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New Zealand, Pocket Wonder World

By HOWELL WALKER

With Illustrations from Photographs by the Author

"QUIET," whispered the boatman, "or they'll black out."

Silently our dory drifted on the placid river floor of New Zealand's dark Waitomo Caves. At first we could see nothing in this eerie underworld. Somewhere in the blackness water dripped faintly, tinkling like bits of fragile glass. We could feel and smell the close, cool dampness of invisible walls.

Then suddenly we emerged from a narrow channel into a vaulted grotto. Above us hung a galaxy of tiny lights, nearer, softer, more delicate than any Milky Way. In the pale blue-green glow our faces stared, ghostlike and amazed. The shimmering river reflected the starry loveliness.

Actually we gazed at a synthetic heaven—the magic making of myriad organisms working for a living. Called glowworms, but really the larvae of a fungus gnat, each generated its own light; each added a star to the subterranean firmament (page 448).

A word spoken or a bump against the boat would extinguish the gleaming canopy as if by an electric switch. To the glowworm, puzzling source of cold light, noise implies danger; so it blinks off. None of us broke the hushed spell everyone felt.

This insect (*Bolitophila luminosa*), found only in New Zealand, is much shorter than its name and not so long as a pin. It shines a tail lamp. Clinging to a silken web of its own spinning against the ceiling, the carnivorous creature lets down a dozen or more sticky threads to entangle midges charmed by the glimmer. Vibrations signal feeding time; Bolitophila reels in the catch, greedily devouring the victim, line and all.

With this adventure deep in a glowing grotto, I began to feel like Alice in Wonderland when she tumbled down the rabbit hole.

Alice wondered whether she'd fall right through the earth and come out among people of the Antipodes. ". . . I shall have to ask them what the name of the country is, you know," she said to herself. "Please, . . . is this New Zealand?"

For me it was indeed New Zealand. Like Alice, I stepped into a miniature universe of natural marvels.

Flightless Birds and Tree-daisies

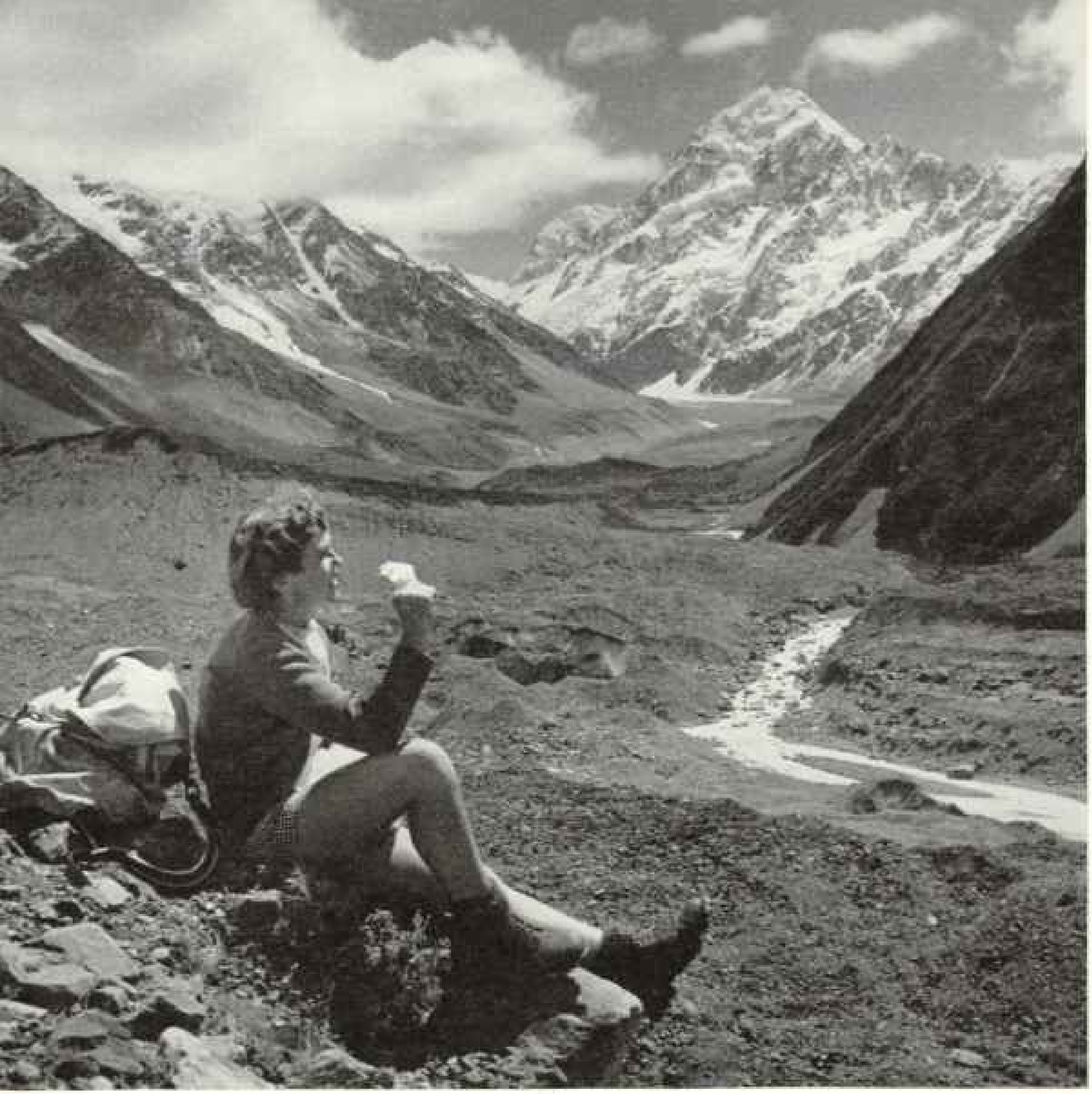
Here I watched the most unbirdlike of birds, the flightless kiwi (*Apteryx*), rest on its ridiculously long beak when not smelling out worms to eat. This earth-bound, chicken-sized oddity runs swiftly, sees poorly, but hears and scents acutely. It wears what looks more like a grayish-brown jacket of soft fur than feathers. No other bird lays an egg so large in proportion to its body; an average female weighs five pounds, her egg about a pound (page 445).*

I found orchids putting forth their delicate beauty close to ice, and daisies growing on trees. Flowers of the tree-daisy (*Olearia operina*) look like those of the common meadow plant, but wave in giant bunches sometimes as high as 20 feet above the ground.

I saw, too, a living fossil, the sole survivor of a group of long-extinct reptiles. The tuatara reaches a length of two and a half feet. Threatened with extinction by such newcomers as men, cats, and dogs, it has disappeared from the mainland, but survives on off-lying islands (pages 444, 460).†

* For details of another strange inhabitant, the takahe, see "Finding an 'Extinct' New Zealand Bird," by R. V. Francis Smith, NATIONAL GEOGRAPHIC MAGAZINE, March, 1952.

† See "Tuatara," by Frieda Cobb Blanchard, NATIONAL GEOGRAPHIC MAGAZINE, May, 1935.



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Mount Cook, Crown of New Zealand's Alps, Soars 12,349 Snow-clad Feet

Maoris called the peak Aorangi, the Cloud Piercer; British settlers changed its name to honor Capt. James Cook (page 449). Though the Netherlands' Abel Tasman discovered New Zealand in 1642, Cook in 1769 was the first European to set foot ashore, and his explorations put the country on the map (opposite page).

In a lavish exhibition, Nature, everywhere spendthrift in New Zealand, shaped this land of surprise. Snows lie deep on alpine heights; sun bakes subtropical beaches. Between these extremes squeeze glaciers, fiords, and volcanoes, fish-filled lakes, waterfalls and geysers, frigid rivers and boiling mud pots. The sea, never far away, crashes wildly on coasts like Maine's and Florida's.

From Autumn to Spring in 30 Hours

"Last, loneliest, loveliest, exquisite, apart" —Rudyard Kipling's description of Auckland, the largest city, aptly fits the whole country.

For that island Eden on the other side of the globe I took off from America one autumn morning. Thirty flying hours later I reached my destination in its freshest stage of spring.

In this out-of-the-way corner of the South Pacific, Great Britain a century ago settled her remotest colony. Twelve hundred miles separate it from Australia, the nearest continent.

Home of brown man and white, New Zealand still glistens with the rough-hewn beauty of a diamond. Fewer than two million inhabitants occupy three main islands—North, South, and Stewart. Dominion authority, however, extends over a fleet of islands ranging from just under the Equator to South Polar regions (map, page 423).

Chief port as well as biggest metropolis, Auckland chokes the North Island's narrowest isthmus (page 430). It continues to grow, spilling over, sprawling out wherever it can.

To see the city's expansion, I climbed an extinct volcano in its backyard. In every direction suburban communities mushroom like the industries increasing to supply them.

"We build 1,000 homes a year," said an executive of one construction firm. "But we don't mass-produce identical houses; each varies so a man returning late at night knows his own!"

More than 17 Sheep for Every Person

Although smaller than California, New Zealand has almost every form of scenery, plus some of the world's best farming and grazing land.

This island Dominion lives largely on grass. Permanent pastures cover nearly a third of its total area. Sheep outnumber people by almost 17½ to 1; cattle more than 2½ to 1.

Fifth among the world's flock owners, the country exports more mutton and lamb than any other; it stands third in wool production and second in its export. Local mills absorb only 15 million pounds of the annual clip; more than 300 million pounds, on the average, go far and wide.

Dairying is the nation's top breadwinner. More than three-fifths of the yearly butter production—now twice the tonnage of the largest liner afloat—supplies larders halfway around the world. Cheese enough to load nine or ten Liberty ships annually leaves for overseas markets. Other processed milk shipments are steadily increasing.

In little more than a century of British settlement, the Dominion has become the dairy farm of the Empire and a world source of meat and wool.

White pioneers, however, were not the first farmers here. Centuries earlier, wave-tossed Maoris landed their frail canoes in New Zealand and made it their home (page 460). They cultivated yams and taro, tried to grow cocoanuts, breadfruit, and bananas.

Tradition tells that these Polynesians brought the seeds on epic voyages from distant Pacific island homes. They used sun and stars, trade winds, currents, and mass bird flights to navigate infinite reaches of empty ocean.

Exactly where the Maoris originated, or when they first migrated to New Zealand, nobody knows. Estimated, but unconfirmed, dates of arrival begin around A. D. 950. Certainly the racial trek continued for centuries. According to the Maoris' own oral history, handed down through generations, their main fleet arrived in 1350.

The Polynesian invasion subdued and virtually exterminated the aboriginal Moriori natives; of them we know almost nothing.

Not until 1642 did white men discover New Zealand; Dutch navigator-explorer Abel Tasman then sighted it, sailing along the western shores. Savage Maoris discouraged his landing there. For the next 127 years only a ragged line loosely charted the "Nieuw Zeeland" on a world map.

In 1769 Capt. James Cook of the British *Endeavour* reached the North Island's east coast. As the first European to stand on its soil, Cook claimed the country for England, and his circumnavigation of the main islands put New Zealand roundly on the map.

In England at first the reaction was, in effect, "No, thanks; we don't want it." But Captain Cook's reports eventually helped to send sealing fleets and whaling ships swarming to these waters. In a few years the sea rovers won hundreds of thousands of valuable skins and countless barrels of oil.

Ruthless exploitation killed the short-lived industries; but sealers and whalers told enthusiastically of Maoriland's possibilities. Adventurers, traders, and missionaries came. Settlement led to discovery of gold; within a single decade, the 1860's, white population jumped from about 75,000 to some 250,000.

As the nuggets dwindled, men settled down to farm. Land disputes with the Maoris grew into bloody wars. Mutual agreement, no victory, eventually brought peace. Settlers resumed their pioneering. Imported sheep increased to feed and clothe a colony that began in earnest to farm for life.

And the Maoris? Since they have been living in harmony with white men, their population has trebled and now exceeds 100,000. They have equal rights and representation in government, make good citizens, superb soldiers, and loyal friends.

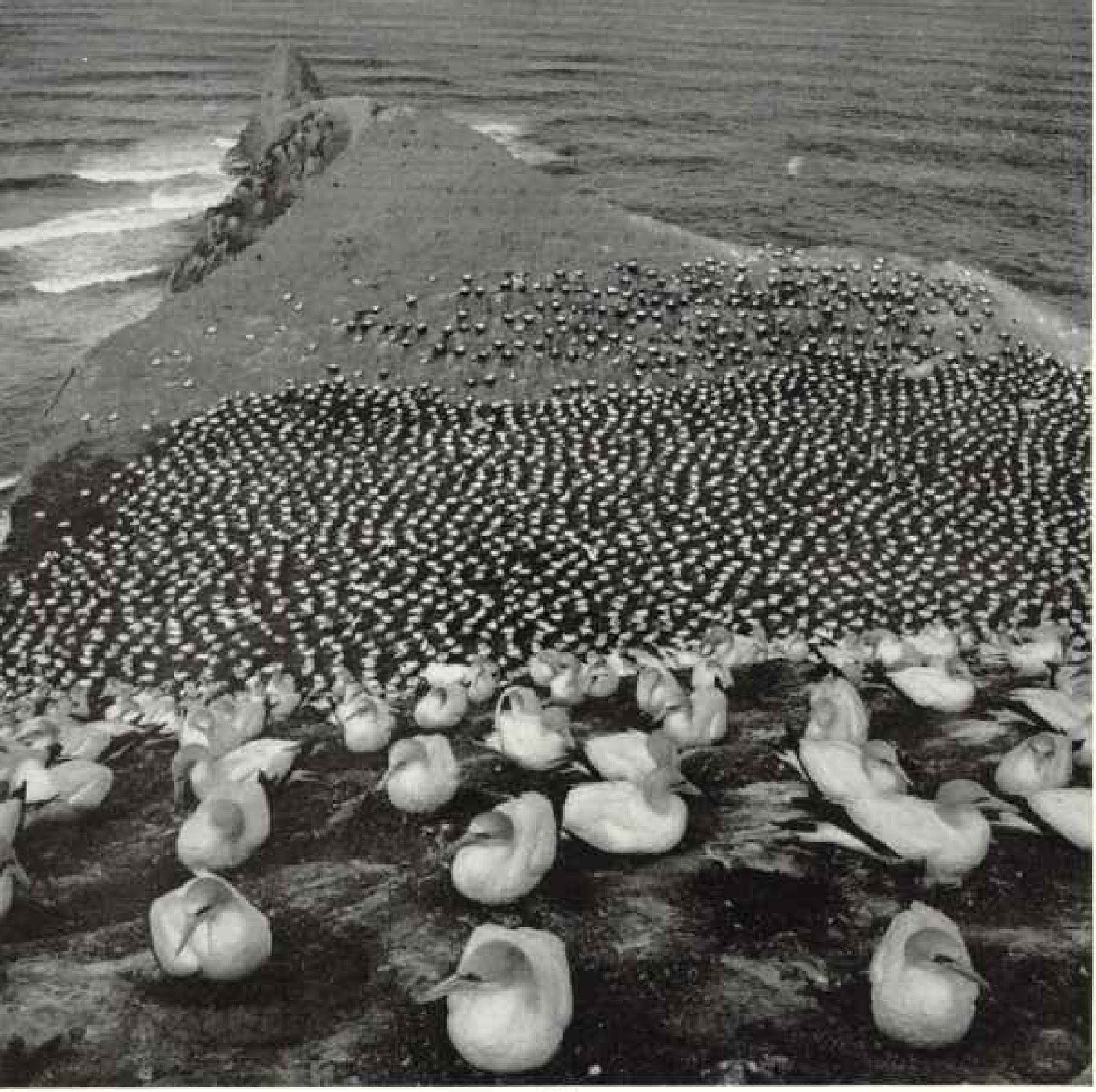
Maoris Celebrate 600 Years of History

From Auckland I drove some 70 miles south to Ngaruawahia, for the town was celebrating the sexcentenary of the main Maori canoe landings in New Zealand.

A heartless rain soaked thousands of Polynesians. Reverently they stood in puddles to hear speeches in their own mellow tongue, watch traditional dances, and listen to songs that reviewed the prowess of their bold seafaring ancestors.

A Maori woman near me expressed her feelings in adopted slang. "Gee!" she whispered. "We're 600 years old!"

Less than a century ago fierce fighting between Maoris and British raged over this Waikato district. Today its rich pastures, peacefully occupied by descendants of the



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No Aircraft Carrier Shows More Wings than Cape Kidnappers in Nesting Time

Gannets have flown here to breed for countless seasons. Multiplying, they have established two more colonies near by. Their breeding season lasts from August to April; this view was taken in October. Seaweed nests hold bluish-gray eggs about the size of a duck's (page 437).

erstwhile enemies, yield a third of the country's dairy output.

Along the Waikato River the Government plans to set up ten hydroelectric stations generating more than a million horsepower. I saw two of these plants already at work, two under construction. For electricity this land of limited coal and almost no oil must, like Switzerland, depend on waterpower.

The whole Dominion is rapidly becoming electrified. I saw only one man milking by hand; machines commonly do the job. The same goes for shearing. A State subsidy carries the current even to remote and lonely farms.

Remember those schoolbook pictures of prehistoric jungle which the weight of ages has pressed into coal? That's the primeval look of the wilderness I penetrated between Te Kuiti and the Tasman Sea. Only scattered sheep grazing under tall tree ferns, and the lonely road ahead, told of man's intrusion.

Through a deep forest gorge I followed the Awakino River to its mouth, then turned south along the sea-torn coast. As I approached the port of New Plymouth, cloud and rain curtained one of the North Island's most majestic spectacles. Up from the Taranaki plains gracefully tapers an extinct volcano; Mount Egmont, remarkably like Fuji, holds its snowy pate 8,260 feet above the sea.

"I think of Egmont as my mountain, as part of my property," said a dairy farmer,

MOUNT COOK AREA

Tops off New Zealand's Alpine Grandeur

(Main map)

NORTH ISLAND

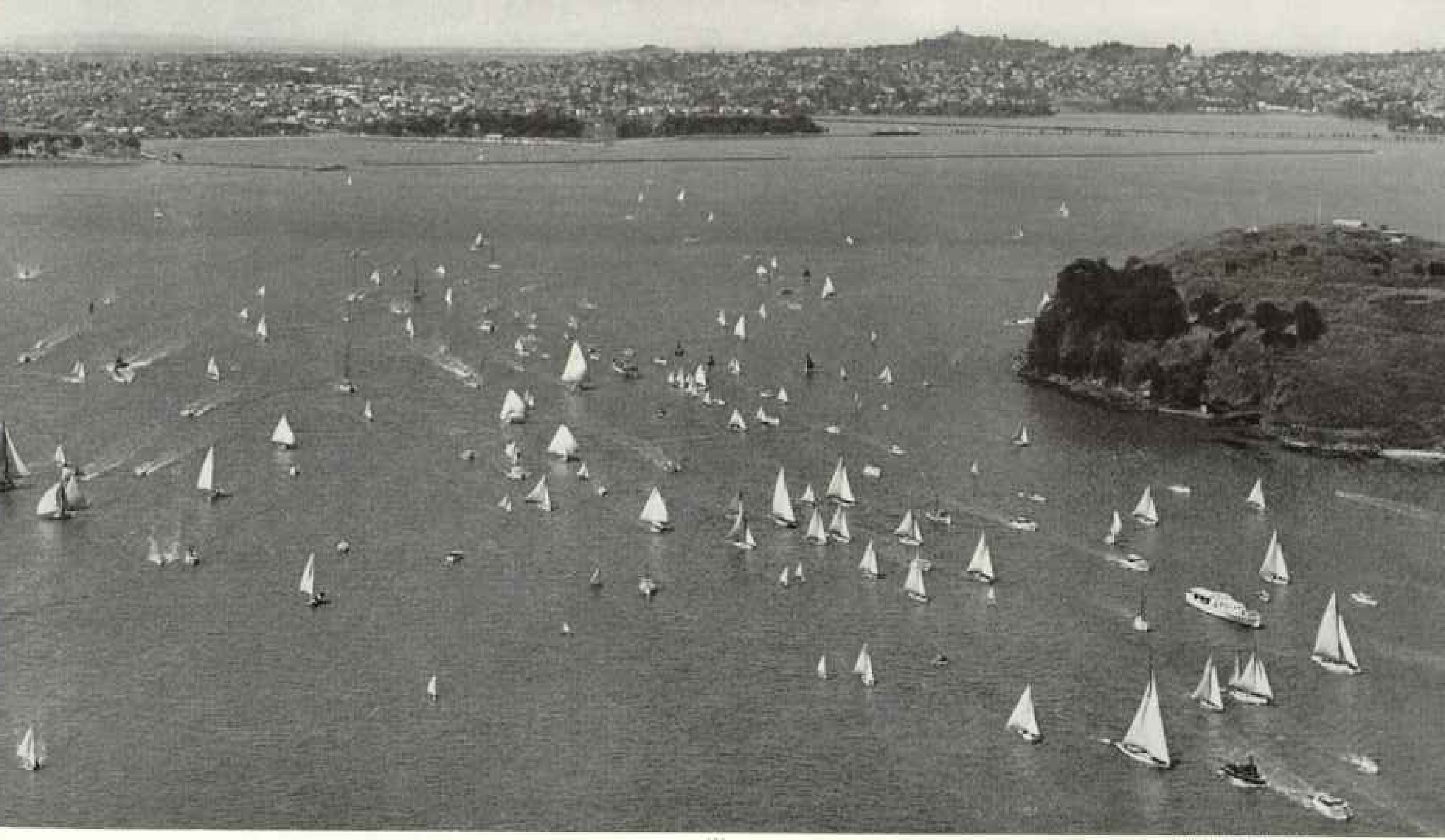
SOUTH ISLAND

Vast Ocean Spaces Isolate New Zealand

Australia, nearest land mass, stands 1,200 miles away. The two countries combined contain fewer people than California; Antarctica supports none. The North Island has more people and arable land, South Island the more spectacular scenery.

Drawn by Herbert E. Eastwood and Victor J. Kelley

The Auckland Weekly News



Billowing Sails Stream Out of Auckland Harbor as Yachtsmen Begin a 1,500-mile Race to Sydney, Australia

Nine competing craft, their spinnakers billying in the breeze, start for the roaring Tasman Sea, one of the severest tests in ocean racing. Scores of speedboats and pleasure launches escort them. *Solveig*, a new sloop from Sydney, won the event, her second competition, in February, 1931.

Tides of Wool Flow as Airily as the Morning Mist

A century ago the first European settlers directed most of their energies to sheep raising. Modern New Zealand, with millions of sheep and cattle, still lives largely on grass (page 421).

Everything on a sheep station revolves around the isolated homestead, long wool shed, and drafting pens. Routine duties occupy sheep farmers throughout the year. Busiest times come with lambing in September, shearing in November and December. In the latter season, men and sheep dogs begin mustering flocks at dawn and may stay on the move all day. Herded into the wool shed, the sheep are shorn with machine-driven clippers by gangs of laborers who move from job to job.

Flocks like this are money spinners. Last year raw wool soared to $2.80 a pound, highest price in the country's history. Twenty years ago, at the bottom of the depression, it sold for less than 10 cents.

But today's wool growers are not rolling in wealth. Their necessities also show a rise; so does taxation. After a farmer pays for labor, fertilizer, seed, and stock replacements, he has little surplus.

Some of the Dominion's nearly 34 million sheep here move to rich grazing grounds in Ruakituri Valley, North Island. Many sheep drovers are Maoris.

Reginald Goymer, "and so does everyone else with land around it."

The dominant volcano intercepts clouds which spill abundant rain on Taranaki, one of the most profitable pastoral regions in the world.

Thirty years earlier Goymer and his wife arrived from England. Today they milk 81 Jersey cows on their 160-acre farm. Besides 30 heifers, four bulls, and some hogs, they retain two horses for sentiment; mechanized farming, now Dominion-wide, turns work horses into museum pieces.

"How does dairy farming here compare with that of England?" I asked Goymer.

"When you buy a farm in New Zealand, you automatically get all the livestock feed you'll need," he explained. "It's just there, natural-like, and always growing, too. Not so in England, where farmers must buy tons of grain to tide animals over winter months—a costly business. You see, here in New Zealand we leave cattle and sheep outside the year round; don't need stables at all."

Leaning on a fence post, Goymer gazed across a paddock toward a rich backdrop of such native trees as stately *rimu*, sturdy *totara*, and feathery tree fern. Far-carrying notes of an unseen bellbird pealed like distant chimes. The smell of grass after rain mingled with the odor of moist soil. The farmer kept silent; his eyes beamed satisfaction.

Maori Gives Volcanoes to Dominion

A Maori chief presented to the Dominion the nucleus of Tongariro National Park, where guests at the Chateau can ski, fish, and golf, all in the same day. Roughly in the center of the North Island, it includes three volcanoes: Ruapehu (the island's highest), Tongariro, and Ngauruhoe (still quite active, page 432).

A tribal ancestor climbed Tongariro and claimed for his people all the land he could see from the summit. Suffering from cold on the mountain, legend says, he invoked Polynesian goddesses for warmth. They furnished fires causing thermal activity for which the country is renowned.

To the south lies Foxton. Founded on flax, the community works mechanically with stuff the Maoris continue to weave by hand.

"New Zealand flax, or hemp (*Phormium tenax*), is native to this country alone and must not be confused with linen flax—another story altogether," said one of the managers of the works.

"Our mill's among the few in the world handling Phormium. Other countries are just beginning to import the seed."

Phormium thrives in swamplands. Thick sword-shaped leaves, five feet or more in length, contain valuable fiber. Working 5,000 acres, the Foxton firm processes the flax for wool baling, plasterers' and upholsterers' hemp, and multi-purpose matting, including that used on beehive bottoms. In World War II the mill supplied the U. S. Navy with fiber for cordage.

Centuries before Foxton found prosperity in flax, the Maoris scraped the leaves with mussel shells and wove the fibers into clothing, mats, baskets, and rope. Often they decorated their handiwork with vegetable dyes from bark or berries. Many still keep the craft alive.

Ships Moor at Main Street

Wellington, oldest and second largest city, became New Zealand's capital at the age of 25. To this near-geographical center and hub of transport, the seat of government moved in 1865 from Auckland. And the marble solidity of Parliament House looks as if it's there to stay (page 428).

The 20,000-acre hill-girt harbor takes ships of all sizes and flags to the city's heart. Residences perch on slopes behind the port (page 446).

Across the water, Lower Hutt creeps up a wide valley. In some ways the growing community of 40,000 persons is to Wellington what Long Island is to New York City.* Here I saw masses of new homes, plus others under construction. Acres of modern factories swell with the overflow from the space-limited metropolitan area. Much construction has sprung up recently on ground that formerly kept Wellington in green vegetables.

The Government owns and operates all main railways. One of its biggest workshops sprawls in Lower Hutt. I walked through a series of sheds which build or repair locomotives, tenders, and passenger cars. Amid all the grime and pounding racket, steam, grease, smoke, and heat, one man in the foundry kept a vase of fresh Iceland poppies.

Straight from this strident inferno I walked into the cool, quiet dignity of Wellington's Government House. There I lunched with Governor General Lord Freyberg, V.C., G.C.M.G., K.C.B., C.B., K.B.E., D.S.O., LL.D., D.C.L., and Lady Freyberg.

A veteran of two world wars, Lord Freyberg earned the highest British military honor for bravery in the first and had command of New Zealand forces in the second. Today Dominion troops in Korea reflect the fighting spirit of their country's most respected soldier.

New Zealanders revere a former Governor General, Lord Plunket. Wholeheartedly he

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

A Visitor Greets a Maori Idol in Polynesian Fashion

Nose pressing, the ancient way of welcome, endures among descendants of the canoe-borne immigrants who reached New Zealand many centuries ago.

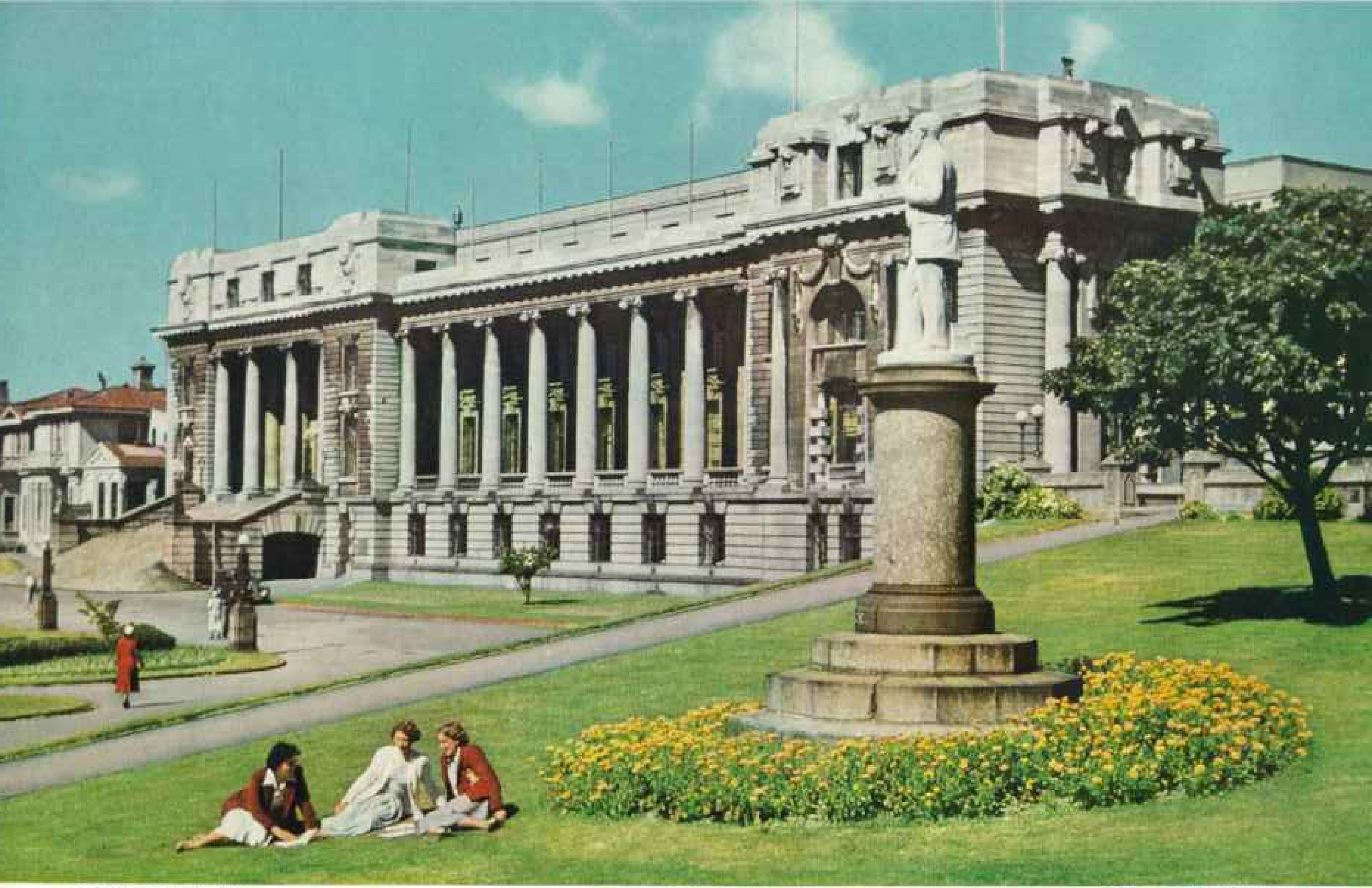
Carved of wood, this huge head guards the entrance to a tribal meetinghouse in Waitangi, North Island. There Maoris in 1840 signed a treaty bringing the country into the British Empire.

New Zealand's white and brown men once fought like Americans and Indians, but now live in harmony. The 100,000-odd Maoris make good citizens, superb soldiers, and loyal friends. They have equal rights in government.

Nature's Fireless Cooker

No slaves to kitchen stoves, Maori women cook basket-held food in Rotorua's boiling springs. For bathing and laundry, they divert the water to cooler streams. These two wear their tribe's old-time tattoo marks on lips and chins. Their flax skirts and woven cloaks come out of storage only on festive occasions.

Kodachromes by Howell Walker



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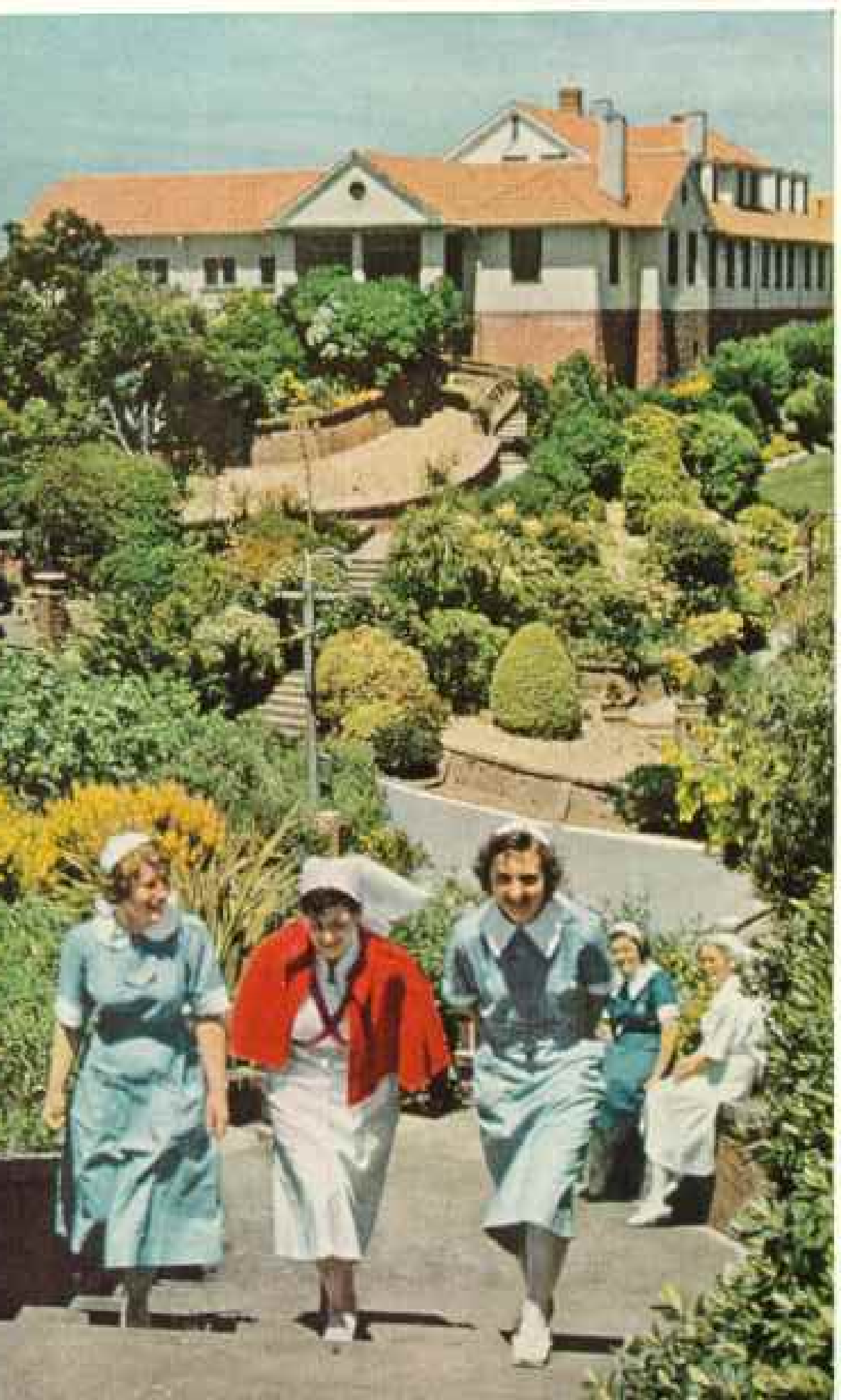


^ New Zealand Laws Issue from This Marble Palace

Parliament meets in Wellington, capital of the country since 1865. John Ballance, a former Prime Minister, tops the flower-fringed pedestal. Great Britain granted self-government to the colony in 1852. Dominion status was established in 1907.

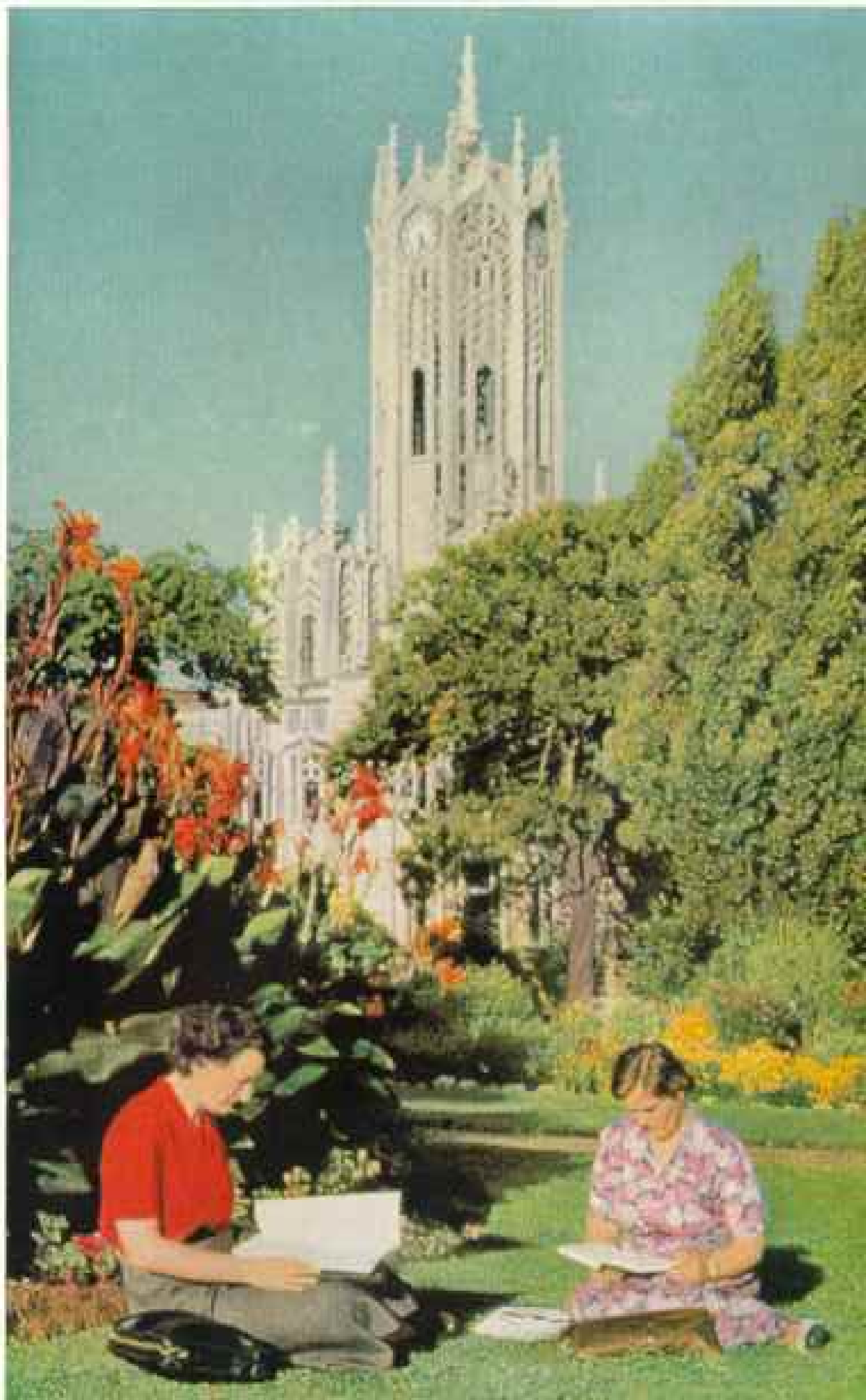
← Nurses Take Steps to Save Lives

Karitane, the Sir Truby King Hospital in Wellington, trains women to care for newborn babies and nursing mothers. Students (in blue) take a 16-month course. Dr. King, who pioneered in checking the wastage of infant life, founded the first of six Karitane hospitals at Dunedin in 1907.

→ Students Absorb Sun

Auckland University College's clock tower rises above Albert Park in the heart of New Zealand's largest city. Established in 1882, the college offers courses in liberal arts; its specialty is architecture.

Kodachromes by Rowell Walker



Kodachrome by Howell Walker

Auckland Grows in Ever-widening Circles Around Its Magnificent Harbor: A View from the War Memorial and Cenotaph

Game Laws Protect the Toheroa, a Shellfish Named by the Maoris

These palatable clams are found nowhere save in New Zealand, where they live beneath sandy beaches. Served in soups or fritters, they are too delicious for their own good. If wardens did not patrol the shores, toheroa might become extinct. This sign, with its seven rules, stands on Muriwai Beach near Auckland. Clamming is forbidden during October and November because toheroa breeds in those months, New Zealand's spring.

Right: A hunter exhibits a toheroa; its foot hangs from the shell. A neck ribbon holds the girl's big hat.

Kodachromes by Howell Walker

Kodachrome by Howell Walker

Springtime Skiers Gaze Across Volcanic Wastes to 7,515-foot Ngauruhoe, an Active Crater

Opposite: New Zealand focuses more attention on racing than on any other sport. Even towns of 1,000 or smaller have tracks. Altogether, New Zealanders have 240 days of running, 90 of trotting. Wellingtonians gather here for the spring meeting in near-by Trentham.

Kodachrome by Bassil Walker

^ Purebred Horses and Cattle Circle Past the Judges at Hamilton's 59th Annual Agricultural Show

As popular as a county fair in America, the three-day program attracts milling crowds and aristocratic animals to Hamilton, chief city of the Waikato district (page 432). This rich farming area supports a million breeding ewes and a fourth of the Dominion's dairy cows. Below: Men and children parade blue-blooded bulls and calves.

↑ Yards of Trout Hang in Appetizing Orange

New Zealand rivers and lakes in the old days offered dull sport. Excitement began on North Island in 1883 with introduction of rainbow trout from North America. They multiplied so rapidly that numbers had to be thinned, and they grew bigger than the ancestral stock, some attaining 25 pounds. Fishing has remained rewarding ever since. In almost every river, trout may be seen flashing across the bottom or idling in the current.

This smokehouse view shows one end of a line of 66 rainbows caught in Rotorua Lake. Smoldering sawdust will cure them in 15 hours. Smoked and salted, they will keep for six or seven weeks.

