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THE NATIONAL GEOGRAPHIC MAGAZINE

Captain Smith of Jamestown

BY BRADFORD SMITH

From April through November, 1957, an anniversary of profound significance in United States history is being celebrated in Virginia: the founding at Jamestown in 1607 of the first permanent English settlement in the New World. Special Federal and Virginia State commissions and the National Park Service have joined efforts for the commemoration. Visitors to the Jamestown festival can see the colony's first years re-created in pageant, music, and art; they can walk through reconstructed James Fort, the settlers' first thatch-roofed, palisaded village; and they can board one of the full-scale replicas of the colonists' three ships. Near-by Colonial Williamsburg and Yorktown are joining in the celebration.

Foremost in this drama of discovery is the fantastic Capt. John Smith. To tell the story of that indomitable soldier of fortune and explorer, the *National Geographic Magazine* called upon historian Bradford Smith, author of many works on colonial America. Mr. Smith, who claims no kinship to the captain, has written two books about him.—*The Editor*

JUST 350 years ago this May three little ships, four weary months out of England, sailed up the broad and placid James River and hove to off a marshy arm of the Virginia shore. Aboard one of them was the man who was to be most responsible for the success of the first permanent English colony in America.

Capt. John Smith, however, reached the New World not as the expedition's leader but as a prisoner, disgraced and accused of insubordination and attempted mutiny.

Officer in charge of the fleet was Capt. Christopher Newport. No stranger to Western waters, Newport in 1592 had sacked four towns of Spanish America and taken or destroyed 20 vessels. For reasons that are still obscure, hostility had developed between him and Smith, and Newport had confined John to quarters.

At dawn on the morning of April 26, 1607, off Cape Henry, a lookout's cry went up:

"Land ho!"

The sea-weary men tumbled out of their narrow bunks and raced to the rail, searching the lifting darkness for the faint outlines of the shore. But John Smith, bursting with energies repressed by the long voyage, could only lie below and listen—and plan.

The *Susan Constant*, with the *Discovery* and the *Godspeed* trailing her like ducklings, slipped into the mouth of Chesapeake Bay. Eager to see what sort of land they had stumbled upon, a party went ashore. One of the men was George Percy, eighth son of the Earl of Northumberland.

"Faire Meddowes" of a New World

"Wee could find nothing worth the speaking of," he reported, "but faire meddowes and goodly tall Trees; with such Freshwaters running through the woods, as I was almost ravished at the first sight thereof."

Nothing worth speaking of! In other words, no gold. For years the English had looked enviously at the treasures of gold and silver the Spaniards took from America. Often the English did more than look—they raided the Spanish galleons, as Newport had done. But they wanted to control the source of this wealth. They wanted to carve out a large piece of America for themselves.

Kodachrome by B. Anthony Stewart, National Geographic Photographer

Stout Wooden Ships Crowded with Colonists Sail Up the James River: May 13, 1607

This spring marks the 350th anniversary of the landing at Jamestown, Virginia, first permanent English settlement in the Americas. Griffith Baily Coale's painting shows settlers scanning the New World's green shores from the flagship *Susan Constant* (center), the *Godspeed* (left), and the *Discovery*. Mr. Coale's work hangs in the Virginia State Capitol at Richmond. His painted fleet inspired the model ships held by these schoolboys.

Sir Walter Raleigh had tried it three times and failed. Now, in disgrace, he lay a prisoner in the Tower. But some of his former associates had wrung a new charter from King James, and it was they who had hopefully sent forth this company of ships.*

Traveling with the expedition was a sealed box in which the Virginia Company of London had named the leaders of the colony.

On the night of April 26 the box was opened. Eagerly the colonists waited to hear the names of the men who were to command them. Newport read them off:

"Bartholomew Gosnold. Edward Maria Wingfield. John Ratcliffe. John Martin. George Kendall. Christopher Newport." He hesitated, no doubt, before reading the last name: "John Smith."

Leaders Distrust the Outspoken Smith

Newport called together the other members. They announced that they were not going to admit the young captain.

Why not?

He was accused of having planned a mutiny. But in those days any word spoken against a ship's captain might be regarded as mutinous. Perhaps more important was the fact that Smith had an irritating habit of telling people how to do things better; still more irritating, he was usually right.

In addition, stories about Smith's well-nigh incredible life must have reached Newport's ears, and there was enough in these tales to make a man uneasy.

While still in his teens, Smith ran away from school, sold his books and satchel, and prepared to leave England for the wars on the Continent. At 16 he reached the Netherlands and fought against the Spaniards. At 20, after returning to England to study the arts of military horsemanship, he set out for Hungary, where a great war was raging between Turks and Christians.

It was no easy trip. On the way, John was robbed, thrown headlong into the sea, nearly drowned, then picked up by a ship and forced into piracy. Even after he had arrived, John had to face the obvious question: What did he have to offer the seasoned soldiers of Hungary?

Well, as it turned out, a good deal. The Christian forces in Hungary faced the task of relieving a besieged town, no easy undertaking. But Smith had picked up a trick or two in the Netherlands campaign. He suggested a plan.

That night the Christians displayed several thousand pieces of glowing fuse in the dark, in such a way as to make the enemy think as many musketeers were advancing. When the Turkish besiegers left their lines to meet this dummy force, the real weight of the Christian attack fell upon them from another quarter. The town was saved—and young John became Capt. John Smith, commander of 250 horsemen.

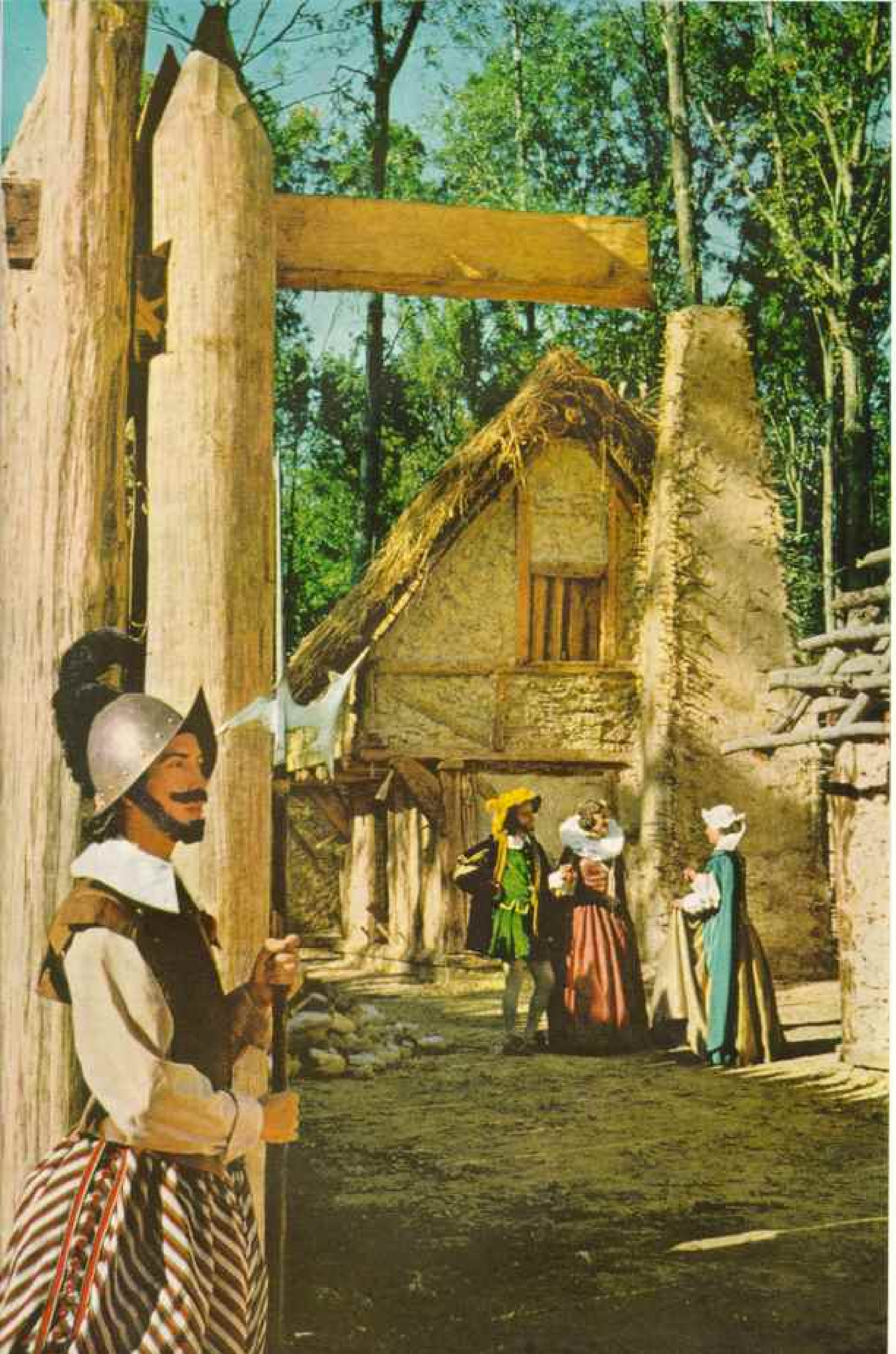
But the high light of John's two years in Hungary came when he accepted the challenge of an enemy to single combat. This was no mere exercise at arms. The fight was to the death.

The Turk galloped onto the field in a splendid suit of armor, decorated at the shoulder with eagle's wings set in silver and gold. Smith, entering "with a noise of Trumpets," gave him a courteous salute.

Then, as John later modestly related (writing of himself in the third person, as he often did), "at the sound of the charge, he passed the Turke [through his open visor], face, head, and all, that he fell dead to the ground; where alighting and unbracing his Helmet, he cut off his head."

Two more Turks rode out to try their luck—and fell in the same way. In gratitude, Prince Sigismund Bathory of Transylvania

* See "Founders of Virginia," by Sir Evelyn Wrench, National Geographic Magazine, April, 1948.



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R. Anthony Stewart (opposite and below) and Thomas J. Abercrombie

← James Fort Rises from the Wilderness

Settlers lived behind a wooden palisade in thatched half-timbered houses plastered with clay and twigs. This fort has been reconstructed for the Jamestown Festival. Bearded guardsman patrols the main gate; gentleman and ladies stroll the compound.

↑ Cross Marks the Cape Henry Landing

Here, at the mouth of Chesapeake Bay, the colonists stopped briefly before sailing up the James River. Fishing pier juts from the dunes at Fort Story.

↓ Replicas of the settlers' ships lie off James Fort. This costumed seaman works aboard *Susan Constant*.

gave the young Englishman a coat of arms depicting three Turks' heads on a shield.

Not bad, for the son of a tenant farmer!

The rest of John's experiences before he got home to England would fill a book, and eventually did—*The True Travels, Adventures, and Observations of Captaine John Smith*. He became a prisoner of the Turks and labored under their cruel whips. Finally he killed his taskmaster and made his escape all the way from the Caucasus back into central Europe.

Smith's recountings of his deeds never lost anything in the telling. Small wonder that Newport should be suspicious of a young man with so bizarre a past. At any rate, he effectively prevented John from taking any part in the settlers' first explorations of Virginia, their first contacts with the Indians.

Colonists Choose a Swampy Site

The Council in London had decreed that the colony should be planted a hundred miles up some river, if possible, so as to be safe from attack by sea. It must be on unoccupied land and located so that a ship of 50 tons could set provisions ashore with ease. It must be easy to defend, healthfully located, and no native must be allowed to settle between this place and the coast.

If there was such a place anywhere in Virginia, the explorers failed to find it. Instead, they chose for their "Jamestowne" a low, swampy fist of land jutting into the river. Its only advantage was that ships could snuggle up to the bank in six fathoms of water. On May 13 the fleet made fast to near-by trees. The next day, men and supplies were set ashore.

"Now falleth every man to worke," wrote a member of the party, "the Councell contrive the Fort, the rest cut downe trees to make place to pitch their Tents; some provide clapbord to relade the ships; some make gardens, some nets, &c."

All of which sounded commendably industrious. But Smith was not long in spotting the prime weakness: leadership.

The colonists' council had elected Edward Maria Wingfield president. He was a man of good birth, but pompous and unimaginative. Though Indians were all about, Wingfield failed to drill his men or to build any defense but a barrier of loose boughs. John Smith shook his head: one surprise attack might wipe out the whole colony.

On May 18 came the first test. Up to the flimsy fort strolled the chief of the Paspaheghs. A hundred armed braves "garded him in a very warlike manner with Bowes and Arrowes."

The chief signaled the English to lay aside their arms. When they refused to do this, he boldly entered the fort with his men. One of the Indians stole a hatchet. An Englishman snatched it back, giving him a blow on the arm for good measure.

"Another Savage, seeing that, came fiercely at our man, with a wooden sword, thinking to beat out his braines."

The English raised their muskets. Silence. Each side waited for the other to move.

The chief gave an angry word of command, and the braves thronged out of the fort and disappeared into the woods.

Three days later Newport headed upriver on a voyage of discovery. This time he allowed John Smith to go along.

The first night they stopped at an Indian village 18 miles above Jamestown, where they were entertained "with Daunces and much rejoycing." In return, the English made gifts of knives, beads, and little bells.

They traveled all the way to the falls, where Richmond now stands, and then the boat could go no farther. Turning about, they floated downriver, visiting and feasting with the Indians again.

This time their way was smoothed by an intelligent and diplomatic Indian named Navirans, who had attached himself to them. But on May 27 Navirans suddenly grew nervous and bade them a quick farewell.

Jamestown Looks to Its Defenses

Newport, suspecting trouble, hurried back to Jamestown.

Before the boat could get its lines fastened, men ran from the fort with the news: Jamestown had been attacked. Though Wingfield had escaped with nothing worse than catching an arrow in his beard, a boy had been killed, a man fatally wounded, 14 others hurt. Indeed, the colony would have been wiped out but for a cannon shot that had knocked down the bough of a tree upon the attackers and frightened them away.

Observed a journal of the time, dryly: "Hereupon the President was contented the Fort should be pallisadoed, the ordinance mounted, his men armed and exercised."

John Smith must have done his share in

Thomas J. Abercrombie, National Geographic Photographer

Captain John Smith, Bathed in Morning Dew, Gazes Down on Jamestown

This intrepid adventurer confronted unfriendly Indians and traded for food that sustained hungry colonists. Exploring, he mapped hundreds of miles of shoreline. William Couper's bronze statue has stood since 1907.

this, for finally on June 10 he was admitted to his rightful place on the council. Thanks to his bitter experience in Hungary with guerrilla warfare, not a man at Jamestown was better equipped than he to understand and meet the conditions of the wilderness.

Now he stood up, short but sturdy, his back straight as a lance, his bushy beard showing the thrust of the chin beneath, and took the oath: "I shall faithfully and truly declare my mind and opinion according to my heart and conscience in all things treated of in that council."

Those who watched him stand there with a hand on the guard of his sword would easily have known him for the man he was—quick of temper but brave and generous of spirit.

Settlers Face Starvation and Disease

Already rations were running short. So on June 22 Newport, leaving 104 Englishmen with scanty provision to maintain their toe hold in Virginia, sailed away to England. He promised to return with food in 20 weeks, an optimistic estimate no one really believed.

Soon the daily food ration had to be reduced to half a pint of wheat and half a pint of barley, boiled in water. Worse still, the barley contained as many worms as grains. The only cheerful note was an abundance of sturgeon in the river, some as long as seven feet.

Sickness attacked the colony. "Scarse ten amongest us coulde either goe, or well stand; such extreame weaknes and sicknes oppressed us," the record reads. By September 10, half the settlers had died.

John himself "tasted of the extremitie." But the man who had suffered slavery under the Turks was not one to be overcome by bad diet or the fevers implanted by swamp-nurtured mosquitoes.

Wingfield's blundering management, how-

Smith's Map of Virginia, pages 590-91

For 30 years the chart ranked as the "mother map" of Virginia. This reproduction copies the first of ten editions. For legibility, National Geographic cartographers have eliminated minor place names and enlarged key ones.

Washington, D. C., if placed on this map, would adjoin the V-shaped crook in the "Patawomeck flu" (Potomac River). Baltimore would appear to the right of the mouth of "Bolus flu" (Patapsco); Annapolis to the left. Chesapeake Bay Bridge would cut through the P in "Powels Ils." Modern Hampton Roads lies just inside "Poynt comfort" at the mouth of "Powhatan flu" (James). Original Indian place names include "Pawtuxunt flu" (Patuxent) and "Susquahanough" (Susquehanna).

← Archeologist Sifts the Soil for Clues to Jamestown Life

Jamestown Island, a peninsula in Smith's time, is now part of Colonial National Historical Park, which also embraces the Yorktown Battlefield and the Cape Henry Memorial.

In 1934 the National Park Service began the Jamestown Archeological Project. Thousands of objects used by the settlers have been uncovered. Each discovery has shed new light on their living habits.

Most recovered items are of metal, glass, or clay.

John L. Cotter here strains mud excavated from the footings of a 17th-century dwelling. Wire mesh catches objects such as coins, nails, and thimbles. ➔Pottery fragments, the neck of a gin bottle, and a sword hilt emerge.

Thomas J. Abercrombie, National Geographic Photographer

POWHATAN
Held this state & fashion when Capt. Smith was delivered to him prisoner

VI

MONACANS

POWHATAN

MANNAH

GOAGS

CHAWONS

SAPONI

TUSKARORA

THE VIRGINIAN SEA

Scale of Leag.

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Leagues

Leagues

CK BAY

WOGOSS

SASQVESAHANOCKS

ATQVANACHVKES

NORTH

Observed and Described by Captayn John Smith
Graven by William Hole

592 National Geographic Photographers Robert F. Sisson and Donald McBain

Rude Houses with Steep Thatched Roofs Sheltered Jamestown's Pioneers

Dr. Leonard Carmichael, Secretary of the Smithsonian Institution and a Trustee of the National Geographic Society, inserts a miniature table in the "crotchet" house, whose V-shaped crotches supported the rafters. The model is in a new hall illustrating everyday life in early America. The Washington, D. C., institution recently embarked on a major modernization program. Funds have been appropriated for a spacious new building to house the Smithsonian's great national collections in history and technology.

ever, was having a bad effect on the stricken colony. Smith, Ratcliffe, and Martin, the only other remaining members of the council, talked it over. Then they went to Wingfield's tent and told him he was through.

"You have eased me of a great deal of care and trouble," he replied. They put him under guard in the *Discovery*.

From now on, John Smith was the dominant personality. The weakened colony leaned upon him, and without him, as later events were to show, it would have collapsed.

When Smith took over there were no houses built, the tents were rotting, and scarcely five men were well enough to mount guard. Even those who recovered, snorted vigorous John Smith, "would rather starve and rot with idlenes, then be perswaded to do any thing for their owne reliefe."

Most of them, in point of fact, had come in hope of quick and easy riches, lured on by the treasures Spain had found in the New World. John set them to mowing, binding thatch into bundles, building and thatching houses.

Then he took half a dozen of his best men down the river to search for desperately

needed food. When he came to Kecoughtan (now Hampton), the Indians offered him mere handfuls of beans or grain for a hatchet or a piece of copper. Captain John wasted no words. He ordered his men to light the matches of their muskets. They fired a few shots, leaped ashore—and the Indians fled into the woods.

Musketfire and Gifts Win Over Indians

The Indian houses were heaped with corn, and Smith's men were all for helping themselves at once. But John held them back, ordering them to prepare for the attack he was sure would come.

It did. Shouting hideously, the Indians charged out of the forest. "Sixtie or seaventie of them, some blacke, some red, some white, some party-coloured, came in a square order, singing and dauncing out of the woods, with their *Okee* (which was an Idoll made of skinnes, stuffed with mosse, all painted and hung with chaines and copper) borne before them." Brandishing clubs and launching a flight of arrows, they hurled themselves at the English, who "kindly received them with their muskets loaden with Pistoll shot."

Down fell the idol in the midst of several stricken braves. The rest whirled about and fled to the woods.

Minutes later a warrior cautiously returned to sue for peace and get the idol back.

"If six of you will come unarmed and load my boat," Smith promised them, largely in sign language, "I will not only be your friend, but will restore your idol and give you beads, copper and hatchets besides."

English and Indians soon sat down to a feast of turkeys and other wild fowl, venison, and Indian bread.

Powhatan Takes Smith Captive

John collected food of necessity, but what he loved most was exploring new country. In December of 1607 he headed up the "Chickahamania" (Chickahominy) to call on Powhatan, supreme ruler over all the tribes in the lower Chesapeake area. Sailing around the river's great grass-bordered bends (page 598), he went as far as the barge could go. There he left most of his party, hiring a canoe and a couple of Indians to carry him and two of his men still farther.

Finally the band waded ashore in a marsh, and John set off into the woods with one Indian. In a few minutes he heard a loud cry and a yelling of Indians behind him.

Grabbing the man with him, John bound him "to his arme with his garters, and used him as a buckler." An arrow whistled out of nowhere and struck John in the thigh.

Spinning about, the captain saw two Indians drawing their bows. He discharged his pistol at them, and they fled. But more sprang up.

Firing and holding his Indian in front of him, he kept his attackers away. Then he backed into a quagmire. Finally, "being neere dead with cold, he threw away his armes."

Triumphant, the Indians dragged him off to their village of Orapaks where, after dancing around him with "hellish notes and screeches," they thrust him into a long house and served him enough food for 20 men, "which made him thinke they would fat him to eat him," Smith wryly remarked of himself.

They told him frankly that they were going to wipe out Jamestown. But if he would help them, they promised him "life, libertie, land, and women." Said John stoutly: You have no chance against the guns of Jamestown.

Pocahontas to the Rescue!

Early in January the Indians led him to Werowocomoco upon the river "Pamaunk" (York). Smith was at last to see Powhatan, though not as he had planned it.

The old chieftain was "proudly lying uppon a Bedstead a foote high, upon tenne or twelve Mattes, richly hung with manie Chaynes of great Pearles about his necke, and covered with a great Covering of *Rahaughcums*" (raccoon skins). He held court in a long house lined with rows of braves, and behind them rows of young women. He was a big man, well built and with gray hair, and had "such a grave and Maiesticall countenance, as drave me into admiration to see such state in a naked Salvage."

Why had the English come to his country? Powhatan wanted to know.

Because they had been chased by the Spaniards, lied Smith. With their ship leaky, they could not leave.

Powhatan held a long powwow with his braves. When it ended, some of the men ran out and came back with two huge stones which they placed in front of the chief. A crowd of braves, hideously painted, rushed at Smith. As many as could grab him laid their hands on him and threw him to the earth, pressing his head against the stones. Others

raised their clubs to beat out his brains. John's luck seemed finally to have run out.

Then at the last moment, as John tells it, "Pocahontas the Kings dearest daughter, when no intreaty could prevaile, got his head in her armes, and laid her owne upon his to save him from death" (page 596).

Pocahontas was a girl of 13 or 14—a charming, playful child, lovely and full of wit and spirit—just the right age to be fascinated by this handsome stranger, probably the first white man she had seen. In one impulsive act of pity, she wrote her name imperishably into American history.

On January 7, Powhatan sent the captain back to Jamestown with an Indian escort. As a reward for his release, Smith promised Powhatan two guns and a grindstone. An apt linguist, Smith had improved his weeks of captivity by acquiring a fair grasp of the Indian language.

But in the matter of a reward he had had his tongue in cheek: the guns he proffered Powhatan's men were big demiculverins. "They found them somewhat too heavie," Smith remarked.

In the end, John sent them off with gifts for themselves and all Powhatan's numerous family. There must have been a very special present for Pocahontas! In the days that followed, she came often to the fort, bringing gifts of food to her new friend.

Only 38 of 104 Survived the Early Months

That January 8, the hungry, discontented men at Jamestown jumped for joy: Newport's ship was returning up the river! Of the 104 Englishmen he had left the previous June, only 38 survived to greet him again.

Newport brought with him some good English food and drink. But hardly had the colonists become accustomed to the taste when disaster struck again.

This time it was fire—fire which swept through the flimsy settlement like a storm, destroying the thatched shelters in a few moments and ruining irreplaceable clothes and personal belongings. Robert Hunt, the minister, lost his whole library. Hardly a building was left standing.

Yet, as soon as shelter could be thrown up, Newport set out with Smith and a party of 30 or more to visit Powhatan—down the James, which the Indians called the Powhatan, into the broad waters of Chesapeake Bay, and up the wide Pamaunk to Werowocomoco.

Smith, pushing ahead to see whether Powhatan was planning an ambush, found the old chief decked out in a great robe ornamented with pictures traced in white shells.

"Your kind visitation doth much content me," the old man said. "But where is your father whom I much desire to see?"

By "father," Powhatan meant Newport, who, Smith had said, was highest in command.

"He remains aboard, but tomorrow he will come unto you," said John.

Newport, however, only spoiled matters by letting Powhatan outsmart him in trading. Smith knew that if English goods were once cheapened he could never buy food enough to keep the colony alive.

The Captain Outsmarts the Indian King

To restore the balance, John idly drew a few blue beads out of his pocket and began to toss them in his hand. Powhatan's eyes widened; he had never seen such beads. Eagerly he offered two pecks of corn for them.

Smith shook his head: "They are of a most rare substance," he said, "and not to be worn but by the greatest kings in the world."

"This made him halfe madde to be the owner of such strange Iewells," a colonist related, "so that ere we departed, for a pound or two of blew beades, he brought over my king for 2. or 300. Bushells of corne; yet parted good friends."

Newport stayed in the country until April while his men futilely hunted gold, using up supplies that should have been left for the colony. Smith fumed over the delay, but when the ship finally sailed, he at least got rid of two liabilities—a troublemaker named Gabriel Archer and the deposed Wingfield.

In June, with all things set in order at Jamestown, Captain Smith set out on a long voyage of exploration. Heading for the razor-thin white shoreline of Cape Charles, he sailed into the "Chesapeack," as he spelled it, exploring each river along the way and mapping as he went.

After two weeks the crew grew heartily sick of the open barge, wet clothes, sodden cold food, and the sickening motion of the boat. They begged him to turn back.

"Gentlemen," he answered them, "what a shame would it be for you to force me to return, with so much provision as we have, and scarce able to say where we have been, nor yet heard of that we were sent to seek?" He meant an outlet to the Pacific.

"... In Such a Rage Snatched the King by His Long Locke in the Middest of His Men ..."

In the winter of 1608-9 Smith went trading for corn. While he was negotiating with one Indian chief, 700 tribesmen surrounded his band of 15 men.

Quickly the captain seized the chief by his scalp lock and pointed a loaded pistol at his breast.

Later a colonist described the incident:

"Thus he led the trembling King, neare dead with feare amongst all his people; who delivering the Captaine his Vambrace, Bow, and Arrowes, all his men were easily intreated to cast downe their Armes, little dreaming any durst in that manner have used their King."

This engraving by Robert Vaughan illustrated the scene in Smith's *Generall Historie of Virginia, New-England, and the Summer Isles*, published in 1624.

So on they went until they reached the "Patawomeck" (Potomac), sailing beyond where Washington now stands until they had reached the falls, where "we found mighty Rocks, growing in some places above the grownd as high as the shrubby trees, and divers other solid quarries of divers tinctures."

They went downstream again and next entered the "Toppahanock" (Rappxhannock). Fish swarmed in its shoals.

"Our Captaine sporting himselfe by nayling them to the grownd with his sword, set us all a fishing in that manner: thus we tooke more in one houre then we could eate in a day."

The last fish John's sword speared was a sting ray which thrust its sting an inch and a half into his arm. His arm and shoulder swelled so his men despaired of his life, but by suppertime he had recovered enough to eat of the fish he had caught.

Heading homeward at last, the explorers rounded "Poynt comfort" and sailed up the James, their barge decked out in colored streamers. They found the colony plagued with sickness and dissatisfaction. Smith was in no mood to stay around and hold the settlers' hands, so in three days he set out again.

After encounters with sickness and canoe-loads of warlike Indians, the explorers reached the head of Chesapeake Bay and sailed up the Susquehanna, close to what is now the Pennsylvania line. When rocks barred the way, Smith sent word by Indian messengers to the "Sasquesahanough" tribe, inviting them to come and meet him.

"Gyants" Come Down the Susquehanna

After three or four days, 60 of them came, bearing gifts of all sorts. They looked "gyant-like," but they were friendly enough. Not only did they bring food, tobacco pipes, and other examples of their craft; they danced and sang, and then began to "adore" young Captain Smith like a god.

Still mapping, John explored the western shore of the Bay. But he found neither the longed-for passage to India nor gold or any other minerals. It was a long time before the English gave up these two fond hopes and learned that Virginia's gold was the golden leaf the Indians smoked in their pipes!

Chief result of the voyage was John Smith's map—a map which in later days was to help establish the Mason-Dixon line and to be an authority for the boundaries of Lord Baltimore's Maryland charter (page 590).

It was September 7 before Captain John brought his men back to Jamestown. Three days later, by popular acclaim, he became president of the colony. Bursting with energy as usual, he extended the fort from three to

(*Continued on page 605*)

↑ Pocahontas Saves Smith from Death; Indians Seized Him in This Swamp →

Seeking trade with Powhatan, supreme ruler of the tidewater tribes, Smith sailed up the Chickahominy River in December, 1607 (page 598). Leaving his boat in these shallow headwaters, he fell into an ambush by an Indian hunting party.

Powhatan ordered Smith slain. But as the executioners raised their clubs, his daughter Pocahontas rushed forward and laid her head upon Smith's, beseeching the chief to spare his life. Powhatan relented and, two days later, formally adopted Smith into the tribe. The engraving above appeared in Smith's *Generall Historie*.

Opposite: Little here has changed since Smith's adventure 350 years ago. Insects buzz about decaying tree trunks. A blood-red cardinal flower (*Lobelia cardinalis*) brightens the marsh.

A Young Fisherman and His Dog Drift Down the Chickahominy River at Sunset

Flowing from the northwest, the river empties into the James a few miles above Jamestown. Chickahominy, an Algonquian word, means people of the coarse-pounded corn; Indian villages once dotted its shores. In the Civil War the river lay across the Union advance on Richmond; fighting raged along its banks in the Peninsular Campaign.

599 Thomas J. Abercrombie, National Geographic Photographer

Gentle Ripples Lap the Knees of a Bald Cypress; Saw Grass Chokes the Shallows

Jamestown's financial backers in London ordered the colonists to seek a river which "bendeth most toward the North-west for that way you shall soonest find the other sea"—the fabulous South Sea that would lead to the riches of India and Cathay. John Smith hoped the Chickahominy would point him into the Northwest Passage.

♠ **Brick Foundations Mark Site of Jamestown's First Statehouse**

From a palisaded fort, the settlement developed into a thriving township. By 1650 brick houses and public buildings, streets, and paths covered half a mile along the river. Settlers made their own bricks and roofing tile and burned lime for plaster.

Jamestown was abandoned and the island given over to farming after the capital's removal in 1699 to Williamsburg, known then as Middle Plantation.

Little of the old town exists above ground today. But archeologists have found traces of footings and cellars of 141 buildings. The General Assembly met in this Statehouse from 1641 to 1676. Tercentenary Monument, a 103-foot spire, rises in the distance. Erected in 1907, it commemorates Jamestown's 300th year.

←Opposite: An early clay bake oven, reconstructed from fragments, is displayed in the museum at Jamestown.

↑ **Bottles Emerge from Burial**

Artifacts reveal much about Jamestown's early life. Fat English wine bottle dates from about 1660. Taller Dutch gin bottle is perhaps half a century older.

↓An archeologist reconstructs German stoneware. On the table are a Hispanic earthenware jug, a broken 19th-century wine bottle, and two pieces of "scratch" ware, so called because artisans scratched designs in the pottery before firing it.

←Church Tower Is the Only Standing Ruin of 17th-century Jamestown

Remnant of an early structure, the tower rises above a church built 50 years ago. Its brick walls are three feet thick. Settlers could fire on enemies through loopholes near the top. Gravestones in the old churchyard carry such honored names as Berkeley, Byrd, Lee, Blair, Sherwood, and Harrison. In July, 1619, the Americas' first legislative assembly convened on this spot.

↑Powhatan's Chimney: Did Settlers Build a Home Here for the Indian Chief?

History says the colonists erected a house for Powhatan in return for a shipload of corn. Local tradition gives this gaunt chimney at Wicomico its name.

↓Chief Tecumseh Deerfoot Cook and helper untangle nets for the shad run up the Pamunkey River. Descendants of Pamunkeys commanded by Powhatan, they live on a reservation 30 miles north of Jamestown.

five sides (our first Pentagon!), drilled the men, put the boats in shape, and sent out trading parties.

In October Newport arrived again, with orders to find gold, a passage to the Pacific, or survivors of Raleigh's lost colony at Roanoke Island. With him came nearly a hundred new colonists—and not an ounce of provision to see them through the winter!

To top all this, he was ordered to crown Powhatan and give him royal presents—a sheer waste of time, Smith barked, when they should have been trading with the Indians for their newly harvested corn.

English Try to Recrown a King

The presents for Powhatan had to be sent around by water, a distance of almost a hundred miles. When it came time to crown the Indian chieftain, "a foule trouble there was to make him kneele to receive his Crowne." At last the English, by leaning hard on his shoulders, forced him to stoop a little. Then they popped the crown on his head.

At a signal, the English boats in the river let go with a volley. Powhatan, thinking the whole ceremony a ruse to destroy him, started up "in a horrible feare." But at last they convinced him all was well.

To Newport, Powhatan gave his old shoes and his mantle. That mantle can still be seen in the Ashmolean Museum at Oxford. It was about all Newport could carry away, for he achieved none of his other impossible orders.

With Newport went the unpopular Ratcliffe. "I have sent you him home," Smith wrote in a bitter letter, "least the company should cut his throat."

Smith was left with the problem of protecting a settlement of 200 men against an unknown number of hostile Indians, upon whom he had to depend for his food supply. All winter he voyaged up and down the rivers trading for corn. When the Indians refused to trade, he threatened them with dire punishment.

"You promised to fraught my ship ere I departed," he told a big chief on one occasion, "and so you shall; or I mean to load her with your dead carcasses."

One night Pocahontas came through the dark woods to warn him that her father planned to feast and entertain him, and then to kill him when he was off guard. Gratefully, Smith offered her presents.

"But with the teares running downe her cheekes, shee said shee durst not be seene to have any: for if Powhatan should know it, she were but dead."

After several more deaths, John Smith found himself the sole remaining member of the council.

"You see now that power resteth wholly in myself," he told the settlers. "You must obey this now for a law, that he that will not work shall not eat, except by sickness he be disabled."

And he set them to making tar and soap ashes, digging a well, building houses, and erecting a fort across the river on a high bluff —known today as Smith's Fort Plantation (pages 618 and 619).

Before it was finished, President Smith made a terrible discovery. The casked corn which was to have seen the colony through till the next harvest was half rotten, and hordes of rats were rapidly eating the rest.

Smith's Enemies Bring Bad Luck

On July 10, 1609, a ship sailed in from England bringing great news: the Virginia Company had been reorganized, and heavy reinforcements of men and supplies were soon to come out under Lord De La Warr.

A month later the vanguard of this fleet arrived—and ashore stepped Ratcliffe, Archer, and Martin! These worthies, all of whom had quarreled bitterly with Smith, promptly demanded their places back on the council.

John refused. A ship, he reminded them, was on its way, bringing officers for the colony, together with their official commissions. Until they arrived, he remained in sole command. Frustrated, the three confederates busied themselves trying to undermine Smith's regime.

Though John had no way of knowing it, the ship had actually been wrecked. Months would pass before the survivors reached Virginia. Meanwhile, plagued with food

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← William and Mary College Girl Wears Jamestown's Sunday Satins

Visitors to the Jamestown Festival, April 1 to November 30, will step back into the 17th century.

The Founders, a drama by playwright Paul Green, depicts the colony's early years. Following the premiere May 15, the play will be presented six days a week at the Cove Amphitheater in Williamsburg.

Nancy Obert here portrays a Jamestown lady dressed for church. Her costume resembles that worn by Pocahontas at the English Court (page 619).

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Twilight Traffic Weaves a Ribbon of Light Across Chesapeake Bay Bridge

John Smith twice sailed these waters in 1608 in quest of a Northwest Passage to the Pacific.

The captain and his party ranged up and down the Bay, exploring one river after another and "digging in the earth, looking of stones, herbs, and springs."

Once in mid-Bay Smith met several canoes full of Indians spoiling for a fight. Most of his men were ill. He placed hats of the sick men on sticks and put a crewman with two muskets between each pair of hats. Fearing themselves outnumbered, the Indians retreated to the shore.

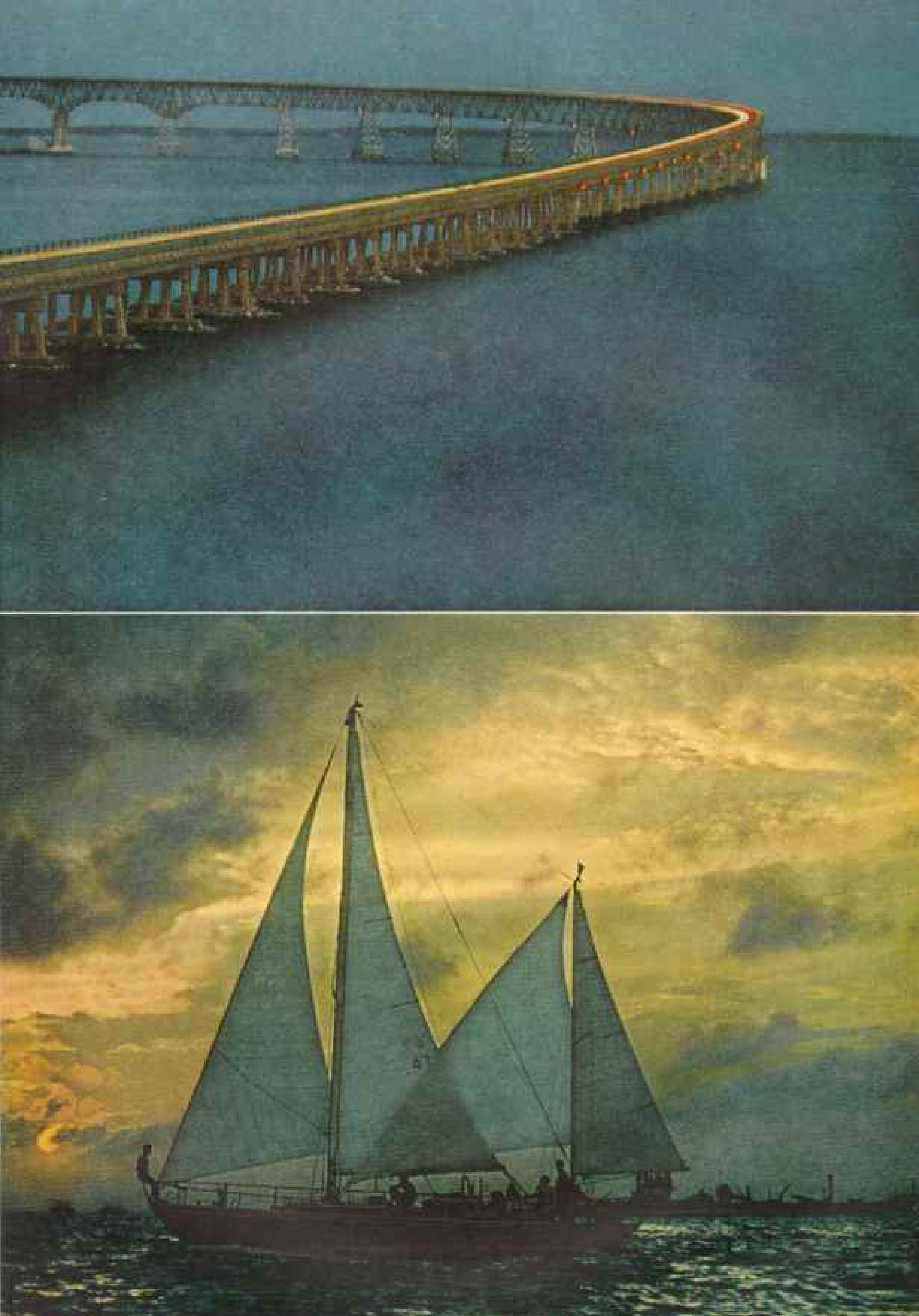
Spanning four miles of open water, this bridge links Maryland's eastern and western shores. The structure cost $44,000,000 and required 3½ years to build. Suspension span in center lifts traffic 198 feet above the ship channel.

Cruising at Sunset, the *Celerity* Enters the Bay at Hampton Roads

Here James River meets the Chesapeake. When the Jamestown settlers came ashore on April 30, 1607, they met friendly Indians living in a village called Kecoughtan. Colonists called the region Point Comfort, as it "put us in good comfort."

Hampton Roads, one of the world's finest deepwater harbors, is the U. S. Navy's chief Atlantic port.

Kodachromes by Thomas J. Abercrombie



shortages and insubordination, the captain did his best to hold the colony together.

Returning to Jamestown from a voyage one day in early September, he was catching a few winks of sleep when by accident his powder bag burst into flame. The explosion "tore the flesh from his body and thighes, nine or ten inches square in a most pittifull manner; but to quench the tormenting fire frying him in his cloaths, he leaped overboard into the deepe river, where ere they could recover him he was neere drowned."

