can't leave the republic during their term.

"In fact," he went on, "a Captain Regent can't go anywhere at all without his co-Captain Regent. The two are together constantly.

In the Middle Ages, you see, there might have been a temptation for one Captain Regent to plot against another. The old rule was a good one, so we've kept it."

"And their salary?" I asked.

"Why, they don't get any salary," he answered in some surprise, "just the honor."

When I wondered aloud that anyone could be found to accept the job, the *avvocato* explained that another old rule, still in force, is a highly effective persuader. A Captain Regent who refuses to serve can be stripped of his goods and citizenship.

Tiny Nation Defied Powerful Neighbors

Despite their love for medieval rules and rituals, the Sammarinesi are dedicated to democracy and liberty—two most unmedieval concepts. They have often risked their own freedom for the freedom of others. There is touching evidence of this in the mementos



STYLING: JEFFREY AND KATHY/DAVID J. PHILLIPS © N.G.S.

on display in San Marino's national museum.

Defying the armies of Austria, Naples, France, and Spain, this little land of oleanders and roses sheltered the fleeing Italian patriot Giuseppe Garibaldi in one of his darkest moments of defeat. It was July 31, 1849. After officially disbanding his army of 1,500 here, he met with disheartened compatriots in the old Simoncini cafe—today's Ristorante Garibaldi—and rallied them to new courage, urging them to follow wherever he led.

Though the Sammarinesi risked the threat of war and annihilation in aiding the exile, they enabled Garibaldi, his wife Anita, and a group of his followers to escape through the Austrian troops encircling the nation. Garibaldi set out on the voyage that would take him as far as New York City, then back again to fight for and forge a unified Italy.*

*See "United Italy Marks Its 100th Year," by Nathaniel T. Kinney, NATIONAL GEOGRAPHIC, November, 1961.

Winning smile—the badge of the Sammarinesi—emblazons the face of Teresa Giardi. In the market town of Borgo Maggiore, she offers for sale her homemade *piadina*, the local unleavened bread.

For pomp and ceremony, members of the Noble Guard, a part-time force of some 60 men, don dark-blue-and-gold uniforms and plumed helmets. Here they dine at the Hotel Cesare after the inauguration of the Captains Regent. San Marino also maintains a Fortress Guard for duty at border posts and at the entrance to the Government Palace. The country hires its policemen from Italy. With nearly everyone related to everyone else, citizens feel that only foreigners can serve impartially.



ATTACHING © NATIONAL GEOGRAPHIC SOCIETY

Hobby of commoners and kings, stamp collecting adds a healthy bonus to San Marino's budget. Here four French girls make a selection at the Government Stamp Office. The country issued its first postage stamps in 1877, and since that time its colorful issues have been in great demand. Stamps have honored U. S. Presidents Abraham Lincoln—made an honorary citizen in 1861—Franklin D. Roosevelt, and John F. Kennedy. Two 1967 stamps feature St. Marinus protecting his nation (below, left), and the peony, from a series depicting favorite European flowers. Annual revenue from the sale of stamps exceeds two and a half million dollars.



Many a modern European, too, owes freedom and even life itself to the people of San Marino. The Sammarinesi shared their provisions and risked their neutrality when they offered shelter to perhaps 100,000 refugees from the holocaust of World War II.

"Where could you have put everyone?" I asked the avvocato Belluzzi.

"We managed," he smiled. "For example, my house, which usually held only two, sometimes had as many as 17 living in it.

"For a while," he continued, "my brother-in-law and I slept in the living room, on tables. What else could we have done?" he shrugged. "From all over Europe people came who were hungry. San Marino has always been an agricultural nation. Our farms were producing grain and vegetables and wine. So we ate a little less bread, and drank a little less wine, and had enough to give to those in need. That was all there was to it."

I wanted to see one of the farms that help support San Marino's economy. Antonio Zanotti, a technician in the government Agrarian Office, took me to an estate at Cinque Vie, near Falciano. There we visited the Zonzini family.

"Alfredo Zonzini is one of the *mezzadri*, or tenant farmers," Signor Zanotti explained as we drove there. "He keeps 56 percent of the revenue of the farm he works; the rest goes to its owner. They share the costs of upkeep."

In the courtyard of the gabled red-brick farmhouse, the weather-beaten, white-mustached patriarch put down the yoke he was mending and greeted us (page 249). From every corner sons, daughters-in-law, and grandchildren appeared, until the 11 people who lived with Signor Zonzini and his wife surrounded him.

All 13 trooped with us into the barns, where he showed me the sleek cattle he raises for beef, then out to see slender young olive

trees almost ready to bear fruit. Bordering his wheat acreage stood the vineyards, their rows of staked and wired grapevines punctuated by apricot trees that would eventually help support the vines.

"Here is an export crop that is new to us," said the old farmer, waving toward a field of dark-green shiny spikes. "Onions. The government assists us in growing them for seed."

Republic Helps Farmers Stay on Land

Later, as we waited for the *merenda*, the afternoon meal, in the huge whitewashed kitchen-living room, Signor Zanotti told me more about the help the government of San Marino gives its farmers.

"About 60 percent of our territory is under cultivation," he said. "To encourage farmers to develop the land and stay on it, we give cash subsidies and grants to build modern buildings and buy equipment."

Huge dried, salted hams from porkers

EDDACHROME BY THE B. FORM © N.A.A.



They dance in the streets in San Marino. With the spontaneity and happiness generated by a holiday, an Italian tourist claims a passer-by for a partner. Income from tourism contributes materially to the little nation's prosperity.

raised on the farm hung above a square fireplace so big there was room inside it for the five-year-old grandchild, Stefano, to sit on a little stool beside the fire. With large brown eyes he watched his mother, Maria, put together the dough to make the local *piadena*, a pancake-flat unleavened bread, and bake it in the fireplace on a three-legged metal grill.

At a long white-painted table in the middle of the big room, we ate the bread wrapped around fresh greens drenched in vinegar and oil. The crisp leaves were bitter and delicious against the blandness of the bread. Thin, chewy slices of *prosciutto*—dried ham—added salt and substance.

"On this particular farm," Signor Zanotti went on, "you are seeing a cross section of our country's entire agricultural activity. And about half the wheat grown here, as in all San Marino, is exported; the rest we use. . ."

"To make *piadena*," cut in Maria, as she

brought out plates for the sizzling, slablike steaks she had been grilling over vine twigs.

"As for olive oil," Signor Zanotti continued, "we import about 165 tons a year, twice as much as we produce. Beet and onion seed, however, we export almost entirely."

"And the wine we keep in San Marino!" exclaimed Signor Zonzini with a flourish, pouring us glasses of crisp white wine made from his Trebbiano grapes.

We finished the meal and the visit with strong black coffee, the only thing served that wasn't grown on the Cinque Vie.

Alfredo Zonzini looked up from his cup, his face like an aged wood carving.

"Counting this year, I've seen 77 harvests come and go," he said reflectively. "It has been a weary, sweaty, backbreaking life. But I am glad," he added, "that my sons, too, are men of the soil." He looked around the table at the assembled family. "May their sons,



in turn, choose to till our San Marino earth."

Such ingrained love of tradition, a prime ingredient in the Sammarinese character, is epitomized by a curious circumstance: The Most Serene Republic, in addition to using the Gregorian calendar, also counts the years by its own system, beginning with A.D. 301.

It's Only 1666 in San Marino

I discovered this during my first trip to San Marino, which turned out to be in 1650—as San Marino measures time. The rest of us might consider the present year anno Domini 1967, but to the Sammarinesi, ever independent, it's really 1666.

But San Marino's calendar reflects more than traditionalism: it proclaims independence, a no less notable national virtue. And that independence was in part responsible, back in 1644 (1945 to us), for a most untraditional political situation: Despite its own

fondness for medieval manners, San Marino quietly went Communist.

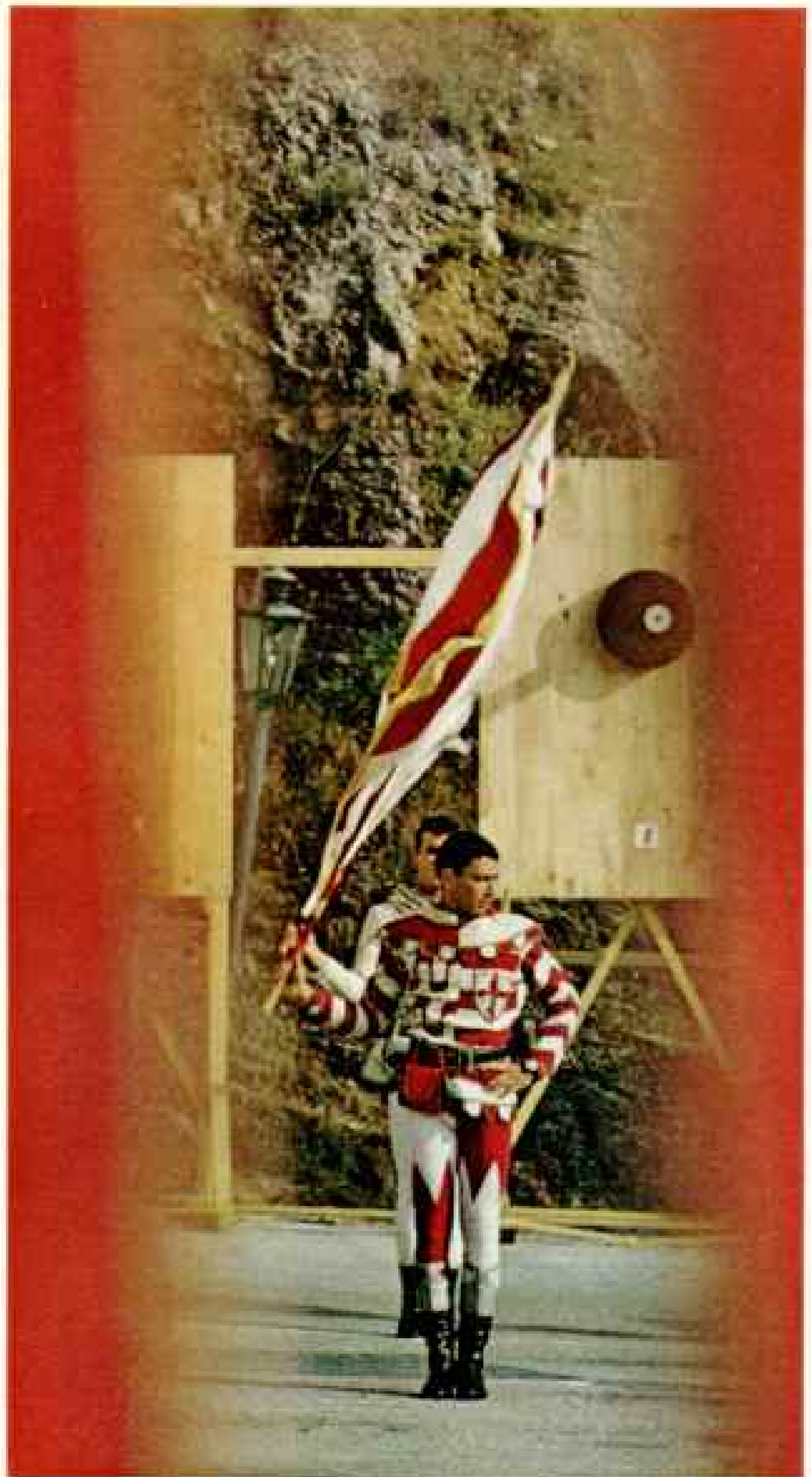
A strong supporter of this anachronistic regime was a gentleman named Maximo Maxim, no native-born crusader but a Rumanian promoter blessed with vision and means. He promised the republic a rich return for the privilege of operating a casino in its capital. In 1949 baccarat tables and roulette wheels were installed, and the voice of the croupier was heard in the land.

The casino was a huge success. The post-war financial difficulties that had brought Communism in the first place were eased. To the dismay of surrounding Italy, San Marino and its regrettable Communist government were both flourishing, and the thriving casino was draining away dollars, pounds, and francs—not to speak of a great many lire—from Italy's casinos. Worse yet, it was rumored that San Marino, by legalizing



First state visit by an Italian President: The arrival of Giuseppe Saragat, on November 25, 1965, lines the streets with children waving the tricolor flag of Italy and the blue-and-white colors of San Marino. In 1945 a coalition of Communists and Socialists gained control of San Marino. Italy virtually blockaded the country in 1950-51, forcing the Communists to close their capitalistic casino, which had been draining profits from Italy's gambling halls. Affairs between the two nations improved immeasurably with the end of the Communist regime in 1957.





KODAK SAFETY FILM © NATIONAL GEOGRAPHIC SOCIETY

Thumb on the trigger, 13-year-old Marino Rossi eyes his target through the sights of his crossbow. Sammarinesi turn to the past each September 3 to celebrate the founding of their republic. Festivities include a religious procession and a crossbow tournament that dates from the 1600's. Adding their splash of color, flag twirlers from the Italian city of Arezzo perform before the targets (above). Rossi won first prize in 1964 and 1965. The crossbows used in the contest are copies of antique weapons in a museum of arms and armor housed in La Fratta, the central and highest of the town's three towers. From them, crossbowmen of old kept careful watch. Although small, the country sometimes seemed a plum to be plucked by warring Italian nobles. But despite invasions in the 16th and 18th centuries, San Marino always managed to oust its enemies and keep its cherished liberty.

divorce (which of course does not exist in Italy), planned to turn itself into a second Reno.

Italy felt that the independent republic was being altogether too independent. In an effort to apply economic pressures, she set up rigid roadblocks and endless border inspections to discourage the San Marino-bound. Maximo Maxim, seeing his blockaded casino suddenly empty, lost no time in heading for Switzerland and greener financial pastures.

I remember sitting at the border point through a three-hour wait, then finally charging through to reach San Marino and find out what the fuss was all about.

After this visit in 1951, after repeated trips to San Marino over the years since then, and after recent interviews to find just what the "Communist threat" had involved, the answer, as accurately as I can pinpoint it, seems to be—nothing.

Bright, birdlike Giuseppina Tamagnini of the tourist office summed it up simply: "The Communist government was in force until

1957; yet San Marino never became a collectivist state, nor did 12 years of Communist rule result in state controls. Many of us felt that even the most vocal Communists were only choosing their point of view as a basis for discussion—and an expression of independence. If this was Marxism, it was *acqua de rosa*—a rose-water kind of Marxism."

Battle of the Mimeograph Machines

After a local mother superior defied the regime, reopening a convent school it had closed, the Communist-led coalition lost its majority in the Great and General Council but kept control of the Government Palace. A rival coalition under the Christian Democrats took over an empty factory in the hamlet of Rovereta, less than 100 yards from the Italian frontier. Mimeograph machines on both sides belched broadsides. Italy moved armed police and heavy weapons to the border.

"We were a bit worried at the time," Signorina Tamagnini admitted. "Up here in the capital we didn't know what was going on below. But after all, who could get a Sammarinese to fight his own cousin?"

As the 1959 election neared, San Marino's factions worked feverishly for the ballots of non-resident Sammarinesi. The Communists brought voters from Genoa's docks and Milan's factories. The Christian Democrats sent flying squads to Sammarinese strongholds in New York City, Detroit, and Sandusky, Ohio, to bring back absentee ballots. Victory went to the Christian Democrats. The Communists were out.

The people went back to their livelihoods, the ruptures healed. Tourist shops and cafes, vineyards and farms, potteries and postage-stamp office, all flourished anew.

Learning his trade, 14-year-old Maurizio Agostini coats an unfired pitcher. Working in one of San Marino's two major ceramics factories, the apprentice carefully applies a layer of *lavanico scuro*—dark volcanic earth—before sending the piece on to the kiln. Such pottery, a favorite tourist souvenir, sells all over Italy.





FRANCESCO/© S.C.S.

Master of a vanishing tradition, Aldo Volpini lovingly fashions a bas-relief head from native stone. For more than 1,600 years Sammarinesi quarried their mountain for buildings and statuary. Then the demand for living space put an end to the industry. St. Marinus himself, say the Sammarinesi, was a stonecutter from Dalmatia who fled to Monte Titano to escape the persecution of the Roman Emperor Diocletian.

San Marino's original industry was stone-cutting, the craft of St. Marinus himself. Today, stone is no longer cut from the terraced and densely populated mountaintop. There is no room for further quarrying. But one man, Aldo Volpini, still carves the local limestone with tools used by two generations of sculptors before him (above). He and his wife run a souvenir store near the top of Titano. His studio is nearby.

Signor Volpini had no formal training in art, only a desire to create. I saw in his studio a touching statue of the sorrowing Mary with the body of Christ in her arms. It is a sad and beautiful work, and shows how strong Volpini's drive to be a sculptor must be.

To practice his art, he must steal time from his more lucrative souvenir shop, typical of the 120 that line San Marino's streets. Like the others, it is stocked with souvenir scarves

and bracelets, postcards, and replica coins from the days when San Marino coined its own money instead of using Italy's.

Among the best-selling tourist items are the strangely mottled local ceramics.

"The volcanic earth called *lavanico scuro* gives it that special finish," explained young, smiling Vincenzo Busignani, director of S.A.M., one of San Marino's larger factories.

"San Marino ceramics are sold in other towns in Italy," he added. "And we export a lot; even in Germany you'll see S.A.M. pieces."

He explained that the initials stood for Società Anonima (a form of corporation) Marina. "Marina is my sister," said Vincenzo. "She's married to Giordano Reffi, a lawyer here in town."

At the name Reffi, I sat up with a start. Alice Rohe, writing in the NATIONAL GEOGRAPHIC MAGAZINE of August, 1918, had

told of a baby boy born here to a Reffi family, who had named him Wilson in honor of our President Wilson, a man they called "an apostle of peace and liberty." I was curious to know where he was.

"Wilson Reffi?" said Vincenzo's brother-in-law, Giordano, when I called on him. "He's my cousin. He lives in New York and has just made the discovery of a lifetime. He found an old painting in a Salvation Army store on Long Island, and a few weeks ago it was authenticated as the work of a famous 16th-century painter, Annibale Carracci."

Then I made a discovery myself: It had been Giordano Reffi who had drawn up the original agreement with Twentieth Century-

Fox when that studio made *Prince of Foxes*.

"The contract antedated your national beautification projects," he grinned, "but it had the same result.

"The towers on top of Titano were beautifully refurbished, roads up there were repaired, and landscaping laid out. And of course," he added, "many of our people enjoyed working in the film." Which, I gathered, had had a record-breaking run at San Marino's lone movie house.

I caught up with burly, handsome Wilson Reffi, the President's namesake, on my return to the United States.