← Fish Too Big for Creels

The angler shows a seven-pound rainbow caught in North Island's Lake Taupo. "Slightly below average," he apologized with pardonable exaggeration, but he did not throw it back. He carries no creel—"they don't make 'em big enough."

Kodachromes by Howell Walker

Nesting Gannets Show Little Fear of Humans

These birds belong to a colony of about 3,000 pairs on Cape Kidnappers, a North Island sanctuary. Capt. James Cook named the cape in 1769 when Maoris tried to snatch a Tahitian boy from his ship. Parent birds share the duties of nest building, egg sitting, and chick feeding. The brooding Australasian gannet clasps the egg firmly between webbed feet.

Wind and Wave Carved "Hole in the Wall"

This volcanic island rises from Mercury Bay, North Island. Here Captain Cook in 1769 observed the transit of Mercury; hence the bay's name. These northern waters, luring many big-game anglers, have yielded a 976-pound black marlin, 459-pound striped marlin, 1,200-pound tiger shark, and 873-pound mako.

Kodachromes by Howell Walker

Drover and Dog Herd Cattle Through a Wild Gorge Decked with Tree Ferns

Tree ferns occur in some places up to snow level. New Zealand's largest grow fifty feet high. Ancestral forms covered the landscape during the Coal Ages. Living fossils, ferns reproduce by bare spores, an ancient method.

Kodachrome by Howell Walker

Livestock Owns the Right of Way on Narrow Lanes or Main Thoroughfares

Cattle, outnumbering people by more than 7½ to one, are so important to New Zealand that automobiles must maneuver past herds as best they can. Here a truck creeps through a market-bound mob in Mangamuka Gorge.

Singing Maori Girls Play Pass-the-Baton

A grotesque figure, carved and painted, supports the roof of the tribal clubhouse in Ohinemutu, North Island. The girls wear skirts of dried flax and sit on a flax mat. Greenstone charms known as *tikis* hang from their necks. If a player fumbles a baton, she loses the game. Assembling for this picture, the girls bicycled to the meetinghouse. One of them is a stenographer, another a schoolteacher.

Rubber-gloved cannery workers tin asparagus in Hastings. Three closest are Maoris.

Tide having gone out in Auckland harbor, the owners give this ocean-going schooner a fresh coat of paint. Oil-storage tanks line the far shore.

Kodachromes by Howell Walker

Kodachrome by Howell Walker

Maori Mother and Daughter Weave Dyed Reeds for a Decorative Wall Panel

When finished, this *tukutuku* will occupy a place between carved posts supporting rafters in the meetinghouse at Waipiro Bay. Weaving is women's job; men do the carving and painting.

supported a lifesaving movement, begun by the late Dr. Truby King, which now gives the nation one of the world's lowest infant mortality rates and highest life expectancies. The Royal New Zealand Society for the Health of Women and Children is better known as the Plunket Society.

In 1907, the year the Dominion was born, Dr. King began the work that so efficiently checked wastage of infant life. In his home at Karitane near Dunedin he and his wife treated the first patients. For his eminent services to motherhood and early childhood he received a knighthood.

Now every town and city has its Plunket Rooms. The Society also maintains six Karitane Hospitals (page 429). At one of these in Wellington I met a grand-niece of Dr. Sir Truby King. Following family tradition, she hoped to help New Zealand's annual crop of some 42,000 babies live to be useful citizens.

In 1898 New Zealand became the first British country to introduce old-age pensions. Since then, the Dominion has led the world in providing for people unable to care for themselves properly because of age, widowhood, orphanhood, invalidity, sickness, unemployment, or occupational disease. A system of medical, hospital, maternity, and other benefits is aimed at safeguarding and improving the nation's health.

To make this possible, persons 16 years of age and over pay so that all may profit.

Much money is spent, however, in quite a different way. A friend accompanying me along a Wellington street asked, "Notice how grim everyone looks?"

"Well, no, not exactly," I said.

"It's a fact, though," he insisted. "They've all put money on the horses, and they're worrying about it."

Horse racing in New Zealand has by far the greatest following of any sport; enthusiasm for it amounts almost to mania (page 433).

Introduction to South Island

Crossing Cook Strait on the ferry from Wellington to Nelson, South Island, I shared a cabin for the 145-mile overnight voyage.

"Care for a smoke?" asked my cabin mate, offering a local brand of cigarettes.

"Thanks, but how's your supply?" I asked.

"Pretty good," he said. "I make the things."

For a factory in Wellington he journeys frequently to the Nelson district, which grows all of New Zealand's commercial tobacco.

"But don't overlook fruit and hops," he warned. "They're important crops, too, in this region."

Orchards begin on Nelson's outskirts and range over several thousand acres. Fruits include apples, pears and peaches, quinces, black currants, and raspberries.

"I think ours is oldest in the area," said one orchardist. "It's been here 80 years. My dad was the first to export apples from New Zealand. He sent a shipment to London 40 years ago."

Nelson warmly claims more sunshine than any other town in the Dominion. Backyard farmers soak it up in 280 glasshouses covering 24 city acres. Between August and May they grow more than a thousand tons of tomatoes. Some also raise grapes and cucumbers and do nursery work. One concern supplies two-thirds of the tobacco seedlings used by New Zealand's plantations.

Thirty-five miles west of Nelson I watched farmers at Motueka cultivating dusty tobacco fields. One planter described the current drought with a tindery phrase capable of kindling this page. Normally, 4,000 acres in the district yield four and a half million pounds of leaf.

While in Motueka I moved from tobacco plantation to hop garden, or vice versa. These two crops checkerboard the countryside. I saw men, women, and children weeding out young hop vines and training the best to climb vertical strings. A diagonal view across the field looked somewhat like a tropical downpour; the air teemed with string.

Tame Eels Eat Pudding from a Spoon

Near the little town of Takaka flows the Anatoki River where a woman tames a colony of eels. To oblige me, she called a dozen to the water's edge and fed them pudding with a spoon. One about four feet long allowed his mistress to pick him up and stroke his slippery black back.

"During the Christmas holidays," said she, "the eels get more to eat than me. I even lose weight, feeding them for tourists. And the worst of it is, this busy season comes same time as haymaking; I have to feed field hands as well as eels!"

Leaving Takaka, I rode south along an empty road, twisting, climbing, and coasting through wild country. At Murchison, a bygone gold-mining center that turned to dairying, I met the Buller River; stayed with it through deep, rugged, bush-clad Buller Gorge to reach Westport in the evening.

Early next morning I set out with a mining engineer for neighboring coal fields. We drove 3,000 feet up into clouds muffling Stockton, one of New Zealand's largest open-cut coal mines. With a bituminous seam 40 feet thick, it has a potential supply of 50,000,000 tons.

We returned to sea level, then climbed 2,000 feet to reach Denniston. This mining town perches on the edge of a precipice like a

444

Dragonlike Tuatara Forms the Only Living Vestige of a Group of Ancient Reptiles

Feeding on insects and spiders, the saurian grows to a length of two and a half feet. A rosette of scales on the head marks the pineal, or third "eye," remnant of a once-important organ. Formerly tuatara roamed the mainland; now it inhabits a few outlying islands. This specimen lives in the Auckland Zoo (pages 419, 460).

medieval fortress. An earthquake once dangerously cracked the cliff which supports the community. Engineers hastily secured the colossal rock with thick steel cables: if it crumbled, most of Denniston would go, too.

In 1877 Denniston started west-coast coal rolling to market. Since then, mines in the Buller district have produced more than 32,000,000 high-grade bituminous tons. All this coal goes to Westport, biggest coal-shipping center, for Dominion-wide distribution.

Gold Splits the Wilderness

But gold, above all else, opened up the west coast and South Island generally. Within a few months of its real discovery in the early 1860's, population multiplied even faster than Australia's rabbits. Cities born overnight swarmed with prospecting thousands. A dozen years later easily worked fields' production fell off, but widespread diggings had cracked the wilderness.

Today from alluvial and quartz sources the west coast wins 10,000 ounces plus of gold per year. Annual dredgings more than triple the figure. To the Dominion's total this western district contributes a generous third.

The west coast reminds me of Oregon's spectacular shore; off-lying sea-sculptured masses knock back a madly foaming surf. As a result of geological ups and downs, limestone layers rise from the beach like mammoth stacks of pancakes (page 447); and through blowholes in the curious formation heavy weather pumps salty geysers.

My southward route along the coast crossed streams gray and swollen. From the island's snow-buried backbone they rushed in a rough-and-tumble race to the sea. I sometimes caught the tremulous call of a little gray warbler; it seemed out of tune with the bold terrain.

Vegetation suggestive of the Tropics shivers in winds from Antarctica. Ferns reach date-palm proportions or grow like shingles over sheer rock faces. Right into luxuriant rain forest near the sea advance the enormous Franz Josef and Fox Glaciers.

I returned almost to Greymouth; then my car, turned east, labored over the Southern Alps and coasted onto the Canterbury Plains.

Some 174,100 residents and nearly as many bicycles make Christchurch largest and most traffic-hazardous of South Island cities. Yet, with Anglican Cathedral and cloistered colleges, parks and oft-bridged river, it has the

Tailless, Wingless Kiwi, a Ball of Furlike Feathers, Uses Her Beak as a Third Leg

Virtually blind by day, the strange bird hunts earthworms by night. She runs swiftly, hears keenly, and scents danger with a ridiculous long "nose." Chicken-sized, the hen lays a one-pound egg, a fifth of her weight. This one shared captivity with a dozen others near Napier (page 419).

most English atmosphere of any (page 453).

I went to the city's 100th birthday party. Seven miles away at Lyttelton, British pilgrims landed in December, 1850. Over the near-by hills they trudged to found a cathedral community of the plains.

A century later, I attended a re-enactment of the landing. A vessel similar to the first colonists' transport, period costumes down to shoes, and a humble ceremony on the water front revived the historic occasion.

A Cake as Big as a Cottage

Through Christchurch streets moved an elaborate parade depicting a century of progress. It began with bullocks and creaking wheels, included veterans of three foreign wars, evolutionary trends from "penny-farthing" high-wheeled bicycles to streamlined cars, and ended with a cake (inedible) as big as a cottage, decorated with 100 giant candles.

Sustained festivities didn't interfere with principal industries. Lambs still fattened on Canterbury Plains, and at a big freezing works outside Christchurch I learned the daily fate of a plump 5,000. Older sheep kept city mills spinning raw wool into suitings, rugs, shirts, blankets, sweaters, socks, and underwear.

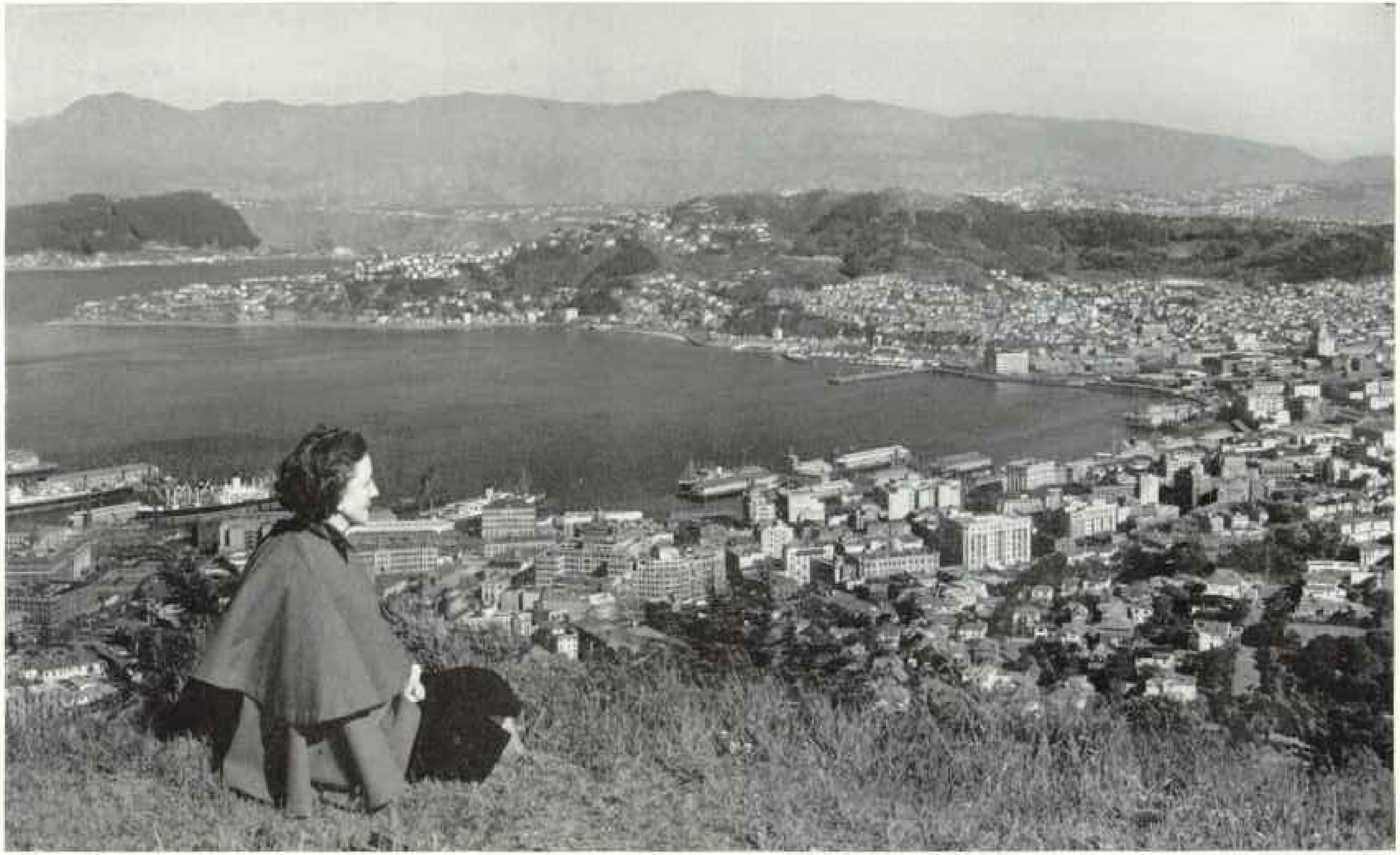
Along Banks Peninsula I drove to Akaroa, a red-roofed village living quietly by a turquoise bay. Here in 1840 an Englishman raised his nation's flag and claimed South Island for Great Britain. Only two days later a French frigate arrived with immigrants hoping to establish a colony. The frustrated Frenchmen remained, however, and the district today retains some of their names.

Back on the fertile Canterbury Plains, I pushed south through mellowing wheat, golden-ripe barley, and verdant pasture. The country everywhere softened with the comforting smell and feel of summer. Abruptly I entered the town of Geraldine and found Santa Claus tossing candy to children.

In time for Christmas I reached Timaru on the east coast, as did a wild sea elephant (*Mirounga leonina*). Exhausted or otherwise indisposed, the bulky mammal, 12 feet long, came to rest at a boat slip in the harbor.

"Too much Christmas Eve," sympathized a sailor.

A thinly settled region of mountains and plains lies west of Timaru; it carries one sheep to several acres and the name of Mackenzie country. During pioneer days, one Jock Mackenzie pre-empted it; nobody else



Wellington Marches Up the Hills in All Directions from the Harbor. Ocean Vessels Moor at Its Front Door

Standing on the strait separating North and South Islands, Wellington is the Dominion's geographical and transportation hub (pages 426, 428). Leading industries maintain offices here; airplanes and passenger ships call daily. This view of New Zealand's capital city is from the western Tinakori Hills.

Pancake Rocks, Worn by Weather, Stand in Flapjack Tiers

Some 50 million years ago, countless tiny calcareous particles were laid down in a layered arrangement at the bottom of the sea.

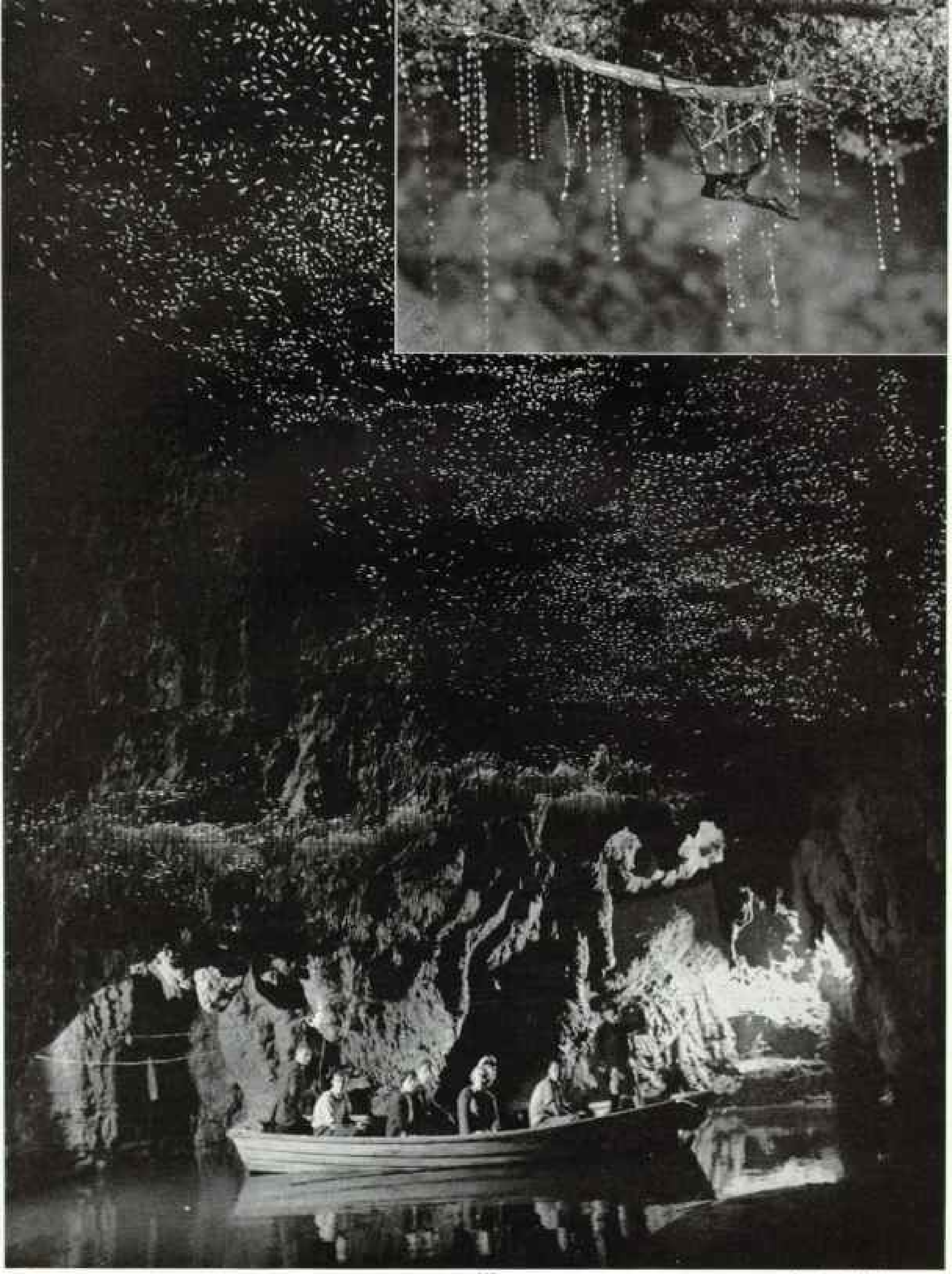
Later, when the limestone was elevated above sea level, rain's erosive fingers began to etch its face. The effect was unequal. Weak spots washed away; hard sections remained as projecting ledges. Joints between strata dissolved like crumbling mortar, creating the pancake effect. Undercutting and collapse hastened the rain's work.

Pancake Rocks stand north of Greymouth, South Island. Similar conditions have created their counterparts in various areas of the world.

Strata here show only a slight inclination from the horizontal. Elsewhere mountain-forming processes have tilted sediments into vertical attitudes.

Salt water as well as rain sculptures these rocky shores (page 444). Close by, the surf has bored cavities known as the Punakaiki Blowhole. Tremendous hydraulic pressures of inrushing seas cause these chambers to erupt like geysers.

Telford H. Work



New Zealand Embassy

Millions of Shining Glowworms Make Waitomo Caves an Insects' Milky Way

Boat and passengers drift silently, for any sound extinguishes the gleaming canopy. Noise means danger to these insect larvae, and they react to it as quickly as light bulbs to the flip of a switch. Inset: The glowworm's silky web, spun against the vault of the grotto, entangles flies and midges charmed by its glimmer. Here sticky beads hold a victim in a flypaper vise, awaiting a hungry glowworm's pleasure (page 419).

contested the formidable fastness. Over remote passes he drove sheep lifted from the Levels in Canterbury; sold them far enough away to escape suspicion.

A Dog Convicted in Court

Mackenzie trained his sole accomplice, a dog, to open gates at night, drive stolen flocks through river torrents, along unknown upland tracks, and down valleys never seen by other men. Finally the law caught and deported Jock. The dog was tried, found guilty, and destroyed, some say hanged!

Crossing still bleak Mackenzie country, I followed Lake Pukaki's west shore north to an isolated alpine resort, the Hermitage (pages 454-455). A warm sun dropped behind icy heights; cool shadows darkened valleys. Day's dying glow played on New Zealand's loftiest peak and stealthily tinged it a faint pink. Then night completed its solitude.

Maoris called this peak Aorangi, the Cloud Piercer. In honor of the memorable British navigator, white men changed the name of the 12,349-foot monarch to Mount Cook. With 16 other peaks above 10,000 feet, it forms a mighty alpine mass (page 420).

Satisfied to let my lenses explore the snow-bound summits, I crawled over monotonous moraine and crunched several miles up the Tasman Glacier (page 451). By a river tunnel in one of the Temperate Zones' largest cakes of ice I entered a natural deep freezer as big as a bungalow. Powerful elements carved it with rugged abandon, but tinted the walls soft pastel blues and greens (page 457).

South of Mount Cook, vacationists crowd Queenstown beside Lake Wakatipu. With 510 sight-seers I made a steamer excursion to the lake's west end. At that point, 21 miles separated me from Milford Sound; but I had to travel 200 to reach it by car.

Starting from Queenstown, the road clung to precipices, spanned swift, narrow rivers and wide valleys. It crossed stony desert, paralleled long Lake Te Anau, penetrated dark beech forests, and climbed mighty heights under snow. It tunneled a mountain of solid granite and cowered under massive cliffs barely less majestic than those of Milford Sound itself, most spectacular of all New Zealand's fiords; I have seen few as grand even in Norway.

Cruise to Fiordland

Dolphins frolicked around the bow of the *Alert* moving smoothly over Milford Sound. The 72-foot launch slipped by Mitre Peak, a mile-high rock rising sheer from the water. Edging past cascade-laced walls, she began a 10-day voyage through Fiordland with 11 passengers (pages 456, 457).

Along this glacier-hewn southwest coast the *Alert* navigated ten fiords, all different, all uninhabited, all wildly magnificent. We glimpsed two fishing boats and one group of three ambitious hikers—nothing else human.

Among virgin woodlands we found tree-daisies, picked frail orchids, and saw mossy stumps left by Captain Cook's men. On or near shore, sand flies raided us relentlessly. A bull seal lunged at me on a rocky islet.

Still using as a basis charts drawn up by Captain Cook in 1773 on his second voyage, the *Alert* probed steep-walled, dead-end inlets deep in unsurveyed territory. Around us towered peaks "of a stupendous height . . ." according to Cook, "covered in places with large patches of snow, which have lain there ever since the creation."

I photographed mountains, waterfalls, and rivers for which I could find no names on any map; they fell within vast blank areas cartographers can only mark "unexplored."

Farthest South in New Zealand

Captain Cook, in one of his rare navigational fumbles, made Stewart Island a peninsula. Twenty-mile-wide Foveaux Strait separates it from southernmost South Island. Long ago the Maoris named it Rakiura, Land of Glowing Sky.

Exactly the size of Scotland's Skye or almost half as large as Long Island, New York, Stewart has the much-indented coastline and fickle weather of the former. Five hundred residents fish, accommodate visitors, or simply live in idle ease.

Most of the inhabitants and the island's several automobiles gathered at the wharf in Halfmoon Bay to watch our arrival at Oban, the only town.

One of those places which perpetuate primeval New Zealand, Stewart offers natural sanctuary for the teeming bird life and grows a botanical profusion. And imagine what inspired such local names as Murderer Cove, Easy Cove, Hidden Island, Sealers Bay, Glory Cove, and the old salts' Small Craft Retreat. Like Robert Louis Stevenson's notion of *Treasure Island*, "it contained harbours that pleased me like sonnets."

Returning to the mainland, I drove from Invercargill to a petrified forest at Curio Bay. More curiously I went to near-by Niagara to learn how the hamlet got its name.

"An early settler gazed at the two-foot falls in our little river," explained the local school teacher, "and sarcastically called it 'Niagara.' The joke spread and the village just grew up with that name."

Dunedin is literally the Edinburgh of the Southern Hemisphere. From the Celtic *Dunedin* comes Edinburgh's name. Founded

by Scots in 1848, Dunedin today remains New Zealand's most Scottish city.

Misty climate and gray stone buildings contribute to the city's Scottish look. On the principal street—called Princes, of course—tweedy folk of ruddy face speak with the unmistakable burr. High tea and fish, wool and ships, banks, churches, schools, and the Dominion's oldest university round out Auld Reekie's distant counterpart.

Dunedin Proud of Its University

Each of New Zealand's four principal cities points proudly to its pet feature: Auckland the harbor; Wellington the seat of government; Christchurch the cathedral; Dunedin *the* university. A discussion of Dunedin's highlights invariably begins brightly with its academic atmosphere and ends with a dour description of the weather.

Alex Black of Dunedin took me to Roxburgh, 60 miles west of his city. He showed me some of the Dominion's main stone-fruit orchards. Here the first apricots planted in New Zealand thrived 80 years ago; many of the original trees are still producing.

A warm, sweet aroma of steaming peaches floated heavily through a factory which receives tons of fruit suitable only for jam: the raw product would spoil before reaching Dunedin or other big markets.

"This place," said Black, "gets local farmers out of a jam by getting them into jam."

From Dunedin I drove north along the coast. At the port of Lyttelton, car and I went aboard the night ferry for Wellington.

"Beware of Wind" warn signs by the road riding the Rimutaka Range northeast of the capital. Others announce, with precise formality, "Deceptive Bends," "Hill—Change Down," and "One-car Bridge, Give Way."

Crossing mountains gleaming with golden gorse, I rolled north over pastoral plains of the Wairarapa Valley.

Napier Gains by Nature's Whim

Napier now knows that it's an ill earth that doesn't quake some good. In 1931 the city got the biggest shock of its life. The land heaved like a storm-rocked ocean; buildings crashed, killing scores of persons.

But this earthquake raised Napier's coastal area some eight feet; reclaimed 10,000 acres once useless for anything except pleasure boating and indifferent fishing; and added potential pastures to Hawke Bay, which specializes in sheep grazing. Furthermore, up from the city of rubble rose a new Napier, modern and shockproof.

A seasonal wool check worth millions of dollars rewards the district for handling a fat eighth of the Dominion's flock. I waded through Napier warehouses overflowing with fleece for coming sales. When I attended one of these international auctions, prices soared to heights altogether foreign to the business (page 425).

"Why?" I asked experienced stockmen.

"Mostly a matter of supply and demand," one said. "The world suddenly wants more wool than is available, and buyers don't seem to care about costs."

"Some countries—America, for example—have had decreasing sheep populations," explained another, "and they are now urgently requiring large amounts of wool."

Up the coast at Gisborne, wool was flying at a frenzied pace in this normally calm town. Shearers couldn't clip fast enough to satisfy sales and shipments. Bales moved through warehouses as if they were perishable foods.

This center of a rich farming region prospers on a bay Cook called Poverty. Maoris chased him from his first landing in New Zealand before he could collect supplies.

Maori History Chiseled in Wood

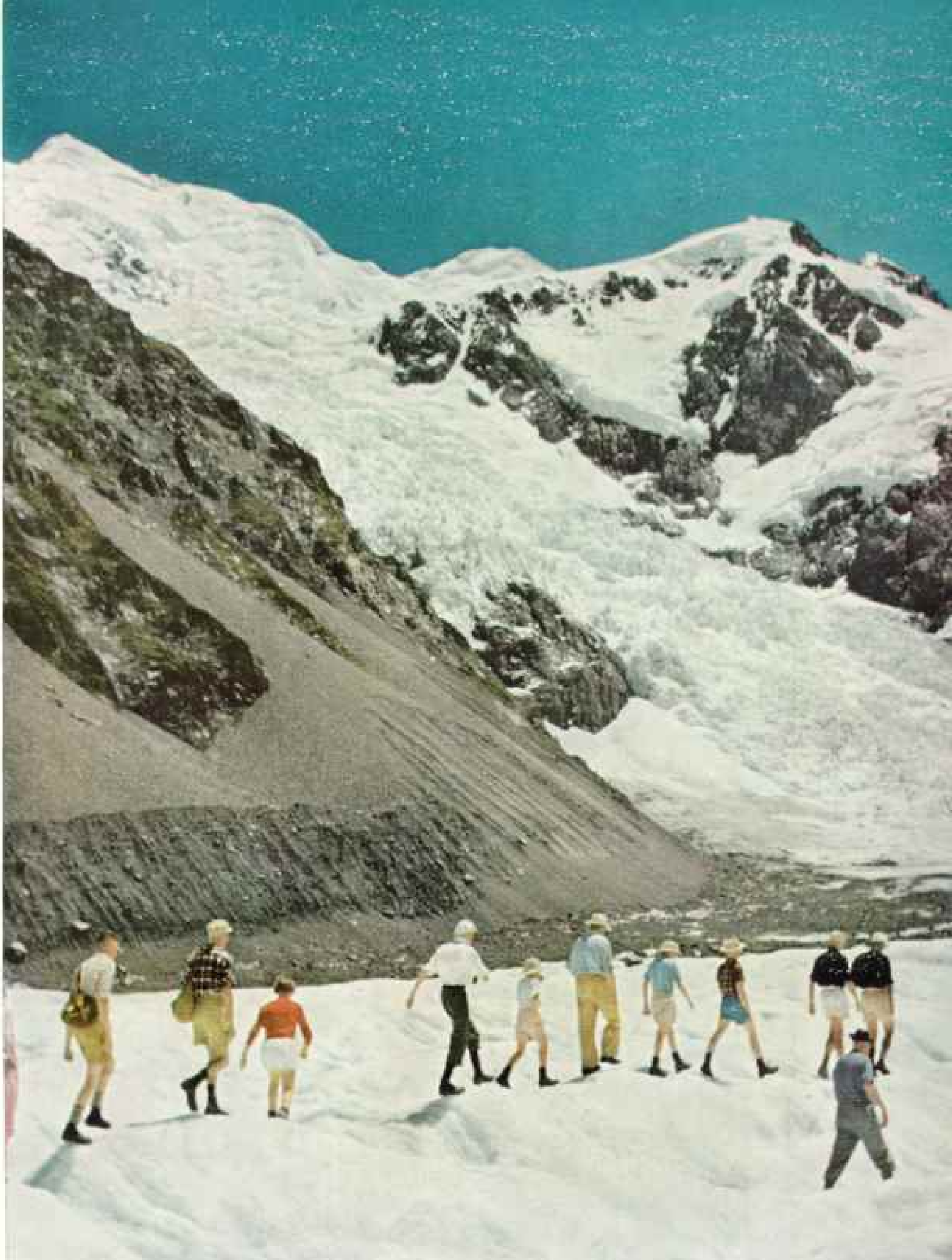
In the Maori meetinghouse at Waipiro Bay, Pine Taiapa chisels all day and into the night. His intricate carvings of grotesque figures decorate the village's most important building. He works to immortalize ancestral princes, princesses, and legendary events in the long life of his people. His art perpetuates ancient Polynesian culture in New Zealand (page 442).

With Taiapa I lived two days. We shared a tin washbasin, ate roast wild pig and sweet potato. I followed his work from initial adzing to fine-tool touches. He could take a six-foot totara log straight from the forest and in a matter of hours transform it into fanciful history exquisitely chiseled. Thirty-two years of practice made his every stroke quick, sure, and clean, and perfected his patterns.

East Cape country is mostly Maori and well off-stage. White residents are rare, tourists few. The brown people earnestly work for a living on their own land, building homes, fencing pastures, raising sheep and milk cows, growing vegetables, sending children to Maori schools, and attending their own churches.

These Maoris take their fun in little towns to which they ride on horses. They like movies, and fill a Ruatoria theater on Saturday nights. Until the management made it impossible, horsemen habitually rode right into the establishment. Now they just carry saddles inside.

I followed 600-year-old Maori tracks inland to Rotorua. Still headquarters of the Arawa tribe, this center of the country's remarkable thermal region has become pre-eminently a



Kodachrome by Howell Walker

Summer Hikers Crunch over Tasman Glacier, an 18-mile-long River of Ice

South Island's mountain massif contains 17 peaks rising 10,000 feet or more above sea level. Here Hochstetter Icefall spills down a ravine into Tasman, one of the Temperate Zones' longest glaciers.

Axes and Saws Flash as Woodcutters Race

Hamilton's agricultural and pastoral show (pages 434 and 435) included a "jigger chop." Contestants notched uniform tree trunks, inserted planks on which to stand, and then chopped off the topmost sections. First to lop his pole and win a prize was the axman on the left.

Crosscut-saw teams, working like reciprocating engines, cut sections of matched timbers (below).

Native evergreen forests a century ago covered more than half of New Zealand. Now they stand dangerously reduced as a result of careless pioneering and indiscriminate timbering. The kauri, a North Island giant, has been pitilessly exploited for boards and ships' spars.

Reforesting, New Zealand has planted quickly maturing trees of foreign origin. Monterey pine from California has shown phenomenal growth. Other imported species include additional North American conifers, Australian eucalyptus, and Corsican pine.

Kodachromes by Howell Walker

Christchurch, Celebrating Its First 100 Years, Hangs Out the City Shield

Most English of New Zealand cities, Christchurch has a population of 174,000 and almost as many bicycles. In 1950 it observed the landing of its English founders with a parade. Floats carried pioneer huts and a 100-candle cake as big as a house. The Anglican Cathedral appears between the poles.

Glaciers Bulldozed Hooker Valley; Summer Now Carpets the Plain with Grass

Ice once covered most of New Zealand. Grasses and sedges gained foothold when the glaciers retreated; beech trees and rain forest took root later. Ice sheets surviving on the Mount Cook range (right) feed this stream.

Kodachrome by Howell Walker

A Large Resort Hotel Appears Lost at the Foot of South Island's Mighty Peaks

Named the Hermitage, the popular inn serves as a year-round base for skiers and mountain climbers. Mount Sebastopol, towering directly above it, overlooks some of the grandest scenery in New Zealand.

Mitre Peak Towers a Mile above Milford Sound

Fiords as majestic as Norway's penetrate South Island's mountainous southwest coast. No one lives in this formidable fastness, which does not lend itself to settlement.

Fiordland's wildlife includes wapiti (elk) from North America. Canadian moose, brought in during the early 1900's, failed to hold on, but imported deer increased so rapidly and became so destructive that the Government now encourages hunters with a year-round open season.

As virtually all Fiordland remains unmapped and untracked, boats provide the best access to its scenery.

Alert, the launch on the right, makes 10-day summer cruises carrying 11 passengers and three crewmen (opposite page). The other craft takes fishing parties on short excursions. They anchor in Milford Sound, whose waters reach depths of 1,270 feet. Only this sound has a road out to civilization; a hotel accommodates summer visitors.

Sutherland Waterfall, New Zealand's highest, drops 1,904 feet over a triple precipice not far away.

Kodachrome by Bowell Walker

← A Glacier Explorer Gazes into Nature's Deep Freezer

↓ Uninhabited Fiordland abounds in sheer precipices, shadowy valleys, snow-clad mountains, lacy waterfalls, and luxuriant forests. A cruise among the sounds shows its marvels to best advantage.

These passengers may fish at anchor or take short excursions ashore. They pick rare flowers and photograph nameless rivers and mountains.

Kodachromes by Howell Walker

Cold Storage, Ending a Vast Waste of Meat, Put Port Chalmers on the Map

New Zealand used to boil down sheep carcasses just for the tallow, which could stand shipment. Port Chalmers, deep-water gateway to Dunedin, revolutionized the Dominion's meat industry in 1882 with a frozen cargo. Each year now the country exports some 340,000 tons of meat, largely to the mother country. Scotsmen, settling this area in the 1840's, made it a little Scotland. Their descendants still speak with a burr.

tourist mecca. And the healing properties of countless hot springs and medicinal waters draw much-traveled invalids (page 427).

Local Maoris, for fluid fees, eagerly guide visitors to geysers, boiling pools, champagne lakes, siliceous terraces, steaming waterfalls, and mud volcanoes. Both Maori sexes dress up or down in long-discarded ancestral costume to stage traditional dances; they sing enchantingly (page 440).

In a Rotorua hospital, blind Tai Paul operates a telephone switchboard. Some nights he leads his own dance band, playing saxophone or clarinet.

"Lost my eyesight during a bayonet charge in North Africa," he told me. "Then I was a prisoner in Italy for a year."

Tai works for an association of the blind, helps others to learn Braille and handicrafts.

"We want to teach the blind to live," said he, "not just eat and sleep and wait."

Maori and White Man Team Up

Maoris find employment in the one and a quarter million acres of State forest around Rotorua. They team well with white men on logging jobs, and half the workers at the Dominion's biggest sawmill here are Maoris.

An officer of the New Zealand Forest Service spent two whole days showing me the magnificent timber stands southeast of Rotorua. We divided our time between indigenous and the so-called exotic woods, mainly imported conifers.

Of New Zealand's approximately 112 native species, not many have value as lumber trees; the best of these—kauri, totara, and rimu (red pine)—belong to a vanishing type. The State tries to preserve those that remain and restores resources with quick-growing, all-purpose types from other countries (page 452).

Monterey, or insignis, pine, for example, grows several times faster in New Zealand than in its native California. Importations like Douglas fir, Western yellow and Corsican pine have shown phenomenal progress.

Imported wildlife has also thrived remarkably—too remarkably. Deer have caused such destruction to forests that an army of skilled stalkers works full time to control them. Possums and rabbits also create a serious nuisance. But brown and rainbow trout make New Zealand an anglers' paradise (page 436). Big game fish off the North Island round out this sportsman's El Dorado.

Captain Cook beat me to Coromandel peninsula's Mercury Bay by 182 years (page 437). "My reasons for putting in here," he logged, "were the hopes of discovering a good Harbour, and the desire I had of being in some convenient place to observe the Transit of Mercury . . ." He might have added, "Mission accomplished."

Putting in at Whitianga, only town on this bay, I discovered exceedingly friendly people and observed the trend of the times. Declining deep-sea fishing invitations hurt like refusing potatoes in Maine. Even the town baker, also a master of marlin, advertises: ". . . what they say of Mercury Bay:—'Not only the finest swordfish, but the very best of bread and pastries, too!'"

Silent Giants of the Ancient Forest

All too hastily I left Coromandel for the peninsula north of Auckland. Beyond Dargaville I parked beside the dusty road and entered Trounson Park, a cool 975-acre preserve of towering kauri trees. My footfalls and a few birdcalls made rare sounds in this world of wood.

Farther along the main route I penetrated an even greater kauri domain, the Waipoua Forest. A sign on one monarch says: "This tree is 43 ft girth and 42 ft to first limb. It is probably 1,200 years old and contains 72,000 superficial feet." Through 20 miles of the dense reserve wound my road, past graceful tree ferns and majestic giants.

I came out of the woods near the southern end of Ninety Mile Beach. Instead of driving over this empty stretch of sand to New Zealand's northernmost point, I went for a refreshing swim in the booming surf.

Next day I learned that sharks in the vicinity keep a local factory going. Oil from their livers contains valuable vitamins.

Farther east at Whangaroa Harbour another fish factory warned against swimming.

"Yes, we handle sharks," said the manager. "We ship fillets to Australia, but process livers for oil. Our snapper and hapuka (groper) go to domestic markets. We export about 65,000 pounds of crayfish tails to America each year."

Birthplace of the Dominion

I drove southeast to Kerikeri, surrounded by citrus orchards and history. Here stand New Zealand's oldest wooden home and a stone store once called the country's most substantial building—former headquarters of the first missionaries to reach this land.

Eight miles away at Waitangi a Georgian colonial residence in 1840 witnessed the signing of a treaty which made New Zealand part of the British Empire. A tall flagstaff on the lawn marks the spot where a huge gathering of Maoris and whites assembled for the ceremony (page 427).

Waitangi looks across the Bay of Islands to Russell, New Zealand's initial white settlement. Originally called Kororareka, it sup-

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Cave Art Mirrors the Canoes That Carried Maori Pioneers Across Uncharted Seas

New Zealand's Polynesians descend from bold voyagers who, navigating by stars and bird flights, challenged the unknown to discover and settle a new land thousands of miles from their overcrowded homelands, possibly Hawaii or Tahiti (page 421). They fashioned their sturdy craft from logs 60 to 100 feet long. An unknown artist long ago carved this rock face in the Rotorua district.

ported the country's first post office and customhouse. In the beginning of the 19th century it harbored hundreds of whaling vessels. Rough-and-ready crews crowded some 20 hotels and grogshops. Today deep-sea fishing craft fan out from here for waters known to big-game anglers around the world.

From the Bay of Islands the colonial capital moved in 1841 to a Maori village on a magnificent harbor and called itself Auckland. Now a place of more than 300,000 people, it moves rapidly toward its destiny of big city. In the last five years population gained another 42,000 along with the usual housing worries (pages 424, 429, 430, 441).

Living Fossil a Reptilian Remnant

At his home in the Auckland zoo, a tuatara *(Sphenodon punctatus)* couldn't care less for the city's future or his prehistoric past (page 444). Grayish-black, scaly and spiny, the lizardlike species once possessed a so-called pineal "eye." Now, lethargic in its movements, it scarcely bothers to bat one of a lateral pair.

The tuatara is believed to occur nowhere today except on a few rocky islands off New Zealand's coast: Stephens, at the northern point of South Island; Brothers, in Cook Strait; and Karewa, in the Bay of Plenty (map, page 423).

"Some have been in this zoo for donkeys' years and a little," said the caretaker.

"What do they eat?" I asked.

"Seem to live mostly on fresh air and a bit of water."