Captain Smith Bids Virginia Farewell

John Smith at last was willing to give up. Ships were about to leave for England, where he could recuperate—if he lived. Yet even now his enemies held the ships for three weeks, in order to collect complaints against him to send back to the London Council.

When, finally, his ship sailed out of the Bay, John dragged himself out on deck to look at the land he had toiled to make a part of England—at the wide waters, the low green shores, the gleaming yellow-white sand.

He had coasted these shorelines in all weathers, struggled through the ooze of the riverbanks, tramped through the forests, made himself welcome at the villages. He was in love with America, not as a man desiring gold or the passage to the South Sea, but for its own sake.

With his departure, Jamestown fell apart. Slaughter by Indians, murder, and cannibalism racked the colony. When the new leaders finally arrived, they decided to abandon the whole enterprise. They were actually sailing for home when Lord De La Warr appeared with a fresh supply of food.

In England Captain Smith had to defend his administration. Though the records are now lost, he seems to have come off fairly well. To make the vindication complete, he published a book which contained his map, a description of the people and country of Virginia, and a narrative of events there.

In part the book was a defense of Smith. But more than that, it praised the New World. "No place is more convenient for pleasure, profit, and mans sustenance," he wrote.

As his wound healed, John had but one thought: to return with a colony of his own. The Virginia of the London Company was now closed to him. But the whole coast from the Carolinas to Nova Scotia was then called Virginia; he might perhaps tackle the northern territory under the Plymouth Company.

In the end, John Smith persuaded four London merchants to send him out with two vessels. In February of 1614 they dropped down the Thames, awaiting favorable winds. One of the passengers was the Indian Squanto, on his way home after a visit to England.

On March 3 the winds came.

"Fair weather! Get the sails to the yards!" called the captain.

"About your gear on all hands! Hoist your sails half-mast high! Make ready to set sail! What's the anchor, aweigh?"

"Yea, yea!"

"Set your foresail! Out with all your sails!"

Once more John Smith was on his way. He went forth this time in search of whales, gold, and copper—that was his agreement with the merchants. Or, failing that, fish and furs.

Explorers Caught Fish but No Whales

Sometime in April the ships reached the "Barty Ils" (Monhegan Island) off the coast of Maine (page 616), about opposite the mouth of the Kennebec, which was named "The River forth." Smith and his men saw whales but could not catch them. They looked for gold but found none.

They turned then to fish and furs, but the season had largely passed. Though they did take 50,000 pounds of fish, it was not enough to defray their costs. By trading with the Indians along the coast, however, they managed to pick up more than a thousand beaver skins.

While the sailors fished, John Smith went off on the sort of voyage he loved, exploring and mapping the shore. "I have drawen a Map from Point to Point, Ile to Ile, and Harbour to Harbour," he says, "with the

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Tobacco Leaves Festoon the Rafters of a Curing Barn in Maryland →

Jamestown colonists found the Indians growing tobacco. "Yt is not of the best kynd, yt is but poore and weake, and of a byting tast," they reported to London. For several years they ignored the weed, never dreaming it was Virginia's equivalent of the raw gold they sought in vain. John Rolfe, husband of Pocahontas, imported tobacco seeds from Spanish America about 1610 and planted them amid native tobacco. The new leaf had a pleasant taste. Exports soared, and Virginia's economy boomed.

Today tobacco is still the major cash crop in parts of Virginia and southern Maryland. P. E. Clark here inspects newly harvested leaves near Upper Marlboro.

Soundings, Sands, Rocks, and Land-marks as I passed close aboard the Shore in a little Boat" (page 614).

Beginning in Penobscot Bay, which he mapped as "Pembrocks Bay," he worked his way down the coast.

To islands south of Portsmouth he gave his own name. Since he was in all likelihood the first to explore them, it's a pity his name did not stick; we know them now as the Isles of Shoals.

Every Man a Master in "Paradise"

Though he had been sent to trade, Smith was more interested in finding a spot for a permanent plantation. "Here every man may be master and owner of his owne labour and land," he wrote. A revolutionary notion, at a time when England looked at America as a dumping ground for orphans and criminals.

The part that delighted him most was Massachusetts Bay, "the Paradise of all those parts." Farther down the coast he came to "an excellent good harbor, good land, and no want of any thing but industrious people." This place became "Plimouth." Then he explored "Cape James" (Cape Cod) and headed back for his ship, boiling over with enthusiasm for the area he had seen.

Reaching England's Plymouth in August, Smith went to call on a friend, Sir Ferdinando Gorges, also an enthusiast for America. Smith persuaded Gorges to help him establish a colony, and Gorges managed to interest the well-to-do Dean of Exeter. From merchants in London Smith collected £200, as well as 15 men willing to form a colony with him.

It was March, 1615, before they were ready. In a vessel of 200 tons, accompanied by a smaller one of 50, Smith set sail. Almost at once he picked up strong winds, and only a few hundred miles offshore a gale so damaged the bigger ship that she had to limp back into Plymouth under a jury mast.

This was a heavy blow. Smith's backers, however, provided another ship, this time a small bark of 60 tons. With 15 colonists and 14 sailors he set out again in June with Edmund (or Edward) Chambers as master.

This time the trouble was pirates. For two days they chased him. When they boarded, Smith was startled to find himself surrounded by some old soldiers from his days in Hungary! Eagerly they offered to join his voyage.

But Captain John, backed as he was by

Colonists Cut Tobacco. This Painting Hangs at Jamestown

Trade in Virginia's "sweet-scented" tobacco grew so profitable by 1617 that settlers were planting in streets and market places.

Controversy over the smoking habit raged hotly in England. King James I, an unremitting opponent, imposed a heavy tariff and wrote anonymously: "A custom loathsome to the eye, hateful to the nose, harmful to the brain, dangerous to the lungs, and in the black stinking fume thereof, nearest resembling the horrible Stygian smoke of the pit that is bottomless."

John Smith disliked tobacco intensely. Even the Virginia Company, investors in the Jamestown colony, lacked faith in the export staple. Directors scolded planters for not weaning themselves from tobacco, at the same time urging them to improve the curing and grading of future shipments.

As late as 1622 Jamestown's backers still looked upon smoking as a temporary fad. Tobacco, they declared, was "a deceivable weed . . . a humor which must soon vanish into smoke."

The Glass Factory Rises Again

Scarcely a year after their arrival the Jamestown colonists were operating English America's first glass factory. Today the glasshouse has been rebuilt by the glass industry, working with the National Park Service. Here, during the festival, master glass blowers will demonstrate the settlers' working methods. This clay-and-wattle structure bears resemblance to the barn in the painting (right above).

←Thomas L. Williams, from a painting by Sidney King
↓Thomas J. Abercrombie, National Geographic Photographer

↑ **Tylerton Stands on Smith Island**

Sailing up the eastern shore of Chesapeake Bay in June, 1608, Captain Smith stopped at a cluster of small islands. The archipelago now bears the name Smith Island. Its three towns—Tylerton, Ewell, and Rhodes Point—lie less than four feet above sea level.

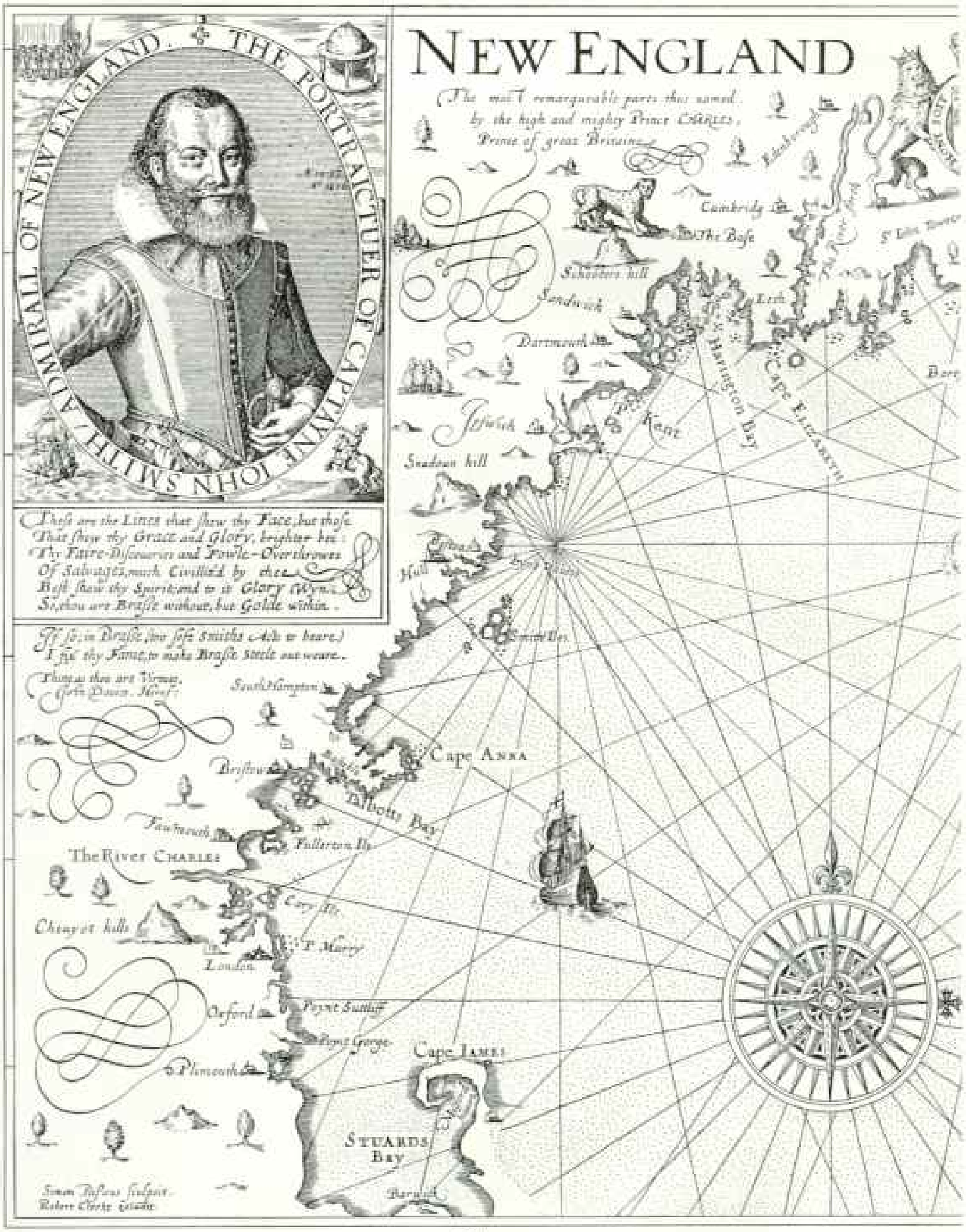
Islanders take pride in their big white homes, picket fences, and narrow lanes. Cinder paths, laid out long before the automobile, serve wheelbarrows and carts. Boats carry residents between towns.

← **Oystermen Work the James River**

An oyster produces up to 100 million eggs a season. Spat, or baby oysters, cling to rocks, shells, and live oysters on river bottoms.

As many as half a dozen seed oysters may grow on a single shell. Months later they are collected and transferred to the York, Rappahannock, and other rivers, where the young grow to marketable size.

These tongers off Wreck Shoal scoop seed oysters with long scissorlike poles armed with steel claws.



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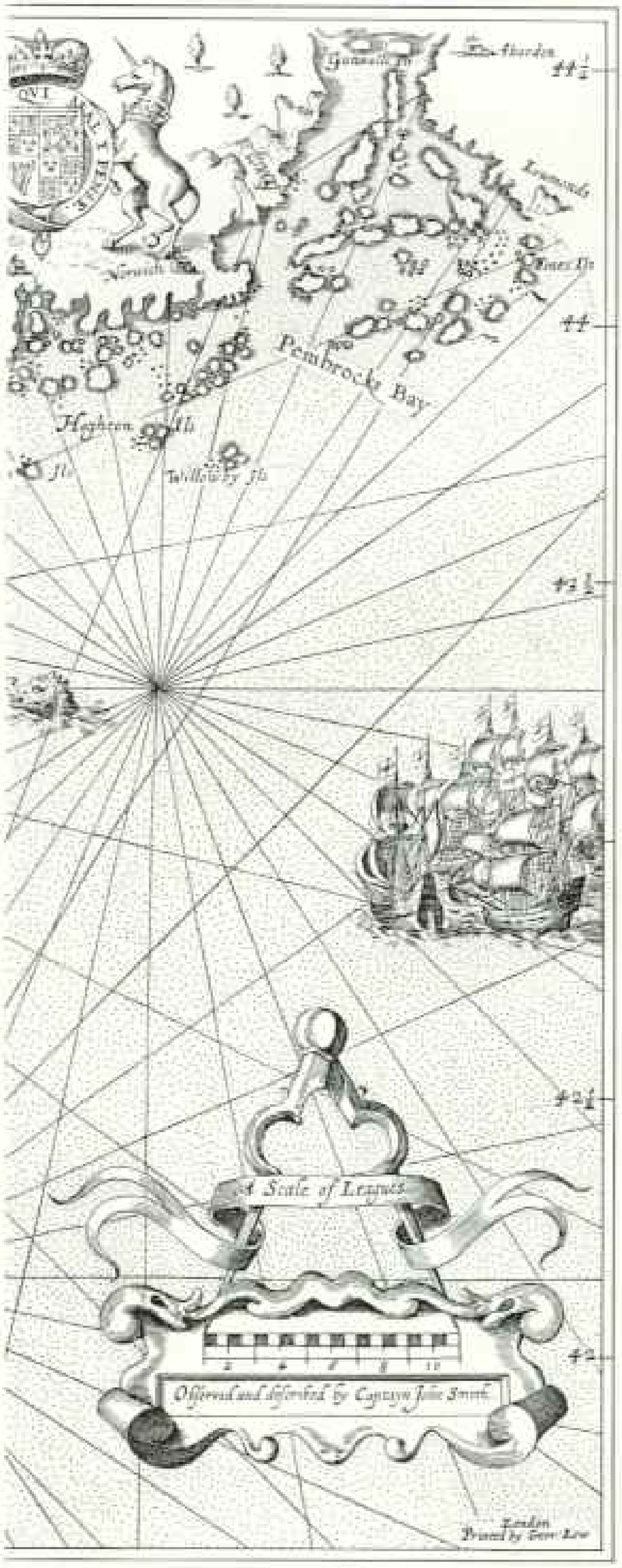
Smith's Map of the New England Coast Gives Proper English Names to Indian Villages

In 1616 Smith published this map in his *Description of New England* following a visit two years earlier. He asked 15-year-old Prince Charles to change the Indians' "Barbarous names, for such English, as Posterity may say, Prince Charles was their Godfather." Today only four place names endure on their original sites: Plymouth, South Hampton, Cape Anna (Ann), and The River Charles. Map's Boston is now York, Maine; London is Cohasset, and Oxford is Scituate, both in Massachusetts. Simon van de Passe engraved the portrait; John Davies wrote the eulogy. The Plymouth Company conferred the title, "Admirall of New England."



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The Captain Dreamed of Settling Here

"I would rather live here than anywhere," Smith said. He died without seeing America again.

➔ Nine editions of Smith's New England map were published. Each contains minor changes.

Student Barbara Sumner studies the 1627 edition, a treasure of the College of William and Mary.

B. Anthony Stewart, National Geographic Photographer

the Dean of Exeter, could afford to have no truck with pirates. The ships separated, Smith heading for the Azores.

He had just come within sight of Fayal when two French ships gave chase. They eluded these, only to be chased again by four more French privateers.

This time the odds were too great. Smith agreed to go aboard and show his commission, on their promise to let him go if it was in order. Instead, the Frenchmen seized him, rifled the stores of his ship, dispersed his men among the fleet, and put a prize crew aboard. Then they went on, chasing every ship they saw and capturing several.

A Pirate Despite Himself

Captain Poyrune of the French fleet finally decided to let Smith go on his way after all and put all his men back on the English ship. But John had first to go about collecting all the things which had been carted off to the other ships. While he was still aboard one of the French vessels, Chambers fell astern, and that was the last Smith saw of him or of his own belongings, most of which were aboard the other ship.

John Smith was now a pirate whether he liked it or not. When the French chased English ships, they locked him up. But when Spanish ships were the game, Smith joined in the fun—"to manage their fights against the Spaniards," as he says—with the understanding that he would share the profits.

Eventually Smith escaped in the ship's

CAPTAIN JOHN SMITH

boat, hoping to reach the coast of France. But a strong current carried him out to sea. Great gusts of wind and huge waves threatened to swamp him.

For 12 hours John fought wind and water, until the tide turned. Sculling and bailing, he finally managed to get to shore, there to discover a true twist of fate: the prize ship from which he had escaped had gone down in the storm.

So, in December, 1615, John Smith limped back to England. Unfortunate but unvanquished, he now put his experiences into a book, *A Description of New England*, which was published in June, 1616, along with his excellent map of the area.

Smith Sees Pocahontas Again—in England

In that very month Pocahontas reached London with her husband John Rolfe and their infant son. Smith went down to Brentford, just outside London, to call on her.

It was a very different Pocahontas he found—not the laughter-loving, cartwheeling youngster of the forest, but a young woman stiffly dressed in rich brocades and lace (page 619). She gave him a modest salutation. Then she turned away her face as if offended.

Has she forgotten how to speak English? John wondered. After he had talked awhile with her husband, however, she began to speak, recalling the past.

"You did promise Powhatan what was yours should be his," she reminded him, "and he the like to you. You called him father, being in his land a stranger, and by the same reason so must I do you."

Then she told him they had thought him dead. That, perhaps, explained her strange behavior when first she saw him that day.

Lovely Pocahontas never saw America again. She died at Gravesend in March of the following year, while Smith was trying to get away on his third New England voyage.

Poor John! His third attempt was a worse fiasco than the second.

"I was wind-bound three months, as was many a hundred sayle more," he explained in a letter to Lord Bacon. In the end he never got off at all. As a consolation prize, the commissioners of the Plymouth Company made him "Admirall of New England."

It was an empty title, for John never again saw his beloved America. The rest of his life—he lived until 1631—was spent in promoting the area he had named New England. When the Pilgrims left he tried to persuade them to let him join them, but they told him his "books and maps were much better cheape to teach them" than himself.

John also had "much conferences" with the leaders who were about to establish the Massachusetts Bay Colony. They adopted the Indian name Smith had first placed in print when he described "the Paradise of all those parts." But they, too, declined to invite him to his beloved New England.*

The Captain Dies, but Not His Dream

Anyhow, he could write. He wrote a second, then a third book on New England. He brought out a handbook for seamen so popular that it was expanded the following year. He wrote about his exploits in Europe. At his death he was writing a big book on the sea, no trace of which survives.

John's magnum opus was *The Generall Historie of Virginia, New-England and the Summer Isles*, beautifully printed with maps and engravings in 1624. In it he republished much of his earlier work, though with many changes, and included information from more than fifty explorers and adventurers. He gave copies to the great merchant guilds of London, still hoping to persuade them to back a plantation in New England.

He was still hoping when he died in 1631, at the age of 51.

"I may call them my children," he wrote of the American settlements, "for they have bin my wife, my hawks, my hounds, my cards, my dice, and in totall my best content."

President and pioneer in Virginia, explorer

* See "Founders of New England," by Sir Evelyn Wrench, NATIONAL GEOGRAPHIC MAGAZINE, June, 1953.

← Monhegan Island, Maine, Knew Smith as Trader and Surveyor

In 1614 the captain commanded a two-ship expedition to New England, London merchants having commissioned him to hunt whales, gold, and copper. Anchoring off Monhegan Island, Smith explored the coast in a small boat while his crewmen fished.

Monhegan was a familiar anchorage for English sailors of that day. During a fishing season as many as 200 vessels touched at the rocky outpost 11 miles offshore. Today fewer than 100 lobstermen and their families live year round on the island.

Above: A plaque erected by residents in 1914 records Smith's visit 300 years earlier.

Below: Prosperous Monhegan Islanders restrict their lobstering season to the first six months of the year. Here, in late June, they pull in their pots. Manana Island looms across the harbor.

 John E. Fletcher

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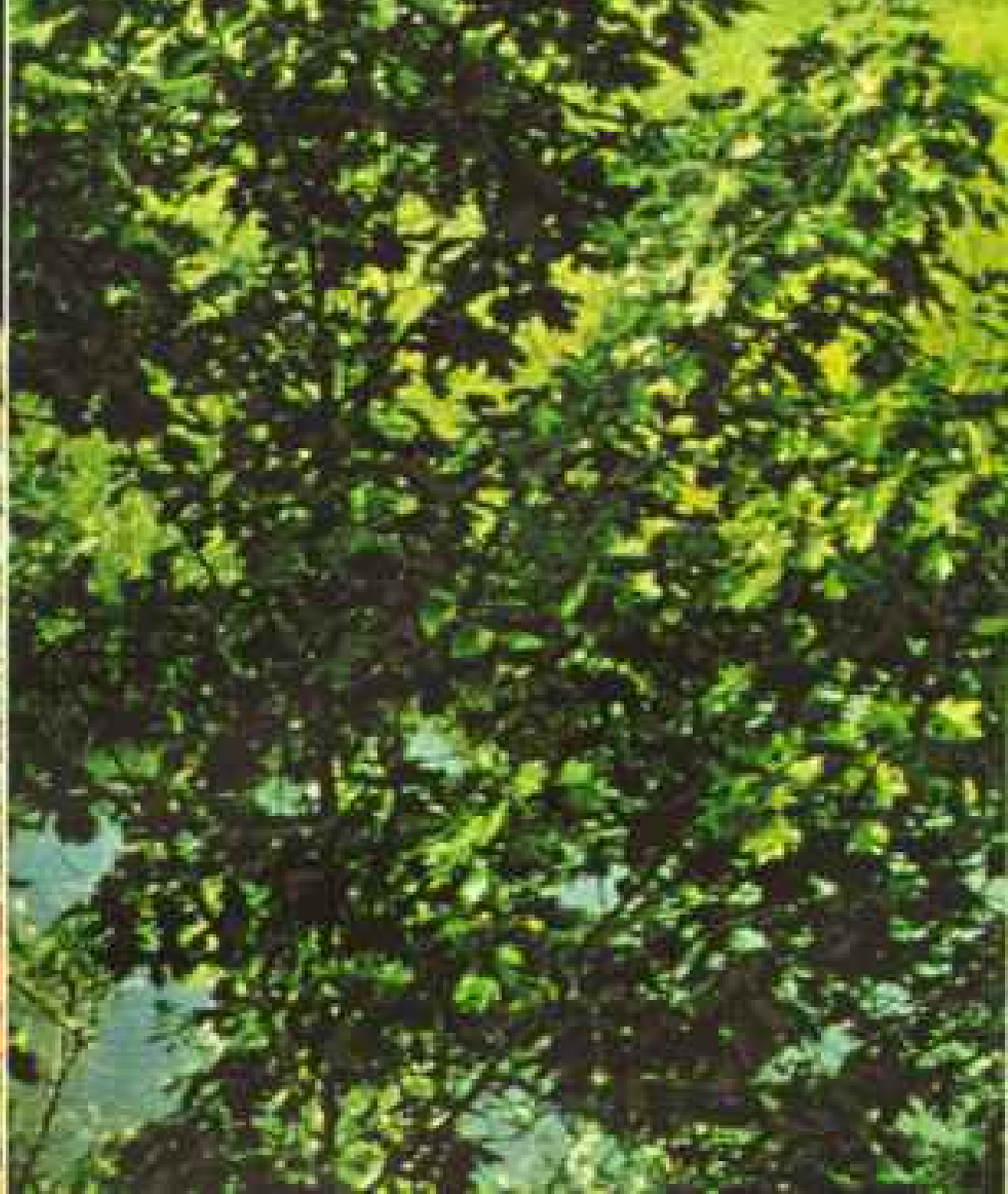
Warren House Has Stood 305 Years

Thomas Rolfe inherited this property from his mother, Pocahontas. Thomas Warren, his friend, built the house by 1652. Soybeans fill the field.

➔Smith in 1609 began construction of a fort on this wooded bluff near Warren House. Famine halted work. Grays Creek winds toward the James.

⸸Edward Addison of Surry, Virginia, displays grapeshot he dug up at the site of Smith's Fort.



Pocahontas Wore Court Dress for Her English Portrait

John Rolfe married Pocahontas in 1614; two years later he took his wife and infant son to England. The presence of an Indian "princess" created a sensation in London. Though only 21 years old and reared in a wilderness, Pocahontas behaved with remarkable aplomb. As Lady Rebecca, she attended King James's court and witnessed one of Ben Jonson's masques.

Shortly before her scheduled return to Virginia, Pocahontas fell ill and died suddenly. John Smith, who had called on his benefactress twice in England, wrote: "It pleased God . . . to take this young Lady to his mercie." Today her remains lie in St. George's Church in Gravesend, on the coast of England.

Here Pocahontas wears the hat, ruff, and brocades of the 17th century. Her portrait, by an unknown artist, hangs in the Mellon Collection at the National Gallery of Art, Smithsonian Institution, Washington, D. C.

620 Parry Brown

Captain Smith's Little Squadron Sails Again into Hampton Roads

A shipyard in West Norfolk, Virginia, built these reproductions for the Jamestown Festival. Billowing square sails drive the 111-foot *Susan Constant* (right), the 69-foot *Godspeed* (foreground), and the 50-foot *Discovery*. Capt. Carl G. Bowman, USCG, commanded the tiny fleet as master of the *Susan Constant*. "She handles well and tacks and wears beautifully," he reported. Norfolk yachtsmen manned the vessels.

Another historic reconstruction, *Mayflower II*, sails the Atlantic this spring (page 708).

of the Chesapeake, namer of New England, to which his writing attracted the Puritan settlements, a mapper whose chart aided Henry Hudson's explorations—truly might John Smith claim that the colonies were "pigs of his sow."

His vision of a vast and prosperous land peopled with free men has come to pass. And no man did more to bring it about than this sturdy, indomitable, persevering son of a tenant farmer, who began his career as a warrior on horseback and ended it as a frontiersman. Having breathed the invigorating air of the New World, he was never again content with the Old. Nor were those who followed him.

The Balearics Are Booming

Low-cost Living Beneath Azure Skies Lures Vacationing Throngs to Spain's Sunny Mediterranean "Isles of Peace"

By Jean and Franc Shor

National Geographic Magazine Staff

With Illustrations from Photographs by the Authors

IT IS natural for tourists, when writing to those unfortunates who stayed at home, to describe their surroundings in glowing terms. Even so, a letter written from Majorca in 1838 by the great composer-pianist Frédéric Chopin may be worthy of note.

"Here I am in the midst of palms and cedars . . . olives . . . aloes . . . and pomegranates. The sky is turquoise blue, the sea is azure, the mountains are emerald green; the air is as pure as that of Paradise. All day long the sun shines. . . . At night one hears guitars and serenades. . . . In short, a delightful life."

No One Leaves Majorca Voluntarily

Inspired by such enthusiasm, which even a modern travel agency might hesitate to duplicate, my wife Jean and I decided, during a recent visit to Spain, to spend a few weeks in Majorca and its sister islands of the Balearics, Iviza and Minorca.* A Spanish friend in Barcelona, where we waited for a plane to Palma, tested our pronunciation of Bal-ee-air'-ix. He also had a word of caution.

"Make sure you have return reservations confirmed and paid for before you leave."

"Why?"

"First, because the island is packed. Airlines and boats are running extra schedules and still can't handle the traffic.

"But maybe even more because Majorca seems to do something to people once they get there. You won't *want* to leave. It'll take bookings made and paid for to get you away!"

We had proof of his first observation within an hour of our arrival in Palma, the islands' capital. A mistake had been made in our hotel reservations, and the travel agency solemnly assured us there wasn't a room to be had. We took our problem to the Spanish Tourist Office. Before we finished explaining our plight, a pleasant Majorcan standing next to us put everything aright.

"I own a new hotel," he said with a laugh, "and I've been looking for someone to sponsor me for membership in the National Geographic Society. Put your bags in my car; the Gran Hotel Alcina will make room for you."

As Señor Alcina drove us along Palma's waterfront on the flower-decked Paseo Maritimo—an avenue lined with fishing boats and yachts on one side and hotels on the other—he spoke of the tourist boom.

"The English and French started coming as soon as World War II ended," he said, "and then the Germans and the Scandinavians filled us to capacity. About 1952 the Americans discovered the island, and since then we haven't been able to build hotels fast enough. I used to manage one of the best hotels in Palma, but I saw what was coming. I got some backing and built my own."

We drew up before the towering white structure that bore his name. Ten minutes later we were having tea with our host on our private balcony overlooking the harbor.

Americans Bring Back Prosperity

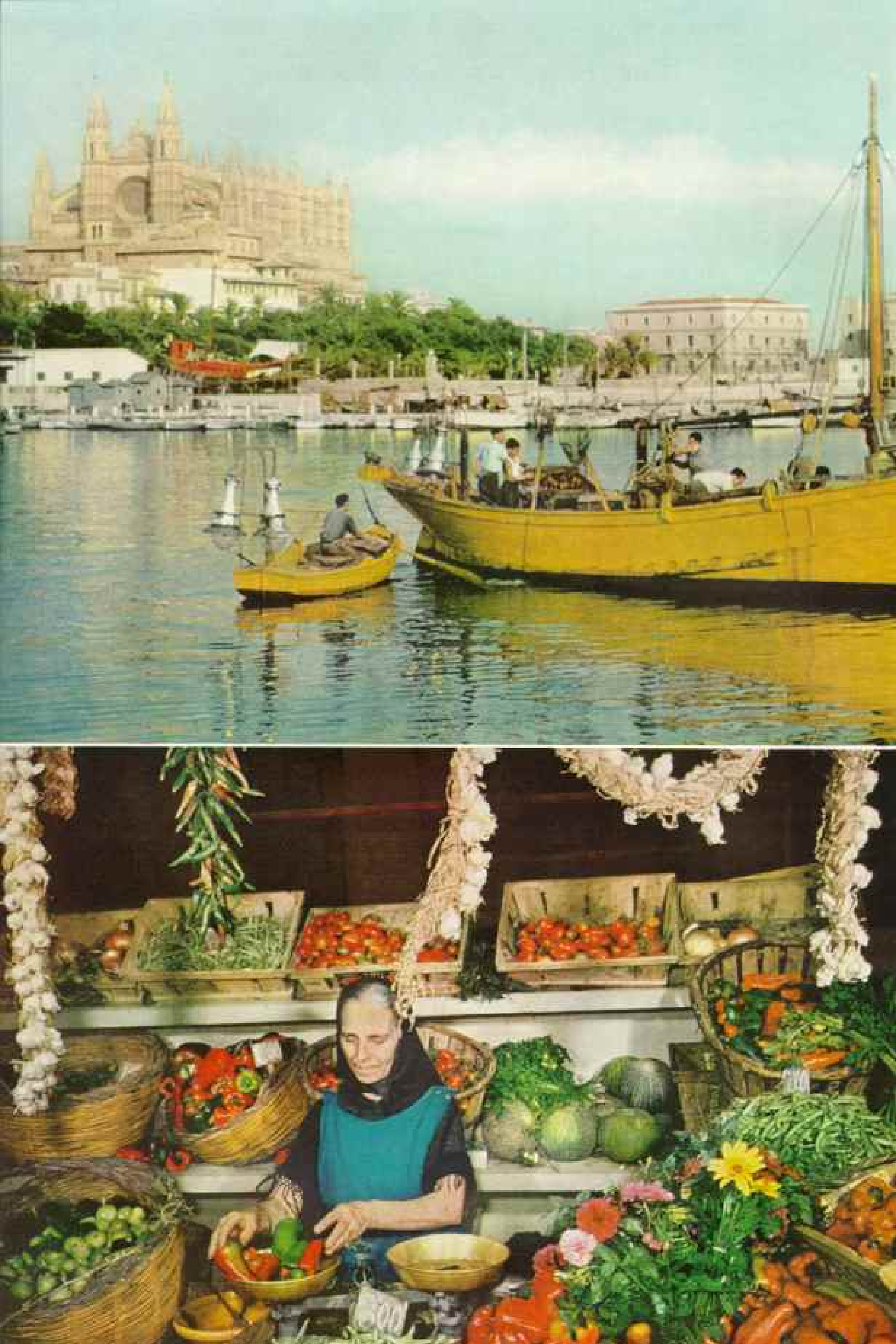
"In a way," Señor Alcina remarked dryly, "this influx of Americans marks the completion of a circle. Palma was one of the most important ports in the Mediterranean from the 13th through the 15th centuries. The island grew fat on shipping profits. We built our great cathedral and some of the finest private palaces in medieval Europe.

"Then Columbus discovered America and ruined everything. Shipping shifted from Mediterranean to Atlantic. For four long centuries Majorca became a backwater. Business disappeared and population declined.

"And then the American tourist discovered Majorca! We're even. You've brought back everything Columbus's discovery took away."

It took Jean and me only a few days to discover why the island is such a favorite with travelers. The climate was all that Chopin had promised. Good roads wound

* See "The Balearics, Island Sisters of the Mediterranean," by Roy W. Baker, National Geographic Magazine, August, 1928.



623

← Bulging Stalls Announce Market Day in Iviza

Third largest of the Balearics, Iviza Island is one-sixth the size of Rhode Island. Good weather much of the year gives the Ivizans prime crops of fruit and vegetables.

On market day the people combine business and pleasure. Everyone goes to town to shop or share a glass of Palo, a favorite drink.

This woman weighs peppers. Beans, flowers, tomatoes, and melons adorn her counters. Strings of garlic and chili peppers hang overhead.

Sun and Salt Draw Bathers → to Puerto de Andraitx

Increasing numbers of retired persons swell the Balearics' permanent population, some 435,000.

Artists like this Majorcan port for its scenery and simple life. The harbor serves the larger town of Andraitx two miles inland. Its waters are exceptionally clear. Distant swimmer looks down through crystal water to the floor of the bay.

←Majorcan Fishermen Weigh Anchor Beneath La Seo, the 13th-century Cathedral in Palma

Enchanting scenes, friendly inhabitants, and a leisurely life make the Balearic Islands a favorite of vacationers and honeymoon couples. Each year thousands of Americans and Europeans enjoy the islands' mild climate and low-cost living.

This boat gets under way in late afternoon for a night's fishing. Lights at stern and on the dinghy lure sardines into nets.

Palma's massive cathedral was built by Spaniards who expelled the Moors in the 13th century (pages 625 and 634).

Jeweled Sunlight Streams Through La Seo's 36-foot Rose Window →

Legend says King Jaime I of Aragon laid the Palma cathedral's foundation in 1232 in gratitude to God for victory over the Moors. As its walls slowly rose, Majorca's kings were crowned and buried within. Work on decorations and minor statuary still goes on.

This Easter Sunday view looks from the nave to the presbytery. Slim columns at left and right lift arches more than 140 feet above the nave.

Under direct sunlight, the stained-glass window creates kaleidoscopic patterns on the stone floor. Electricity lights the altar, chandelier, and wall sconces.

 Kodachrome by J. Allan Cash

through almond and fig groves, past acres of rippling grain, and along smooth white beaches (page 640). In tiny cliffside villages on the scalloped coastline brightly colored fishing boats bobbed at anchor.

Best of all, the Majorcans were among the most natural and openhearted people we had ever met. During our weeks in the Balearics we were invited into dozens of whitewashed farm cottages, offered wine and plates of fruit, and urged to share the family meal.

Less Than $10 a Day for Two—with Meals

Our own living costs were amazingly low. The Alcina is a first-class hotel, and our room was the best in the house. But for the two of us, with three meals a day, the rate was less than $10. And the meals were banquets. Great trays of cold prawns, tuna fish, cold meats, sausages, lobster and chicken salad introduced each repast. Then came soup, a fish course, meat and vegetables, salad, fruit and cheese, and dessert. I gained five pounds in the first ten days and might have kept on indefinitely if Jean had not called a halt.

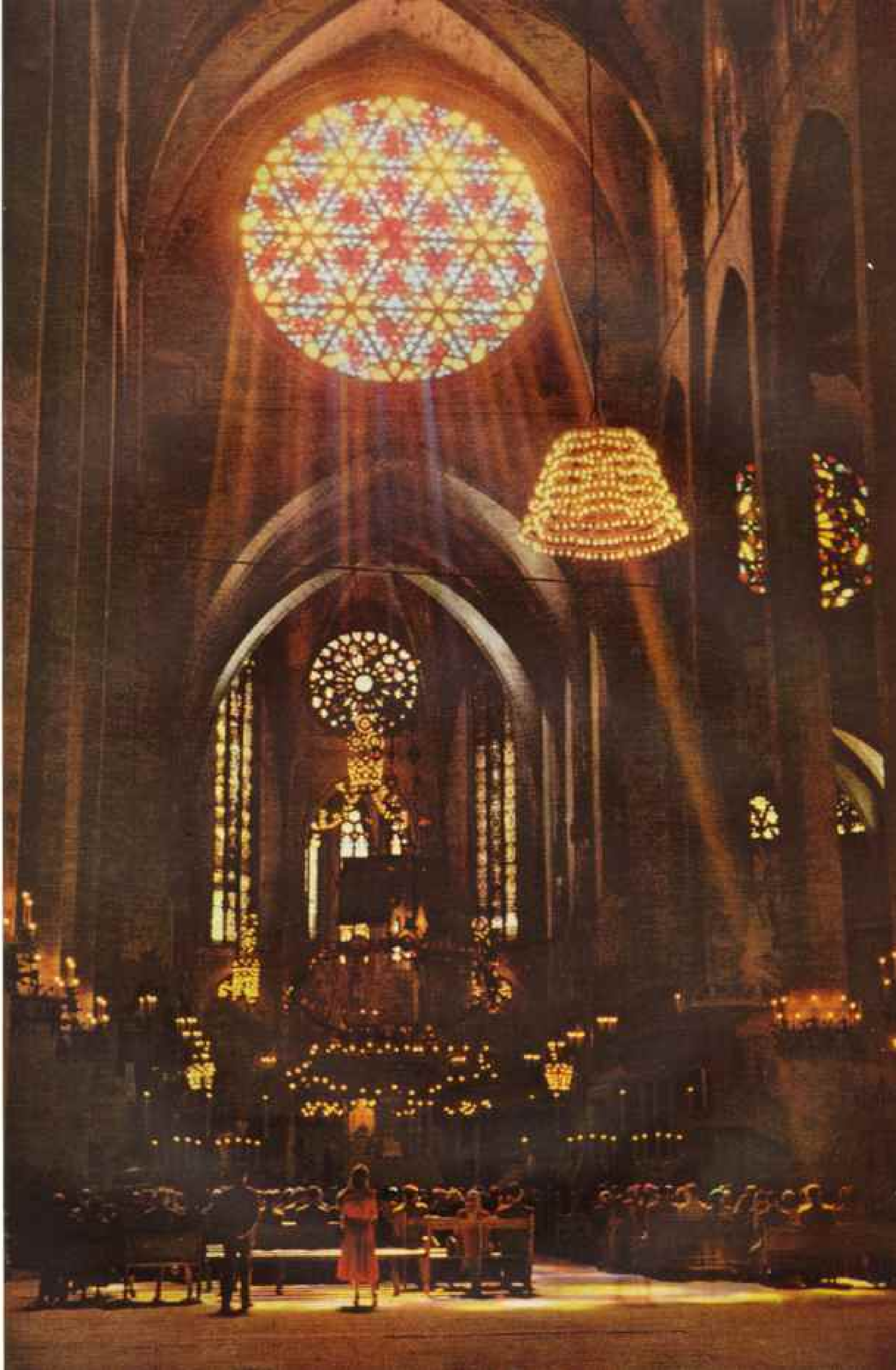
Palma itself, a busy city holding 150,000 of Majorca's 350,000 people, offers a wide variety of attractions, from its towering cathedral, La Seo, to the palace of the Almudaina, where the kings of the short-lived Majorcan dynasty once ruled.

But to Jean and me Palma's greatest charm lay in the warm, hospitable, lived-in air of its tree-lined streets and the stone-paved courtyards of its ancient houses. Vegetable vendors hawked their wares from the backs of tiny donkeys in the winding lanes, and on every turn we came upon a shady square where tables covered the worn cobblestones. For a dime we drank tiny cups of coffee and sampled flaky *ensaimadas*, the sweet Majorcan pastry (page 651).

On the waterfront we watched fishermen

The Balearics: an Eden in the Mediterranean

Three main islands and a scattering of rocky islets make up this Spanish province. Prized for their strategic position, the islands passed from conqueror to conqueror—Phoenician, Carthaginian, Roman, Visigoth, Moor, and Spaniard. Carthage recruited her expert stone slingers, the Baleares, from the archipelago.



unloading their varicolored catches in the early morning hours. In the late afternoon the golden cathedral made a magnificent background as the boat crews coiled lines, stowed nets, and loaded bait for their night's task (page 622).

Many of the Majorcans, we found, understood our bad Spanish. But Majorcan is a dialect of its own, closely related to Catalan, and we frequently were at a loss for a means of communication. We asked the local Spanish Tourist Office to recommend a guide and interpreter, and every day for the balance of our visit we had reason to be grateful.