"The Carracci is now in the customs warehouse at Kennedy airport," he told me. "Some

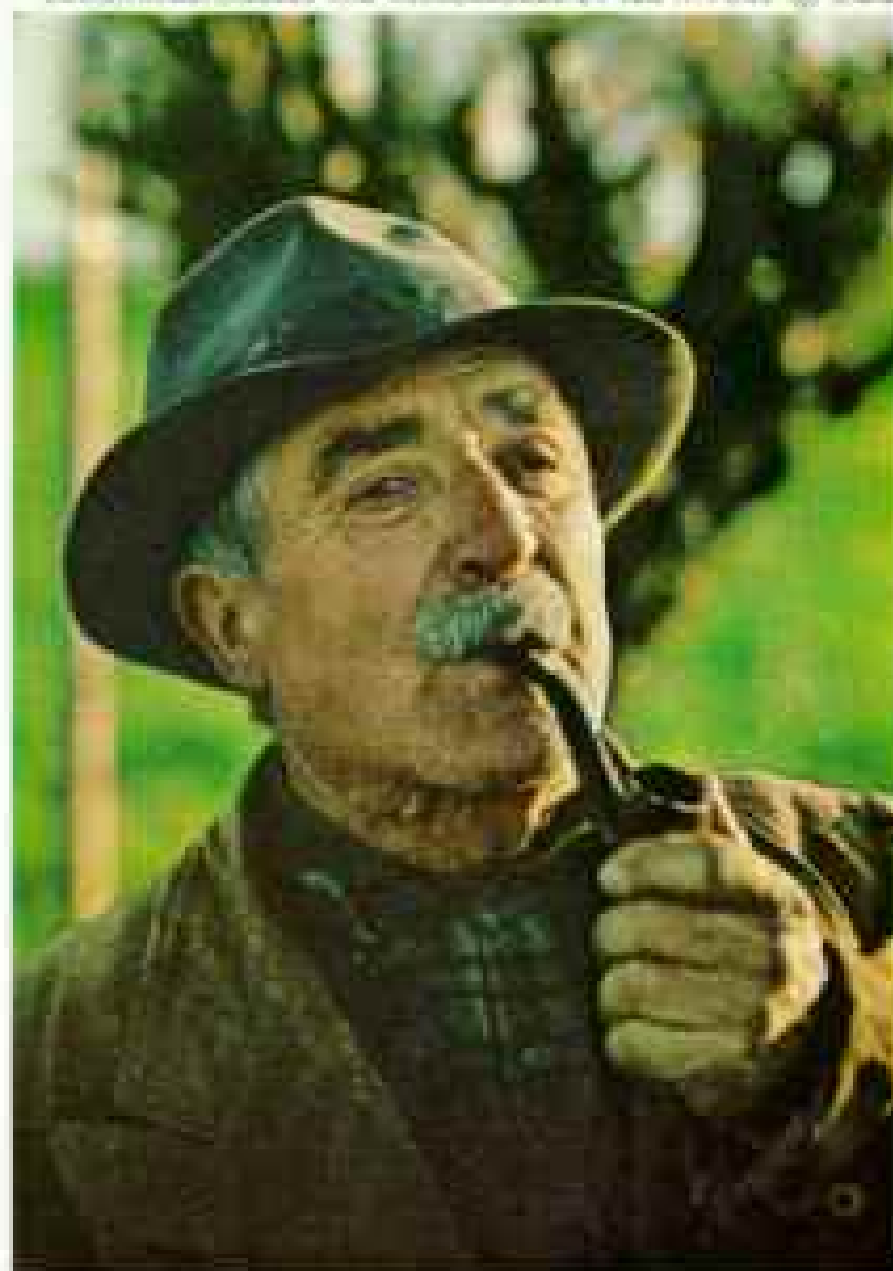


Pleased with their vintage, wiry Sammarinesi from La Dogana heft grapes onto an ox-powered sled. The country produces some 500,000 gallons of wine annually, primarily white Trebbiano and Moscato and red Sangiovese.

Gold of plenty, wheat falls to a binder pulled by a chugging tractor against the backdrop of Italy's village of San Leo. Leo, who retreated to Monte Titano with St. Marinus, later established his own hermitage on this outcrop, now topped by church tower and fortress, far right. In the 18th century the fortress imprisoned the infamous Count Alessandro Cagliostro, Italian alchemist and impostor; he died inside its walls.



STACCHINO LARDEI AND MONTECORICE BY TED H. FINE © N.E.S.



Patriarch and husbandman, Alfredo Zonzini wears his 77 years lightly. His wife and sons, their wives and children—a family 12 strong—help tend his crops.





museums have asked to exhibit it; then I'll put it up for auction—\$75,000 base price.

"You know," he said, "when I first came to the U. S., I had many struggles, but finding this painting was like being kissed on the forehead by America. It must have been destiny when my father gave me the name of your President—destiny that I would finish my days over here."

Another United States President was also beloved of the Sammarinesi. They wrote to Abraham Lincoln in 1861, expressing concern and sympathy over the troubles that were besetting his country and declaring him an honorary citizen of San Marino.

Touched, Lincoln replied: "Although your dominion is small, your State is nevertheless one of the most honored in all history. It has . . . demonstrated . . . that Government founded on Republican principles is capable of being so administered as to be secure and enduring."

Lincoln's bust stands today in a place of honor in the Government Palace, looking down upon the door of the Great Council Hall, where the deliberations of the republic's legislature take place.

Courageous Republic Snubbed Napoleon

The Sammarinesi still revere the traditional dying words of their founder Marinus, bequeathing them freedom and warning against entangling foreign alliances—more than 1,400 years before George Washington performed the same service for us. Through the centuries they have followed his advice; San Marino has striven to remain unembroiled and to shun war. Witness this warning in the arms museum atop Titano:

"Weapons not only represent the metallurgical, political, and inventive evolution of a people, they also demonstrate the preponderance of war, wished by the few, and followed foolishly by the many."

To underscore this peaceful philosophy, San Marino last April proudly became the 77th signatory of a world treaty banning the use of nuclear weapons in space.

The little country has always refused to seek new territory. In support of this position, it even dared put the dreaded Napoleon in his place, back in 1797. As a mark of special favor to that "model of a republic," Bonaparte had sent an envoy with offers of additional territory. To his surprise, his emissary was rebuffed. Antonio Onofri, the Captain Regent who had the delicate task of refusing Napoleon's offer, explained that only in poverty and insignificance could San Marino hope to maintain herself free and sovereign through the centuries.

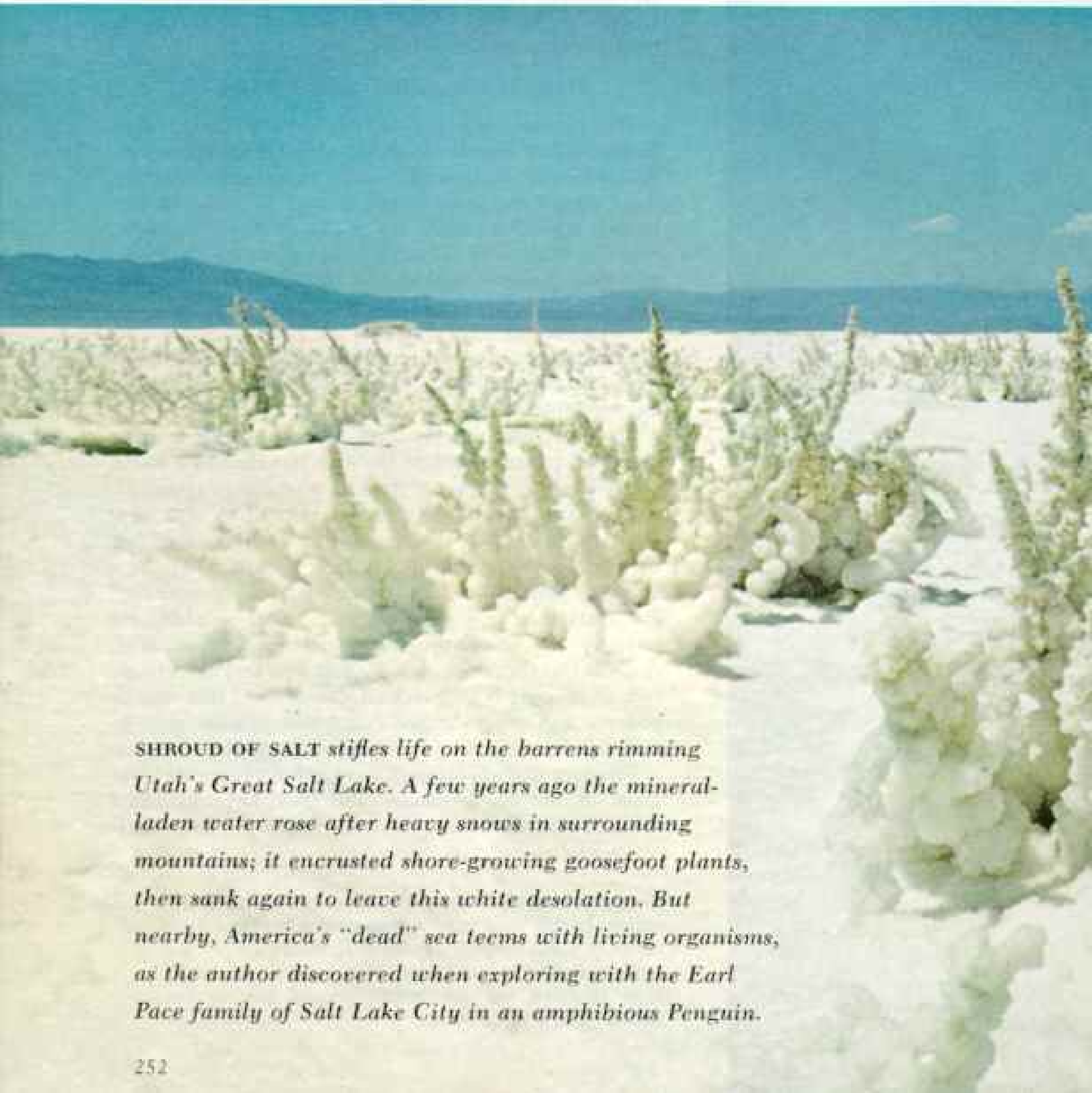
Freedom and sovereignty have always been the chief goals of the Sammarinesi, and they have managed through troublous times to cling to both. THE END

Single sweep of the eye encompasses a fourth of the nation. In this view from a helicopter, a new four-lane highway winds through patches of farmland toward the serrated face of Monte Titano. Majestic in mien, republican in spirit, the tiny nation remains true to her founder's legacy—freedom.

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Life in a “Dead” Sea— Great Salt Lake

Article and photographs by PAUL A. ZAHL, Ph.D.
National Geographic Senior Natural Scientist



SHROUD OF SALT stifles life on the barrens rimming Utah's Great Salt Lake. A few years ago the mineral-laden water rose after heavy snows in surrounding mountains; it encrusted shore-growing goosefoot plants, then sank again to leave this white desolation. But nearby, America's "dead" sea teems with living organisms, as the author discovered when exploring with the Earl Pace family of Salt Lake City in an amphibious Penguin.

LIFE ON OTHER PLANETS? Scientists have pondered the question for ages. Most of us find it hard to conceive of life as we know it in such hostile environments: searingly hot or profoundly cold; with atmospheres lacking oxygen, showered by deadly radiation, or laden with noxious vapors and poisonous chemicals.

Yet life, we know, can exist—and multiply at times in incredible profusion—in the saturated brine of Great Salt Lake. Last summer I studied and photographed these remarkable organisms, which somehow have learned to thrive in seemingly deadly water, eight times saltier than the sea, thirty times saltier than most body fluids.

Behind me and on both sides shimmered

an endless expanse of salt, showing no sign whatever of life, plant or animal. Before me sparkled a lake in which no fish swam. One could imagine few places, on this planet or any other, less hospitable to organic processes, more damaging to delicate cells.

Sharing with me this blend of dry heat, blinding whiteness, and crunching salt were Salt Lake City businessman Earl Pace, his pretty blond wife Beverly, and their two sons, Rand, 14, and Ron, 10 (below). A lifelong resident here, Earl is intimately familiar with Great Salt Lake—its coves, inlets, and islands. First we scouted his lake from the air.

“Shorelines of old Bonneville,” Earl shouted above the plane’s roar, as we passed terrace-like striations high on a mountainside.

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ILLUSTRATION © H.C.A.



By "Bonneville" he was not referring to a car or a speedway but to a gigantic body of water that 50,000 years ago covered much of western Utah and parts of Idaho and Nevada. In area comparable to present-day Lake Michigan, the waters of ancient Bonneville reached depths of more than 1,000 feet.

Then, when the last age of glaciers waned and its ice tongues retreated northward, weather in this part of the world became hotter and drier. Lake Bonneville shrank below the level of its outlet. Streams continued to add their water, but not enough to offset evaporation. The lake grew saltier and saltier.

Today the largest remnant of that once mighty inland sea is known as Great Salt Lake. Only a twentieth the size of the original and now nowhere deeper than 50 feet, it is one of the world's wonders—so salty that no swimmer can possibly sink in it.

Pilot Ed Dreier banked the plane and we headed northwest. We were looking for a "bloom"—a patch of rose-hued water caused periodically but unpredictably by the sudden mass multiplication of bizarre organisms that dwell not only in Great Salt Lake but also in warm, salty waters elsewhere in the world. Such organisms belie the very name of the Near East's Dead Sea, for example, whose waters are even saltier than Salt Lake's.

Storm-lashed Brine No Place for Boating

The gray-blue, 30-by-70-mile sheet of water spreading out below us appeared lifeless indeed. To the east, at the foot of the majestic Wasatch Range, from which Brigham Young and his stalwart followers in 1847 got their first glimpse of the "Promised Land," lay fair Salt Lake City. Along the lake's south shore sprawled a checkerboard of dike-enclosed salt pans, backed up by the smoking chimneys of a great copper refinery, and beyond them the mineral-rich Oquirrh Mountains.

Oddly, there were no sails on the lake, no craft of any sort. Earl, a sailing enthusiast, told me why. For one thing, he said, sudden storms are a constant threat; without warning, a mirror surface may be whipped into a fury of breaking swells.

"Not only dangerous but miserable to be caught in—your boat white and weighted with salt, your clothes and hair coated with crystals, your eyes stinging from the spray, your motor more than likely dead from an ignition short."

Then, too, much of the lake is shallow, offering few places for convenient launching and landing. Great Salt Lake has nothing to offer the angler. Most of its islands are arid and desolate, some with shores encrusted forbiddingly with salt.

One such island we were now approaching. Our map identified it as Gunnison, about eight miles offshore in the lake's northwest quadrant, and inhabited only by terns, gulls, and pelicans. Bays and shallows shimmered in delicate shades of pale pink to deep rose—"blooms," unmistakably.

Ed eased down to about 200 feet, then slowly circled. Comprising less than 170 acres, the island was starkly bare except for scrubby bushes here and there and a central crest of rock heaps and hummocks. Its entire shore was white with glistening salt.

I regretted that our plane was not a helicopter so that we could land and wade out into the tinted shallows to appraise the strange color there. We circled once more, then headed back to our base.

The Pace family helped me arrange a return trip to the intriguing island a few days later. We all set out at dawn in Earl's 3/4-ton truck. Loaded on the back was a rented Penguin, a vehicle



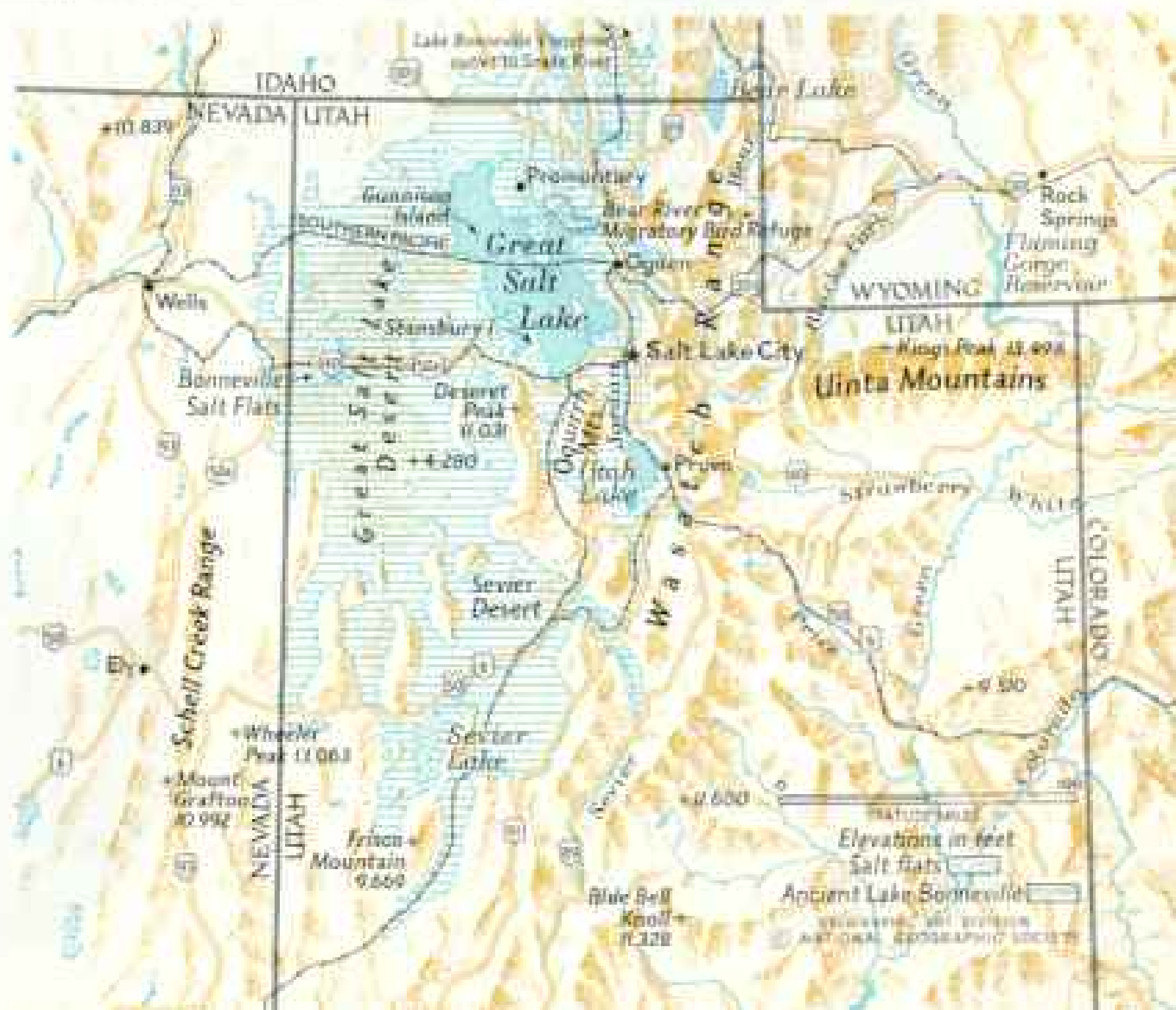


RODRIGUES © NATIONAL GEOGRAPHIC SOCIETY

As if borne on a billowing pink cloud, Earl Pace reclines atop mineral-heavy water tinted by algae and bacteria. His wife Beverly, twirling the quill of a Great Salt Lake pelican, perches with son Ron on salt "coral" deposited by surf and spray. Though swimmers literally cannot sink, they risk choking on the saltiness of the lake's dense water—eight times more saline than the oceans.