Also peculiar to New Zealand alone is the toheroa *(Amphidesma ventricosum)*. This marine bivalve somewhat resembles a large quahog. On a sandy beach near Auckland friends showed me where and how to dig for the clams. Law forbids keeping any toheroa less than three inches long and limits one day's take to 20 per person or 50 per vehicle (page 431).

That evening I enjoyed a legitimate bowl of the most palatable and satisfying soup I ever tasted anywhere, including France.

So I added another item to the list of things which fill this pocket world of wonder.

Unlike Alice's Wonderland, however, New Zealand is one of real people. Here brown men and white have settled together. Among themselves they have wrought a way of life born of mutual respect and liking. And they are shaping a hopeful heritage for generations to come—an encouraging example for a troubled world.

Hays, Kansas, at the Nation's Heart

Plains Where Indians, Gun-toting Sheriffs, and Buffalo Roamed Now Shape an Empire of Wheat, Cattle, and Oil

By Margaret M. Detwiler

With Illustrations by National Geographic Photographer John E. Fletcher

OUR home in Hays, on the wide plains of Kansas, lies just 73 miles southwest of the geographical center of the United States. Located at the heart of America, Hays is itself American to the core.

The little city, crisscrossing the shallow valley of Big Creek, is an island of trees and rooftops in a rolling sea of wheatland and cattle range. In summer the restless Great Plains wind ripples the encircling miles of grass and grain.

Hays bears a family resemblance to dozens of western towns. Mostly they are "look-alikes," with grain elevators, water towers, flour mills, and ruler-straight railroad tracks.

Yet, behind their neat but undistinguished exteriors, each place is unique. The touchstone to test the stuff they are made of is often —as with Hays—a leafing through the pages of their past, almost certain to be colorful in these longitudes of the United States.

Viewed down the long perspective of history, Hays and other west Kansas communities are indeed "Johnny-come-latelies." Yet how much Kansas has achieved since the twilight of the pioneer era!

It was 1861 before Kansas gained statehood, and the Civil War's wounds were starting to heal before the first transcontinental railroad pushed steel across the lonely plains. No town in this part of the State is more than a hundred years old.

Bound for a New Home

When I learned that Hays was to be my new home, the prospect was unalluring. Washington, D. C., where we lived at the time, naturally was in the thick of events. Exchanging the Nation's Capital for what sounded like a prairie crossroads seemed like exile to a remote no man's land.

This impression shows that my knowledge of Kansas then was practically nil. In less than a year our little family was quite at home in the friendly city of Hays.

With my little girl I flew from the East as far as Salina, Kansas. In the small plane that took us on from Kansas City, we followed the Kansas, or Kaw, River for more than a hundred miles. We noted the thinning of the trees and the increasing distances between farmhouses, and felt a surge of excitement as we crossed the threshhold of the real storybook West.*

As we stepped out at Salina, we were struck —literally—by the wind, to me the outstanding feature of the Kansas plains.

At Salina my brother met us and we motored west the last hundred miles to Hays. My brother is a doctor; I went west to keep house for him.

We were pleasantly surprised to find the country not so flat as we had expected. In fact, there are some quite presentable hills.

The roads, however, generally following section lines, mostly run straight east and west or north and south. Farmhouse lights, which appear near at night, take a long time to reach. My little five-year-old, used to the more winding roads of the East, kept asking why there were no turns in the highway.

Ditches Serve as Flood Insurance

Having heard much of the rich Kansas wheatlands, I was depressed at first by the appearance of the farms, bare of trees and often with unpainted buildings. The countryside in brown winter garb somehow was not appealing.

Indeed, it was easy to see that times could be hard on the open plains, with little water and the persistent winds. Trees along the streams and dry creek beds we passed offered some relief.

Along the side roads huge ditches, twelve to fifteen feet wide and four or five deep, had been dug for drainage. Cactus, sage, and Russian thistle (a kind of tumbleweed) vied with the grasses to fill them up.

What could be the purpose, we wondered, of such broad ditches in so dry a land? Later we watched them prove their worth during heavy spring rains and floods (page 484). They also act as catchment ditches for snow blown off the roads by blizzards.

We passed a couple of Osage orange hedges, but for the most part yellow limestone fence posts held the barbed wire that kept the Hereford, Black Angus, and Galloway cattle in their dry pasture. Just beyond the fences the ground was plowed for several feet as a guard against the spread of prairie fires. Fields of

* See "Speaking of Kansas," by Frederick Simpich, National Geographic Magazine, August, 1937.

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Bucking, Bell-ringing Brahman Steer Tosses His Rider at the Russell, Kansas, Rodeo

The cowboy may hang on by one hand but is disqualified if he uses the other. He gets a prize if he stays on eight seconds and shows good form. A clown (right) performs antics to distract the steer from fallen riders.

milo, a grain sorghum used for feed, had ripened to a coppery color, contrasting with the drab yellow of dried buffalo grass.

We had been heading due west and shortly drove into one of the most gorgeous sunsets I had ever seen. As if to refute the sense of dullness, the whole scene suddenly reflected the brilliant sky. Harsh lines softened in the roseate glow. Warmth and life came to the surface, as in some old masterpiece.

I found myself wondering what stories these plains could tell. What was Kansas like in its days as the land "where the buffalo roam?" Later, through study and talk with students of old-time Kansas, I gradually began to fill in this storied past.

We found Hays, metropolis and county seat of Ellis County, an interesting small city. It is proud of its colorful history as one of the toughest places in Kansas. Wild Bill Hickok, Buffalo Bill Cody, and Calamity Jane are among the picturesque characters associated with early Hays.

Hays started as a railroad town near old Fort Hays, named for Gen. Alexander Hays, killed in action in the Battle of the Wilderness. This was one of the forts protecting the Smoky Hill Trail traffic from Indian attack.

Gen. George A. Custer and Seventh Cavalry units arrived at Fort Hays in 1867 to campaign against the Indians. Understandably enough, the Indians objected to white men settling their lands, putting through the hated railroad, and slaughtering the buffalo, on which their whole economy depended.

The Comanches, Pawnees, Kaws, Cheyennes, and other tribes contributed to the stirring Indian history of Kansas. About 1650, Pueblo Indians from the Rio Grande Valley migrated to the Smoky Hill River basin. There they erected a pueblo, "El Quartelejo," in what is now Scott County State Park.

These Pueblos built a system of irrigation ditches to water their maize. Later, a white homesteader reconstructed the Indians' system.

The first white men to arrive in the terri-

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Hays Cowboys, Big and Little, Need Fancy Boots for Rodeos and "Goin' to Town"

Western Kansas boys tread the footsteps of immortals—Generals Custer, Sherman, and Sheridan, Wild Bill Hickok, and Buffalo Bill Cody (page 487). They walk streets where outlaws fought pitched battles.

tory of present-day Kansas were Coronado's party of Spaniards, northbound from Mexico in 1541 in their search for the Seven Cities of Cibola.* They didn't find the mythical cities, but their report described, among other things, an animal recognizable as the buffalo.

Aborigine Meets Parisian

The French explorer Etienne de Bourgmont came up the Smoky Hill River in 1724 to make a treaty and establish trade with the Comanches. Impressed, he declared this the "most beautiful land in the world."

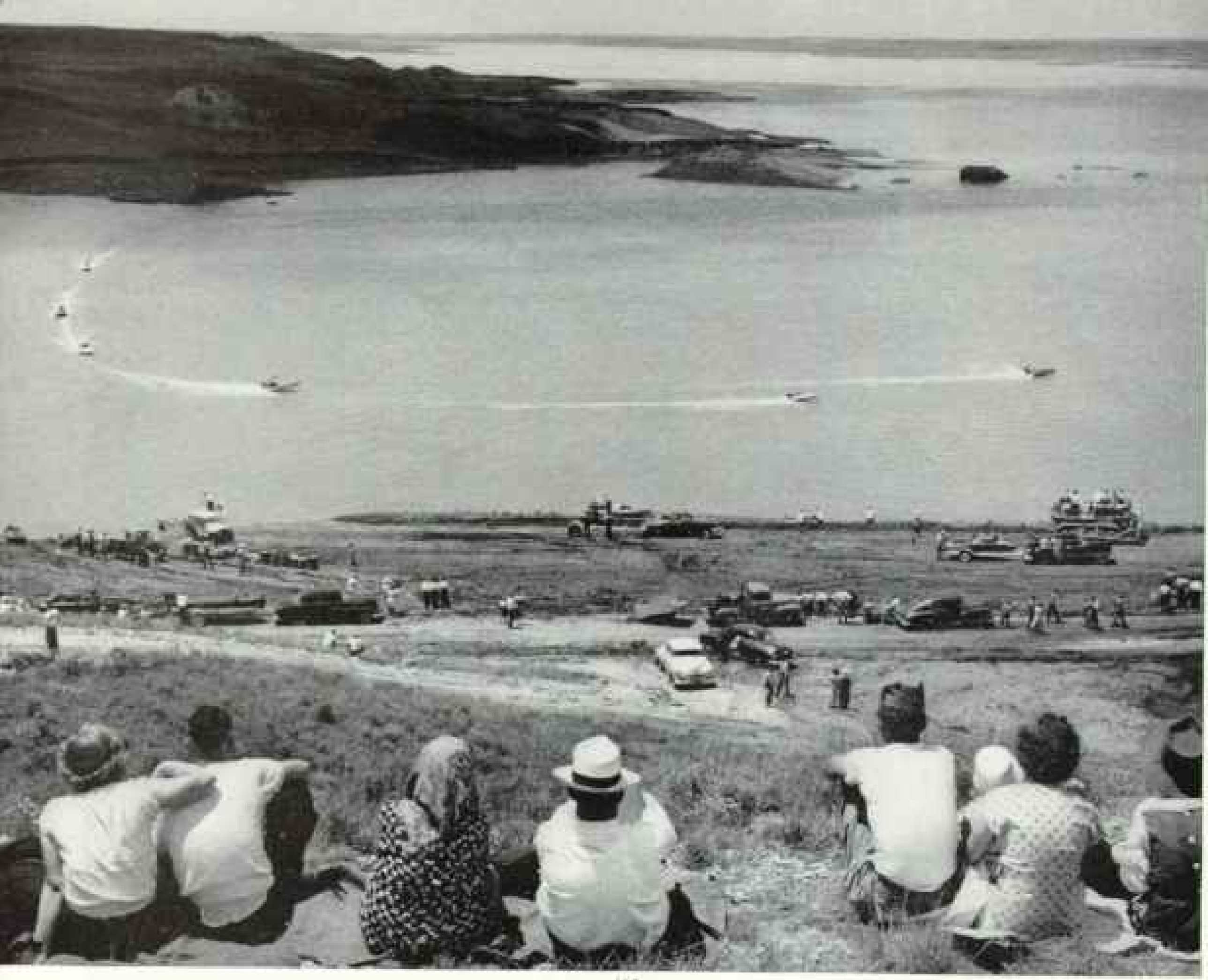
On his return to France, De Bourgmont took with him eight braves and the daughter of a Missouri chief. Received in Paris by royalty, they danced at the opera and the theater and certainly were the first redskins ever allowed to hunt in the Bois de Boulogne! To them the highly perfumed Parisians "smelled like alligators."

Before passage of the Kansas-Nebraska Act, by which Congress established the Territories of Kansas and Nebraska, few settlers stopped off in Kansas. The lure of California gold urged them farther westward. The Kaw was one of the gateways to western trails. The old Santa Fe Trail crossed the southern part of the Territory, and the southern branch of the Oregon Trail paralleled the Kaw before turning north to follow the Platte River (map, page 465).

Pack mules and horses transported freight to Santa Fe prior to 1824, when wagons came into general use. By 1859 overland freighting had become a tremendous business on the western trails. The wagons, made in Pittsburgh, had a capacity of a ton and a half. Eight or ten oxen or mules pulled them.

The Concord coaches, made in Concord, New Hampshire, cost $1,000 each. That was a large sum in those days, but the coaches had to be big and strong. A con-

* See "Mapping Our Changing Southwest," by Frederick Simpich, National Geographic Magazine, December, 1948.



Outboard Racers Scoot over a Lake Covering Plains Where the Buffalo Roamed

Cedar Bluff Reservoir gives western Kansas a lake twelve miles long and seven miles wide. With Kanopolis Reservoir, 130 miles downstream, it will irrigate 52,500 acres and help control floods (map, opposite). Lake and shores already provide fishing and hunting. These spectators watch festivities at the dedication of the huge earthen impounding dam in June, 1951. Spring's heavy rains, spreading disaster in Kansas cities, brought one blessing: they filled Cedar Bluff quickly.

temporary described them in the *Missouri Commonwealth*, published at Independence, July, 1850, as "got up in elegant style, and . . . each arranged to convey eight passengers.

"The bodies are beautifully painted and made watertight," the account continued, "with a view of using them as boats in ferrying streams. The team consists of six mules to each coach. The mail is guarded by eight men, armed as follows: Each man has at his side, fastened in the stage, one of Colt's revolving rifles, and in a holster below, one of Colt's long revolvers, and in his belt a small Colt's revolver, besides a hunting knife; so that these eight men are ready, in case of attack, to discharge one hundred and thirty-six shots without having to reload."

In 1865 the fare between Atchison and Denver was about $175 and excitement along the way was practically assured. Stations for changing animals and drivers were 10 to 25 miles apart. They consisted of one to three rooms of logs or turf. Sometimes a dugout was provided; from it the men could defend themselves in case of Indian attacks.

Eating places, 25 to 30 miles apart, were a little larger, with sheds and outbuildings. Meals were adequate but monotonous—bacon, eggs, hot biscuits, coffee, dried peaches and apples, with occasionally some beef, buffalo, elk, or antelope. Sometimes there were preserved fruits and vegetables.

Hardships Included Dried-apple Pies

Dried apples seem to have been the cooks' stand-by. They became anathema to at least one pioneer who expressed his sentiments in verse, a couplet of which runs:

> I loathe! Abhor! Detest! Despise!
> Abominate dried-apple pies!

Editor Horace Greeley made the trip to the West Coast in 1859. In Leavenworth, Kansas, he visited the headquarters of the big

465 Drawn by William T. Poole and Irvin R. Alleman

Hays Misses the Nation's Geographical Bull's-eye by Only 75 Miles

Closest town to the country's center is Lebanon (lower map). Stage and express routes passed through Hays or close by. The first train arrived in 1867. English and German settlers built Victoria and Herzog (page 479).

freighting company, Russell, Majors, and Waddell, of which he left this description:

"Such acres of wagons! such pyramids of extra axletrees! such herds of oxen! such regiments of drivers and other employees! No one who does not see can realize how vast a business this is, nor how immense are its outlays as well as its income. I presume this great firm has at this hour two millions of dollars invested in stock, mainly oxen, mules, and wagons. (They last year employed six thousand teamsters and worked 45,000 oxen.)"

The heads of the firm opposed swearing, which was, of course, considered one of the manly arts. Oath-making and whip-throwing were the bullwhackers' pride. A story is told of a bullwhacker entering Alexander Majors's office to ask for a job.

"Can you drive oxen?" asked Majors.

"Yep," replied the fellow, "I can drive oxen to hell and back."

"Well, well," replied the freighter, "I can't use you because our firm doesn't make that stop."

With the passage of the Kansas-Nebraska Act, Kaw lands were opened to settlement. There was a rush from both slave and free States to stake claims. Emigrant aid societies helped settle the new Territory. Feeling ran high in both North and South.

The *Democratic Platform*, of Liberty, Missouri, declared, "We are in favor of making Kansas a 'Slave State' if it should require half the citizens of Missouri, musket in hand, to emigrate there, and even sacrifice their lives in accomplishing so desirable an end."

At that time the entire white population of this highly prized Territory, extending from Missouri to the Rockies, consisted of a few hundred soldiers at the forts and about an equal number of civilians living at the Indian missions, stage stations, and trading posts.

With the inrush of settlers came the "Bleeding Kansas" days, when slave and free staters struggled to control the government. Violence broke out. The trouble centered in the more quickly populated eastern part of the Territory, around Lawrence. In the thick of the bloodshed was John Brown, later hanged in West Virginia for seizing the armory at Harpers Ferry.

Frontier life was at best a challenging adventure, but in Kansas it was extremely difficult. The border warfare, droughts, floods, prairie fires, blizzards, grasshoppers, dust storms, and the ever-present threat of Indian attack discouraged all but the hardiest.

Since there was little wood in the central and western parts of the State, log cabins were not common. Sod houses, dugouts, shake houses of shinglelike slabs, and hay tents were the settlers' early homes.

Corn was the staple crop and a main article of diet, served as hominy, corn-meal mush, corn bread, and in a variety of other ways. Sometimes it was dished up with a little syrup, made at home by pressing the juice from sorghum and boiling it down.

How Pioneers Concocted "Coffee"

Matches, salt, and coffee were rare. Ingenious pioneers devised a substitute for coffee, however, made of ground sun-dried sweet potatoes and okra, and wheat browned over a fire in the family skillet. Buffalo chips (droppings) were the regular fuel.

Pioneers mostly made their own cloth and thread. Needles were scarce, expensive, and carefully hoarded. Calico could be purchased for forty or fifty cents a yard.

Settlers banded together to open schools, or they were started by town subscription. The furnishings were most primitive; the first textbooks were whatever reading matter the parents happened to have.

New military posts had been established in the sixties for protection of the trails, and, later, of railroad workers and settlers. Old Fort Hays was one of these. It was founded in 1865 as Fort Fletcher, on the banks of Big Creek, 14 miles southeast of the present city.

At that time the fort was in the middle of a vast, uninhabited, grassy sea. Uninhabited by white people, that is. Indians roamed the plains following buffalo migrations.

The name of the fort was changed to Hays in 1866. After the camp was flooded out early in 1867, several soldiers losing their lives, it was moved to higher ground just south of the location chosen for Hays City a little later the same year.

As railroads pushed westward, towns were laid out, and one succeeded another as "the tough town at the end of the railroad." While Ellsworth held this dubious honor, the grading gangs were working toward Fort Hays. They were moving deeper into Indian country and the tribes' resentment swelled.

Decline and Fall of a Kansas Rome

William Rose and Buffalo Bill Cody founded the town of Rome northwest of Fort Hays, on Big Creek, in 1867. Within a month it had a population of five hundred, rapidly increasing to two thousand. Flimsy shacks and false fronts shot up overnight with the influx of hundreds of railroad workers (page 481).

A month later a railroad representative arrived and tried to buy out Cody. He refused; so the railroad located its own town, Hays City, a mile east of Rome. Relations between the two towns were somewhat less than cordial.

The Romans hoped that water couldn't be located on the Hays City site. The railroad, in its turn, had the grading raised several feet as it passed Rome so that the town was cut off from the fort. It was jokingly called the "walled city."

After many failures, and many jibes from the rival town, the railroad's engineers at last struck water. Hays was soon flourishing with a few tents and sod shanties, one grocery store, a clothing shop, three dance halls, and 22 saloons (page 476).

Within a short time those inhabitants of Rome who had not already moved to Hays were nearly wiped out by a cholera epidemic.

General Custer made Fort Hays his headquarters during several Indian campaigns. Mrs. Custer lived at the fort and wrote *Tenting on the Plains*, a fascinating account of her experiences and the life around her.

Indians were killing railroad workers and homesteaders, and attacking the stage stations. Several stage stations on the Smoky Hill route were wiped out and a few Ellis County people were scalped. The fort protected Hays from actual attack. However, the Indians were everywhere. There were plenty of scares, and the soldiers fought several battles.

Indian tribes occasionally attacked each other. One day, almost within sight of the fort, a fierce battle took place between Kaws and Cheyennes. The latter had killed a lone

Kodachrome by John E. Fletcher

Kansas Youngsters Learn ABC's Where Wild Bill Hickok Taught with Flying Lead

Here the author teaches a Jefferson School practice class directed by Fort Hays Kansas State College to train teachers. The college stands on grounds of old Fort Hays, which used to protect wagon trains and railway construction gangs against Indian raids. The city of Hays grew up near by as a rail center. In those days Marshal Hickok enforced the law with a six-shooter. Background presents the State's basic riches and sunflower symbol.

Reproduction by John E. Fiedler

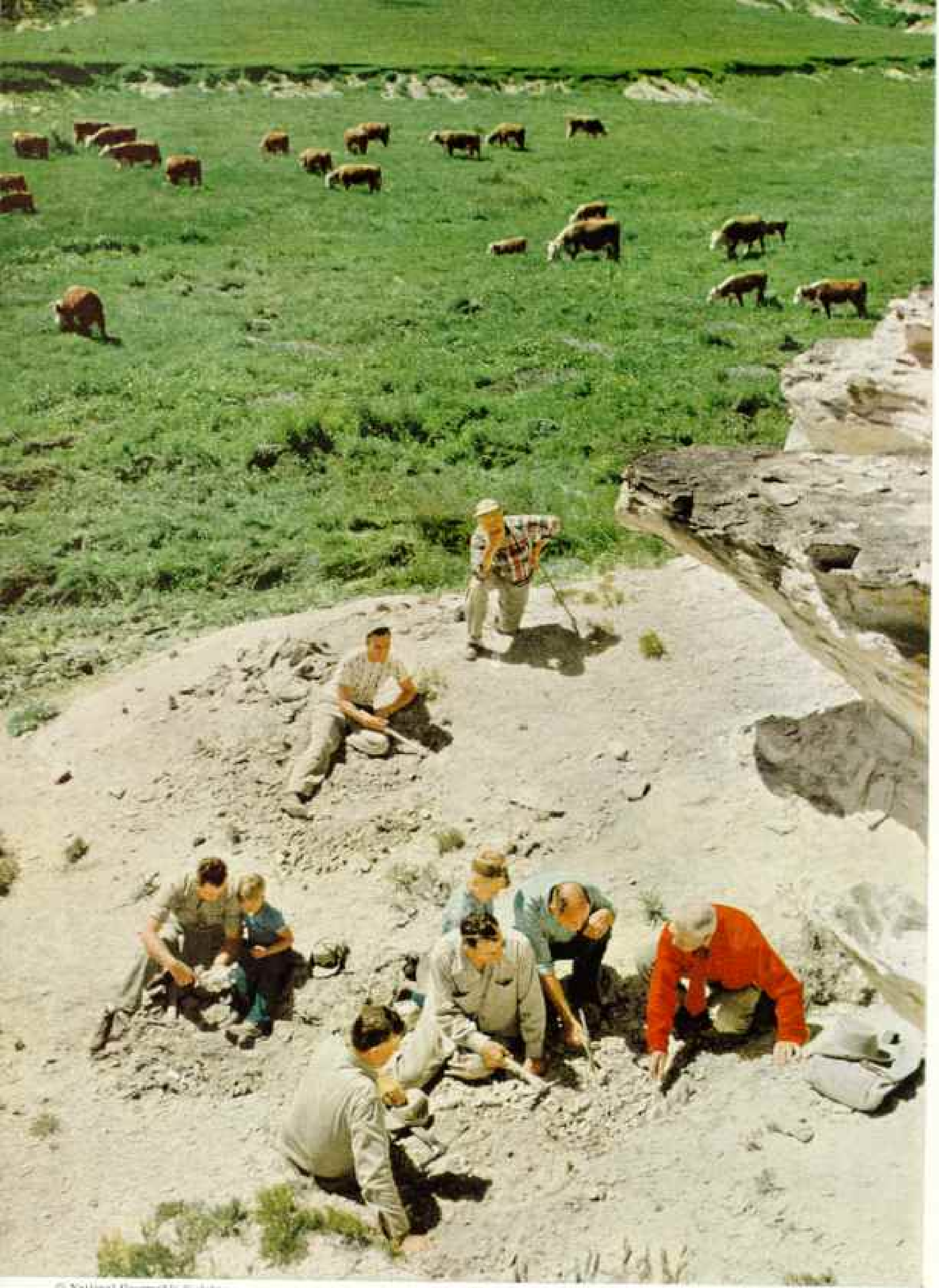
▲ Smoke and Flame Erupt from Oil Field Waste

Some 16 years ago Fred Bemis and his family were raising cattle on lands along the Saline River, about 15 miles north of Hays. Then an oil strike on the ranch brought unexpected fame and wealth to the Bemises. The Bemis-Shutts Pool is in Ellis County. Five adjoining counties, including Ellis, pour out the bulk of Kansas oil. A maze of derricks almost as thick as trees bristles across the rolling country.

As oil is pumped from wells, a nonmarketable material called basic sediment drains into pits. This waste is burned off when wind and other conditions are favorable. Flames leap 40 feet; heat scorches surrounding grass. Clouds of black smoke are visible 25 miles away.

◂ Students of Fort Hays Kansas State College admire French escutcheons which accompanied gifts brought by the *Merci* Train, France's thank-you to Americans for their 1942 Friendship Train. This car of the *Train de la Reconnaissance Française*, or Train of French Gratitude, came to Fort Hays as a campus exhibit.

Kodachrome by John E. Fletcher



Kodachrome by John E. Fletcher

Beef Cattle Graze Land Where Giant Reptiles Laid Down Their Bones in a Shallow Sea

College teachers near Quinter dig out the spine of an extinct mosasaur, a 30-foot snakelike monster that swam in a Kansas sea 100 million years ago. Paleontologist George F. Sternberg (right) supervises the recovery.

Russell Celebrates Its Beginnings by Reverting to Old-time Dress

Every ten years the Kansas town stages a festival which it calls a "Prairiesta." Wives put on sunbonnets; little girls wear long skirts. The hand-embroidered German costume in center is 150 years old. Ostrich plumes adorn the beaver hat at right.

Weeks of Beard Culture Bring Back the Razor-shy Days of Old

Russell men attending the Prairiesta must grow beards or pay $10 fines. Barbers get a rush of business when the celebration ends. Edward F. Arn, the clean-shaven Governor of Kansas, here makes a "before-and-after" contrast with his whiskery companions.

Kodachrome by John E. Fletcher

Thriving Russell Celebrates Ten Years of Growth. A Parade Down Main Street Opens Its Five-day Prairiesta

Seventy German pioneers from Wisconsin founded Russell eight decades ago; they built homes of mud and sod. In those days the Union Pacific and Kansas Pacific had just opened the Great Plains by pushing rails west. This miniature train, a loan from the Union Pacific, commemorates those stirring times.

Young Cowboys and Cowgirls, Riding Circling Boats and Wooden Horses, Say It's Carnival Time in Russell

Western Kansas has been a racial melting pot. Spanish and French explorers opened up its trails. Aristocratic British settlers in 1873 founded a cattle empire, but it failed. Riding in pink coats after jack rabbits and coyotes, they added a novel touch to the scene. Transplanted Germans from southern Russia migrated to Kansas 78 years ago and added great impetus to western grain growing. Their hard winter wheat, brought from Russia, outgrew and outproduced domestic strains (page 489).

Kodachromes by John E. Fletcher

Kodachrome by John E. Fletcher

Loving Hearts and Strong Backs Built Victoria's St. Fidelis Church

William Jennings Bryan called this Roman Catholic edifice the Cathedral of the Plains. To help create it, every parishioner was assessed $45 and six loads of stone. Each heavy stone was placed in position by hand.

Kaw, precipitating a four-hour fight. The Kaws took four scalps and several ponies in revenge. Soldiers at the fort remained aloof while Indian killed Indian.

Once a small party of buffalo hunters was surprised by a band of Cheyennes along the Saline River, north of Hays. Since the Indians asked for food and the hunters had little to give, red men and white returned together to the city.

Indians Came, Saw—and Ate

Townspeople came out to meet the strange cavalcade. Officers rode over from the fort for a council. Jim Hall, the postmaster, acted as interpreter, and all joined in smoking a peace pipe. The Indians' pipe had a three-foot stem decorated with a painted horsehair tassel and trimmed with brass.

After the usual speeches, in which the Indians protested in vain the white man's perfidy, the meeting adjourned for refreshment. The Indians had fierce appetites. The chief, White Wolf, consumed three hearty meals within a couple of hours.

The tribesmen then entertained the townspeople with pony races on the main street, and with all-too-convincing demonstrations of their skill with bow and arrow. The citizens of Hays breathed a sigh of relief when their guests finally galloped off.

Early Hays reflected the violence and restlessness of the frontier, always ripe for mischief. The soldiers had no USO's in those days, and Hays had its share of gamblers and questionable characters to prey upon the lonely men.

Besides railroad workers, there were hundreds of mulewhackers coming in with supply trains for the troops. Some of these trains had as many as 800 wagons, strung out for miles along the trail.

The Government built large warehouses to store the supplies, which arrived by rail when the track was at last completed to Hays. From Hays supplies and equipment were distributed south to Fort Dodge and Fort Larned by wagon until the Santa Fe Railroad went through to Dodge City. Often as many as 500 Government and Mexican teamsters crowded into Hays at one time.

The children delighted in the colorfully clad Mexican traders who came up the Fort Dodge trail. Their trains consisted of large, canvas-covered wagons, each pulled by eight or ten yoke of long-horned oxen and with two trailer wagons chained behind.

Equally exciting was the arrival and departure of the heavily guarded stagecoaches. They were so precisely scheduled that many citizens who had no other means relied on them to tell the time.

When Hays was founded, the stage route was shifted to serve the new city. A few of the old stage stations and the ruins of others may still be seen. In several places, never turned by the plow, tracks of the wagon wheels still are imprinted.

While Hays was at tracks' end, westbound trains arrived daily, except Sunday, at about noon. They pulled out for the East at 1 p.m. The cars rolled only by day for fear of Indian attacks. Ellsworth was the overnight stop. Winter blizzards frequently blocked trains at cuts filled with snow.

Matt Clarkson, buffalo hunter, reports in his memoirs that the people of Hays thought nothing of finding one or two dead men on the streets nearly every morning. They were buried in Boot Hill cemetery in the clothes they died in. Most of the bodies were just shoved into dry-goods boxes and thinly covered with earth.

In the summer of 1869 Wild Bill Hickok was hired as marshal of Hays City, succeeding three peace officers who had died prematurely—of "lead poisoning"—or been frightened away. By the end of the year he had struck courageously for law and order, having killed several offenders and driven out many undesirables.

Old-timers like to reminisce about Wild Bill's exploits. The story is told that once he exhibited his marksmanship by shooting at a wooden post. After ten shots, inspection of the target revealed only one hole in the post. Onlookers were a trifle skeptical until they dug out the hole and found ten bullets embedded in it.

Convictions Few in Frontier Courts

Under the best circumstances, a conscientious officer of the law was at a disadvantage. It was hard to get a conviction in court. Even when a man was brought to justice after a long cross-country chase at the risk of the sheriff's life, the court, more often than not, let the offender go free.

Mike Joyce, a lawyer in Hays, claimed to be the only judge in the western part of the State. He boasted there was no court higher than his. His laxity became notorious. Once a prisoner pleaded guilty to killing a man. Joyce shouted, "Shut your darned mouth. Case dismissed for lack of evidence."

The following is an entry in the Ellis County commissioners' proceedings in 1876: "The varments were so bad it wasn't healthy for a man to sleep in jail. For that reason the prisoner was dismissed."

Buffalo Bill Cody proved his right to his title by winning a buffalo-hunting contest sponsored by the Kansas Pacific Railroad.

At the age of 11 young Cody had been left

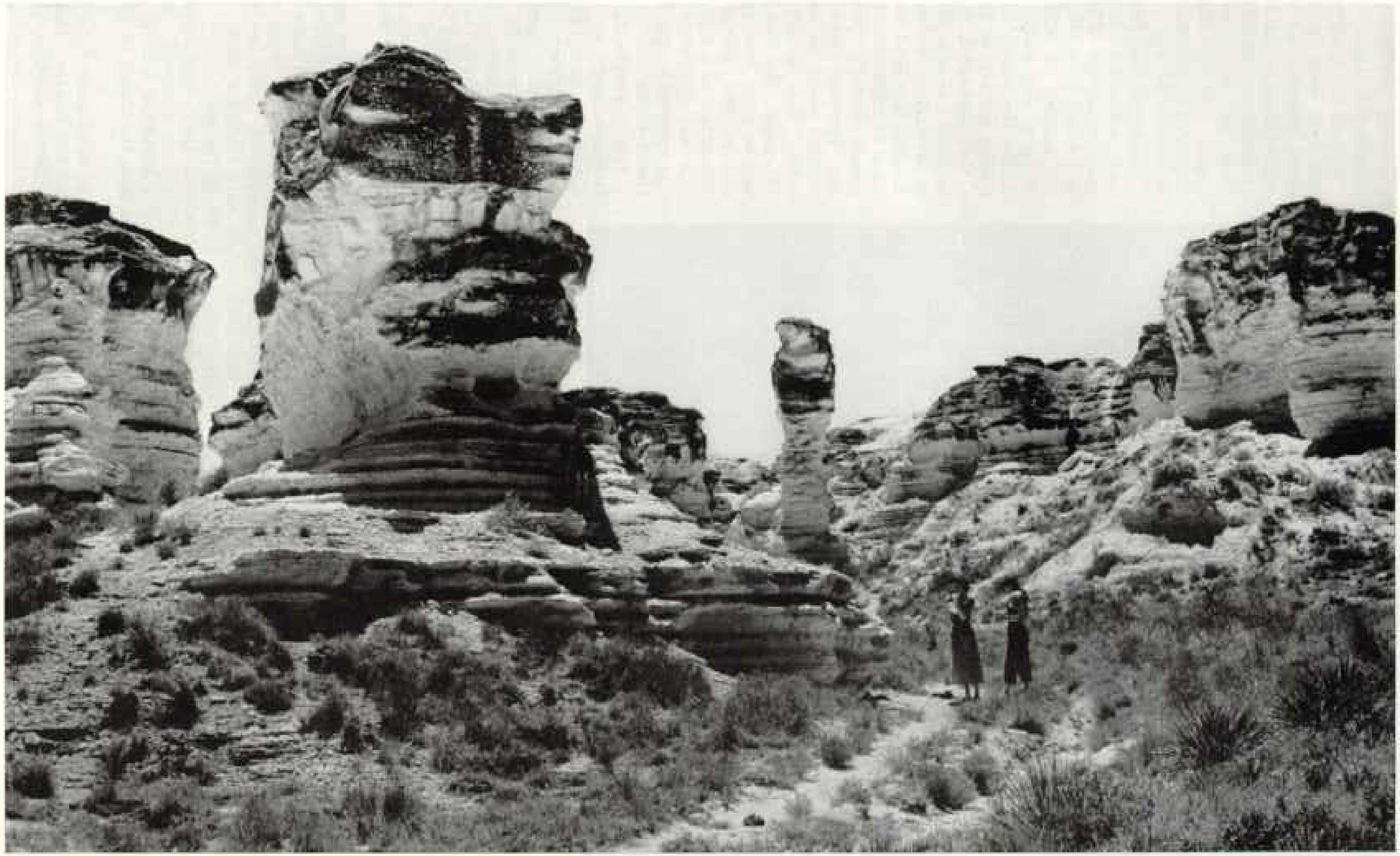
N. A. Voss

Downtown Hays About 1885 Looked Like the Jerry-built Setting of a Modern Western Film

False fronts adorned South Main and Fort Streets. Gem and its neighbors were saloons; the large building on the right remains in use. Old Fort Hays spreads beyond the trees. Top panel: Author, daughter, and friend stroll across a field at Victoria near the "Cathedral of the Plains" (pages 474 and 480).

A Limestone Cobra Stands Among the Weathered Battlements of Castle Rock. Its Spreading Hood Seems Poised to Strike

Layers of rock laid down by an ancient sea have been eroded into the towers, walls, and pinnacles here rising from level plains west of Hays. Lt. J. R. Fitch named the fossil-rich bluffs in 1865 while he was exploring the Smoky Hill River stage route (page 481).



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The Comic-book Set Gets Together at the Nation's Hub

Readers perch on the window ledge of a store in Lebanon, the town closest to the geographical center of the United States. The surveyed point, marked by a small monument, lies on a farm two miles northwest of town.

head of the family by the death of his father. At 14 he became a Pony Express rider. He made one of the swiftest long rides in history, 320 miles in 21 hours and 40 minutes (page 487).

In Hays young Cody was picked on by older men, until Wild Bill Hickok took a liking to the youngster. No one particularly cared to risk trouble with Wild Bill.

Buffalo Herds by the Square Mile

Buffalo Bill got a job providing meat for the railroad workers at the fabulous salary of $500 a month. He was to provide 12 carcasses a day for 1,200 workers. He kept the job for 18 months; during that time he killed 4,280 buffaloes. Taxidermists mounted many of the heads for display in railway offices across the country.

Early travelers by stagecoach and by train recorded their amazement at the tremendous herds of buffalo that roamed the plains.

"Of all the quadrupeds that have lived upon the earth, probably no other species has ever marshaled such innumerable hosts as those of the American bison," said the *Annual Report of the Smithsonian Institution* for 1887.

"It would have been as easy to count or to estimate the number of leaves in a forest as to calculate the number of buffaloes living at any given time during the history of the species previous to 1870."

Col. Richard I. Dodge recorded a 34-mile journey in 1871 across the heart of Kansas, in a light wagon, when 25 miles of the route passed directly through one immense herd. It covered about 50 square miles. Yet, in the next 18 years, the slaughter was so great that at the end of that period the appearance of a wild buffalo was worthy of special mention by the Associated Press.

It is no wonder that the Indians fought so tenaciously for their right to the buffalo range. They were dependent upon the animals for virtually their whole livelihood. Their food was largely buffalo meat. From the hides, sinews, and bones they made their shelter, their clothing, bedding, coffins and winding sheets, thread, bowstrings, snowshoes, and ornaments. Buffalo chips were their fuel.

Before it became famous as a "cow town," Dodge City, 85 miles southwest of Hays, was a center for collection of buffalo hides and bones for shipment east. The bones were used in carbon manufacture. Only the hump and hindquarters were taken for meat. The rest was left to rot in the sun.

Passengers practiced their marksmanship on the animals from train windows. Later travelers described a landscape littered with carcasses. Breezes bore the stench of decaying flesh.

There was plenty of other game to be had, but none so useful as the buffalo. General Custer wrote of elk, wolves, antelope, geese, and ducks. Others mentioned also wild tur-

keys, mountain lions, and coyotes, as well as prairie dogs and rattlesnakes.

Hunters cut out the buffaloes' tongues to keep track of the number killed. "Brick" Bond held the record with more than 6,000 in 60 days. In the last two months of 1874, he shot more than a hundred a day and employed five skinners.

How Indian Centaurs Raided Herds

Old bulls guarded the perimeter of the herds. In one method of hunting, the Indians would shoot a few merely to make an entry into the herd. Galloping through the opening, they picked off the young calves and two-year-olds.

Their ammunition exhausted, the Indian hunters would work their way out of the herd, leaving the carcasses for the squaws to skin and cut up. Experts at this, their women soon had the skins pegged to the ground to dry. Some of the meat was smoked and the rest pulled off in thin strips and dried. This "jerked" meat kept indefinitely. Every particle of the beast was saved for some purpose.

One account of an Indian hunt with bow and arrow says: "Cody's Wild West show could not begin to offer the wild excitement that prevailed for the next half-hour. It was simply glorious. . . . It was a wonderful sight to see the Indians stripped to the waist and riding like centaurs, guiding their horses by their knees and the bending of their bodies, allowing free action for the arms to use the bow. They would shoot their arrows with such force that, missing a bone, it would go entirely through the body." *

The *Railway Advance*, the first newspaper printed in Hays, contains an item in its maiden issue, November 9, 1867, mentioning buffalo meat as being a drug on the market. Wolf pelts were selling for $1.25 and $1.50, and coyote pelts for 75 cents. At the same time, the Big Creek Land Company was offering land around Hays at $1.50 to $2 an acre.

In 1872 a wealthy Scot named George Grant, traveling east over the newly completed railroad, conceived the idea of purchasing a large tract for British settlement. The railroads were eager to sell land to create business. They gladly sold Grant some 69,000 acres ten miles east of Hays for about 83 cents an acre. Thus he became the district's largest landowner.

Grant's idea was to give younger sons of good British families, usually expected to go into the military services or the ministry, a chance to establish themselves on their own land. The adventure appealed to many youths.

The new colony was named Victoria, after Britain's queen. About 80 persons came over the first year. The original group landed in New Orleans in the spring of 1873, bringing purebred sheep and the first Aberdeen-Angus cattle introduced to this country.

An architect made the long journey from London to lay out the town of Victoria. Streets were to be 100 feet wide and alleys 20 feet. Yellow limestone was plentiful and soon several fine homes were finished. Grant's own villa resembled an English manor house, complete with walnut staircase, music room, and study.

The British colonists and the garrison of Fort Hays engaged in mutual entertainment. The English had brought fine silver and china and lived in style. They organized a cricket club, a race track, weekly dances, and a hunt club. It was a somewhat startling sight, in that frontier land, to see the aristocratic newcomers galloping over the countryside in their pink coats.

Most of the young men, however, were not very serious about farming and cattle raising. Many of them received remittances from their families and soon came to be known in Hays as "remittance men."

Grant brought in more fine stock from Europe and Canada, and took many prizes. His ambition was to have the largest stock farm in the country. Trouble plagued the colonists, however—blizzards, a prairie fire, and a plague of grasshoppers.

The colony reached its peak of about 500 members between 1876 and 1878.

Germans from Russia Arrive

The railroad, meanwhile, had sold the land adjoining Grant's colony to immigrants from Russia. They were Germans who had gone to farm the Ukraine and Volga River lands at the invitation of Catherine the Great. There they were ground down as peasants and preyed upon by Kirghiz hordes that swept over the land, pillaging and killing.

When they reached Kansas, therefore, these immigrants were a suspicious people who kept to themselves and had difficulty adjusting to their new surroundings. They dressed and acted differently from other settlers.

Lacking any prepared residence, the Volga Germans, as they call themselves to this day, slept in the open until their houses were built. They had large families, and all were used to hard work. Their first dwellings were made of sod, laid like bricks. The men made crude furniture from scraps of wood; their stoves were of mud bricks baked in the sun.

The industriousness of the Volga Germans must have made the aging Grant realize the futility of his dreams for his sport-loving colony. About two years after the coming of

* *Prairie Trails & Cow Towns*, by Floyd Benjamin Streeter, Chapman & Grimes, Inc., Boston, 1936.

the Germans, he died. With his death the Victoria colony began to dwindle away. The drought of 1880 hastened the disintegration.

Some of the colonists moved their businesses to Hays or to other parts of the country. Others returned to England. Within a few years the Germans were left in control at Victoria. Here, at least, the meek inherited the earth.

A half-mile from the British settlement, the Volga Germans had established the little town of Herzog, part of present-day Victoria. Herzog was one of five German settlements in Ellis County. The original Volga German colony was joined by immigrants direct from Germany and by other Germans who had settled temporarily in Kentucky and Ohio.