Fernando Gual de Torrella, a slender young man in his middle twenties, was born in Palma and educated in Barcelona. A member of one of the oldest noble families on the island, Fernando was no professional guide—he had, he told us, just completed a philosophical novel that was awaiting publication—but he was temporarily at leisure.

Through Fernando we also engaged Gabriel Gelabert, a plump, eternally happy chauffeur who owned a middle-aged American car. They made a perfect combination. Fernando was related to almost everyone of importance on the island, and Gabriel seemed to know everyone else.

In our walks about the streets of Palma's old section, Jean and I had been impressed by many a great seigniorial palace with its formidable doorway. We asked Fernando if we could visit such a mansion.

"My cousin, the Marqués de la Torre, owns one of the finest," he replied. "I'll ask him to invite you to tea."

Islands' Moorish Past Lingers On

Don Jorge Truyols, son of the marqués, tall, slender, gracious, showed us through the enormous rooms of Palace de la Torre, where his family has lived for more than 300 years. We were particularly interested in one huge chamber with tapestry-hung walls, carpeted floor, and no furniture other than a profusion of silken cushions.

"This is our Moorish room," Don Jorge explained. "The Moorish influence remained strong in the island long after the Moors were driven out in the 13th century. At one time every great mansion in Majorca had at least one such chamber. This one hasn't been changed since 1650. For that matter, I

Palma's Wide Harbor Welcomes Travelers to Majorca

More than 40 percent of Majorcans make their home in this growing capital and main port, the terminus of the island's rail and road systems. Some 2,000 ships, many of them cruise vessels, call each year.

This view looks across the inner harbor toward downtown Palma. A yacht club occupies the basin at left; the 1,150-yard-long breakwater leads to a lighthouse.

Hotels on the near shore offer a superb view of Barranco, the mesalike elevation in the distance.

↓ Embroidered Cap and Bib Beautify a Donkey

Introduced by Moorish drivers, ornate harnesses appear throughout Spain and the Balearics. Majorcans weave them of grass and bright yarn.

This Palma vendor sells earthenware pitchers protected by grass packing. Each vessel has two openings: a wide mouth for pouring and a narrow spigot for drinking.

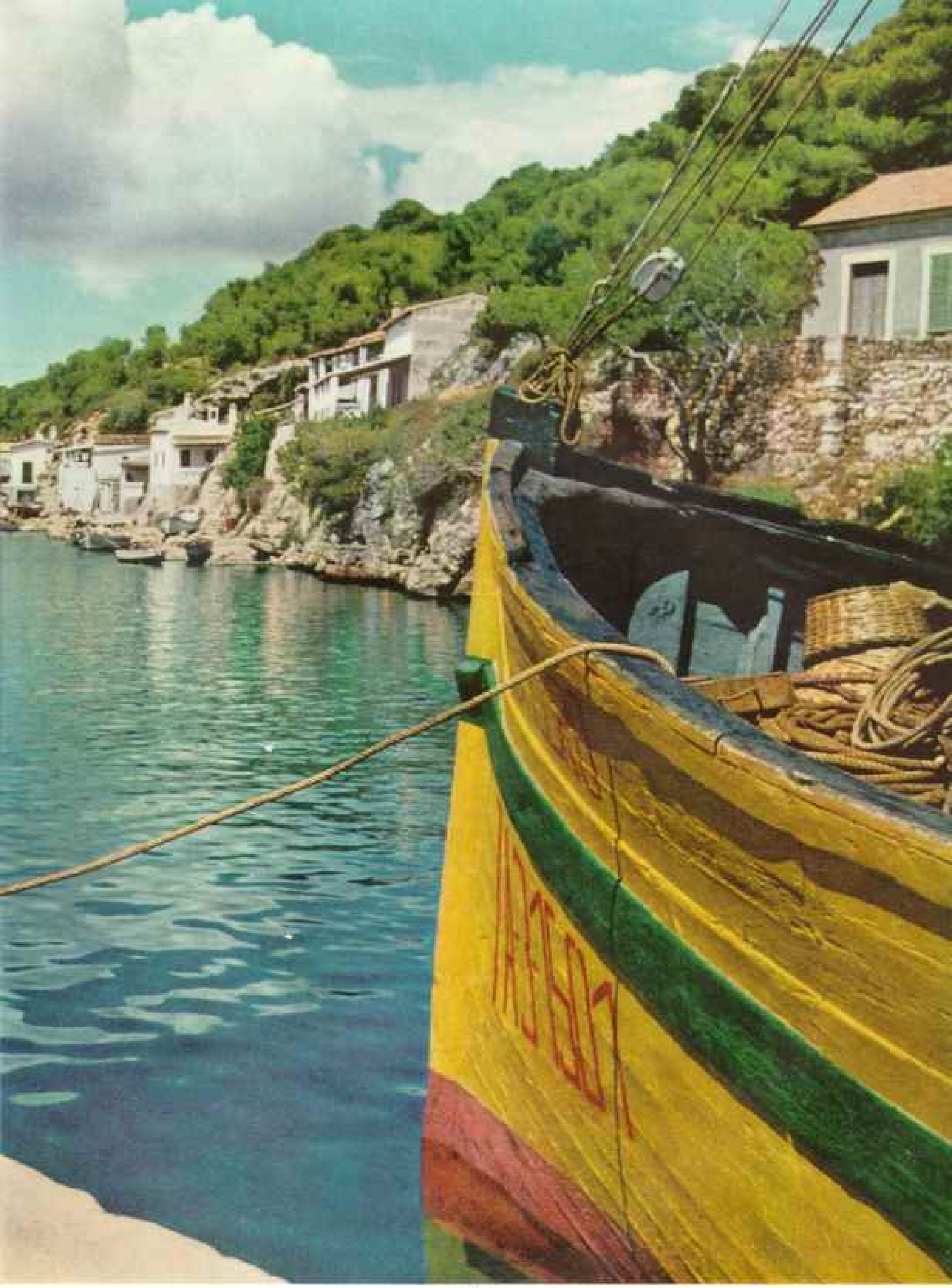
doubt if it has been used very often in all that time!"

Since it was Chopin's enthusiastic description that had first attracted us to Majorca, it seemed only proper that we should see the ancient Carthusian monastery at Valldemosa where he spent a winter on the island almost 120 years ago. The drive was a pleasant 11 miles, first through groves of ripening almonds, then over rocky slopes where ancient olive trees assume fantastic shapes. For the last mile Gabriel's car labored heavily up a steep hill, and suddenly the Cartuja lay before us.

"I had seldom seen and never lived in a lovelier place," wrote George Sand (Aurore Dupin), the fa-

Majorca Seems Made to Order for Artists. This Visitor Paints Serenity

Tranquil inlets, sheltering small fishing villages, indent the island's rugged coast. This man comes every summer from Barcelona to capture the charm of Cala Figuera de Santañy. Boaters and swimmers enjoy the water.



629

Private Villas, Dazzling White in Sunlight, Climb the Rocky Slopes

Most of Majorca's large towns lie inland. Haphazard roads and bus service preserve the calm, unhurried life of Cala Figuera. Infrequent visitors stay in boardinghouses. A fishing boat ties up to the stone quay.

mous French writer who shared Chopin's visit to Majorca. The intervening century has only added to the beauty of the ancient castle and convent.

Chopin and George Sand came to Majorca in search of sunny balm for the composer's failing health. They settled first near Palma, but the heavy winter rains, combined with the local fear that Chopin's lung ailment was contagious, forced them to seek a more congenial setting.

Chopin Rented a Monk's Cell

The Carthusian convent, established by King Martin of Aragon in 1399, had been secularized in 1836 and the monks driven out. Their comfortable three-room cells, each with a garden, were for rent. Chopin secured one of these lodgings (page 636).

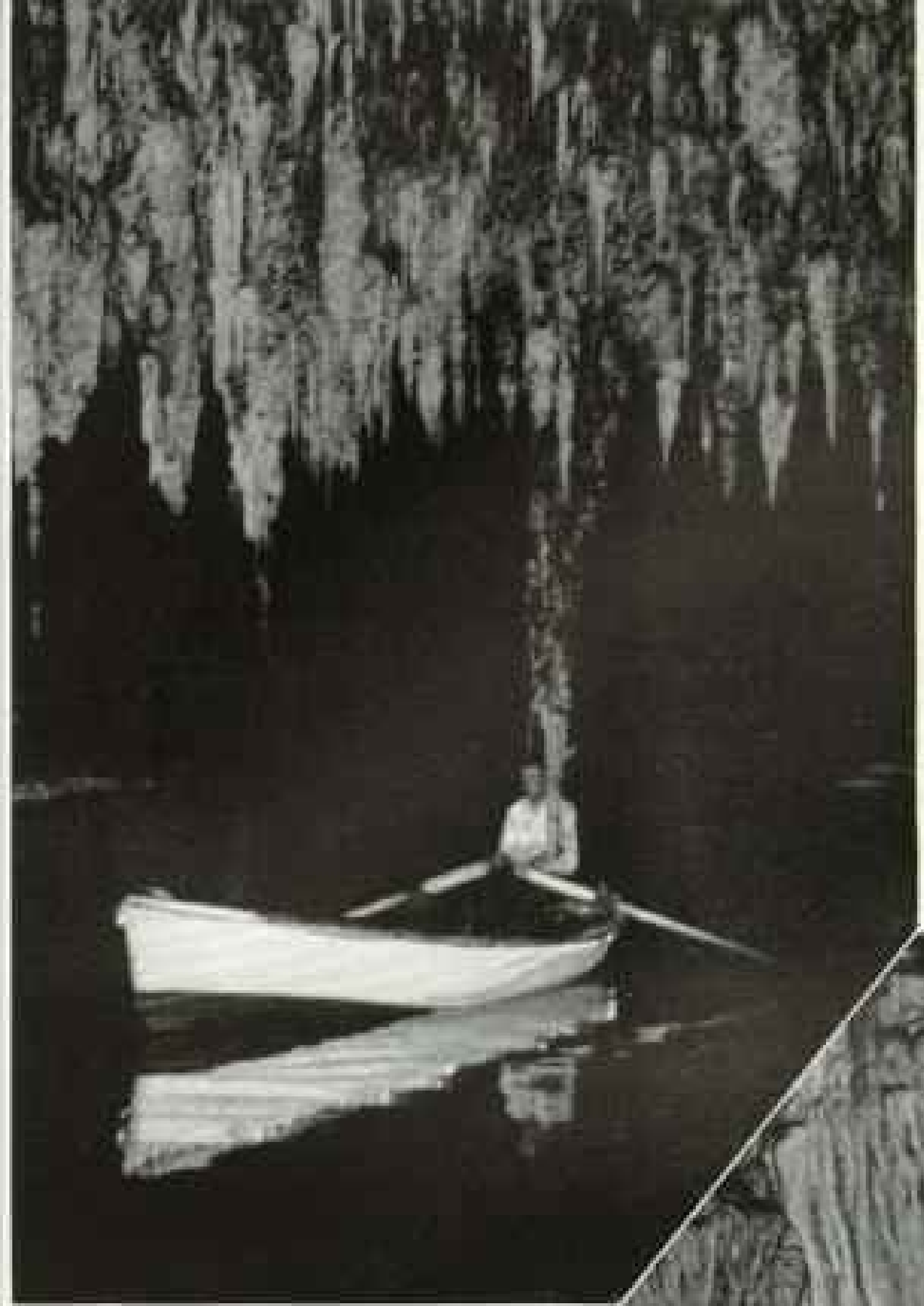
His first letters from there, like those of George Sand, were songs of pure bliss. "Under this sky, one feels oneself permeated by a poetic feeling," wrote the composer.

But disillusionment was not far behind. The Pleyel piano which Chopin had ordered from Paris was long in coming, and when it did reach Palma, customs and transportation difficulties further delayed its arrival at the monastery. The rains that had plagued the couple followed them to Valldemosa, and Chopin's health continued to deteriorate. George Sand, nursing him like a mother, found him a "detestable patient." When the piano finally arrived, he set to work composing in an attempt to mend his straitened finances, but spells of racking coughs made every day and night a torment.

Yet it was under these circumstances, George Sand wrote, that the master created "the finest of his short pieces which he modestly called Preludes." And in her biography she describes one cold and rain-swept night in which he wrote that short crystallization of beauty famous for a hundred years as the "Raindrop Prelude."

"That evening's prelude," she wrote later, "was full of rain drops beating on the monastery roof, but they were transformed by his imagination and singing gift into tears falling on the heart."

Chopin and George Sand left the island in the early spring of 1839. Later Madame Sand was to write bitterly of that unfortunate winter. And yet little more than a century later Majorca has made a veritable shrine of their quarters. Every day crowds wend through the stony passages, gaze at the piano on which Chopin poured out his tortured genius, and listen breathlessly as guides point out the "very room where Chopin slept."



631

Water-borne Musicians Play in the Caves of the Dragon

Cuevas del Drach, one of Majorca's attractions, unfolds a labyrinth of chambers frosted with limestone icicles.

Guides lead visitors down echoing corridors to a gloomy amphitheater beside 540-foot-long Lake Martel. Then, as boats move in, the lights are turned up.

A photoflash here reveals a musical quartet driven by a lone oarsman. Crystalline islands and promontories dot the lake. Hanging stalactites on left are mirrored as standing stalagmites (page 648).

History says 1,500 Moors, fleeing the battle over Palma, took refuge in the caves. Spanish soldiers built fires at the entrance and smoked them out.

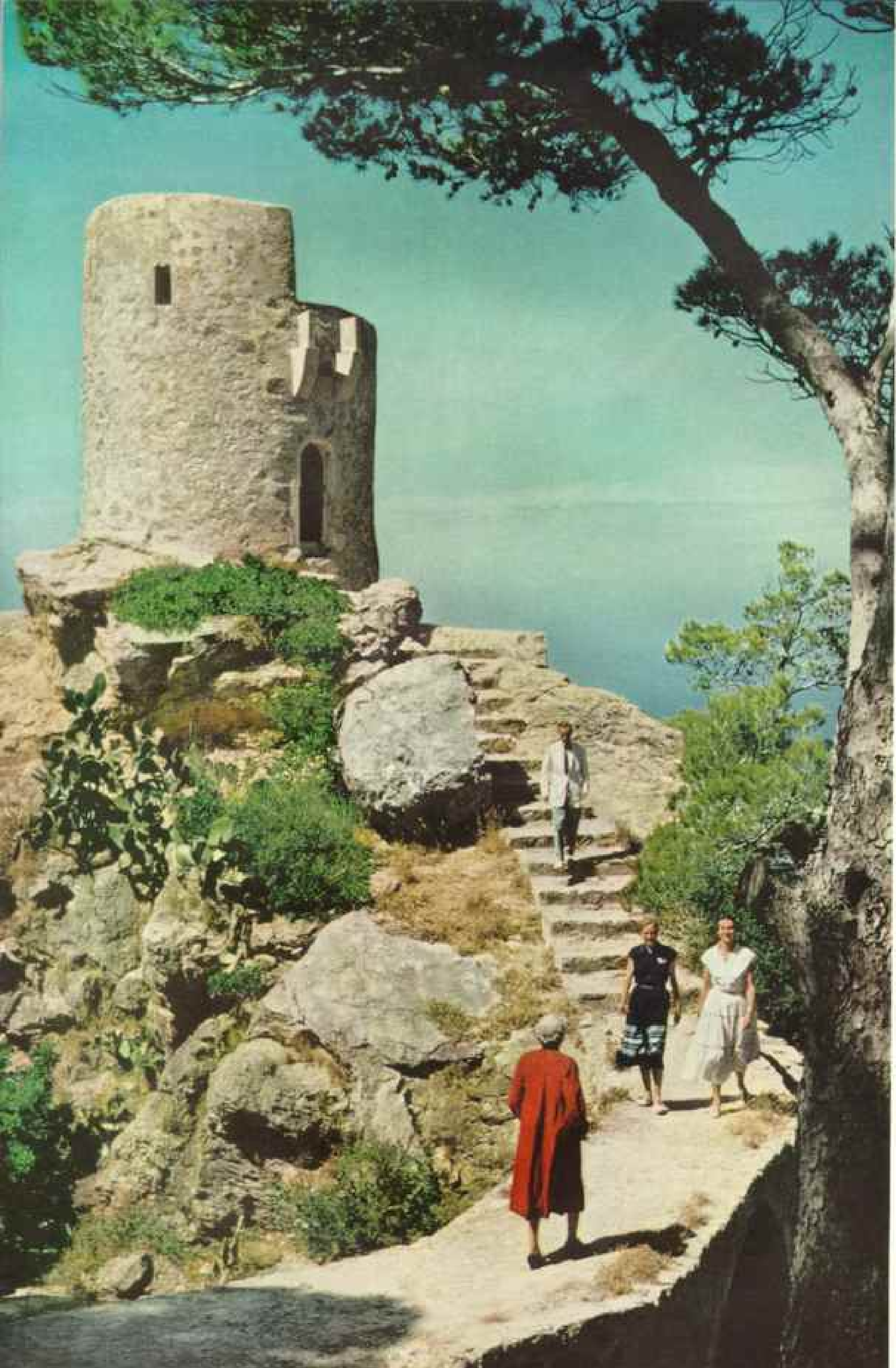
Twin Stalagmites → Admit Visitors

Underground trickles all over the world form frozen Niagaras like these formations in Cuevas del Drach. Limestone in solution hardens in tumbling patterns as evaporating water releases its stony burden.

"The only trouble with that," a Majorcan friend told us, "is that no one knows exactly which cell he occupied. Until a few years ago, there was quite a fight about it. Two adjoining cells were owned by different families. At one time each family had a barker at the door, urging tourists to visit the cell *really* occupied by the famous pair.

"Then the families pooled their resources, and now one admission takes you through both cells—one pointed out as Chopin's, and the other as that of George Sand."

There is in Majorca another place of pilgrimage, this one of quite a different sort. It lies in Petra, a town some 20 miles east of Palma, and for any American, particularly one who lives in or has ever visited



California, it holds great interest. For here was born, and here found his vocation, Fra Junípero Serra, the father of California.

The house where Miguel Joseph Serra was born in 1713 is the simplest of Majorcan cottages, with a stone-floor living room downstairs and a tiny bedroom tucked beneath the sharply sloping eaves. Only a few steps away stands the weathered Franciscan monastery where the young man went to school and found his call to the priesthood.

Father Serra Named California Cities

The names of the chapels in the Petra convent were destined to travel far. When the Franciscans replaced the Jesuits in Baja California in the middle of the 18th century, Father Junípero Serra was appointed superior of the missions on the peninsula. From there, on tireless feet, he began thousands of miles of apostolic journeys. And when he established the missions which were to grow into great California cities, he must have bethought himself of the convent of his boyhood, and its chapels of San Francisco, San Luis Obispo, San Juan Capistrano, San Buenaventura, and San Diego.

We felt oddly moved, stepping into the chapel to St. Francis of Assisi (page 656), to realize that it must have been this very altar that the friar from Petra had in mind when he founded the tiny mission destined to give its name to California's city by the Golden Gate.

It was midafternoon when we left the convent, strolling along a street which must look almost exactly as it did when the great missionary walked it more than two centuries ago. Two-story buildings plastered with mud made a shallow canyon of the stone-paved street, and the bright sun drew a sharp dividing line of shadow down the middle.

The Majorcan census credits Petra with nearly 4,000 inhabitants, but few of them were visible at that hour. Hungry, we finally spotted a boardinghouse and entered a small whitewashed room with bare but spotless wooden tables. While we waited for someone to answer Fernando's shouts, Jean read the price list posted on the wall.

"Let's quit work and move here," she laughed, pointing to the listing for a double room and three meals. It came to less than a dollar a day per person.

A smiling, buxom hostess appeared, wiping her hands on her apron as she apologized for the delay. She explained that lunch had already been served, and that she had neither meat nor eggs left in the larder.

"But if your friends would like," she added hospitably to Fernando, "I'll make them some *sopas mallorquinas*."

"That's the standard dish of the poorer people of the island," Fernando explained. "It's made of tomatoes, garlic, onions, green peppers, thinly sliced potatoes, bread, and sometimes a few green beans."

We told our hostess we'd be happy with sopas mallorquinas. "Come back in half an hour," she said. "A *Spanish* half-hour!"

No Soup in Majorcan *Sopa*

We returned in an hour, and after only a few minutes' wait our steaming sopas were set before us. We ate our way happily through second helpings and congratulated our hostess on the excellent flavor. But I was somewhat surprised, I added, to find no liquid in a dish called Majorcan soup. The bread and potatoes had soaked up all the broth, leaving a thick stew.

"But señor," she protested, laughing, "there is never any sopa in sopas mallorquinas. If you want sopa in your sopas, you must order it specially."

Our drives around the 60-mile-long and 45-mile-wide island took us to many seaside villages high above the blue Mediterranean, but none more lovely than Bañalbufar. It perches on a mountainside that plunges steeply to the surf, the descent broken by a series of terraces. Vines and grains are planted in some of the higher fields, but most of the land is devoted to tomatoes.

Juana Vivas, the charming daughter of Bañalbufar's lone hotelkeeper, offered to show us through her village. We hadn't walked a hundred yards along the steeply sloping street when Jean's nose began to wrinkle.

"This town smells like the world's biggest tomato juice cocktail," she told our guide.

Juana laughed and nodded her head.

← When Pirate Ships Appeared Offshore, This Lookout Tower Spread the Alarm

Majorcans in the 16th and 17th centuries built a network of coastal watchtowers, called *atalayas*, to announce the approach of marauders. Signal fires passed warnings from station to station. This tower stands near Bañalbufar, Majorca.

When the United States fought the Barbary pirates in the early 1800's, it used the Balearics as a base.

Costumed Players Enact Palma's Liberation from the Moors

North African Moslems overran the Balearic Islands in the 8th century and held sway for the next 500 years.

In 1229 Jaime I, 21-year-old King of Aragon, led an invasion that freed the islands. Heavily outnumbered, his men laid siege to Palma, capturing it on the last day of the year.

Majorcans recently organized an annual summer festival depicting the island's stormy history.

Clyde Robinson, an American, wrote the play; he also directs it. Father Tomás, a Palma composer, wrote the music.

Bellver Castle, built at Palma by Jaime II, the conqueror's heir, provides an authentic stage for the amateur actors, all townspeople.

Here in the castle's central courtyard the plumed Emir Abu Yahye surrenders to the crowned King Jaime I. Prostrate "Moor" complained of a crick in his neck from posing on the stone floor.

Crescents decorate the Moors' shields and flag. Red-striped gold of Aragon marks the conquistadors' standards and shield.

Bellver Castle, once a political prison, is now a museum.

← Heralds in Velvet Salute a Visiting Emperor

The conquest of Majorca was only a chapter in the long struggle for the Balearics. Turkish fleets and Moorish raiders continued to threaten the successors of Jaime I.

In 1541, when Emperor Carlos V of Spain landed at Palma on his way to fight the Barbary state of Algiers, Majorcans recruited 100 knights to accompany him. His expedition failing, Majorca was left open to counter-invasion, and islanders were carried away into slavery.

Standing on a balcony ledge, trumpeters in 16th-century livery here announce Carlos's arrival. White-collared pages raise banners on pikes.

➔ Ladies of the Majorcan court read and embroider in a festival tableau. Embroidery is still an important craft in the islands.

"Come upstairs with me," she said, and led us up a steep staircase to the attic of a weathered stucco house. We bent our heads to pass through the low doorway, and gasped at what we saw.

The gabled roof was hung solidly with bright red tomatoes strung like giant beads (page 649). At a wooden table in a corner two barefoot girls were arranging the fruit in regular rows, then stringing it with needle and cord.

Cash Crops: Tourists and Tomatoes

"We call these *tomatas de ramillete*—it means a bunch of tomatoes," our young friend explained. "Almost every house in the village has an attic exactly like this. This is our only cash crop—except tourists."

One of the girls at the table offered us a couple of particularly rosy tomatoes; we found them sweet and loaded with juice. The fruit, she told us, must be picked in the early hours of dawn or after sunset.

"When the sun is on the fields," she explained, "the odor of the fruit and the juice in the leaves is so strong that the pickers get sick. My two brothers and I started at four this morning and picked until seven-thirty. And it will take my sister and me all day to string this batch."

One day an invitation came to lunch at Canet, one of the finest of Majorca's great estates, six miles east of Bañalbufar.

We drove with Fernando to Canet in midmorning of a day that represented the island at its best. Leaving our car at the foot of a magnificent stone staircase, we walked up slowly to the music of hundreds of songbirds. The soft breeze carried the perfume of flowers. To complete the illusion of fairyland, the heavy front door of the mansion was opened by a tiny red-jacketed page boy who led us through a vaulted entrance hall and up a curving staircase into the lofty drawing room.

Chopin's Own Piano Enthralls Sightseers at Valldemosa

George Sand and Frédéric Chopin spent the winter of 1838 in the Carthusian monastery here. Guides point to this instrument as one on which he composed several preludes. His bust and portrait decorate the cell.

Our hosts, the G. Herndon Phillipses, formerly of Washington, D. C., made us at home and gave us a tour of the private chapel, the seemingly endless series of bedrooms, dressing rooms, sitting rooms, studies, morning rooms, and just plain rooms.

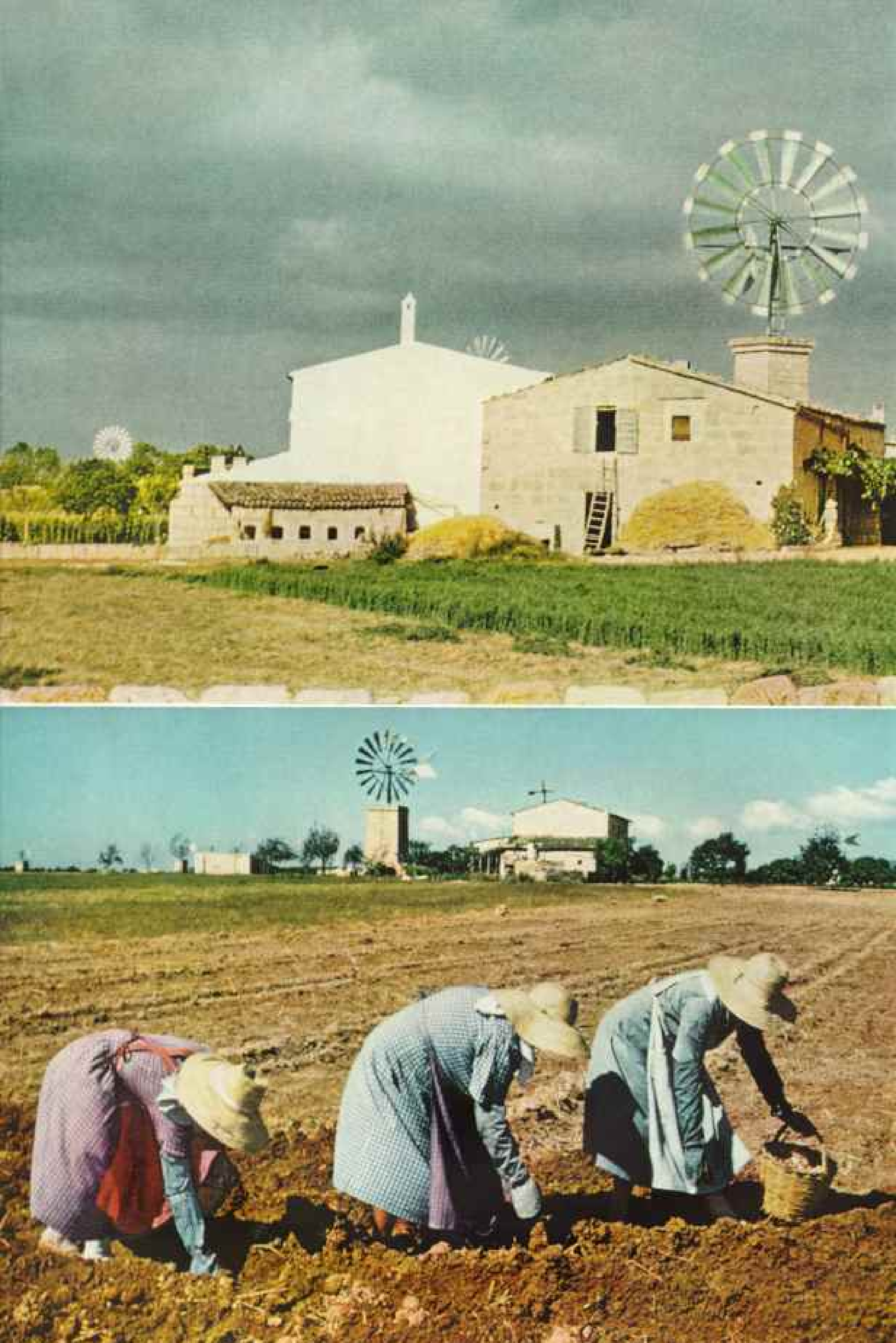
"We have one whole floor of bedrooms shut off," Mrs. Phillips said, "and we still have more than we can ever use. At times I get lost myself upstairs."

Lunch was an elaborate affair, with numerous servants offering food from silver and china that had served the nobility of Majorca. Afterwards we wandered through extensive gardens dotted with artificial lakes and

(*Continued on page 645*)

Girls of Felanitx Coax the Family Pet out of a Sky-blue Henhouse

Majorcans know Felanitx for its striking women and fine earthenware jars. This building's walls attest the islanders' love of colors. Potted plants bloom in the cluttered alleyway.



↑ Sails on Stone Pedestals Clatter in the Breeze

Majorcans cultivate three-quarters of their land area, a larger percentage than that of any other island people in the Mediterranean. Outmoded farming methods require entire families to work fields all day long.

Since streams are few and rains light, farmers depend on springs and wells to water their crops.

These painted windmills pump water onto farms at Sant Jordi, near Palma. Hay lies stacked beside the stone barn.

Jean Shor Inspects the Larder → of a Farmhouse on Iviza

Fruit trees, chickens, pigs, and vegetables make this farmer all but self-sufficient.

Jaime Tur Colomar here conducts the author on a tour of his immaculate storehouse.

Earthenware jars hold wine, vinegar, and olive oil. Grain fills sacks and basket. Bacon and sausages hang from the rafters.

←Wide-brimmed hats, long dresses, and elbow-length mittens protect farm women from the sun. They plant potatoes in a field not far from Palma.

640

Thatched Parasols on Formentor Beach Lure Few Bathers from the Sun

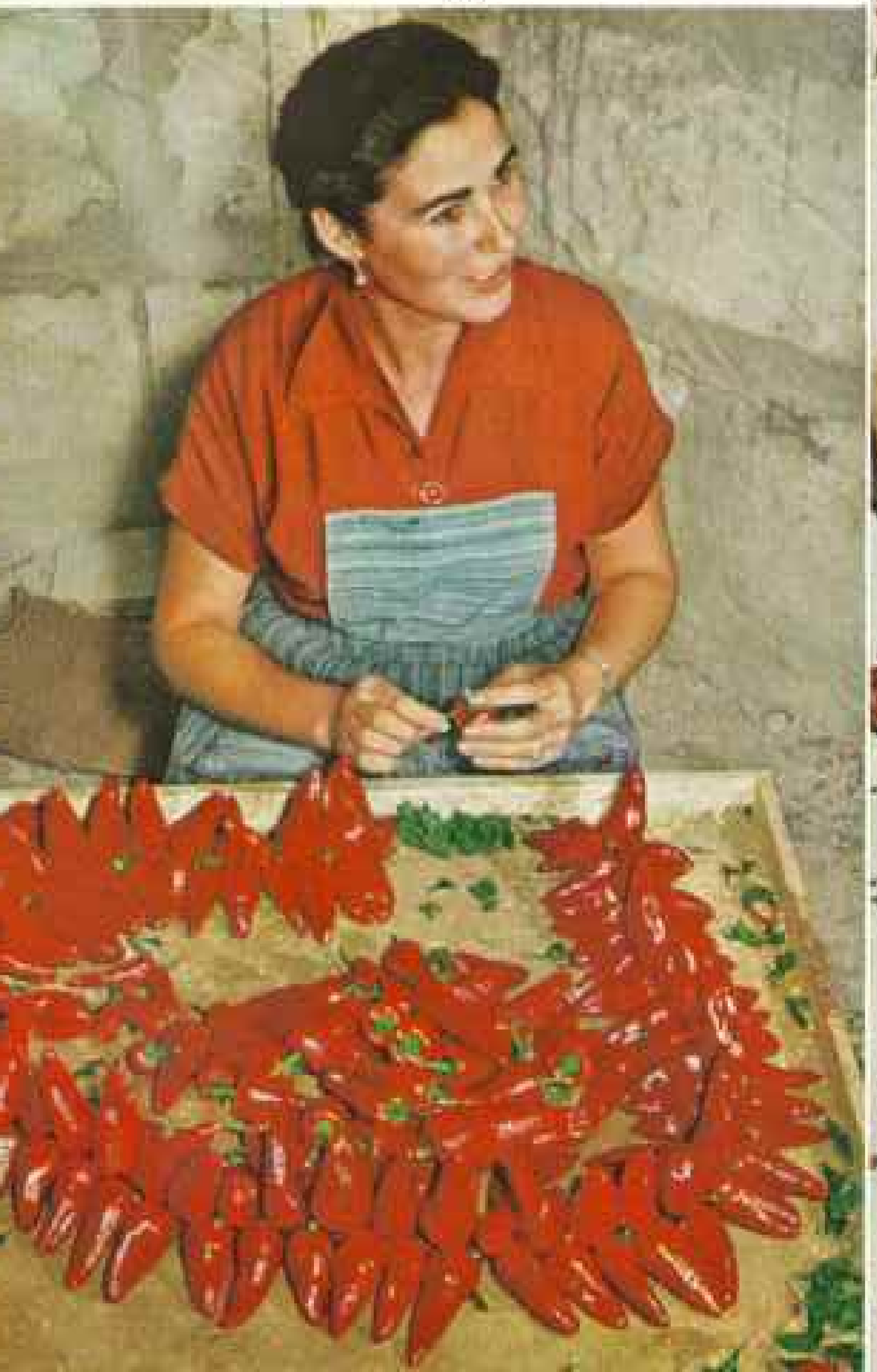
641

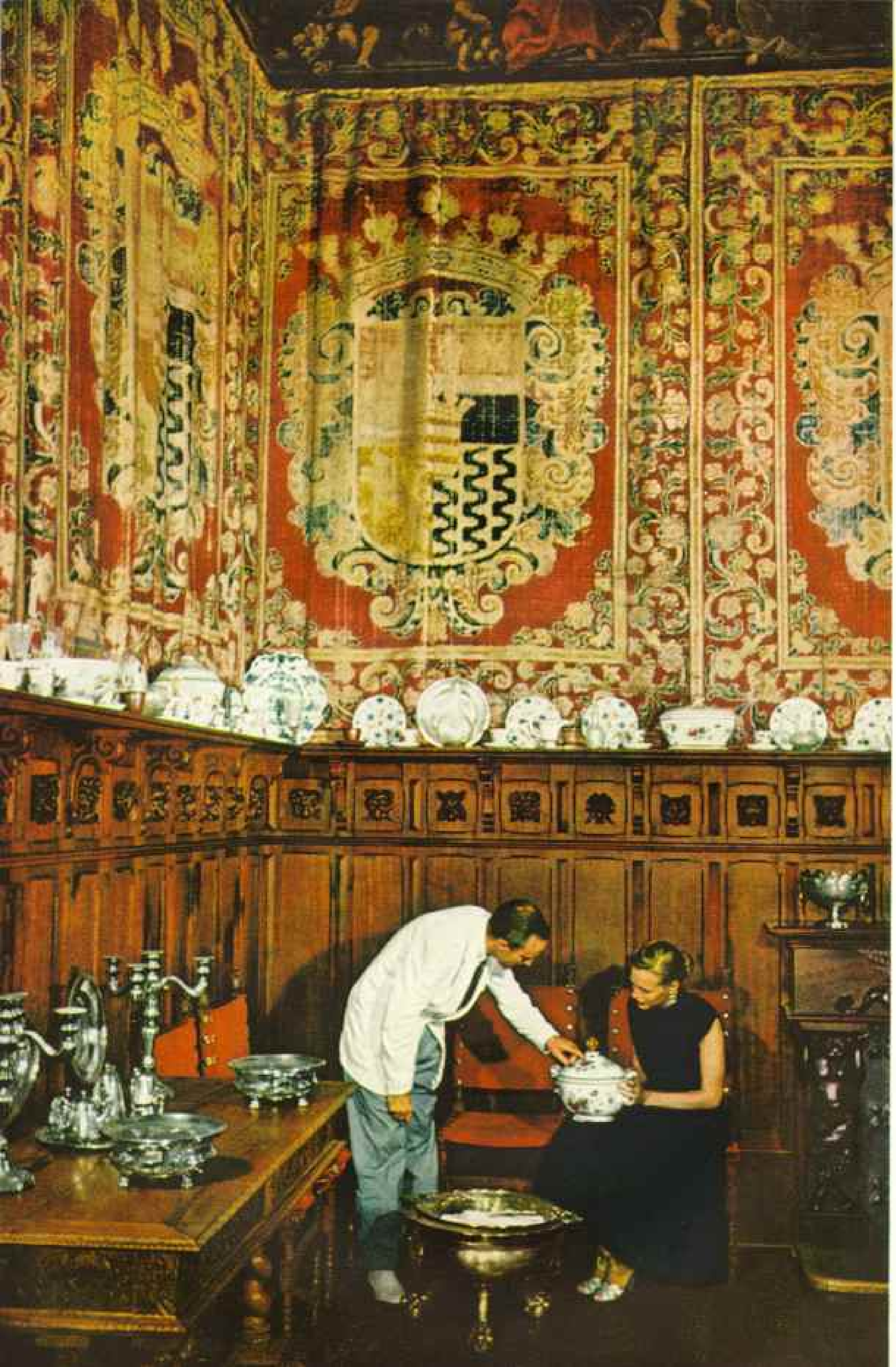
Villas Dot the Mountainside. A Ruined Watchtower Crowns the Peak

Drying Peppers Paint a Majorcan Yard Coral Red. Goatherd Leads His Flock Past a Stone Warehouse

Houses Wear Brilliant Tapestry →

Many Majorcan farmers hang peppers on sunlit walls to speed drying—a sight that reminds Americans of the pepper-bright walls of Spanish villages in New Mexico. Workers here load a cart in Marratxi. ↓ This woman threads each fruit carefully to give it maximum sun and air on the drying wall.





met a few of the tenant farmers who grow olives, almonds, and vegetables for market.

We said goodbye to the Phillipses in their great hall, and a butler closed the door behind us. We walked slowly down the seemingly interminable flight of steps, glancing back now and then at the imposing façade.

Hosts Ride Off by Motor Scooter

An explosive sputtering broke the silence of the rolling lawns. Down the curving drive and through the great gates put-putted a tiny Italian motor scooter. Our host, impeccable in white linen, lifted a hand from the handlebars and waved. Mrs. Phillips, riding pillion in a smart afternoon dress, nodded politely, her hands firmly clutching the safety bar behind the front saddle.

We watched in amazement. Then I remembered that Mr. Phillips had mentioned a Spanish customs regulation making it impossible to import a car for more than six months, and his laughing reference to "put-putting off to a friend's for tea." The contrast between the dignity of the Phillipses' establishment and the noisy little scooter started Jean and me home in high humor.

But something had obviously affected Fernando. On our way back to town, he answered our questions about Canet with polite thoroughness, but without the enjoyment he usually took in discussing his native island.

"Don't you like Canet?" Jean asked him.

"Of course I do," he replied. "It is the most beautiful manor house in Majorca. It always has been."

"Then you have been inside it before?"

"I have," he said. "It is my grandfather's house. I was brought up in it."

The example of the Phillipses and other American and English friends who had rented homes on the island convinced Jean that we should leave our comfortable hotel and set up housekeeping. We had a few weeks of vacation due us, and I agreed that loafing on a Majorcan beach would be a perfect way to spend it.*

From friends we learned of a one-bedroom cottage in Puerto de Andraitx, complete with Catalina, a sturdy Majorcan maid-of-all-work, and Henrietta, a diminutive donkey who, with her two-wheeled cart, provided the most dependable transportation in the village. All could be had for three weeks for $50.

We couldn't have made a better choice. The Majorcan population of Puerto de Andraitx numbers about a thousand, the foreign colony half that number. It is not a tourist center, but it has a sheltered harbor with the bluest water imaginable (page 659), quays lined with yellow and blue fishing craft from Barcelona, Tarragona, and Valencia, and gently sloping hills dotted with houses of every color.

Sun and Leisure Fill Golden Days

The permanent residents are fishermen, farmers, and the keepers of the cafes that line the waterfront. The stone quays are solidly banked with tables where a couple of pesetas will buy a glass of strong Majorcan wine, and another will produce myriad tiny dishes of Mahón cheese, olives, anchovies, almonds, and *sobrasada*, a Majorcan sausage made of pork and pimento, fit for the gods.

Our life there was as nearly perfect as life is likely to be on an imperfect planet. We awoke every morning to the aroma of Catalina's strong coffee, and slipped into bathing suits and rope-soled sandals for breakfast on the terrace. The meal was always the same—plates piled high with golden slices of Majorcan oranges, pint-sized cups of coffee and hot milk, and warm ensaimada.

After breakfast we would turn on the radio and listen briefly to the news of the world. Then we would walk the hundred yards down to the breakwater and spend the morning swimming lazily about the sheltered cove.