Red galaxy of life: Trillions of halophilic (salt-loving) bacteria streak a laboratory culture beside large salt crystals, here magnified three times.

Broad and briny splash in the Utah desert, Great Salt Lake survives as a remnant of Lake Bonneville, a vast inland sea once a thousand feet deep. Though Great Salt Lake's level has dropped 17 feet in the past century, river inflow today balances loss by evaporation. The lake's four billion tons of dissolved minerals—sodium chloride, magnesium, lithium, potash—lure chemical firms to the liquid mine.



designed for duck hunting and marshland travel, with a Fiberglas body and wheels with extra-wide tires (page 253). This ingenious amphibian would float when necessary, yet not bog down in the squashy salt flats.

We parked the truck near where the Southern Pacific tracks approach the lake from the west, lifted down our versatile craft, and set out across an expanse of hot, blinding, half-flooded salt barrens. Whenever the mire slowed us, the boys and I would hop out and push; when the wheels lost traction in deeper water, we would wade alongside to guide. The tepid brine felt pleasant on my legs.

It was almost midday when we sighted the salt beaches of Gunnison Island. The whiteness of the shoreline was dazzling, and hardened hummocks of salt in the offshore shallows looked like ice floes in an arctic sea.

Flocks of gulls and pelicans wheeled overhead; some of the pelicans had chosen to nest on this isolated island, carrying fish from distant fresh-water lakes and marshes to feed their young. The water was still as marvelously pink as I had seen it from the air.

My aim was to take samples from the island's bays and beaches for later study in a laboratory I had improvised at my Salt Lake City motel. At a score of locations I dipped up vials of the pink brine. But when I held them

up against the sky, I could see nothing whatever floating or suspended in the liquid.

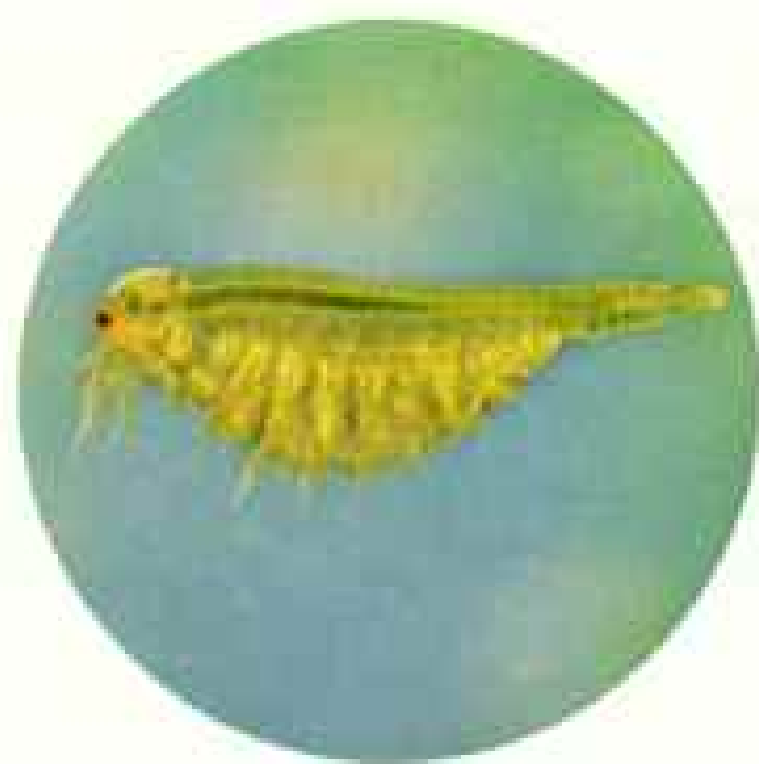
I recalled a talk with John Samuelson, chief chemist at the Morton Salt Company works, 10 miles west of Salt Lake City.

"Several types of salt-resistant algae and an unknown number of bacteria live in these brines," he had said. "In summer they sometimes proliferate at a furious rate, tinting the lake orange, red, or green. But individually most are visible only under a microscope."

Lake's Brine Preserves Dead Birds

Reassured, I packed up my samples and joined the Pace family on a hike around the island. Rocks and pebbles along the shore were cemented together by the crystalline residue of brine spray. Earl and Rand struggled to break off a piece of this hard white pavement, and it took some doing, for the sun had slow-baked the stuff to a consistency nearly that of concrete. Representing the mineral content of the lake, it was almost pure sodium chloride—common salt.

Down the beach a way we came upon the remains of a pelican and then a gull, both apparently having died of natural causes. Washed up on shore, their carcasses lay perfectly mummified by the salt, each feather a marvel of crystalline design. Who knows how



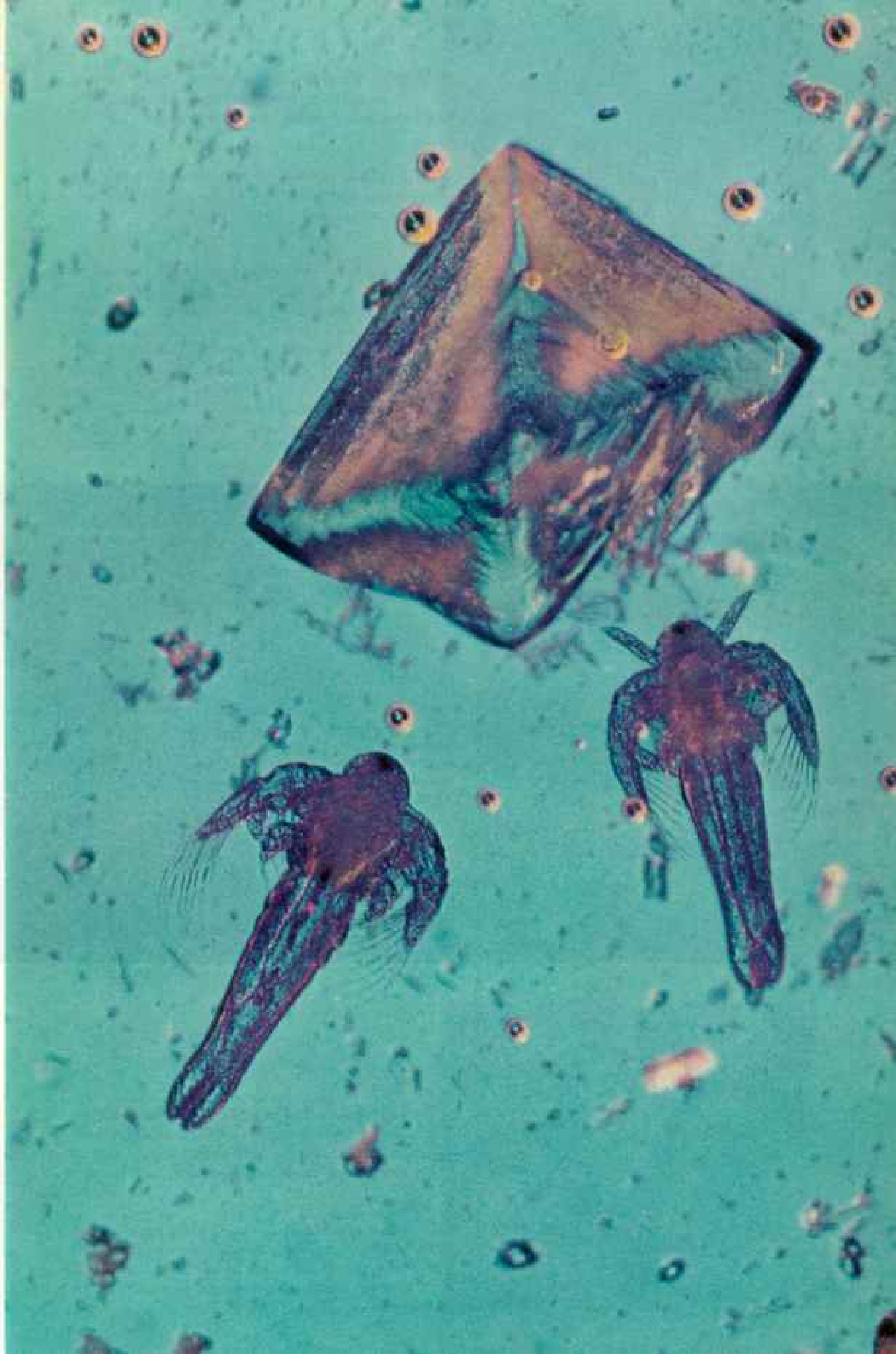
WILSON/STONER © R.S.S.

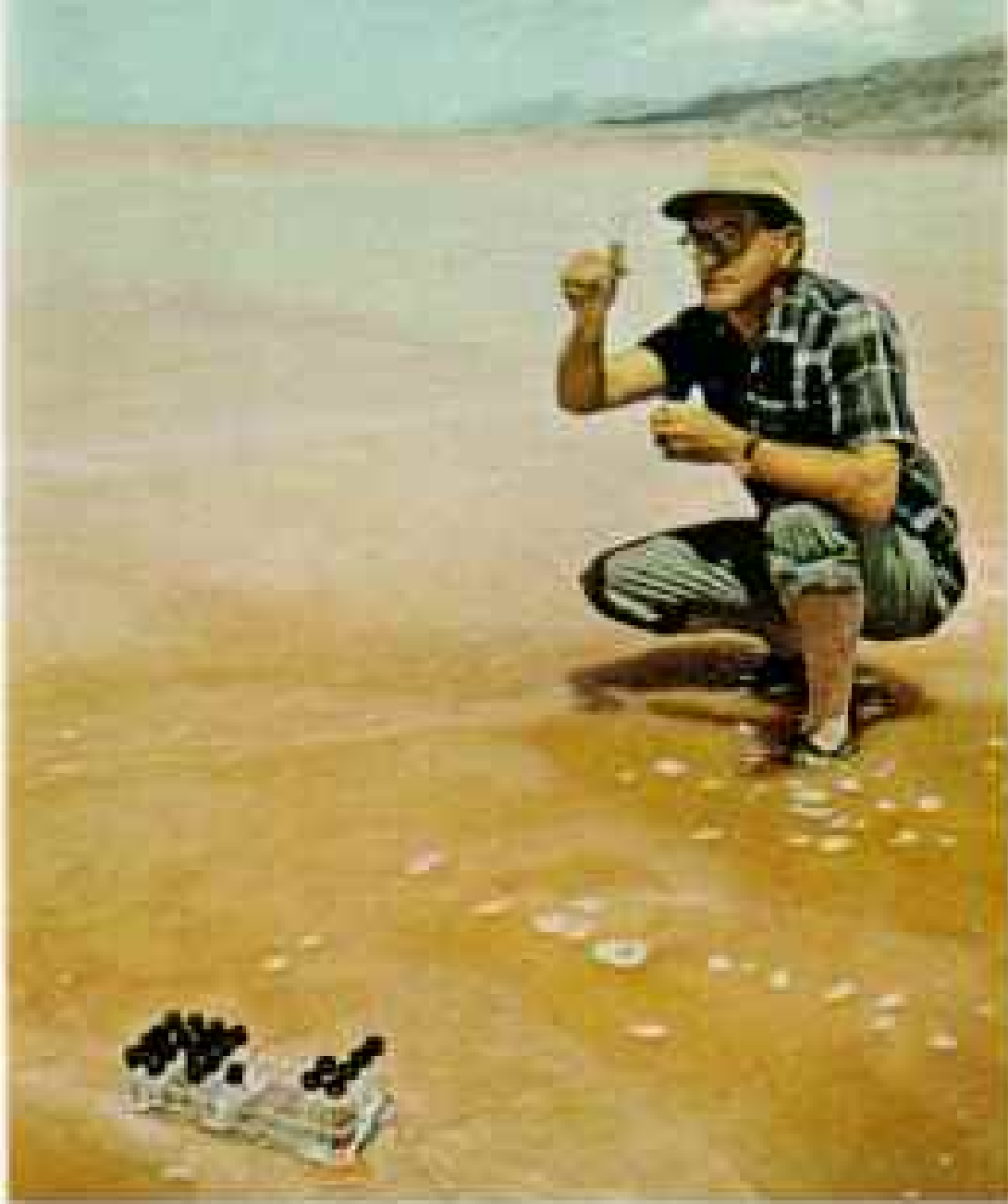
Minuscule monarchs of Great Salt Lake, quarter-inch brine shrimp multiply in astronomical hordes. Young *Artemia salina* (above) mature to feathery adults (upper right), their beady eyes carried on stalks on either side of the head. Two females bear ballooning egg sacs; the one at right appears magnified twenty times.

Brine-shrimp larvae, enlarged 25 times (opposite), resemble space men hovering near an angular flying saucer—a salt crystal. Soon they will metamorphose into adults.

With shrimp hatchlings esteemed as food for tropical fish, Mr. Pace and others harvest eggs by the bushel. Eggs the author kept on a shelf for four years still hatched when sprinkled in salt water.



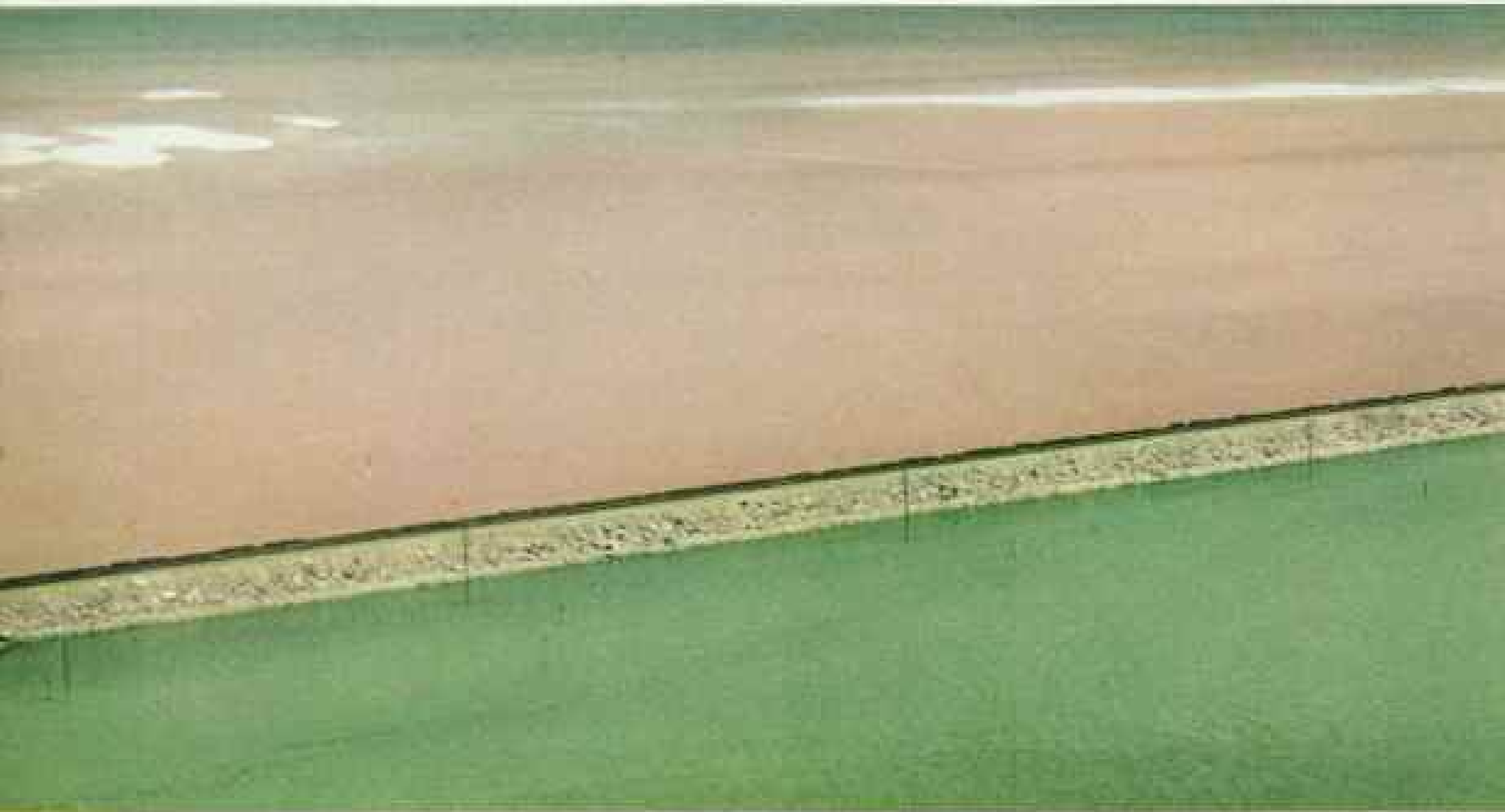




Shoe-deep in salty shallows, the author dips brine tinted by teeming *Dunaliella salina*, algae that thrive in the lake's harsh waters.

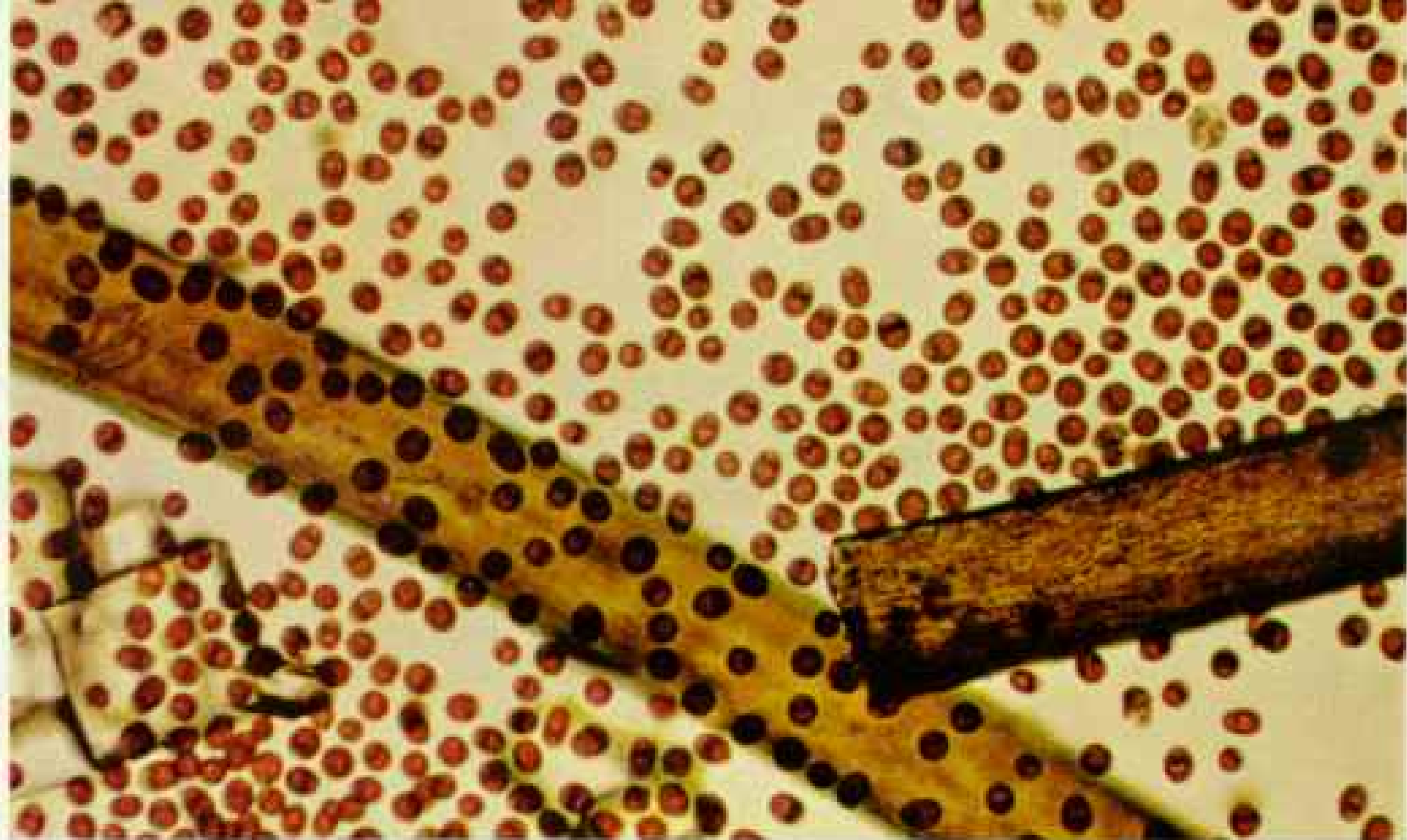
Loglike strands of human hair (right), enlarged 200 times by a microscope, dwarf black-banded ovals of *Dunaliella salina*.