When Victoria had outgrown three successive churches, the present "Cathedral of the Plains" was begun. When I first saw this impressive structure, I could hardly believe my eyes. It is a big building, 220 feet long and 73 wide, with twin towers visible for miles across the plains (page 476). I could not imagine how so small a town could build so large and beautiful a church.

Cathedral a Labor of Love

The Cathedral of the Plains, erected mostly by hand labor, took three years to build. Each parishioner over 12 was assessed $45, no small sum to those struggling people. The pastor, Father Jerome Mueller, also assessed each communicant six loads of stone, to be hauled in by the parishioner to the site.

The building, officially St. Fidelis Church, is beautifully decorated within. The stained-glass windows from Munich are among the finest in the country. Huge granite monoliths support the stone arches (page 474).

For all their hard work, the Volga Germans had a good time. They loved music and often could muster in one family enough musical instruments for a small band. They were frequently invited to play for the British, and always had a music festival on their own feast days. Weddings were especially gay.

The evening before a wedding was known as *Polterabend* (racket eve) and was as lively as the name implies. Early the following morning the bride went to the home of the groom, taking only what she wore. The groom and his mother had previously selected all her clothes, the groom providing the dowry! A man had, in a way, to buy his bride.

A tremendous feast at the home of the groom followed the wedding ceremony. A whole hog or quarter of beef often barely sufficed for the many guests. There was, of course, plenty of liquid refreshment in the form of a drink, made from rye, which was called *quast*.

After the feasting, the dancing began. Two violins and a dulcimer, or perhaps a zither, provided the music. It was each man's pleasure, or duty, to dance with the bride, and while doing so custom demanded that he pin a gift to her dress. Dancing and feasting went on for three days.

The Germans gave their word for wedding, *Hochzeit*, to the exaggerated, hopping waltz they danced and, by extension, to the festivities as a whole.

The Volga Germans of Victoria still cling to many of these old customs, but nowadays the celebrations last only one day.

Hard Wheat Proves a Godsend

Another group of German settlers from Russia, the Mennonites, brought with them a hard winter wheat, called Turkey Red. It was the first hard winter wheat grown in the State.

American farmers, sowing soft wheats in Kansas, were not having much success. Winter wheat soon led in production, since it was hardy enough to survive cold and drought.

Millers found the hard wheat more difficult to grind, but the few who tried it discovered, in compensation, that it gave much more flour to the bushel. Converts to the new grinding methods multiplied.

There still remained, however, a long struggle to sell the new flour to housewives. Other types of hard wheat were tried. Mark Carleton, of the United States Department of Agriculture, pioneered in discovering the hardiest strains. He visited Russia in 1898 and 1900 to find and bring back new varieties.*

Today the wheat is sown in the fall. Cattle are allowed to graze on it during the fall and winter, when it is a few inches tall. In the spring it blankets the countryside with green (page 489).

Then the wheat turns to gold, and in June the huge harvesting machines begin their work. Gradually they move northward, harvesting from one county to another. Around Hays, farmers usually expect to finish the wheat harvest by the Fourth of July.

For the rest of the summer, fields not planted to feed lie fallow to store moisture. Acres of yellow sweet clover and purple alfalfa lie between the green fields of milo and kaffir, carpeting the earth with glowing color.

Spring comes late to Kansas, or so it seemed to me after a cold, dry winter. I longed for the woodland wildflowers of the East. When spring did arrive, however, I found the roadsides a mass of bloom with many unfamiliar kinds of wildflowers (page 488).

* See "Mapping the Nation's Breadbasket," by Frederick Simpich, NATIONAL GEOGRAPHIC MAGAZINE, June, 1948.

Few People Know that Buffalo Bill, the Successful Hunter, Failed as a Town Founder

William F. Cody helped establish Rome, Kansas. Its population, rising to 2,000, shrunk when neighboring Hays boomed. A cholera epidemic hastened Rome's decline and fall (page 466). This sign is on U. S. Highway 40.

The handsome blooms of yuccas covered the hillsides. Cottonwood trees, filling the air with "snowflakes," soon had the landscape looking as if some great mop had been shaken over it. A Baltimore oriole family built its nest near our window, and meadow larks filled the countryside with song.

Finally the rains came, not in gentle spring showers, but in Niagara-like torrents. Hail pounded the gardens and tremendous winds flung the wet right into the house, through closed doors and windows. We had been praying for rain to settle the dust, but this was too much of a good thing.

New Dams to Check Floods

Two floods lashed Hays within a month. The thunder and lightning were terrific. Many other Kansas towns suffered also from the rapid rising of streams (page 484).

I thought of Mrs. Custer in her tent those many years ago. It had blown down about her ears one night in such a storm, and the night Big Creek flooded she and some soldiers had been marooned on a flood-made island for several hours.

Big Creek runs into the Smoky Hill River, which rises in eastern Colorado and flows eastward, meeting the Republican River at Junction City to form the Kaw (Kansas).

Twenty miles southwest of Hays, the Cedar Bluff Dam on the Smoky Hill is a part of the Missouri River Basin Project (page 464). This, with the Kanopolis Dam to the east, will provide a large irrigated area in central Kansas (page 485).*

The dam at Cedar Bluff is earth-filled. The foundation was sunk in the solid shale of the preglacial river bed, some 68 feet below the present bed. The dam rises 202 feet above its deepest foundation and stretches 12,560 feet in length. Its vast slopes are faced with rock.

The high bluff covered with cedars that names the dam was noted as a landmark by Lt. J. R. Fitch, who surveyed the Smoky Hill Trail in 1865.

In the Junction City *Union*, September 9, 1865, Fitch described another famous landmark, 50 miles west of Hays: "Camped two days to rest," he said. "The scenery here is

*See "Taming the Outlaw Missouri River," by Frederick Simpich, NATIONAL GEOGRAPHIC MAGAZINE, November, 1945.

really grand. One mile south is a lofty calcareous limestone bluff, having the appearance of an old English castle with pillars and avenues traversing it in every direction. We named it 'Castle Rock.'"

Castle Rock is still a grand sight, 87 years later (page 477). It rises from plains empty for miles around, except for a scattering of cattle. As we drove there over the dusty roads, flocks of horned larks flew up and away with a flash of white underfeathers. Pheasants scurried along the fences. Approaching the castle, we flushed a great bald eagle from our path.

Castle Rock itself, part of the Upper Cretaceous formation of central and western Kansas, presents endless interest to geologists. Many prehistoric records are written on its face. This country at one time was the bottom of a vast inland sea. Rich finds of fossil fish and other interesting creatures give promise of numerous further discoveries (page 470).

Last spring the geologists at Fort Hays Kansas State College dug out the fossilized head of a giant fish at Castle Rock. In Hays, the college has a fascinating museum housing George F. Sternberg's wonderful fossil collection, as well as many mementos of early Kansas days.

Hays a Frontier Town Grown Up

After Fort Hays was abandoned as a military post in 1889, its 7,600-acre site was ceded in 1900 to the State and divided between a park, a State normal school, and a State agricultural experiment station. Instruction began at Fort Hays Kansas State College in 1902. It is now a liberal arts college with an enrollment of about 1,100 (pages 467 and 469).

The buildings are all of native yellow limestone, which is soft when quarried but hardens on exposure (page 490). The campus is beautifully planted with trees, and its lily ponds lie cool and inviting. Sheridan Coliseum is one of the State's largest auditoriums.

The Fort Hays Agricultural Experiment Station works in cooperation with the United States Department of Agriculture, pursuing studies of soils, fertilizers, and irrigation, forage crops, crop diseases, and noxious weeds. The station also carries on cattle, horticultural, and feed researches. It produces and distributes large quantities of seed, trees, and shrubs adapted to this area.

Ellis County is a large oil producer. The pumps work in the fields side by side with windmills that lift water for grazing cattle. Oil was discovered in this district in 1928. Now there are wells in almost every direction.

To the north, in the Saline River breaks, well towers seem almost as thick as trees. Thousands of underground acres are being tapped. Great black pools of waste appear. When periodically burned off, they emit huge clouds of heavy black smoke, visible for miles (page 468).

Hays is a center for this local oil industry. Ellis County now has more than fifty producing pools.

From modest beginnings, Hays has grown to be the county seat, with a population of about 8,500. Of a number of small industries, the largest is a flour mill. The Hays station of the Central Kansas Power Company, using Kansas' abundant natural gas for fuel, serves many towns in the northwestern part of the State.

The town is proud of its fine churches and two well-equipped hospitals. People come to Hays for medical attention from all parts of northwest Kansas.

The German element of the population now seems predominant, although it is gradually being assimilated. These people have done well and are a credit to our country. They brought up large families in one- or two-room houses, worked tirelessly, and scraped to make ends meet.

The children walked miles to small country schools. Now *their* children and grandchildren own many of the leading businesses in Hays, as well as much wheat and oil land.

Of all the larger animals, the coyotes alone have held their own. A nuisance to farmers, coyotes carry a price on their heads. Hunters go out by car and plane during the winter and may kill forty or fifty a day in a single roundup.

Land of Space and Optimism

The people who live on these plains are of necessity hardy, long-suffering, and optimistic. Loving the wide expanses and far horizons, they have learned to take the long view of life.

The beauty of the prairie grows on all who live there. A native son, Floyd Benjamin Streeter, librarian at Fort Hays State, has described it most fittingly in his book on the Kansas River country, *The Kaw:*

"It is on the western plains that the most haunting beauty is found. These plains are a world of pastels where skies are not just blue but azure, where clouds are never white or gray but tinted masses, where thunder and lightning are not just thunder and lightning but majestic battles of the elements. In April, the plains are a jade world; in June, a pale-green world; in August, a seared world; in autumn, a rose world."

If Kansas is no longer a "home where the buffalo roam," it still is a land "where the skies are not cloudy all day."

Kodachrome by John E. Fletcher

Boy Scouts Collected Wastepaper to Pay for Hays's Statue of Liberty

This copy of the New York Harbor shrine stands in the Ellis County Courthouse square. In its way, it is a monument to the American boy who earns money collecting scrap iron, bones, rags, and paper.

Kodachrome by John E. Fletcher

"Too Much or Too Little" Is the Story of Water in Western Kansas. This Flash Flood Struck Hays in May, 1951

Hays was one of the first towns overwhelmed by the Kansas-Missouri disaster last spring. Rampaging Big Creek drove 4,000 residents from their homes. This rescue party paddles between abandoned cars. Opposite: Red Rock Canyon, once a refuge of horse thieves, is invaded by a reservoir's backwaters.

↑ Women and Soldiers Honor Hays War Dead on Memorial Day

On May 30, 1951, when many young Kansans were risking death on Korean battlefields, the Ladies Auxiliary to the Veterans of Foreign Wars placed a wreath on the monument to World War I casualties in the Hays cemetery.

In pioneer times, Hays buried victims of violence in Boot Hill. Long ago the growing town engulfed that cemetery.

← A 4-H Club member near Gorham raises chickens as her project. Her rooster will be fed milo, a grain sorghum widely used for feed.

→ A young Buffalo Bill perches atop a bullet-pitted slab preserved as having been used by William F. Cody as a target post. Once the stone stood in front of Cody's home in Rome, now a vanished prairie town; here it decorates a yard in Hays.

As the hired provisioner for a railroad gang, Cody—better known as Buffalo Bill—killed 4,280 buffalos in 18 months. A Pony Express rider in his youth, he once rode 320 miles in 21 hours, 40 minutes.

Kodachromes by John E. Fletcher

Kodachrome by John E. Fletcher

A Coachwhip Snake, Twined Among Wild Flowers, Takes Its Name from Tapering Tail and Braided Appearance of Scales

Six-foot coachwhips carry no venom but can inflict painful bites. The flower, *Scutellaria resinosa*, one of the skullcaps, grows in the Hays region.

Wheat Grows Green on a Prairie Once Black with Bison

These wheat men examine a controlled stand grown at the Fort Hays Agricultural Experiment Station. They attend the station's annual Wheat Growers' Field Day.

Millions of buffaloes, grazing shoulder to shoulder on these plains, amazed travelers less than a century ago. One herd covered 50 square miles. So great was the slaughter for food, hides, and robes that by 1890 the appearance of a single wild buffalo won special mention in the press.

In 1866 Gen. William T. Sherman looked over this area and wrote:

"These plains can never be cultivated . . . never be filled with inhabitants capable of self-government and self-defense . . . but at best can become a vast pasture field. . . ."

Kansas settlers, unmindful of Sherman's warning, plowed and plowed, until the State took the lead in wheat production. Flood damage dropped it to second place in 1951.

Kansas owes that preeminence largely to settlers who introduced Turkey Red wheat from Russia (page 475).

Kodachrome by John E. Fletcher

Kodachrome by John E. Fletcher

Picken Hall's Soft Yellow Glow Comes from Hays's Native Limestone

This colonnaded building was the first erected on the campus of Fort Hays Kansas State College. Last year's floods damaged foundations and equipment. Renovation improved the landmark.

The Fur Seal Herd Comes of Age

Every Year a Million Mighty Swimmers and Half a Million Young Bring Drama to the Lonely Pribilofs

By Victor B. Scheffer and Karl W. Kenyon

Biologists, Fish and Wildlife Service, U. S. Department of the Interior

FROM the crest of Hutchinson Hill, on St. Paul Island in the Pribilofs, we could see spread before us the largest breeding colony of fur seals in existence and, incidentally, the greatest assemblage of wild animals to be seen in such a limited area from any one point in the world.

Thousands of dark, moving bodies all but covered the semicircular mile of seal breeding beach bordering Northeast Point. They numbered at least 100,000, though the view encompassed only two of 21 named breeding grounds, or rookeries.

In the light of our population studies to date, we estimate that the Pribilof herd numbers about one and a half million seals. Its size now remains generally constant, and each year scientifically harvested furs yield the United States Government more than one-eighth the sum paid for all Alaska.

Saved by International Action

As we looked out over the vast swarm of seals and listened to the chorus of bellowing and bleating carried aloft on the fresh sea breeze, we found it difficult to believe that forty years ago their ancestors wavered at the brink of extermination.

In this magazine in 1911 the United States Deputy Commissioner of Fisheries announced the end of an old order and the beginning of a new.* No longer would the sealing schooners of the North Pacific nations be permitted to sail on their wasteful voyages of slaughter. No longer would men kill seals indiscriminately on the open sea, where many animals that they shot were never recovered.

The days of which Jack London wrote in *The Sea-Wolf* were ended. Large-scale pelagic sealing, which had reduced the seal herd from millions to fewer than 150,000, was a thing of the past. A new era in the wise use of a great natural resource had begun.

The immense gathering of seals we now beheld was a living monument to the foresight of the top-hatted envoys of Japan, Russia, Great Britain (representing Canada), and the United States, who, on July 7, 1911, gathered in Washington to sign the treaty that gave the remnant of the Pribilof seal herd a new lease on life. Perhaps to Rudyard Kipling's charming story *The White Seal*, in *The Jungle Book*, and to David Starr Jordan's *Matka* may be attributed a good share of the public sentiment that gave impetus to this decisive move.

At first glance, the animals spread before us appeared to be in wild confusion. Big 600-pound bulls rushed about, bellowing and fighting. Their smaller mates, weighing only 60 to 100 pounds, seemed to be moving aimlessly, and little black pups were crawling everywhere (page 500).

Bulls Hold Harems by Force

Yet, when we limited our field of observation to a small area, a fundamental pattern emerged. Each bull held sway over a small patch of ground. He allowed no other bull to trespass on his chosen territory, and any cow that crossed the boundary became part of his harem, his to have and to hold whether she liked it or not. Here she must remain, unless stolen by a neighboring bull, until her pup was born and until she was bred anew.

The fur seals of the North Pacific are known to science as *Callorhinus ursinus*, which, translated freely, means "bearlike with beautiful snout." They are distant relatives of the dog, cat, and bear, and close kin of the California sea lion, familiar to most of us as the trained seal of the circus.

Seals are warm-blooded, with lungs and milk glands. They breed in summer on the islands of Pribilof (United States); Medny and Bering, of Russia's Commander Islands (Komandorskie Ostrova), and Robben (Tuleni). Robben Island, in the Sea of Okhotsk and less than half a mile long, was controlled by Japan from 1905 to 1945, when Soviet Russia recovered it (map, page 496).

Seals from all the islands mingle to some extent during their winter travels at sea, but, through some sixth sense not yet understood by man, they sort themselves into clans and return to the islands of their birth for the summer breeding season.

Before the massive snowdrifts have melted along the basaltic beaches and hillsides in early June, the first fat and belligerent bulls appear on the Pribilof shores to proclaim themselves "beachmasters." Each establishes himself on a small station about twenty to forty feet in diameter (page 499).

By mid-June, when the cows begin to arrive, the breeding-ground pattern is well estab-

* See "Making the Fur Seal Abundant," by Hugh M. Smith, National Geographic Magazine, December, 1911.

Karl W. Kenyon

Sleek, Dripping Fur Seals Rest on a Rock and Sniff the Bering Breeze

Following a herd instinct ages old, the female returns in mid-June and July to the Pribilof Islands, her birthplace. While being wooed and bullied by her harem master, she bears a single pup, the offspring of her previous year's mate. These cows, returning from a fishing trip far out at sea, pause at water's edge to listen for their bleating pups. No mother ever makes a mistake singling out her cub among tens of thousands.

lished. Other bulls are driven savagely away. Some bulls succumb as a result of the bloody battles.

Human intruders also are forced to retreat before the bellowing charge of the bulls. Only the cows are welcome. In great waves of silvery brown they engulf the breeding beaches in late June and early July.

Each bull seal presides over from one to 100 cows, with an average of 50 to a harem. The beachmasters ignore completely the little black pups soon scattered over the ground around them.

Burly "Beachmaster" Touches No Food

From the time of his arrival until he quits his post through sheer exhaustion, the beachmaster touches neither food nor drink and gets precious little sleep. His long period of activity, coupled with fasting, is unique among mammals.

Various observers have wondered how long a bull seal may hold his post. However, it remained for our Aleut assistant, Lavrenty Stepetin, to keep an accurate record of a bull's vigil. One recent season Lavrenty visited a certain portion of Reef Rookery every day and found that two well-marked bulls remained on their chosen stations for 54 and 59 days, respectively!

Both animals were active during the entire period, fighting and rounding up cows that attempted to stray away. Needless to say, when they finally retired to the side lines, they showed, in deep wrinkles of loose skin and red-rimmed eyes, the effects of their long ordeal. During the period of breeding activity, bull seals may lose as much as 200 pounds of the fat stored beneath their hides during the preceding winter of feeding at sea (page 501).

For many years, in mid-July, the Government manager of the Pribilof Islands has conducted a census of the harem bulls. This he can do because the bulls are so large that they stand out clearly above their smaller mates and because they hold fast to their

Hands in Pockets, the Model Balloons a Lustrous Sealskin Coat

So supple is sealskin that an entire pelt can pass through a napkin ring. Six to ten skins go into the average garment, which costs from $1,500 to $2,500. This unusually full coat, displayed by Gunther Jaeckel, New York City, required 11 skins and was priced at $2,975, plus tax. Three months' labor is required to process each skin. Vegetable dyes brushed into the fur produce three standard hues—black, Safari brown, and Matara brown.

chosen stations for two or three months. The annual census gives us a good indication of the size and condition of the breeding portion of the herd.

During recent years the number of families, or harems, has fluctuated between 11,000 and 13,000. For each harem bull that we count at the height of the breeding season, we figure there are 40 newborn pups—roughly half a million, all told.

Like the bull, the cow is well adapted to her strange way of life. Since she must mate within a few days after giving birth to her pup, Nature has provided her womb with two branches alternating in function. Almost as soon as her little one is born, she is able to conceive next year's pup in the resting branch.

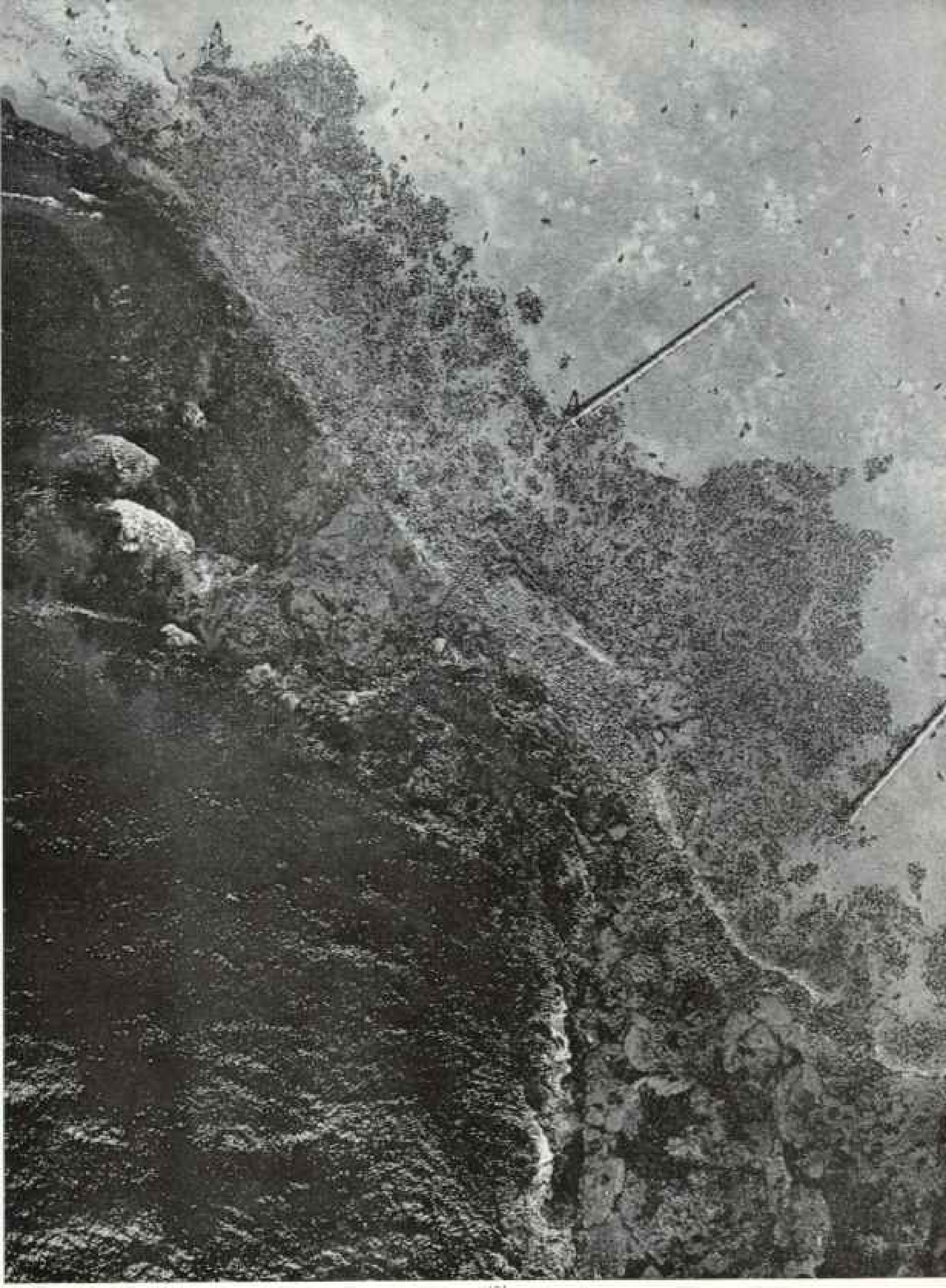
Most animals similar in size to the fur seal bear their young a few months after mating. In the fur seal, however, the fertilized egg undergoes a long dormant period, with the result that the pup is born a year from the time of conception. In 1947 we captured a female on the Pribilofs and sent her to the San Diego Zoological Gardens in California for study. She gave birth to a healthy pup 374 days from the time of her capture!

Our investigations have revealed that, contrary to an old belief, each adult cow does not bear a pup every year. We have sampled mature cows throughout the year and found that about 20 percent are not pregnant. The reason is yet to be explained. Our studies of seals, we find, are constantly bringing new and vexing problems to light.

A Seal Pup Born Every Five Seconds

A pup at birth is precocious. He weighs 10 to 12 pounds; his eyes are open; he has a warm coat of fur and is ready to scamper about. He immediately adapts himself to the damp, chilly climate of the Pribilofs.

One drizzly morning in July we watched a seal pup discover the bewildering world about him. At birth the little fellow found himself surrounded by swirling fog, dripping black



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An Airplane View Shows Seals Clustering in Knots Like Iron Filings Drawn by a Magnet

Each harem of bull, cows, and pups has its private territory, bounded by irregular lanes. Bare, trampled earth (right), is speckled with unmated bulls hoping to capture a harem. Dark seas roll against St. Paul Island from the left.

Victor B. Scheffer and Karl W. Kenyon

Piers Let Men Walk Among Savage Bulls

Using these two platforms, biologists count Polovina Rookery's harem bulls and note casualties.

boulders, and a host of restless, indifferent adults. He took his first unsteady steps to carry himself clear of the shallow puddle of muddy water in which he rested.

His mother, crouched near by, alternately bleated encouragement and snapped at a strange pup that came too close to suit her. She sniffed her own anxiously, and repeatedly raised her voice in a series of loud and excited bleats. Strangely, the voice of a seal is quite like that of a sheep.

The mother neither licked her pup's wet coat nor helped him along with her mouth as a mother dog or cat might do. When frightened, a cow will often grasp her newborn baby by the flipper and drag him out of harm's way. But this cow simply chose a comfortable spot and lay down on her side so that her pup could snuggle close and nurse from one of her four abdominal nipples (page 506).

At the height of the season, in mid-July, a pup is born on the Pribilofs every five seconds! Approximately one out of every 100,000 is an albino, like the one in Kipling's story *The White Seal*. An albino is handicapped in the strenuous battle for survival. Its eyes, lacking protective pigment, are weak and watery, and its conspicuous coat makes the white seal an easy prey to enemies at sea. Few survive to adulthood.

Pups at First Fear the Water

A seal, like other mammals, is entirely dependent on its mother's milk during early life. Unlike most mammals, however, the seal pup feeds irregularly during the three-month nursing period. This pup's mother probably stayed with him a week, then left for a foraging expedition at sea of perhaps a week's duration. In the old days, pelagic sealers often killed cows with milk a hundred miles or more from the breeding island.

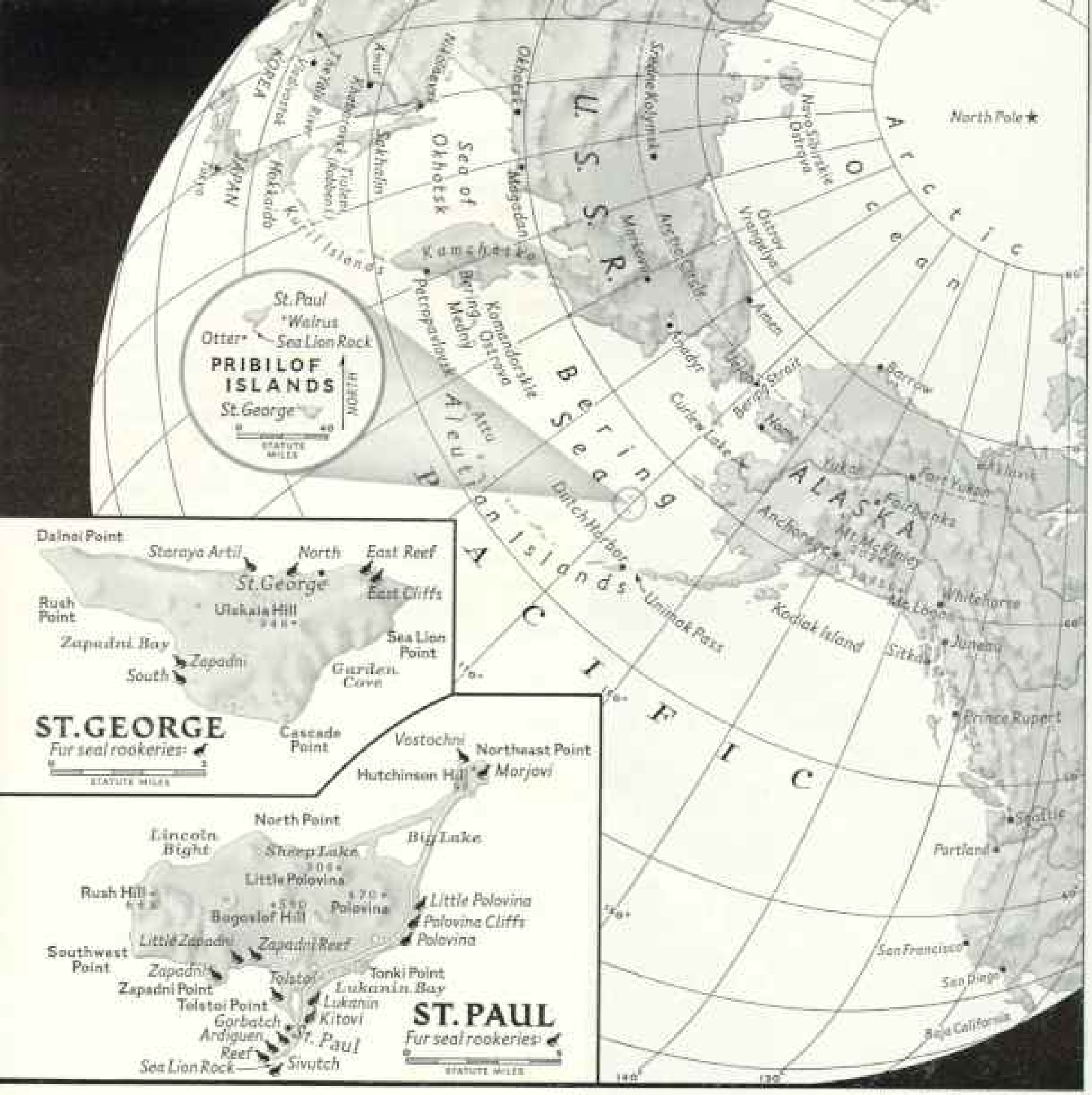
When his mother returns, the pup makes up for lost time. To quench his insatiable appetite, he drinks about five times as much as a human infant of the same body weight. Toward late summer the pup's stomach may contain as much as a gallon of rich, creamy milk after a feeding.

A pup in this condition looks more like a little black balloon than a seal, and he finds difficulty in moving about on the rocky beaches. He soon drops into a deep sleep, almost a stupor, and remains so for several days after his mother has gone back to the sea.

Altogether, the pups of the Pribilof Islands put on about 4,000 tons of weight during the summer, all gained on mothers' milk!

Pups do not venture to swim until they are about a month old and at first are quite fearful of the water.

One little fellow demonstrated this as we walked along a breeding beach near the water's edge. Most pups near by saw us approach-



Drawn for Irvin R. Alleman

Treeless, Rain-swept, and Wind-lashed Are the Pribilofs, Five Dots in the Bering Sea

Alaska fur seals select the sailors' "Mist Islands" as their breeding ground because summer's blinding fogs usually shield them from sunshine, which they do not enjoy (page 506). Gerassim Pribilof, a Russian navigator, explored the isles in 1786; the United States acquired them in 1867. As if 4,400 miles above the Pribilofs, the map maker shows where they lie in relation to America, the Arctic, and troubled Asia.

ing and scrambled away among the boulders. Then one that had failed to awaken during the confusion suddenly raised his head to find himself hemmed in by humans on one side and the cold Bering Sea on the other.

Bleating loudly in a frenzy of fright, he scampered along the shore, tumbling head-over-flippers as he hastened among the rocks, trying simultaneously to escape from us and to remain clear of the water.

His reaction led us to try an experiment to see whether or not a newborn pup *could* swim. We "kidnapped" one from his mother and placed him in a tank of sea water. The little fellow stayed afloat for about 20 minutes, paddling frantically, but plainly would have become exhausted had we not returned him to his anxious mother.

When a male pup is nearly a month old, he begins to utilize his leisure time in playing beachmaster. He spars with his fellows, growling in a most ferocious manner. He also practices the art of swimming. Contrary to popular belief, a mother fur seal does *not* teach her young to swim.

It is an entertaining sight to sit quietly near the shore in early August when the pups first venture into the water. The initial plunge is usually short. The pup wades out until it suddenly finds itself beyond its depth, then

A Light and Roomy Aleut Boat Ferries Passengers from the Harborless Pribilofs

The Aleut is free to leave the islands at any time; he works for the Government as he chooses. He receives a monthly wage and a bonus for sealskins harvested. A citizen, he votes in Territorial elections and pays his taxes. Aleuts used to make their seagoing bidarka from stretched skins; this boat has canvas sides. It carries Government agents, fur men, and natives out to a supply vessel which calls five times a year.

turns in alarm, with eyes rolling, and dog-paddles back to terra firma.

As the days pass, the pup's courage increases, and by August 15 the water along the breeding beaches is dotted with hundreds of little black heads bobbing about. When fall approaches, the young are as much at home in the water as on land.

A pup apparently does not begin to forage at sea for itself until the grim realization strikes that its mother will never return. The mother loses interest in her pup in the late fall when instinct bids her move southward. The pup is left to fend for itself as best it can in the rough northern sea. Mortality is high among seals during their first year of life, mainly, we think, because they are weaned so abruptly at a harsh, stormy season.

For wild animals, fur seals are relatively free of disease. They live in a clean, cold environment and have little contact with other mammals which might infect them. Before the pups leave the islands in the fall, however, tragedy strikes many of them. A vicious little hookworm parasite, *Uncinaria lucasi*, may kill as many as a fifth of their number.

In August the pathetic bodies of baby seals litter the breeding grounds. In 1950 we counted 54,000 dead pups on St. Paul Island alone; practically all were victims of hookworm, as nearly as we could determine.

The question is, of course, what can be done to hold such losses to a minimum? The problem is still unsolved. Dr. O. Wilford Olsen, a Government parasitologist, recently returned from the Pribilofs with notes and specimens from a three-month study of the life history of the hookworm. We are looking forward to his recommendations for controlling the ravages of the disease.

Killer Whales and Sharks Kill Many

What enemies do the seals face during their long migration at sea? Killer whales and sharks, at least. Near the Pribilofs, at rare times in late summer, observers have seen killer whales devouring pups swimming near the beach.

Undoubtedly sharks, too, account for a few seals each year. We once saw a seal near Tolstoi Point with both of his hind flippers bitten off near the base. Occasionally we see

seals with flippers scarred or missing as if shorn away by some strong-jawed creature of the deep.

When icy fall gales lash the Pribilofs, the fur seals begin to vanish. Where do their winter travels carry them? We are still trying to answer this question completely.

During the late falls of 1947 and 1948 we cruised in Bering Sea and North Pacific waters aboard the research vessel *Black Douglas* and spent many hours searching the sea from the pilothouse. We have concluded that seals begin to leave their summer breeding grounds during October and continue to depart in ever-increasing numbers until late November. The old bulls remain for the most part in Alaskan waters, but young males and females fan out over a much wider area, a few even striking as far south as the Mexican border.

Following the Fur Seals South

As we rolled and pitched through Unimak Pass in the Aleutian chain one stormy day in late November, we saw many seals headed southward. Often they leaped clear of the water, "porpoising" in the lingo of the seafaring man. They were traveling singly or in small scattered groups of two to four.

We have never been able to confirm the popular belief that fur seals travel at sea in large herds, or "rafts." Since they are extremely gregarious on land, it seems strange that they lead an almost solitary existence during the winter.

Through a fortnight of incessant rough December weather, we traveled from Dutch Harbor to San Francisco's Golden Gate. Every day, even when we were a thousand miles from land, we saw a few seals.

When we reached warmer waters about 50 miles off central California, the number of seals increased sharply. All along the continental shelf of our Pacific coast we found them, as did the pelagic sealers of the last century, working out of San Francisco in sailing vessels. Seals are most abundant 20 to 50 miles offshore, singly or in groups of up to five or six.

During a trip along the western Aleutian chain as far as Attu we saw few seals, but the Japanese have long reported to us that some Alaska-born seals travel to the western Pacific.

Several of our Pribilof tagged seals have been recovered in Oriental waters, although the evidence indicates that the bulk of the Alaska herd winters off the shores of the United States and Canada.

Whether the seals go southeast or southwest during their 5,000-mile winter migration, the fact remains that they are, next to man, the most widely traveled of all mammals breeding on land.

The claim of the Japanese that fur seals were damaging their local fisheries led them, on October 23, 1941, to abrogate the treaty of 1911 and to resume hunting seals on the high seas.

Following the dissolution of the treaty, the United States, in 1942, completed a provisional arrangement with Canada under which we now deliver to her one-fifth of the annual Government harvest of Pribilof sealskins. In return, Canada forbids her nationals to hunt seals on the high seas, thus allowing them to feed unmolested along her extensive British Columbia shore.

The food of the fur-seal herd is, naturally, a subject of concern to commercial fishermen of the North Pacific. Although scientists have examined 1,300 seal stomachs, they still would like more data on the year-round feeding habits of seals.

"Why not examine the stomachs of all the animals killed on the Pribilof Islands?" you may ask. The seals are most uncooperative here, for not one of them comes ashore with food in its stomach. They digest it at sea.

Last spring one of us traveled to Sitka, Alaska, and accompanied the Tlingit Indians on a sealing expedition. Under the provisions of the current treaty, the natives take a small number of seals each year as the animals pass Sitka on their northward spring migration. On this occasion they took 41. Forty of these seals had fed entirely on herring and one on squid.

Our colleague, Ford Wilke, recently returned from Japan where he examined the stomachs of seals which he and Japanese fishermen collected. He found that the stomachs contained squid and lantern fish, with small amounts of pollack. The lantern fish is a small, sardinelike fish with luminescent spots.

The data available to us from the examination of 1,300 seal stomachs indicate that fur seals feed on squid, herring, lantern fish, pollack, smelt, salmon, and rockfish, in that order of frequency. Thus it appears that the bulk of the fur seals' diet consists of marine life having slight commercial value.

Seals Dive 200 Feet for Prey

During the early 1940's, when certain vitamins were worth their weight in gold, fishermen were receiving as much as $10 a pound for soup-fin shark liver, a substance rich in vitamin A. From shark nets set on the coasts of Oregon we recovered the drowned bodies of two fur seals. Both had become entangled more than 200 feet below the surface, giving us for the first time an idea of the depth to which seals will dive for food.

Fur seals appear to feed mainly at night.

Kodachrome from Funke Fur Company by Harry W. Max

A Belligerent 600-pound Fur Seal Awaits His Harem in the Pribilofs

The Pribilof Islands, five tiny bits of land some 300 miles from the Alaskan mainland, accommodate about a million and a half fur seals during the breeding season.

Blubber-fat bulls swim ashore in May and early June and stake out private territories bounded by invisible walls. No rival crosses these "keep-off" lines without inviting savage battle, perhaps to the death.

Waves of cows stream from the surf in late June and early July. Burly males, promenading the shore, coax the newcomers to their harems. Any coy female is bitten, mauled, and dragged until she submits to a lover six times her size.

Beachmasters, the breeding males, maintain a day-and-night vigil over as many as 100 wives. For almost two months they neither eat nor drink, but live on stored-up fat. Seldom do they sleep. If they do, an envious neighbor may snatch a cow by the scruff of the neck and drag her off.

➔ An Aleut boy cradles a sick seal pup.

 Kodachrome by Karl W. Kenyon

↑ Bulls, Cows, and Pups, Roaring Like a Cataract, Cram St. George Island's Rock-strewn Rookery

↓ Territorial lines forgotten, seals of all ages wander across harem grounds as the breeding season ends in August. One rib-lean, battle-weary bull, 200 pounds of fat exhausted, rests on the rock in center. Pups, overcoming a natural fear of water, frolic in the surf.

A Sealing Gang Sorts Bachelor Bulls near St. Paul Village, an Aleut Settlement

Protection, with scientific harvesting of surplus males, has brought the herd back from the brink of extinction. These three-year-olds are driven easily but bite if given a chance. Only those with the best fur are taken.

303 Kodachrome U. S. Fish and Wildlife Service by Victor B. Scheffer

Survivors Strangely Show No Fright as Comrades Go to Their Last Roundup

Harvests yield some 63,000 skins a year. Four-fifths of the pelts go to the United States; Canada takes the rest by treaty right. The Pribilof herd has repaid Alaska's purchase price nearly twice over.

Government Biologists, Studying Rate of Growth and Migration Habits, Tag 2,000 Pups a Day on St. Paul Island

Frisky pups, rounded up into a pod, wait their turn at the tagging tables; a few cluster against the corral fence. At birth pups are coal-black and weigh 8 to 12 pounds.

Biologist Bill Sholes fastens a metal tag to a pup's leathery fore flipper. Aleut helpers hold the writhing youngster lest it nip hands and clothes. Though the seal appears meek and helpless, sharp teeth can inflict a painful wound, as many a careless sealer has learned. Right: A soft-eyed, lonesome pup, numbered and released, returns to the fence for company rather than wander home alone. He may carry his tag as far south as southern California.

Kodachromes by Karl W. Kenyon

Kodachrome by Karl W. Kenyon
Kodachrome U. S. Fish and Wildlife Service by Victor B. Scheffer

Hind Flipper Aloft, an Overheated Cow Fans Herself While Nursing Her Pup

Lower: Stupefied by almost a gallon of milk apiece, two-week-old pups sleep in a huddle. They gorge enough at one meal to last for days while mothers fish at sea. If orphaned, they will starve; no cow ever adopts a pup.

Dr. G. Dallas Hanna, of the California Academy of Sciences, wrote us recently that while he was collecting fish under a brilliant electric light off California a fur seal made a nuisance of itself by "hijacking" small lantern fish as he attempted to catch them in a hand dip net.

At sea during the day we usually see seals loafing or sleeping, and we find that animals collected in the morning tend to have more in their stomachs than those taken in the afternoon.

Further evidence of the night feeding of the fur seal was given us by a sailor who was fishing from the deck of a boat at anchor off the Pribilofs. It was midnight, moonless and foggy. Fishing was poor. The hook was at the bottom, 50 feet below. Suddenly the sailor felt a tug at his line. When he pulled it in, a flashlight revealed a young fur seal on the hook.

Not eager to risk an encounter with the teeth of the highly indignant beast, the seaman was relieved when the hook tore loose and the seal departed in haste.

Too Many to Count Exactly

The size of the population of Pribilof fur seals is a matter of interest to many groups. To the Aleut residents and to the men and women of the American fur trade, seals are a source of livelihood. Commercial fishermen, on the other hand, look upon seals as competitors for fish.