When lunch was ready, Catalina would shout down the hill to us, and we'd hurry up the grade to see what fresh delight awaited us. Her way with fish was born of generations of island ancestry, and every day brought a new surprise, invariably delicious.

Lunch was followed by the inevitable

← Polished Panels and Tapestried Walls Brighten an Old Mansion in Palma

Spanish conquerors of Majorca replaced Moorish mosques with churches and cathedrals and filled the capital with their private palaces.

Palace de la Torre, ancestral home of the Marqués de la Torre, stands just within the defensive wall thrown around Palma in the 16th century.

Here, in the ornate dining salon, Fernando de Torella, a kinsman of the marqués, shows Jean Shor an antique English tureen. Other family treasures line the sideboards. The arras, woven by Italian artists in the 17th century, bears De la Torre crests.

* See "Keeping House in Majorca," by Phoebe Binney Harnden, National Geographic Magazine, April, 1924.

Boys "Astride" Paper Horses Perform a Centaurs' Dance; Giant Heads Grin and Glower

Historians trace the dance of imitation horses back to the ancient Greeks and the older cultures of Asia. Romans are believed to have carried the theme to Spain, where Catalans and Basques still express it with their lively folk dances.

Majorcans learned the dance of the *Cavallets* (Little Horses) from their Spanish liberators. They performed it in religious pageants to signify the warding off of evil. Later they danced the Cavallets for important visitors.

Here the Little Horses delight crowds on the fiesta of San Agustin. Boys step into papier-mâché steeds and charge and pirouette to the commands of their leader, paradoxically called the *dama* (woman).

These riders form a living merry-go-round before a drug and hardware store in Felanitx. Spike-eared goblins, essence of evil, circle threateningly about them.

The giant heads are common to festivals in Mediterranean countries; one sees them especially along the French Riviera.

➔Opposite below: Guitars, mandolin, flute, and violin play for a young dancer in Valldemosa, Majorca.

↓ Cavallet Horsemen Introduce Their Hoofless Mounts

Each year a new crop of riders succeeds to the same cardboard steeds. Scars on these horses' flanks and shoulders reflect the fury of many a charge.


FERRETERIA

siesta; all of Puerto de Andraitx was sound asleep, and we would have been thought odd had we been seen wandering about. Later we would hitch up Henrietta and go for a drive in the hills above the port.

If Henrietta was in a cooperative mood we might cover as much as five miles in the three or four hours before sunset. More often she would balk half a mile from our house, and I would climb out of the cart and try to drag her up the winding road, while Jean urged her with gentle slaps of the reins.

It never did any good. Once Henrietta had stopped, she was through for the day. Inevitably we would surrender, drag her anvil-shaped head around, and then leap for the cart as she trotted briskly for home.

Our housekeeping chores were few and painless. Catalina did most of the shopping, and her accounts were blameless. It was a bad day when our food bills amounted to more than a dollar. Everything was wonderful until Catalina decided to learn English.

Catalina Writes English for the Ear

It began one morning just before Jean took the bus for Palma. It was Catalina's habit, whenever either of us went to town, to give us a list—in Spanish—of her grocery needs.

On this particular day, Catalina handed the list to Jean just as we left the house. My wife opened it casually as we walked down the dusty road, and suddenly stopped dead.

"What in the world?" she asked, handing me the scribbled paper.

I looked at the list. Catalina's script was not elegant, but it was clear. And this is what we read: Tuelf Eks, Bata, Solt, Cofi, Schuga, Orandchs, Epels, Vedchetebls.

It was "vedchetebls" which gave me the clue. "Read it fast and phonetically," I said.

Jean returned that evening with a dozen eggs, butter, salt, coffee, sugar, oranges, apples, and an assortment of vegetables. Catalina beamed with delight.

"It works, the little book!" she cried. There followed a cascade of unintelligible sounds which she apparently believed to be English. Jean finally broke through to ask, in Spanish, if we might see the source of this new learning.

Proudly Catalina produced a little paper pamphlet. Arranged in parallel columns were Spanish and English words and phrases—the kind that compilers of such works always refer to as "useful." And beneath each Spanish phrase was its phonetic equivalent in English.

When Catalina was safely back in her kitchen, Jean and I spent a hysterical half-hour with her prize. "Spik tu mi slauli" was reasonably easy to understand, but "Jev yu eni logadch?" took a bit more thought, until one remembered that the Spanish "J" is pronounced like our "H." This also helped explain "Juot uil yu teik for dze brekfast?" and made it clear that "jot uote" was just what a person needed who had said, "Ai uish tu uosh maiself."

Jean returned the book to Catalina with thanks, and tried to explain that the phonetic column was only to assist in pronunciation, and that if she wished to write in English she should use the spelling in the adjoining row. Catalina would have none of that.

"Eh-hgay-hgay-essey" she spelled in Spanish. "No. But Eks! Claro!"

We finally persuaded her to return to Spanish as our medium of oral communication. But until our holiday ended, our shopping lists were adorned with greips, poteitos, pichis, criim, and tiy. I miss Catalina. Those were jepi deis!

Our vacation over, we returned to our job of photographing the island. We visited the famous beaches at Camp de Mar, Formentor, Palma Nova, and Cala Santañy. We saw the weaving of Majorcan straw hats, shoes, and baskets in Artá and the manufacture of artificial pearls at Manacor. We glided in silent skiffs over the subterranean lake in the Caves of the Dragon and sat enchanted beneath a ceiling draped with stalactites as musicians floated by in candlelit boats (page 630).

Majorca is the largest and most populous of the Balearics, and by far the best known, but Minorca and Iviza offer their own attractions to the visitor. Accompanied by Fernando, we flew to Minorca, second in size of the three largest islands of the chain.

Minorca is 30 miles long and 13 miles at its maximum breadth. Some 50,000 citizens inhabit its wind-swept surface, most of them

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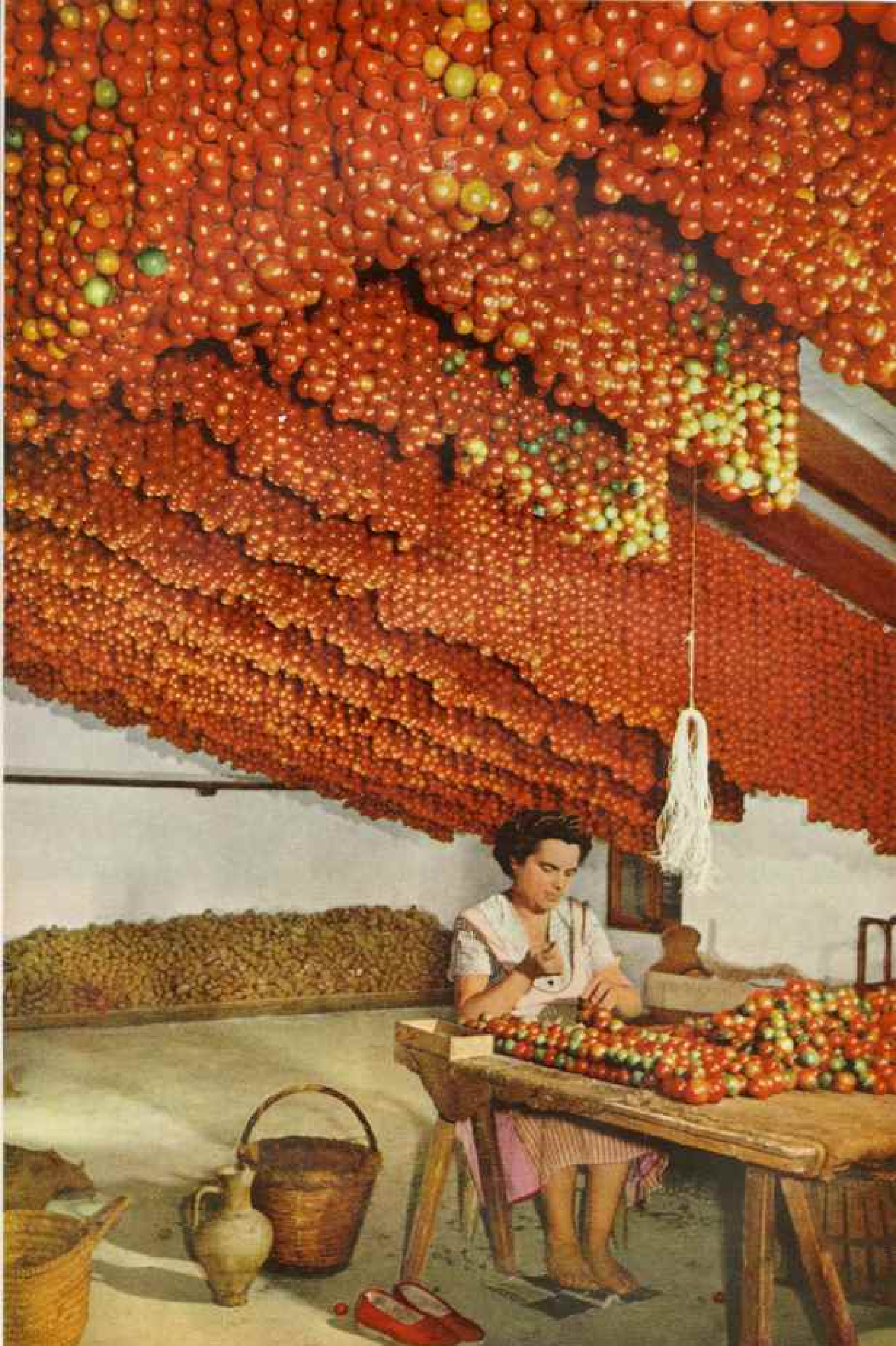
Tomatoes Strung on Strings Suggest → Toy Balloons Risen to the Rafters

Families gather the mature fruit before sunrise and cart it to farmhouses. Women pierce the stems with twine and hang the strands from attic beams.

Salt breezes wafting through open windows help keep the fruit fresh and sweet until it can be sold at winter's premium prices on the Spanish mainland.

This Bañalbufar woman threads tomatoes in rows.



in the two cities of Mahón and Ciudadela.

The great Italian navigator, Andrea Doria, is credited with the remark that "June, July, August and Mahón are the best ports of the Mediterranean." Britain and France fought for the base during the middle of the 18th century. Lord Horatio Nelson spent several months at Golden Farm, near Mahón.

Today Mahón is famous for its cheese, a pleasantly sharp Cheddar type, and for the fact that it gave mayonnaise to the world. Local tradition holds that the Duc de Richelieu, who captured the island from the British in 1756, learned the recipe during his stay there and presented it to Louis XV's chef as Sauce Mahonnaise.

Although Minorca, like the other Balearics, has known the rule of Phoenicia, Carthage, Rome, the Vandals, Byzantium, and the Moors, the half-century tenure of the British seems to have made the strongest impression on Mahón. The architecture is strongly reminiscent of 18th-century England, and all the houses have sash windows, almost unknown in other Mediterranean towns.

Tales of Cowboys and the Far North

In one way, at least, there was a strong American influence in Mahón when we were there. Bookshop windows were filled with translations of the works of Zane Grey and James Oliver Curwood. Why these tales of cowboys and the Far North should appeal to an island people is a mystery, but *La Estampida* (The Thundering Herd) and *Corazones de Hielo* (Hearts of Ice) seemed

← Threshers Shake the Almond Harvest into a Mobile Net

Botanists believe almonds originated in Persia. Semi-tropical countries cultivate the tree for its nuts and oils.

Majorca's almond trees, numbering 11 million by some estimates, blanket the island with pale pink when they bloom in spring.

These farmers, who live near S'Avall, harvest their crop with long poles. Nuts fall on the wire screen and funnel into the wheelbarrow. Woman with basket gleans any that miss.

→Sweet and flaky, called *ensaimada* is a breakfast specialty of Majorca.

↓Women fry doughnuts for a fiesta at Felanitx.

Picnickers Crowd Deck and Cockpit of a Canopied Boat

Balearic islanders in the 15th and 16th centuries won fame throughout Europe as cartographers and seamen.

When Portugal's Prince Henry the Navigator set about charting the African coast, he chose a Majorcan, Máster Jacome, to instruct his pilots. A school of cartography founded in Majorca contributed to other explorations.

Balearic sailors took their gift for seamanship with them to the New World. In the 18th century an immigrant named George Farragut joined the United States Navy. His son, David Glasgow Farragut, became a naval hero of the Civil War—"Damn the torpedoes!... full speed!"—and the Nation's first admiral.

The crew of this small boat voyaged 90 miles across the open sea from Palma, their home port, to Ivizu. English sightseers board the craft for a trip across the bay to San Antonio Abad (below).

Rowboat at left was deliberately swamped to swell planks.

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Pig-tailed Women Stroll Sun-drenched Streets in San Antonio Abad

The island of Iviza, less a vacation-land than its larger neighbors, holds faster to tradition.

An Ivizan girl by custom announces her readiness to marry by standing between her parents at Mass. Her father decides when suitors may call.

Courtship rules are strict. Applicants line the walls of the main room, each awaiting a turn to plead his case from a chair placed beside father and daughter.

Competitors criticize one another's performance and toss pebbles at predecessors who fail to yield the chair on time. Failure to heed the warning may lead to a street fight.

Once the girl has made her choice, rejected suitors may display annoyance by firing pistols near her feet as she leaves Mass. Etiquette requires her to take no notice.

These women chat on the way to market. Each wears the bright pigtail ribbon and dark shawl still common in Ivizan towns and villages. Residents whitewash their homes, usually once a year. San Antonio Abad's name means St. Anthony the Abbot.

to be the two most popular works of fiction.

Ciudadela, home to about 12,000 Minorcans, was once the island's capital. Today, shorn of political prestige, it lives on the Lewis Carroll-like combination of shoes and lobsters. Dozens of small factories turn out thousands of pairs of sturdy *zapatas* monthly, and much of the island's income depends on their export to the Spanish mainland.

Shoes Custom-made for $3

My own walking shoes were in bad repair, and Fernando suggested that I let a local bootmaker turn me out a pair. At the shop of Lorenzo Gual we explained that our stay in Ciudadela would be brief, and asked if he could make up something in 24 hours.

"I could," he answered, tugging at his mustache, "but it would be very expensive."

"How much would a pair cost?" I asked.

The cobbler thought for a minute. "Since I'll have to pay my helper overtime, I'd have to charge you $3," he announced apologetically. And the next evening he produced a stout pair of excellent leather which fitted perfectly.

A flight of steps leads from Ciudadela's cobbled main street directly down to its tiny harbor. Sailors mend nets and repair lobster pots on the stone quay at waterside (page 660). We stopped to chat with a group sitting on the stone steps, and in a moment found ourselves sipping wine with them in a waterfront cafe.

A government official in Mahón had told us of controls placed on the lobster catch in recent years, and I asked how our new acquaintances liked them. To my surprise, everyone was enthusiastic.

Conservation Saves Lobster Fishing

"We didn't like the idea of someone from Madrid telling us how to run our business," said bearded Cristóbal Marqués, "but the people who came to enforce the new rules seemed to know a lot about fishing, and they worked through our own Fisherman's Association. Besides, fishing had gotten so bad we knew something had to be done."

The new rules, the fisherman told us, were relatively simple. Certain fishing grounds were closed completely. No fishing was allowed during September, when the crustaceans spawn. And all lobsters under 10½ ounces had to be thrown back.

"That was the hard part," said Antonio Cifre. "It was like throwing half a dollar into the sea. But the law required us to break off one small leg of each lobster we threw back. By the time those young lobsters matured and were caught again, they weighed about 2½ pounds. We realized it was better to put back the babies."

There was a quiet charm about Minorca which invited a longer stay. But our time was growing short, and we still had not seen Iviza. Reluctantly we flew back to Majorca and took an interisland steamer to the smallest of the Balearic trio.

It was just as well that we saw it last. If we had started our tour there, we might have had very little time for the other islands. For Iviza, 25 miles long and nowhere more than 13 miles wide, has an aura of history and hospitality that enfolds the traveler from the moment he steps ashore in Iviza (Ibiza), the capital city.

Ivizans Fought in Hannibal's Army

The Phoenicians mined lead and salt on the island, and extracted their famed purple dye from shells that abounded on its white beaches. Carthage occupied it for centuries, and the famous stone slingers of Hannibal's infantry were recruited from Iviza, as from Majorca and Minorca. Following the Third Punic War the Romans occupied the island, and the Ivizans were strong supporters of Julius Caesar during his civil war with Pompey.

After various struggles came the Moors, who left their mark on Iviza. The town's low mud-and-plaster houses are brightly whitewashed, and many have the Moorish arch. The island dialect contains a high percentage of words of Arab origin, and the desert tradition of hospitality to the traveler has never faded.

We found Iviza's greatest lure in its beaches, stretching from San Antonio Abad on the western shore to Santa Eulalia del Río on the east coast.

Here, too, on Sundays the dusty country lanes are lined with women on their way to church, clad in the richly colored garb of their great-grandmothers. The men, in somber black, walk ahead.

We were driving along a narrow road near San Antonio Abad just at sunset when we passed a grizzled farmer and his fresh-faced daughter, walking along the dusty road. The father carried a scythe with a handle shaped

from a tree limb, and his daughter bore on her shoulder a flat wicker tray laden with figs. Struck by her charm, we stopped and asked if we could take her photograph.

Shyly she refused and walked rapidly ahead. But when we explained our work to her father, he laughed with delight and ran to stop her and bring her back.

When we had finished our photography, the father invited us to visit his home.

"We live only a mile down the road," he said, "and tonight our neighbors are coming to help hull our almond crop."

We declined his invitation to dinner, but agreed to drop in later. At ten o'clock we left our hotel and walked the few hundred yards to his home under a full moon.

It was immediately obvious that money was not plentiful in the family of Jaime Vingut Torres. Only a few rough stools and benches furnished the whitewashed main room. But within minutes it was equally evident that warmth and happiness more than made up for the lack of material possessions.

Jaime's wife Doña Catalina showed us through the four small rooms of her home, beaming as she took us into her kitchen, where meals were cooked over an open fire but where water was piped into a stone sink.

"The old part of the house was built more than 300 years ago," she told

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Church Clock Tower Caps the Skyline of Manacor

This town in eastern Majorca produces leather, pottery, and artificial pearls. Pearl makers jealously guard their secret coating process.

←Franciscan Monastery in Petra Inspired the Names of California Cities

In 1769 Father Junipero Serra, a Franciscan friar born in Petra, Majorca, set out from Mexico to found missions in California. Rejecting the easier sea voyage, Serra trekked 600 miles of grueling desert from Loreto, Baja California, to San Diego. There he built his first brushwood chapel. Three years later the indomitable friar returned to Mexico City to report on his missions. His account led to Juan Bautista de Anza's expedition of 1774, first to cross the mountains into California by way of Sonora and Arizona.

In all, Father Serra and his successors founded 21 California settlements, including Los Angeles, San Juan Capistrano, and Carmel. They named one mission San Francisco after their patron saint, Francis of Assisi.

Serra died at Carmel in 1784, having transformed California from a Spanish claim into a thriving colony. El Camino Real, his King's Highway, still links coastal cities.

This ornate chapel to St. Francis belongs to a friary near Serra's birthplace in Petra. The friar named his California missions for other chapels in the cloister (page 633).

Majorca's Famous Son Stands in Bronze→ in the United States Capitol

Father Serra helps represent California in National Statuary Hall. He holds a model of Carmel Mission.

us, "but we added the kitchen ourselves only last year. Before that there was only a lean-to on the back, and we had to carry water in buckets."

In the dirt-floored living room the family and half a dozen neighbors were sitting around a great pile of almonds, carefully stripping the green husks and tossing the nuts into wicker baskets. We met Jaime's son and daughter-in-law and their three children, and the neighbors. Daughter Maria, a blush coloring her lovely 17-year-old face, introduced her fiancé, a handsome dark-skinned young man in his early twenties.

Stools were found for us, and we joined with a will in the husking bee.

Song and Courtship by Candlelight

A single candle lighted the low room, and as affairs of the countryside were discussed, sudden bursts of laughter would make the flame waver. Frequently someone would start a song, and the whole room would join in. Maria and her young man, sitting close together as far as possible from the candle, worked industriously. But Jean noticed that almost invariably they reached at the same time into the heap of almonds, where their hands touched and lingered.

It was after midnight when the oldest of the neighbors, a mustachioed man of 70, rose and nodded to his wife. The other visitors departed with them, but the Torres insisted that we remain for coffee and almond cookies. While the women busied themselves in the kitchen, Don Jaime answered my questions about his small farm.

"I have nearly six acres," he said, "but they are scattered in eight different fields. I bought the last piece three years ago, and I'm still paying for it."

The family's only cash crop, Señor Torres explained, was almonds. This had been a fair crop year, and there would be nearly 2,000 pounds for the market.

"That will bring about $100," he told me. "The payment and interest on the new land will take $75, so there won't be much left. But we eat well, and thanks to God we're all in fine health. This is a good life."

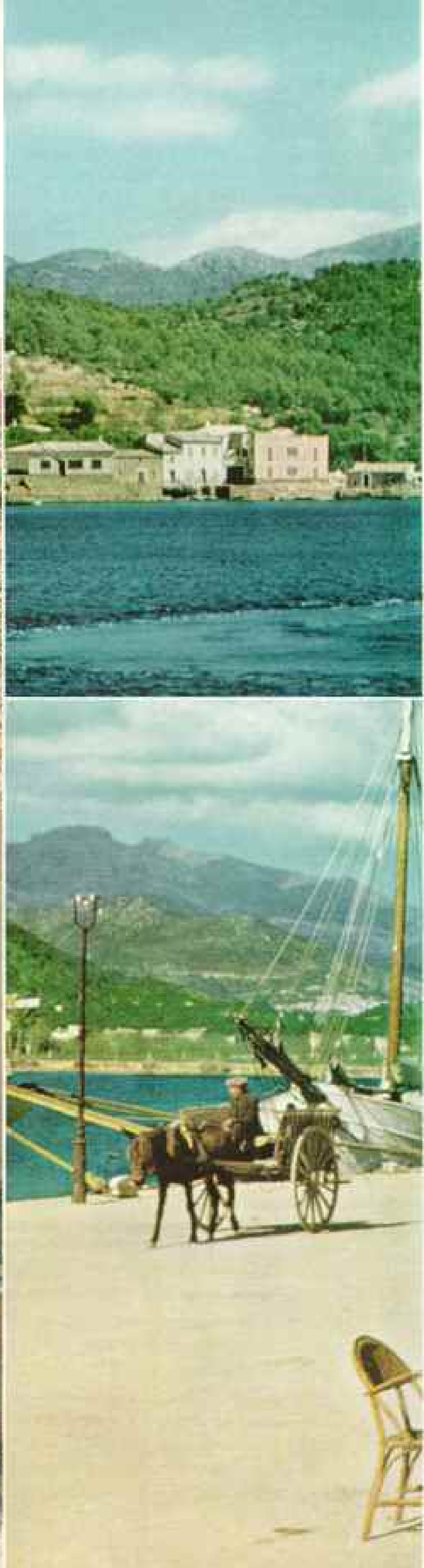
I asked when Maria and her suitor would

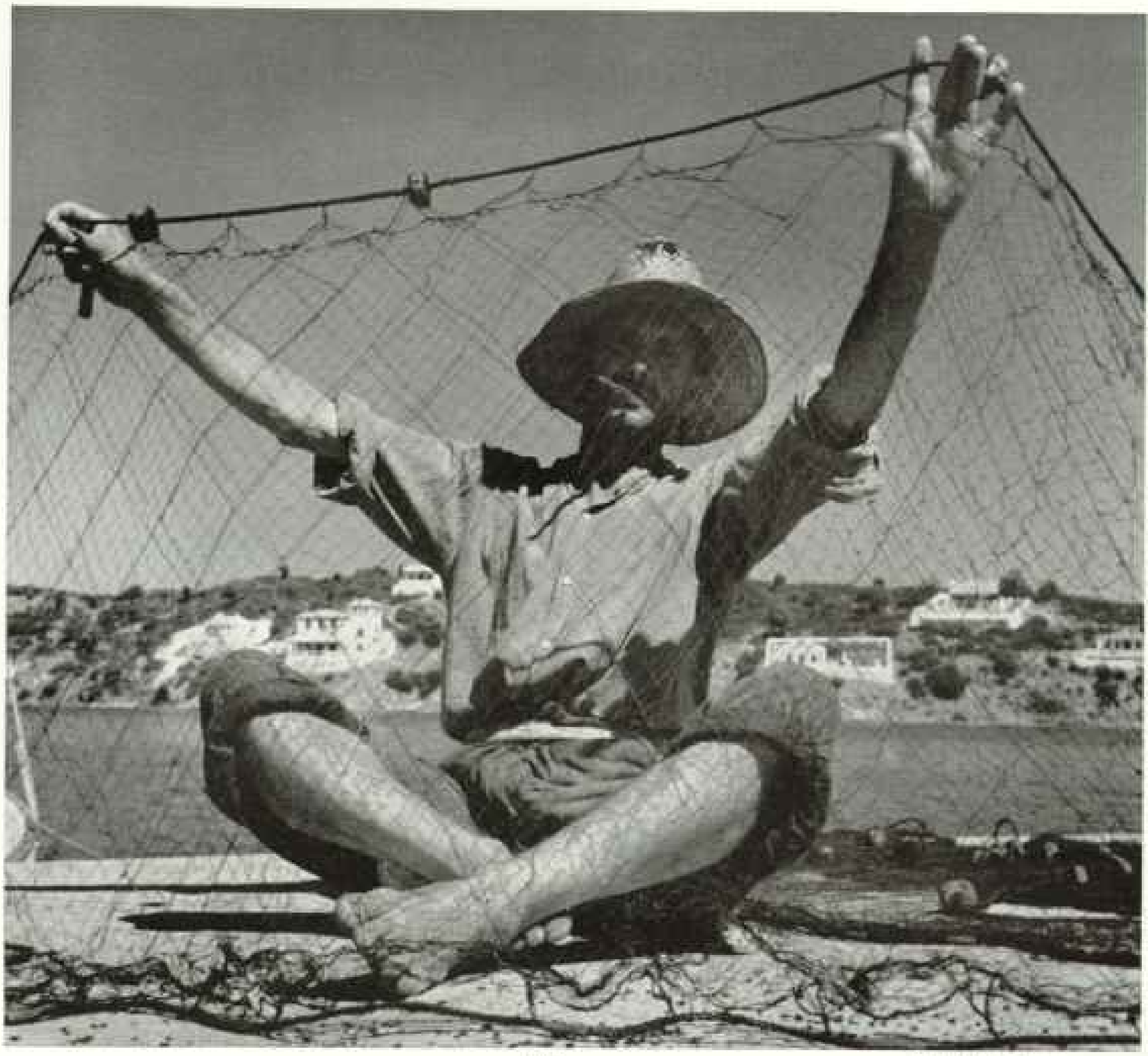
British Cutter Slips into Andraitx Harbor ➔

Good anchorages and clean beaches draw many a boat owner to the Majorcan coast. This sloop, a veteran of several Atlantic crossings, heads for Puerto de Andraitx.

Below: Villagers linger over cool drinks and a game of checkers on the quayside of Puerto de Andraitx. A mule cart rumbles past vessels of the sardine fleet. Villas climb hills across the bay.

⬇A portico of branches shades farmer and sons eating their lunch of bread and soup. Beans fill the pan on ground.





660 David Moore, Gamma

Seen as Through a Veil, a Minorcan Mends His Fishing Net

marry. For the first time, Don Jaime looked troubled.

"That is difficult," he said. "It is the matter of the dowry. They wish to marry this year, but a man in my position should give his daughter a dowry of at least $10, and I do not see how it can be managed."

"Won't her young man let you pay it later?" I asked.

"He doesn't care at all," said Don Jaime. "But my family would be disgraced were it known that my daughter had not brought a proper portion to her new household. It is hard for the young to wait, but our family pride is more important."

I told Jean the story as we walked home that night. Next morning at dawn I waylaid Don Jaime on his way to his fields.

His first reaction was an indignant refusal. Almost bitterly he insisted that he could care for his own family. But after I explained that Jean and I had no children of our own, and that we would get a lot of personal pleasure from having a part in his daughter's happiness, he wavered. Finally, with a smile, he accepted my 400 pesetas.

Maria Did Not Forget

We left for Majorca that day, in time for our reservations back to Barcelona. Our friend's warning, we found, had been right. We didn't want to leave. But we were to have a souvenir of our Balearic visit.

Six months later, back home in Washington, D. C., we received a package from Iviza. It was a beautifully worked tablecloth, worth immeasurably more to us than the meager dowry. And a few months later came a letter from Maria, enclosing a picture of a fat and laughing Francisco Torres Mercadel.

The Wichitas: Land of the Living Prairie

Buffalo, Longhorns, and Other Stalwarts of the Old West Come Back in Oklahoma's Unique Mountain Wildlife Refuge

By M. Woodbridge Williams

National Geographic Magazine Staff

With Illustrations from Photographs by the Author

"WHOMP!" A half-ton buffalo flopped over on his side directly in front of me.

Back and forth the young bull rocked in the buffalo wallow—a shallow, grassless bowl in the prairie, about eight feet across. A cloud of yellow dust rose around him. He seemed to be trying to turn over on his back, as horses do, but his hump proved too much of an obstacle. Finally he heaved to his feet, shook himself, and wandered off.

Half-ton Buffalo Crash Head On

The dust had barely settled when two older bulls lumbered into the wallow. Facing each other, they charged together, forehead slamming forehead with a dull thud that could be heard 300 feet away. With horns crossed, the great brutes strained and swayed as they tried to push each other off balance.

I raised my camera. "Here's an exciting picture," I thought. "Two prairie giants in deadly combat." Again and again the bulls separated and slammed their heads together (page 682). Then suddenly they stopped and sauntered off. The "deadly combat" was only a game.

Yet it all looked fierce enough, and I was more than a little nervous. Standing there among the herd, I kept reminding myself to move slowly and quietly; no matter how docile a buffalo may look, he remains dangerous and must not be upset. So while I watched the bulls and cows with one eye, I kept the other on a near-by tree—my escape route in an emergency.

The scene before me was a common sight to the pioneers. They wondered at the strange crater-shaped holes in which the creatures wallowed—taking dust baths in dry weather, mud baths when it rained. Some of the wallows grew to miles in length and even today scar the prairies and plains. They are the imprint of the 60 million American bison—called buffalo by the frontiersmen—that once roamed North America.

Today, in a mountain bastion in southwest Oklahoma, roughly 9 by 16 miles, the primeval prairie the pioneers saw has been recreated. Here the United States Fish and Wildlife Service operates a living museum of prairie life, the Wichita Mountains Wildlife Refuge (map, page 666).

As a naturalist, I came to Wichita to study and photograph the animals—the buffalo, the stubborn longhorn cattle and impish prairie dogs, the wild turkeys and proud eagles. Most of these, I found, I could observe from a portable canvas blind or even a pickup truck. But to get close-up pictures of the buffalo's daily life, I had to move unobtrusively right inside the herd—almost become a buffalo myself.

For nearly an hour the animals grazed around me; then some moved to a near-by group of mesquite trees for a scratching session. Leaning against a trunk worn smooth by many hides, a buffalo would rub its neck up and down. Next, with a contented expression, it moved forward and massaged its flanks. Finally it turned and backed up to the tree to work down its rear section.

Bison Came from New York Zoo

There were not enough trees for all the buffalo to scratch at the same time; some stood patiently in line for their rubdowns. The naked arms of the rubbing trees, long dead, reached up grotesquely. Some historians, I recalled, wondered whether buffalo, by rubbing against trees, destroyed timber and substantially extended the prairie. One 18th-century settler even claimed that buffalo rubbed down his log cabin!

Ironically, the buffalo, elk, and longhorns that roam the Wichita refuge are not Oklahoma's own. By 1889 only about 1,000 buffalo were left in the entire United States. When President Theodore Roosevelt designated this land a game reserve in 1905, most of it was overgrazed cattle pasture, and the original wildlife had long since been killed

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Wichita Granite Frames the Entrance to a Prairie Playground

Like an island in the sea, a worn-down range of ancient rock—the Wichitas—lifts above the southwestern Oklahoma prairie (right). Here the United States Fish and Wildlife Service operates a 59,020-acre playground and living museum of prairie plants and animals.

More than three-quarters of a million people visit the refuge each year to hike, ride, swim, picnic, and enjoy the wildlife.

Oklahoma riders make constant use of the refuge. Bob and Alma Kirk (left) and Genelle and Frank Rush here pause in front of the Medicine Park entrance.

Opposite, above: At noon the riders picnic above Lake Jed Johnson.

Mount Scott Overlooks → Elmer Thomas Lake

The mountain, 2,464 feet high, is the pinnacle of the Wichitas.

A paved road snaking to the summit commands this sweeping view. Installations of Fort Sill Military Reservation appear in the distance. Fort and refuge meet in the middle of the lake.

off. In 1907 fifteen buffalo were imported from the Bronx Zoo of the New York Zoological Society; the herd has since grown to about 1,000. Similarly, elk were brought in from Jackson Hole, Wyoming, and longhorns from along the Mexican border.

With delight I explored for two months the fantastic rocks, lakes, and prairie regions of the Wichita refuge. One of my favorite spots for observation was Comanche Lake in an area known as the Big Game Pasture, some 34,000 acres fenced in so that wild animals can raise their young without interference from man.

One morning in November, when Indian summer spread its soft, warm blanket over the land, I drove across the Big Game Pasture before sunup and stopped back of Comanche Lake.

As I left my car and shouldered my heavy telephoto equipment, I heard the closing notes of an owl's serenade; prairie grasses about my feet exhaled the damp, sweet odor of wild hay. On a boulder-strewn slope leading down to the lake I came upon two bucks silhouetted against the crimson east.

When I advanced uncertainly through the dawn, the deer broke their silent reveille and trotted away toward oak thickets along the lake shore.

Mallard Opens Morning Symphony

I paused for a moment to watch the sun burst above Elk Pass at the east end of Comanche Lake. Like spotlights sweeping over a stage, the first rays shot across crags, woods, prairie, and lakes. Trees turned to cinnamon, russet, and orange, and wind ripplets on the lake shattered shafts of sunlight into a million golden flecks. The quack of a mallard opened the morning symphony.

Quickly I slipped into my blind, set up several days earlier so the wild creatures would get used to it (page 667). A moment later I heard a noise overhead like the whine of a low-flying plane. Through a slot in the canvas wall I saw a flight of mallards skid onto the blue lake.

The drakes sported their brightest courting plumage. Metallic green flashed from their heads; white collars set off erect necks; black feathers curled jauntily up from each tail. These fine colors would be replaced by brown and gray for a short time next summer on the birds' nesting grounds in Canada.

A dignified drake led a convoy of quacking, speckled females and quieter males toward shore to dip for food in the shallows. The males' white underparts sparkled in the sun when tails pointed skyward. Farther out on the blue water some diving ducks—small, bizarre, hooded mergansers and bufflehead—bobbed up and down in search of food.

Bolder now, the mallards waddled ashore and inland through the woods, snapping up acorns and bugs, their webbed feet overprinting deer and elk tracks on the lakeside game trails. Then suddenly, with loud quacking and a rush of wings, they thrashed back through the trees to the safety of open water, frightened by some enemy invisible to me.

Wild Creatures Bring Forest to Life

On shore northern blue jays filled the oaks with color and raucous calls. In the warming day redheaded woodpeckers popped from holes in dead trees along the lake shore and added their busy clatter to the chorus (page 677). From the woods a variety of wintering songbirds supplied sweeter melodies.

As the sun filled the cove in front of my blind, four-legged creatures were moving silently along the woodland floor. A cow elk and her calf slipped from the oaks across the cove. The calf came down to water while the mother fed among the trees. Bulls lurked back in the granite hills; I could hear their ringing bugle.

A doe stepped daintily along the game trail. Not far behind trotted an intent buck with magnificent antlers. Looking neither right nor left, he pursued the coy doe, which kept just out of reach. I had come to the lake during the white-tailed deer's mating season.

At this time the bucks lose some of their fear of man; a few days ago, I knew, one had almost run over a cowboy near refuge headquarters. Below my blind I watched a young buck play Don Quixote with a low-hanging oak limb. He butted the branch until he considered it conquered; then he ate the leaves.

Hours fled by while I peered through

Glowing Post Oaks Shade a Young Elk; → Geronimo Ridge Soars in Granite Steps

The Wichitas are ideal for game because of their extensive "edge effect"—the sunlit forest margins that provide a wide variety of food and cover.

Here the edge effect shows well. Page 678 offers an even better example.

The author found this calf, momentarily separated from its mother, on a trail near Comanche Lake.

camera finders at this busy wildlife community. Then I looked up, struck by the sudden silence. Except for some ducks rafted together on the lake and a few more sunning on the banks, wildlife had vanished. The young elk had rejoined its mother back in the trees. Deer traffic on the trail stopped. Even the noisy woodpeckers and kingfishers ceased their chatter. The midday rest had come to the land.

Comanche Lake is a man-made reservoir, backed up by a dam across Deer Creek as it flows south toward the Red River. Though it quickly became my favorite spot for animal photography, it is only one of 22 artificial lakes on the refuge that check erosion and tide the game population over during long dry spells.

Army Guns Rumble on Refuge

One such drought had just ended in a series of cloudbursts when I set out on my first full-length tour of the Wichita refuge. My guide was Ernest J. Greenwalt, Wichita's manager for 20 years until his recent transfer to the National Elk Refuge in Jackson Hole, Wyoming. As we drove to the south gate under murky skies, I heard a deep booming from the crags.

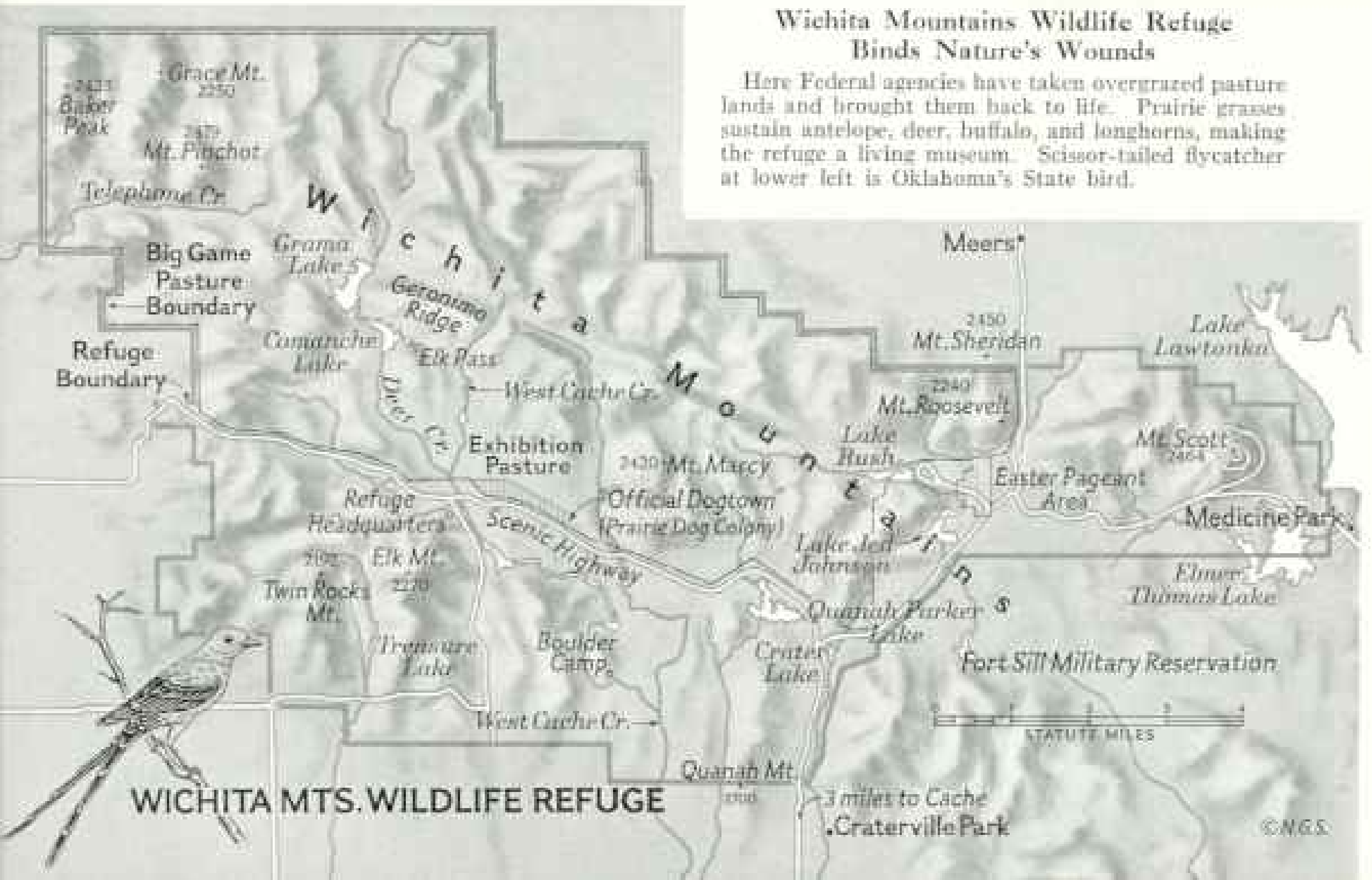
"Artillery," Greenwalt said. He explained that huge guns from the Army's near-by Fort Sill fire from the south side of the refuge at targets on the military reservation. In exchange for this privilege, the Army helps keep up the refuge roads.