Drawing a sharp line, the Southern Pacific's rail causeway (below) separates waters dyed by two of the lake's species of algae. *Dunaliella salina* tints pink a backwater of concentrated brine on the far side; emerald *Dunaliella viridis* (lower left) reigns on the near side. Trains cross the lake on 31 miles of dike-supported track that bypasses historic Promontory, Utah, where in 1869 officials drove the Golden Spike to complete the first transcontinental railroad.



Tiny one-celled plants like *Dunaliella viridis* (left) create basic foods for the lake's creatures. Such algae use the sun's energy to turn carbon dioxide and water to sugar, starch, and protein.

Feast of *viridis* turns adult brine shrimp green (right). A gleaming needle indicates size. Lake life's adaptability to a hostile environment intrigues scientists probing the possibility of life on other planets, such as Mars.



PHOTOGRAPHS BY PAUL A. JAHN © NATIONAL GEOGRAPHIC SOCIETY





many days or years they had been there, eyes staring sightlessly at the sky?

I asked Earl to demonstrate the lake's "no-sink" character. He waded out into the pink water up to his waist, then stretched out as if on a sofa. Head high, arms and legs above the surface, he floated like a cork (page 255).

In the glaring sun the temperature stood at 100° F., a minute after stepping ashore Earl was dry—wearing a talclike coating of white crystals. Aside from smarting eyes, this sticky, gritty aftermath is the only uncomfortable part of swimming in Great Salt Lake.

Here in the lake's seldom-visited northern reaches, cut off by the Southern Pacific dike (preceding pages), the salinity soars to as much as 28 percent, in contrast to 18 to 24 percent in southern and eastern waters. But even there the swimmer cannot sink, a fact that visitors delight in proving for themselves.

Late that night, when I was back in town, my microscope instantly revealed—as John Samuelson had predicted—the secret of the pink water. Under the lens swam myriad single-celled, potato-shaped algae known to botanists as *Dunaliella salina* (page 259, top). Each reddish-orange cell sculled through the water by means of two long hairlike whips growing from one end. Other, even smaller

species, *Dunaliella viridis* (page 258, bottom) and *Chlamydomonas*, were bright green and similarly propelled by whiskery flagella. Still another green variety, called *Aplanotheca* or sometimes *Coccochloris*, was encased in a transparent jelly of its own making.

Smallest of all were the bacteria, vaguely pink and revealed only as shimmering dots and rods even under the microscope's most powerful lens. A million could have perched on the point of a sharp needle.

Salt-hardy Life Draws on the Sun

The question persisted: How could these algae and bacteria survive, much less flourish, in a medium salty enough to kill almost every other form of life?

Our knowledge here is scant. We may only conclude that somehow, during the course of evolution, nature provided these curious forms with means either for preventing penetration of the salt or for keeping it from accumulating in toxic amounts.

But most crucial to the survival of these remarkable creatures is the capacity of the algae to draw on the sun for energy. Possessing the magic energy-trapping ingredient, chlorophyll, they are able to unite simple carbon dioxide with water to form starch,



sugar, and protein. Without this process of photosynthesis, there would be no life at all, for it produces the basic foodstuffs on which all animals, including man, depend.*

Among the earth's many thousands of animal species, only a tiny shrimp and one genus of fly are equipped to survive in Great Salt Lake. Like the algae and bacteria, which belong to the plant kingdom, they have their heyday during the summer months.

Best known for its eggs, the brine shrimp (*Artemia salina*) is a feathery, semitransparent crustacean which at times almost chokes shore waters (pages 256-7). During July or August dip up a glassful of water, and chances are that in it you will see several, even scores, of these tiny creatures. Or watch gulls sitting on the lake, nipping down with swift beaks for a meal of brine shrimp.

Mature female shrimp develop an under-pouch of eggs, each no larger than a grain of finest sand. Those released in spring and summer soon hatch, but eggs laid in September or October remain dormant over the winter. Wind and currents concentrate them mainly on the southwest shores, where they accumulate at the waterline in siltlike windrows.

Black hotsam of insects laps the southern shore; beyond the lake's leaden swells rise barren peaks of Stansbury Island. Wade among the "buffalo gnats," as Westerners call the brine flies, and they rise in sluggish, harmless clouds, then quickly settle again.

Like brine shrimp and algae, these flies of the genus *Ephydra* bear out a law of the lake: Few species can tolerate the harsh broth, but those few exist in stupendous swarms. So Capt. Howard Stansbury discovered when surveying the lake in 1850, he found the shore coated with a deep mud of decaying fly larvae "of the consistence of mortar & very black slimy & offensive."

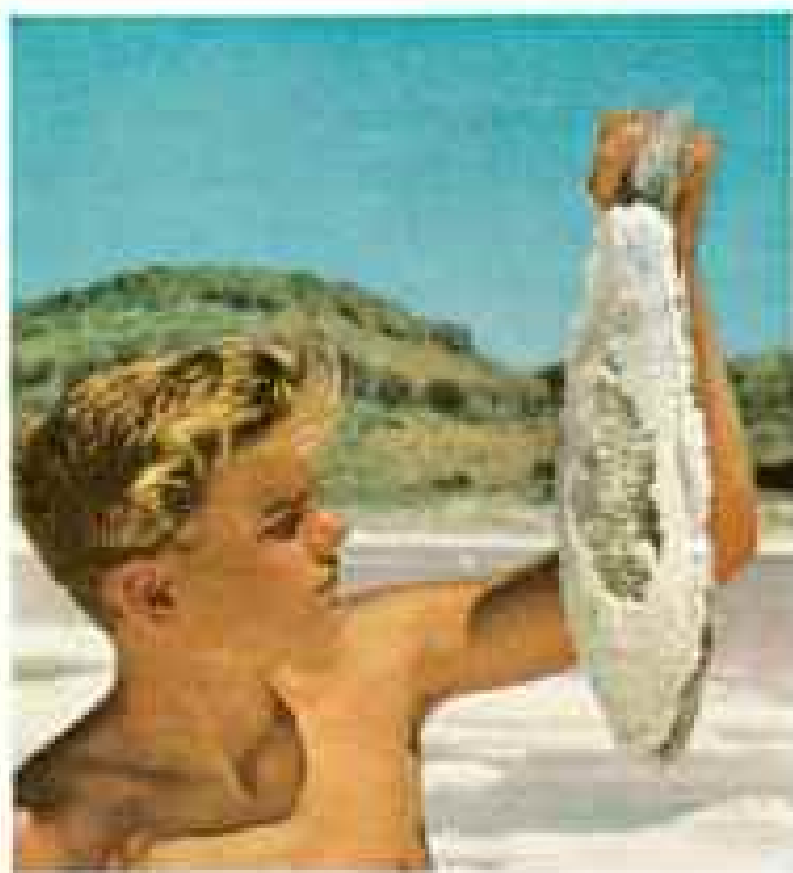
Brine-fly eggs hatch each spring into water-borne wrigglers, then metamorphose into baglike pupae that fasten to shore and bottom debris (top, about life-size). After a few weeks the flies emerge to darken the lake surface and salt-crusted shores as they graze on algae. Adults above, about four times life-size, crawl on a clump of salt.

The flies help feed the lake's gulls, revered state birds of Utah. Gulls flocked to Mormon grain fields near Salt Lake City in 1848 to devour a plague of crickets that threatened to bring famine by destroying the infant settlement's first major crop.

*The author described this process in "How the Sun Gives Life to the Sea," *GEOGRAPHIC*, February, 1961.



Salt on their tails but quick to flee, white pelicans usher their preflight young into shallows off Gunnison Island. Thousands of the huge birds nest on uninhabited Gunnison, seeking protection from coyotes and other



marauders. They share the 165-acre domicile with gulls.

With Great Salt Lake barren of fish life, the pelicans commute 25 miles and more to feed from fresh-water streams and swamps in the Bear River Migratory Bird Refuge (map, page 255). If startled while winging homeward, the parents may jettison their catch—the fate of the salt-cured carp that Rand Pace holds (above).

Commercial collectors scout the shoreline in planes to locate the densest and most accessible deposits. Then crews in trucks with wide-tread tires cross the salt flats to harvest the shrimp eggs, scooping them up in bags. Great Salt Lake brine-shrimp eggs find a world market as a source of live food for tropical fishes. Properly dried, they remain viable almost indefinitely.

Some years ago I gave away my aquariums, tropical fish, and pet sea horses when I moved from New York to Washington. Four years later, while rummaging through a drawer, I came across a bottle of brine-shrimp eggs, label faded but contents intact.

Were the eggs still alive? I sprinkled some into a beaker of sea water, and within two days there was another crop of swimming shrimp larvae, brought to life as if by magic after a four-year sleep.

A tough outer shell and the fine knack of remaining dormant, like the wound spring of a stopped clock, suggest how this remarkable suspension of life may take place. As to why, one need only consider the grinding adversity imposed by seasonal extremes. Worked upon by searing sun in autumn, ice and snow in winter, the beached eggs are successively baked, frozen, and thawed. But the life spark survives.

When spring rains and mountain runoff temporarily reduce salinity near the shore, a crack appears in the leathery outer shell of each quickened egg, and a single larva emerges. It swims off in an immediate and urgent quest for food—providentially supplied by the lake's algae and bacteria, just beginning to burgeon.

It is true that other organisms—amoebae, ciliates, diatoms, and the like—inhabit waters of Great Salt Lake, but only where rain and inflow have a diluting effect. They cannot be regarded as truly indigenous, for they cannot survive in the saturated brine that harbors the tiny shrimp and the lake's only other animal inhabitants, flies of the genus *Ephydra*.



REPRODUCTIONS © NATURAL GEOGRAPHIC SOCIETY

My first encounter with the flies occurred not far from where the railroad causeway spans the lake, here 31 miles across. The beach was typically salt white, but ahead lay a patch blackened as if by coal dust. As I approached, a low murmur told what I was seeing—an almost solid blanket of tiny flies. The insects rose, hovered for a moment, and then moved en masse along the beach, finally to settle again on the salt.

I crept close enough to observe that some were mating, some depositing eggs, and others licking algae from the salt crystals. In the nearby surf I found scores of fly wrigglers, each a little larger than its mosquito counterpart, apparently feeding on algae and bacteria. These would soon metamorphose into brown pupae, eventually into adult flies.

In summer, *Ephydra* flies may blacken miles of shoreline (pages 260-61). When disturbed, they simply take evasive flight, then resettle. Never did a single fly alight on my skin, or even approach me in curiosity.

Strange Species Thrive in Harsh Worlds

One objective of my summer's work was to collect live cultures of micro-organisms for shipment to my research colleagues of the Department of Biological Sciences at Fordham University in New York City. There we are studying biochemical and life-cycle details of salt-resistant microbes. By August my collection was complete, except for fresh samples of *Dunaliella salina*, the orange-red algae.

On a final sortie I drove 120 miles to a remote corner of the lake, where on an earlier aerial reconnaissance I had spotted reddish

water. A prevailing wind had pushed the discoloration close inshore, where the water was now a virtual pink soup. I filled several vials, and through a microscope perched on the hood of my car, I saw an incredibly dense population of vermilion algae. Here were thousands of the curious *Dunaliella* cells, pigments gleaming, flagella lashing.

The brine under my microscope was at true saturation; sodium chloride was recrystallizing as fast as it was being drawn into solution. Here was proof that this species could thrive in the absolute maximum of saltiness, and compelling evidence that adversity may exist only in the eye of the observer.

Many another little-known plant and animal on our planet has adapted to conditions similarly harsh. We do not often see these hardy creatures, for they live mainly in a microscopic world. One group, for example, actually "eats" carbolic acid; others metabolize iron, carbon monoxide, naphthalene, soap, paraffin, kerosene.

Some species thrive without oxygen; some flourish in the scalding waters of hot springs; others on the slick ice of glaciers. Cave dwellers, including some vertebrates, live perpetually in a total blackout. And miles below the surface of the sea live scores of abyssal wonders, under pressures of as much as 16,000 pounds per square inch.

Who can define the potential of creative forces in the universe? If life has been able to evolve and adapt to such bizarre earthly habitats, why not in even harsher and weirder environments—say, perhaps, on some distant planet?

THE END

First Woman Across

By MYRTLE SIMPSON

A KIND OF DREAM WORLD enveloped us, a blank white waste of sodden snow patterned with shallow lakes and swirling melt streams. Haze blurred the horizon; weariness dulled the mind.

Behind us lay 375 miles of our trail across the Greenland Icecap, and, for all my fatigue, I felt some small pride to be a woman standing where no woman had stood before. Surely within another 20 or 25 miles the ice-free

mountain fringe of the Greenland west coast must lift into view.

For nearly a month we had trudged across the Inland Ice, as Greenlanders call it. The sun burned down and the snowscape seemed endless as we tugged on our sledge harness.

"This sloppy stuff is killing us," lamented my husband Hugh, shaking the wet snow off his skis. "It just can't go on like this much farther."

Our altimeter showed a steady drop



Greenland's Ice

Photographs by HUGH SIMPSON, M.D.

in elevation; yet mirages of rising ground mocked us as we squinted ahead at the pale and milky sky for the first glimpse of land.

Distant Speck Prompts Joyful Shout

We had descended past the firn, or névé, line, the elevation on permanent ice fields below which summer melt occurs. At this latitude, almost on the Arctic Circle, and at this time, mid-July, the firn line lay at about 5,500

feet, more than a mile above sea level.

Days later we floundered on through sucking slush, and then... My eye caught a shape on the horizon that was no cloud.

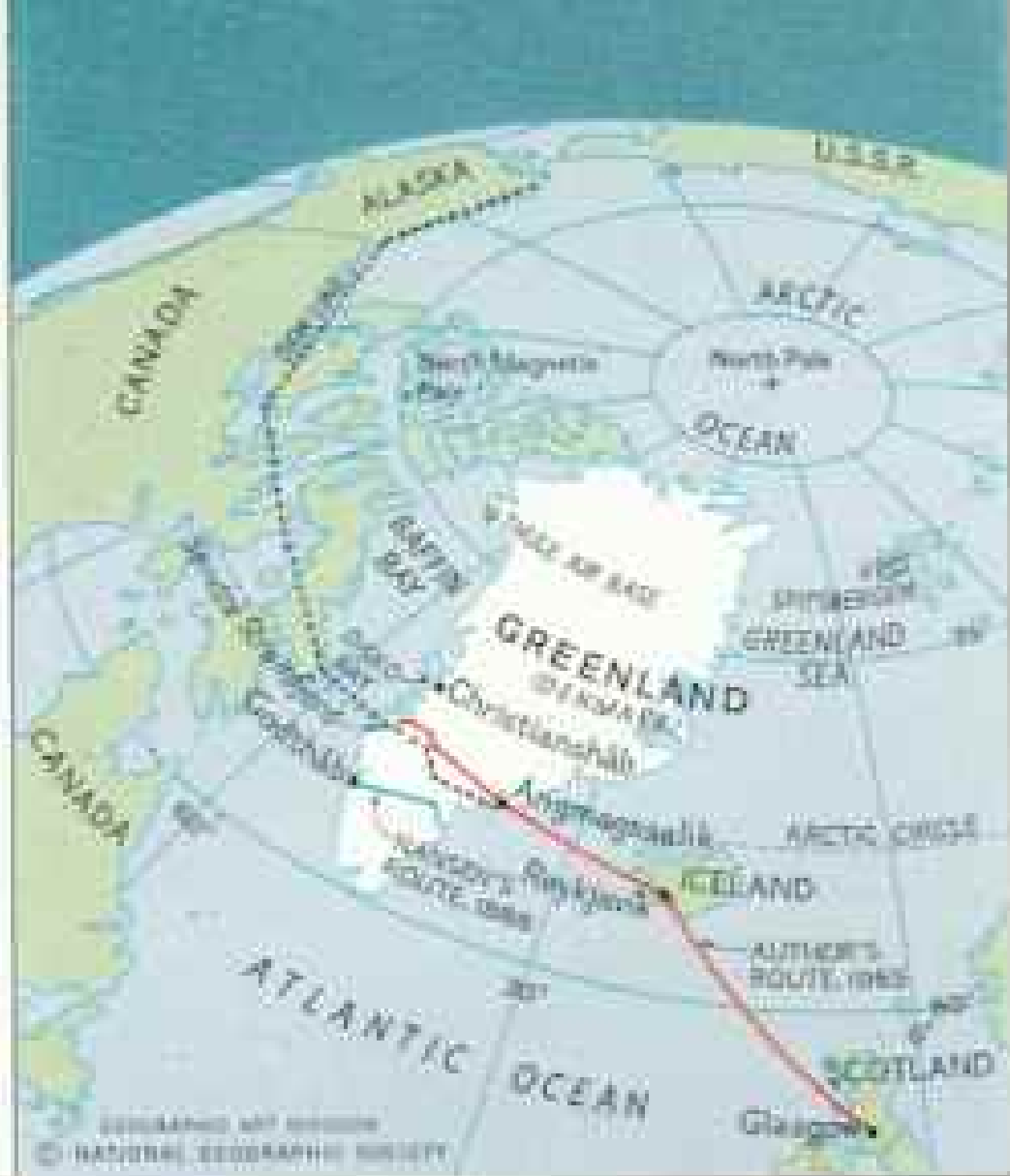
"Land!" I shouted, and felt the exultation of Columbus's lookout at his first sight of the New World.