In 1940 we were assigned the task of taking a census of the seal herd. Fortunately, the entire herd assembles at definite places on the Pribilof beaches at a definite season of the year. Seldom does a seal go ashore elsewhere unless it happens to be injured.

We soon found, however, that there were drawbacks to our job. The females and young males are constantly moving back and forth between the sea and the beach. Only the harem bulls and pups remain on land for long. Thus, only a portion of the herd is available for counting at any given time. The harem bulls are readily counted; the harem cows are not.

Since each cow bears only one pup, we can find the size of the actively breeding cow population if we count the pups in late July while they are still on land. The number of pups is so large, however, running into the hundreds of thousands, that since 1922 it has not been considered feasible to make an actual count.

With these ideas in mind, we brought a twin-engined Beechcraft equipped with an aerial camera to St. Paul Island in 1948 and photographed all breeding areas. On many of these pictures seals and rocks appeared to blend, making a count of individual animals impossible. Yet the masses of animals and the outlines of the rookeries showed up well (pages 494-5). We achieved useful results by measuring the occupied breeding areas and by integrating these with sample, or "yardstick," counts made on the ground.

We are still not completely satisfied with the results and are working on a method of counting pups directly. We are also studying the return of tagged seals as a clue to the numbers in each age class.

From 1911 to the late 1930's the herd was growing steadily, and a method of computation was established which we believe satisfactorily represented the population from year to year.

This system became obsolete when the population reached its natural ceiling: that is, when the herd matured, or came of age. There are just too many seals to count. As a result, for a little more than a decade the number of seals in our herd has been imperfectly known. By a combination of methods we have arrived at our present tentative estimate of 1,500,000.

The herd has ceased to grow and is in balance with the natural factors of life and death which limit its further expansion. Two of the most important factors are, we suspect, the limited summer food supply within swimming range of the nursing mothers, and the increased disease rate on the breeding grounds, a result of overcrowding.

But in spite of their great numbers, the Alaska fur seals are not the world's most abundant seals. According to Dr. G. C. L. Bertram, Director of the Scott Polar Research Institute, the crabeater and Weddell seals, fringing the entire Antarctic Continent, compose larger groups running into millions. The crabeaters and Weddells are hair seals, unimportant commercially at present.*

Pups Bite the Hand That Tags Them

Shortly before the tempestuous Bering winds strike the Pribilofs in the fall we conduct our annual pup-marking operations. To date, we have branded or tagged more than 75,000 pups.

The job is a rugged one, since pups at this season have learned to use their sharp little teeth, and they weigh from 20 to 30 pounds. After two strenuous weeks spent in placing metal tags on the flippers of 20,000 angry little beasts, we emerge from the fray with torn clothing, bitten hands, stiff backs, and a lost love for seals (pages 504 and 505).

The permanently marked animals which are recovered year after year provide valuable information. For example, by finding the

* See "The Conquest of Antarctica by Air," by Richard E. Byrd, NATIONAL GEOGRAPHIC MAGAZINE, August, 1930.

percentage of tagged to untagged animals in the current harvest, we are able to approximate the number of pups that were born during a certain past season of tagging.

Recovery of a series of known-age animals gives data on growth and maturation. Several seals which were hot-iron branded as pups in 1902 were seen on the Pribilofs in 1923, thus giving us a valuable bit of information on the longevity of fur seals. The oldest seal now living is probably around 25 years of age.

Metal tags may identify a Pribilof animal when it is recovered on a distant shore, thus adding to our knowledge of seal migration. During the stormy winter of 1949-1950, the bodies of 30 pups bearing tags were washed ashore on the coasts of Washington and Oregon. Knowing what proportion we marked, we deduce that there were 700 to 800 untagged as well as tagged seals washed up along these beaches, to say nothing of those lost far at sea and never found.

For many years our progress in biological research was hindered by our inability to determine the age of a seal unless we had tagged it as a pup. Recently, through studies of known-age specimens, we discovered that a seal's teeth furnish a valuable clue to its age.

During the winter, while a seal is at sea, it eats more than during the summer breeding season. A record of the winter season of plenty is left as a ridge on the root of each tooth, while the summer season of fasting forms a depression.

A Norwegian biologist, Dr. Johan T. Ruud, has found a similar record of age on the baleen plates of Antarctic whales. Whales, like seals, feed in different pastures at different seasons.

Humane Harvest of Seals Each Summer

To many of us, "fur seal" means a soft, rippled coat of brown or black, the Government Alaska sealskin of commerce (page 493). The annual harvest of sealskins begins on the Pribilofs as soon as the three-year-old males appear in mid-June and ends by the last of July.

At 2 o'clock of a typical mid-July morning the alarm bell jolted us into reluctant activity. We pulled on our woolen clothes and topped them off with oilskins and rubber boots. The temperature is normally around 40° F., and a wind-blown drizzle often makes it seem even colder.

When we stepped outside, the breeze that hit our faces completed the process begun by the alarm clock. We met several Aleut sealers, warmly clad like ourselves, and joined them on their way through the murky midsummer twilight to the bunkhouse for breakfast.

After hot coffee and pancakes we stopped for a short chat with Victor Misikin, the village foreman, as he supervised the loading of men, clubs, and knives into big red trucks.

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"Good sealing weather," he remarked with a friendly grin.

If it is raining hard, few seals stay on land; and if it is clear and dry, the sealing roundup must be made very slowly to avoid overheating the fat and thickly pelted animals. A light breeze with heavy fog is ideal.

By 3 a.m. the equipment was loaded, and the 50-man crew was aboard the trucks. Off they rumbled into the mist and over the red scoria road that leads to Polovina Rookery, six miles from St. Paul village. Charles H. Anderson, the Government's resident manager on St. Paul Island, and foreman Victor led the procession. We brought up the rear in our "Biology Hot Rod."

All the breeding grounds, or rookeries, bear old Russian names; for example, Zapadni, Morjovi, and Staraya Artil. They cover about a fifth of the shore line and have remained

virtually unchanged since their discovery by Gerassim Pribilof in 1786 and 1787.

There are 15 breeding grounds on St. Paul and six on St. George, each with its near-by hauling ground where the young male seals, too young to breed, gather in masses. These have the best fur.

Drive of Young Males Begins

From the hauling grounds, selected animals are driven for the yearly harvest. Since some of these grounds are large and others are small, they are grouped for convenience, so that a round is completed every five days. Polovina is a rather large rookery. It furnishes enough skins for one day's work.

About a quarter of a mile from Polovina the procession stopped.

"The wind is from the east, so I think we better make the pickup from the west end."

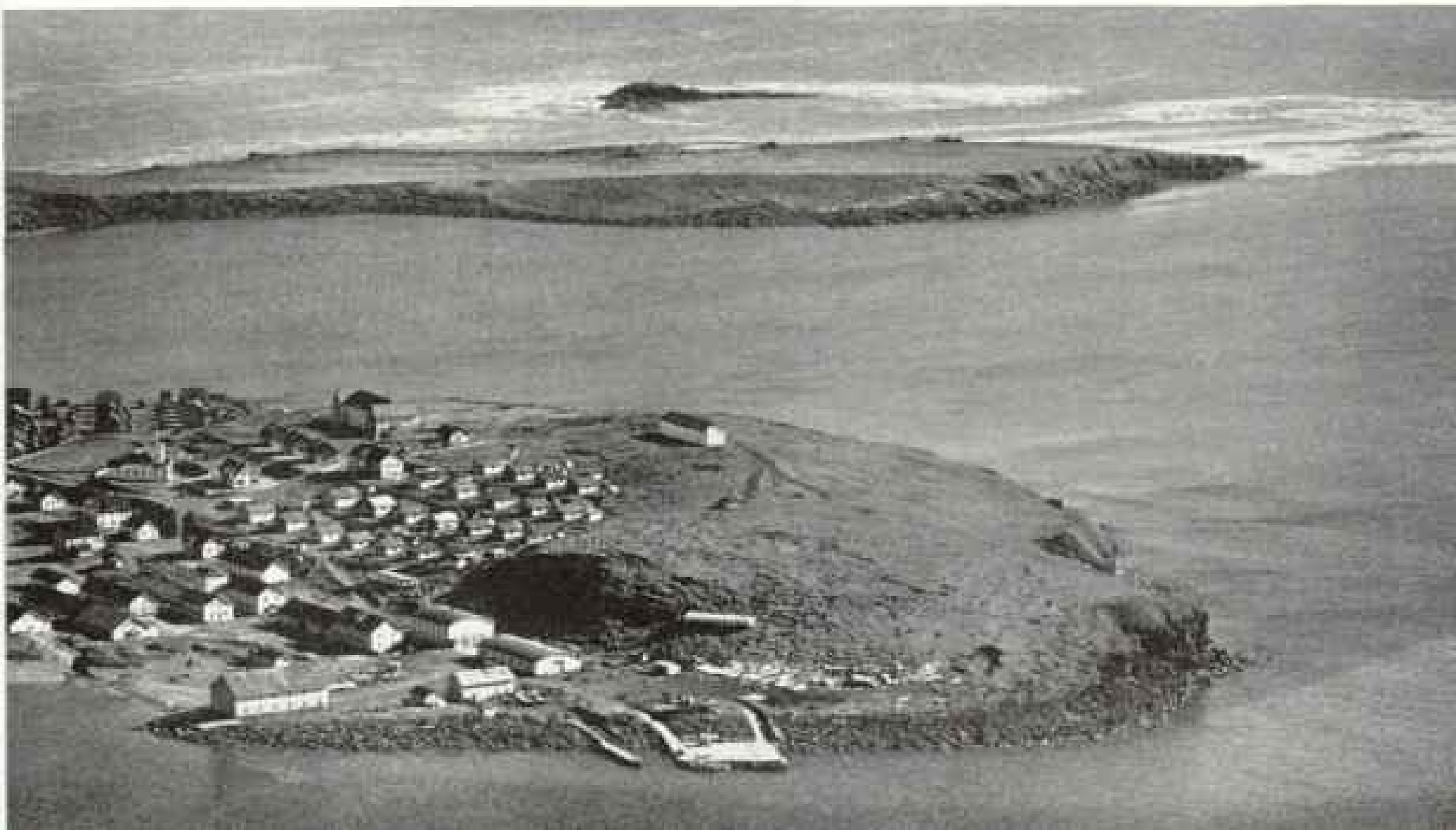
350 Aleuts Call St. Paul Village Home; Three Seal Colonies Live on the Neck of Land Next Door

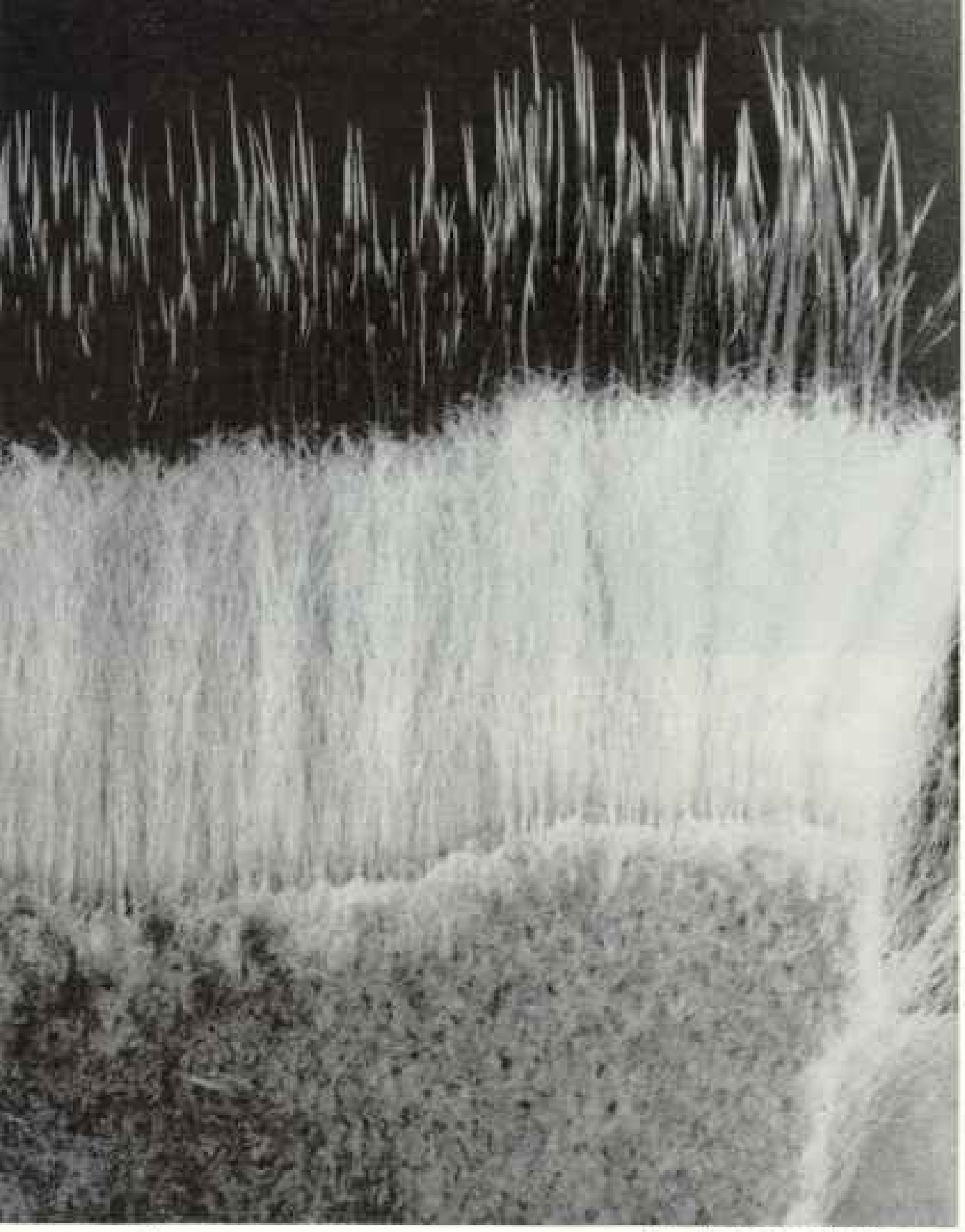
Villagers help with sealing in summer, trap foxes, and maintain and repair roads and buildings. In summer, soupy fogs roll in; winter's fierce winds pile up huge snowdrifts and ice floes. Each summer Aleuts from Alaska and the Aleutian Islands come to St. Paul to work in the by-products plant, where seal meat and blubber are rendered.

Top: The Russian Orthodox Church in this lonely village was established in Tsarist days. It has a Russian-born priest.

Lower: Radio station KVR (left) is operated by the Fish and Wildlife Service.

July's visiting seals are barely visible on the distant peninsula. Sea Lion Rock lies behind the rookeries.





310 Victor B. Scheffer and Karl W. Kenyon

Coarse Guard Hairs Protect Silky Underfur

Only the bristly outer coat is visible on a live seal. Processors expose the fur, which insulates the animal from cold and damp, by scraping off the guard hairs. This enlargement shows the inner fibers of the fur, some 300,000 to the square inch, emerging from the skin.

Victor advised his crew in English, and then added instructions in Aleut. Like many a Pribilof Islander, he is fluent in both tongues.

We fell in behind the men as they set off silently through the dripping waist-high grass. Ten minutes later we emerged on a beach of dark volcanic sand strewn with drift logs cast into Bering Sea by rivers of the mainland. No trees grow on the chilly, sunless Pribilofs, though fields in summer are lush with lupines and wild celery.

Bachelors Still Asleep

Now we assembled in a group a hundred yards down-wind of the hauling ground. Through breaks in the fog we saw in the rising light a gray carpet of sleeping seals, well back from the water's edge.

A gentle surf was breaking and, blended with its sound, like a weird and distant symphony, came a chorus of seal voices many thousands strong from the breeding ground hidden in the mist. While the bachelors sleep, the adult seals carry on their activities night and day, without regard to time or weather.

"The bachelors are still sleeping," Victor whispered with satisfaction.

He added a final word to his men, who immediately set off at a fast trot, crouching low and heading for the open space between the seals and the sea. Victor stayed behind with us.

"I think we'll get a thousand this morning," he volunteered.

"We'll put a cigar on it that it won't be over 800," one of us retorted.

The men were now nearly between the seals and the water.

Suddenly, as one body, the seals were awake. In wild confusion they headed for the water. But the way was blocked by men sprinting near the water's edge, shouting wildly and waving their hands and coats.

A few animals succeeded in dashing through their ranks and were lost a moment later in a white flurry of spray. But the men were strategically spaced, and most of the seals wheeled about to stampede up the beach toward the grassy fields.

Soon, with a skill born of long experience, the men had cut the large mass of animals into small "pods" of about a hundred each and were herding them slowly and with frequent rests toward a broad, level prairie a quarter of a mile away. The men's voices were all but lost in the rumbling and slapping as a thousand leathery flippers pounded the earth.

Once the seals are away from the water's edge, they may be driven as easily as sheep. Yet the men were cautious and alert, for the jaws of a seal are strong and their teeth are edged like knives. More than once a careless sealer has suffered a painful bite.

Sealing has its lighter side. A man up ahead of us maneuvered close behind an unsus-

pecting comrade. Quickly he reached down and grasped him firmly by the calf of the leg. The victim responded with a frenzied leap and a wild yell, sure he had been bitten by an angry seal.

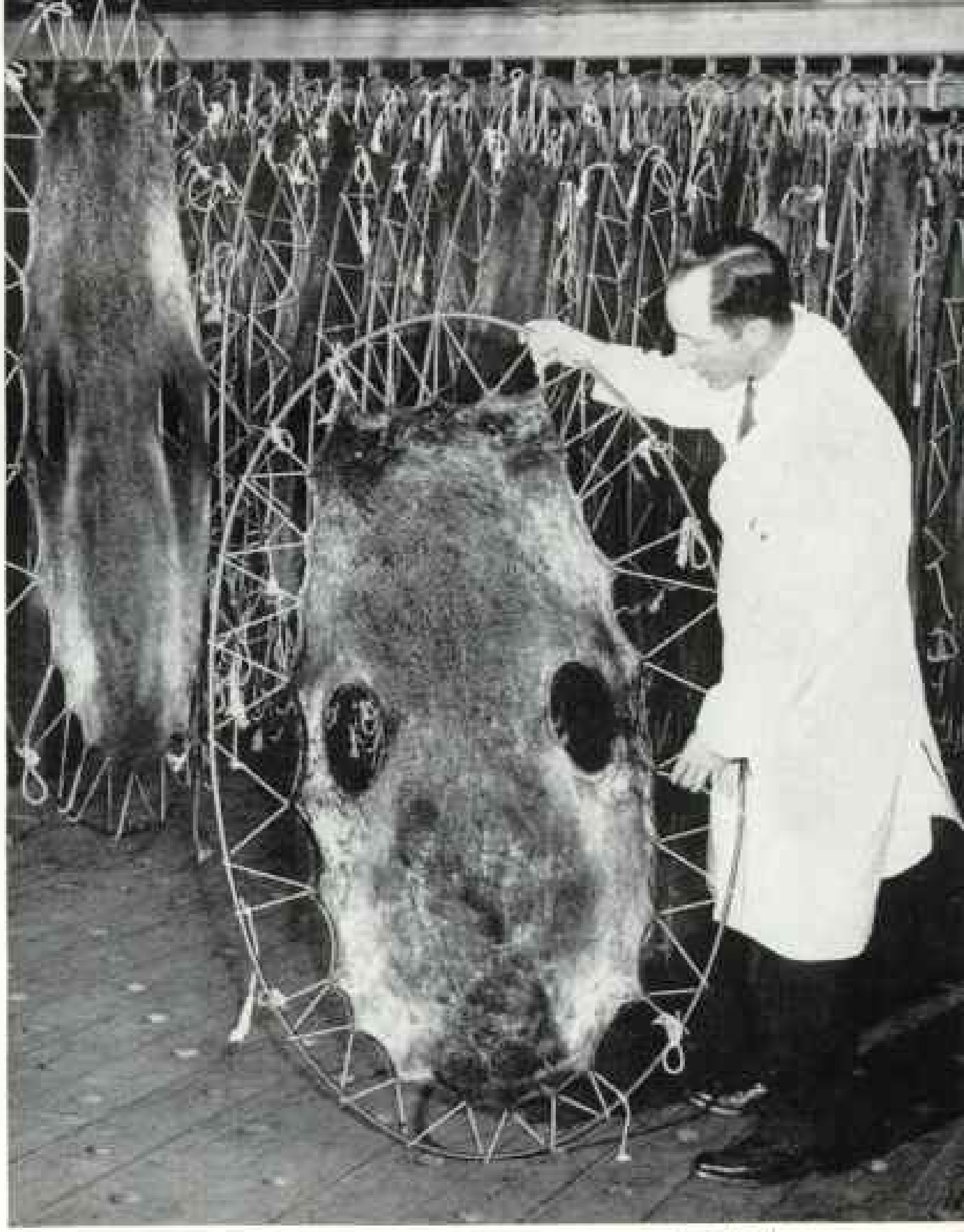
Within half an hour all the seals had been driven to the edge of the killing field. There they were reunited in a large group and were allowed to rest while the men assembled their equipment (pages 502-3).

The killing is done as humanely as possible, with a single blow on the head from a six-foot hickory club that looks like an overgrown baseball bat.

Scrambling among the sealers, we took particularly interesting specimens for biological study.

Survivors Show No Sign of Fright

Through many years of experience men are able to select animals within the commercially valuable size range and dismiss those too large or too small. About a third of the seals on this particular morning were rejected and allowed to make their way back to the beach. This they did in leisurely fashion.



511 Fouke Fur Company

Sealskins Stretch and Dry on Hoops in St. Louis

Pribilof skins, salted and casked, are shipped to the Fouke Fur Company, exclusive agent for the United States Government, for processing and sale. Fouke auctions more than 60,000 seal pelts a year, some 80 to 90 percent of the world's total.

Oddly enough, seals are not frightened at the sight of their fellows being killed. The rejects soon are sleeping peacefully on the hauling ground. As if bent on a rendezvous with death, certain marked animals reappear time after time in the drives throughout the season.

Amid exclamations in English and Aleut, the selected animals were laid out in rows of 10. "Andy," the resident manager, jotted in a book the length of each seal as it was reported to him by the caliper man, or sealer. These measurements, more than a million and a half now on record, help us follow the trend of the harvest and watch the growth rates of various age classes.

Every man has his job and, with the precision of a factory production line, each seal was measured, bled, and skinned in two minutes or less from the time he was killed.

In this manner, about 65,000 seals have been taken each summer during the recent postwar years. In striking contrast, the average harvest during the 20-year period of exploitation, 1871-1890, was nearly 115,000! The "capital investment," the breeding stock, was being destroyed at that time, but few knew it; of those who did, few cared.

Trucks carrying skins and carcasses soon were rumbling toward the village. The skins are accepted there by employees of the Fouke Fur Company, of St. Louis, Missouri, a firm which, since 1921, has cured and processed all Alaska sealskins for the Government.

On the Pribilofs the skins are washed, freed of blubber, salted, and barreled. Later, one out of five is sent to Canada as its share of the catch; the rest go to St. Louis, where they pass through 125 different operations. Three months later they emerge as trimmed and dyed skins and are subsequently sold at semi-

Not a Frown in a Classroom. Happy Aleut Children Attend School on St. Paul

Few kids play hooky here; attendance is 98 percent. They love arithmetic, staying late, if teacher is willing, to do problems. Home economics delights the girls, manual training the boys. Most children wear made-in-the-U.S. clothes ordered by mail from catalogs brought by air to the Pribilofs.

annual auctions under Government supervision.

The Alaska sealskin, because of its beauty, durability, and rarity, has often been called the "gold standard" among furs, and it is true that the market value of sealskins, with relation to other furs, has remained fairly stable during recent years.

The skinned carcasses, rich in protein, fat, and minerals, are taken to the by-products plant where they are converted into meal and oil. The meal is eventually used in the States in chicken feed and the oil in soap. The net revenue to the Government from meal and oil amounts to about $45,000 a year.

It was 9:30 a. m. now, and sealing was over. While some of the sealers gathered choice cuts of meat, we assembled our specimens and, on the side, gathered a bucket of tasty seal livers for the boardinghouse table.

As we were about to leave for the village, Victor suddenly turned in our direction with a grin.

"Where is that cigar?" he shouted. "We got 976 this morning."

Today on the fur seal islands, St. Paul and St. George, we see the prophecy of 1911 fulfilled. Under the program then launched, the seal herd has come of age and now provides an annual profit of about $1,000,000 to the American people.

Since the discovery of the Pribilofs the Alaska seal herd has yielded about 8,000,000 skins. Of this total, 1,500,000 have been taken in the era of modern management, since 1911, and these have brought the Federal Treasury a net profit of approximately $13,740,000. Thus the seals have repaid, nearly twice over, the $7,200,000 which our Government gave Russia for all Alaska.

We hope that the biological studies now in progress will contribute toward a fuller understanding of an interesting animal and will enable the Government to increase and sustain the revenue from a great natural resource.

Portsmouth, Britannia's Sally Port

From King Alfred to the New Queen Elizabeth, British Fleets Have Fared Forth from This Citadel of Sea Power

By Thomas Garner James

With Illustrations by National Geographic Photographer B. Anthony Stewart

OUR ex-troopship, eight days out of New York, bore no resemblance to the *Narcissus* of Joseph Conrad. But as I stood on the wet deck in the half-dawn of that first postwar spring and watched the dark landfall ride over the rim of the English Channel, I thought of his salute to the "mother of fleets and nations."

The Britain I was meeting for the first time needed no better introduction than those full-rigged phrases of the Anglo-Polish sailor and novelist:

"Guarding priceless traditions and untold suffering . . . The great flagship of the race; stronger than the storms! and anchored in the open sea." *

All that forenoon we drove up-Channel like a China clipper with fresh tea in her hold; tiny fishing trawlers bounced from our bow wave. Aboard our transport, still in her war paint, were haggard, homesick Britishers newly freed from Japanese prison camps.

The Britain I watched passing to port was like our ship, still in battle gray. Every misty headland bore its Lloyd's signal station or radar tower. An aircraft carrier and two destroyers challenged and blinked us by. The sea air was chilly as a sentry.

Sea Watchdogs Guard Approaches

At the turn southeast of the Isle of Wight we met Britain's reception committee—a phalanx of sea-bed forts and fighting ships. Like uncounted thousands of vessels before us, we followed the tide into Southampton Water by permission of the watchdogs of Spithead and Portsmouth (map, page 515).

That was my first sight of salty old Portsmouth, or "Pompey" as the sailors call it, single-minded base for a maritime power whose heart pulses with the beat of the sea.

Since then, as if by a whirlpool, I have been drawn back many times by Portsmouth's harbor and history, its fleet and its tides. In six years of seeing this naval base in all moods and weathers, I have come to respect the Royal Navy's steadfastness in "guarding priceless traditions" as one of the few reliable beacons left in a storm-tossed world.

On the eve of 1952, when the world still had found no peace, I stood with my friends Lt. Col. and Mrs. Harold Wyllie on the windy balcony of their Ship Tyger Flat at the top of Tower House, overhanging the narrow tide-ruffled entrance to Portsmouth Harbour.

Within the circle swept by our telescope I could see all the panoply of centuries of sea power contained in one great panorama.

Veterans of Korea and Trafalgar

Some three miles to the southwest, down the path of the low winter sun, the light fleet aircraft carrier *Theseus*, not long returned from battle in Korean waters, lay at anchor in Spithead.

Near by, black against the somber blue of the Isle of Wight's hills, a big new aircraft carrier, H.M.S. *Eagle*, was practice-catapulting her first brood of fighters.

A few cables farther on swung the carrier *Karel Doorman*, once H.M.S. *Venerable*, purchased from Britain by the Dutch—Britannia's foe of old, now long a staunch ally.

High above us, vapor wakes from invisible jet planes congealed in the icy air.

Fifty feet beneath our balcony, seas broke on the stone parapet as a steel-blue submarine, swinging hard over to cross the tide into Haslar Lake, flipped her wash against the base of the tower.

At the Royal Dockyard jetty, a pistol shot to leeward of the harbor entrance, the carrier H.M.S. *Warrior* had been loading troops and supplies for a fast run to Middle East trouble zones a few weeks earlier. There now lay H.M.S. *Indomitable*, carrier flagship of the Commander in Chief of the Home Fleet.

Between us and *Indomitable* a constant stream of water traffic eddied in the half-mile triangle bounded by the Dockyard, the harbor entrance, and Gosport Hard (page 524).

Cross-harbor ferries ran so uninterruptedly that tars and workmen seemed to catch them on the fly, leaping from quay to bobbing boat like pieces of scrap to a moving magnet. Housewives with their shopping baskets were as nimble as the sailors and workmen.

Weaving in and out through the commercial traffic, the little boats of the Royal Navy were using the crowded water to teach handling and discipline. On even the tiniest,

* From *The Nigger of the Narcissus*, by Joseph Conrad, J. M. Dent & Sons, Ltd., London.

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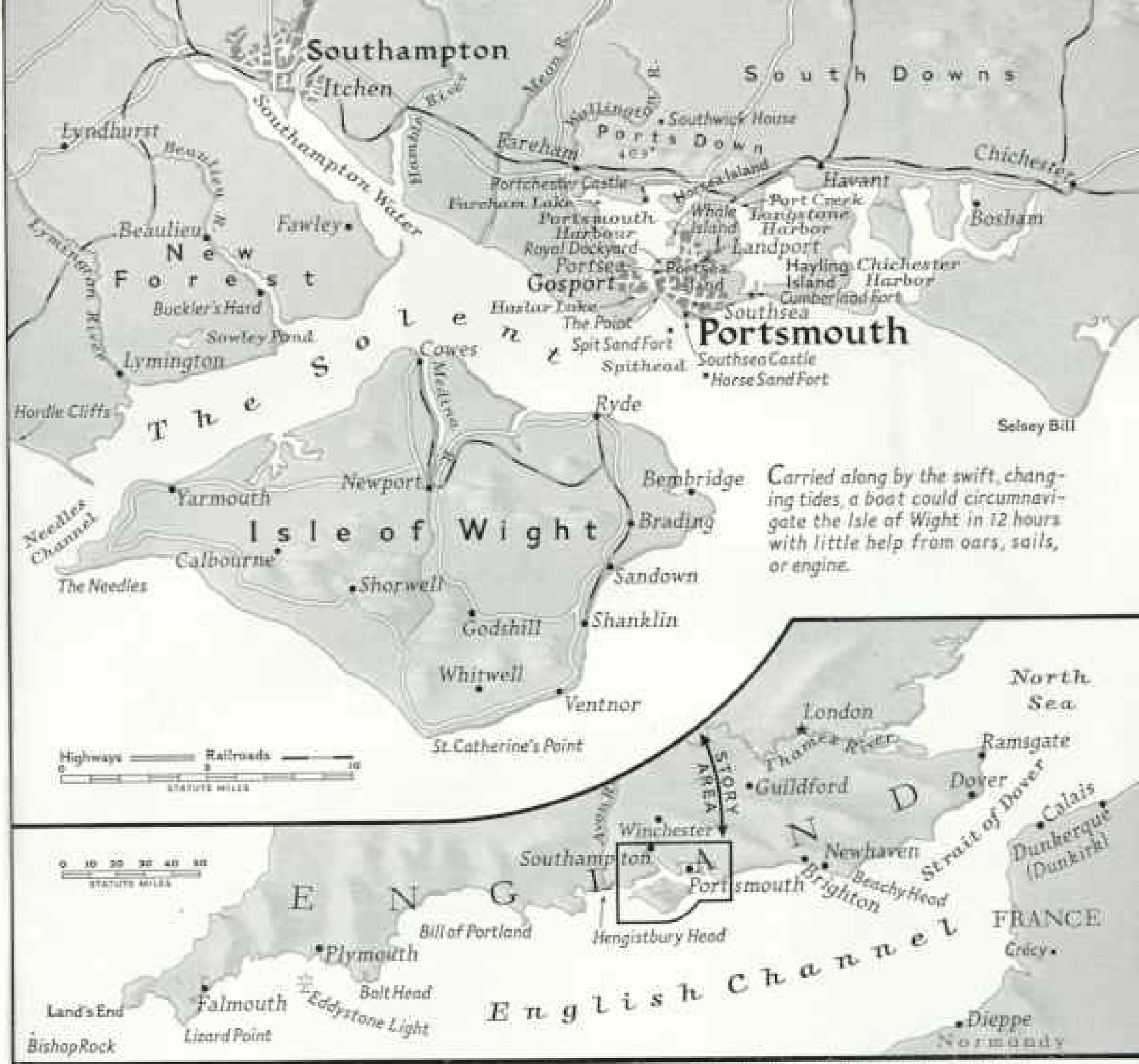
Keystone

Troops Bound Overseas Pipe a Salute to Portsmouth's Beloved H.M.S. *Victory*

Nelson's flagship at Trafalgar is preserved at the naval base as a national shrine (pages 533 and 542). In 1941 a German bomb exploded under the vessel's port bow, holing her stout oak hull and cratering the dry dock. Damage was quickly repaired. This pipe and drum band of the Royal Inniskilling Fusiliers marches in the vanguard of 5,000 troops embarking from Portsmouth for duty in the inflamed Middle East.



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Drawn by Robert W. Northrop and Irvin E. Alleman

Portsmouth, Lair of British Warships, Is the Commonwealth's Greatest Naval Base

The harbor has sheltered warships for some 1,600 years. It has known Roman galleys, the "long serpent" ships of Saxon raiders, and the fleets of English kings and queens. Forts guard the narrow harbor entrance. Vessels must negotiate difficult tides in Spithead and the Solent. These tides alternately flood and drain Port Creek, a natural moat separating city and naval base from the mainland.

sailors lined the foredeck at parade rest, making their vessel look its smartest. Helmsmen of craft dodging the nearest neighbor barely had time to sigh with relief before another converging vessel raised a new and tougher traffic problem.

All about us a thousand hooters, signal flags, flashing lights, and speeding picket boats exposed the sleepless nerves of Britain's senior dockyard and pre-eminent naval base.

In the very center of all this white-waked hustle and welding-torch glitter of a keyed-up command post rose the checkerboard strakes, scarlet gun ports, and noble stern cabins of two wooden sailing ships—as eloquent as battle standards in giving the fourth dimension of time to the wintry glories of the scene.

Lord Nelson's full-rigged *Victory*, shored up in Britain's oldest graving dock, flew at the main the St. George's cross flag of the Commander in Chief, Portsmouth. Across the harbor on the Gosport side, afloat but stripped of masts and rigging, lay the 134-year-old Bombay-built frigate *Foudroyant* (page 520).

Even more than the great modern carriers, these two timbered veterans seemed to breathe into the Atlantic wind the mighty invocation:

> Rule, Britannia! Britannia rule the waves!
> Britons never, never, never will be slaves.

Victory—whose keel was laid down in 1759, seventeen years before the American Colonies declared their independence—had survived her latest war in accustomed Navy fashion:

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German Fire Bombs Gutted Portsmouth's Guildhall; Tower and Walls Remain

The Guildhall, dedicated in 1890, was the city's municipal center. It contained offices, auditorium, and priceless art objects. On January 10, 1941, a shower of incendiary bombs fired the building. Weeks passed before the ruins cooled enough to be entered. Archives and official silver plate were found unharmed; all else was lost. The building has not yet been restored.

stripped for action and with Nelson's "duty" signal flying.

On the night of March 10, 1941, a German bomb landed squarely on the floor of *Victory's* dry dock, under the ship's port bow. Seasoned English oak fared better than steel and concrete; the hole in the ship was smaller than the crater in the dock.

When the stone residence of the Commander in Chief, Portsmouth, was blown apart, that gentleman calmly moved to Nelson's old quarters aboard *Victory* and thereafter rode the war out in considerably more comfort than the Luftwaffe.

Unless another war strips her for action again, *Victory's* proud spars will remain among the loftiest in all Portsmouth. The postwar job of re-rigging her took nearly three miles of rope—30 tons of gear altogether—spliced and knotted to patterns and commands which have virtually disappeared from the sea's manuals and glossaries.

My host, Colonel Wyllie, an expert on the old sailing Navy, acted for the Society for Nautical Research in advising the Dockyard on the task.

Not a single bend, hitch, splice, whipping, or serving is less than perfect; for while the catspaw of courses slowly rose again tier upon tier, the riggers knew that leveled telescopes from the big ships' bridges and from Tower House were focusing on every knot. There

Ferry and Submarine Pass in the Narrow Entrance of Portsmouth Harbour

Portsmouth Point (foreground) faces Gosport across a slender channel. Thus the sprawling harbor (right) is all but landlocked, assuring a sheltered anchorage. When a large naval vessel enters or leaves, the harbor entrance is closed to other traffic. Ships ride at anchor (upper left) on the Gosport side of the harbor (pages 524 and 534). The battleship H.M.S. *Duke of York* lies at the extreme right.

are no perfectionists surpassing those who served and still worship the old Navy of sail.

Victory today silently tells much about the way the discipline of perfection was learned through that century of sea fighting up to and through Trafalgar.

The several hundred seamen then aboard her slung their hammocks by the guns they served. In view of the limited headroom below, any over five feet seven inches tall must have developed a permanent stoop or knockproof head.

Only with neck bowed and knees bent could I climb down *Victory's* three gun decks and past the darkened orlop and magazine to the tree-sized keel. It was easy to understand why the custom arose of allowing officers to remain seated to toast the sovereign's health; but I wondered what Nelson's Capt. Thomas M. Hardy, an uncommonly tall man, saw in a naval career.

Right up to Nelson's day, interiors of the King's ships were painted a single color: scarlet. It meant that they were ever ready for blood, with oakum and salt beef always at hand for stopping shot holes in either the ship's hull or a seaman's powder-blackened hide.

Colonel Wyllie is now supervising the restoration of *Foudroyant*. Through the telescope I watched craftsmen of an almost forgotten art at work on the canted and curiously carved frames for the cabin lights on each quarter.

"Isn't she beautiful?" he asked. "There is the last surviving fighting ship of the old sailing Navy still afloat.

"*Foudroyant* was built in Bombay dockyard in 1817 as H.M.S. *Trincomalee*, of the world's best boatbuilding timber, Malabar teak, by Parsis who made a religion of their fine workmanship. Up to her main deck she is still the same ship which saw forty years of service in the active fleet.

"If we are successful in raising a £60,000 endowment fund to keep her shipshape, we can continue giving training courses aboard her, in boat handling and character building, to ships' companies of a hundred boys or girls at a time.

"You have seen the past in *Victory*, and you witness the present all about you in the ships refitting here after service in Korea, Suez, and

wherever else Britain has accepted responsibility for keeping the sea lanes open.

"*Foudroyant* links the past and the present to the future. We who know how much our survival depends on keeping alive naval tradition in the youth of Britain owe it to her, as well as to the nation she has served for so long, to see that she is kept ready and useful for generations yet to come."

An occasional thump beat against the wind down the harbor—antiaircraft practice from the Whale Island naval gunnery school, which, in the British tradition, bears the nautical name H.M.S. *Excellent*. From *Foudroyant*'s graceful silhouette I swung the telescope past Whale and Horsea Islands to pick up the line of Army forts on the ridge of distant Ports Down, four miles to the north.

Part-time Island, Born of Tides

Well I remembered the first long summer afternoon I had spent stretched out on 400-foot-high Ports Down, studying the lie of the mighty anchorage.

From that ridge I first saw how Portsmouth anchors a three-by-four-mile "part-time island" guarding the island of Britain. As I watched while the day ran out, to the distant accompaniment of sunset guns and crying bugles of the forts, the flat below me changed from island to peninsula. And as the dusk brought ten thousand lights to life, fully half the fifty square miles of "land" within my range of vision disappeared beneath the returning flood.

I realized that no cartographer could draw for me a map of the visible shoreline between my hillside seat and the great breakwater and gale screen of the Isle of Wight, ten miles away, unless I told him exactly what hour of what day I wanted the map to represent.

Port Creek, which connects Portsmouth Harbour on the west with Langstone Harbour on the east to cut Portsea Island off from the mainland, was alternately a drowned moat and then a gutter of mud, where little boats lay tipped on the turn of their bilges like sailors sleeping off shore leave.

When the prevailing southwest breeze blew full, the sucking sound of the tide's tentacles draining every crevice in the foreshore came plainly up the slope.

Complex one-to-six-knot currents, set in motion by the tide, run wet fingers round the Isle of Wight and in and out of every bay within the ring of sea and hills.

Endlessly changing combinations of wind, wave, and tide make the waters triangulated by the harbors of Portsmouth, Southampton, and Cowes a perfect cradle for seamen. In this strange maze of moon-moved waters a well-worked boat would need little help from engine or sail. On calm days she could be shifted from dock to dock almost anywhere between Wight's Yarmouth and mainland Portsmouth, in either direction, by the tides alone.

A boat could even circumnavigate the Wight by leaving Bembridge bar on the *first* inshore flood (Southampton Water has a double high tide). The flood would carry her westward past Cowes, down the Solent, right through the Needles funnel. From there the easting tide would bear her along the south side of the island to Bembridge bar again, completing a 60-mile ride on a tidal merry-go-round (map, page 515).

Shakespeare wrote of the "inconstant moon," and every Elizabethan seaman whose ship awaited the next tide from Spithead knew what he meant.

Not all the Admiralty's complicated tables and charts could match the local lore of the old pilot on whose tug I once steamed up Fareham Lake, deep into the veins of the harbor. The tides were more important to him than his boilers; the inconstant moon's cosmic rhythms punched his time clock and paged his calendar.

Like Chaucer's Shipman, "Hardy he was, and wys to undertake. With many a tempest hadde his berd been shake. He knew wel alle the havenes." No current, or bar—or Dunkirk rescue!—could dismay him after such a discipline.

Not even carefully planned sabotage, which exploded ammunition barges in Fareham Lake soon after the Korean battles opened, could close the vital fairway to such weathered hearts of oak.