This arrangement has worked well for a number of years. But at the time of my visit, the Army was pressing for outright control of 10,700 acres in the refuge as a buffer zone for firing even longer-range weapons.

On February 28, 1957, the Department of the Interior announced an agreement giving the Army a ten-year permit to use about one-third of that area for training and for firing into impact areas outside the refuge borders.

Boulder Camp, beside West Cache Creek, and Treasure Lake, under the sheer ramparts of Elk Mountain, both remain open to the public as favorite camping and picnicking sites. Wildlife protection continues.

Driving now through a low range of hills,



Wichita Mountains Wildlife Refuge Binds Nature's Wounds

Here Federal agencies have taken overgrazed pasture lands and brought them back to life. Prairie grasses sustain antelope, deer, buffalo, and longhorns, making the refuge a living museum. Scissor-tailed flycatcher at lower left is Oklahoma's State bird.

we came to a mountain that resembled a tumbled heap of granite boulders. This was Quanah Mountain, named for Quanah Parker, last and one of the greatest of the Comanche chiefs. Son of a white captive, Cynthia Ann Parker, Quanah adjusted to white man's ways better than most of his compatriots. In the late 1800's he became a prosperous cattleman and built a rambling house beneath Quanah Mountain. There he kept several wives and enjoyed the homage of his 18 children.

Eventually, Greenwalt told me, Quanah visited Washington, D. C. He was ordered by the Commissioner of Indian Affairs to get rid of all but one of his wives, to conform to the laws of the land.

"Quanah thought that one over for a while," Greenwalt chuckled, "and then, so the story goes, he said to the official: 'Mr. Commissioner, you tell them!'

"Anyway, Quanah kept his wives; one of them, Topay, still lives in the old mining town of Cache, just south of the refuge."

North of Quanah Mountain we entered the upland valley which, hemmed by granite peaks and ridges, forms the main body of the refuge. Oak woodlands, lakes, and grass-rich prairies alternated across the land. Greenwalt was proudest of the grass. He stopped the car to point out the big four: little bluestem, the dominant grass of the Wichita, which ripples reddish-brown in fall; six-foot-high big bluestem; the feathery-topped switch grass; and the yellow-plumed Indian grass (page 674). "We call these four the 'ice cream' grasses, the animals like them so much," he said.

Farther along he pointed to a turflike growth only hand high. "Buffalo grass," he said. "Despite its shortness, it is the food buffalo choose over all else in the fall."

Grass Anchors the Hillsides

The grasses serve for more than merely feeding the buffalo, longhorns, and other animals. One striking example of their use I had already noticed: despite the torrential rains of the past 48 hours, Wichita's streams ran clear, with no sign of silt.

Greenwalt showed me a conical hill where rich, virgin grass formed a deep mulch almost hiding the rocks. This hillside could absorb 10 inches of rainfall in 24 hours. Acting as a giant sponge, it would release excess water slowly and without erosion.

As we drove on, Greenwalt explained that

Author Williams Builds a Blind on Comanche Lake

Candid animal portraits are a photographer's reward for long, tedious hours spent in the cramped quarters of a blind.

Mr. Williams set up this burlap shelter several days in advance of filming in order that ducks, deer, and other wild creatures might get used to the structure.

In protected game areas like the Wichita refuge, most animals lose some of their fear of man and become easier to photograph.

Many naturalists regard the wild turkey as the wariest of North American game birds. But at Wichita the author filmed one flock for hours at a time. Gobblers ignored him as they strutted and displayed their plumage (page 692).

Comanche Lake, one of 22 man-made reservoirs on the refuge, backs up behind a dam on Deer Creek in the Big Game Pasture.

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↑ Wild Faces Peer from Wichita Woods

The author found early morning and the golden hour before sundown best for capturing Wichita wildlife in his camera.

The white-tailed doe above feeds on acorns near refuge headquarters.

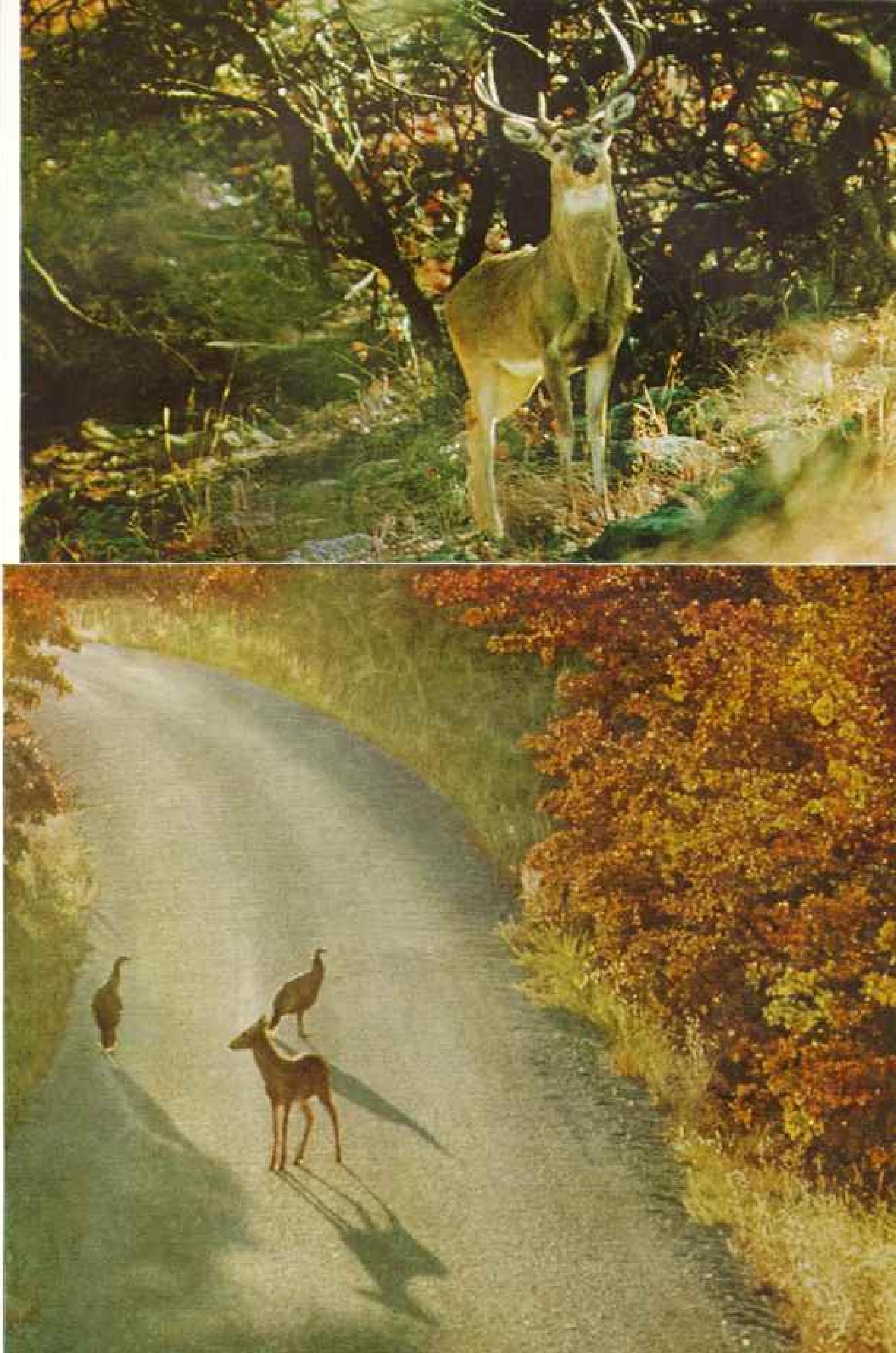
Opposite, above: A splendid buck stops and stares at the author's blind on Comanche Lake. To get the picture, Mr. Williams cut a hole in an unopened side of the blind.

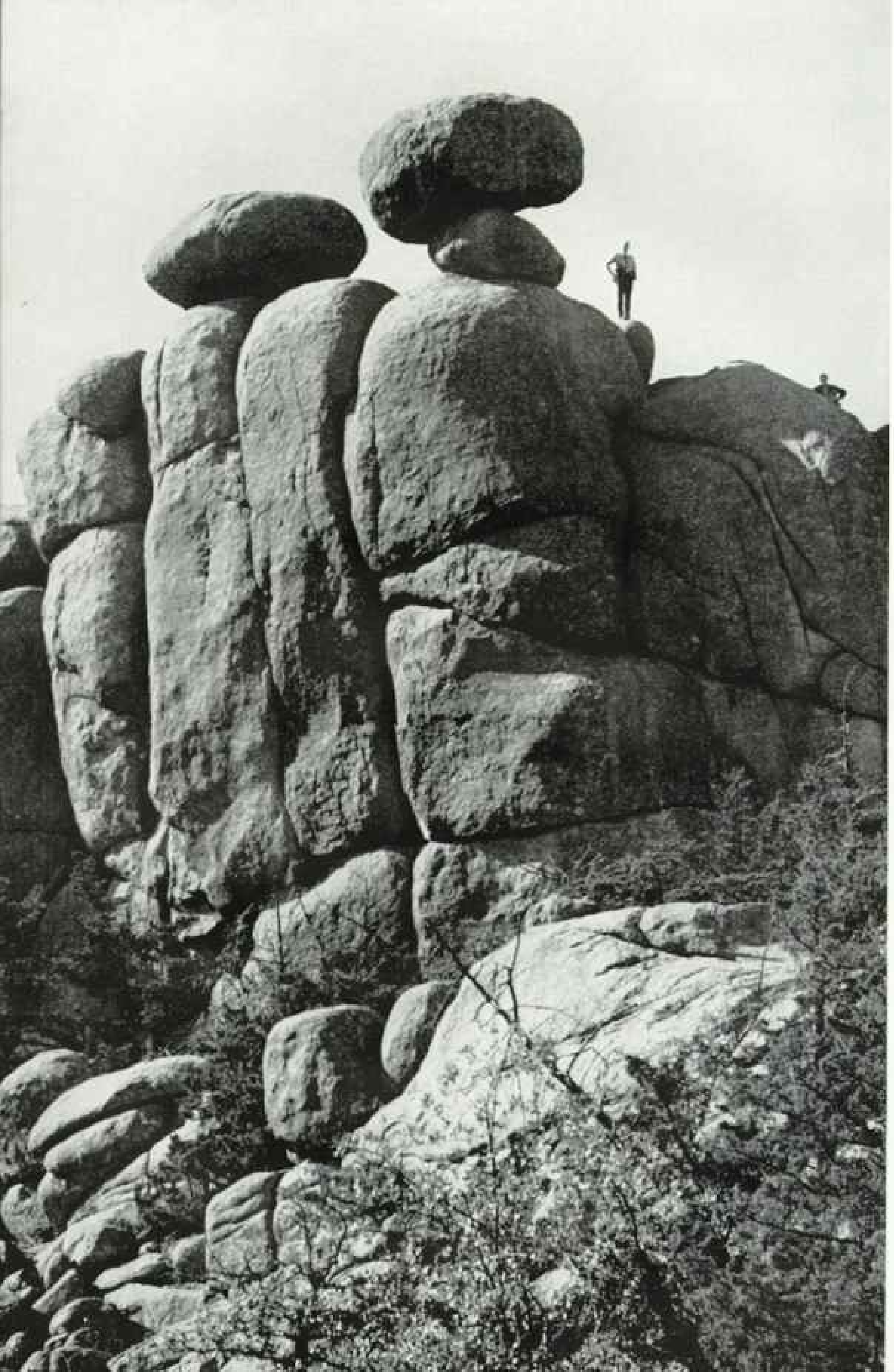
For several years a doe named Chigger hung around headquarters, begging food and tobacco from visitors and drinking from pop bottles. Chigger became such a nuisance that she was carted off and abandoned in the wilderness. Back she came.

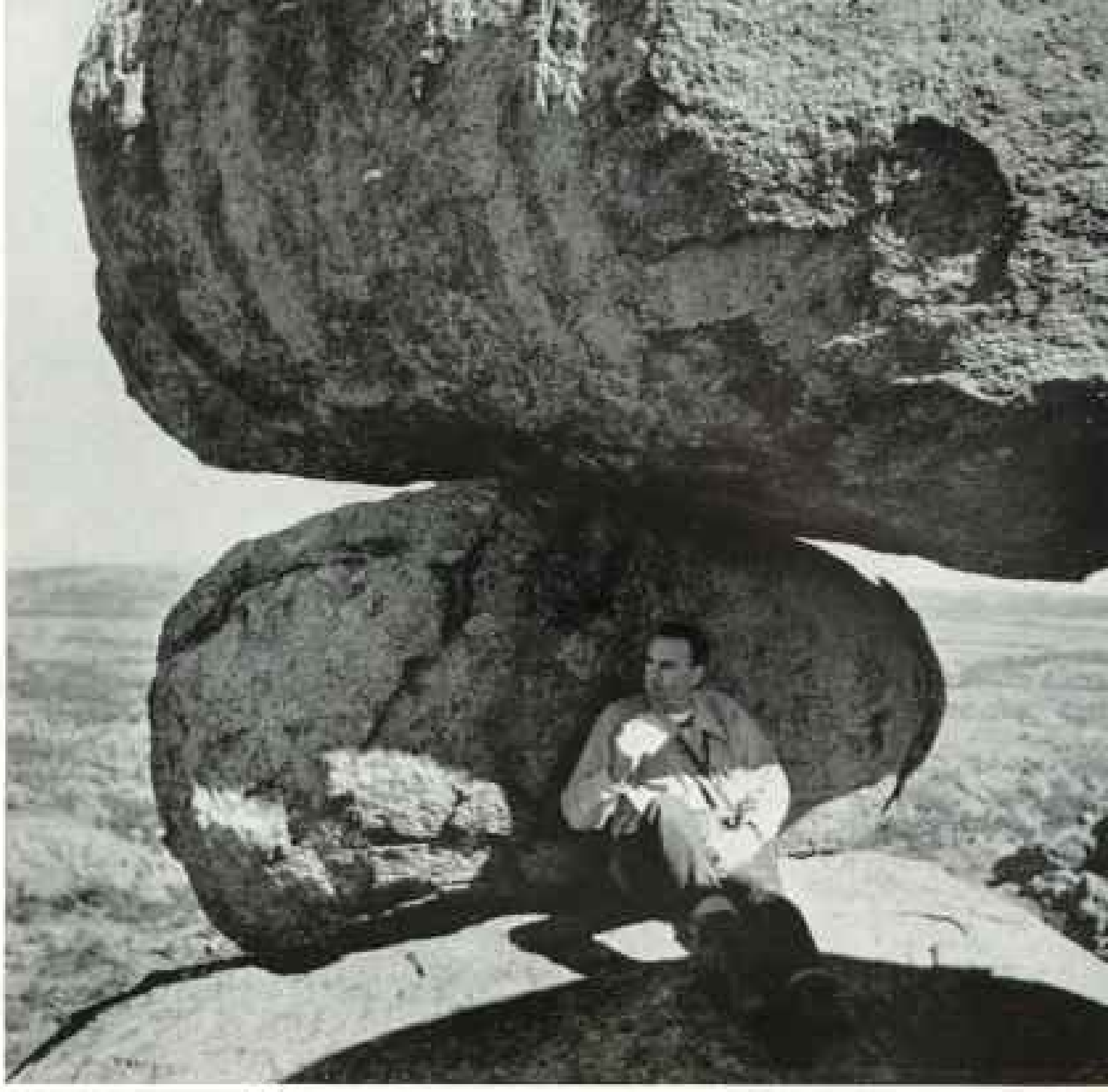
Then one day a child offered food to Chigger, but jerked it back. For striking the child with her sharp hoofs, Chigger was banished to another preserve. As a result, the refuge tolerates no more tame deer.

Fawn and Turkeys Tread a Paved Road at Dawn →

Prairie grasses and oaks glow in the warm light of the slanting sun. Later in the day motorists driving this shady trail will peer into the woods for sight of game.







Balanced Boulders Perch on the Brink of Twin Rocks Mountain

←Widely spaced cracks in the face of the mountain were caused by cooling and contraction some 640 million years ago, in the Pre-Cambrian Era.

Through the ages, erosion cut deeper into the grooves. Exfoliation, a weathering phenomenon, peeled off the granite like the concentric rings of an onion. Boulders atop the cliff became so rounded that one finally lay balanced on another.

Imbalanced by erosion or shaken by earthquakes, the rocks eventually tumble, sometimes felling trees as they crash to the canyon. Some of the boulders on page 689 may once have stood in balance.

→Arch Merhoff eats lunch without fear that the doubly balanced rocks will topple. So far, natural forces have not been strong enough to tip these giants.

the Wichitas owe much of their wealth of plants and animals to their geographical location: they are at a point where many eastern and western species come together.

He showed me protected spots where relic stands of bigtooth maples survive on Wichita slopes among the more eastern elm, white ash, wild persimmon, blackjack, and post oak. Eastern red cedars, twisted by the elements, cling like gnarled dwarfs to the granite bluffs.

Meadowlarks Mix from East and West

Two meadowlarks perched on a fence, puffed up in the cool prairie winds. "Often," Greenwalt said, "we see the western and eastern meadowlark side by side in the winter. You can't tell them apart except by their songs. The eastern meadowlark sings to the farmers: 'There's weeds in your wheat.' The western meadowlark has a longer song: 'There's weeds in your wheat, and you'll never get rich.'"

I saw light-blue eastern bluebirds mingled with their darker Rocky Mountain cousins. I watched these alpine tourists dart from mesquites into the wind, hover with beating wings, and then, tiring of the sport, drop to the ground to feed. Again, near Quanah Parker Lake, I saw a swirling black cloud of nearly a thousand blackbirds settle over thick rushes.

Perhaps the most spectacular summer resident is the scissor-tailed flycatcher, Oklahoma's State bird. In October, when I saw them, the birds were leaving for winter homes farther south. I shall never forget the picture of a 10-inch pair of tail feathers spread like open scissors, the white-and-rosy underparts bright against the blue sky when a bird swept out from its perch on a tree or a telephone wire to capture some flying insect.

In prehistoric times the Wichita Mountains towered thousands of feet above the surrounding land. Uncounted centuries of erosion, earth movements, wind, rain, heat, and cold wore the peaks down and cracked their rock cores into a wild confusion of tumbled blocks, joints, and balanced spheres (opposite).

Indians have lived among these mountains for centuries. The Wichita were primarily farmers, whereas the Comanche and Kiowa based their lives upon hunting buffalo. For all, however, the rock peaks that rose within sight of their villages and camps formed the center of their world.

Before white men came to the mountains, great buffalo herds grazed the rich grasses in upland valleys; elk, bear, cougar, and lobo wolf roamed the mountains.

As their buffalo vanished in the years of the white hunters, Comanche and Kiowa raided white settlements and wagon trains for horses and food. In 1869 Fort Sill rose

Kodachromes by E. P. Haddon

Young Rattler Gives Silent Warning

Having only a button, this western diamond-back vibrates his tail but cannot make the buzz of an adult. He carries fangs and venom from birth; these he uses for killing his prey. Pits in the side of his head serve as a sort of thermometer by which he detects warm-blooded creatures even in the dark.

Ornate Box Turtles Meet in a Meadow

Turtles have outlived the dinosaur and many other reptiles now found only as fossils. Their armor has remained essentially unchanged for 175 million years. During cold weather these turtles burrow in the ground. Males in the mating season joust like knights in slow motion, nipping necks and trying to overturn each other.

near Medicine Bluff to contain the marauders on a reservation. The great Indian warrior Geronimo and his Apache band were settled here eight years after their surrender. By 1875 the Indians of southwest Oklahoma had submitted to the white man's rule.

In 1901 the Territory of Oklahoma, the western part of the present State, was opened to white settlement. Prairies were plowed, pastures overgrazed. Streams running to the Red River turned dark with mud.

When the Wichita reserve was first established in the old Kiowa-Comanche-Apache Indian Reservation, the granite peaks still sheltered a few prairie areas fit for wildlife. Here restocking began in 1907 with the arrival of buffalo. Yet grazing permits remained valid, and the onslaught of domestic cattle and wild animals was too much for the land.

By the 1930's trees stood shorn as high as hungry cattle could reach for leaves; ragged sores opened on hillsides and allowed mud to pour down streams. Dust devils swirled across denuded cattle pastures.

In 1935 the land was transferred to the U. S. Bureau of Biological Survey, now the Fish and Wildlife Service. By 1938 all domestic cattle and horses were excluded from the mountains, and only game was left on the refuge. During the depression the Civilian Conservation Corps built dams and watering tanks and nailed down soil with grass and bushes. And so, slowly, the refuge came back to life.

Indians Welcomed Buffalo's Return

No people were happier to see it come back than the Indians, descendants of the tribes that had owned this land before it was spoiled. Many of them today live on farms or in towns around the refuge; their forefathers erected buffalo-hide tepees along the streams and in green valleys of the Wichitas.

I met some of these prairie-rooted people in Craterville Park, a small settlement just south of the refuge. Here 1,200 Indians had gathered during my visit; a motion picture company was filming an Indian village scene, circa 1872, for the movie "Around the World in Eighty Days" (pages 694 to 696).

At Craterville Park, too, I met a 79-year-old grandmother who told me much about the early days of the refuge. She was Mrs. Frank Rush, the widow of one of Wichita's early supervisors.

She could recall vividly the exhilaration that swept through the Indian population when her husband spread the word that buffalo were coming back to the Plains. For two weeks Indians poured into the refuge to witness the great event on October 18, 1907.

The first calf born from the shipment, Mrs. Rush recalled, was rightly named "Oklahoma." He lived to the ripe old age, for a buffalo, of 20 years—the grand old man of the growing herd.

Turkeys Come Back from Extinction

In the 1890's wild turkey and prairie chicken had been shipped from Oklahoma to eastern food markets by the wagonload. Turkeys, once thousands strong, dwindled away. Finally only one hen was to be found on the Wichita refuge.

"She built a nest back of headquarters," Mrs. Rush recalled, "and laid her eggs." One day a ranger came in to report nothing left but some feathers. A predator, probably a fox or coon, had found the nesting hen.

Mrs. Rush started a new flock, using Rio Grande bronze turkey hens imported from Texas and one big gobbler from Missouri. From 23 eggs she raised 22 young, feeding them on cottage cheese. When they were old enough to shift for themselves, she released them into the forest.

Today about 400 wild turkeys roam the refuge. They have proved valuable for scientific study. In most parts of the United States wild turkeys are difficult to study; observers regard them as perhaps the wariest of North American game birds. But on the protected refuge they are secure, and a great deal has been learned here about their habits.

One flock lives beside West Cache Creek, near the homes of the refuge staff. For their nearest neighbors, the birds act as an alarm clock. On winter mornings turkey talk and the flapping of wings awaken them at 7; in the evening the birds take off at 6:30, like lumbering cargo planes, to roost in near-by treetops.

In spring the turkey flying school enlivens the wood lots. Adult birds usually must run for several feet before taking to the air; their chicks have even more trouble getting airborne. On the first trials the fledglings flutter from the ground to a stump, then to a higher limb, and so on up. Only after considerable practice can they flap their way directly to the treetops with the parents.

Each flock lives in a well-defined territory;

↑ Here Comes Yesterday —a Herd of Longhorns

Longhorn cattle, descendants of Spanish colonial herds, were all but bred out of existence in the United States by 1900. Supplanted by beefier types, they are kept today by refuges, zoos, and a few ranches.

In 1927, 30 longhorns for Wichita were gathered along the Mexican border. Numbering 275 today, the herd is one of the largest in the Nation.

Steers carry the biggest horns. Some of these span five feet. Old-time cattlemen reported eight-foot spreads.

➔The herd waters in Quanah Parker Lake.

←Ernest J. Greenwalt (right), a long-time manager of the refuge, and Arthur F. Halloran, biologist, admire head-high Indian grass in a climax prairie on the refuge. Dominant prairie grass is the bluestem (page 678).

in winter the territory may be subdivided between hens and poults in one group and gobblers in the other.

I followed one wild flock for hours as it fed through the oaks. Bluish heads bobbed up and down as the birds stripped seeds from grass stems. The turkeys had regular routes through their territory. I watched the hens dust themselves in a bowl worn out of the woodland floor that must have been used time and time again.

Reveille Wakens Roosting Gobblers

Early one November morning I found the flock still roosting. A single strident gobble first broke the pre-sunrise silence. Then a heavy body floundered through the treetops, soared up over the woods, and glided down onto a road that had become a turkey landing strip. One by one the other turkeys awoke, glided to the pavement, stood stock-still, then began to move about and feed.

A brief flurry broke out; the ill-tempered gobblers fluffed their feathers and noisily drove the hens off down the road. The gobblers then went off to drink at a water hole.

The routed hens regained their composure and began to work back toward the feeding toms. The sun rose to warm the land; a doe and fawn minced delicately across the road, passing the turkeys (page 669).

The hens had now rejoined the gobblers, and the mixed flock of about 30 birds moved into a sheltered sun-splotched glade in the oaks. Another fight began: two hens darted at each other. Around and around a tree went the birds. The rest of the flock noisily converged on them, like boys running to a fist fight.

Soon the entire hen population was in a whirling uproar. Then, as suddenly as it began, the fight ended. Pecking order had been re-established.

I was interested to see male turkeys strutting and displaying their plumage in the fall; this is much more common at mating time in March.

When he displays, a gobbler's feathers seem to explode outward with a soft pop (page 692). The tail spreads into a great fan. The body swells; wings sweep the ground. The

(Continued on page 685)

Prairie Dog Sits Up and Barks, "This Den Is Mine," He Proclaims

Many a beast and many a bird instinctively stakes out a territory. Such a square, marked with imaginary borders, he jealously defends against rival males.

So it is with the prairie dog, *Cynomys ludovicianus*, a rodent akin to the marmot. In claiming his territory, he rises on hind legs, lifts forepaws in salaam, and gives voice to a high-pitched call.

One dog's salaam may set off the entire colony. Soon all are leaping like jumping beans.

Prairie dogs grow sleek and fat on grasses, roots, and insects. Wary of natural enemies, they rarely venture far from burrows.

Dog towns were common in the American West until ruthless poisoning by settlers took effect. An estimated 400 million once dwelt in underground cities hundreds of miles long.

Today most prairie dogs live in refuges. This fellow dwells in Wichita's "Official Dogtown" (map, page 666).

Redheaded Woodpecker Stores Acorns in a Tree

Where acorns are plentiful, redheads often remain throughout the winter. They throng in dead trees, building homes inside the trunks. Their relatives, the California woodpeckers, often chisel holes in telephone poles and fence posts for acorn warehouses.

Cow Elk "Freezes" in a Stream

During the annual roundup on the refuge, cowboys herded the elk into a fenced pasture, and the author pointed his camera at a cow. Before he could trip the shutter, she vanished in thickets and stream. Unable to escape, she reverted to the infant practice of freezing and blending with the scenery.

Young deer and cattle often do the same trick. Cowboys say the animals "sull."

↑ Cowboys Ride Up to Grama Lake, Heart of the Big Game Pasture

While touring the prairies in 1832, Washington Irving found Oklahoma teeming with grass and game.

Today one-third of the topsoil from the State's sloping cropland has washed away. Drought, plowing, and overgrazing destroyed the cover.

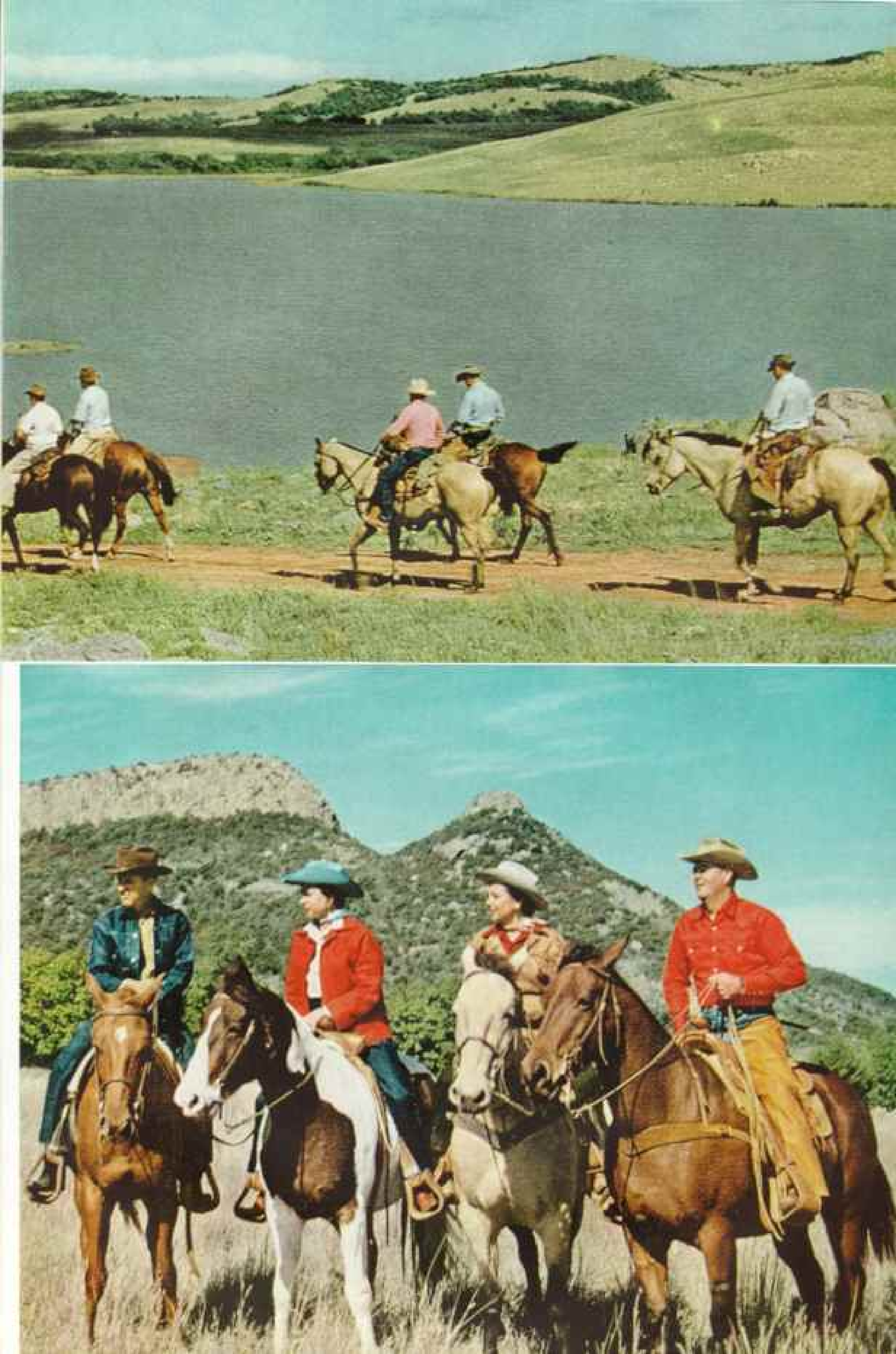
An intensive effort is now being made to restore the sick land. Already the prairie lives again on the Wichita refuge.

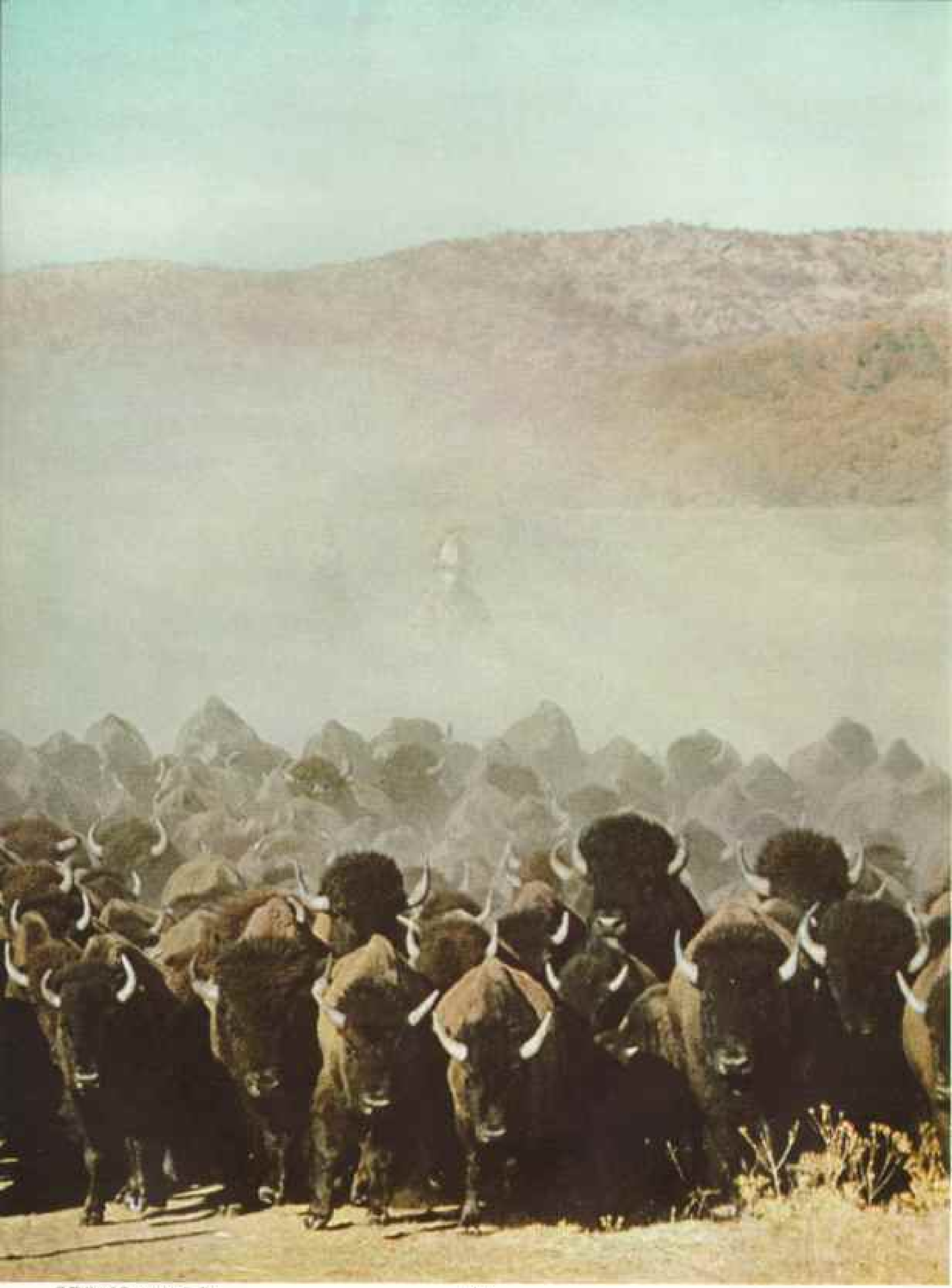
Here bluestem grows in the Big Game Pasture, a 34,000-acre fenced nursery. The horsemen set out to round up buffalo for a movie company.

←Suzy Rush is a granddaughter of Frank Rush, supervisor of the refuge when it was restocked with buffalo and elk.

→Suzy's parents, Frank and Genelle Rush (right), and Bob and Alma Kirk ride beneath granite-capped Mount Sheridan.

This peak was named for Gen. Phil Sheridan of Civil War fame, who hunted elk and fought Indians in the Wichitas.





680.

Ground Rumbles, Dust Swirls as Bison Pound Across the Prairie

Always unpredictable, the American bison (commonly called buffalo) may charge without provocation. Highway signs in the refuge warn visitors against leaving the road. Wichita's herd numbers about 1,000.

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Six Riders Drive the Herd. Half-ton Bulls Stampede into the Camera

Each winter cowboys round up the refuge's buffalo herd (page 687). They cut out, brand, and vaccinate the calves. Some young stock is sold alive to zoos. Excess animals are killed for meat.

Bison Blacken the Prairie as in Pioneer Days

From Canada into Mexico, from Pennsylvania to Oregon, some sixty million bison once roamed the grasslands.

Striking down the herds, white men converted their ranges into crop and pasture lands.

In 1902 the Federal Government started its first captive herd—with 21 animals—in Yellowstone National Park. Wichita in 1907 established the second herd with 15 shipped from the New York Zoological Park.

This herd grazes the Big Game Pasture (page 678). Calves are about six months old.

Opposite, below: Two young bulls test their strength trying to push each other off balance. Sometimes the loser is gored. Bull on right has a broken horn.

This contest takes place on a wallow worn by animals rolling to dust their hides. Wallows left by old-time herds still scar the Prairie States.

↓ Bark Scrapes Hide at a Rubbing Post

Buffalo rub to relieve itching skin and insect bites. Sometimes they line up to wait their turn. Many tough hides have worn this mesquite tree smooth.

Bizarre Mantis Stalks Across Granite on Elk Mountain

The insect's abdomen is heavy with eggs. These she will lay in a frothy mass that hardens into a chambered case.

Color and pattern camouflage the insect to resemble the lichen-incrusted rock. Eastern members of the same species, *Stagmomantis carolina*, frequently wear green to blend with the prevailing vegetation.

Ancient Greeks attributed supernatural powers to the insect, which they called *mantis*, meaning prophet. Seers predicted the future according to its movements.

The forelegs' prayerful attitude gives the praying mantis its name. Far from engaging in prayer, it is a rapacious hunter of other insects. After mating, the female usually kills the male and eats him.

Powerful front legs armed with cruel spines make the insect a formidable hunter.

This mantis cleans her legs after a meal. Her head can revolve in an arc as wide as a man's; her two large eyes, made up of hundreds of simple lenses, each producing a tiny part of the entire picture, command more than 300 degrees of vision.

Millepede Scurries over Moss

Many invertebrates survive droughts by remaining under moist rocks. Rain brought this one out. With more than six legs, it is not a true insect. If handled, it emits a pungent odor, but does no harm to man.

bluish head with red wattle is cocked back against the fluffed feathers. "Puff!"—another male struts, then another, amid the soft rustle of straining feathers. Perhaps such fall antics were practice for the spring courtship to come.

Cowboy Comes to Longhorn's Rescue

Special pride of the refuge are its 275 Texas longhorns, one of the largest remaining herds in the United States. When the pioneers struck west, they found vast numbers of these cattle grazing wild in the Texas plains, descendants of stock introduced into the New World by Spanish conquistadors.

Between 1866 and 1890 eight to ten million bawling longhorns were driven from Texas to railheads and markets in Kansas and other States; one famous route was the old Chisholm Trail. Then railroads pierced southward, making the long drives unnecessary. Stockmen produced beefier cattle by crossing longhorns with English breeds, and longhorns all but disappeared.

One of the early employees at the refuge was a red-haired ranger named William Earl Drummond, an ex-cowboy who had worked with longhorns and remembered them with affection. He could find only two specimens remaining in the Wichitas.

"I figured if they were getting that scarce, something should be done to save them," he told me. "I took it up with the Forest Supervisor, Harry French."

A year later Congress voted money to buy longhorns for the refuge. The problem then was finding them. Two Forest Service men, Will C. Barnes and John H. Hatton, looked at 30,000 cattle along the Rio Grande and Gulf coast before they located 30 genuine longhorns. These were shipped to the refuge in 1927. Since then Drummond, now retired, has happily devoted his life to preserving the strain through selective breeding.

Braving the Longhorn Herd

When I went to photograph the longhorns, refuge biologist Art Halloran accompanied me. We had spotted the herd in the Exhibition Pasture, a section of the Big Game Pasture bordering on the highway. When I swung down from the pickup truck with my camera and tripod and started walking toward the herd, Halloran looked nervous.

"I wouldn't go out there, Woody," he said. I looked at the longhorns milling a short distance away. Several of the big-boned cows and bulls stood rigid, staring at me with a curious—or was it belligerent?—expression. I couldn't be sure.

Their sharp horns curled up at the ends like a handle-bar moustache; on some steers they stretched at least five feet across.

Three refuge cowboys rode up. Obligingly, they were going to drive the herd past my cameras. As I stood beside my tripod, Heck Shrader, the leader, tried to reassure me.

"I don't think they'll charge you," he said. "But if they do, just lie flat on the ground."

That did it. I climbed back into the pickup with Halloran and mounted my camera there.

Now the drive began. Dust swirled as the close-packed herd pounded by, the cowboys hard behind. White, black, spotted, dun, red, and even bluish steers lumbered by, horns clicking together, hoofs churning (page 674). It was a sight from another century—but I was glad to be photographing it from a 20th-century steel truck.

Roundup Provides Buffalo Banquet

More unpredictable and harder to work than the longhorns are the big, hard-charging buffalo. Yet the Wichita cowboys, with patience and hard riding, round up the buffalo each winter (page 680).