The three men who were my companions looked up. A black mountain peak toothed the horizon.

"Thank heavens," said veteran



MEETING A CHALLENGE accepted by few men, a daring mother of three crosses Greenland's forbidding icecap. She and two other members of her husband's expedition quicken their pace to keep the sail-rigged sledge from overrunning them before a favoring wind.



Traversing the Inland Ice, as the vast frozen interior is known, the Scottish Trans-Greenland Expedition matched the 1888 feat of Norwegian explorer Fridtjof Nansen. No other group has made the trip without dogs or motorized vehicles.

Crossing the Arctic Circle, the four explorers spanned the world's largest island, trekking 440 miles in 40 days. Danger, discomfort, and uncertainty dogged their tracks over the massive cake of ice that lies atop this county of Denmark, fifty times bigger than the mother country. The bold adventure furthered research by Dr. Hugh Simpson—a pathologist at the Royal Infirmary in Glasgow and a lecturer at Glasgow University—into the effects of stress on humans.

mountaineer William Wallace, and limp with relief we all slumped on the sledge.

"Unless that's a mirage," said our navigator, Roger Tuft, "in another few days you'll be the first woman ever to have crossed Greenland's Inland Ice on your own two legs—or any way, for that matter."

And so, indeed, it turned out. But hardly can it be said, as we hear of some sporting events, that "the outcome was never in doubt." It was very much in doubt before we even made our first landfall in ice-jammed Johan Peteresen Fjord on Greenland's east coast.

Ordeal Provides a Study of Stress

Why were we in Greenland anyway? And why had I, a wife and mother of three, undertaken the arduous foot-crossing of the Greenland Icecap? The second question is quickly answered: Hugh and I have spent much of our married life exploring remote lands. Purely as adventure, the Greenland crossing would satisfy our souls.

Only one party had previously crossed Greenland's Inland Ice without using dogs or powered vehicles. The intrepid Fridtjof Nansen made the first ski traverse from east to west in 1888. Hauling five sledges, the six-man party dispelled rumors of verdant pastures hidden in the hinterland.

We had deliberately chosen to repeat this grueling trek to measure the effects of its mental and physical demands upon us. Hugh is a pathologist on the staff of the Royal Infirmary in Glasgow. Most of his professional life has been dedicated to learning the effects of stress on human beings. One key to this study is the output into the blood of adrenal hormones called corticoids.

The adrenal glands, located above each

kidney, are stimulated in pressure situations. Body tissues are bathed in corticoid hormones. Eventually these stress hormones are liberated into the urine, and on our cross-Greenland journey Hugh, at regular intervals, would collect specimens for later laboratory analysis. Does the body get used to prolonged strain and cause the hormone level to drop to normal, Hugh wondered, or are the glands stimulated throughout the entire period?

It was only natural that I should be first to enroll as one of Hugh's guinea pigs. Bill Wallace and Roger Tuft jumped at the chance when Hugh asked them to round out the party. Bill, an expert skier and climber, had ascended Peru's highest peak—22,205-foot Nevado Huascarán—with Hugh and me in 1958. Roger and Hugh had shared considerable sledging experience in the Antarctic.

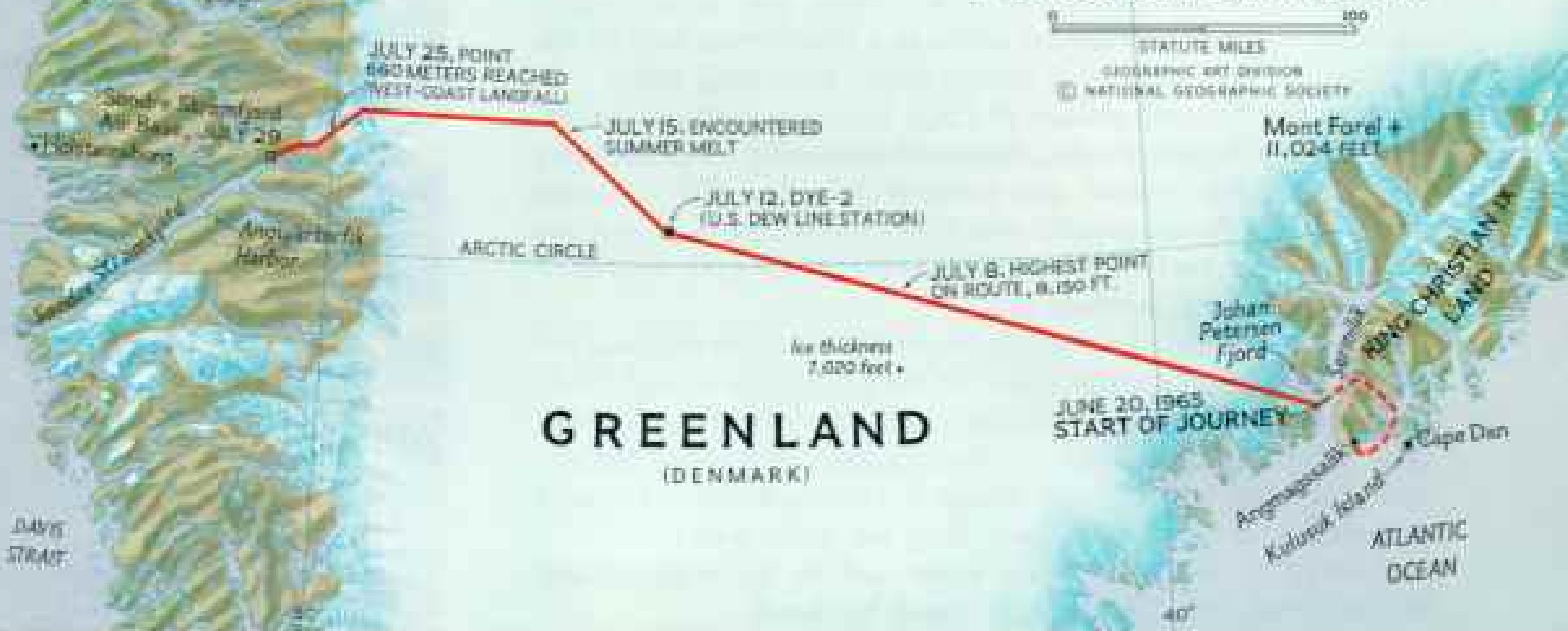
Our expedition had support from medical research funds of the Secretary of State for Scotland and from the Mount Everest Foundation, but the participants themselves provided the greater part of the financing.

We mustered our team and assembled equipment for departure from Scotland in June, 1965. Flying to Iceland, we chartered a DC-3 for the hop to Greenland.

My heart beat fast, one sparkling morning, to see the mountains of East Greenland,

The Author: Myrtle Simpson, born into a British army family, has climbed and explored from the Australian outback to the Andes, from Spitsbergen to Surinam. A career as a radiologist, marriage, and the care of three children—none of these has curbed the wanderlust that lures her to the remotest parts of the world. Mrs. Simpson is the author of two books of family travel, *Home Is a Tent* and *White Horizons* (Victor Gollancz Ltd., London), the latter an account of the Greenland expedition.

Across the Inland Ice



Blocked by pack ice, a coastal vessel unloads expedition members at the mouth of Johan Petersen Fjord, 30 miles north of their intended starting point. The travelers began with 900 pounds of equipment loaded on two 12-foot sledges. Later they abandoned one sledge and discarded nonessential articles to lighten the load.

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PHOTOGRAPH BY NATIONAL GEOGRAPHIC SOCIETY



magnificent white spires and rocky peaks, take shape out of the blue distance. We glided down to a shuddering halt on the runway on the island of Kulusuk (map, preceding page).

From the Eskimo village of Cape Dan a motorboat ferried us to nearby Angmagssalik, chief settlement of East Greenland, with a hospital, school, and governor's house. The clustered red homes of Angmagssalik stood trim in their postcard setting of naked rock, turfy hollows, and yellow and purple wild flowers beside the ice-jammed sea.

For just one day Angmagssalik could put at our disposal the *Johan Petersen*, a coastal vessel of the Royal Greenland Trade Department. On a fine morning, June 15, we pitched all our gear aboard, the cheerful Eskimo captain revved up the engines, and the sturdy boat chugged westward toward almost perpendicular mountains more than ten miles away.

Narrowing leads of open water led to an impenetrable barrier of sea ice. The captain shook his head.

"Impossible," agreed Hugh gloomily.

Should we beat a retreat to Angmagssalik? Or unload on the pack ice and make our own way to shore?

A difficult decision—I was glad it was Hugh's! Once the boat left us, there would be nowhere to go but over the icecap to West Greenland. We would be entirely out of touch; our modest radio equipment included no transmitter. If the ice broke up, we might be blown out to sea.

Pack Ice Forces a Change of Plan

Hugh decided to gamble, but at a more promising place. The captain changed course and sailed into Johan Petersen Fjord until the boat bumped into ice. The crew tossed down our gear and we jumped onto a floe. It rocked under our feet.

Why, I wondered for a moment, had I left a comfortable home and my three children for all this ice, frigid water, and bare rock? As the little ship pulled away, I had to force myself not to call it back and leap aboard.

When the two 12-foot Nansen sledges were loaded, we slipped into the nylon harnesses, two of us pulling each sled, and leaned toward shore. After camping on a cake of ice for the night, we set off once more at 4 a.m., riding the night-formed crust.

Rounding a point, we were confronted, not with the upward-sweeping ramp of a glacier, but with a steep rock wall. Roger stepped out boldly toward the shore—and disappeared! Bill and Hugh rushed forward and just managed to grab his wrists before he was sucked into the tidal crack.

We hurried Roger to shore and soon had the primus stove roaring. I crumbled dehydrated meat into a billycan of snow, then added a hunk of margarine, along with a handful of dried onions. The hot stew restored Roger. Mugs of cocoa followed, and by then we were all half asleep.

After our rest we pondered our problem anew: Could we find a route up that rock face? We loaded one sledge and manhandled it up a snow-filled gully. Suddenly, underfoot, I found some patches of dog fur and, farther on, a discarded tobacco pipe. We had stumbled onto an Eskimo trail!

Topping a saddle, we looked down on a little lake, frozen solid. Beyond it, as welcome as Jacob's ladder, a gleaming glacier curved upward like a staircase to the Inland Ice.

We dumped the load and went back—five times—for more.



"Half of me was dying of heat, half of cold," Mrs. Simpson recalls of the 10-mile struggle over the fjord's rotten sea ice. She and William Wallace pull and





EXTRAPHONE (BELOW) AND BUDACHROME BY WOOD SIMPSON © U.S.S.

Roger Tufft pushes a sledge across a lead of open water at the edge of rocky land. Blazing sun turned the ice to slush that partly sank under their feet. Later Mr. Tufft plunged through a tidal crack; quick action by his companions saved him from drowning. One tent of double-thickness nylon provided the only shelter from blizzard, rain, and sun (below). Bicycle wheel trailing the sledge turned a mileage meter.

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Mantle of ice as much as two miles thick covers most of Greenland. Rimmed by jagged mountains, the frigid mass depresses the interior into a bowl whose bottom lies 1,200 feet below sea level. At trail's end, the travelers found lush grass and colorful wild flowers carpeting a coastal belt.

Trudging into eternal emptiness, the Scots inch across a frozen desert. They move during night hours, when the ever-present sun descends almost to the horizon and cold glazes the summer-softened surface.

Finally we surveyed our assembled gear. We had to travel light. We transferred all food from plywood cases to nylon zipper bags. We tore covers off our notebooks, discarded tooth paste, trimmed edges off our maps. The men even urged me to throw away a photo of my children. I refused.

Brutally hard work it was, pulling the sledges up the slope. Our hopes soared each time we topped a crest and saw no serious crevasses blocking our way. We crossed fox tracks and several times heard ptarmigan croaking among the cliffs. We set up a depot on a nunatak—a peak protruding from glacial ice—at an elevation of 2,500 feet.

Ski Mishap Stirs Grim Speculation

Skiing back downhill to pick up another load, we found our light Norwegian cross-country skis hard to control. Hugh, perhaps overconfident, flew faster and faster down the slope. Suddenly, he saw great drifts ahead. He couldn't stop. His skis flew apart and he whirled head-over-heels in an appalling "egg-beater." Both ski poles shattered. Hugh limped back to camp rather shaken.

"How helpless we would have been if I had broken a leg or arm," he said.

Next day, from a nunatak at about 3,000 feet elevation, we decided to go on with just a single sledge. Across a surface hardened by night frost, we were able to pull the whole 725-pound load quite easily, even wearing skis. The second sledge looked forlorn, abandoned there on the naked rock.

To avoid the soft, wet surface during full

sunlight, we traveled at night, when the sun hovered on the horizon and the snow was firm. On and on, up and up we went, higher and higher in a silent, empty world.

Reaching the unbroken Inland Ice was like soaring out of clouds into the empty blue of space. There was an infinite stillness, a feeling of unrecorded time, and a poignant sense of loneliness.

A bicycle wheel at the stern of the sledge turned a mileage meter which ticked off our progress (page 273). The going became easier as our total weight dropped by the amount of food eaten each day—about ten pounds.

Keeping us going in a straight line fell to Roger, who had made landfalls as a small-boat navigator in the south Indian Ocean. The sextant has to have an artificial horizon when used on land. Compasses were erratic, swinging sluggishly to magnetic north, which lies far to the west of true north in Greenland (map, page 266). Precise time of day was critical to Roger's calculations, so we got our time checks from a little transistor radio (next page).

Now and then flocks of arctic terns or a lone skua visited our camps as we rested while the sun was at its highest. Most exciting of all was the sight of an arctic fox gamboling in the vast white emptiness, 30 miles from the coast. Even far inland on the ice we saw occasional flying birds.

Plod on, plod on. For ten days the going was monotonously the same. Then on the eleventh low clouds began to gather and snow fell. The wind got up, and for eight torturous hours we floundered forward blindly in a bliz-

zard—and covered only four miles. Utterly exhausted, we pitched the tent and fell into it.

Hugh made a gallon of soup and we drank it all. The wind and snow lashed the tent, but I felt marvelous curled up in my sleeping bag.

Gradually a new sound beat on the tent. Rain! We hadn't expected it at this altitude, 5,750 feet. It continued all day and another night, and we just lay snug playing chess and reading our one book—Churchill's memoirs.

Eroding the surrounding snow, the down-pour left our tent on a pedestal, and what a transformation it had wrought on the terrain! The rain had frozen, sheathing the snow with ice. All the sastrugi—wind-formed ridges of snow—had been flattened. Our skis met no resistance. The sledge rambled along behind.

Dye 2: Pinpoint in a World of Ice

For three nights the going was fast and fine. But ice and isolation began to play subtle tricks with my imagination. I began to feel that someone else was with us. "He" kept looking over my shoulder. The "green man" of Greenland, perhaps. Roger confessed that he too had felt the strange, unseen presence.

The highest point we recorded was 8,150 feet. Beyond that "height of land," as we started to go down, the sledge moved more easily and our skis flew over the silky snow.

Now we talked constantly of our next landmark—the American DEW Line radar station perched in the middle of the Inland Ice.

"What do you think they will offer us to eat?" Bill asked.

"Fried chicken," said Roger.

ROCKHOUND © R.S.S.





EXPEDITIONERS BY ROGER TUFFT (PHOTOS) AND HIGH SEPPON (C) N.C.S.

With a boxtop laboratory, Dr. Simpson carries on his research project. Stress stimulates the production of adrenal hormones that find their way into urine. By collecting specimens for later analysis, Dr. Simpson learned that the expedition members never adapted to prolonged stress; hormone production rose when the going was hard and dropped as it grew easier. A U. S. Army doctor has made similar studies among combat troops in South Viet Nam.

Missile-age outpost, domed Dye 2—radar station of the Distant Early Warning (DEW) Line—welcomes its first visitors to arrive on foot. Mr. Tufft stands near the sledge, Dr. Simpson at the left. Startled American crewmen appear ant-size beside the huge installation, hitherto reached only by aircraft. During a brief respite from struggle, the explorers reveled in Dye 2's comfort—hot coffee, good food, and steaming baths.

Plotting his position on a featureless waste, Mr. Tufft (below) prepares to shoot the sun with a bubble sextant. The device contains an artificial horizon for use where a true one cannot be seen. Transistor radio, left, provides accurate time checks. With minimal equipment, the navigator guided the party to within four miles of its planned west-coast landfall.



So we named the base "Chicken Maryland," though "Dye 2" is its official designation.

One evening as our skis slid across the creaking snow, I noticed a pinpoint on the horizon, the image watery from distance. None of us came near guessing the object was actually 24 miles away.

It took us all night to reach a contraption weird enough for a James Bond film. A Brobdingnagian golf ball squatted on top of a huge metal box that perched on giant jacks (below). Diesel engines thundered away. No one paid any attention to us.

"Some early-warning system, this," said Hugh. "We could have blown it up with a small mortar."

A yellow Caterpillar tractor snarled through the great silence, shoving snow off the airplane runway. I waved to the driver, who wore a baseball cap.

"Hi!" I shouted. He saluted and drove on.

We took off our skis and stumbled over to a metal shed. A man there couldn't believe that we had walked across the icecap. He picked up a phone and called the main building.

"You can't go in till they have permission from the Pentagon in Washington. You can have a sandwich here, though, if you like."

"Never mind," Hugh said, "we'll push on."

Hot Showers Mark Respite From Struggle

Communication with the Pentagon proved impressively fast, however. Suddenly people began spilling out of the building, clicking cameras and shaking our hands. We were propelled toward a 30-foot ladder rising into the heart of the structure.

"Welcome to Dye 2!"—the words were cast into the iron steps. We were hurried along shiplike corridors to the canteen. The giant building had everything—air conditioning, a bar, private rooms with bath. Cups of coffee

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PHOTOGRAPH BY WILLIAM WALLACE © N.S.S.





Faces baked by sun and glare, the author (from top) and Dr. Simpson add a new chapter to adventures they have shared. Mr. Wallace, grizzled by frost, earlier joined them on a 1958 climb of Peru's highest peak—22,205-foot Nevado Huascarán. Three and a half years in Antarctica helped qualify Mr. Tufft (below) for this arduous trek.



Melt water's eroding fingers create a chaotic maze in the expedition's path near the western edge of the icecap. The sledge cracked its wooden frame in two places when it lurched into this gully; glue mended the breaks. Abrasive ice crystals ground skis dangerously thin.

Lakes and meandering rivers of melt water posed obstacles below the firn line, where summer thaw occurs. The explorers detoured when they could, or forded marrow-chilling shallows.



were thrust at us, ham sandwiches, and finally champagne!

"Want a shower?" Our peeling faces and grimy clothes and the men's scruffy beards fully warranted the invitation. How delicious the hot water felt!

Later I joined the others in the canteen.

"How about talking to the folks at home? We have a hot line to Europe, you know."

I was handed an ordinary-looking receiver. Operators spoke in American, Icelandic, Yorkshire; then I heard the unmistakable Scottish accents on the Edinburgh exchange.