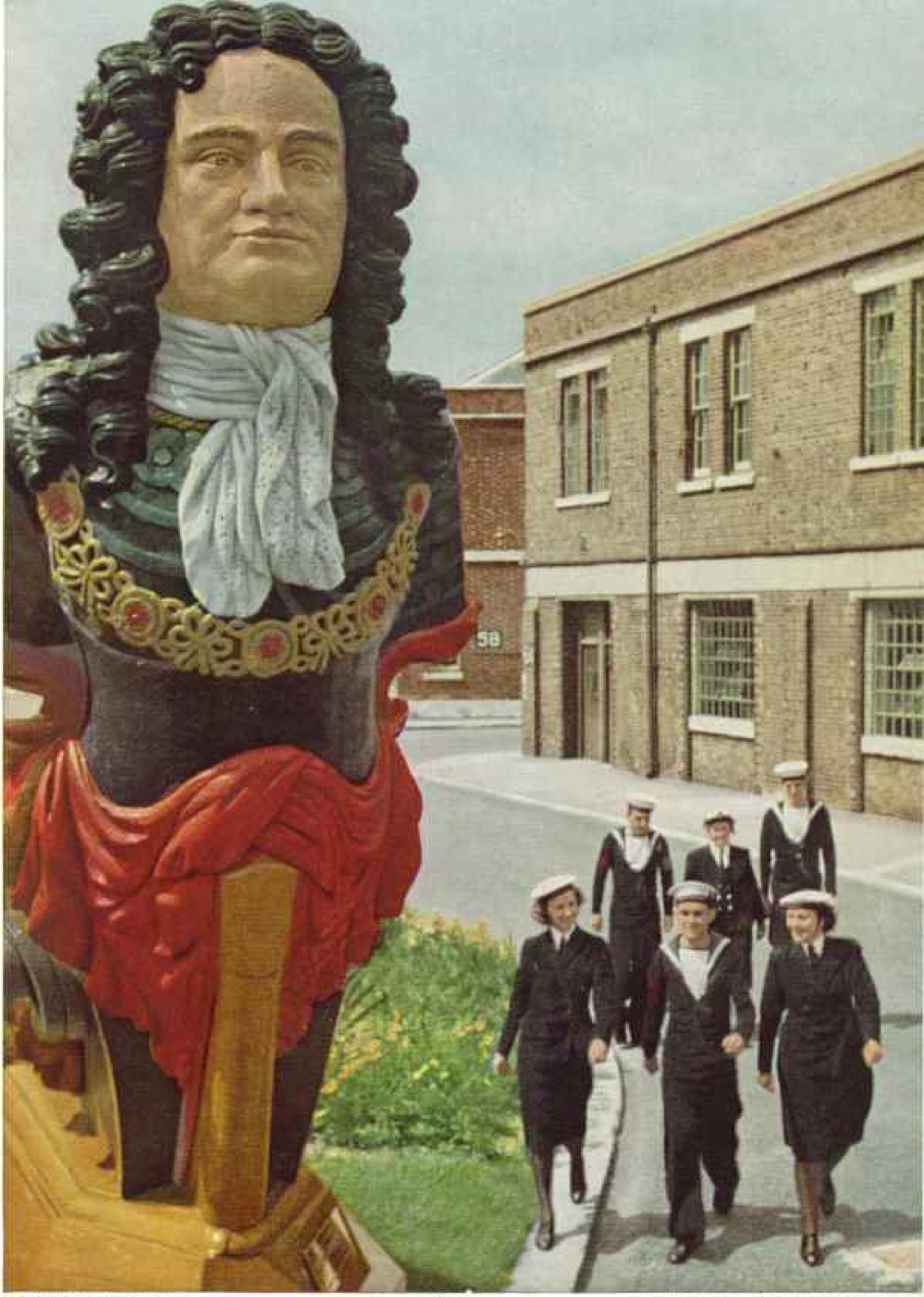
Skill Gained Here Applied in War

If Waterloo was won on the playing fields of Eton, how many naval victories have sprung from the tide-battling work boats and racing cutters of Spithead and the Solent?

Consider the case of the British frigate *Cardigan Bay*, making herself at home in the treacherous waters of Korea. Was *Cardigan's* conning officer remembering Portsmouth's tides when he took his ship by touch and sixth sense so far up the Han estuary and river behind the astonished Communist lines as to suggest cavalry tactics rather than naval?

In July, 1951, a small launch from the same *Cardigan Bay*, under command of Portsmouth Lt. Mark Ross, guided a U. S. landing ship through tricky sand banks and channels 100 miles behind Red lines to recover parts of a Russian-built MIG-15 shot down offshore. While aircraft from both British and American carriers flew cover, Lieutenant Ross's watermanship and "Nelson's touch" contributed to the success of the operation.

The Ports Down ridge overlooking the



Kodachrome by H. Anthony Stewart

A Treasured Figurehead Reminds Portsmouth of the Days of Wooden Ships and Iron Men

Here Nelson traditions linger. How the three uniformed Wrens would surprise him! They leave a shore station named H.M.S. *Vernon*. The prow piece, representing the Duke of Marlborough, survives the 121-gun H.M.S. *Marlborough*.

Kodachrome by B. Anthony Stewart

Sea Cadets Learn the Ropes Aboard Old *Implacable* (Left) and *Foudroyant*. Sub-hunting Frigates Lie in Background

Tattered Warship, Shining Drums Make Hearts Beat Faster

Of the ships which fought the Battle of Trafalgar, Britain's 1805 triumph that dashed Napoleon's hopes of mastering the seas, two remained in Portsmouth until recent years. One, H.M.S. *Victory*, Lord Nelson's flagship, rests there still (page 542). The other, the French-built H.M.S. *Implacable*, is no more.

The 74-gun *Implacable*, launched in 1800 as the *Duguay-Trouin*, survived Trafalgar only to be captured a short time later. Refitted and renamed, she served for years as a British ship of the line. Later she trained generations of seamen, like those Sea Cadets who spend a week of their summer holidays deciding whether to seek Navy careers.

During World War II, damp rot penetrated *Implacable*'s timbers. As restoration demanded $800,000, which Britain could not spare, this noble veteran was ceremonially sunk in December, 1949.

The Royal Marines' regimental drums are kept smart for all occasions. George IV gave them the globe insignia. "From the difficulty of selecting any number of places to inscribe on these standards," said his brother, the Duke of Clarence, "your Sovereign has been pleased to give . . . 'the great globe itself.'"

Kodachromes by B. Anthony Stewart

↑ Ships That Pass the Esplanade Excite the Wanderlust in Every Beholder

The spectacle of liners, battleships, and submarines, their wash tossing small boats, holds visiting landlubbers spellbound by the hour. Some watch the Spithead panorama through telescopes (left). Night reveals hundreds of lights tossing on the waves.

↓ Portsmouth Memorializes D Day, Climax of Its Centuries of Adventures

General Eisenhower, in his headquarters near by, made the fateful decision to launch the Normandy attack on June 6, 1944. (The marker's error—"1945"—has been corrected.) More than 250,000 Allied troops embarked from this port.

Kodachrome by B. Anthony Stewart

Bombs Damaged 9 Portsmouth Houses in Every 10; This Crusader Shrine Was Hard Hit

Domus Dei (God's House), now called the Garrison Church, was founded as a hospital almost 750 years ago. In 1588 it nursed Spaniards from the defeated Armada. The author (right) surveys the ruin.

Kodachrome by B. Anthony Stewart

Harbor's Tooting Whistles and Naval Dockyard's Swinging Cranes Spread Daylong Drama Before Audiences on Gosport Hard

In these narrows, yachts and rowboats dodge battleships and submarines; ferries, bucking the traffic stream, cut in like jaywalkers. Seamanship solves every problem. Gosport used to be God's Port. Its Hard, to an Englishman, means a landing place.

Joyful Screams of Passengers Signal the Passing of the Children's Special

Thanks to sea air, boating, and bathing, Portsmouth is a popular resort. Southsea, a residential quarter, is its playground. Clarence Esplanade has led these seaside strollers to Southsea's Children's Corner. In the distance stands Southsea Castle, Henry VIII's "ryght goodlye and warlyke castill."

Kodachrome by B. Anthony Stewart

▲ Lord Mayor and Wigged Town Clerk Inspect a City Seal Drawn by Art Students

Portsmouth received its first charter in 1194 from Richard the Lionheart, but did not attain city status until 1926. Now it embraces neighboring Portsea, Landport, and Southsea, and counts 230,000 residents. Portsmouth, New Hampshire, is a namesake.

▼ Portsmouth Is the Queen's to Command; These Are the Ceremonial Keys

Centuries ago the town's garrison commander was known as Constable of the King's Castle at Portchester. His successor's office has on file the invasion orders of every GI moved through the port. The adjutant keeps the keys ever ready for the monarch.

phenomenon of the swirling tide is an earthworks honeycombed with underground forts, built, like the sea forts rising from Spithead, about the time of our American Civil War. At mile intervals the tunneled strong rooms lift foreheads up through the chalk under brick-surfaced helmets camouflaged with grass.

In these Ports Down forts were the undercover Naval Plotting Room and part of the headquarters "brain" (known as "the Plot") of the Allied invasion to liberate Europe. Here planners worked night and day toward the great climax of June 6, 1944 (page 529).

On that June morning the spring tide of the free world swept full force across the Channel and up the beaches of Normandy.

In Southwick House (now called H.M.S. *Dryad*) just over the down ridge away from the sea, I saw the sail-sized map of the invasion plan set up for the late Admiral Sir Bertram Ramsay, Allied Naval Commander in Chief, Expeditionary Forces.

Scene of Eisenhower's Historic Decision

Sitting in the chair General Eisenhower had occupied, I looked up at the clock high on the map. Its hands were frozen at "H" hour. On the map the first Allied spearheads were reaching the beach.

A small plaque near by reads:

> In this room at 2230 on the fourth day of June, Nineteen Hundred and Forty-four, General Dwight D. Eisenhower, the Supreme Allied Commander, made the historic decision to launch the assault against the continent of Europe on the sixth day of June despite uncertain weather conditions. Had this major decision not been made the whole operation would have had to be postponed until the next suitable tidal period a fortnight later. Adverse weather conditions which then arose might well have altered the whole course of the war.

In the parish church of Ports Down, just before invasion, the headquarters staff of the British Second Army took chivalric vows: "To relieve the oppressed, to restore freedom . . . and to bring peace."

Their chaplain recited the prayer popularly attributed to Sir Francis Drake before Cádiz in 1587: "O Lord God, when Thou givest to Thy servants to endeavour any great matter, grant us also to know that it is not the beginning, but the continuing of the same until the end, until it be thoroughly finished, which yieldeth the true glory . . ."

As they knelt on their battle eve, from their massed ships in the harbor flew the cross of St. George, the same cross which had streamed over Knights Templars and Hospitallers on the Third Crusade as they left this very same harbor.

Britain's years of pre-invasion thrust and parry against the Nazi crescent drawn around her was in many ways a geographic duel of naval base against naval base, dockyard against dockyard, in which the Fleet bases were often in the very front lines.

In 1941 the German battleship *Bismarck* ran, like a hunted stag, across half the Atlantic, trying to reach the relative safety of a French harbor. Admiralty wireless towers on Horsea Island crackled with "game's afoot" messages until warships and carrier planes closed in for the kill.

To destroy the lock gates of the huge dry dock at St. Nazaire, thus denying its shelter to *Bismarck's* sister ship *Tirpitz*, was the early 1942 objective of an overage ex-United States destroyer, H.M.S. *Campbeltown*. Originally the U.S.S. *Buchanan*, she was one of 50 United States destroyers traded for the lease of eight British bases.

It was like sailing into the gates of hell. One British lieutenant, watching two of every three of his escorting motor launches blow apart under the German fire, kept repeating to himself, "My God, we're still alive!"

The dying *Campbeltown*, set to explode in a few hours like a giant time bomb, rammed her lock-gate target only four minutes off schedule. In one furious sacrifice she altered the whole balance of the Battle of the Atlantic that year.

Later, crews trained on the first British midget submarines—built secretly in the Portsmouth yard—took the war relentlessly home to *Tirpitz*, hiding in Norwegian fjords.

His Majesty's Dockyard at Portsmouth fitted out nearly a thousand assault vessels and assembled parts of the artificial harbors used for the Normandy thrust.*

Battered landing craft and torpedo boat survivors from Normandy, St. Nazaire, Dunkirk, Dieppe, and scores of other Channel battles lie quietly now in the creeks below Ports Down. Some, converted into houseboats, fly kitchen aprons where the battle flags streamed. Still others wait to be cannibalized for scrap.

Black Prince Repeated History

But Portsmouth's tides of battle sweep back far beyond World War II.

One of the attack vessels assigned to the American task force on D Day, 1944, was the new 5.25-inch-gun British cruiser H.M.S. *Black Prince*. Driving close inshore, this 20th-century namesake shelled almost the same French beaches where in 1346 Edward III and his black-armored son landed their fighters who later won at Crécy.

For Edward some 1,600 ships had been assembled in Spithead; and the Black Prince's

* See "Normandy's Made-in-England Harbors," 16 ills. and map, NATIONAL GEOGRAPHIC, May, 1945.

Yachts of the Royal Ocean Racing Club Sail Through Spithead, Scene of Regattas and Naval Reviews for Centuries

Yacht racing off the Isle of Wight (background) is an old British pastime. In the 18th century the largest racers were heavily armed. Their crews sometimes fought with French privateers before coolly finishing a Channel run. These waters saw the schooner yacht *America* triumph over Britain's best in 1851. Her prize, the Royal Yacht Squadron's Cup, became the *America's* Cup, held in the United States ever since. The last competition was in 1937. Moderate-size craft here start a cross-Channel race. Between the two leading craft looms Spit Sand, one of the sea-bed forts (page 515). In the dim background lies the battleship H.M.S. *Vanguard*.

On This Map Allied Commanders Plotted the Invasion of Normandy

Southwick House, a manor estate near Portsmouth, served as naval headquarters for historic Operation Overlord, which established an Allied beachhead in Normandy. In the War Room was erected this huge wall map. It charts cross-Channel routes and landings for the Allied "bridge of ships" (page 527).

On D Day, June 6, 1944, General Dwight D. Eisenhower came here to watch his plan unfold on the map. Lines, counters, and markers were put in position as reports streamed into headquarters.

Dark areas reproduce the south of England (top) and the French coast (bottom). Route lines show how the armada assembled. Ships converged on "Piccadilly Circus," a water-traffic control point (circle) off the Isle of Wight. Thence they headed for the beaches east of the Cherbourg peninsula.

Since World War II Southwick House has become H.M.S. *Dryad*, a Navy navigation school. Officers now use the War Room as a lounge. But the map is preserved virtually as it was on D Day.

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Portsmouth's Car Ferry Pulls Itself Across the Harbor with Giant Chains

This odd craft runs on a double track of chain cable which it picks up from the harbor floor and pulls over windlasses. It saves automobiles a long land trip between Portsmouth Point (foreground) and Gosport.

sire paraded his bowmen and men at arms on the Common lying along the sea front between Old Portsmouth and Southsea, the same greensward where 1944's champions gathered their battle kit by the landing craft.

Below the downs and at the edge of one tidal creek is a solid reminder of Portsmouth's first role in Europe's history—a Roman fortress, whose walls enclose a square of nine acres now bounding the ruins of Portchester Castle.

Caesar's imperial galleys, perilously vulnerable to the 15-foot tides pouring over the Channel shelves, found this land-enclosed harbor a heaven-sent refuge. The fortress the Legionaries built here was the westernmost of the chain guarding the "Saxon Shore."

The Anglo-Saxon Chronicle names the year 418 as that in which the Romans "gathered together all the treasure that was in Britain. Hiding part of it underground, they bore away the rest into Gaul." The Roman tide was receding before a new wave of power—"long serpent" ships of Saxon sea wolves.

Of all the Anglo-Saxons, the greatest was Alfred. According to the Chronicle, he built a number of ships "twice as long as those usual in these times, some whereof had sixty oars and some more, and were of a peculiar build, of the King's own invention, being both higher, swifter, and steadier than those of either the Danes or the Frisians."

Alfred's fleet began Britannia's rule here in the waters of the Wight in 897, and maintained it in a pageant of billowing red, purple, and gold "cloak of the wind" square sails of double velvet.

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Sailing Enthusiasts Trim Their Model Yachts Before a Race on Canoe Lake

Miniature sailboats race here each week in summer. Their owners, members of the Portsmouth Model Yacht Club, include many retired seamen. These models are scale replicas of six-meter sloops.

In 1066 Harold, last of the Saxon kings, made the mistake no English ruler has dared to repeat. His ships of war gathered near the Wight to repel the threatened invasion by William of Normandy; but as the summer passed, Harold failed to keep his fleet "in being." Result: England fell for the last time to a foreign invader.

It was the Conqueror's violent heirs who, in the 12th century, began building Portchester Castle within the walls of the old Roman fortress. From one corner of the square the Keep lifts its flint-hard and eight-feet-thick masonry walls a hundred and ten feet. The view of Portsmouth Harbour from its lead-sheathed roof is almost the equal of the panoramic crow's-nest view from higher Ports Down.

Crusader Richard the Lionheart sailed up this very harbor in 1189 to proclaim himself King of England. Twenty-three years later Richard's brother, the John of Magna Carta,* enclosed with walls the beach "docks" of Portsmouth village, where mud and wattle dams, hastily raised at dead low water around grounded vessels, allowed hull repairs to be made in the "dry."

As the size and draught of the King's ships continued to increase, and the upper harbor silted up, the center of gravity of Britain's naval strength gradually moved from Portchester Castle at the inner end of the harbor to the deeper water and dry docks of the growing village at the harbor mouth.

* See "The British Way," by Sir Evelyn Wrench, National Geographic Magazine, April, 1949.

532 © Frederick Mott, New York Times

U.S.S. *Columbus* Pipes King George VI Aboard for a Good-will Visit

The late King lunched aboard the cruiser November 8, 1949, at Portsmouth. The British Sovereign's standard flew at the United States warship's main truck. Lewis Douglas (bareheaded at left), then Ambassador to the Court of St. James's, receives His Majesty; Admiral Richard L. Conolly stands by his side. A boatswain at the gangway gives a regulation left-handed salute as he pipes the honors. Beyond is H.M.S. *King George V*.

Victory's Resident Ratcatchers Survey Their Realm from a Cannon

Nelson's old flag-ship carries a cat as mascot. Shown here are Fishcake, a former pet, and her offspring, Ginger. Minnie, *Victory's* ratter until 1948, bore 113 kittens in her 14 years on the ship's muster role.

During the long Napoleonic Wars the Castle Keep and the hulks in the harbor held up to 12,000 prisoners. The Frenchmen used their time and rations of beef to make oxtail soup and to carve what are now almost priceless ship models from the bones.

Bombs Destroy Many Landmarks

Seeing the rest of "Pompey" today is complicated by the damage done to many of the prewar landmarks. Like Malta, this strategic city was hammered hard by Nazi air raiders. Decoy fires were lit on near-by Hayling Island to confuse their aim, but it was difficult to conceal a target area so well known. The principal business and shopping centers for a population of 230,000 were obliterated, the Guildhall gutted (page 516), nearly every house damaged. In four years of Nazi raids nearly a thousand civilians lost their lives.

The best way to see what is left (provided you have looked the ground over from Ports Down beforehand) is to walk along the sea wall from Southsea, following the crescent of the beach westward past the harbor mouth to Portsmouth Point, then around the commercial harbor to the Royal Dockyard.

First landmark west of Eastney's Royal Marine Barracks and Cumberland Fort along this course is Southsea Castle, begun by Henry VIII in 1539 and still heavily fortified.

The Tudor Henrys, VII and VIII, made Portsmouth a blockhouse commanding the English Channel water gap through which expanding nation-states of Europe glimpsed new frontiers across the seas. The Portsmouth base could easily dominate the Channel, since sailing ships preferred to hug the safer English coast.

Onward from Southsea Castle, naval memorials bedeck the beach promenade. *Victory's* stream anchor at Trafalgar lies here to mark where Nelson's rowing barge took him from English soil for the last time, out to his waiting "band of brothers" in Spithead.

At the end of the promenade are remnants of the sea ramparts and moat defending Old Portsmouth, including the Sally Port, the Square Tower built in 1494, and the Round Tower, dating from 1417.

Here at the harbor bottleneck, Henry VIII stretched a "mightye chaine of yron" across to Blockhouse Fort to protect his hundred sail. An occasional four-foot link still ap-

pears buried in the shingle at extreme low tide.

Behind the ramparts rises the gutted Garrison Church, originally a hospital (Domus Dei) founded early in the thirteenth century by a Crusader back from the Holy Land. German airmen in 1941 burned out all but its chancel (page 523).

Fortunately, architect Mr. R. A. Thomas has been able to restore the ravaged Buckingham House at No. 10 High Street, once owned by Capt. John Mason, founder of New Hampshire.

Cross Recalls Fate of *Mary Rose*

On High Street, up which Charles I's bust stares from a niche in the sea wall, stood circumnavigator Lord Anson's house, now also destroyed. The area of destruction extends right up to the Portsmouth Cathedral, St. Thomas's, where a piece of timber dredged from the Spithead wreck of Henry VIII's *Mary Rose* forms an altar cross.

Mary Rose was an unwitting sacrifice to the development of the ship-killing gun, which could be fired broadside through open ports in the hull—the English invention which subsequently changed all ship design and naval warfare. When she heeled over in going into action against the French, her open gun ports were submerged; she filled rapidly and sank as Henry himself looked on from his Castle.

Wrapping a sheltering arm around the tiny Camber, the commercial anchorage within the Navy's harbor, is Portsmouth Point (page 517). On the Point, in the 18th century, forty public houses in as many rods supplied sea-weary sailors with "fleet's in" amenities. The Wyllies' Tower House is on the site of what was once the Shyppe Tyger Inn.

The old Star and Garter Hotel here, where many of the great three-decker admirals stayed and fugitives hid from the Navy's press gangs in a secret room, now stands derelict. But "the Point" retains its salty flavor in the busy boatyards and the bombed sites strewn with marine gear.

Within the Dockyard itself and lying to starboard of *Victory*, a figurehead-decked museum displays the late W. L. Wyllie's "Panorama of Trafalgar," a magnificent canvas of the sailing Navy's culminating battle as seen through the stern fanlights of the French 80-gun *Neptune* (page 543).

Colonel Wyllie, himself a noted marine artist, sculptor, and engraver, told me how his father had studied the eye-witness accounts of the battle, and details of the ships taking part in it, for forty years before he started work on the vast spread of the canvas.

Moored in the harbor up until December, 1949, was a part of the canvas come to life, a ship which had actually exchanged shots with *Victory* at Trafalgar—the French 74-gun *Duguay-Trouin*. Fortunate to be on the far wing of the French and Spanish line as Collingwood and Nelson crashed into it, she escaped; but within another fortnight a pursuing British squadron came up with her.

Technically, she never surrendered; her colors were struck for her by British shot before the surrender order, given by the last surviving officer on deck, could be carried out.

Taken into His Majesty's fleet and fitly renamed *Implacable*, she fought with distinction against the Russians in the Baltic in 1808, and in 1840 took part in a blockade of the Syrian coast to prevent the Egyptian advance against Turkey. King Edward VII himself helped save her from the shipbreakers in 1908.

Between World Wars *Implacable* served as a holiday training ship for boys and girls, under Colonel Wyllie's command. At the start of World War II she came back on the Admiralty's active list as a floating storehouse.

Colonel Wyllie, who had been a Royal Flying Corps pilot in World War I, rejoined *Implacable's* complement with a Royal Navy Volunteer Reserve commission to teach seamanship to wartime recruits. He greeted each new ship's company with the announcement that they would live under rules for perfection first drawn up by a young frigate captain who served under Nelson.

A Grand Old Ship Goes Home

The unavoidable neglect of six years of war accomplished what no enemy, not even *Victory*, had been able to do. When I saw her last, with her buff and scarlet color bands in gaudy relief against the North Sea blue of the restless steel veterans moored near her, *Implacable* was still being useful as a training ship for Sea Cadets. But the rot of neglect had then reached her vitals. All the old ship's legion of friends could not save her at the last.

On December 2, 1949, flying the British and French standards side by side, *Implacable* was towed out through the harbor mouth to sea and to the immortality of being ceremonially blown apart.

Through the long night the Channel tides carried the flotsam southward; and so eventually she returned home to the French beaches where she had been laid down long ago in 1797.

Portsmouth's virtually landlocked harbor and its sheltered roadstead outside, large enough to anchor a large part of the world's navies safely at all seasons and all tides, were obviously enough to mark it from almost the

Kodachrome by B. Anthony Stewart

Sailors Keep Portsmouth in Business; They Affectionately Dub It "Pompey"

Many on retiring settle down near the docks and ships they served. In the old days, when pigs roamed the streets, seamen lived aboard hulks in the harbor. This duty party leaves the Royal Naval Barracks.

Kodachromes by B. Anthony Stewart

♣ Cricket Players Quit a Field Bordered by Roman Walls and Norman Tower

To guard Portsmouth Harbour against marauding Saxons, Romans around the year 300 erected here a fortress, *Portus Adurni*. Portchester Castle was built some 900 years later by Norman kings. Walls of its 110-foot-high keep are eight feet thick.

♥ Jack Tar's Head Is in the Clouds; His Feet Tread Historic Ground

On Southsea Common Edward III mustered the 11,000 bowmen who fought at Crécy. Henry V, Henry VIII, and others massed their forces here. Nelson strode the Common going to his death at Trafalgar. Gardens and playgrounds now deck the mile-long field.

As Quiet as a Village Harbor Is the Camber, Portsmouth's Commercial Anchorage

This basin gives no hint of the bustling Dockyard near by. Low tide dumps the fishing vessels on a melancholy mud waste. The cupola tops St. Thomas's Cathedral, founded in 1180.

Royal Marines Display the Military Styles of Three Centuries

Grins show the amusement of these sea soldiers at being used as fashion models. They line up aboard the battleship *Duke of York* at Portsmouth.

Old costumes, preserved in chests for just such occasions, are incomplete. Outfitting the man on the left was simple; he wears the modern uniform. His companion at far right has the first Marine dress, style of 1664, when 1,200 "land souldgers prepared for sea service" were organized as "the Duke of York and Albany's Maritime Regiment of Foot."

Since that year British Marines have fought in so many countries and on so many seas that the globe has become their insignia (page 521). They wear the name "Gibraltar" on their crest because in 1704 they defended the captured Rock.

When the Boxers attacked Peking (Peiping) in 1900, British and American Marines fought side by side.

Until recent years, Marines aboard ship were quartered near the naval officers, whom they traditionally protected in days when mutiny was not unknown. Navy ways and Navy architecture, changing through the years, have outmoded that arrangement.

Kodachrome by B. Anthony Stewart

Figureheads, the Gods of Sail, Retire to Their Valhalla

To the ancients a figurehead seemed as necessary to a war galley as its oars. Egyptians displayed a religious symbol on the stem, Phoenicians used a horse's head, and Romans employed a warrior's bust. Medieval Spaniards chose saintly figures. Englishmen liked dragons, lions, and, later, the enormous half-figures of national heroes (pages 519 and 540).

In 1848 the Portsmouth yards built their last naval sailing ship; and, with the coming of iron hulls, figureheads lost their natural perch below the bowsprit. The last British examples served the Royal Navy as late as World War I on sloops of the *Odin* class.

Victory Museum treasures some of these old naval prow pieces. Here stands helmeted Bellerophon, the mythical Greek who tamed Pegasus, the Winged Horse; Portsmouth launched him in 1818. Army signal officers admire the crowned and bearded figurehead of H.M.S. *Tremendous* (1784 to 1897). The turbaned Moor came from H.M.S. *Carnatic*, a Portsmouth-built warship.

Kodachrome by B. Anthony Stewart

White Ensign, Britannia's Battle Flag, Rises on H.M.S. *Duke of York*

In 1943 the *Duke's* 14-inch guns mortally wounded the German battleship *Scharnhorst*, long a thorn in the Royal Navy's side. Later she helped bottle up Japan. A 35,000-tonner, she remains one of Great Britain's five modern battleships.

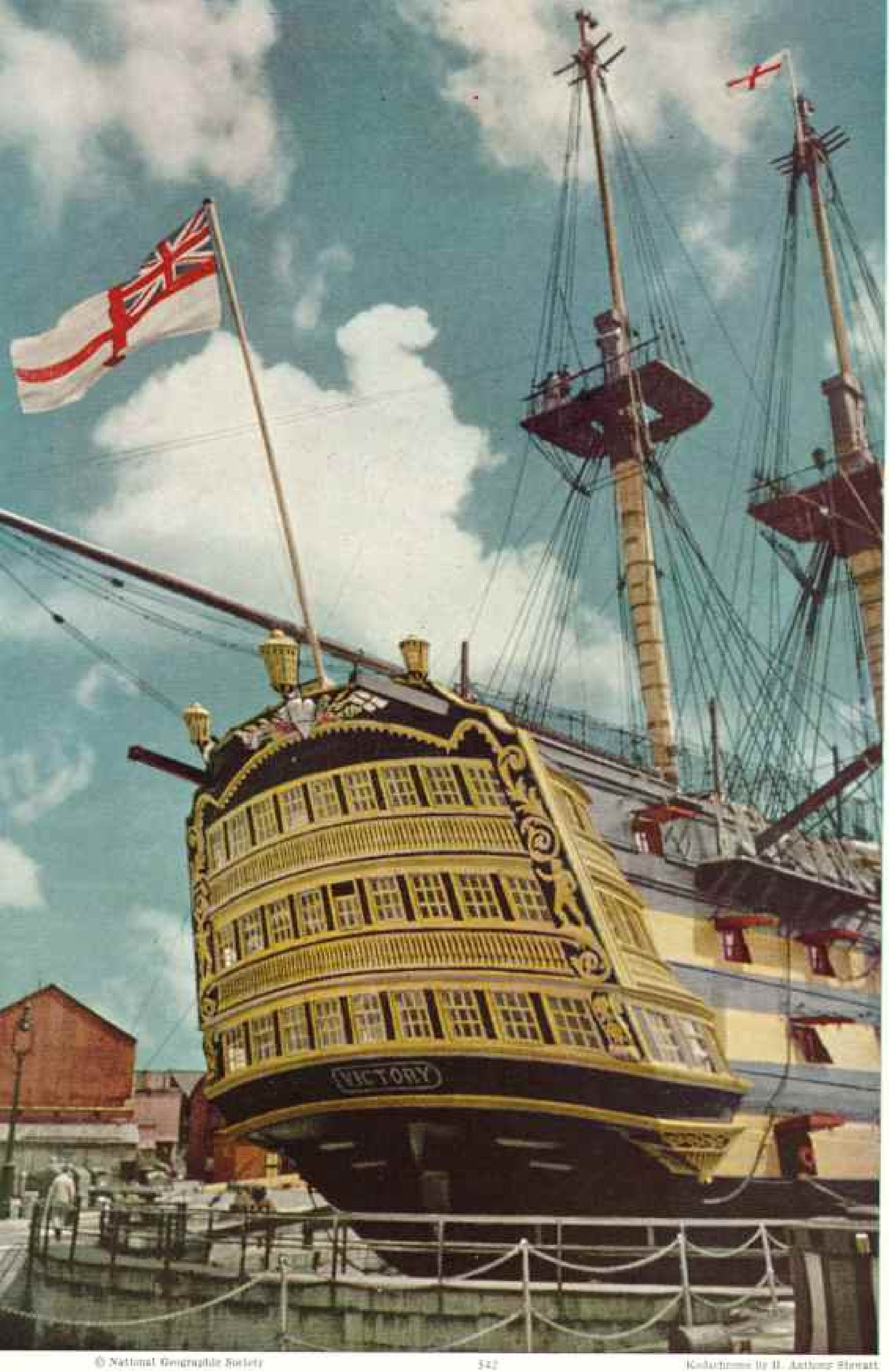
Day Begins in the Royal Dockyard with the Hoisting of the Flag

King John made Portsmouth a dockyard. Here in 1495-96 Henry VII built England's first dry dock. When Charles Dickens was born, his father worked at the yard. The figurehead glorifies Admiral Benbow, who in 1702 fought the French despite a shattered leg.

Reproduction by R. Anthony Stewart

The Sally Port, a Peephole into History, Dreams of Bygone Ships, Far-off Places

This gate in the old fortifications was the customary spot for rowing out to wooden warships in Spithead. From it, says a tablet, "naval heroes innumerable have embarked to fight their country's battles."



 542 Kodachrome by B. Anthony Stewart

"A Nobler Shrine than Westminster Abbey" Is *Victory*, Nelson's Flagship at Trafalgar

"Panorama of Trafalgar" Illustrates a Proud Chapter in British Naval History

The late W. L. Wyllie studied battle accounts and ship details for forty years before beginning the painting. His canvas depicts the Battle of Trafalgar as seen from the stern cabin of the French 80-gun *Neptune* (page 534). King George V and Queen Mary attended the 1930 unveiling in Portsmouth's Victory Museum.

beginning as the premier naval port of the Empire.

But draw a ring around Portsmouth 15 miles in radius, and the geographic reasons for its role in Britannia's naval history become even more understandable.

A centuries-old smugglers' paradise lies eastward in Langstone and Chichester Harbours, and a sportsman's heaven in Cowes an equal distance to the west. In their time, both smuggler and blue-blood sailing sportsman have served the Admiralty well as naval architects and as trainers of seamen.

Some of the best-known shipbuilding firms of Portsmouth, Gosport, the Solent, and Southampton Water descend from craftsmen who would build for the highest bidder, whether pirate lugger or King's revenue cutter. They taught each other designing for speed, as French privateer hate and English sea hound had taught each other earlier.

As for the sportsmen, the Admiralty watched the outcome of important races sailed in the Solent or Spithead, many of the Portsmouth officer members of the Royal Yacht Squadron serving as crews. After the schooner yacht *America*, representing a syndicate of the New York Yacht Club, outsped all British yachts around the Wight in the Exhibition summer of 1851, a British admiral hauled her out in a Portsmouth dock to study her lines.

One Gosport-Cowes builder still carries in his files today the lines of the stout launch his firm built for H.M.S. *Bounty* before she sailed from Spithead with Capt. William "Breadfruit" Bligh.

This builder will also tell you about the brig *Waterwitch*, built on his slips for the Royal Yacht Squadron's Earl of Belfast. Belfast's favorite sport with the armed *Waterwitch* was to wait for the Navy's fast dispatch brigs to get under way from Spithead, Bermuda bound, and then sail circles round them.

In 1834 the admiring Admiralty purchased *Waterwitch* and put her to chasing the fast Baltimore-built slaving schooners off west Africa in those days when the pursuing white ensign was the Negro slave's flag of freedom.

Still later, young British officers on leave from Portsmouth studied speed as volunteers in ships which ran contraband past the

Federal blockade between Bermuda, the Bahamas, and Confederate ports.

From such privateer-smuggler-sportsman antecedents, Portsmouth still draws zest. Sailboats are carried as standard equipment on almost all British naval vessels. While naval men take a sailor's afternoon off racing in Spithead or the harbor, telescopes may level across them to the famous Gosport yard and sail loft where some of the *America's* Cup challengers were designed, built, and rigged.

Where Ships Found Hearts of Oak

On the western edge of the 15-mile circle around Portsmouth is a final clue to her geographic predestination. Abutting on the Solent and reaching inland between Southampton Water and the Avon River is the New Forest.

Here many ships of the "wooden walls" around England found their ribs and hearts of oak. An average of 3,500 full-sized oaks, felled and then seasoned in the timber ponds, went into each stout hull.

After the launching at Buckler's Hard, a score of husky sailors at long sweeps would work the hull down Beaulieu River and across Spithead on the conveyor belt of the tide to the Portsmouth rigging towers and ropewalks.

Commissioned there, the ships were blessed by the chaplain of the Fleet with the traditional prayer: " . . . that we may ever be a terror to all that is evil and bitter."

Three miles from Buckler's Hard is Sowley Pond. Here, in the 18th century, ironstone broken from Hengistbury Head and the Hordle Cliffs was worked in blast furnaces heated with charcoal from the New Forest, and shaped by a water mill's tilt hammers into fittings and guns for the ships.

With a forge and rolling mill near by in the upper tide-creek veins of Portsmouth Harbour, Henry Cort, to break Russia's grip on the iron trade, developed in 1784 the puddling process which helped to make British ironmasters second to none.

The strength grown into the native oak and the spirit tempered in the iron torn from Channel headlands were the breed and the blood enduring in the great ships.

In the year of Waterloo, the astonishing sight of the first steam vessel puffing into Portsmouth Harbour broke up a court-martial sitting in the *Gladiator*. But the tradition of sail and oak died hard. In the Crimean War against Russia, the Admiralty used paddle steamers simply as tugs to tow the big wooden three-deckers into position for shelling the batteries ashore.

But in 1862 *The Times* of London yielded to the inevitable in a dispatch describing the world's first action between ironclads, the battle between the Federal *Monitor* and the Confederate *Merrimac* in far-off Hampton Roads, Virginia:

"Whereas we had available for immediate purposes one hundred and forty-nine first-class warships, we now have two, these two being the *Warrior* and her sister ironside [*Black Prince*]. There is not now a ship in the English navy, apart from these two, that it would not be madness to trust in engagement with that little *Monitor*."

A new dreadnought age of armor and machinery had come.

One of the best vantage points for a farewell view of Portsmouth is the Sally Port, cut through the sea ramparts by the Square Tower and by the tide running strongly past the harbor entrance. Here "naval heroes innumerable have embarked to fight their country's battles" (page 541).

In the Spit roadstead where rebellious seamen were flogged through the drumming fleet or keelhauled from yardarm to yardarm, Peter the Great of Russia, enchanted by the spectacle of a sham battle in 1698, exclaimed that the life of an English admiral was more to be envied than that of a Tsar of Muscovy.

The young Queen Victoria, thrilled with her first naval review in 1842, exulted: "I feel today that I am indeed Old Ocean's youthful Queen, and that I am indeed surrounded by those who will uphold that title in the battle and the breeze."

Her great-great-grandchild Elizabeth, now Queen, has as consort a handsome sailor prince.

Submarines Lent the Land Their Power

I stood on the Sally Port one afternoon in Britain's grim winter of 1946-47. The nation's reserves of fuel and energy had been exhausted by the gales of war.

From the sea, one by one, submarines slipped silently by me. They were headed for the Dockyard to lend the power of their Diesel-driven generators to the machines which, lacking coal, would otherwise have stopped.

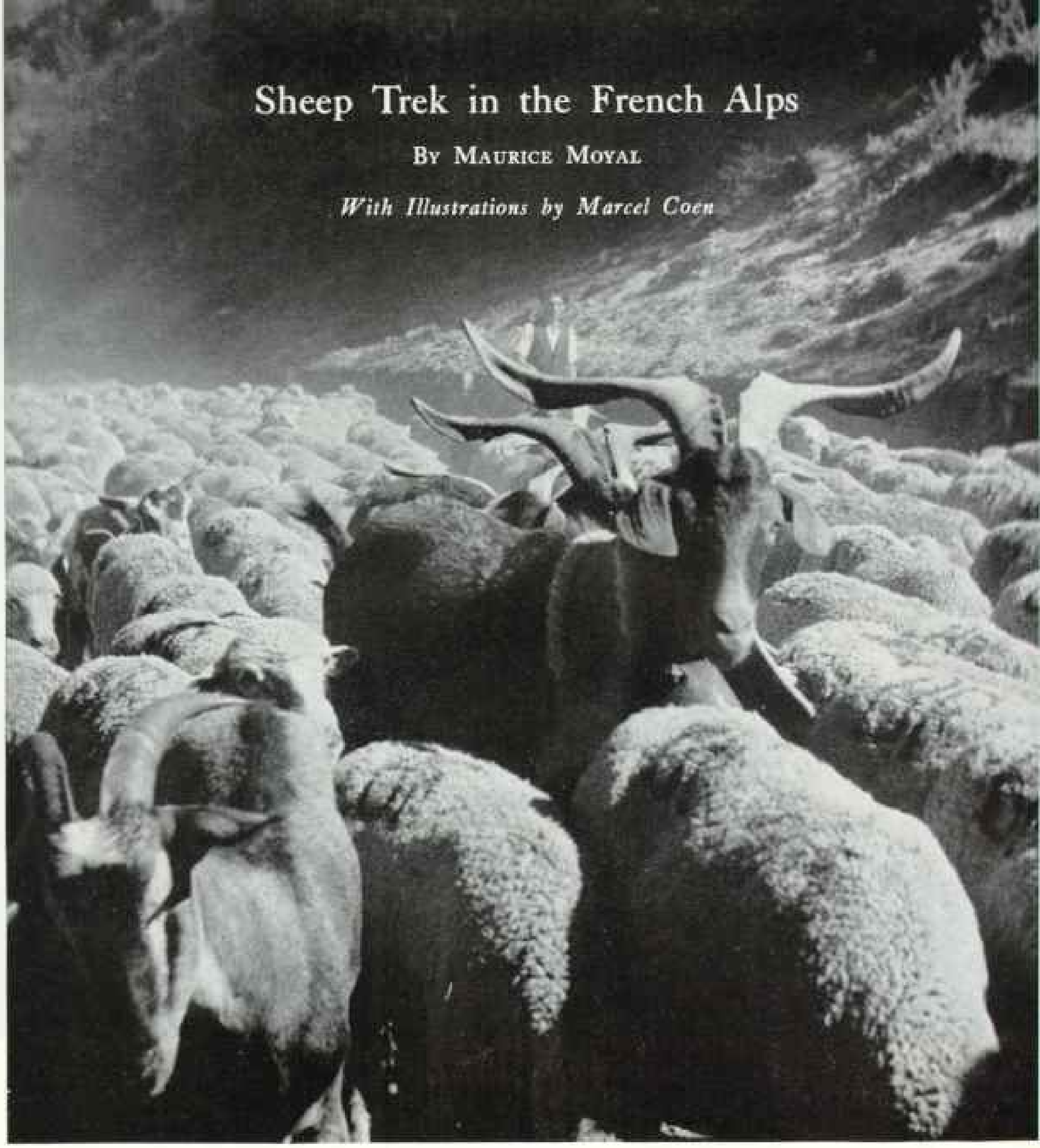
While I watched the day fade through the snow squalls, back against the hills of Wight, the giant swift shadow of the twin-funneled R.M.S. *Queen Elizabeth* smoked in from the sea. Suddenly across the intervening water came the sea queen's thunder voice, in a roar of greeting to the hills and to the fighting ships.

That voice proclaimed to all the lionhearted that while Britain's link to lands across the sea was kept unbroken, the mother of fleets and nations still was "stronger than the storms."

Sheep Trek in the French Alps

By Maurice Moyal

With Illustrations by Marcel Coen



FOR Jean Chemin, French sheep raiser, summer ushers in a centuries-old trek that takes his flock of 2,300 sheep and goats from sea-level grazing lands to lush pastures 8,000 feet up in the Alps, within a stone's throw of Italy.

Toward the end of spring his sheep get leaner and leaner. Their flat, scissorlike jaws scrape the lowland pastures bare, upturning every pebble in their quest for the last blades of grass. As La Crau plain becomes a burning caldron under the fiery sun, they suffer intensely from the heat.