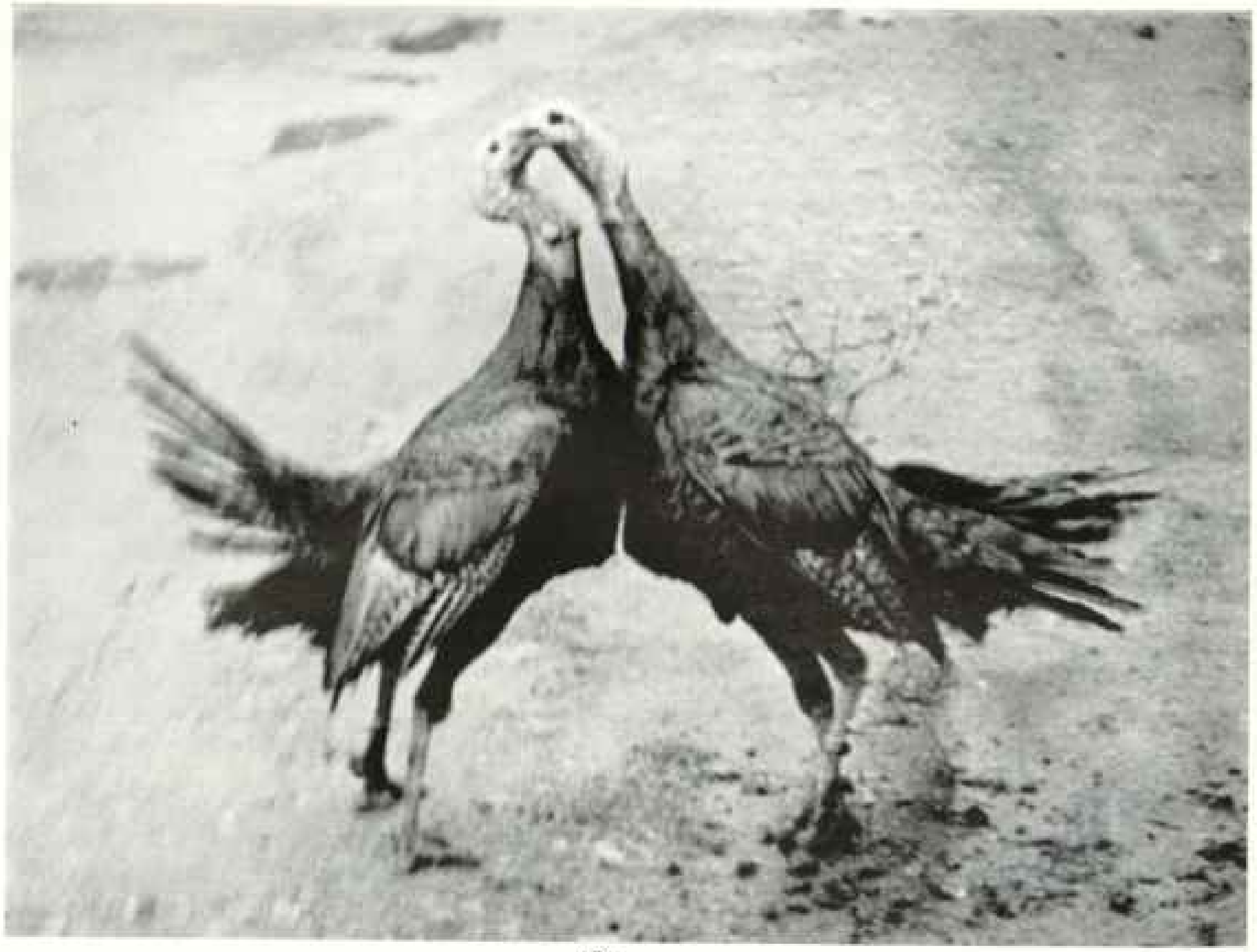
"You can drive buffalo," Shrader told me, "anywhere the buffalo want to go. They just weren't meant to be worked."

Dick Hitch, assistant manager of the refuge, spots hard-to-find herds from Army helicopters on training flights from Fort Sill. Calves are cut out, branded, and inoculated against brucellosis, a bovine scourge known in cattle as Bang's disease. Then they are returned to the herd, and somehow each finds its way back to its mother.

The size of the herd must be kept down to prevent overgrazing the land, and excess stock is sold alive or for meat. In 1956 the refuge received nearly $50,000 from buffalo and longhorn sales.

It was not unusual for the Greenwalts to find a rancher at their door at 6 o'clock in the morning, or after supper, asking to buy a buffalo.

The most unusual request came from a man who lived in a New York City penthouse and wished to give a buffalo banquet. For authentic flavor, he ordered "buffalo chips" (dried dung) for cooking the meat. This was the only firewood the pioneers knew on the



686

Toe to Toe, Wild Turkeys Fence with Beaks. They May Use Spurs Like Gamecocks

Toms become aggressive when early spring's warmer, longer days stimulate the mating urge. They acquire harems and fight off covetous rivals. Gobbler on right carries a biologist's leg band.

almost treeless prairies. His order was filled.

"Longhorns don't mix with buffalo," Drummond told me. "I'd bet on a buffalo to lick a longhorn. You can usually bluff longhorns by standing up to them, but not buffalo. There is always some cow in the herd that will come bounding out of the bunch toward the rider as if she would like to swallow both him and his horse. If she has a young calf, get out of her way.

"Bulls can be dangerous, too. If one raises his tail and starts toward you, give him room!"

Visitors Disobey Warning Signs

Signs along the Scenic Highway warn visitors not to leave the pavement or venture too near the buffalo. Yet every day I saw people stop their cars and walk with children in hand toward the hulking beasts, trying to get close-up pictures. Generally the buffalo would turn and present only backs and tails for their portraits. But visitors have been charged and forced to take to the trees.

It was to capture views of American bison other than the one on the back of the nickel that I "became a buffalo." Leaving my car at sunup near Crater Lake, I joined a drifting herd and wandered with them for hours, watching them as they ate, fought, drank, wallowed, and scratched.

When I first moved cautiously into the herd, all heads were lowered as they grazed on buffalo grass. At close range I could see that calves born the preceding spring had turned dark brown like their parents; and humps were beginning to show; at birth they are reddish brown and look much like domesticated calves. At six months they spend most of their time grazing, but occasionally one would thrust its eager head toward its mother's udder, jolting her hindquarters and almost lifting them off the ground.

From where I stood, I could also watch the great unwieldy animals squirm on their sides, kicking and thrashing about furiously in a wallow.

In explanation of this striking buffalo habit,

687 K. J. Greenwalt, Fish and Wildlife Service

Necks Entwined Like Coiling Serpents, the Duelists Fight to Exhaustion

Battles may last off and on for days, but fatalities are rare. Usually wary, these birds were so absorbed they ignored the photographer. They charged and backed off, battling to a draw.

many zoologists agree that flies, mosquitoes, and other insects have something to do with it. These pests plague buffalo in summer, and rolling in the dust offers the beasts temporary relief, as does the mud of the wallows after rain. But now, in late fall, the animals were not shedding or bothered by mosquitoes or flies. Rolling, I suppose, just made them feel good.

At about 10 a.m. the buffalo wandered in Indian file across the Scenic Highway to the small creek that drained from Crater Lake. I crouched among the shrubs along the creek, hoping to catch the animals as they came to water. Here my presence, for a change, caused alarm; they pawed back up the bank and tried to cross at a different point.

I moved back so they could drink. Then, crossing to a new range, the herd grazed again while some bulls idly butted heads. At noon they settled down in the grass. Tired of chasing buffalo, I too sat down among the shaggy dark hulks.

Far back in the hills I saw aged buffalo bulls, displaced veterans of many battles. The old patriarchs live alone or in small groups. With wind whipping their chin whiskers, these statuesque brutes often stand against the prairie skyline or on some granite rise of tossed boulders. Their stolid nobility epitomizes a once mighty race which, thanks to conservationists, has been saved from extinction.

"Official Dogtown" Puts On a Show

Many of the visitors who come to see Wichita's buffalo stay on to admire the antics of the prairie dogs—actually 10-inch-long rodents of the species *Cynomys ludovicianus*.

One day I stood outside "Official Dogtown," as the refuge staff calls the main colony, and watched as a prairie dog leaped skyward, let out a shrill squeak, and dropped back on his haunches, looking surprised at his own exuberance. His antic was contagious. It swept dog town like a cyclone. One animal after another leaped above the earth mound around its doorway, forelegs outstretched as if in sup-

plication. The Greenwalts called it "salaaming" (page 676).

The ground resembled a battlefield, pocked with small volcano-shaped craters. The "dogs" scurried between burrows or nibbled on short buffalo grass. Their high-pitched whistles reminded me of birds.

To photograph prairie dogs, Art and I decided to use the pickup for a blind, because the animals were used to cars. We drove into dog town, cut the motor, and waited. A few heads poked cautiously above ground; then some of the animals sat upright for a better look. But none was close enough for a good picture.

I tried a bird photographer's trick: I dropped flat on the ground, and the truck drove off; again the animals vanished into their holes. Theoretically, they would think I had left with the truck. There was no sign of life. Impatiently, I raised my head.

"Queeick!" A small face entrenched behind a dirt parapet near by sounded the alarm note; its two shiny eyes had been watching me all the while.

On the next try I slowly slipped from the truck and moved forward on my stomach, pushing the tripod and camera in front of me. The dogs were nervous but did not dive. Gradually they became used to my prostrate form. I inched closer, made an exposure, then another. In half an hour I had all the pictures I wanted.

To control poaching, Greenwalt sometimes cruised the refuge at night. On one patrol he met a soldier from Fort Sill who had been posted at dog town during maneuvers.

"How goes it, soldier?" he asked.

"All right, sir."

"Where're you from?"

"Brooklyn."

"How do you like your job?"

"O.K., but I can't stand those giant mice!"

Bitter Winds Bring a Banquet

Toward the end of my stay in the Wichitas, a fierce north wind howled in from the central Plains to serve the animals their Thanksgiving dinner. Oaks and pecans shook and twisted until their nuts were dashed to the leafy table below. Never was a banquet set with greater fury.

Along exposed West Cache Creek, which drains much of the Wichitas and carries the water toward the Red River, the gaunt, naked arms of trees reached above leafy leggings still hanging on the lower limbs. Gay fall leaves had turned brown overnight.

In 24 hours the bitter winds passed. Shy deer emerged among the barren trees and nuzzled up to their eyes in fallen leaves for nourishing acorns and other nuts. The acorns from post oaks, in particular, are an important food of the white-tailed deer in winter months. Creatures ranging from coons to wild turkey and mallards also joined the feast.

But the storms that blessed the wildlife delayed my chance to photograph it. A cold spell followed the norther. On a frosty morning I trained my telephoto lens on ring-neck ducks as they moved through mists on the lake, trailing V-shaped wakes. My lens would not focus; it was frozen stiff.

Wildlife Show Reaches November Climax

I kept warm by rebuilding blinds flattened by the winds. One camera shelter went up and down three times. The last time I untangled the canvas and cordage, a short-tailed white-footed mouse scampered out. He had taken shelter from the storm, perhaps, or the talons of a hunting owl.

From my blind on Comanche Lake the wildlife show reached its climax after mid-November. There had been little activity one early morning—too cold. I was about to give up shortly after sunup, when a furry ball with a ringed tail emerged from the parklike oaks and began to forage among the grass and stumps. My telephoto lens revealed a raccoon feeding in broad daylight.

Not satisfied with the few acorns the deer had left, the black-masked bandit nimbly climbed a post oak, up and up, until the limbs swayed with his weight. Here he picked acorns that had survived the northers, stuffing them into his mouth.

Still hungry, the coon slid down the tree, ambled to the lake, and went in up to his belly. He worked along the shore, plunging his stiff forelegs up and down, his handlike paws feeling the bottom for crayfish. Suddenly he looked up, then dashed off into the woods, not caring how much noise he made in the dry leaves. Perhaps he had just remembered that this was no time for a coon to be up and about. The books say he is a nocturnal animal.*

(Continued on page 697)

* See "Raccoon: Amiable Rogue in a Black Mask," by Melvin R. Ellis, National Geographic Magazine, December, 1936.

A River of Granite Boulders Cascades Down Mount Scott

Slowly weathered by alternating frost and thaw, the rocks peeled off the mountain flanks and rolled into the creek bed, possibly during the Ice Age. After rains, water invisibly swirling through the slide sounds like a cataract.

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Young Explorers Toss Stones in West Cache

Early traders, copying an Indian method of storing food, cached goods along the creek; hence its name. Today West Cache Creek provides a recreational jewel in a land subject to long dry spells.

The gorge lies within the 10,700 acres that the Department of Defense sought from the Department of the Interior to expand gunnery ranges at Fort Sill. By a recent compromise, the Army receives a ten-year permit to use about one-third of that acreage, but not to fire into it.

←Bailey's hedgehog cactus, *Echinocereus baileyi*, grows wild only in the Wichitas.

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Wild Flowers and Fruits Brighten the Refuge

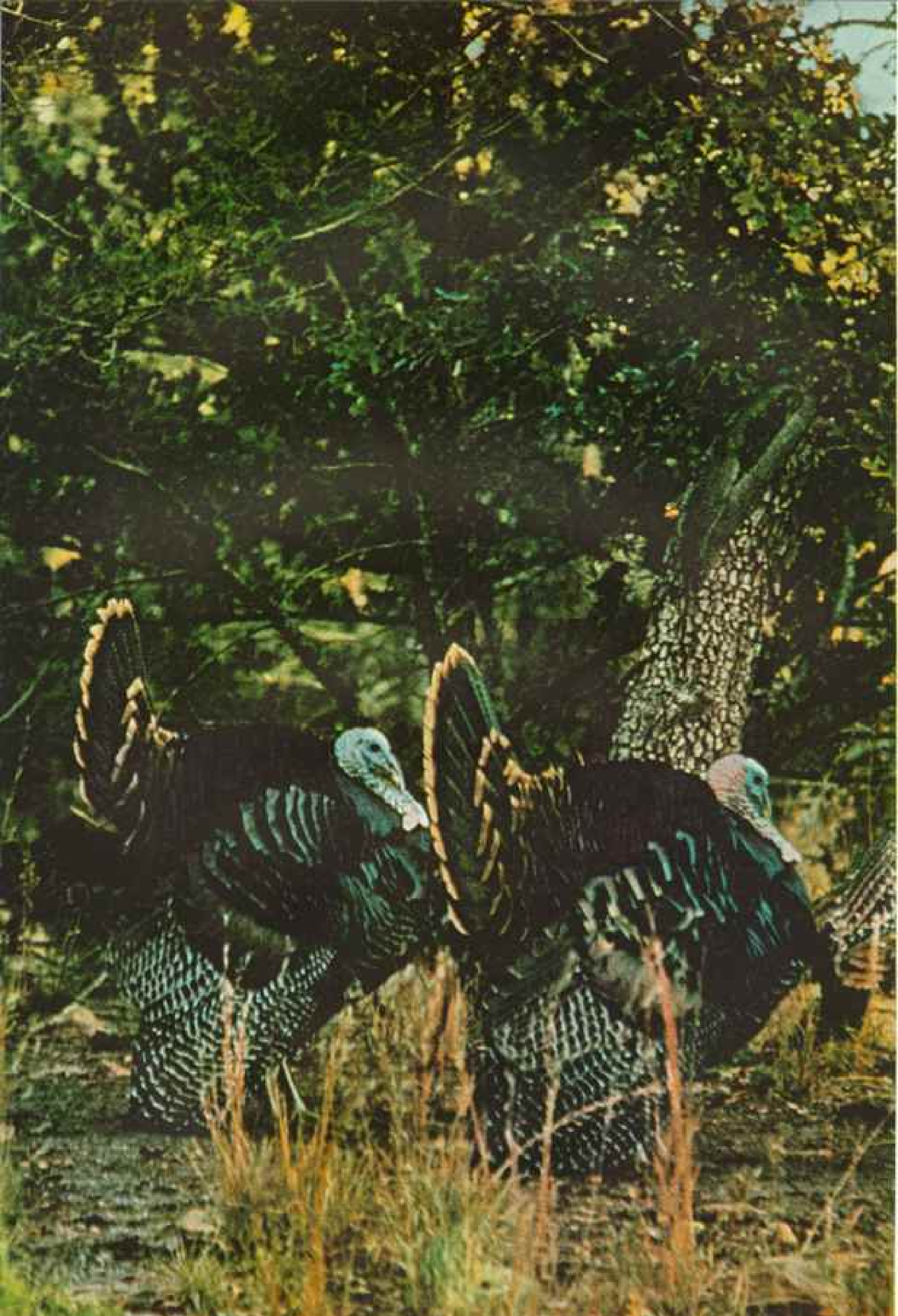
Upper right: Coralberry, or Indian currant, *Symphoricarpos orbiculatus*, reddens oak-hung stream courses through fall and winter.

Sometimes cultivated in gardens, the berries are used for Christmas decorations.

Center: Spiderwort, *Commelina erecta*, is a favorite food of deer. It is often called dayflower because the blooms last only a day.

➔Perhaps the showiest wild flower on the refuge is the Indian blanket of the Plains, *Gaillardia pulchella*. It makes drab granite glow. Seen in masses, it suggests a colorful blanket.

Kodachromes by M. Woodbridge Williams (above) and Richard Hitch (right and opposite below)



Strutting Gobblers Stage a Fashion Show in Early-morning Light

Spanish conquerors of Mexico about 1520 found domesticated turkeys among the Aztec Indians. Shipped to Spain, the bird spread rapidly through Europe. Our domestic turkeys came back to us by way of Old World barnyards.

Because the turkey was a native American, Europeans originally had no name for the bird. They called it turkey, one school contends, because they confused it with the guinea cock, which was imported through Turkey.

Further confusion is spread by the turkey's scientific name, *Meleagris* (referring to guinea fowl) *gallopavo* (alluding to the peafowl).

In New England turkeys were so plentiful that Pilgrims shot Thanksgiving birds from their doorsteps. Flocks eventually vanished before the white man's guns.

Southwesterners in the 19th century slaughtered entire flocks as the birds returned to roosts overhanging streams. A hunting party under General Sheridan in 1869 killed 200 in one night.

When turkeys died out in the Wichitas, Texas sent some of its big Rio Grande birds to build up a wild flock. Protected by the Fish and Wildlife Service, they have partly lost their fear of man.

In the spring gobblers strut to attract females. Going into bachelor quarters in the fall, they strut among themselves.

These gobblers belong to the headquarters flock, which lives within sound of typewriters and housewives' dishes. The author had little difficulty following them on feeding expeditions through the woods. They stand three feet high and weigh 20 to 25 pounds.

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Indian Tepees Blossom in Craterville Park

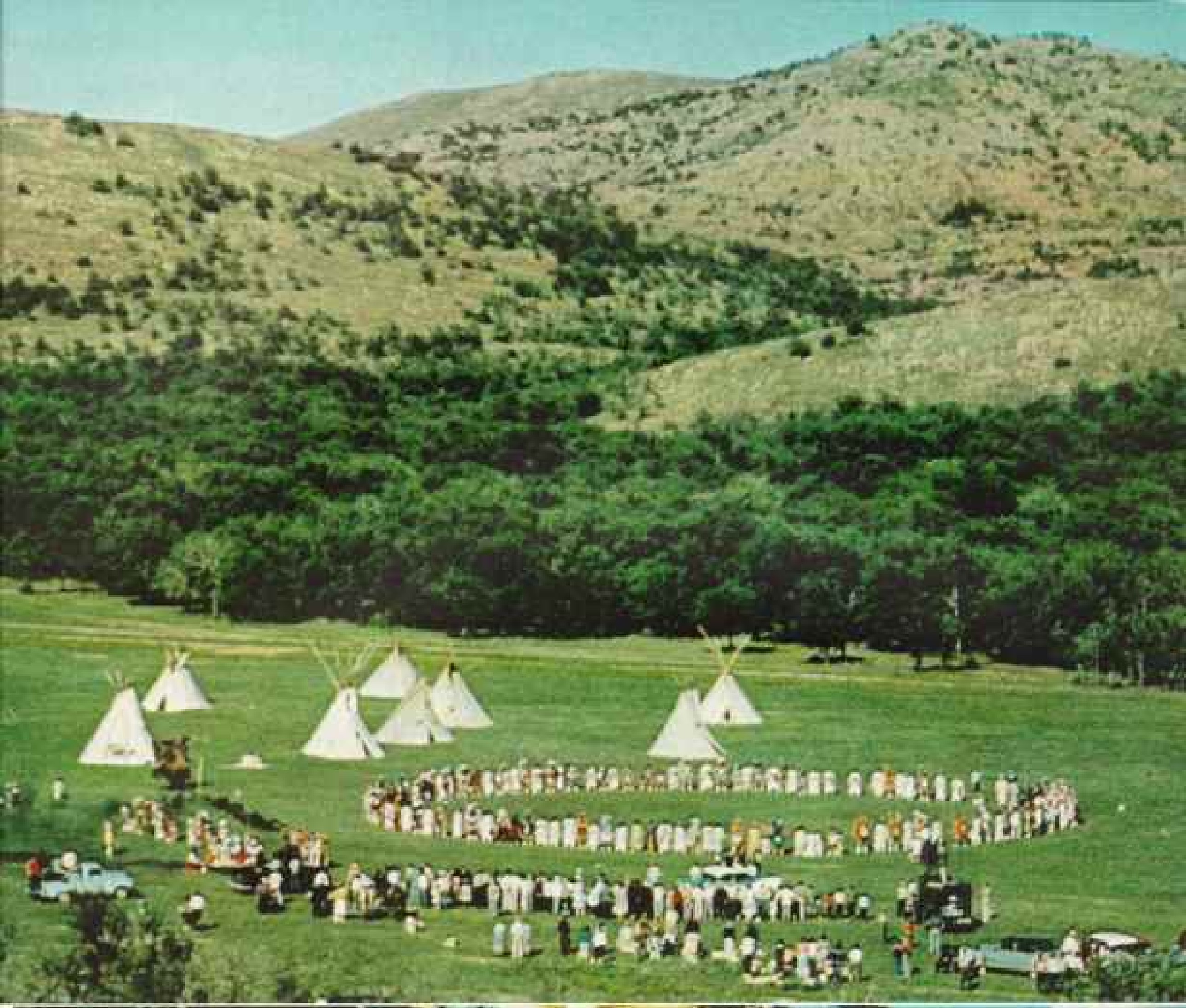
Using the Wichita Mountains for a background, Kiowa, Apache, and Comanche erected their lodges to help Mike Todd make scenes for the movie "Around the World in Eighty Days." Here his camera truck (right) films a circle dance.

←Yellow Wolf, a venerable Comanche chief, wears authentic garb.

The chief holds a peyote fan, an object used in a popular religion, partly Christian and partly aboriginal.

→Young Cheyenne girls wear "fancy-dancer" costumes that draw on the cultures of many tribes, a modern trend called pan-Indianism.

Indian dances are now social occasions. Members of various tribes join in the dances and invite their white friends. Oklahoma's biggest Indian powwow is held each year at Anadarko.



Red Man's Baby Gets a Kiss White Man's Style

Some 56,000 Indians, a seventh of all those in the United States, live in Oklahoma. The State's very name means Red Men, from the Choctaw.

During World War I Choctaw soldiers baffled German intelligence by setting up a communications system in their own language.

Except on ceremonial occasions, Oklahoma Indians wear white man's clothes, and their children go to public schools.

Attending the powwow in Craterville Park, Mrs. Mary Joe Secondine, a Comanche, dressed herself and family in heirloom buckskins, which she rubbed white with clay. Here her 3-month-old baby rides an unaccustomed cradleboard. Jerry Lynn Toyebo steals a kiss.

↓ Young Braves Wear Fine Feathers

Frank Brown, an Oto from Red Rock, entertains his grandsons with Indian tales from yesteryear. He says his bear-claw necklace came from his great-great-grandfather.

Kiowa, Comanche, and other Indians once held intertribal races and ball games at the foot of the Wichitas. Proud of their horses, they placed bets as braves raced ponies across prairies and hills.

The sun had warmed Comanche Lake. Thin November ice began to melt around the edges. I walked to the west end and quietly set up my telephoto equipment under dead trees along the lake shore. Gay streaks of red, black, and white shot between the silvery trunks. The redheaded woodpeckers were busy storing their winter acorn supply.

Woodpecker Uses Bill for Ice Pick

The redheads make good use of their bills. I watched a young one enlarging its winter hole in a gnarled dead trunk. Puff after puff of sawdust came out of the hole and floated away in the breeze. Then I saw the bird stick its head from the hole and flick its bill, and more sawdust formed a tiny cloud. I wondered how many billfuls of sawdust must be removed to build a woodpecker home.

Then I spotted an adult who flitted down to a log that dipped into the ice near the lake shore. Tap, tap, tap. The bill struck rapidly at the ice. With this efficient ice pick the woodpecker chipped loose its morning drink. Ice slivers melted in its mouth when its head tilted upward. The drink took perhaps five minutes instead of the customary few moments. To verify what I had seen, I walked to the spot after the woodpecker had gone back to storing acorns. I found the ice pitted and shiny splinters lying about.

Wintering eagles arrived on schedule late in November. I reached the blind one cold morning while bald and golden eagles soared over the granite crests hunting breakfast. Waiting for one to land close enough to photograph, I spotted other animals up and about.

An elk family of cow, bull, and calf plunged down to the lake with great commotion. A turtle stuck its dark head above the blue ripples for a moment to breathe, then sank noiselessly back to its muddy winter home. A few minutes later a fine white-tailed buck almost walked into my blind (page 669).

Face to Face with a Bald Eagle

Toward noon, activity slackened. Still sighting no eagles, I picked up a magazine and read. My inattention proved costly. When I looked out after half an hour of reading, the movement was too abrupt. A bald eagle had lighted on a dead snag across the cove, and now it rose, swooping by the blind.

It turned its proud white head so that I caught the glint of sharp eyes peering directly at me. Apparently it did not like what it saw. It sailed unhesitatingly out of sight behind Geronimo Ridge.

Disappointed, I began to pack my gear. Then, across the cove, I noticed a young bald eagle that had stolen in to perch. Its plumage was dingy and dark; three or four years pass before these birds begin to acquire their handsome adult feathers.

Though the eagle's back was toward me, I was under constant surveillance, for the bird seemed to turn its head 180° to stare into the blind. It sat still for some time. I hoped it would sweep down on a raft of ducks, as I had seen eagles do from a distance. We were playing a game of patience, we two.

Then the scraggly youngster screamed once and took flight. Ducks quacked hysterically and scurried over the surface toward the center of the lake, but the eagle showed no interest in them.

Instead it dropped onto a stump that jutted only a foot above the water, then plopped into the lake among the grasses. It bathed in the water as if unmindful of the cold. Once in a while it flapped its wings in this giant birdbath.

Blind Blocks Game Traffic

While intent on the strange spectacle, I heard the crack of twigs behind the blind. Pulling back the flap, I was partially blinded by the afternoon sun, but I could make out massive antlers among the trees. I reached down for my spare camera, but again my motion was too quick; the creature veered off. I could see it was another magnificent buck. I realized that my blind must be directly across an animal trail leading to the water.

I turned back to the lake. The eagle was still at its bath. In 15 minutes it rose in a sheet of spray and flew back onto the stump, then to a near-by tree.

A dark form glided in to land on top of an adjacent tree. Through my lens I could see glints of gold scattered through the head and feather pants on the legs. A golden eagle had returned from the hunt.

I finally folded my blind and left Comanche Lake with light heart and uplifted spirit. The Oklahoma parting is: "Come back and see us soon!" That I will, perchance in springtime, when Indian blanket flowers brighten the granite, the thud of battling buffalo bulls sounds among the hills, and the wild turkeys dance their courtship fantasies.

Dawn Creeps Over the Gulf of Mexico. *My Lettie*'s Crew Hangs Up the Shrimp Net

The trawler, operating out of Key West, Florida, has put in a hard night netting pink crustaceans near the Dry Tortugas. Red floats buoy the upper lip, and chains hold down the lower lip as the net plows along the bottom.

Shrimpers Strike Gold in the Gulf

Trawlers Drag Rich New Grounds in the Gulf of Mexico at Night, Making the Humble Shrimp America's King of Sea Food

By Clarence P. Idyll

Professor of Marine Biology, The Marine Laboratory, University of Miami

With Illustrations by National Geographic Photographer Robert F. Sisson

"LET'S pick her up!" shouted Capt. Hammy Lowe. Sudden action erupted aboard the spanking new shrimper *My Lettie* at his command.

It was 3 a.m., and the sea breeze blew chill. Since midnight the Key West trawler had been dragging her big net over the coral-mud bottom of the Gulf of Mexico, northwest of the Dry Tortugas. It was time to haul.

My Lettie slowed, her wake dying into the black night. Her winch rattled, and twin steel cables towing the 100-foot trawl through the whitish ooze 18 fathoms down began winding around the drums.

Within minutes the two steel-rimmed otter boards, like twin doors 10 feet high, broke the surface astern, and the dim triangular shadow of the net appeared. When pulled along below water, the boards veer apart like kites; thus they hold the mouth of the net wide open. But now, hoisted from the water, they clapped together loudly as if in self-congratulatory applause (page 705). The net bulged. It would be a good haul.

Quickly the net swung aboard, lifted by a creaking boom. The bottom of the cone-shaped bag jerked open with a yank on the trip line, and a shimmering stream of sea life poured onto the open afterdeck.

Nets Scoop New Riches from the Sea

Under powerful floodlights glaring from wheelhouse and boom spilled multihued fish, shells, crabs—and perhaps 300 pounds of wriggling coral-pink shrimp.

Here lay true treasure, Florida's new "pink gold," lifted by night from waters buccaneers once sailed. This is one of the fishing world's most colorful sights. In such netloads, scooped from roiled Gulf shrimp grounds, greater riches are being brought up than all the gold ever sunk off the Spanish Main.

Within the last three years, shrimp have passed salmon and tuna to become the leading United States fishery in value at the dock. Their annual catch now brings shrimpers some $65,000,000, compared with tuna fishermen's income of $48,000,000.

National Geographic photographer Bob Sisson sailed aboard *My Lettie* this trip out and had rigged the boat with big photoflash bulbs. Each time his camera clicked, the shrimper lit up in a startling blaze of light.

The radiotelephone crackled with queries from alarmed shrimpers working the surrounding pitch-black waters: "Anyone know where that lightning's coming from?" . . . "*My Lettie* from *Cracker Boy* . . . You afire, Hammy?"

Captain Lowe reassured the fleet: "We're just having our pictures taken."

Crewmen Ken Crompton and Joe Baker wasted no time in swinging the trawl back overboard. Now they sat spraddle-legged on deck, sorting and heading shrimp with practiced speed (page 700).

Shrimp Carries Heart in "Head"

Actually the "head" of a shrimp is much more than a head. It houses the heart, the stomach—in fact, the greater part of the shrimp's internal organs.

By snapping off this upper section, a fisherman effectively cleans a shrimp, leaving only the meaty "tail." This contains part of the intestine, some of the reproductive organs in the female, plus nerves and blood vessels. The rest is solid flesh, protected by the jointed shell.

Their heading chore done in surprisingly short order, the fishermen flushed the basketloads with a hose, then lowered them into the hold and packed the shrimp tails into bins amid crushed ice. The "trash" left on deck—starfish and scuttling crabs, squids and baby octopuses—went overboard in shovelfuls.

I have often tested the edibility of creatures amid such trash: for instance, the "rock" shrimp with its hard shell and scant but tender meat; or the curious squilla that fishermen call "sea louse" or "thumb splitter," because of its jagged claws and projections. I find that many of these strange shellfish

All Hands Aboard Clean the Catch

"White" shrimp, the kind commonly sold in the markets until a few years ago, hide in the mud by night and feed by day. But "brown" and "pink" shrimp—90 percent of Florida's present catch—are nocturnal, and trawling crews now must work at night.

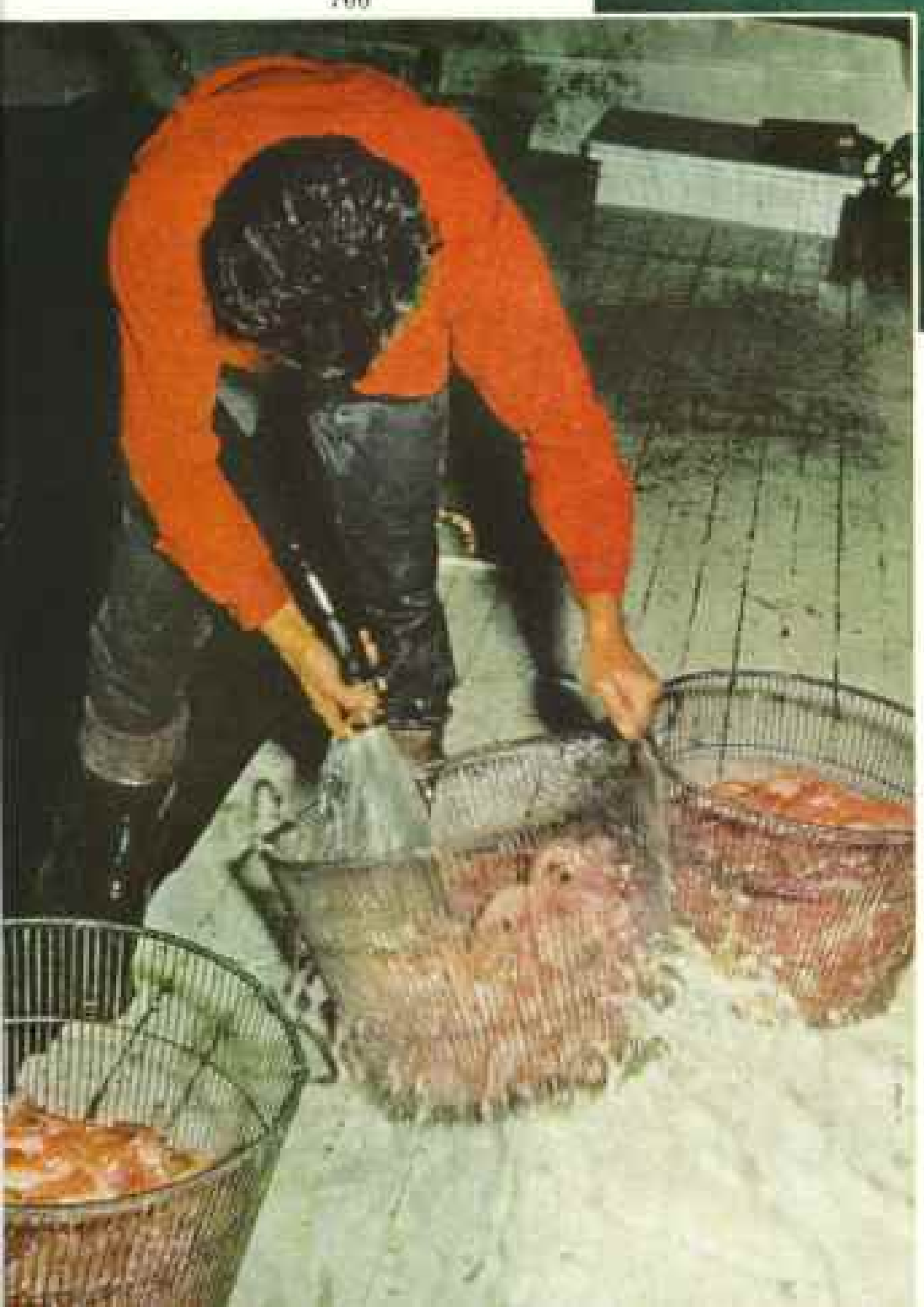
Here, under floodlights, *My Lettie*'s captain, cook, and a crewman process a fresh haul with practiced swiftness. They pick up a shrimp in each hand; thumbs flick against forefingers, and the beheaded shrimp, called "tails," fly into wire baskets.

A good header can fill his 60-pound basket in about half an hour.

Forty percent of a shrimp is lost in the "head," which includes heart, stomach, and most other internal organs.

Removing heads guards against early spoilage.

Small "try" net at extreme right is used to test likely areas. The regular net is trawling astern.



← Sea Water Sloshes Through Baskets of Pink Gold

With new trawling methods and rich new grounds, shrimping has become king of United States fisheries. The annual catch, worth about $65,000,000, now far surpasses tuna, salmon, or oysters in value to the fishermen.

The treasure that Gulf shrimpers bring up each year exceeds all the gold and silver ever raised from Spanish ships in these waters.

Headed and washed, these shrimp will be iced down in bins (opposite).

Shrimp Cocktails by the Thousands → Spill from a Trawler's Hold

After five or six days of trawling, vessels working off the Dry Tortugas speed back to Key West with their perishable cargoes.

Here *My Lettie* unloads at the dock. Shrimp and ice, packed in alternate layers, are scooped out, hauled topside, and dumped into tanks of salt water for another washing. Sorted, graded, and iced down again in wooden boxes, the tails head for market by refrigerated truck.

are delicious. But though the trash may exceed headed shrimp from a catch six times over, it is not economical to save it.

Dawn had begun to dissolve the sky's black curtain by the time the next haul was made. *My Lettie* turned for Key West and home. After six nights on the Tortugas grounds, it was time to take in the catch and to re-ice, refuel, and provision for the next trip.

At dockside, big baskets on the end of a boom swung the mixed shrimp and crushed ice from the hold, dumping the cargo into tanks of salt water. Then the glistening pink tails went into new wooden boxes, 104 pounds to a box, mixed with clean ice. Soon refrigerated trucks roared from the waterfront with the day's landings, bound for Miami. Some headed on northward to fish markets in Washington, D. C., Baltimore, Philadelphia, or New York.

On her next voyage *My Lettie* would be going farther afield, across the wide Gulf of Mexico to shrimping grounds in the Bay of Campeche off the Yucatan Peninsula. There she would stay five or six weeks, trawling with boats from Texas, Louisiana, and north Florida ports.

The powerful, wide-beamed trawlers that plow the hurricane-troubled Gulf of Mexico today work new shrimp grounds, in ways relatively new to the shrimpers themselves. Their success is a story of a dramatic gamble that paid off.

The now-famous Dry Tortugas shrimp beds have been known only since late 1949. They were found by two enterprising shrimpers from St. Augustine, the brothers John and Felix Salvador. Before that, our Marine Laboratory at the University of Miami had published suggestions that sizable shrimp populations might exist along Florida's west coast.

Mystery of the Missing Shrimp

The Salvadors had noticed some puzzling facts. Shrimp were caught regularly in bait nets strung from bridges between the Florida Keys, and big shrimp often turned up in the stomachs of fish caught out of Key West. But despite repeated explorations, no one could find where these shrimp came from.

A Key West sea food firm, Thompson Enterprises, Inc., lent the Salvadors a decrepit old fishing boat, and they rigged her with a small try-net trawl. With another St. Augustine shrimper, E. L. "Bluff" Peterson, Felix Salvador dragged the bottom between Key West and the Dry Tortugas for two straight days. No luck.

"We were heading back for Key West," Felix told me later. "But as one last chance, we let the trawl down one more time, even though the sun had set. When we hauled it in, we found it bulging with beautiful big pink shrimp. We'd found the secret: those shrimp came out of the mud only at night!"

The discoverers hoped to keep their find to themselves. But when they brought boats of their fleet to Key West, the word flashed through shrimp ports from Brownsville, Texas, to Beaufort, North Carolina.

"Pink Gold" Fever Seizes Key West

Key West in mid-February, 1950, had much the same atmosphere as must have hung over the gold-rush camps of California and the Yukon. Within a few weeks, some 400 vessels lit up the new Tortugas beds at night. Key West bulged with excited men; the docks could barely handle the traffic of boats, ice, and incoming shrimp. A rich golden stream of shrimp began to flow north over the bridges and causeways of the Overseas Highway.

The Key West shrimp were of a variety little known to commerce, reddish in hue with a darker spot on their tails, and with grooves running lengthwise atop their heads. They were not like the shrimp taken for years, the "common" or "white" shrimp, *Penaeus setiferus*. These were of another species, known to us in the Marine Laboratory as *Penaeus duorarum*.

Their discovery opened the latest chapter in the colorful history of American shrimping, which has gone through more than one revolution in the last half-century.

Before World War I, shrimpers used simple beach seines, walls of netting that were dragged over the mud in shallow bays. Some were only a few feet long and could be pulled by two men. Some, 2,000 feet long or more, had to be handled by as many as 20. Such a net herded shrimp into a pocket, to be scooped up and thrown into a skiff.

Between 1912 and 1915, following ocean-fishing tests by Federal biologists, a few Portuguese and Italian fishermen at Fernandina, Florida, tried something new: the otter-board trawl, pulled along the bottom. The shrimp industry suddenly came of age.

In deeper waters farther from shore, catches

Anything Besides Shrimp Is "Trash" to a Shrimper

Marine life of every variety comes up in a shrimper's net, usually in much larger volume than the shrimp. Here a crewman picks up an orange filefish. Crabs, starfish, squids, octopuses, sponges, and small fish add to the trash. All are shoveled overboard.

Shrimpers dread sharks and sawfish, which destroy nets, and red scorpion fish, whose needle spines inflict painful wounds.

Injections of Harmless Dye Mark a Shrimp for Identification

Cajun shrimpers in Louisiana call the shrimp *la chevrette*, or little goat, because its backward leaps with sudden flicks of its tail suggest the gambolings of a kid. In forward flight this small cousin of the lobster is a surprisingly fast, smooth swimmer. Tagged specimens have covered 450 miles.