"Is anything the matter?" said a thin voice over the air. It was my mother, and only then did I realize that I had wakened her: It was midnight in Scotland.

Square-rigger Sails the Snows

We thanked our exuberant hosts and climbed back into our parkas. What a send-off! Cardboard boxes were thrust into our hands, and dozens of cameras clicked.

Running downhill, alive again in our own

world of ice and sky, we set off at a cracking pace. After ten miles we pitched the tent and opened our presents. Oranges! Little packets, too, of instant tea.

As we pressed on, a strong wind pushed at our backs. We got out our sail, strapped a bamboo mast to the sledge, and hoisted a square rig. It filled with wind, and the sledge tore along. The boys skied in front while I steered from an anchor position astern. How pretty it looked, our galleon of the Greenland gales, our *Kon-Tiki* of the snowy seas!

We logged more than 20 miles a day, and quickly lost altitude. Now trouble loomed ahead—the dark line of a melt-water lake. We had descended to the level of summer thaw.

Reluctantly we took down our sail and wove around lakes and rivers. As we crossed one stream, I fell in up to my neck—and my dear husband Hugh stood there taking a picture of me in my plight.

Next day I sighted land. Nobody slept that night. We all huddled at the tent door, gazing toward the black peak that spelled finis.





REARRANGED BY HUGH SIMPSON © R.S.S.



to the monotony of the Inland Ice.

Now the icecap divided into huge glacial flows. Crevasses slashed the surface and we welcomed them, since they swallowed up the rivers. But now the surface turned to rough-ice crystals. My skis began to flex and feel flabby, and I found to my horror that the abrasive ice had worn them wafer-thin. Would they last?

Sledge's Solo Run Ends Sadly

We came upon torn meteorological balloons, ptarmigan feathers, even patches of gravel. Our small radio direction finder picked up Søndre Strømfjord Air Base, the Danish outpost at the end of our Greenland crossing. We turned southward, aiming for one particular projection of land, Point 660 meters, as it was designated on our map.

On one rush down an ice hill, our long-suffering conveyance nose-dived into a snowbank with a loud crack (preceding page).

"There goes the sledge," shouted Roger, and we found the wooden frame broken in two places.

While Roger and Hugh glued and

Monarch of the tundra, a caribou stag crowned with majestic antlers browses near Søndre Strømfjord, where Mrs. Simpson's history-making journey ended. Joined by her children and a friend, who flew in from Scotland, the author spent a month at an Eskimo hunting and fishing camp while her companions made a 250-mile kayak trip to Christianshåb.

Suspicious and quick tempered, a musk ox remains watchful even while resting. One of the shaggy beasts chased Dr. Simpson's kayak party up a steep 1,500-foot slope during a portage. The men escaped by leaping into a canoe left behind on an upland lake. They sat helpless while the musk ox gored to shreds a rucksack dropped on shore. The animals may reach five feet in height at the shoulder and 800 pounds in weight.

Doting Eskimo mother, Magdalena—here with three-year-old daughter Gertrude—proved a good campsite neighbor. She taught Mrs. Simpson such skills of arctic matrons as cutting up caribou and drying the meat.

bound the sledge together, Bill and I set off to find a route to Point 660. On foot, unhampered, the going was easy. At the top of an ice hummock I caught my breath. I was looking down at land—nothing but land!

Bill and I ran, slithering on the ice, stumbling on the moraine gravel, and threw ourselves down on green grass. I buried my face and hands in it, smelling it, feeling it. I clutched handfuls of flowers—purple saxifrage and moss campion, yellow poppies and glorious lush willow herb. The colors dazzled me after the endless white. I laughed and cried, and undemonstrative Bill was as moved as I.

When I looked up, my gaze met the soft eyes of a caribou with a mouthful of grass. He looked sad, as if Santa Claus had cut him off his team.

Our map confirmed that this was Point 660. Exultantly we returned to Hugh and Roger.

Next evening saw us all off the ice, 36 trail days from Johan Petersen Fjord. We pegged out the tent on the warm, soft tundra grass beside a lakelet of turquoise blue. Ducks bent the reeds at the water's edge, and a caribou and her calf meandered down to drink. Buntings twittered happily, and a white stone came to life as an arctic hare.

I couldn't resist the water and walked straight in. The caribou looked on astonished.

A few days later we reached an unoccupied hut at the end of a rough road. Here Hugh called a halt to backpacking. For his adrenal experiment he wanted us to arrive at Søndre Strømfjord relaxed, in order to obtain quick contrast with the long period of physical stress. With the airbase in sight, we dropped our loads where we were and walked in with our hands in our pockets.

Jet Brings Children for Family Reunion

The Danes received us hospitably at Søndre Strømfjord Air Base, then a refueling stop for commercial flights between Europe and western North America and still an alternate haven for aircraft.

For the three men, new adventure lay ahead—a kayak traverse of the ice-free fringe of West Greenland; from Søndre Strømfjord their trail would lead 250 miles north through fjords, lakes, rivers, and mossy mountain passes to Christianshåb on Disko Bay.

But a family reunion preceded the men's departure. One evening a Scandinavian Airlines System jet swooped down to bring to Hugh and me our three children, Rona, Bruce, and Robin, three, four, and five respectively. With them came a friend, Heather Wheeler, who emerged from the plane clutching a bag of peaches, paper windmills, and fishing rods.





She had come to help me make a collection for the herbarium in the Royal Botanic Garden at Edinburgh.

A small boat took Heather and me and the three children 27 miles down Søndre Strømfjord to Angujårtorfik Harbor, where Eskimo families gather in summer to stock up on caribou and fish. There the five of us would live until the men returned from the north.

How quickly we adapted to Eskimo ways! We learned to cut up the caribou and to relish roe fresh from the belly of the *ekaluk*—the arctic char. And we learned something of the complex Eskimo language.

Lowering Sun Signals End of Summer

One day an Eskimo family—Magdalena and Jacob and their three little children—set up camp nearby to hunt caribou. Their children rushed up to mine, and from then on we were one family (pages 277 and below).

Magdalena and I were busy all day, cutting up the animals that Jacob killed. The haunches we threw in the river to keep fresh. Steaks and liver, kidneys and hearts we ate from day to day. We dried the meat and smoked the tongues. Nothing went to waste.

What a convenient, uncomplicated life the Eskimo leads! In summer Greenlanders don't sleep at night; they just take the odd nap. Coffee boiled constantly on the primus stove, and conversations drifted on endlessly.

I learned to like my coffee with a slice of fat floating on the top—it satisfied my craving for butter. The children enjoyed raw marrow. Meat was plentiful, the berries were ripe, and

char flocked into the river. What more could we want?

But now the sun hung lower in the sky each day, and cold weather approached. What had happened to Hugh?

One September morning I was squatting with Magdalena and Jacob, sucking boiled *ekaluk* off the bones, when we heard shrieks from the children. We leaped to our feet—a blue kayak was sailing into our bay. Hugh! He looked like the wild man from Borneo, with a bushy beard and a great thatch of hair.

We left the valley a few days later. Magdalena and I clutched each other and cried. I was leaving very real friends. They had taught me far more than I could them.

Our earlier adventure had taught us something, too. After weeks of evaluation, Hugh completed our stress hormone study on the icecap crossing, and the results somewhat surprised us: The plateau of adrenal response was sustained for as long as the stress—our bodies did not adapt, in hormone output, to continued pressure over long periods. The output rose when the going was hard, tapered off a little if our progress grew easier, but rose again if new difficulties were encountered.

Soon we were soaring toward Europe, minds awhirl with memories. As the shimmering, pearlescent Inland Ice unrolled far beneath our Copenhagen-bound jet, a traveler pointed down and said:

"I hear some idiots crossed that on foot this summer. How silly can you get?"

I shook my head in feigned agreement. He would not have understood. THE END

Skyscrapers of cod, elaborate fish-drying racks preserve summer's bounty for the long winter ahead near Angmagssalik. Delighted with unusual visitors, youths introduce the author and Mr. Tufft to the Eskimo way of life. Lacking forests, Greenlanders imported these timbers from Denmark.

Children of two worlds share a meal. Bruce, at left, Rona, and Robin Simpson—ages 4, 3, and 5—and dark-haired Hansina, 7, sister of Gertrude, dine on fish taken in the nearby fjord.



PHOTOGRAPHED BY HUGH SIMPSON © A.S.S.

Ancient Aphrodisias and Its Marble Treasures

By KENAN T. ERIM, Ph.D.

Photographs by JONATHAN S. BLAIR



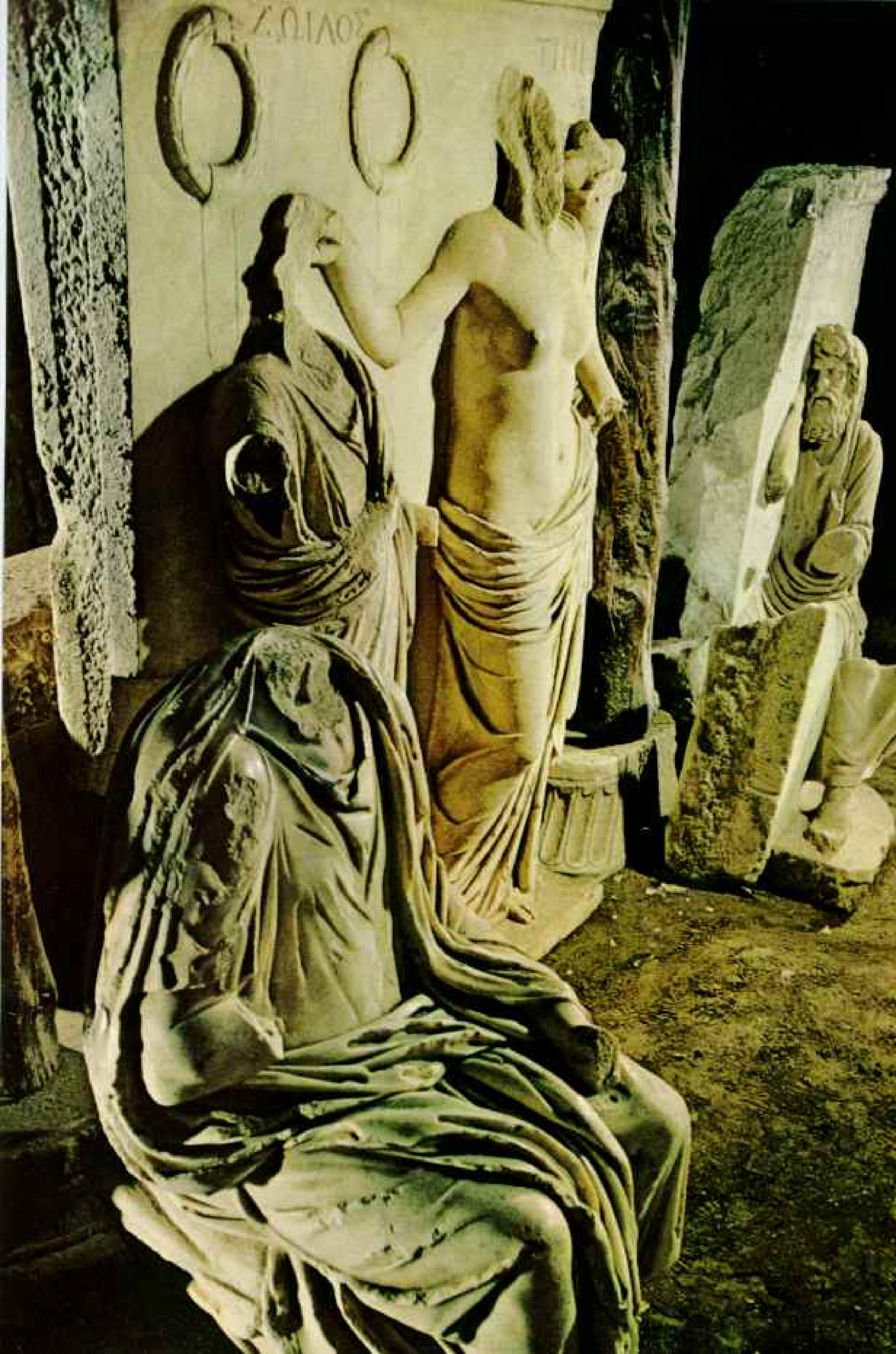
IMAGINE COMING upon a city of antiquity so rich in archeological treasures that choice sculptures roll out of the sides of ditches, tumble from old walls, and lie jam-packed amid colonnaded ruins.

This fantastic situation exists at Aphrodisias, a Greco-Roman city we have been excavating on the Anatolian uplands of Turkey, 95 miles southeast of the Aegean port of İzmir.

The skills of the ancients blessed Aphrodisias with such a profusion of art and architecture of the very highest quality that even in six years of digging there we have only skimmed the surface.

While I was working at the site, a portrait head of a woman from about the time of Christ broke loose from a buttress of Byzantine brick and literally rolled to my feet. A wall built of debris from earlier centuries yielded a massive statue of the goddess Aphrodite, for whom this city was named. And in the

WITH ELOQUENT SILENCE, battered sculptures bear witness to lost grandeur. Paint still colors eyes and hair of a youthful head, perhaps that of Apollo. An allegorical figure of Honor, at right, crowns a citizen named Zoilos; Greek letters label the faceless pair. Bearded Eternity and a seated philosopher share the storage room.



APHRODISIAS

EMBRACING an isolated valley of southwestern Turkey, a barely touched trove of Greco-Roman art and architecture marks Aphrodisias—home of sculptors whose works graced the whole Roman Empire. The village of old Geyre, upper center, mingles with ruins of this city named for Aphrodite, its patron goddess. Columns at center mark the site



of the deity's temple—also shown on the corresponding map at right. Poplar groves hide the agora. Aphrodisias' commercial and administrative heart. An oblong stadium seated 20 to 30 thousand spectators for athletic games. Defensive walls encircle more than 200 acres. Either built or repaired hastily about A.D. 350, they contain fragments that suggest an earthquake had earlier shattered Aphrodisias. Still alive in Byzantine times, the city became the seat of a Christian bishop. But invaders and more tremors brought final ruin.

The author, associate professor of classics at New York University, guides excavations here. A National Geographic Society research grant helps support his work.



SCALE IN FEET

DRAWN BY G. STEFANOFF AND S. W. BEATTY
GEOGRAPHIC ART DIVISION
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PHOTOGRAPH BY NATIONAL GEOGRAPHIC SOCIETY

odeon, or concert hall, we have exhumed scores of elegant statues and relief fragments.

I have come to know Aphrodisias as a place haunted with memories in marble. Voiceless but eloquent, her faces from the past form a colorful company—Apollo, Artemis, and Dionysus; nymphs, satyrs, centaurs, and bacchantes; pugilists, patricians, magistrates, and helmeted legionaries of Imperial Rome.

This is the stone-wrought citizenry whose rediscovery is bringing new fame to the fabled city of Aphrodite, mother goddess of love, fertility, and life itself.

Under the aegis of New York University, my assistants and I are gradually sorting out the maze of friezes, colonnades, and mosaic pavements; the Roman tunnels and the great stone arc of the theater; the overlapping walls and the chunks of fallen lintel stone.

National Geographic Society research grants permitted an enlarged program of excavation in the summer of 1966, and a further grant from the Society makes possible a full schedule of work at the site this year.*

Yet our efforts to date have hardly opened

the door on the wonders of Aphrodisias. Major discoveries might easily continue for several more excavation seasons, and much restoration and cleanup would remain to be done.

Gardeners Stumble on Marble Treasures

Tombs at Aphrodisias have yielded objects which indicate that a Turkish hamlet took root on the site by the 18th century. Geyre was the name given it, and its tottering houses still nestled helter-skelter amid the ruins when I first visited the site.

Well before I got there, the villagers, in 1957, started to dig a channel to bring water to their garden plots from the slopes of the nearby peak of Baba Dağ. As happened so often when they worked in the fields, their picks and shovels rang against finely cut marble blocks and sculptured relics. Where the growing ditch approached old fortification walls, the diggers came upon fragments of

*Professor Erim has also received invaluable support from the Littauer Foundation, the American Research Institute in Turkey, and Dumbarton Oaks, and from the U.S. Department of State through counterpart funds.



Caskets pour wine for the living as two men at old Geyre press grapes in sarcophagi claimed from the ruins. When told that ancients intended the ornate marble troughs for burials, villagers politely disagree, pointing to grape clusters on the sides (below).

Toying with garlands, Eros brings a cheerful note to death. Drill holes outline relief on a partially finished sarcophagus. Traveling salesmen offered the caskets throughout the Roman world; local artists added customers' portraits to blocked-out heads like the one at upper right. Aphrodisian sculptors also journeyed afar, founding ateliers across the empire.



beautiful draped figures done in high relief.

Local dignitaries summoned Mr. Ahmet Dönmez, then with the Department of Museums and Antiquities of Turkey. Mr. Dönmez, after a brief search for further fragments, persuaded the farmers to dig their channel elsewhere. Recovered pieces of sculpture were removed to a storeroom.

Suspension of work in the irrigation ditch set the stage for one of the most exciting finds of my archeological career.

City a Center of Sculptor's Art

While studying classical art and archeology at Princeton University, I had been fascinated by the text and pictures in a book written by an Italian scholar, Maria Floriani Squarcia-pino. This volume presented detailed evidence establishing Aphrodisias as the home of a significant school of sculpture in the first centuries of the Christian Era.

Marbles attributed to Aphrodisian sculp-

tors had a haunting quality which I could not easily resist. I resolved to return at the first opportunity to Turkey—the land of my birth—to visit Aphrodisias.

A reconnaissance trip in 1959 fired my enthusiasm, and in June, 1961, I organized an exploratory campaign, staffed by an architect-surveyor, a photographer, and three assistants.

At the very start of work, we examined the abandoned irrigation trench. We were all slightly tense. Aphrodisias had been barely touched by the archeologist's spade, and the site had gained a reputation for handsome remains. But would we be rewarded by really worthwhile finds? Or had all the best things already been skimmed off?

In 1904-5, a French engineer, Paul Gaudin, excavated at Aphrodisias and discovered grandiose Roman baths. In the forecourt of these Baths of Hadrian, he found a series of superb consoles, or brackets, embellished with heads of gods and figures from mythology.

An Italian scholar, Giulio Jacopi, worked at the site for a few weeks in 1937. Jacopi brought to light a stunning first-century frieze of garlanded heads that decorated an Ionic portico near the presumed agora, or marketplace. Most of the finest sculptured sections from this so-called Portico of Tiberius—almost as long as two football fields—went to the museum in İzmir, Turkey.

Why was so promising a site forgotten? After Gaudin, Aphrodisias lay dormant because of its isolation, and archeologists focused on more accessible sites. World War II prevented a follow-up on Jacopi's work.

Lovely Lady Welcomes Diggers

Perched on a protruding marble block, I scanned the weed-grown trench dug by the farmers. With caution we descended into it.