To make the long trek with the flock, cameraman Marcel Coen and I joined Chemin at his home village of St. Martin de Crau, 38 miles northwest of Marseille, near Arles (map, page 549).

Alpine Thaw Is the Starting Gun

Despite his eagerness to start, Chemin had to wait for the thaw to set in on the Alps. At such high altitudes spring replaces winter almost overnight. When the sheep reach journey's end, a rich carpet of tall grass and forage herbs spangled with myriad wild flowers awaits them.

The sheepman used the last days to complete careful preparations for his expedition and the months he would spend far away

from centers of population. Into a covered wagon he heaped everything needed by people remote from civilization and markets, from thread and needles to salt and brandy, from sheep medicines and extra clothing to coffee, sugar, and bacon.

Oversight of the most trivial thing would call for a day-long hike, down dales and up high hills to the nearest village, Bousieyas, ten miles from his shepherd's cabin, which stands in the shadow of 8,396-foot Cime du Voga.

Night Treks Avoid Scorching Heat

The trek started the same morning the little local newspaper announced "Thaw on the Alps!"

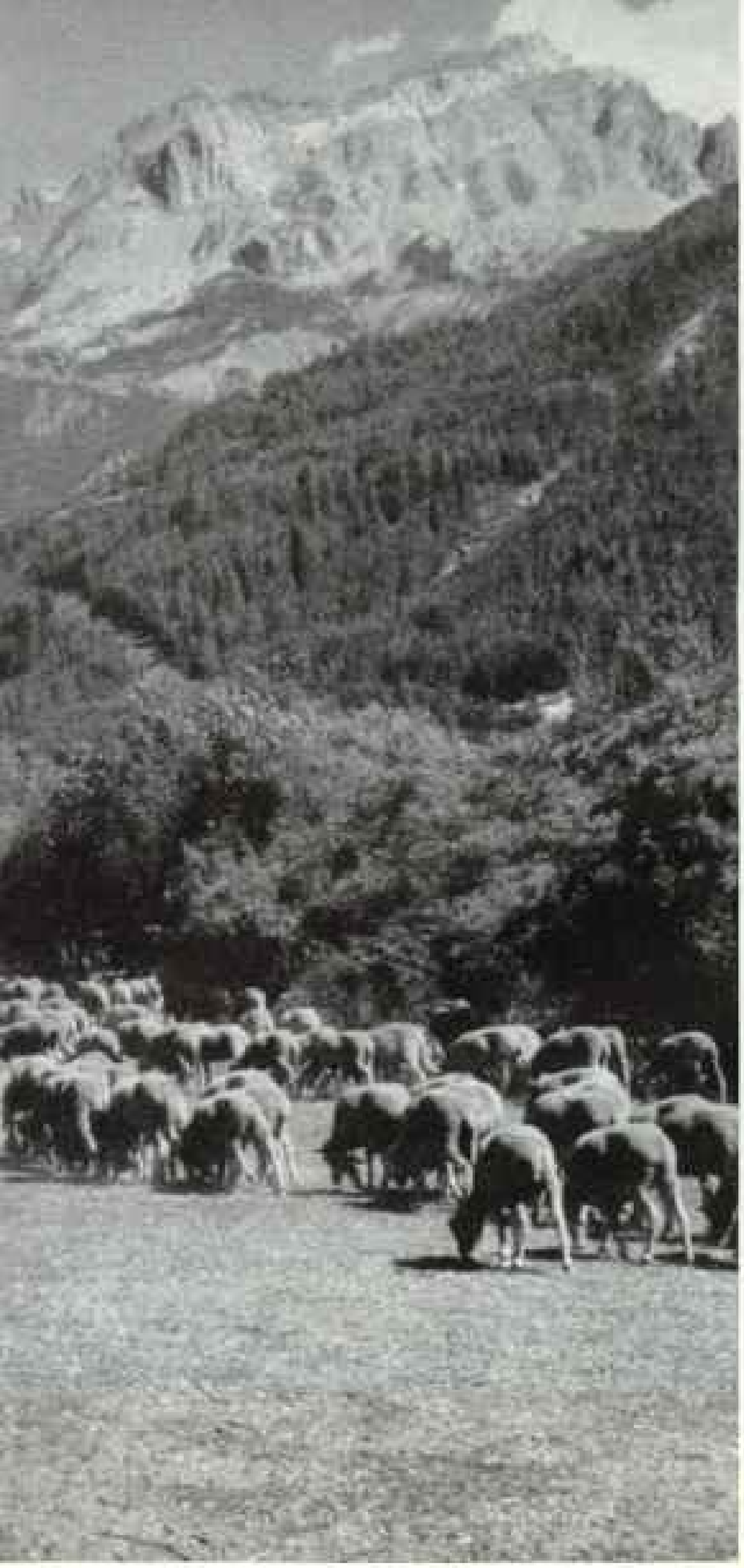
Because the animals must be acclimated slowly to freezing mountain nights, the drive is made in 13 marches ranging up to 15 miles in length.

To evade the scorching heat at the outset, the flock traveled mainly after dark (p. 551).

At 7 p.m., on the first day of summer, we set out. Bastian, 67-year-old *baïlé*, or chief shepherd, set the animals on their long trek with the sacrosanct formula, "Brrrr, veni, veni pitchoun!" (Now, move along, little ones.)

Accompanied by his faithful dog Lamir, half wolf and half shepherd, Bastian was to lead the whole way and keep the pace at a steady mile and a half an hour. He warned me that such a slow pace, best for the flock, would be hard for me, for it is unnatural and tiring to cut the length of one's step by half.

Lamir barked at the hocks of the six trained rams that would lead the flock. When shorn, they had been left with three tufts of wool on their backs, to allow the shepherds an easier grasp if the flock should suddenly stampede in fright.



Through an Alpine Valley Ambles a Bleating, Hungry Flock

The covered wagon carries provisions for the shepherds' stay in the mountains. Donkeys pack the precious cargo up higher passes. Shepherds take care not to overlook one necessary item, from needles and thread, food and clothing, to salt and sheep medicines. To forget one article means a day-long hike from the remote mountain pasture to the nearest village.

While flocks rest, shepherds pedal their bicycles in search of pastureland en route. The author (upper), who accompanied one of the French sheepmen, stops to repair his machine.

One of six rams trained to lead the flock bears his owner's mark in red paint. Three tufts of wool, left after shearing, allow shepherds an easier grasp should the flock stampede. This ram is a cross between a Dorset Horn and a Rambouillet (page 548).

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Pasture-bound, Nimble Rambouillets Take Rough Terrain with Ease

One scrambles headfirst down a rock; others wait their turn. Shepherds worry constantly lest animals be left behind when fleece catches on a thicket. This breed is noted for its high-quality wool.

Soon, to the jangle of the rams' bells, goats, horses, asses, dogs, and sheep got slowly under way.

In the middle of the flock shepherds François and Simon shrilled whistles and cracked long whips. To urge their dogs to start prodding, they shouted in a drill sergeant's voice: "Brillant, Tambour, Marquise, Garçon, jappe, jappe, coquin!" (Bark, bark, you rascals.)

Symphony of Bells Identifies Flock

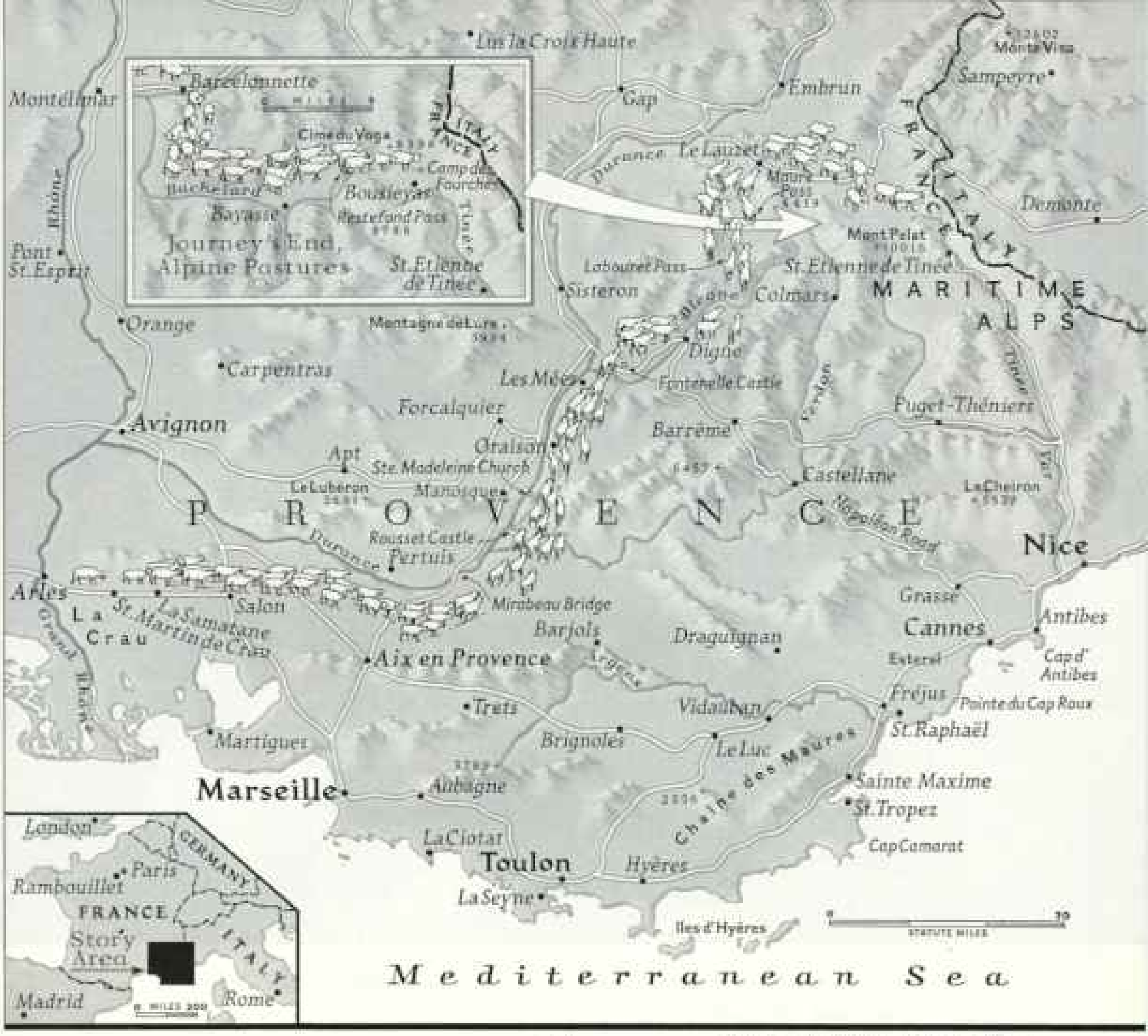
Bringing up the rear, at the head of the steady gray mare that, with her colt, drew the heavily laden wagon, Jean Chemin set the rear swell in motion with "Ite, pitchoun!" Unknowingly he repeated a part of the Latin phrase uttered by Roman Catholic priests to send their flocks home after Mass—"Ite, missa est." (Go, the Mass is ended.)

Under the sun's slanting rays the whole bleating flock, enveloped in a dense cloud of golden dust, tramped forward to the merry accompaniment of their bells.

At a distance the ringing of a flock's neck bells sounds like the harmony of swift-running waters. During the drive it set the rhythm of our life.

In all, there are forty kinds of bells, making up four scales. Each sheep farmer chooses his bells so their notes blend into a sonorous chime peculiar to his own flock. The loud, clear ringing of the rams' and asses' bells, the mere tinklings of those of the horses and dogs, are attuned in a distinctive chord. Thus, even at a distance, those who know can identify by ear the flock in motion (page 561).

As we got under way, the deep peace of twilight crept over La Crau plain. Legions of frogs in the rapidly diminishing rain pools began their monotonous evening singsong. Mixed with the pungent smell of wool grease and the sweat of horses and asses was the



549 Drawn by Harry R. Oliver and Irvin R. Alleman

From Sun-baked Southern Plains the Sheep Trail Weaves Across France to the Alps

Summer heat in La Crau area makes sheep migration necessary. Movement to the high Alps must wait until after June's thaws. To acclimate flocks to freezing temperatures at night, the trek is made in leisurely fashion, with 13 daily—or nightly—marches. In autumn, shepherds drive the flocks back to the plains.

dry scent of the overheated, drought-chinked earth.

At first I sensed that my host had a lingering suspicion of my motives. Even though I had been introduced by a mutual friend, the sheep raiser was wondering, in the back of his mind, why I should share his life of toil and hardships even for a few days.

Farmers Eye Flocks with Distrust

Generally, owners of sheep are not eager to have with them outsiders who may bear witness against them if their animals "stray" into cultivated land. No love is lost between them and the settled people bordering the trail to the Alps.

Originally the shepherds enjoyed the right of pasture for their flocks for fifty-odd yards on each side of the trail. Little by little, bordering farmers encroached upon these pastures to the point of wiping them out through the simple process of gradually moving, then erasing, the cairns that marked the borders of the trail.

Consequently, when no one is watching, the sheepmen tend to turn their animals loose in fields and meadows at night. The farmers, however, are quick to take advantage of the least grazing on their lands to claim high damages when they can back their claims with evidence.

We marched all that night. About 3 a.m. the stars waned and looked as if detached from the sky. At dawn it was as if a dagger had stabbed the graying firmament, spilling a track of blood. The black outlines of a Provençal farmhouse emerged; we were at La Samatane, our first halting place.

Behind a screen of cypresses François kindled a fire between two flat stones, and soon

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On Provence's Busy Napoléon Road, Sheep Almost Meet Their Waterloo

Blaring horns caused a stampede; frightened animals surged around cars like a sea of wool. Motorists angrily tried to keep sheep off cars. The flock's six dogs, occasionally leaping on fenders to survey the scene, finally calmed and reorganized their charges. The author and photographer helped restore order (page 560).

coffee was boiling. While we drank cups of the strong, scalding beverage and devoured rashers of bacon with half a loaf, *polenta* was cooked for the dogs. Ravenously they devoured the thick, yellowish mush. Without bothering to spread our sleeping bags, photographer Coen and I were soon asleep.

Bicycle Hunt for a Pasture

When I awoke, the sun was high. Jean was untying leather thongs that bound a bicycle to the side of his wagon. He was about to look for a suitable meadow for his voracious charges. I accompanied him on my own bicycle (page 547).

No doubt during the night the sheep had snatched a few blades of grass en route, but this impromptu meal was not nearly enough. Their stomachs were almost empty.

After we had pedaled several miles, a farmer waved us to a halt. He led us to a lush clover meadow that seemed to me just the thing. It was cheap, too, the owner claimed: only the equivalent of $30 for all the clover of this matchless meadow where our animals could have their fill.

How wrong I was! This meadow was not worth a sou, I found. With the condescension of a grownup explaining a most obvious thing to a child, Jean told me that the animals were getting hotter and hotter and that such green stuff, still full of water, would be bound to give them colic.

I certainly wouldn't have picked out the dry and seemingly blighted meadow Jean finally chose. But its withered grass, ideal for a flock with a long trek ahead, had the right nutrition value.

We pedaled back to the flock, and Jean signaled it to get going. The village constable suspiciously accompanied us to keep a close watch over our animals' moves. In an ever-changing pattern the sheep would scatter and then line up for a while in single file, according to their fancy. But straying must be prevented at all costs. The law was watching!

Sheep's Eyes, Reflecting the Photographer's Flash, Gleam Like Headlights

Shepherds lead their close-packed charges over the Mirabeau Bridge spanning the Durance River. By night marches, men and sheep avoid southern France's scorching sun. Bastian, chief shepherd, set the pace for the trek at one mile and a half per hour, easy for sheep but tiring for humans (page 546).

The Durance plain, crossed by a silver thread of a river, unrolled before us like a carpet, dotted by pretty red-tile-roofed villages. The slowly unfolding horizon had for me a charm I had never appreciated while riding in a motorcar.

We were in one of the richest farm areas of southern France. As far as the eye could see, ripening grain stretched in swells of different hues, the dark red-gold of Italian wheat, the platinum blond of the French variety.

In some fields, farmers, to the accompaniment of gay Provençal songs and rhythmic hand clappings, were already threshing their harvest with stone rollers drawn by mares from whose collars hung little tinkling bells.

The six dogs of our flock tirelessly shuttled to and fro along the edges of the wheat fields to keep their charges from straying into them.

In the mountain pastures, I was told, a good dog will hunt all day for a stray lamb. When he finds it, he will gently pin it down with his paw and bark loudly for his master.

But not every dog has such a gentle disposition. Ill-tempered Tambour was stealthily biting the sheeps' hocks. With a well-aimed stone François recalled him to proper behavior.

"Why don't you file this wicked cur's fangs?" I asked.

"Because he's a valuable dog, worth at least $50, and if we did so, the sheep would soon stop fearing him. They must actually feel a dog's fangs, but their skin must not be broken."

Once in a while, the shepherd continued, rams of a flock in the high pastures will gang up against some particularly wicked dog and imprison him in a wide circle. With lowered horns they will gradually close in and trample him to death.

François had not actually witnessed such a strange scene, but he said his father had had a dog that almost lost its life in that way.

Unaccountably, the dog had submitted to

The Old Gray Mare Meets a New Member of the Flock

Some newborn kids weigh nine pounds at birth. Depending on pasturage and breed, they can gain as much as half a pound a day and double their weight in a month. Although baby teeth are present soon after birth, goats and sheep are slow to develop permanent incisors. Yearlings have only two; a full set appears in a four-year-old. On a grassy Alpine slope the shepherd fondles a kid destined, perhaps, to grow into a nimble rock-climber like its parents.

At times, on rough inclines, the Jean Chemin flock would advance only after male goats took the lead. Occasionally these animals would perch on the roofs of mountain cabins, as if to show off before their less agile companions.

←Lamb and horse lick at coarse salt spread on a flat stone. Each sheep consumes about a pound of salt a month.

These sheep take their name from the experimental farm at Rambouillet, France. Here, in the 18th century, the breed was developed from Merino stock imported from Spain. It yields both fine wool and good mutton. Rambouillets, imported into the United States in 1840, prevail on ranges of the West.

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Past a Lonely Provençal Castle Flows the Woolly Tide

Headed for Alpine pastures lush with grass, mingled flocks pass the imposing landmark. Red-painted "JC" marks identify the sheep of Jean Chemin, whose flock the author accompanied on its annual trek (page 545).

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A Shepherd Discards His Staff for an Umbrella

Rain in the lowlands en route prepared the sheep for later icy downpours in the Alps. The travelers encountered many kinds of weather, from bright sunshine to sleet storms. Once they were hit by egg-size hailstones (p. 562).

his fate, making no attempt to break the death circle. François's father had had a difficult time rescuing his whimpering aide.

When we arrived at the rented meadow, the noonday sun was relentlessly searing the landscape. The sheep, suffering from the heat, forgot about grazing. They hurried to shelter under the sparse shade of a few trees dotting the meadow and tucked their heads under one another's bellies. Those on the fringe kept turning round and round in a vain attempt to dislodge the happy few in the center from their shaded places.

Only when the sun had lost some of its fire would the sheep start grazing. The meal would take them several hours. Meanwhile, we had time for a snooze.

It seemed I had just snatched the traditional forty winks when it was time to get up. My limbs were stiff from lying on the bare earth. It was pitch dark.

Brisk puffs of wind wafted toward us the fragrant scent of thyme and rosemary growing on the near-by mountains. Occasionally flashes of heat lightning illuminated the dark velvet of the night, a night strewn with the bright diamond dust of stars. So brilliant were the constellations that they seemed near enough to pluck.

Even when seemingly lost in deep thought, Bastian, the sturdy chief shepherd, kept a keen eye on the flock. To the outsider, nothing looks more like a sheep than another sheep. But for Bastian every animal was a distinct personality.

"See this lively ewe?" he asked. "Three months ago she contracted a disease. Her tail swelled and filled with water; I tied a string around it. After 24 hours I untied it and pierced the tail with a big needle. Now there's no healthier animal in the flock.

"Does this ram look crestfallen? Why, the poor beast has a straw in his eye."

As the road climbed, the air became cooler. We followed the left bank of the winding Durance River, which was shrunk by drought to a narrow channel.

As we walked along the edges of a forest, rain began to fall.

"Why don't you take cover under those trees?" I asked Bastian.

"No, sirree," he replied. "This cool shower prepares the sheep for the icy downpours that will fall upon us before our journey's over."

We forsook the Durance Valley for that of the Verdon River, a swift, sea-green torrent. In the pure air of dawn our swim in this icy stream was a joy.

Sheep Jam on a Hairpin Turn

The distance between 16th-century Rousset Castle and Oraison we covered in a single stretch. While rounding a difficult hairpin bend on the steep slope, near Sainte Madeleine Church, the lead sheep, seeing most of the flock below them, abruptly turned tail and ran to join them. For half an hour the woolly snake sought to chase its own tail, resulting in a veritable animal log jam.

Before tackling the first mountain passes, we rested for a whole day at Oraison. Ahead

↑ A Lantern Lights the Shepherd's Way

Mares and donkeys drawing the wagons are good-tempered and steady. To avoid trampling the sheep, they halt automatically when the flock stops. Beside his gray mare stands Jean Chemin, sheep raiser.

↓ Anxious Eyes Watch for the Pot to Boil

Regular diet of shepherds is thick soup, lard, ham, and codfish roasted under ashes. Rashers of bacon, French bread, and coffee round out their meals. Dogs eat *polenta*, a thick, yellowish mush.

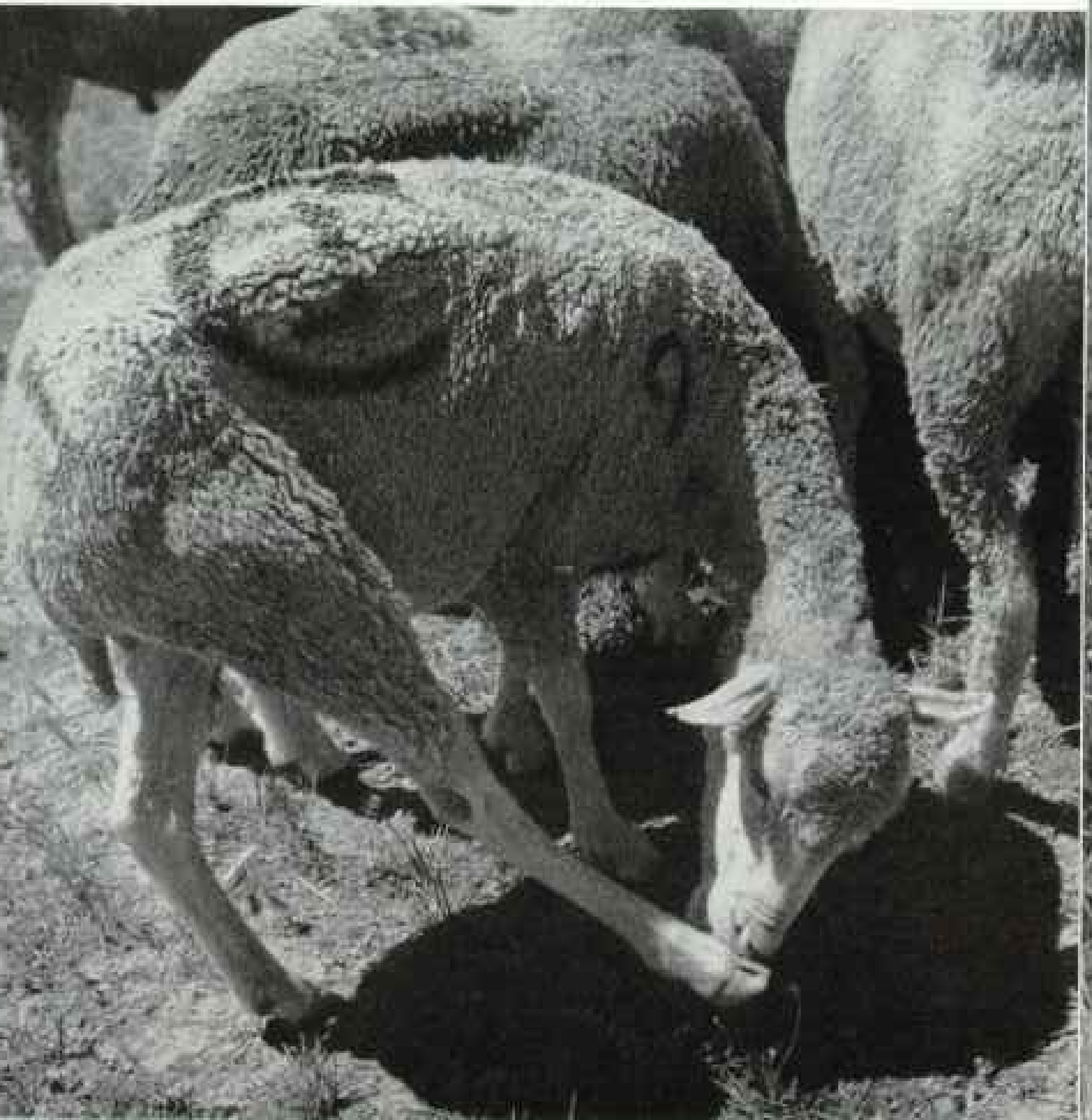
Sleep Overtakes a Dog, Exhausted from Chasing Sheep

↑ Frequently, to keep their charges in line, the shepherds' dogs nip the hocks of sheep, hard enough to assert authority but not to break the skin. Usually the sound of the dogs' bells suffices to keep the animals from straying (page 561).

← The mare did double duty—draft horse over lowlands, pack animal in the mountains.

Many a Sheep Is Limping by the Time the Long March Is Over

This footsore animal's right ear bears a V-shaped notch, mark of Jean Chemin's flock, as well as his painted "JC" on the wool. Close-cut fleece covers a shapely leg of mutton. -> Grasses almost hide a French Alpine nanny's newborn kid, at her feet. Both sheep and goats are tethered close to their young so that they will not abandon them.



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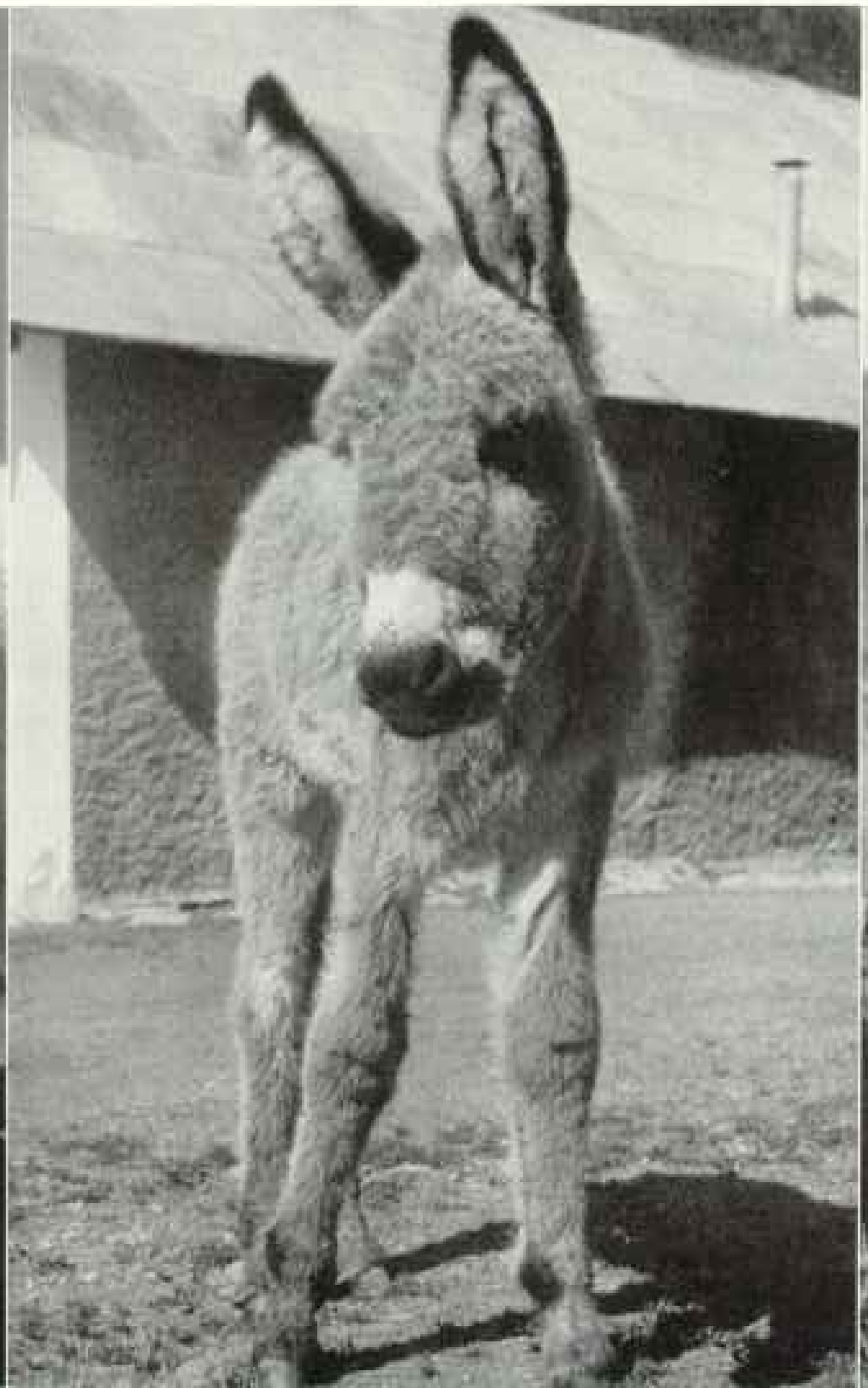
Across a Snow-flecked Mountain Valley, Shepherds and Dogs Guide the Flock of 2,300 Sheep and Goats

Goats, Good Climbers, Lead Sheep Over Rough or Snowy Stretches; Shepherd and Baby Donkey Enjoy Alpine Sun



560

Too Tired to Walk, Little Curly-top Gets a Ride

When some of the sheep began to limp toward the end of the journey, they were hoisted aboard the covered supply wagon. The vehicle also became a maternity ward when one of the goats produced a kid (page 557).

I could see heights far more formidable than the lesser chain of Alps already climbed. In the pure light of upper Provence the snow-capped Montagne de Lure stood out so clearly that it seemed cut from cardboard.

We passed the big, curiously shaped Les Mées rocks, called the "Capuchins" for their likeness to the hooded friars, and crossed the Bléone torrent. Then we took the Napoléon Road.

It was noon, and the thick traffic on this imperial highway almost proved our Waterloo (page 550). Cars, charabancs, trailers, trucks, and buses blared their horns and seemed to delight in frightening our sheep. Soon the jam reached monumental proportions; everyone began to argue and blame us for the trouble.

In glaring heat and blinding dust we tried frantically to round up the ever-stampeding sheep. The dogs leaped on car fenders and stood like generals viewing the seesaw of battle. Somehow they managed to dam the unruly current into a single stream and leave a narrow channel for the vehicles.

I found myself doing my bit, waving my arms wildly and lustily shouting, "Ièou oh-ho, pitchoun!"

Marcel also lent a helping voice. Our extra hands were a boon, and the shepherds' attitude toward us changed radically. We were accepted as full members of the outfit.

Soon we found that a number of the sheep were limping. During a halt at Fontenelle Castle, these were marked with a rose-tinted paint. On all but one of the last stretches they would be carried by truck.

Jean put one sheep, too exhausted to jog along, in the back compartment of the wagon; soon a goat near to kidding time joined it.

While crossing the 4,419-foot-high Maure Pass, the wagon echoed with frail bleatings. Jean brought out a newborn kid and laid it on the grass to dry.

To introduce the baby to its mother, Jean tied the goat beside it. This must be done at once, for even after an hour or two it might be too late (page 557).

At lambing and kidding time some ewes and nannies refuse to acknowledge the blood of their brood. Shepherds, therefore, tie each mother to her offspring for a day or two in the corral. If the mother proves too restless for nursing, her legs are tied together.

Dog Bells Mean Bare Fangs to Sheep

It seemed to me the ewes recognized their lambs by scent. Simon had a story about this. During the previous year's return trek to La Crau pastures, twenty lambs, huddled one against another, were exposed to the rains. They must have lost their individual smell, for their mothers chose to ignore them, and the cumbersome tying operation had to be done all over again.

The dogs, we found, were getting weary,

and their paws, inflamed by repeated contact with the hot asphalt of the road, left bloody marks as they limped along. We had to do their job, running and waving their little bells at the ever-stampeding sheep. Quickly the strays got back into line, for in their minds the tinkling of dog bells is associated with bare fangs.

The slopes were getting steeper and steeper. After a welcome halt at a pass, the trail took a shortcut over a mountain, allowing us to leave the endless hairpin bends of the high-road. We followed a dried stream bed strewn with huge rough rocks and round, polished pebbles.

Jean, having to stick to the road with his wagon, handed me his whip, putting me in charge of the rear guard. Sweating and waving a dog bell to prod the stragglers along, I toiled over the uneven rock bed.

At the beginning I could not bring myself to use the whip, but soon I had no choice. Bazaine, my dog, barely managed to crawl along and was not much help.

I was nearly at the end of my tether when we reached Le Lauzet, where we took a day-long rest. The strain of the long journey was beginning to tell on everybody. Worn out with fatigue, I had become an automaton.

At night I held on to a shaft of the wagon as we walked. Now and then I would fall into a doze, but soon a sharp bump against mare or wagon would jolt me awake.

The shepherds were not above falling asleep. But old Bastian was so used to the trail that he managed to trudge along in his sleep as long as his feet were treading the hard asphalt of the road. As soon as they touched soft grass, he would wake with a start.

Once Simon fell into a canal while asleep; after that, to keep himself cool and wide awake, he took to shedding garment after garment. He finished our last two stretches stark naked.

We cut across Barcelonnette by night. It

561

The Bellmaker of Arles Tests His Product with an Ass-Bone

Each sheep farmer chooses his bells so that their notes blend into a chime peculiar to his own flock (page 548). Thus he can recognize the music. Père Michel, expert at an ancient craft, proudly produces a sonorous bong.

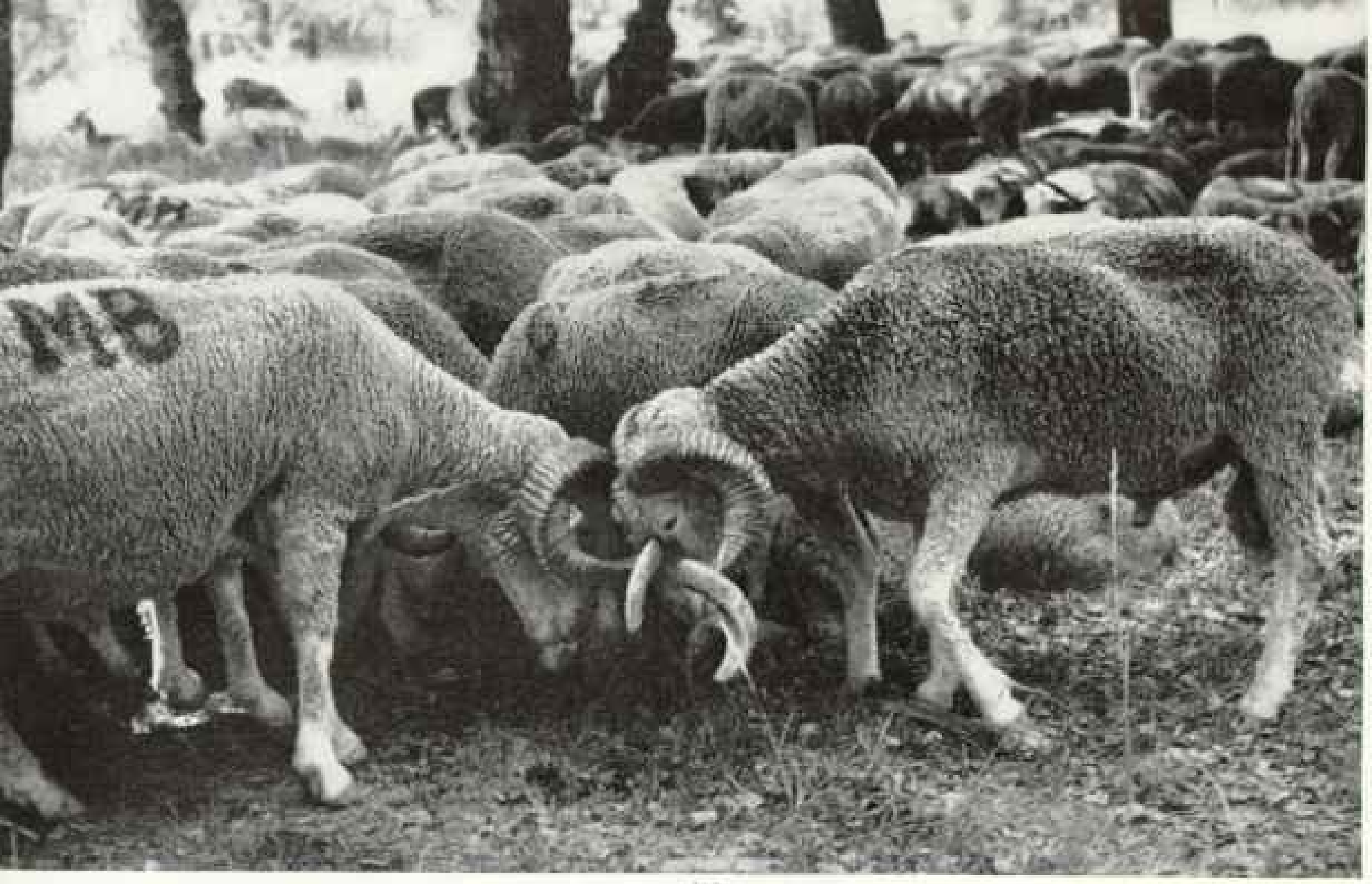
was as if a living torrent had flooded the sleeping little town. Our bells echoed loudly in its narrow, winding streets, bordered by high-gabled old houses.

The aroused dogs of Barcelonnette began a growling concert. In our dogs' barking rang all the scorn of the free for the chained; and the mating calls of our part-wolves found a deep echo in many a locked-up female.

Scaling the Last Mountain Barrier

Then we began the narrowest and dizziest part of our long trek, following a road that climbed high above the Bachelard Valley, a mere trench seemingly hewn in living rock by some supernatural sword stroke. The Alpine torrents we had crossed were fittingly climaxed by its wild stream, teeming with trout. The foaming waters leaped in a never-ending succession of rainbow cascades.

The Bachelard is the smallest and most



362

Belligerent Rams, Clashing Horns in Battle, Disturb the Flocks' Peace

easterly subtributary of the Rhône in these parts. We had to climb over a last steep chain of mountains that separates its catch basin from that of the Tinée River. In the upper part of this valley was our journey's end.

Before tackling this last and most formidable obstacle, we rested 24 hours in Bayasse village at the beginning of 8,786-foot Restefond Pass. The sheep must eat their fill. If they were to cover this last stretch hungry, they might climb over the steepest and barest rocks in their search for grass—and fall to their death.

Ten flocks from La Crau plain had already invaded the Bayasse pastures. All the shepherds gathered for a rousing banquet-size meal at the local inn before scattering over the Maritime Alps district. During this last fling the innkeeper was ever ready with another helping of fresh mountain trout or an additional bottle of heady local wine.

Since we were soon to exchange the highway for a mule track, the wagon was left behind. Its cargo was transferred to pack-saddles on the mare and the asses.

Along this final stretch, often shrouded in mist and clouds, the asses were to lead the way, for they have a phenomenal memory for topography. Once an ass has trod a winding mountain track, he will remember its bends forever.

I was as heavily loaded as any pack animal. On top of an 80-pound rucksack I carried part of Marcel's photographic equipment.

Soon the trees vanished. Under a glaring sun we climbed some three thousand feet more through a barren landscape of fallen rocks and snow patches.

At a place where deep snow buried the mule track, the flock stopped abruptly and refused to forge ahead. The male goats were prodded to take the lead. Only when they had trampled a way through would the sheep advance.

We had breakfast on a large stone slab called "Hannibal's table." Tradition has it that the great Carthaginian general, crossing the Alps, offered sacrifices on it to placate a local deity.

Flock Stampedes in Crashing Storm

Clouds and thick fog shrouded the top of Restefond Pass. In the nick of time the sheep reached the relative safety of the strategic road that cuts across the pass. Egg-size hailstones began to lash painfully at their muzzles. With lowered heads they submitted to the fury and again refused to move.

"Quick, take off your hobnailed boots and throw away everything in your pockets made of metal!" yelled Marcel.

I could soon see his point; the whole mountain range echoed with loud thunderclaps. With a blinding crash, lightning struck the top of the pass, a few feet above our heads.

Like chaff in the wind the maddened animals scattered. The wind veered and lashed

▲ Shepherds Eat with Gusto at Journey's End

➤ François shaves for the festival honoring the shepherds for a job well done.

▼ A wooden collar, designed to hold a ram's bell, displays carved figures and initials of the sheep raiser, Jean Chomin. Shepherds turn to such work to help while away the long, solitary watches over flocks.

Onward a Shepherd Leads His Flock Beside Frowning Alpine Crags

Aided by their dogs, such shepherds trudged some 180 miles with ram- and goat-led sheep, from St. Martin de Crau to lush pastures 8,000 feet up in the mountains. Traveling through valleys, across rivers and plains, the procession reached its goal, Camp des Fourches meadows, with few casualties.

at their tails, adding to the rout of the flock.

Forgetting our own safety, Marcel and I ran like mad in our stocking feet through low-creeping fog to round up the terror-stricken animals.

"First the rams!" Jean shouted somewhere.

How ludicrous to have taken off our boots to run after animals which were wearing metal around their necks!

Soon the loud jangle of the rams' bells began to rally the scattered flock. Luckily we had caught only the tail of a freak storm. Before long the gale stopped and the fog cleared away. Everybody was relieved that our casualties were few, for the previous year on this same pass Jean had lost fifty sheep struck by lightning.

In a steady sleet drizzle we climbed down a mule track, turned by the storm into a muddy torrent, to the 8,000-foot-high Camp des Fourches pastures that Jean had rented for the season.

Rounding a last bend, I saw ahead three small cabins of unhewn stones, with roofs sloping nearly to the ground. The largest was the shepherds' cabin; the others were the stables. Near by was an open-air corral for the sheep.