Scientists tag shrimp with metal or plastic disks to expand their slim knowledge about migration habits, growth rates, and life span. But tagging is difficult, and current experiments use organic dyes.

The United States Fish and Wildlife Service has discovered that dye fed to shrimp in fish scraps shows up in the gills. Color can also be injected hypodermically.

Here a scientist at the Marine Laboratory of the University of Miami injects methylene blue into a pink grooved shrimp, *Penaeus duorarum*.

increased markedly, and the size of shrimp taken became larger. Most important, the big bottom net pulled by a fishing boat could be handled by two or three men; shrimping suddenly became highly profitable. Against 9,500,000 pounds of shrimp landed in the United States in 1889, by 1930 the annual catch had shot up to 88,000,000 pounds—and the boom was only beginning.

The first little inshore trawlers of about 35 feet in length, having swept aside the old beach seines, gave way in turn to bigger boats, 50 to 60 feet long. Shrimping moved from the coastal bays and shoals out into the open Atlantic and Gulf.

A Prediction Proves Wrong

In 1938 trawlers west of the mouth of the Mississippi River found the home of the "jumbos," white shrimp with tails 6 to 7 inches long. Caught in huge numbers, they boosted Louisiana's lead as the monarch State of the shrimp world.*

But then came a lull. Despite high shrimp prices in World War II, no more new shrimp grounds were located, and it looked as if shrimping had reached its peak. A Federal Government report gloomily announced in 1945 that the chances for ever finding new shrimp beds were extremely slim. This bit of advice proved thoroughly wrong.

In 1940 the shrimp boat *Neptune* had returned to Port Isabel, Texas, with a strange catch of brownish shrimp. They had been hard to sell because the buyers, used to white shrimp, considered any other color a hint of spoilage. After the war, other boats headed south to fish off the shores of southern Texas and adjacent Mexico. They landed more and more "brownies," or "Brazilians" (of the grooved-headed species *Penaeus aztecus*). And thanks to good salesmanship and the growth of quick freezing, "Golden Brazilian" shrimp began to appear in grocery stores.

Then with dramatic suddenness in 1950 came the opening of the Dry Tortugas beds, teeming with still another variety, the big spotted pink shrimp.

I went to Key West a few weeks after the first strike to write a report for the Florida State Board of Conservation. Boats were pouring in every day, and I talked with the excited fishermen wherever I could.

One salty veteran of 27 years of shrimping paused long enough to say to me, "Tarnation, I never did believe it when them guys in Washington claimed shrimping was a goner.

"Just goes to show you, young fellow," he ended. "Even a college education won't keep you from making mistakes."

"How right you are," I replied politely. He bellowed at his crewman, and his boat swung from the dock, bound for Tortugas.

Skeletons Are Left Behind

Biologically, shrimp are among the most fascinating of nature's creatures. Nearly 2,000 species exist, each somewhat different in appearance and life history. But all belong to the same class, the Crustacea, together with crabs, lobsters, and crayfish.

Like insects and spiders, the crustaceans wear their skeletons outside their bodies rather than inside. In place of a complex of bones, the shrimp's skeleton consists of a suit of armor, at once hard and flexible. This armor cannot grow. The young shrimp must climb out of its shell from time to time, expand, and grow another skeleton.

A spawning salt-water shrimp releases half a million to a million eggs into the sea, fertilized from a spermatophore previously attached to her body by a male. The baby shrimp drift with the currents. If fate is kind, they move shoreward from the deep-water spawning areas. If voracious arrow-worms, young fish, larval crabs, or other predators do not gulp them down, they settle to the mud of coastal estuaries and marshes.

A young shrimp passes through 10 larval stages in all, some so completely unlike the mature animals that only an experienced biologist is likely to recognize them. At one point

* See "The Delectable Shrimp," by Harlan Major, National Geographic Magazine, October, 1944.

From Key West to Yucatan, the Gulf Is a Mine of Living Gold

Two "Barn Doors" Are the Net's Steel-bound Jaws. They Hold the Trawl Open

Shrimpers off Texas and Mexico scrape the bottom with nets more than 100 feet wide. Dragging immense swaths for hours at a time, they scoop up virtually everything in their paths. Smaller, more selective nets used in Florida waters bring up a higher proportion of shrimp to trash. A trawl owes its efficiency largely to its doors, or otter boards. Rigged with chains at the mouth of the net, they move through the sea like a pair of opposing kites. Water pressure forces them apart, spreading the net wide.

they remind me of water fleas. It's hard for a layman to tell them from baby sailfish or mullet.*

Eventually, those shrimp that survive move seaward again, migrating back to the spawning grounds. It appears that most adult shrimp spawn only once and that their life span is only one year.

What science knows of shrimp comes chiefly from studies of white shrimp, which dominated the industry until 1950. These burrow into the bottom mud by night and come out by day. But the two "new" species of grooved shrimp do just the reverse. Exactly why, we don't yet know.

Shrimp not only delight the gourmet's taste; they are one of the most nutritive foods known to man. The edible part of shrimp is largely protein; fat content is remarkably low, less than one-half percent by weight. Like most sea food, they contain a lot of iodine, plus vital minerals such as calcium, magnesium, phosphorus, and iron.

For best flavor and enjoyment, shrimp must be fresh, or quick-frozen while still fresh from the sea. With trawlers staying out much longer, the problem of keeping shrimp fresh aboard the shrimp boats themselves has grown acute.

One day at the Marine Laboratory my phone rang, and a friend said, "I've just bought the *Sachem*, an old shark hunter. I'm converting her to a freezer boat to fish Campeche, and I want to avoid carrying ice to chill the shrimp until I can get them into the freezer. Will they stay fresh in chilled water?"

"I don't know," I said, "but we'll try to find out."

A series of experiments proved that shrimp could be kept fresh as long in chilled sea

* See, in the National Geographic Magazine: "Strange Babies of the Sea," by Hilary B. Moore, July, 1952, and "Solving Life Secrets of the Sailfish," by Gilbert Voss, June, 1956.

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Storm at Sea Ties Up the Shrimp Fleet in Key West. Nets Dry Like Laundry

Broad-beamed and seaworthy, these diesel-powered trawlers can stay out six weeks at a stretch.

water as in crushed ice. Some Gulf shrimpers now are using this new method successfully.

At the Marine Laboratory we have also sought to control the so-called "black spot" that sometimes blotches the shells of shrimp. The discoloration is harmless to the meat inside, but it downgrades a catch in eye appeal and hence salability. One new way, now coming into use in the shrimp fleet, is to dip freshly headed shrimp into a weak solution of sodium bisulfite, widely used to preserve dried fruits, potatoes, and other foods.

The ultimate proof of the shrimp lies in the eating, of course. To test freshness, the Marine Laboratory forms "taste panels," calling on staff members with proved ability to detect slight differences in shrimp flavor.

Raw shrimp from each test sample is first sniffed, and scored from "5" (perfectly fresh) down to "1" (unfit to eat).

The tester then turns to the cooked samples, each boiled exactly four minutes with a measured amount of salt. He will chew thoughtfully for a time, perhaps murmur a noncommittal "Hm-m," then put down his score silently. He sips a little tepid water to recondition his taste buds and moves on to the next sample.

Such constant and close association with one particular food, some of which is decidedly not fresh, is not the only hazard of our work. All of us make regular voyages with the shrimp boats and have suffered misadventures. Biologist Bob Ellis, for one, was standing with one foot inside a coil of rope when a trawl was dropped overboard. Only a fast jump saved him from following the net to the bottom of the Gulf.

Shrimpers themselves face many hazards. Sudden violent storms sweep the Gulf of Mexico, sometimes reaching hurricane velocity. And ever since United States boats began trawling off the Mexican coast in the late 1940's, the "shrimp war" has kept the fleet on edge.

Mexico claims sovereignty stretching nine nautical miles (about ten and a half land miles) from shore, while the United States recognizes territorial limits of no more than three sea miles. For ten years, "Yanqui" shrimpers have had to face Mexican seizure of their boats, fines, and an occasional shot across the bow.

Another problem is navigation. Older fishermen coming south to the new deepwater shrimping grounds have been jolted out of their comfortable ways. To get out of sight of shore was a frightening experience, and trawling at night made it worse.

Giant Deepwater Shrimp Discovered

In the early days many boats could get to the Tortugas grounds only by following somebody else who knew the way. One February day in 1950 six trawlers followed another shrimper over a shoal near the Marquesas Keys east of the Dry Tortugas, and all seven hung up their nets on the bottom.

Electronic depth finders and automatic pilots are coming into the shrimp fleet. But only experience—and luck—can fend off disaster when a shark, sawfish, or big sting ray tangles with the net. A fighting-mad sawfish with its vicious, sharp-toothed blade can tear a $300 trawl to uselessness in minutes.

Changes in the shrimpers' world are not over. Only recently, promising new types of shrimp have been found in very deep waters. Wine-red giants, tasting much like lobster, have come up in test trawls 1,000 to 5,000 feet down. Some of them are nearly a foot long and weigh a third of a pound each.

So long as otter boards and questing nets stir the bottom in new regions, the story of shrimping will change. How much more of this rich sea treasure exists under the keels of fishing boats, no one really knows. The searching out and tapping of this living bounty holds a promise far greater than finding all the pirate treasures ever lost in history and legend.

We're Coming Over on the *Mayflower*

In a Dramatic Good-will Gesture, Britishers Built a New Pilgrim Ship to Sail Across the Sea as a Gift to All Americans

By Captain Alan Villiers

"RIGHT within a sixteenth of an inch, by gum! Bill Baker knows his stuff." Shipbuilder Stuart Upham slapped the wooden rail. "There's a mighty difference between planning a model and building a galleon that's going to sail the Atlantic, that's got to steer and be stable and handle well, and that men can live in. It's been 300 years since ships like this were laid down and fitted out along this coast."

We stood on the deck of a reproduction of the famous *Mayflower*, which I am to sail across the North Atlantic from Plymouth, England, to Plymouth, Massachusetts, this spring. What had pleased Mr. Upham was the way the foremast slipped precisely into the place planned for it—absolutely right.

Across the steep-sided, pretty cove of Brixham harbor, the cliffs and the trees dripped with rain. A trio of modern diesel trawlers was putting out fish at the wharf near by. Lines of gray slate-roofed houses clung to the wet cliffsides. Smoke of soft-coal fires rose into the gray air. A big tramp, westbound

in ballast, came slowly in from sea, to pick herself an anchorage in the shelter of Tor Bay.

Stuart Upham grinned. "The ship they couldn't build," he quoted, looking with his keen blue eyes to the berth where the new *Mayflower* daily grew more shipshape and wonderful.

Mayflower Sails Out of History Books

I grinned too. I knew what he meant. That was what the armchair critics had said. But I remembered another thing they had said: she was a ship we couldn't sail. Mr. Upham had confounded his critics. My test was still to come. If I did half as well as Stuart Upham, we'd be all right.

We walked around the ship together. Awnings covered the high poop and the low prow, where men were working with

United Press 709

← *Mayflower II*, 20th-century Pilgrim Ship, Tastes Her First Salt Water

Britons cheer as *Mayflower II*, mastless and without uppermost planking, slides down the ways at the Upham shipyard in Brixham, England. Towed into near-by dry dock, she was finished with meticulous attention to detail, even down to proper shape of inkwells in the master's cabin.

Above: Reis Leming, former United States airman, wears the George Medal, won for saving 27 English lives during coastal floods. For this heroism he was given the honor of christening *Mayflower II*. Copying an Elizabethan rite, he toasted the vessel from a silver cup, then threw it into the water.

The Author

For 40 adventurous years Alan Villiers, master of the new *Mayflower*, has followed the way of the sea in sailing ships.

A generation of National Geographic members knows him as one of the finest living writers of the sea. He has written ten previous articles for the National Geographic Magazine, from "Rounding the Horn in a Windjammer," February, 1931, to "Under Canvas in the Atomic Age," July, 1955.

Born in Melbourne, Australia, in 1903, he went to sea as an apprentice at 15, serving in British and Scandinavian windjammers, whaling ships, and steamers. He rounded Cape Horn in grain-ship races from Australia to England in the early 1930's. Later he bought the square-rigged *Joseph Conrad*, which he took around the world as a school ship. He spun the yarn of this voyage, too, for the National Geographic in February, 1937.

During World War II, as a commander in the Royal Navy, he took part in the invasions of Sicily, Italy, and Normandy. Since then he has sailed aboard Arab dhows in the Persian Gulf and Red Sea and voyaged with Portugal's Grand Banks fishing fleet. Author of many books, he is also a noted photographer and lecturer.

In a subsequent issue of The Magazine, Captain Villiers will present his personal narrative and exclusive color photographs of *Mayflower II's* voyage.

The Editor

much the same tools the original shipwrights must have used when they built the first *Mayflower*. The very accents of the shipwrights seemed to come from history, too, for these were Devon men, and things change slowly in that part of England.

"Give her another bang now, Harry. Handsomely! Handsome does it!" An older man in a cloth cap was speaking to a younger wielding a sledge hammer, carefully fitting the last awkwardly shaped timber to the handsome beak—a holdover from the days when ships had rams built out there to damage each other in sea fights.

Our beak in the *Mayflower* provides a working platform to handle the spritsail and the fore bowlines. It will serve the purposes, also, of general wash place and men's room, for the ship has no modern refinements in these departments. This beak is what sailors call the "head," and plumbing is absent.

Near by came the ring of hammer on anvil. We looked in at the shipyard's foundry to watch the blacksmith turning out the stout ironwork which is to support the rigging from the oaken sides, and ironwork for the rudder—vital, all of it, and being turned out by hand, just as it was centuries ago, from the very best of hand-wrought iron.

Hempen Ropes for Wooden Masts

Across the way was the rigger's loft, where lengths of the most enormous hempen ropes I had ever seen lay upon the deck like sleek and docile boa constrictors, each 30 feet long. Enormous pear-shaped slabs of heavy wood with eyes hand-cut into them hung on a bulkhead (page 719).

This was the standing rigging, the heavy cordage which will support the three wooden masts on the Atlantic voyage and, we hope, for a couple of centuries afterwards. I'd

Spidery Rigging Fits the Most Faithful Facsimile of the *Mayflower* Ever Made

So unimportant in her day was the *Mayflower*, a smelly, leaky tramp merchantman, that no one left records of her actual appearance. Naval architect William A. Baker of Hingham, Massachusetts, reconstructed her plans through years of patient research in the United States and Europe, learning minute details about ships of Elizabethan times. "Now," he says, "I'll listen to serious criticism only from a Pilgrim Father!" Here Mr. Baker looks over a three-foot scale model built from his master drawings. No fixed stays support the canted bowsprit; it rests in a deep step below decks.

Robert F. Sisson, National Geographic Photographer

A Forest of Adze-marked Timbers Dwarfs Shipwrights Fitting the Inner Planking

The best of timber went into *Mayflower:* Douglas fir for decks and spars, tough Devon oak for everything else. Master craftsmen of the Upham yard manhandled pieces with infinite care, using old-time methods. Construction took nearly two years. Here a temporary batten, bark-covered, holds double futtocks, or frames.

never seen such rope, for wire had taken the place of hemp for rigging the best part of a hundred years before I went to sea.

"Another item everybody said we could never get," said Stuart Upham. "You remember the chorus: you can't get the wood, you can't get the shipwrights, you can't get the yard, you can't get the rope . . ."

"You can't get the captain, and you can't get the mates, and you can't get the sailors, either," I went on.

Yes, we'd heard all that—heard it ever since the keel of the new *Mayflower* was first put down in Upham's yard on Independence Day two years ago. That was about as far as she'd get, said the pessimists, and there were plenty of them.

But the brave little galleon, a carefully reproduced merchant ship of the sort that carried the Pilgrim Fathers to America, rose steadily in spite of them. Keel laid July 4, 1955; ship launched September 22, 1956; ship to be rigged and manned and ready for sailing by April, 1957. It has gone according to plan.

The idea of building another *Mayflower* and sailing her across the Atlantic to present as a gift to the people of America was born in the war. It was a plan conceived by Warwick Charlton, English expert in public relations and former fighting man with the famed Eighth Army.

Plan Born of Wartime Comradeship

"I hit upon this idea while I was fighting alongside American boys in North Africa, Italy, and France," Mr. Charlton told me. "I wasn't the only one who was grateful for our common heritage or remarked upon the ease with which we got along, Briton and American, and that we had so much in common—reactions, ideas, fighting spirit.

"I remembered hearing a lot about exchange scholarships. All very well in their

The Pilgrim Galleon Scuds Before a Gale

Wind whips the tops off the waves as the *Mayflower*, a bone in her teeth, slides into a trough. Foresail and mainsail, which can be reefed only by taking off the bonnets at their feet, swell in the blow. Anxious crewmen have furled fore and main topsails and lateen-rigged mizzen (aftermost sail). Now they muzzle the spritsail in the ship's beak. Another crewman mans the pump. The helmsman, only his body visible (in cutaway section), cannot see ahead. He steers by compass, the feel of the ship, and orders shouted from above.

Miserable, seasick passengers, part of the 104 Pilgrims packed in the tiny ship, sprawl on decks or hang over the side. *Mayflower* flies the Cross of St. George and the Union Jack as it was before Ireland became part of the Empire. Rigging details, strange to modern sailors, are as authentic as careful research can make them

HERVEY GARRETT SMITH

way, but what really had ever been done to, well, sort of point the lesson of our wonderful common heritage? I figured it was precious little. France had given the Statue of Liberty. England, from whom so much had come in the past, sent a few exchange professors.

"I wondered what could be done about it. Then I hit upon an idea that was really worth while. The *Mayflower*, of course! I knew nothing whatever about ships, but I did know the Pilgrims' story. And what an inspiration that is! I'll build a new *Mayflower*, I thought. Not a model—the actual ship. I struck a wall of negatives for ten years, but I stuck to my idea."

Yes, Warwick Charlton stuck to his idea. At first there were almost insuperable difficulties. Little was known of the original *Mayflower*, which was just an old tramp square-rigger cheaply available for charter at the time the Pilgrims wanted to cross.

No one paid attention to her. There were 19 other vessels called *Mayflower* in English records of the time (a fact which was no help to research students afterward). The few contemporary journals of the historic crossing scarcely mention the ship's name.

She was overcrowded, smelly, leaky, old, and, if the truth be told, not far from rotten, at least in parts, for one of her main beams broke in a seaway on the way across and had to be propped up by a "great iron scrue" the Pilgrims carried as cargo. It is a ripe old ship that splits her main beam at sea. Believe me, that's one thing the facsimile is *not* going to repeat.

Dimensions, rig, precise hull form, the course followed, even details of the crew—all these were lacking. The famous *Mayflower* was built in the days when shipwrights produced a ship to traditional design handed down from father to son, according to the size requested. There were no naval architects.

All we knew—all any students could find out—was the rough capacity of the ship (180 "tuns"; but what kind of tons?), the fact that she had topsls (because a young fellow went overboard and saved himself by clinging to the topsl halyards, which chanced to be

Captain Villiers Tries Out a Pear-wood Cross-staff, Forerunner of the Sextant

Jean Grimmett plots the ship's course and progress on a traverse board as Villiers shoots the sun. Copies of 17th-century navigators' equipment are being used on the voyage, but modern instruments check the results.

B. Anthony Stewart, National Geographic Photographer

trailing in the water), and that she had probably been in the wine trade with France. Her captain's name was Christopher Jones, and she may have been old enough to have fought against the Spanish Armada.

We can deduce, too, that she must have been a smart enough sailer, to make the fall westward crossing of the Atlantic at all. As it was, it took her 67 days.

She must have been a roomy, chunky little tub to manage to stow all 102 Pilgrims who sailed with her, their shallop and gear, and a crew variously reckoned from 20 to 30 men. They must have been packed in like Bedouin migrants in an Arab dhow.*

Mr. Charlton had some breaks. A lot of research had gone into the problem of just what sort of little ship the original *Mayflower* probably had been. In England, Dr. R. C. Anderson, president of the Society for Nautical Research, had found data enough to establish just what a ship of her size, rig, and period was like and, with a naval architect, had produced plans and a beautiful model of the ship, which now stands in Pilgrim Hall at Plymouth, Massachusetts.

In New England, naval architect William A. Baker of Hingham, Massachusetts, had made old-ship design his hobby for years. In 1951 he was commissioned by Plimoth Plantation, Inc., to draw up plans for another *Mayflower*—not perhaps a precise *Mayflower*, but a ship as much like the original as she could possibly be made, 100 percent right in rig, in hull form, in lines, in manner of working and sailing, and everything else (page 710).

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A Fat File Holds Letters from Volunteer "Pilgrims"

The author and Warwick Charlton (center), who sparked the Mayflower Project, turned down scores of requests from would-be voyagers, many of them women. Captain Villiers picked the crew; it includes Sub-Lt. John Winslow (left), Royal Navy jet flyer and descendant of an eminent Pilgrim. The original *Mayflower*'s crew numbered an estimated 20 to 30.

Briton and American Join Skills

Mr. Baker's building plans were ready just about the time that Mr. Charlton's paper plans were coming to fruition. The Englishman heard of the American project, and the problem of just what to build, and (to some extent) how, was solved there and then. It is to Mr. Baker's plans that the new ship is built, and they have worked out wonderfully.

"If a couple of the original Pilgrim Fathers walked into this yard, I reckon they'd recognize the ship all right," said Mr. Charlton. "But they'd find her a good deal better than the one they sailed in."

They would. She's new, for one thing. And she's immensely strong. Mr. Upham scoured the woods of Devon for stout oaks to go into the new *Mayflower*, and he found them. Nothing but the best and biggest trees satisfied him (and he had to look for some by night, for fear of protests from tree lovers here and there).

Another thing in the new ship: she may have a bit more head room here and there. Head room for passengers is a modern luxury: the Pilgrim Fathers and their families had to bump their heads on the low 'tween-deck beams and get around the best way they could (pages 726-727).

* Births during the *Mayflower*'s voyage raised the total passenger list of Pilgrims to 104.

MAYFLOWER RETRACES HER HISTORIC

"Thou hast here (gentle reader) a true hydrographical description of so much of the world as hath beene hetherto discovered..." So reads a note on the Molineux-Wright map of 1600. National Geographic cartographers turned to the Atlantic portion of this historic chart to depict the Mayflower's route. Other quotations on the map are from the writings of Plymouth's second governor, William Bradford.

VOYAGE

After they had injoyed faire winds and weather for a season, they were incountered many times with cross winds and met with many feirce stormes . . .

. . . they shooke off this yoake of antichristian bondage and, as ye Lords free people, . . . joyned themselves . . . into a church estate . . .

. . . by a joynte consent they resolved to goe into ye Low Countries, where they heard was freedome of Religion for all men . . . . . after 11 or 12 years [in the Netherlands] . . . they began to incline to this conclusion, of removal to some other place . . . The place they had thoughts on was some of those vast & unpeopled countries of America . . .

As for accommodation, the original *Mayflower* was no passenger ship—and the new one won't be, either. The difference is that nowadays a benevolent government steps in and says just how humans may be transported at sea, whereas in 1620 it was nobody's business at all. Passengers then had to take ships as they found them.

Today we would have to provide lifesaving equipment, proper sleeping space, washrooms, running water, ventilation, a doctor, and all the rest of it, for 125 or 135 persons, were we to ship a full complement of modern Pilgrim Fathers. We cannot. There just isn't room. It is quite impossible aboard so small a ship to offer accommodation anything like the standard now required by law. As for lifeboats, she'd have to carry enough each side, on gravity davits, to get all the people away in case she had to be abandoned. Her lifeboats together would be bigger than she is!

For all these reasons, we'll have only 30 to 35 people aboard the new *Mayflower*.

To have a hope of complying with the law at all, both sides of the Atlantic, our ship has to be registered for the voyage as a yacht, otherwise she'd come under an impossible host of regulations. And, as a yacht, she cannot carry passengers at all—only the crewmen, and guests of the owner. She cannot carry cargo, either.

All the crewmen, from the master down, have to carry valid passports, stamped with a crewman's visa duly waited in line for at the United States Embassy or nearest consulate, with all hands photographed and fingerprinted.

On the paper side, at any rate, the new ship has to be up-to-date. Well, we may console ourselves with the reflection that, though the Pilgrim Fathers may not have had to get passports and visas, they took a pushing around from their own countrymen before they ever were allowed to sail. It was that pushing around which, indeed, had already driven them from their homeland to Holland, before they set their course westward to live out their lives as free men in a free, new, and wonderful land.

What those noble pioneers could face, it

718 B. A. Stewart

Riggers Set Up the Mizzen Shrouds; They Stay the Galleon's Third Mast

Elizabethan sailormen had no wire rigging or turnbuckles. To support their masts they used tarred hemp, pulling it taut with deadeye-and-lanyard combinations like the three shown here. Deadeyes survive today on older boats, such as Chesapeake Bay bugeyes. Chain at left is shipyard gear; *Mayflower* used hemp even for anchor cable.

is little enough to ask that we take in our stride, with all sorts of modern aids to help us.

The replica will sail just as the old ship did, with the same classic rig—foremast well forward, carrying foresail and tops'l; mainmast amidships also with two sails; and lateen-rigged mizzenmast stuck on the high aftercastle of a poop right aft. She'll carry an awkward sort of water sail, called a spritsail, on the steeved-up bowsprit that rises above the beak at the bows (pages 712-713).

She'll steer the same way as did her forebear—by hand with a whipstaff. Her gear and her anchor and her heavy halyards will be handled in the same way—with a period windlass forward and a period capstan on the main deck as the only aids, just like the ones the original ship once used.

The cumbersome and frequently awkward running rigging will be the same. (Running rigging, as opposed to standing rigging, is the term for those ropes that "run"—that move through the blocks and do not just stand. Standing rigging holds the masts up. Running rigging works the ship.) All this rigging, eight tons of it, has been specially made by a famous Scots firm, whose own records go back to the early 18th century.

Navigator Uses Old Instruments

We shall have copies of the old navigation instruments aboard, too, such as a wooden binnacle with an old-style compass card lit by a candle, a cross-staff, and a traverse board. This is a kind of cribbage board in which pegs signify courses and distances run (page 714).

But I've never seen a cross-staff outside a marine museum, and candles are inadequate to light a binnacle. So I'm taking a good modern sextant, too, and a chronometer, and the best of modern charts, and an oil lamp for the binnacle.

After all, I am bringing a mighty important little ship across the North Atlantic, not taking part in a pageant. It's my job to see that the ship *arrives*. I'll take the sextant and things quietly away again, once we safely reach Plymouth, Massachusetts, but meantime they have a job to do.

We have to carry radio, too. It is a government regulation. We have to fit the ship with the proper lights for a sailing vessel under way at sea, and efficient apparatus for making fog signals, and the like—more government regulations.

The original *Mayflower* was spared one risk that may be serious for us. She sailed into an Atlantic that was remarkably bare of other shipping. If there had been any other ships there, they would have been little sailers like herself. So the risk of collision was negligible. I reckon that will be our most serious danger.

Sailing ships of any kind are so rare now that steamers no longer look for them. By law, a ship under sail, without power to assist her, may show only red and green side lights, and these may show only from ahead to two

points abaft either beam—the red to port and the green to starboard. She may show a white stern light, too.

With only these lamps (the original had only a stern light, which was a bunch of candles in an enormous glass house, like an outsize in ancient coach lanterns) she may be hard to see. Her sails cannot help but obscure the side lights at times. And these days there are a thousand and more liners, tramps, oil tankers, warships, and so forth crossing the Atlantic both ways at any one time, to say nothing of fishermen and all sorts of odd vessels.

I shall do my best to keep off the liner lanes. I'd like to do what my friend, the captain of the Norwegian full-rigged ship *Christian Radich*, does. He keeps his sails floodlit by powerful searchlight at night when his ship is anywhere near the steamer lanes, so he can be seen.

But I haven't enough electric power for that—only enough for the radio and some lighting. I shall take along a lot of flares and let them off in the noses of the steamships, and I'll have a couple of big flashlights to shine on the sails.

But then maybe those ships will think they're seeing the *Flying Dutchman* and steam over to take a closer look!

Well, I *have* got good pumps in case I need them, but I hope it will never come to that.

There were—and still are—lots of problems like this, some foreseen, others not. A major snag was how to get a crew. As for that, I came into the picture myself in rather an unusual way, although it was exactly the kind of adventure that I like.

Fat Hempen Shrouds Lie Coiled Like Snakes in Upham's Rigging Loft

A Scottish ropework searched its records back to 1736 to find the secret of laying up the eight tons of handmade cordage for the new *Mayflower*. Wrappings of small stuff cover huge sausagelike ropes. Big five-holed deadeye is part of the forestay rigging; collar at the other end slips onto the bowsprit. Hook on the floor will secure a topmast shroud. Chief rigger Bill Gregory rests hands on smaller rope from which running rigging—halyards, sheets, tacks, and the like—will be made.

Wide World

Brixham: *Mayflower* Awaits Her Sailing in the Dry Dock at Upham's Shipyard

I heard about it all first in a letter from Dr. Melville Grosvenor, then associate editor of the NATIONAL GEOGRAPHIC MAGAZINE. England, he wrote, was building a *Mayflower* replica to be sailed across to America as a gift. So I wondered who was going to sail this extraordinary vessel. Because that was going to be a mighty interesting job—maybe a difficult one too, but, at any rate, the No. 1 maritime adventure of the year 1957 and for a good many other years.

Where to Find a Crew?

So I went along to the Mayflower Project's offices, which I tracked down in an old maze of a building called the Wool Exchange in the City of London, not far from the Bank of England. Nobody was exchanging any wool in this building when I got there, but on the top floor I found Warwick Charlton. I soon satisfied myself that the venture was real and well organized in the proper spirit.

"Who's going to sail the ship across for you?" I asked, at the end of a fascinating interview.

"As a matter of fact, we were thinking about you," said Mr. Charlton.

"You can consider that arranged," I told him, and set at once about the business of selecting a crew.

In that I was greatly helped by several things, though handicapped by the fact that, since this was a wholly British gesture, obviously the crew must be Britishers. It was many years since there had been any ocean-going British sailing ship, and more than three centuries since the Pilgrims' *Mayflower*.

I was helped by the fact that that last British ship had been my full-rigged ship *Joseph Conrad*,* and I had done my best to keep in touch with the crew. I was further helped by the fact that I'd had to get a crew together a year or so before to handle John Huston's extraordinary sailing ship, the

* See "North About," by Alan J. Villiers, NATIONAL GEOGRAPHIC MAGAZINE, February, 1937.

R. Anthony Rouart, National Geographic Photographer

Ships That Knew These Same Berths Battled the Spanish Armada

whaler *Pequod*, when he was making the film of *Moby Dick*. Mr. Huston made that film mostly in the Irish Sea. The *Pequod* was an old ship, leaky, awkwardly rigged, very hard to handle, and a constant source of worry to her crew.

But I'd got a good group of fellows together here, and we'd managed. I reckoned that if we could keep the *Pequod* afloat for four months or so, sailing a stout little vessel like the new *Mayflower* on a delivery voyage to the United States of America would be a holiday. After all, we have to get her there only once.

I approached all the good sailing-ship men under 70 that I knew, and two over that age who were still splendid men to have around. (One of these died, unfortunately; the other said he'd come.) They saw the thing the same way I did, and the whole lot of them arranged to give up, or to get leave from, whatever they were doing, and come along. There was immense enthusiasm on all sides.

"I am getting a year's leave," wrote Godfrey Wicksteed, with whom I'd sailed 30 years before in the four-masted bark *Bellands* in the Australian trade. He'd gone on to qualify as master in sail; when the depression came, he had switched to schoolmastering and now was headmaster in a Cambridge school. He's signed on as Chief Mate.

"I will stay handy in short-voyage ships until you want me," wrote Second Mate Adrian Small, a red-whiskered Cape Horner who qualified as mate in sail since the end of the war by sailing in the few surviving Finnish ships (now gone).

"I'll be there," said Bos'n Ike Marsh, famed modelmaker and grand old sailorman. "I've looked forward to an experience like this all my life."

"Count me in!" wrote Jumbo Goddard from Australia. Jumbo sailed in the big Erikson grain ships just for the fun of it. Joe Lacey and Joe Powell, able seamen from the *Pequod* (Joe Powell is also a film stunt

Godfrey Wicksteed, Chief Mate, Oversees the Packing of Ship's Meat

Even the ship's galley stores are authentic. Her biscuit was made from a 17th-century recipe. Beef and pork for the voyage were salted down by an elderly butcher who still remembered the old-time art.

man by trade, a skilled spear fighter for those Roman films, as well as a good seaman), said the same thing.

Scots architect Andrew Anderson-Bell, once a second mate and now, as a qualified architect, town-planning for Ethiopian Emperor Haile Selassie in Addis Ababa, hustled aboard an airplane and came to Brixham for his place aboard. Dr. John Stevens, also once a second mate, then wartime submariner, then qualified surgeon, signed up as able seaman and surgeon.

Two Shipwrights Sign On

Three of the best and most experienced members of the Oxford University Yacht Club (known personally to me, for I live these days in Oxford) offered to come, and I was glad to have them.

Shipwright Edgar Mugridge, one of the skilled team working on the construction of the ship since the beginning, said he would like to be ship's carpenter. It is traditional to take along a carpenter from the builders, and I am glad to have him. Stuart Upham said he'd come, too. That makes a good team, master shipwright and carpenter, one of them the builder himself. That is a nice gesture of confidence.

Four young ship's officers in merchantmen trading to the ends of the earth, all sailors in yachts as a hobby, signed as deck hands for the sake of the experience. We have signed a Rhodes scholar at Oxford who spends his summers fishing in a dory on the Grand Banks in one of his father's schooners; the former steward of the *Joseph Conrad*; a friend named Jack Scarr, who ferried small craft on tough voyages in the war and is now master at a famous English public school; and Jim Fuller, who was known as "Hardcase" in the *Joseph Conrad*. So my crew mounted.

One of my best boys was one of the first chosen—young John Winslow, whose direct ancestor was famed among the *Mayflower* Pilgrims. John is a sub-lieutenant, Royal Navy, and a jet pilot now. He has been given

three months leave to sail with us, and I am pleased to have a Royal Navy man—above all, one with the name of Winslow (page 715).

Oxford University, Royal Navy, the old Cape Horners—my men have a wide diversity of background. One and all are fired with the great idea.

I know all these crewmen personally and have sailed with many of them. To punch the awkwardly rigged little *Mayflower* some 3,500 miles to windward across the North Atlantic is no game for hopeful enthusiasts. That job will be tough, and the ship's people must know their stuff. More than that, they must form a harmonious team of good mixers as well as good seamen, for the success of the whole venture depends upon just that.

While I have been raking the earth for my mariners, optimists of all kinds have beaten a path to my door. I have a file eight inches thick of applicants to sail in the *Mayflower*, and at the Project offices are three more which are even larger. The response has been tremendous, from women as well as from men.

Lady Cites Years in Windjammers

One day I said in a newspaper interview that the new *Mayflower* was no place for "glamour pusses." I said there'd be neither the living nor the toilet facilities aboard that the modern woman took so much for granted.

"I am a South Australian, not young, and definitely no glamour puss," wrote a lady from South Australia. "But I have made five deep-sea voyages in the late Capt. Gustaf Erikson's big sailing ships, including three times to the United Kingdom by way of Cape Horn. In all my voyages I helped in any way I could.

"I always understood from the captains that they preferred women to be seen as little as possible, and heard even less! I think I must have been regarded as fairly satisfactory, to make five voyages. Now I would like to sail in the *Mayflower*, if you are taking any women at all."

I nearly relented at that one.

As a matter of fact, there is no doubt that we could "man" the ship entirely with women and girl yachtsmen, if we wanted. But that would be far from historically correct—even farther than taking no women at all! Those women in the original ship were members of families and they were not there for the ride. Neither did they pretend to be sailors.

We shall pick up our modern girl Pilgrims off Cape Cod. Until then, the new *Mayflower* will be a man's world. It is easier that way. And I shall have combed that ship through with a fine-tooth comb for stowaways—male or female—before we set sail from Plymouth.

We are taking one American lad—Joseph M. Meany, Jr., of Waltham, Massachusetts—a boy especially chosen by the Boys' Clubs of America. I think this is an excellent idea. The National Association of Boys' Clubs in Britain has chosen us a boy, too, 17-year-old Graham Nunn of Corby in Northamptonshire.

Getting the right sort of provisions was a problem. Our ship has no refrigeration, and so the food has to be old sailing-ship style, whether we like it or not. That means lots of salt beef and salt pork, which is carried in barrels. But nobody packs that kind of meat any more, for there has been no demand for it for years. Even the Grand Banks cod-fishing schooners have refrigeration.

We tried every ship chandler in England. It was always the same story: no old sailing-ship salt beef or pork. So we have had to commission the oldest ship's butcher we could find to have beasts specially slaughtered and salted down in the approved manner. Just ordinary corned beef won't keep for months at sea. There are very few butchers left who even remember how to prepare the meat for real sea salting.

Biscuit Firm Fills Order

We were luckier with the ship's biscuit. Huntley & Palmers' at Reading, England, looked after that, using recipes dating back to the 1600's. When the late Capt. Robert Falcon Scott's hut in Antarctica was examined some years ago, stocks inside included this firm's ship's biscuit, and it was as good as ever.

The original *Mayflower* did her cooking in a rough sort of brick oven forward. This is regarded as an unacceptable fire risk today, so we have to improve on it. We are taking an old-fashioned solid-fuel ship's range. But we shall bake bread once or twice a week, in the old style.

We'll have a fair supply of canned goods, too, which is fair enough. The art of preserving food in sealed containers is not new. In the Pilgrims' time, some food was kept in sealed jars. Francis Drake took along some fine delicacies kept in this manner.

The old-time sailors ate a lot of cheese and drank a lot of beer. We shall have the cheese,

but not the beer. The allowance of beer used to be a gallon a day for the mariners. Maybe it kept better than water in casks.

We'll have water and it won't be in casks. We have built four good iron tanks into the hold to have sufficient fresh water, but it will have to be strictly rationed—none for washing, except rain water.

Sails Sewn by Hand

Another problem was getting the sails, but choice of the ancient fishing port of Brixham took care of that one. Brixham men helped Drake fight against the Armada, sailing up-Channel in 1588. The sailing tradition is not wholly dead there yet, though it is years since the last sailing fisherman left the port.

We found one last old-time sailmaker who knew how to put a good belly on a lateen mizzen, though he had never been asked to do that in his life. He has sewn a suit of sails for us by hand, cut from best Scots flax canvas specially woven for the ship by Francis Webster & Sons, Ltd., of Arbroath, Scotland.

Webster's made the canvas that we used in the big Cape Horners; they know their business. They have been weaving canvas for sails for more than 200 years. The very name "Webster" means weaver.

Research into the sailmaking and the hempen rigging has involved a minute scrutiny of innumerable old documents, as well as the checking and cross-checking of information gleaned from old sailmakers and retired craftsmen, some over 80 years of age. It is a good thing that the records were kept and that the craftsmen have lived that long.

The Gourock Ropework Company in Port Glasgow, Scotland, for instance, traced records to 1736, written in a fine, bold, and legible hand on parchment, telling the secrets of how to lay up cordage. Each of our ropes must be not only historically correct but also able to accept the stresses that a 17th-century sailing ship, bouncing about in the great gray swells of the North Atlantic, imposes on its sails and rigging.

There are 350 separate ropes in the rigging

←Ship's Tops Loom Against the Sky as They Did in the Days of Drake

Shored up with rough timbers, *Mayflower* rests stern to sea in the finishing dock. Her ornate beak copies those used for ramming enemies in early sea battles. Circular tops, here left unfinished to give riggers easy access, shielded musket men and provided foot room for handling topsails.

High Poop Suggests a Skyscraper →

This superstructure on the stern houses quarters for captain and privileged passengers and space for the helmsman. As it rises it shows a marked inward slope, known as tumble home.

Name, hailing port, and picture of a May-blooming hawthorn flower have yet to be painted on the stern. Bands of tarred hemp, called "woolding" by the old-timers, are wrapped around the masts to strengthen them.

B. Anthony Stewart, National Geographic Photographer

of the new *Mayflower*, and we have to know them all. Many have names which have long been out of use, such as jeers, catharpins, knavelines, and the like.

The old *Mayflower* didn't even have footropes on the yards. How the mariners were expected to work aloft without footropes to stand on, I can't tell. The big yards lowered to the deck, we know, but a good deal of work had to be done aloft.

I think we'll be rigging temporary footropes for the voyage and taking them down when we get off Cape Cod. I don't want any mariners falling into the sea.

Ship Insured for $250,000

We have to carry a lot of insurance, too, which the old ship didn't worry about, and the insurers have a say in the amount of unnecessary risk we take. So have I.

Every member of the crew will be properly insured against all ordinary risks. The ship herself is insured for the best part of $250,000. She is costing that much to build—and there, too, is a mighty big break with history. I doubt that the old one cost more than a thousand English pounds. There is a record that she was appraised in London in 1624 for £128 8s. 4d., though she was reported then to be "in ruinis," and Captain Jones was dead.

The money to build the new ship has been paid by British industry and by all sorts of Britishers. Many have come to Brixham and paid their shillings to visit the building ship; others have sent in donations.

Throughout the summer of last year, visitors to Upham's shipyard averaged between three and four thousand a week, for the *Mayflower* project has fascinated everybody. Thousands wished to see a real galleon come to life, especially a reconstruction of the immortal *Mayflower* preparing to sail to America. No wonder it has appeal on both sides of the Atlantic.