Suddenly I gasped at something I saw embedded in the side of the trench—and almost lost my balance. Pointing, I called out to William Crovello, photographer of our team. We both shouted, "Look! There's a marble head!"

Lâtif, the watchman at the site, hastened to our side and skillfully extracted the marble from the earth. I brushed away the soil still clinging to it.

The head was a woman's, unusually beautiful. The nose was chipped, but otherwise the sculptor's work was almost unmarred.

The lady's gently waved hair was drawn to the nape of her neck, and she wore a diadem as well as a curious tiaralike headdress with the shapes of towers and fortification walls, which I recognized as the crown symbolic of the personification of a city. The expression of the face was charming and slightly melancholy in the gentle half smile of the lips.

A memory nagged me as I examined

Protector of life and bounty: Cult image of Aphrodite probably copies a grander version that stood in the city's temple. Excavators found the two four-foot sections of the second-century statue serving as fill in the wall of a Byzantine building. Mythological figures emblazoning the deity's garment proclaim her powers over earth, underworld, sea, and sky.



DEFYING TIME, EARTHQUAKE, AND MAN'S CHANGING BELIEFS,

Ionic columns glow in a Turkish sunset. Christians inserted the blocks at right after A.D. 400, when they turned the Temple of Aphrodite into a basilica. Pagan ancestors had raised the shrine during the first century B.C. Stork's nest replaces architrave atop one distant shaft. Metal bands reinforce columns in danger of crumbling.

286 ILLUSTRATION © NATIONAL GEOGRAPHIC SOCIETY



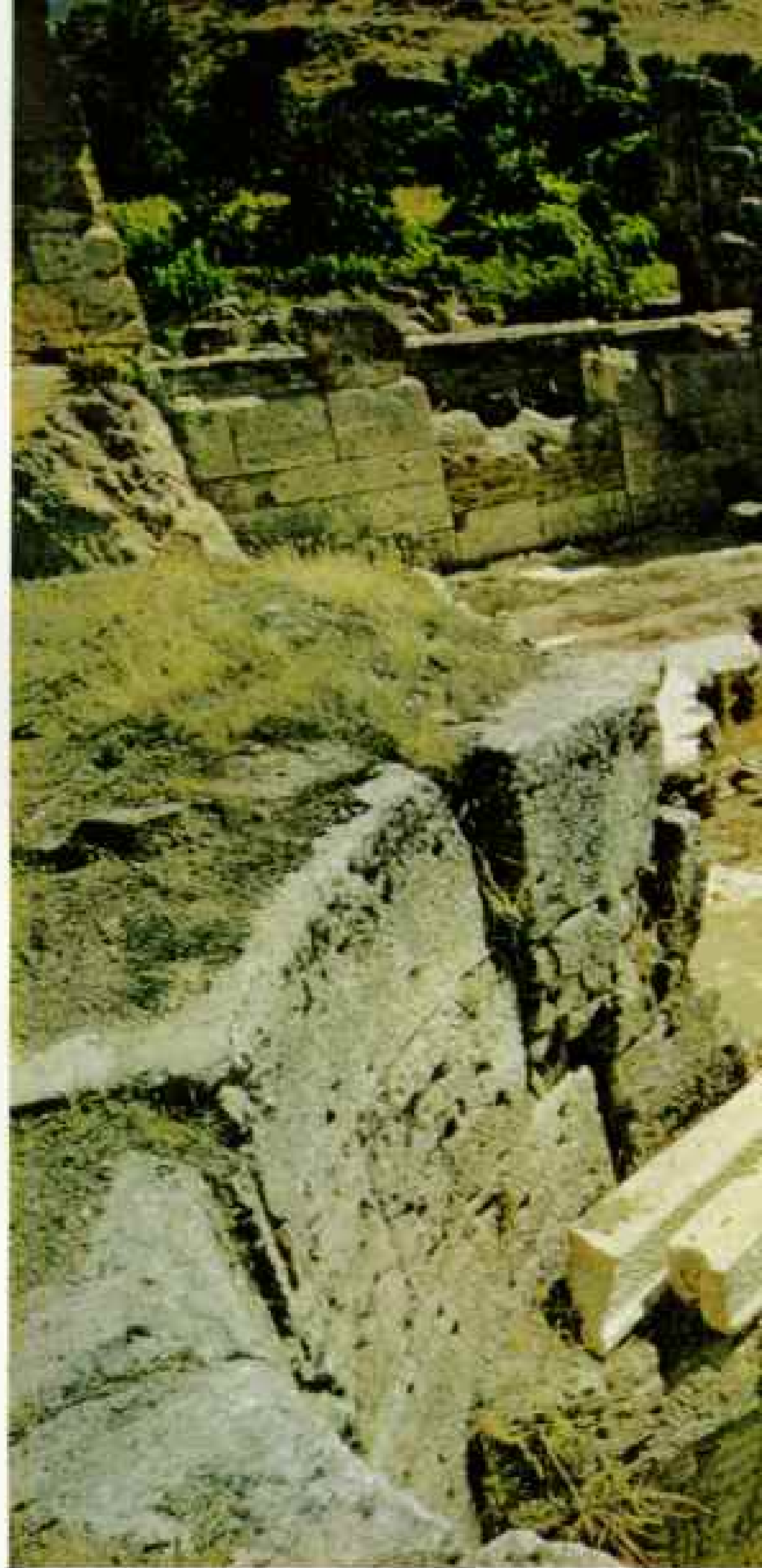




VEDACYRONES © R.L.E.

Reflecting luxurious tastes, the Baths of Hadrian boasted central heating and abundant running water. Warmth from roaring wood fires circulated under a floor supported by the terra-cotta pillars at center. Bathers relaxed at the edge of a steaming, shallow pool in this main chamber. Pitted stones, once faced with marble, wall the room, which measures 112 by 46 feet. To enter, customers crossed porticoes crowned with heads three feet high, such as the bull (above) and minotaur-like creature (below).

Other rooms offered a choice of temperatures and, as in modern Turkish baths, Aphrodisians could finish their ablutions by plunging into a pool. Waterworks fed the city from streams in nearby mountains. Inscriptions indicate that the baths were built or enlarged during the reign of the Roman Emperor Hadrian, A.D. 117-138.



the fragment. Clutching the head tightly in my arms, I walked to the storeroom where other salvaged pieces had been cached. Lâtif scurried behind me with the key, muttering to himself, "*Tuhaf!*—Curious! How did we miss that head, when we have been over that ground so many times?"

In the dim storeroom the mutilated statues and fragments seemed like romantic ghosts. I went straight to the figure of a woman, her flowing, wind-blown drapery exquisitely carved in relief. The head was missing.

Straining, I lifted the marble in my arms and placed it atop the neck of the figure. The breaks joined perfectly. Life suddenly seemed restored to the time-battered stone (page 191).

I noticed that Lâtif was scrambling about among fragments in the back of the room.



Presently he emerged, lugging a piece of marble inscribed with traces of Greek letters. In triumph he fitted it into the side of the figure. The letters read *Polis*—"The City."

The inscription confirmed my hopes upon seeing the turreted crown. Here was the formal emblem of the city, a *Tyche*, or "Destiny."

Aphrodisias Casts a Binding Spell

The restoration of the statue was a splendid omen. We were deeply moved by such perfect concurrence of circumstances. The city of Aphrodisias was welcoming us! Under her spell I have returned five times—and hope to go back again and again—to learn more about the city's beguiling past.

Aphrodisias lies off the beaten track, 1,800 feet above sea level (map, page 282). The

rough road twists and curls amidst a wide splendor of mountains and forested plateaus.

I recall my driver, the first time I came to Aphrodisias, pointing to a peak he laconically identified as *Baba Dağ*—Father Mountain. Suddenly, around a curve, we came in sight of ranks of pink and yellow stuccoed houses, as uniform as any American subdivision. The driver noted my puzzlement, shook his head, and said, "*Yeni köy*—The new village."

This was the transplanted Geyre, where people of the old village had been moved—by government decree—to escape the threat of earthquake and to protect the antiquities.

Bypassing new Geyre, our jeep turned east. Soon I caught sight of white Ionic columns. Along the roadway fragments of capitals, column drums, and friezes lay in romantic



Aphrodite's city yields Christian relics

WORKERS discovered the bronze cross, incised with the Virgin, top, and saints of the Eastern church, in an 11th-century tomb. A villager brought to Dr. Erim the gold coin bearing a portrait of Maurice Tiberius, Byzantine emperor from A.D. 582 to 602.

Ruins of Byzantine homes held articles of daily life. Burial worked chemical changes on a glass bottle, imparting a milky iridescence. A householder poured oil into the mouth of the bronze lamp, shaped like an actor's mask, to fuel a wick at the chin.

disarray. I was seeing Aphrodisias at last!

I can never forget the enchantment of those first hours in this place of derelict splendor. The rickety houses of the old village nestled amid pear groves, pomegranate bushes, and tall plane trees. In dusty alleys and courtyards, we saw beautifully carved sarcophagi being casually used as laundry tubs. Fluted column sections propped stairs and balconies. Fragments of inscriptions still spoke from the scrap stonework of a wall.

The ruins of the ancient city lay all about, between the houses, in the fields, among the graceful poplars. In a golden sunset I walked into the magnificent stadium, where cheers from 20 or 30 thousand throats echoed 18 centuries ago between the long banks of stone seats (pages 282-3).

Fourteen erect columns of the Temple of Aphrodite, most sacred of the city's shrines, had defied the ravages of time, war, and earth tremors (pages 286-7). Here and there a marble face would return my stare—a faun, a Medusa, or a bull would peer at me from the brambles and the clinging vines.

Roman Baths Show Taste for Living

I found that Aphrodisias spreads out from a conical knoll, or acropolis, that is probably entirely man-made. Two miles or more of Late Roman and Byzantine fortification walls enclose the greater part of the site.

Northwest from the acropolis stand in majestic files the surviving columns of the Temple of Aphrodite. Close on the southern flanks of the temple lie the remains of a complicated early Byzantine structure we called the Bishop's Palace. Between the palace and the acropolis, in a growth of young poplars, stands a magnificent row of high-style Ionic columns, all that remains of what was probably a portico of the agora.

To the south of Aphrodite's temple, the Baths of Hadrian, with their elaborate central heating, are yielding amazing evidence of the Roman taste for luxury. And on the northern fringe of the site, barely within the

Clad in wind-blown gossamer, this lady of Aphrodisias welcomed Dr. Erim to her city. Shortly after his arrival in 1961, he found the head in a ditch; it fitted perfectly on the body discovered earlier by villagers. Fortresslike tiara and an inscription identify her as a personification of the city. She once formed part of a frieze honoring a prominent citizen. Other figures from the group appear on page 281.





city walls, the stadium survives nearly intact. It is surely one of the most impressive in the ancient world.

Each summer since 1961 we have journeyed to Anatolia, and each summer a wealth of archeological wonders has been our reward.

In 1962 part of the patron-goddess Aphrodite herself came to light. We found two four-foot sections of a colossal cult image of the goddess, her garment a masterpiece of embellishment (page 285). The large fragments had been used in building a wall.

The same year, probing in a lentil field near the Temple of Aphrodite, we uncovered the lovely odeon, or small auditorium for music or recitations (above). Marvelously well-preserved, the odeon yielded up many elegant portrait heads, statues, reliefs, and inscriptions.

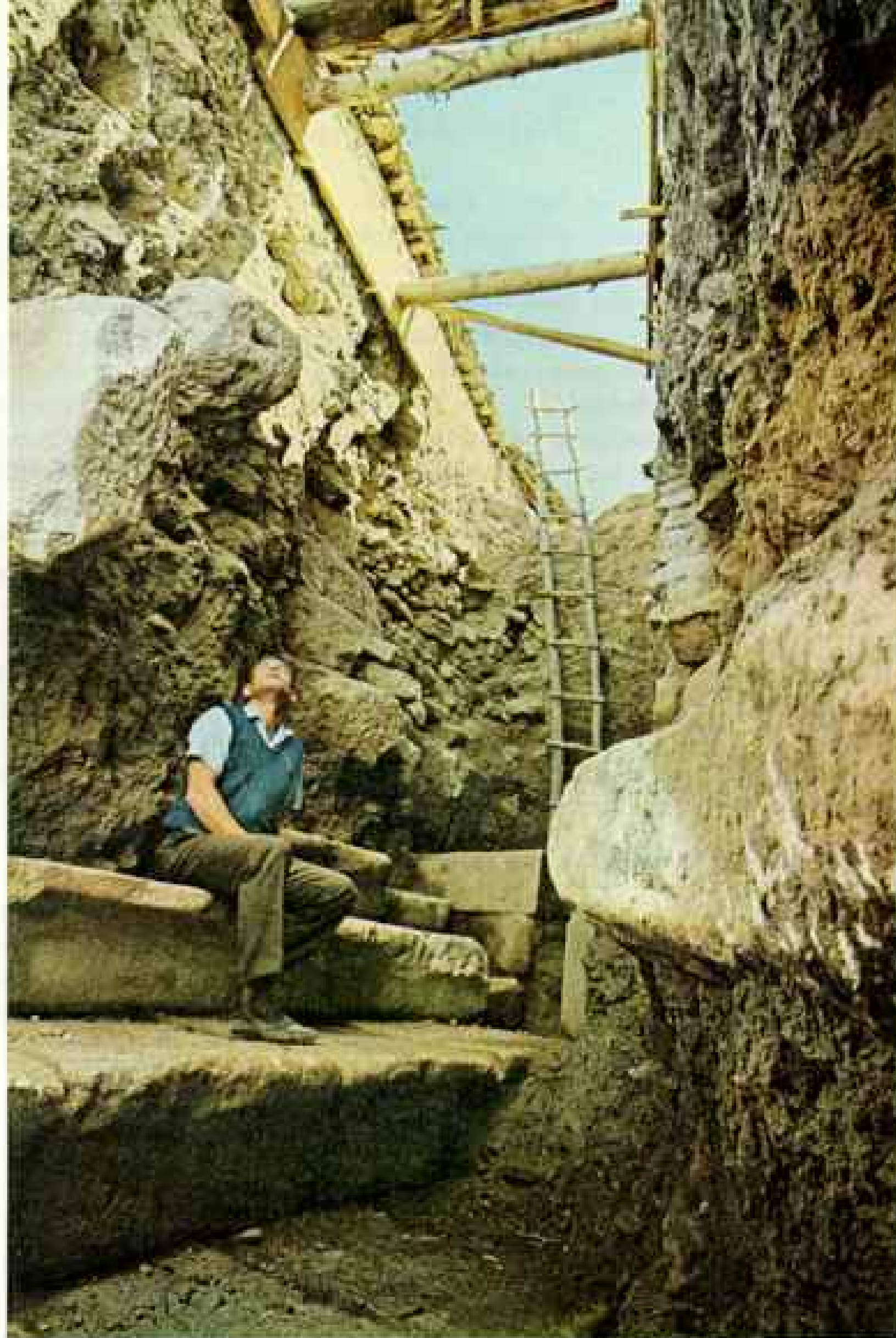
From the beginning the Temple of Aphrodite has attracted much of our attention. The

original plan of the shrine, obscured by its later conversion into a Christian basilica, becomes clearer to us with each summer's work.

Abundant inscriptions reveal the Aphrodisians as having been strongly civic-minded. The wealthy and high-born, as patrons of the arts, often were memorialized with likenesses, sometimes idealized, in marble.

Cousins Emerge From Sleep of Centuries

In ruins behind the stage of the odeon, our 1964 dig unearthed a pair of notable larger-than-life-size portrait statues, conveniently identified by inscriptions on their bases. One was a sumptuously robed and diademed lady, Claudia Antonia Tatiana. The other, Lucius Antonius Claudius Dometinus Diogenes, was a cousin of Claudia and a local senator. He emerged proud in beard, flowing mustache, and priestly headdress, the very model of a



provincial worthy who could vie in pomp with the imperial princes back in Rome.

Last year we documented early phases of Aphrodisias' long history by the discovery of an Early Bronze Age cemetery. A child's bones in a large jar, sherds of pottery, a few knife blades of obsidian, and a small jug carried our finds back to the dim horizons of 3000-2200 B.C.

In 1966, too, we excavated at the theater on the east slope of the acropolis (above, right), so buried in centuries of silt that only thousands of hours of shoveling will reveal it all.

Within a short period, our investigations have yielded a fantastic harvest of monuments and artifacts of quality and significance. Yet despite this wealth, Greek literary sources are strangely grudging of information about the city's early history. Before it bore Aphrodite's name, the city had other designations,

Fifteen feet down in the overburden of time, a visitor takes a seat in the still-buried theater of Aphrodisias. An exploratory trench bored some of its stone benches last summer. Here, packed audiences once applauded as actors vied for acclaim and cash prizes during drama contests. Wealthy Aphrodisians endowed lavish public festivals that featured musical and athletic competitions as well as plays.

After centuries of interment, an odeon, or concert hall (left), basks in the sun. Rainwater covers the geometric mosaic of the orchestra floor. Scaffolding steadies a column of a spreading portico that opened toward the agora and distant acropolis, left. Dr. Erim hopes that eventually such discoveries will fill out a story largely ignored in ancient literature—the life and times of the Aphrodisians.

one of them apparently Ninoé, from Nin or Nina, a goddess similar to Ishtar or Astarte.

Following Greek penetrations into Asia Minor after Alexander the Great (356-323 B.C.), the city was renamed Aphrodisias, since Ishtar and Aphrodite were equivalent divinities in ancient mythology.

The name Aphrodisias suddenly appears in the first century B.C. Appian mentioned it, stating that the Roman dictator Sulla, at the direction of the oracle at Delphi, sent gifts to the Carian Aphrodite—a golden crown and a double ax—in A.D. 82, hoping thereby to gain power and good fortune. (Caria was the overall name for the region in antiquity.)

Mark Antony, following the wishes of Julius Caesar, decreed the city inviolable and exempted it from payment of tribute. Its temple was empowered to offer asylum to outcasts.

Traveling Vendors Hawked Sarcophagi

Excellent white and blue-gray Carian marble, quarried from adjacent slopes, made possible the adornment of the sanctuary of Aphrodite and the erection of other monuments. Soon the reputation of the city's sculptors spread abroad.

Traveling salesmen offered sarcophagi from Aphrodisias, predecorated with figures but with the heads blocked out roughly, so that likenesses of the gentry laid to rest could be added. Artists trained in the Carian city set up shop abroad, establishing an Aphrodisian school of sculpture in the farthest corners of the empire. Their masterpieces adorned the homes of aristocrats and the villas of the Caesars. Proudly, such Italy-based sculptors as Koblanos, Aristeas and Papias, and Antonianos inscribed *Aphrodisiensis*—of Aphrodisias—after their signatures.

Aphrodisias nurtured writers, poets, rhetoricians, and philosophers. Xenocrates, who wrote medical treatises during Nero's reign (A.D. 54-68), was an Aphrodisian, as was the early Greek writer Chariton. In the third century Alexander of Aphrodisias, expounding Peripatetic philosophy in Athens, became one of the shrewdest commentators on Aristotle.