Dead tired and half frozen, I fell, rather than sat, upon a stool in front of the cabins. Hot coffee and warm food soon revived us.

As we ate, a semicircle of angrily bleating animals advanced on us. François smiled and explained that they were clamoring for their salt ration.

In the mountains dew lacks salt, and animals cry for body builders in solid form. Salt must be spread over flat stones where they can lick it (page 552).

"Quiet, you brutes!" cried Jean. "Always on the trail you came first. Now that we have reached journey's end, let us have our home-coming meal in peace!"*

* For an account of an American sheep drive, see "Arizona Sheep Trek," by Francis R. Line, NATIONAL GEOGRAPHIC MAGAZINE, April, 1950.

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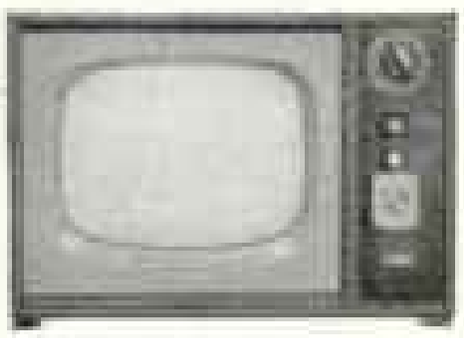

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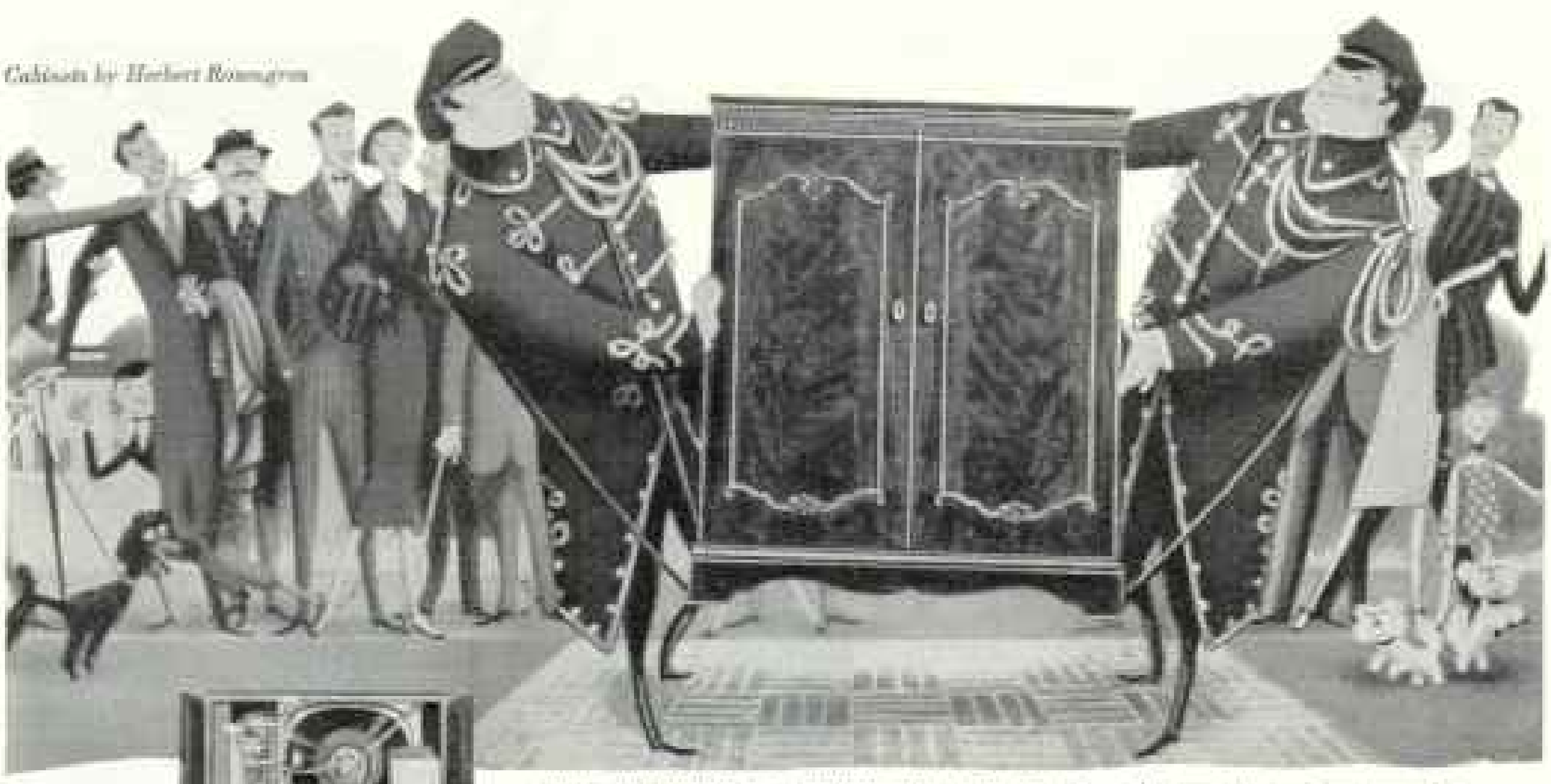

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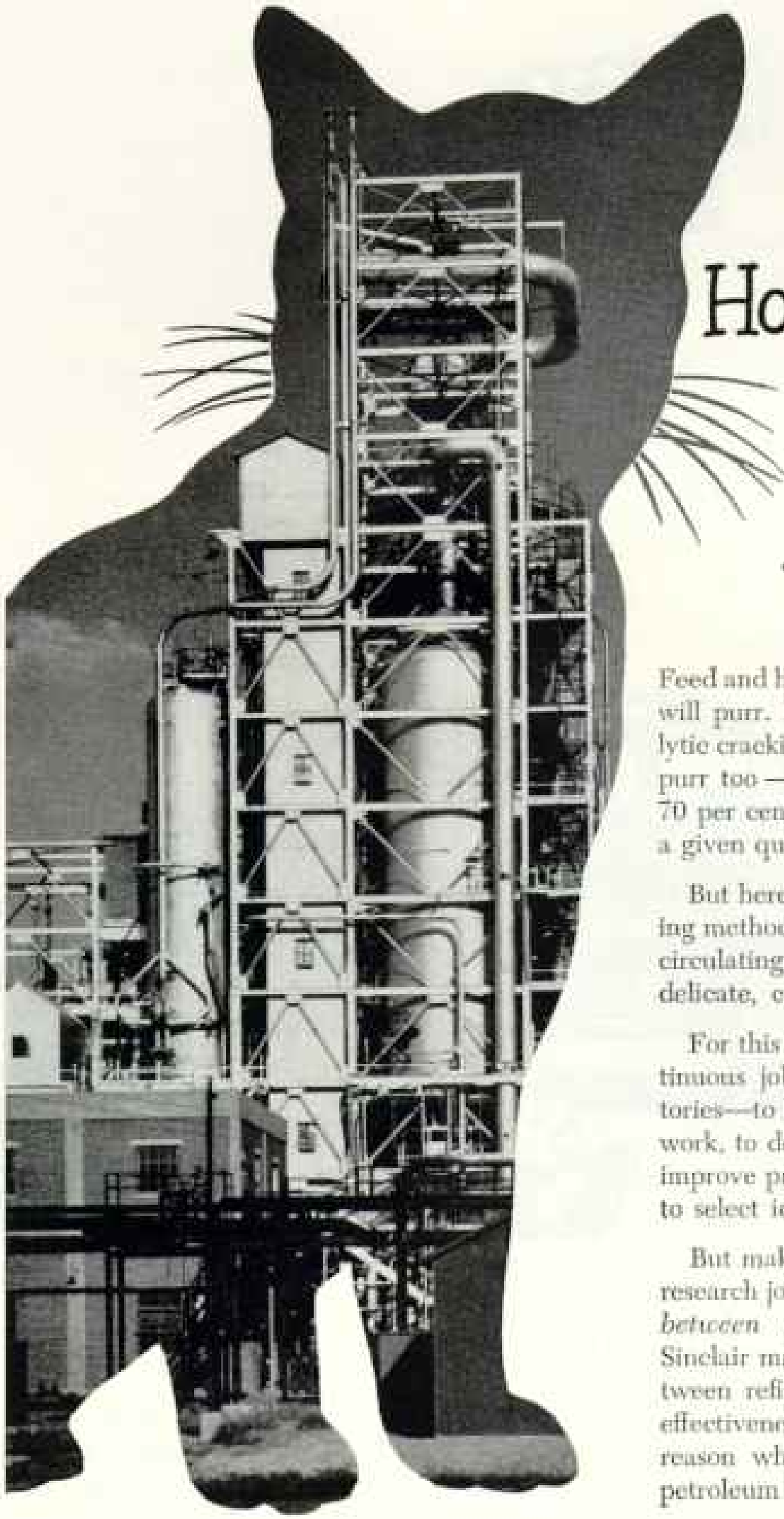

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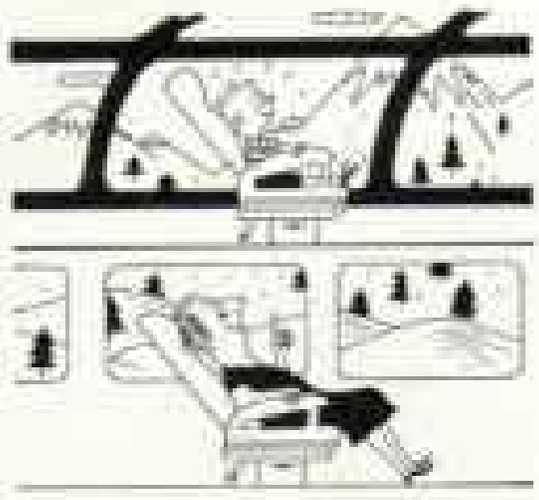

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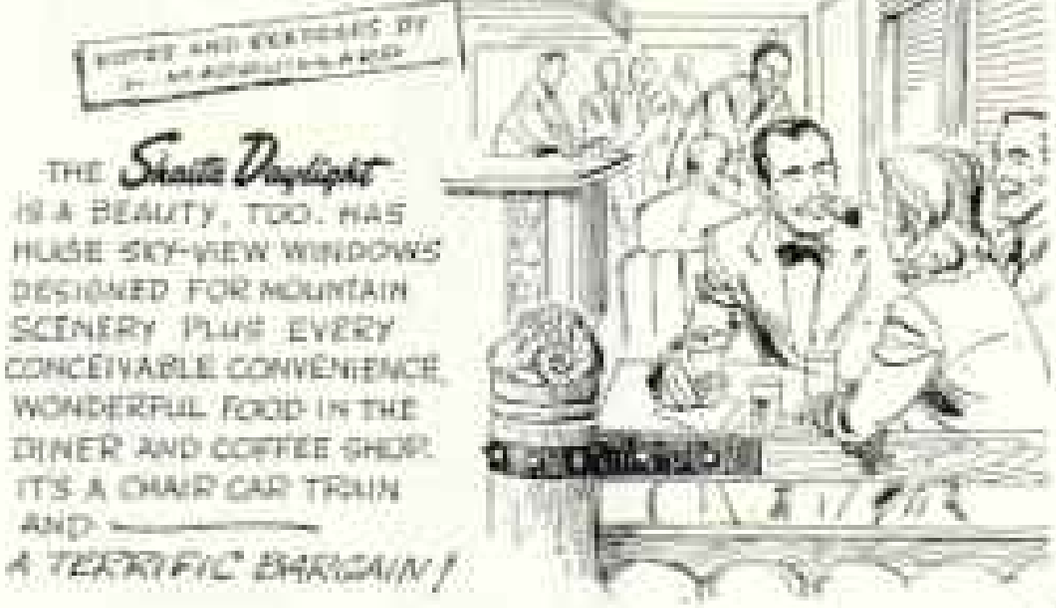

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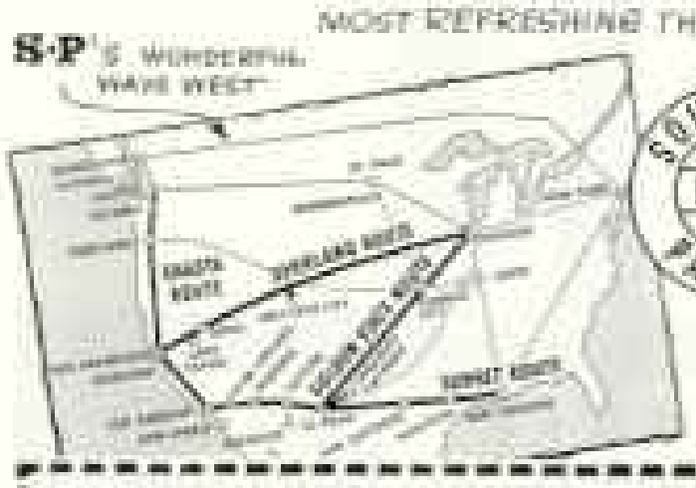

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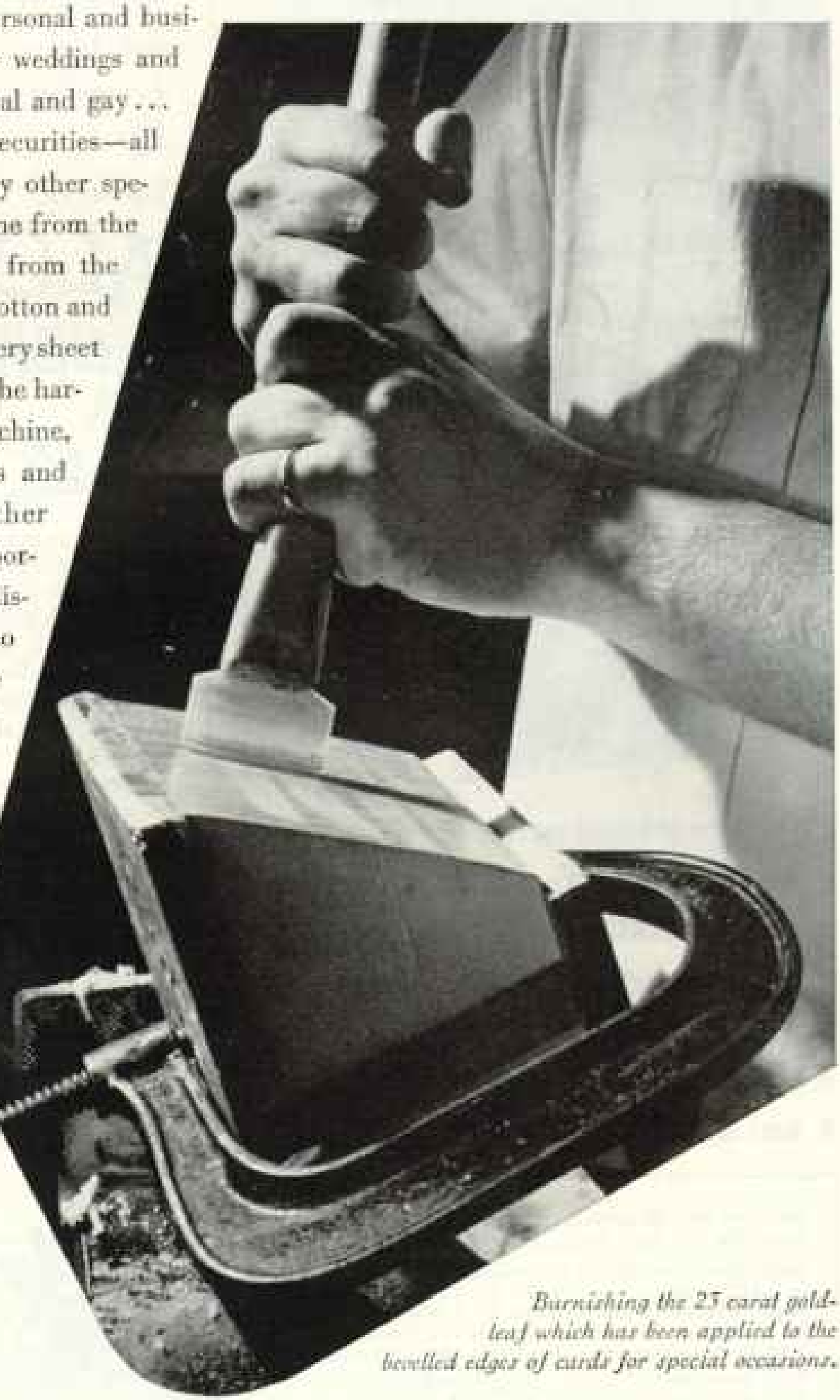

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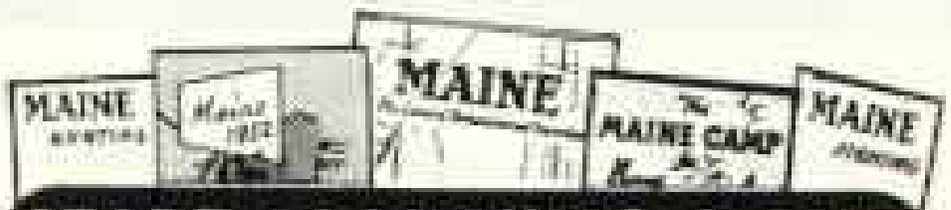

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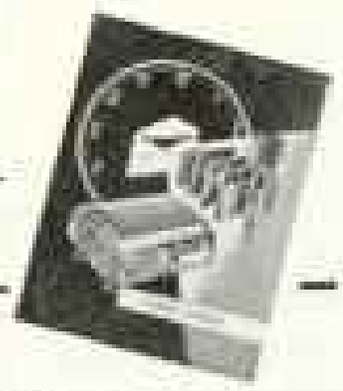

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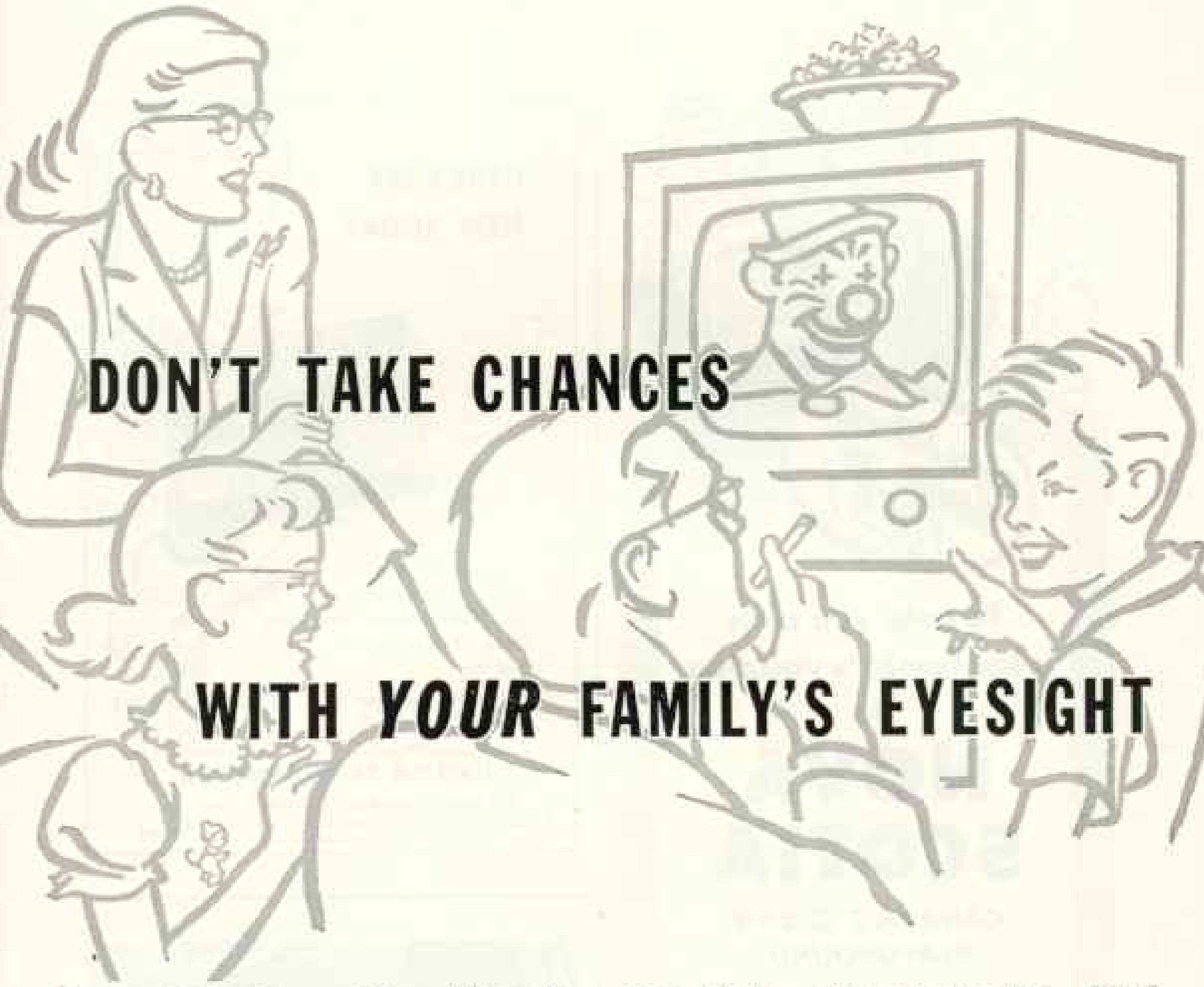

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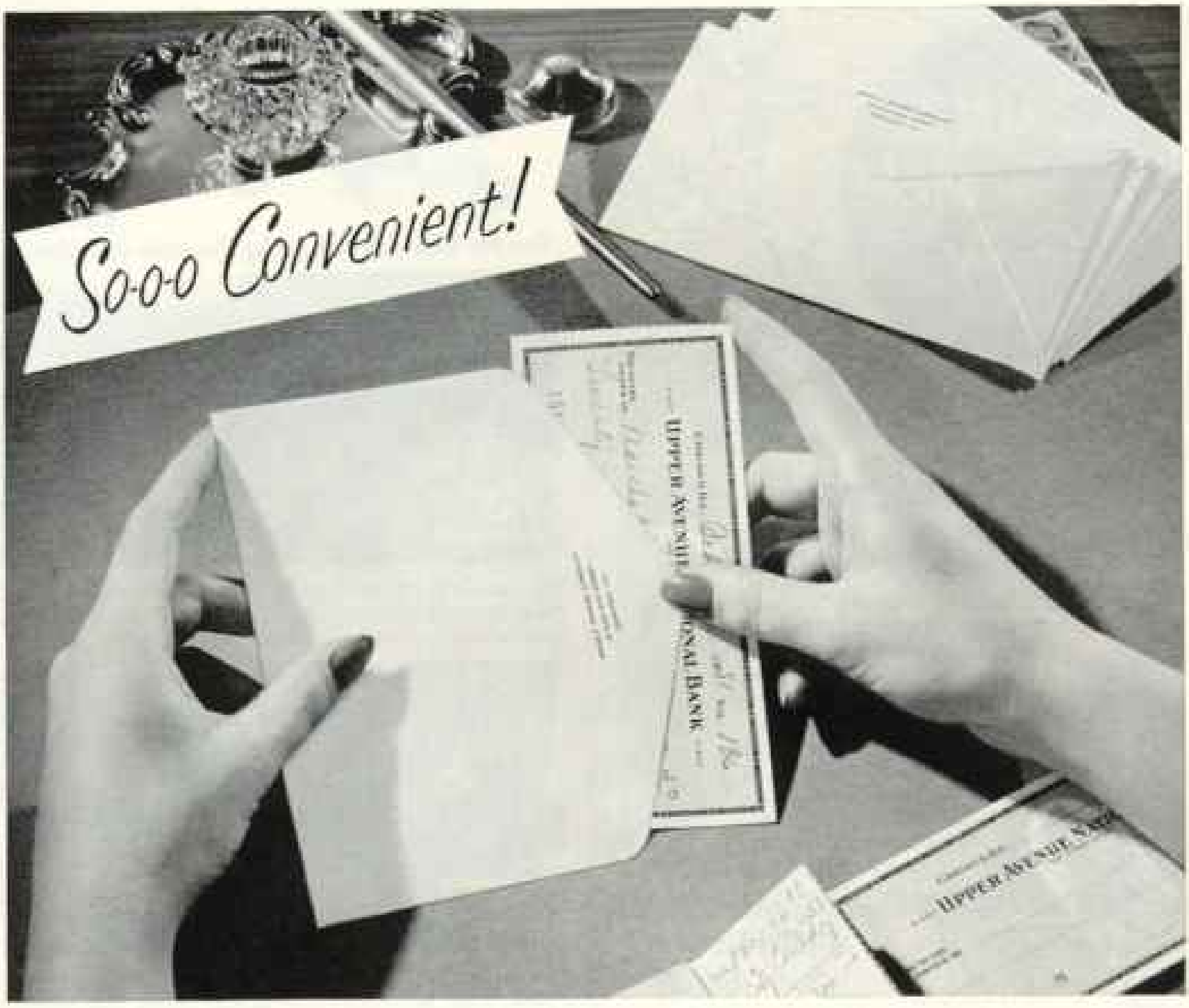

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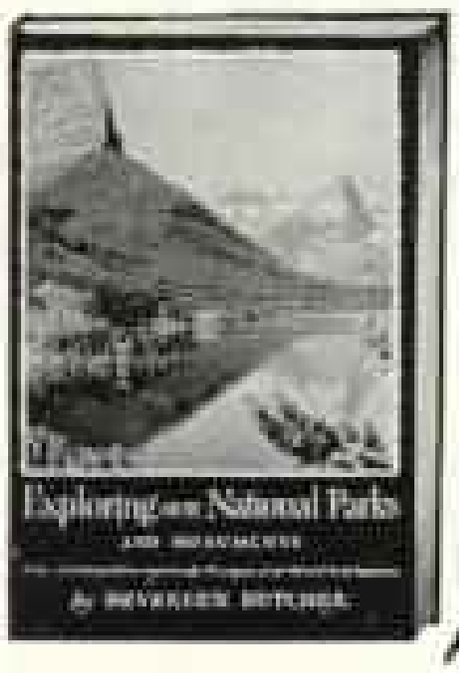

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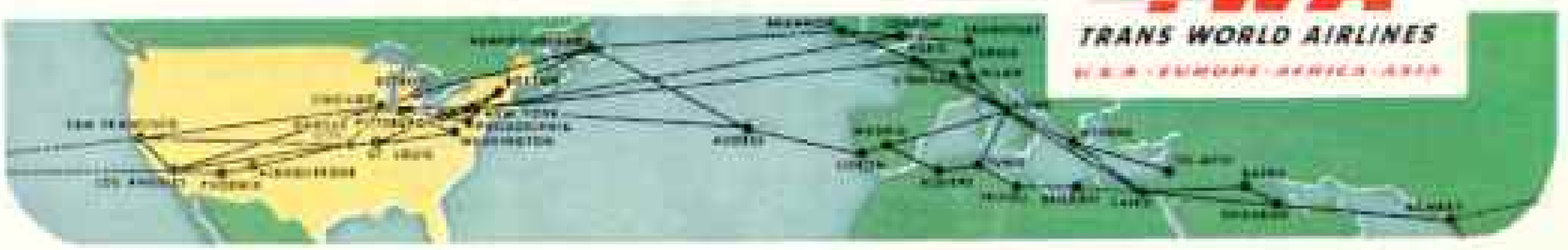

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As a result, hope for greater gains runs high. Even now there is progress to justify this hope. For example, *if diagnosed early and treated promptly and correctly*, authorities say that 98 percent of cancers of the skin, 80 to 90 percent of cancers of the breast, and 85 percent of cancers of the rectum are curable.

Cancer of other parts of the body also is being treated with greater success. In fact, it is estimated that some 70,000 lives are now saved each year from cancer—lives that, not so long ago, might not have been spared.

According to the American Cancer Society, present cure rates could be *doubled* if those who develop cancer would seek medical help in time. This calls for greater public knowledge of cancer—particularly its possible "warning signs." While the symptoms of this disease are variable, no one should delay seeing the doctor if any of the following signs occur:

1. **Any sore that does not heal promptly.**
2. **A lump or thickening in the breast or elsewhere.**
3. **Unusual bleeding or discharge.**
4. **Any change in a wart or mole.**
5. **Persistent indigestion or difficulty in swallowing.**
6. **Persistent hoarseness or cough.**
7. **Any change in normal bowel habits.**

(Pain is not usually an early symptom of cancer.)

These "warnings" are NOT sure signs of cancer. In fact, relatively few people who have such symptoms are found to have the disease. Yet they indicate that something is wrong, and that the doctor should be consulted. Should his examination reveal cancer, prompt treatment with X-ray, radium, or surgery—used separately or together—will greatly increase the chances for cure.

Moreover, since cancer may start without any "warning signs" at all, periodic medical check-ups may help to safeguard against it. Such examinations are especially important for people aged 50 and over.

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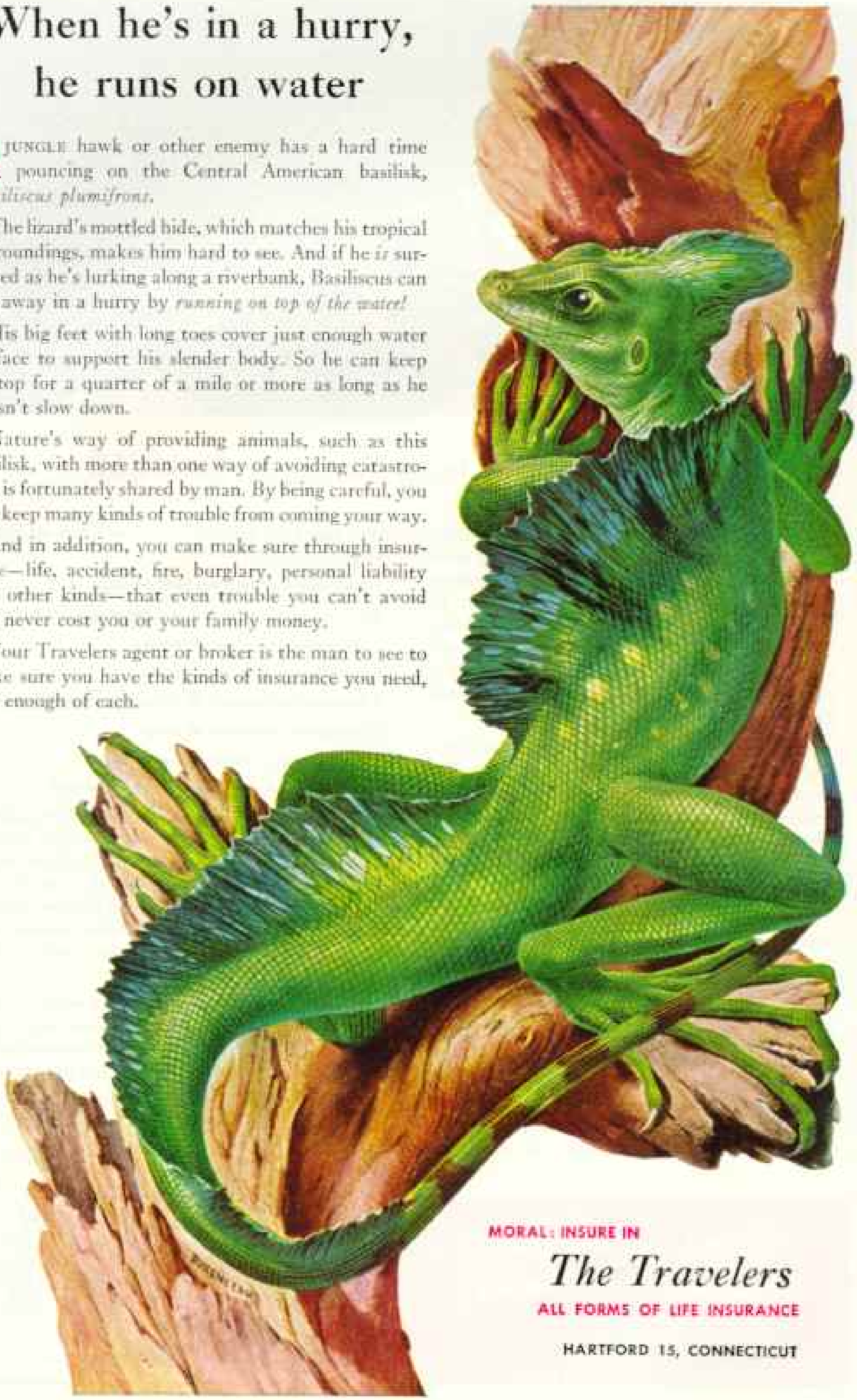

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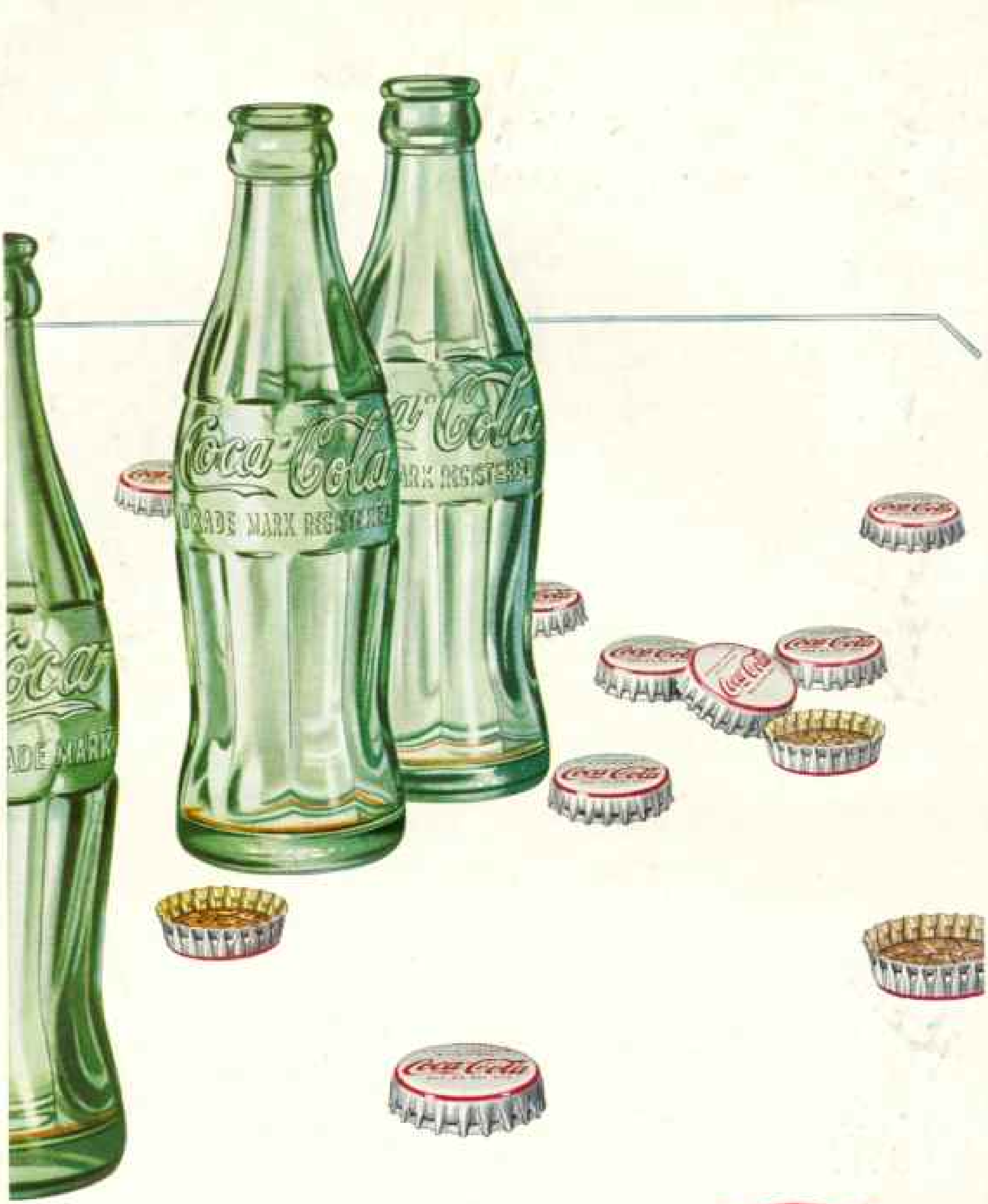

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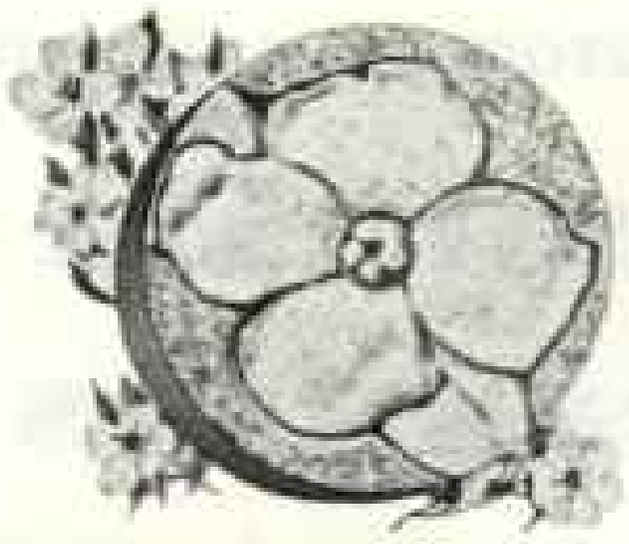

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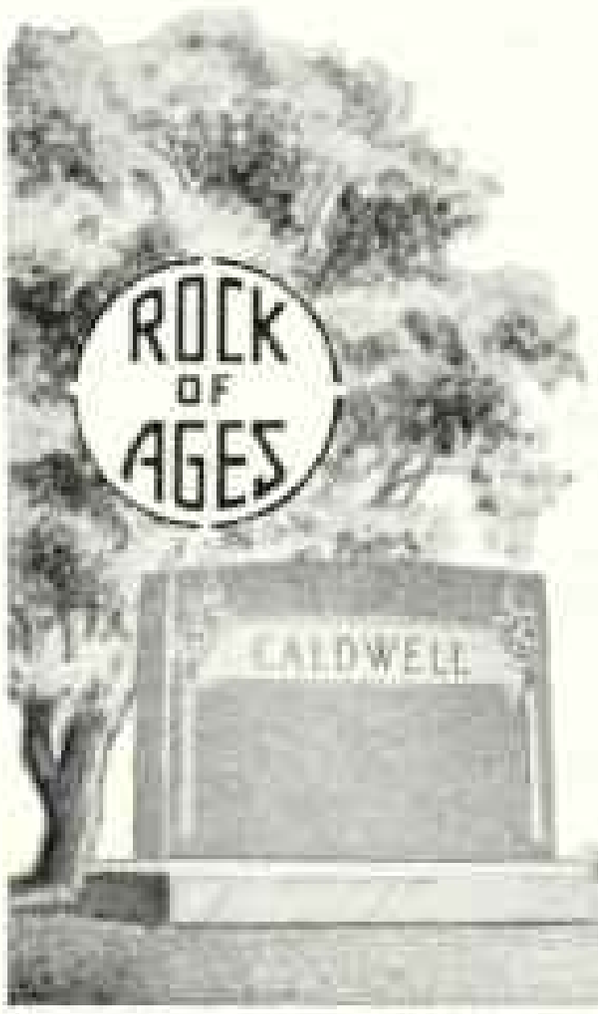

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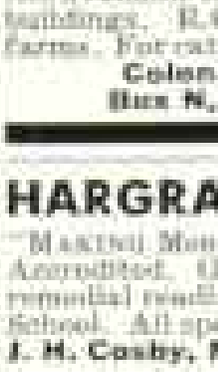

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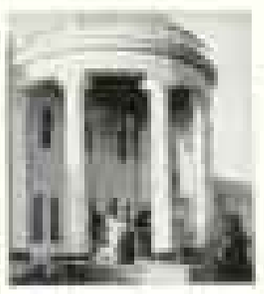

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4-52

The Call that Saved a Plane

A heavy snow was falling in the winter darkness when Mrs. Lucille Wilson, night operator at Alamosa, Colorado, heard the sound of a low-flying airplane. It was well past midnight and Mrs. Wilson knew that the last scheduled airliner had gone over many hours before.

Then she heard the sound of the low-flying plane again as it circled back over the town.

A light flashed on Mrs. Wilson's switchboard. Soon as she said "Number please" an anxious voice said—

"This is Ralph Zook, dispatcher down at the railroad depot. Did you hear a plane? Didn't sound right, somehow. It's flying pretty low."

"I heard it, too," said Mrs. Wilson. "And there's no plane scheduled this time of night."

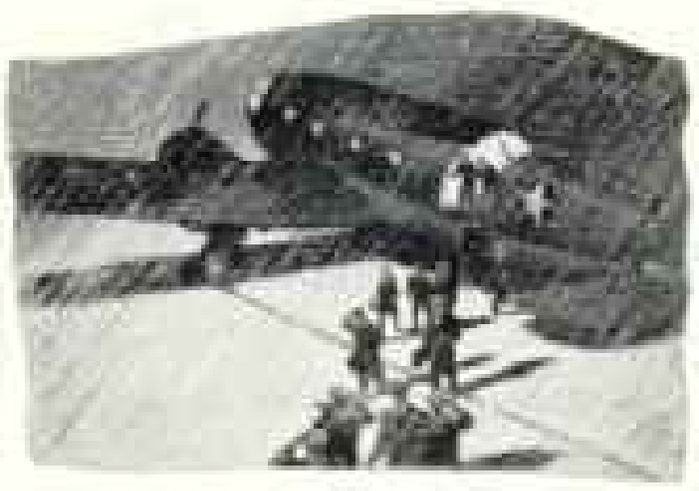
"That plane could be in trouble," said Mr. Zook. "We ought to do something about it."

"I'll try to reach someone to turn on the lights at the airport," said Mrs. Wilson. "Listen! There it is again! It's lost!"

Quickly Mrs. Wilson went into action. She called the airport, the government weather station, and a private flying service. But no one answered.

Then she reached Stamy Edmisten, an airline employee, at his home. He rushed to the airport and turned on the landing lights. A few minutes later a C-46 military transport loomed out of the snowstorm and came in for a safe landing. Thirteen men stepped from the plane, none the worse for the experience.

What could have been tragedy was prevented by quick-acting Ralph Zook and Stamy Edmisten and the alert, cool-thinking operator, Mrs. Lucille Wilson—one of about 650,000 telephone men and women guarding and serving America, twenty-four hours a day, in every kind of weather.



The landing lights were turned on and the big C-46 came safely to earth.

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