With the advent of Christianity, a metropolitan bishop was seated at Aphrodisias. Temples were converted into churches and the city was renamed Stavropolis, "City of the Cross." Between the 11th and 13th centuries, Seljuk invaders and Turkoman raiders ravaged Aphrodisias. Earthquakes must have added to the devastation, and soon the de-

serted monuments, colonnades, and churches subsided into the silt and dust of time.

Little by little, though, we are removing the overburden of a millennium. What was enjoyed and lost can now be praised again.

Two of the sturdier houses of old Geyre provide our excavation headquarters, where we sort our treasures. There are potsherds to classify, carved marbles to date, coins to clean.

Frequently, at the start of a new season, our local workmen bring us a few coins, pots, or beads, or a fragment of sculpture or inscribed marble which they have found while laboring in fields and vineyards.

Just last summer Ismail, a foreman on the dig, stunned me by handing over a bag of several hundred bronze coins! Within the next few days, fellow workers gave me more coins, bringing the total to 7,200. The men had found them in the vicinity of Aphrodisias, but outside the excavation area.

The coins, of small denomination, had been minted under fourth-century Roman emperors, among them Valentinian II, Theodosius, and Honorius. This was a dazzling find.

Old Artifacts Serve Modern Ends

In late summer, as the grapes ripen all around the village, the farmers present us with heaping dishes of honey-colored or dark-blue grapes. Some villagers make a heady wine from the fruit, or *pekmez*, a delicious jelly that we spread on flat country bread at breakfast.

For vats in which to press the grapes and ferment the juice, the people use the old broad sarcophagi, often delicately carved with garlands of fruits and flowers.

I gave up trying to explain that these convenient troughs once served as caskets. The countryfolk smile and shake their heads, pointing to the clusters of graven grapes. "You see, *ağabey*—brother," they say, "these were meant to be used for pressing grapes!"

No point arguing. In this adaptation of ancient artifact to modern use, as in our own revelations of forgotten history, Aphrodisias lives again and mysteriously reveals itself to those who can appreciate beauty and probe beyond the horizon of the moment.

Surely there will be much more to tell about our progressive excavations at this marvelous ancient city. I look forward to making that report in these pages. How exciting it is to contemplate the yet undiscovered treasures of Aphrodisias that may enrich the story!

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COVER: Paint still adorns a handsome marble head, perhaps of Apollo, recovered at Aphrodisias (page 280).

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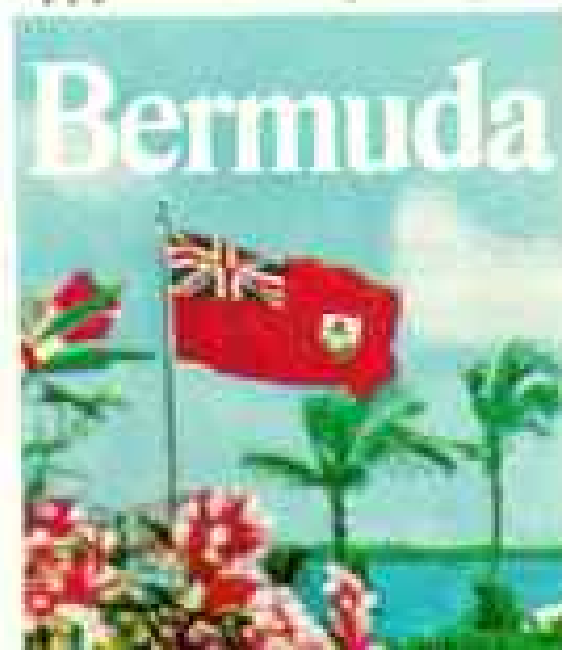


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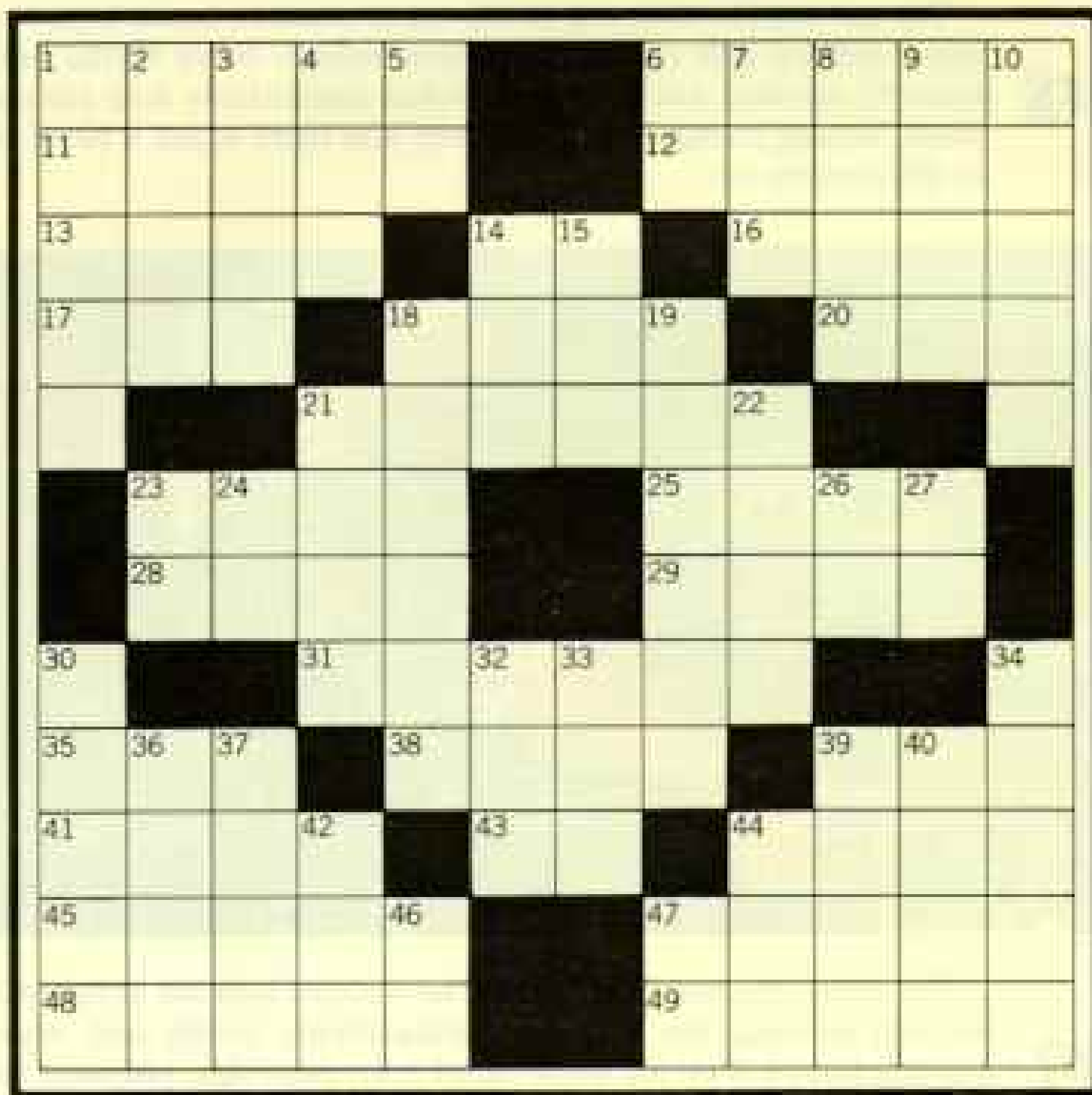
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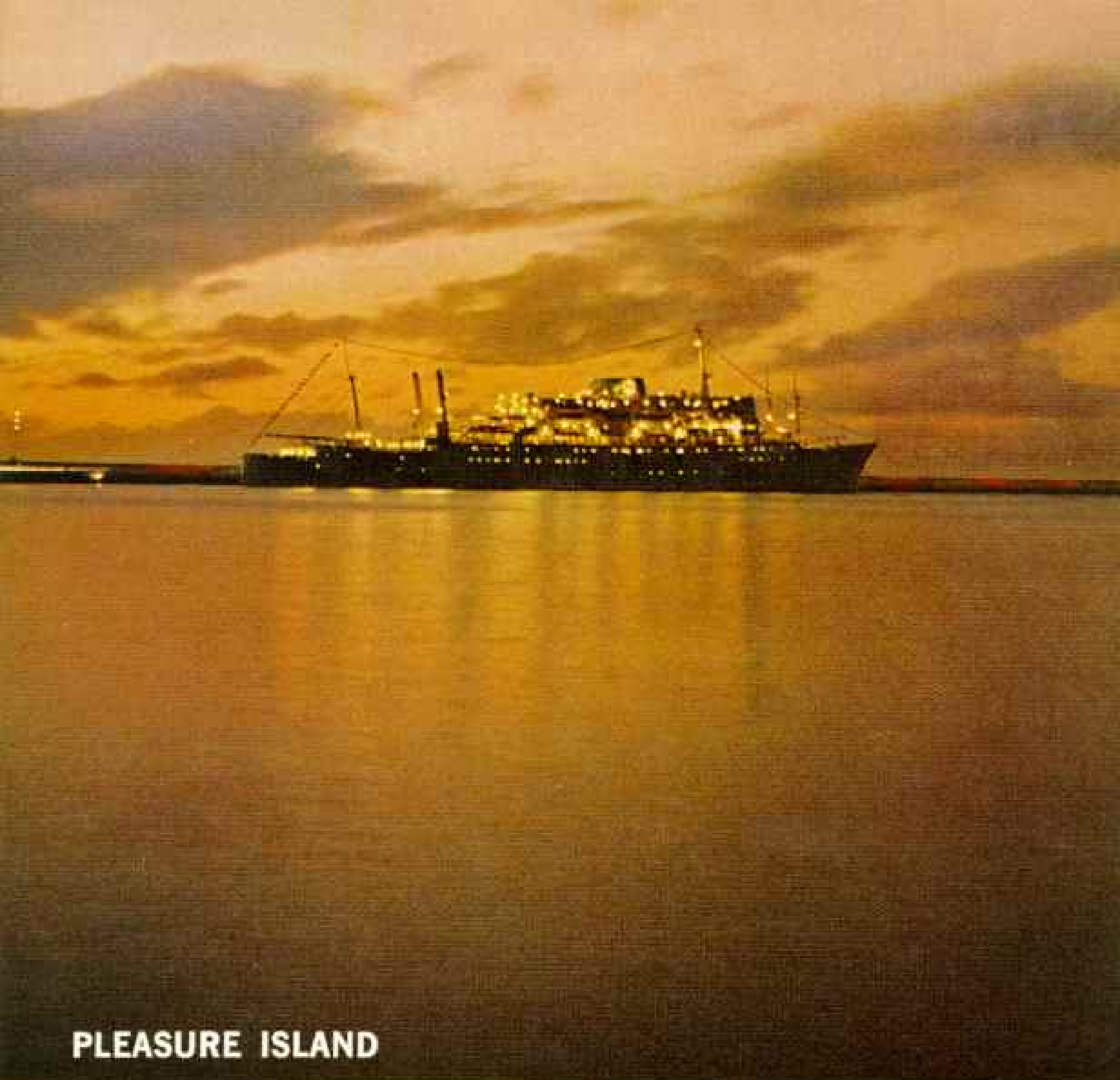
1. Rabbit or knockout
6. Florida city
11. Hollywood statue
12. Command
13. Man's first name, Ponce's last name
14. The spirit of _____
16. Kiss Me _____
17. Printed persuaders
18. Couples

20. Non-women
21. Railway stations
24. Sherlock Holmes' Baker St. address
25. Girl's name
28. How many Arabian nights?
29. Metal
31. Bends over
35. A limb
38. Hurt
39. Female deer

41. To judge
43. LXX
44. The Jones and the Sawyer boy
45. Mr. Stevenson
47. A flat cap for men or women
48. Cowboy circus
49. Baked, lima, or jelly _____

DOWN

1. White bear
2. Second-hand
3. Sergeants
4. Tin container
5. Sixty minutes (Abbr.)
6. U. S. State (Abbr.)
7. Annoy
8. First man
9. To allot
10. Girl's name
14. Soft drink
15. Into the valley of death rode the _____
18. Entries of debt
19. Privates have one
21. God (Spanish)
22. Gentlemen
23. Voting age
24. XX
26. Preposition
27. In grammar, an article
30. Electronic eye
32. Killer's license number
33. Gold (Spanish)
34. Lies down
36. Do over
37. Canasta term
39. The dumb girl
40. A portent
42. Girl's name
44. Golf term
46. Downing St. address
47. Ammunition for toy gun



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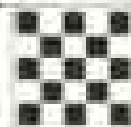
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Now, it is *School Bulletin* time.

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Drowning...how can you save a child like Steve Berry?

One warm, sunny day, two-year-old Steve Berry was splashing around in his little backyard pool. His mother, thinking he was perfectly safe, went into the house to answer the phone. In those few unguarded minutes, Steve fell over. When Mrs. Berry returned, she found him face down in the water, limp and motionless.

She immediately started mouth-to-mouth rescue breathing—and saved her son's life.

Every year thousands drown—many of them children. Some of these tragedies are the result of carelessness and panic. Some, because children either don't know or don't obey the rules of water safety. And some happen because nobody present knows—as Steve's mother did—how to restore breathing. (Directions at right.)

America's drowning toll could be drastically cut if parents would take these precautions:

If there's a baby in your family, never leave him alone in a tub or basin—not even for the few seconds it takes to answer the doorbell. Very young children often have no fear at all of water, and when they're in even the shallowest of pools, constant supervision is vital.

If you're a child around three or four, it's not too early to start his swimming lessons. If you're not qualified to teach him yourself, get someone who is.

After a child learns to swim, forbid him to swim alone or at unsupervised beaches or pools, including even small backyard pools.

Warn him against playing pranks in the water. Jokingly calling for help and other such antics cause confusion and may lead to

accidents of one sort or another.

Also make it clear that the one thing a swimmer in trouble should *never* do is panic or thrash around wildly. Your child should know how to conserve his strength and stay afloat until help arrives.

Metropolitan has published a booklet—*Panic or Plan?*—that covers a number of potential threats to your family's health and safety and tells you how to be prepared for them.

For a free copy, write to Metropolitan Life Insurance Company, Dept. N-87, One Madison Avenue, New York, N.Y. 10010.

How to give rescue breathing



1 Place one hand under victim's neck and lift. Tilt head back as far as possible by holding the crown of the head with your other hand.



2 Pull chin upward until the head is tilted back fully. This is essential for keeping the air passage open.



3 Place your mouth tightly over victim's mouth. Pinch nostril shut. Breathe hard enough to make the chest rise. For babies and very young children, cover both nose and mouth tightly with your mouth. (For an adult, breathe vigorously about 12 times a minute. For a small child, take relatively short breaths, about 20 per minute.)



4 Remove mouth. Listen for sound of returning air. If you don't hear it, recheck head position. Breathe again. If you still get no air exchange, turn victim on side and slap between shoulders to dislodge foreign matter. Repeat breathing, removing mouth each time for escape of air. Don't give up. If possible call a physician.

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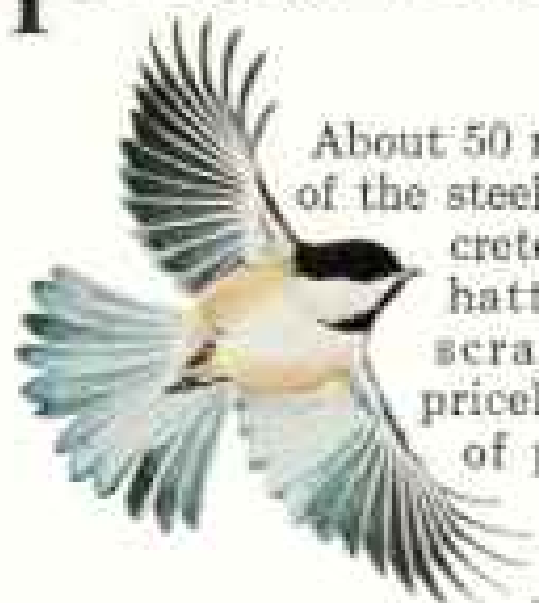
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How a labor union and a university helped preserve a natural woodland treasure.



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the same today as it has been for some 8000 years.

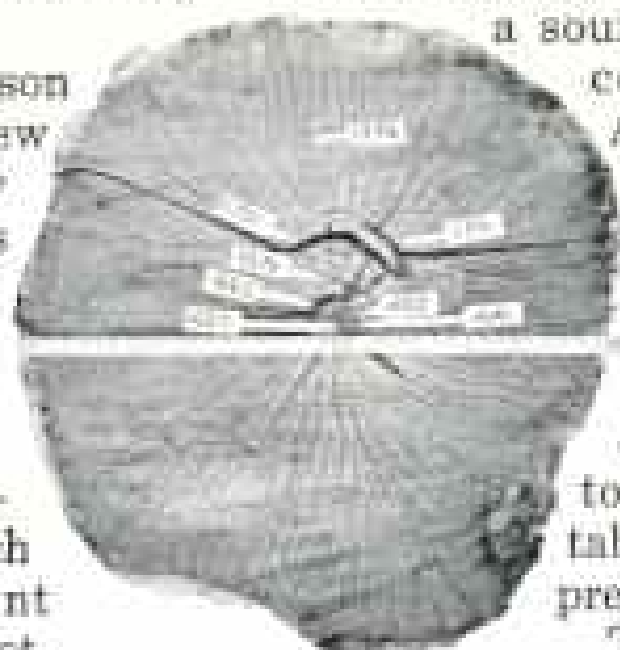
The William L. Hutcheson Memorial Forest in New Jersey is one of the few remaining virgin forests in the Northeast. Wildlife abounds in hundreds of species. Below ground is a fantastic world of insects and microscopic organisms, each playing its own important role in the life of the forest.

Nature has been working for thousands of years to perfect this



"climax" community in which trees, plants, animals and all the creatures of the forest have reached a state of harmonious balance with their environment. Left undisturbed, this stabilized society will continue to perpetuate itself century after century.

In 1955, Thomas Mettler, whose family had owned the property since 1701, was urged to sell it as a source of timber for commercial use.



Aware of its unique value, Mettler held off on the sale until public-spirited residents of New Jersey had time to organize and establish it as a forest preserve.

Thanks to the help of private individuals and groups, including members of the United Brotherhood of Carpenters and Joiners, the forest was eventually purchased and named in honor of William L. Hutcheson, a past President of the Union.

Under the direction of Rutgers University, the forest is used as an



"outdoor laboratory" for Nature studies. Through greater knowledge of this age-old woodland, man may gain insight into his own relationship with Nature and understand more fully his dependence on the natural resources that nourish his spirit and sustain his being.

Sinclair has long been dedicated to conserving America's natural resources and wants to encourage private citizens to take a more active part in preserving our national heritage. For a booklet describing what others have done and how you can help, write Sinclair Tour Bureau, 600 Fifth Avenue, New York, N.Y. 10020.

Also include your request for information about touring to any scenic landmarks you wish to visit.



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