As I walked around the ship down there at Brixham with Stuart Upham, I felt a thrill greater than any other ship ever gave me. I watched the master's tiny cabin growing in stout oak atop the great high poop (though I noted with regret that it lacked headroom; I hope my head won't collide too violently with that same oak when I am called suddenly at sea). I looked along the decks where there is never a straight line anywhere, saw the pon-

derous tiller being jostled into position, and noted the intent look of purposeful interest on the faces of the shipwrights.

Our ship measured only 58 feet on the keel, with a 25-foot beam, and 12 feet 6 inches in depth; she had a tonnage of 181 by the methods of reckoning used in the early 1600's. Her jutting beak and her built-up aftercastle gave her an over-all length of 106 feet 5 inches. But she looked almost incredibly small there in her dry dock, and she would look even smaller at sea.

She was to go into the water at the end of March. Then we would sail her sea trials, bashing about the English Channel in fresh winds and strong. None of us knew anything of spritsails or lateen mizzens. None of us has ever handled a jeer, or steered with a whipstaff, or maneuvered a high-sterned ship (which must catch a lot of wind) with masts so strangely spaced.

But I reckon those old-time shipwrights and riggers knew what they were doing. The underwater lines of the little *Mayflower* are marvelously

← Four-foot Handspikes Fit Square Holes to Turn *Mayflower's* Anchor Windlass

Even sailors of Pilgrim times, shorter by several inches than men today, could not stand upright in the low compartment that housed the windlass. Laboriously bringing home an anchor, they depended upon the toothed pawl at center of the cumbersome one-piece barrel to keep their hempen anchor line from running out again when they stopped to rest. The line fed into the open hatch for coiling below. The author will use the windlass room as a sail locker.

↓ Carpenter Checks Athwartship Beam

Accounts of the *Mayflower* voyage say that a main beam gave way in mid-Atlantic and had to be propped up with "a great iron screw." Here Edgar Mugridge, master shipwright sailing as ship's carpenter, inspects a 15-inch-square beam similar to the offending timber. Scaffolding at his feet will protect the mainmast foot against iron ballast.

Lieutenant Winslow wears seaman's clothing of the time of James I. His garb was designed by a theatrical costumer.

B. Anthony Stewart, National Geographic Photographer

728 Robert F. Sisson, National Geographic Photographer

***Mayflower*'s Sturdy Shallop Nears Completion. She Will Meet the Pilgrims at Sea**

To explore shallow coastal waters, the Pilgrim Fathers brought over a small boat stowed between decks. Trying to reproduce her, Mr. Baker found no authentic description and resorted to Dutch plans of the 1600's. Under spritsail-and-jib rig, with leeboards to keep her from sliding sideways when beating to windward, she will meet the new *Mayflower* off Cape Cod.

Plymouth Marine Railways in Plymouth, Massachusetts, invited a pair of master shipwrights from Maine to help build the shallop. Here one of them, Francis E. Fahey, squares a leeboard support timber.

sweet, and she looks as if she will sail well. It is a good time of year when we go, as early in April as possible. Then the east winds blow, which used to take the French and the Channel Islands codfishing schooners over to the Grand Banks.

Galleon Beats Straight Westward

It is too late in the year for me to go the southern route, down to the trade winds and westward in Columbus's tracks. I shall have to make a straight run of it the best way I can. That may be tough, for ordinarily the whole force of the Atlantic weather comes from the west, just the way I have to go.

However, we shall hope for the best—a day or two of favoring easterlies to get clear of the land (for the English Channel is overfull of ships, and its rocky coastline is no asset to me). Then I plan to stand to the nor'ard, to get out of the North Atlantic Current, and beat along the best way I can.

We will land by the famed Plymouth Rock, after a Compact signing off historic Province-town. The *Mayflower*'s shallop, being built now at Plymouth, Massachusetts, will sail out to meet us and escort us in.

The city fathers are laying on a wonderful reception for us at Plymouth. After that, Plimoth Plantation, the energetic and capable organization that is transforming part of Plymouth into the town the Pilgrim Fathers made, will take over *Mayflower* and place her in a permanent, revered, and ideal berth.

I look forward tremendously to the thrill of bringing the gift ship in. We'll need good luck. But, after all, we've had a lot, and ask only a little more.

We were lucky to find Bill Baker's expert plans (otherwise there would have been a year's delay); lucky to find Stuart Upham's shipbuilding yard, with a team of shipwrights who still understood the building of oaken ships and had the tools to work with; lucky to find the Devon oak, too, and the sailmaker and the rigger, and the cordage company and canvas weavers—aye, and the crew, too. We can do the job now, we hope. In a very few years it would certainly have been too late.

The World in Your Garden

Your Society's New Book Reveals the Adventure, Geography, and Exotic Lore Behind Our Everyday Flowers, Fruits, and Vegetables

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IT'S spring, and tender shoots poke through the moist brown earth. In mountain meadows gay armies of wild flowers drive back wintry banks of snow. And as the land grows green and days grow warm, more and more of us are turning to our garden plots. Blooms pictured in well-thumbed seed catalogues are images that spur our labors on.

Some home gardeners have a head start; they nurtured seedlings inside while winter still blustered out of doors. At your Society's headquarters, we too have tended a garden through recent months—a very special garden now near fruition. And we feel its rich harvest of information will delight members everywhere.

The project? A new book, *THE WORLD IN YOUR GARDEN*. It grew out of members' enthusiasm for the fascinating stories behind our familiar flowers, vegetables, and fruits portrayed in the NATIONAL GEOGRAPHIC MAGAZINE. Paintings by Else Bostelmann illustrated these articles by plant explorer W. H. Camp and U. S. Department of Agriculture botanists Victor R. Boswell and J. R. Magness.

Now this wealth of picture and text—together with much new material—is to be published in permanent book form. With it, member-families can themselves go plant exploring around the world without stepping out of their gardens.

Would you bid $10,000 for a tulip bulb? Hollanders once did, for the plant was not their own. It came from Turkey, where its name means "turban."

Perhaps it shouldn't surprise us that Asians once grew the East Indian lotus and hibiscus for their cooking pots. We, after all, eat a close relative of the latter in our common garden okra. But fancy the knightly feast of medieval times when marigold seasoned the venison, roses graced the stew, and the violet mingled with wild onion in the salad!

It is hard to think of anything more American than apple pie—yet the apple originated between the Black and Caspian Seas. Peaches and oranges came not from Georgia, Florida,

Flowers of Many Lands Bloom at Artist's Touch

In her studio, Mrs. Else Bostelmann "grew" the plants for the National Geographic's new book, *The World in Your Garden*. She portrayed our familiar flowers, vegetables, and fruits in their natural colors. Exotic backgrounds evoke their distant homelands.

B. Anthony Stewart,
National Geographic Photographer

or California but from China, where they were cultivated 4,000 years ago. The Near and Middle East gave us lettuce, carrots, peas, and spinach. The Andes produced the "Irish" potato. In fact, most of our daily fruits and vegetables came from distant lands.

Plants Sparked Great Age of Discovery

Columbus, Vasco da Gama, Magellan all sought the spice-rich lands of the East. First Portuguese caravels and galleons, then East Indiamen flying Dutch and English flags plied the monsoon seas for Asia's bounty of plants. Later, sleek-hulled American clippers spread white wings as they scudded homeward, holds bulging with Canton's tea.

Botany Bay on The Society's maps marks where Captain Cook collected hundreds of different plants from Australia's virgin shores. And how many of us remember that Captain Bligh's mission on the ill-fated South Seas voyage was to bring breadfruit to Jamaica?

From the days when conquering Alexander brought back curious plant specimens from the ends of the world, plants have figured in the bold deeds of men. Scientists scour the hinterlands for new and useful plants.

For example, the noted plant explorer David Fairchild, a Trustee of The Society for nearly 50 years, introduced numerous plants to America during his half-century and more of scientific work. In his National Geographic articles and his books, he told of his botanical adventures in faraway places.

National Geographic members may take pride, too, in the accomplishments of such Society-sponsored explorers as Joseph F. Rock, who gathered blight-resistant chestnuts, the seeds of many other trees, and 493 species of rhododendron in China.

But bringing plants back alive is just one link in the chain. Exploration continues in laboratory, botanical garden, and experimental station. Here scientific "miracles" of plant breeding and hybridization produce tastier, more nutritious foods and greater yielding, disease-resistant strains, thus constantly bettering the Nation's agriculture.

What could be more basic to man's existence than plants? They feed and clothe us and manufacture the very oxygen we breathe. Without them earth's life would cease.

The Industrial Revolution or a dozen Waterloos could hardly match the prodigious change man worked in his destiny when he learned first to reap, then to cultivate wild plants. For only when man could produce and store food against future needs was he able to settle down and begin to civilize himself, to build his towns and cities.

In the New World the ancient Maya founded their civilization on the cultivation of corn. Granaries along highroads in the Andes insured the Inca Empire against famine and ruin.

Little wonder that plants became woven into the fabric of religion, mythology, and folklore in every land.

Flower Arranging a Rite in Old Japan

Just as the list of the world's useful plants has grown, so has your Society's new book. New tales of plant adventure have clamored for admission, new aspects of a subject as broad as life itself.

Delicate drawings trace the evolution of the art of flower arrangement from stylized Japanese beginnings and show how to make effective displays. An illustrated introductory section dramatizes the vital role plants play in the story of man. Map end sheets locate regions where leading flowers, fruits, and vegetables originated.

We bring *The World in Your Garden* to the attention of National Geographic members, for books have an important place in your Society's program to increase and diffuse geographic knowledge.

NATIONAL GEOGRAPHIC SOCIETY

SIXTEENTH AND M STREETS NORTHWEST, WASHINGTON 6, D. C.

ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

To carry out the purposes for which it was founded 69 years ago, the National Geographic Society publishes the National Geographic Magazine monthly. Receipts are invested in The Magazine or expended to promote geographic knowledge.

Articles and photographs are desired. For material The Magazine uses, generous remuneration is made.

In addition to the editorial and photographic surveys constantly being made, The Society has sponsored more than 100 scientific expeditions, some of which required years of field work to achieve their objectives. It has aided and encouraged exploration literally to the ends of the earth, having contributed to expeditions of Rear Admiral Robert E. Peary, discoverer of the North Pole, and Rear Admiral Richard E. Byrd, first man to fly over the North and South Poles.

Photomapping the heavens to a depth of a billion light-years from Palomar Observatory, the National Geographic Society and California Institute of Technology have expanded the known universe at least 25 times and discovered tens of thousands of giant star systems. This seven-year Sky Survey (1949–1956) has made available to observatories all over the world the most extensive sky atlas yet produced.

In Russell Cave, Alabama, in 1956, an archeological expedition of The Society and the Smithsonian Institution excavated the oldest material of human origin yet found east of the Mississippi—charcoal from cooking fires of 8,000 years ago. The site revealed a unique record of man's occupancy from 6,000 B.C. or earlier until about A.D. 1650. Finds included many artifacts, weapons, and the 4,000-year-old bones of a man and a dog.

National Geographic exploration and scientific study made known to the world the natural wonders now preserved as Katmai National Monument and Carlsbad Caverns National Park.

The Society's notable expeditions pushed back the historic horizons of the Southwest to a period nearly eight centuries before Columbus by dating the vast ruins of Pueblo Bonito.

In Mexico, The Society and the Smithsonian Institution, January 16, 1958, discovered the oldest dated work of man in the Americas. This stone is engraved, in Maya-like characters, November 4, 291 B.C. (Spinden correlation). It antedates by 200 years anything else in America bearing a date and reveals a great center of early American culture, previously unknown.

On November 11, 1935, the stratosphere flight of the world's largest balloon, *Explorer II*, sponsored by The Society and the U. S. Army Air Corps, reached a world record altitude of 72,395 feet. Capts. Albert W. Stevens and Orvil A. Anderson recorded scientific results of extraordinary value.

The Society and individual members contributed $100,000 to help preserve for the American people the finest of California's sequoias, the Giant Forest in Sequoia National Park.

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The splendor of the stratosphere

Up you go—up, up beyond the limits of today's planes. Up seven miles from the earth, and now almost eight.

You level off in the stratosphere. And even though the DC-8 puts half a mile behind you with every breath you draw, you feel no sensation of speed or flight.

Just outside your window the temperature in the thin air is 60° below zero. But the air in the cabin has the soft touch of a June day, fresh and sweet and comfortable.

In the astonishing world of the stratosphere, your eyes will behold splendors never seen by you before.

The view of the earth moving lazily and distantly below is exhilarating, with glimpses of fields and towns and mountains in miniature, or silver stretches of the seas.

Up this high, too high for the longest fingers of weather to touch you, you sense a tranquillity, a detached peacefulness, a freedom of spirit. You share a feeling of majesty with the sun and moon, often seen hanging in the sky together.

During the day, the sky is an ocean of shining blue. In the evening, the blue deepens into dark velvet. The moon sends forth its milky light. The stars loom larger and brighter, and you are enthralled by the ghostly radiance of the night sky.

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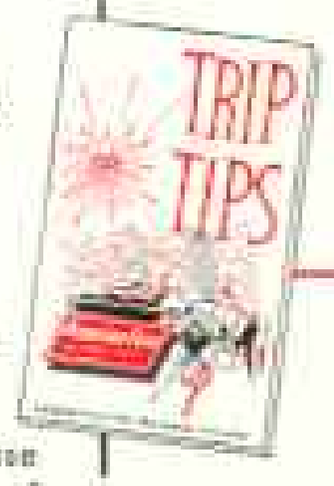

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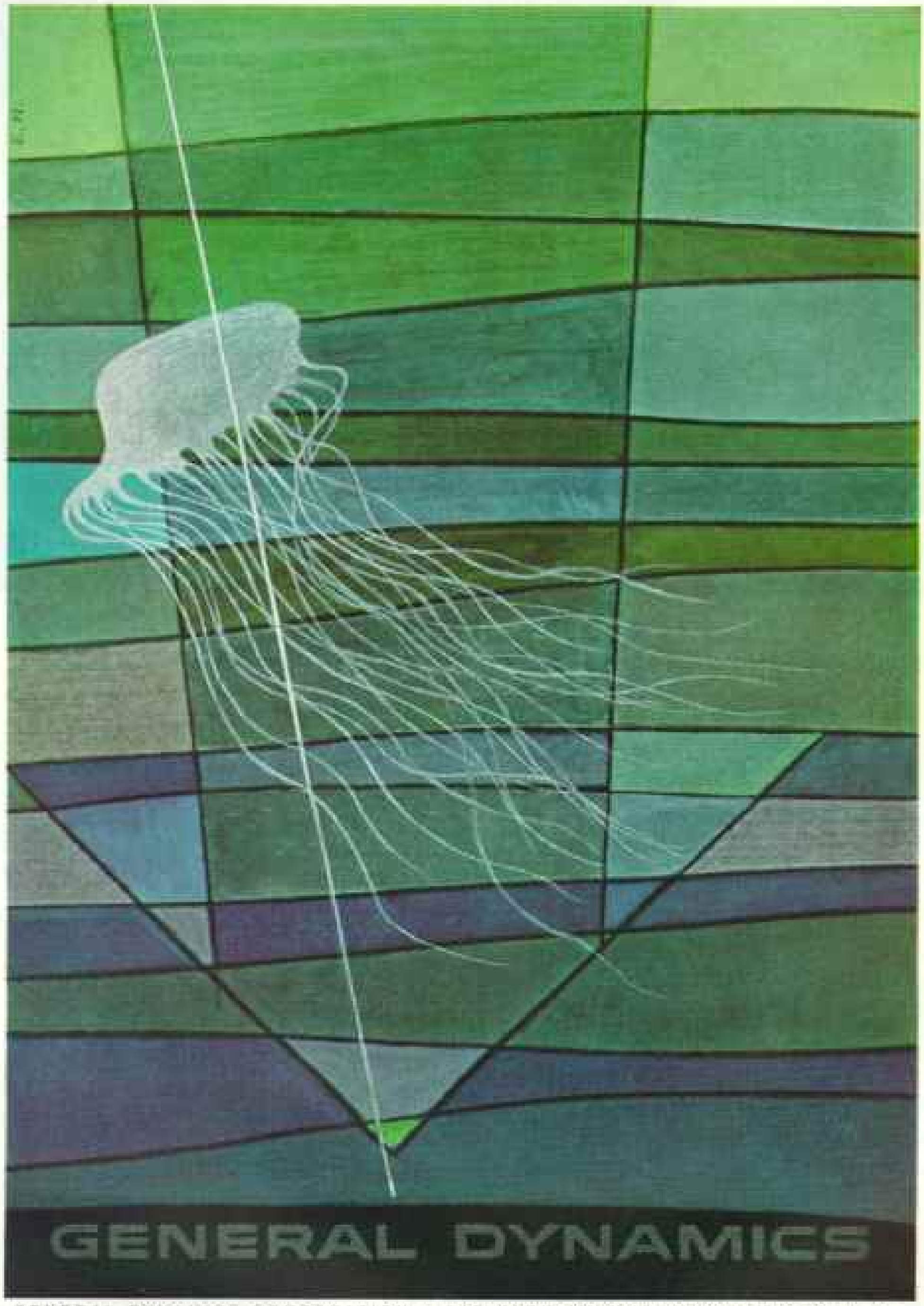

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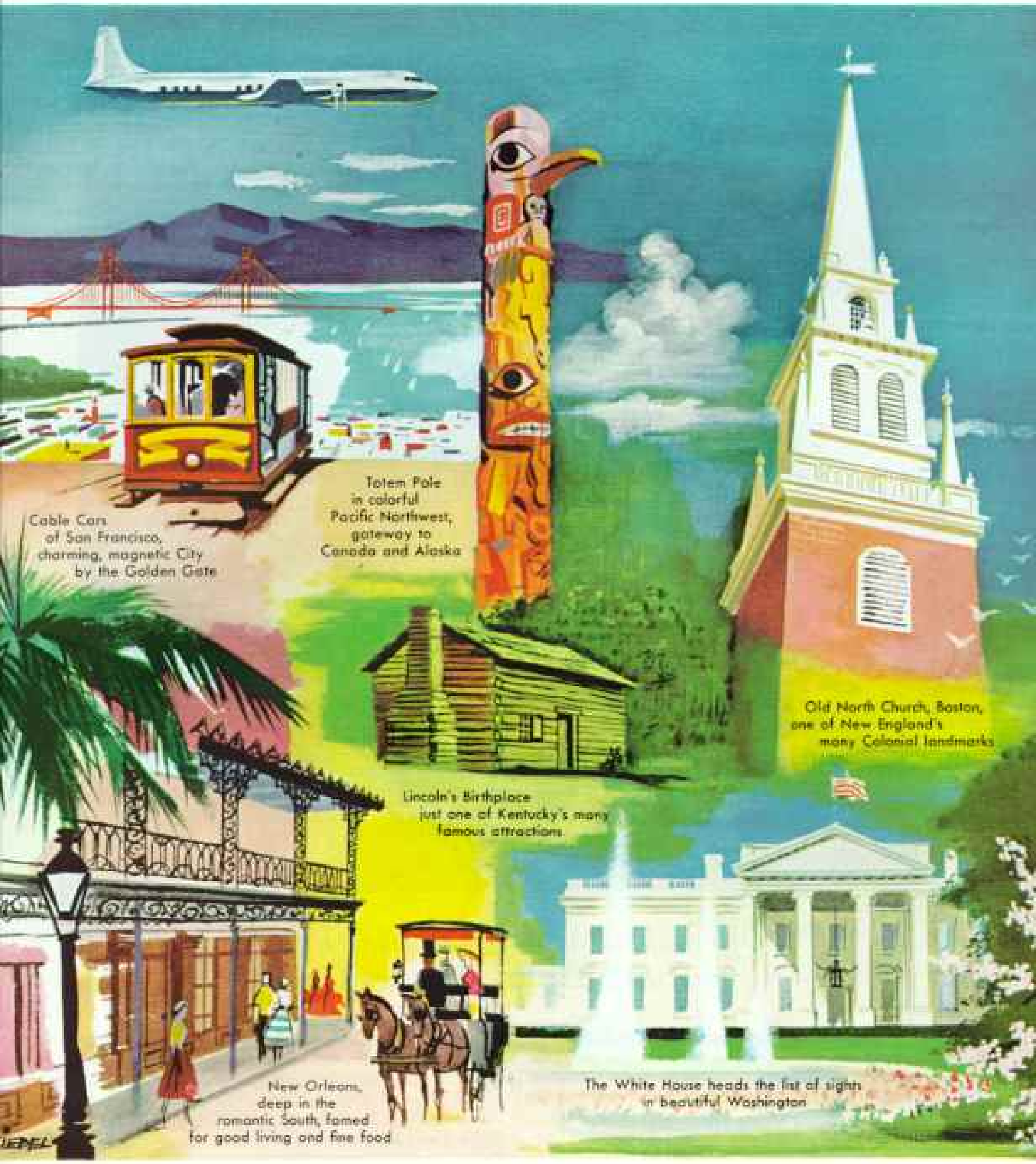

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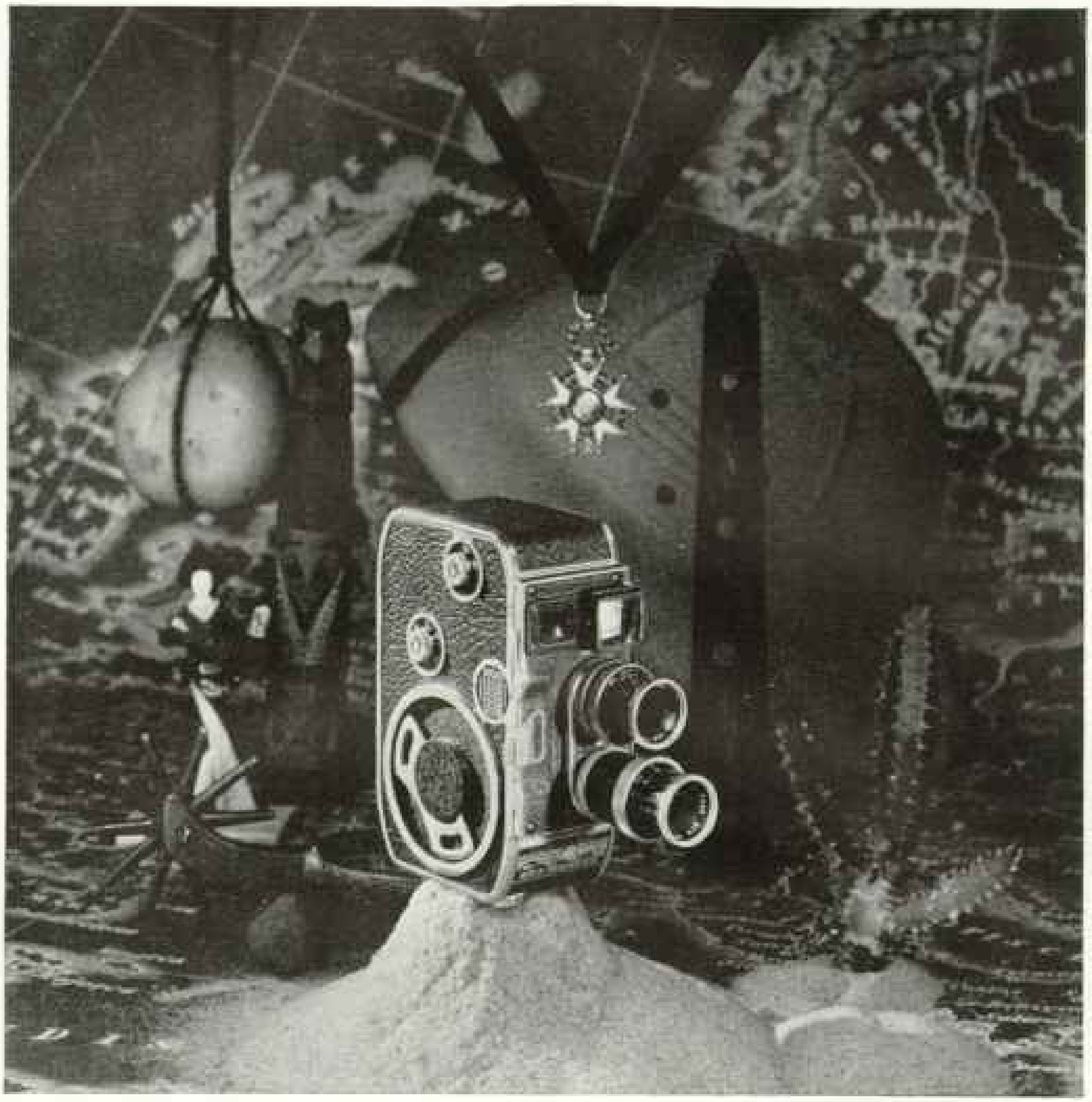

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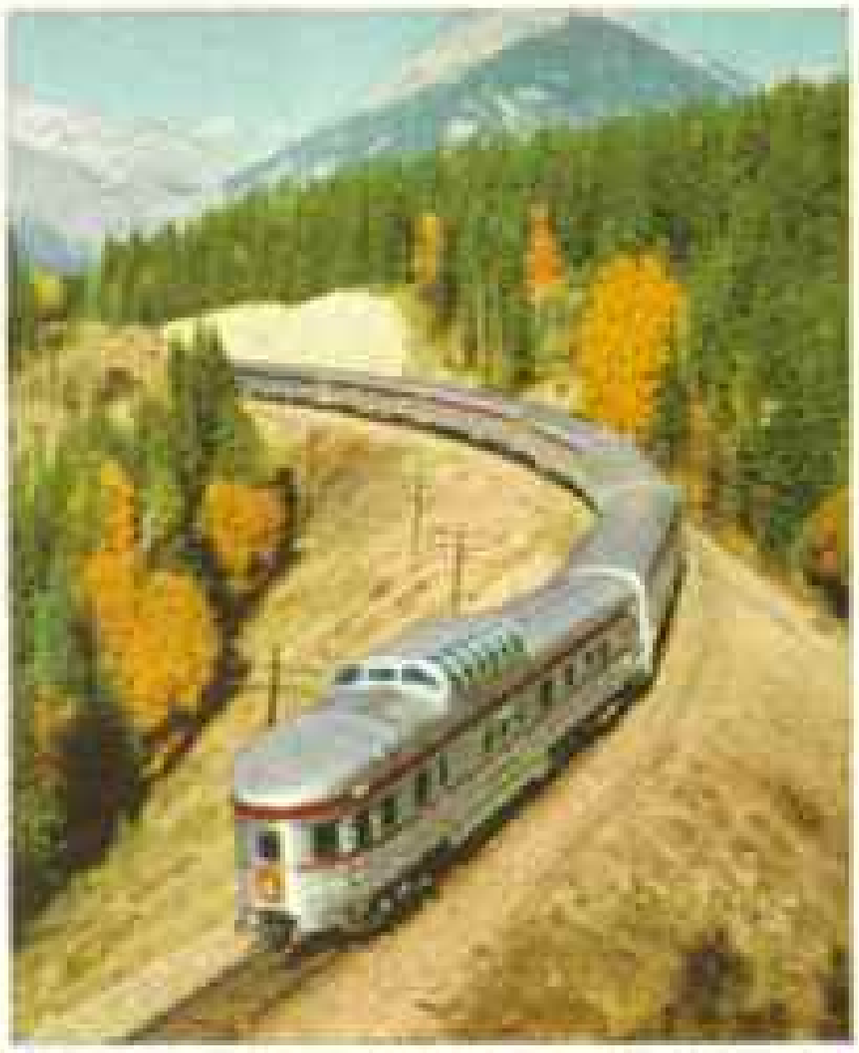

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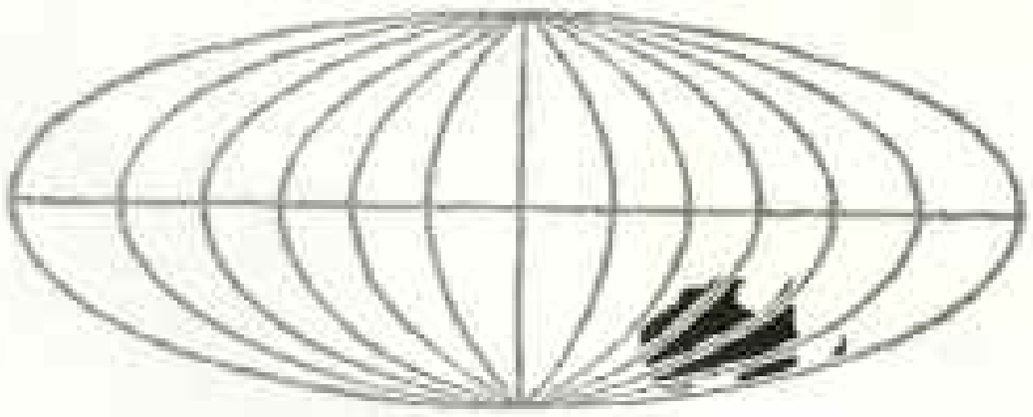

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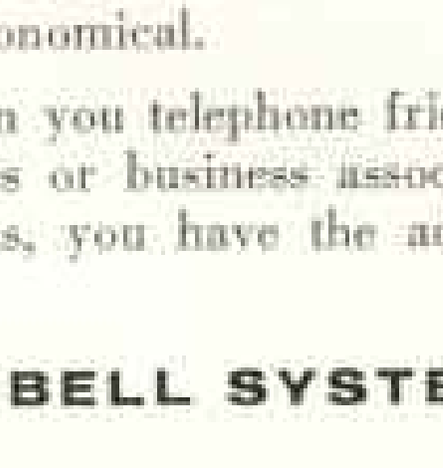

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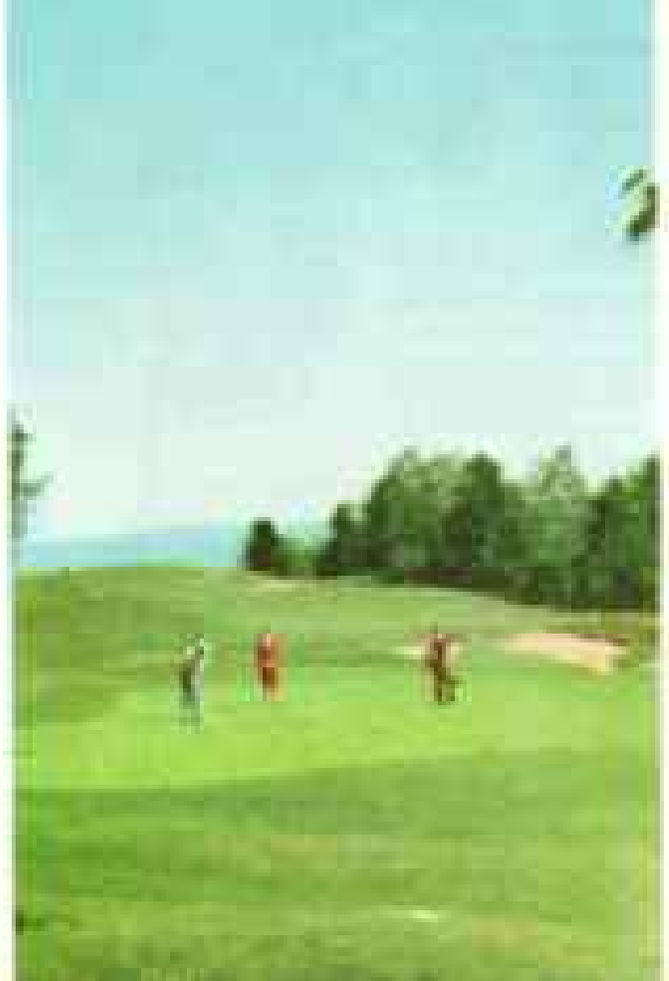

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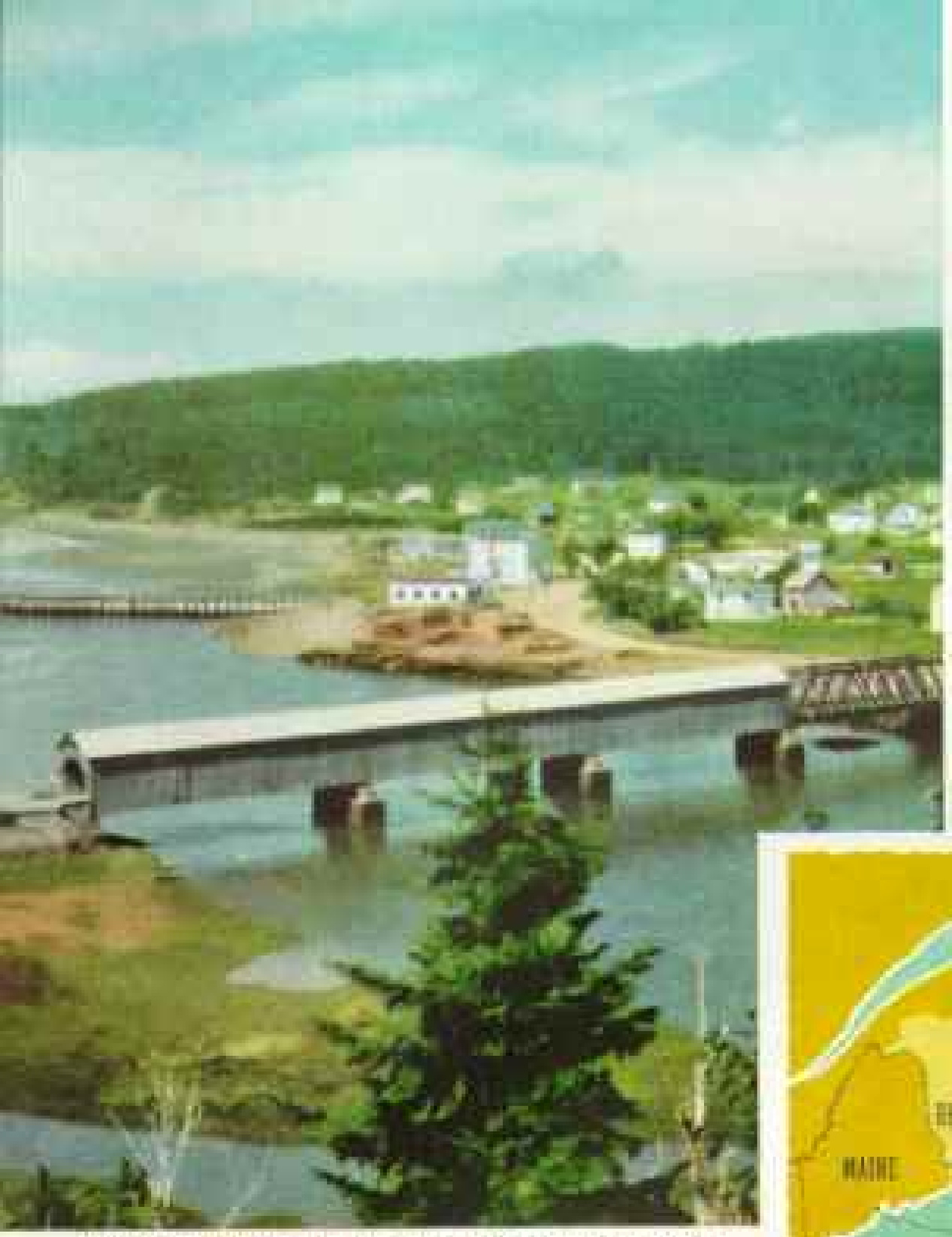

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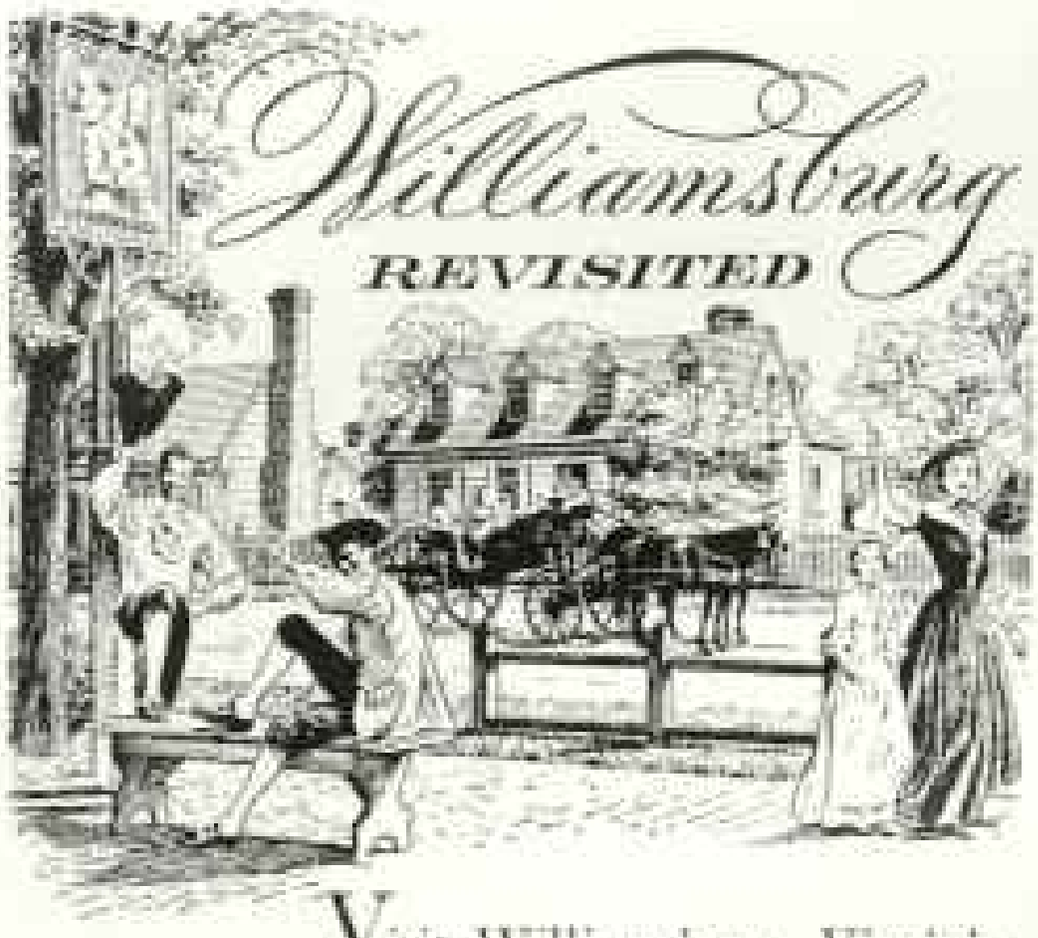

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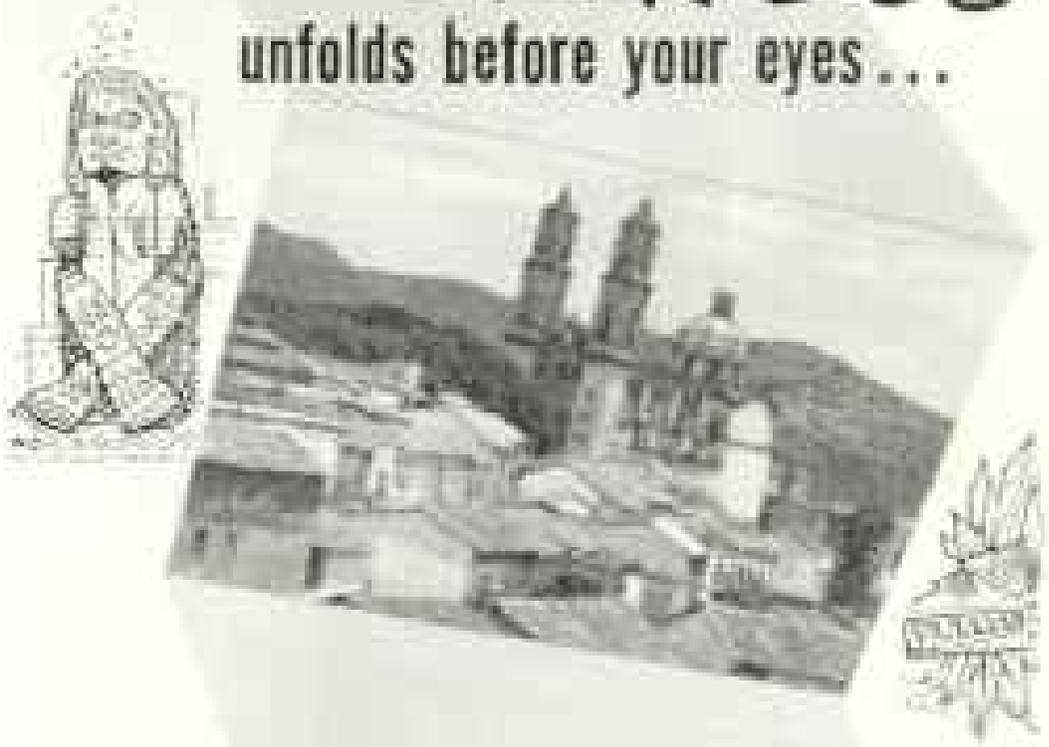

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Below—Majestic Mt. Hood, in Oregon.

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How to win "the battle of the bulge"...

EXTRA INCHES and pounds are health hazards . . . and they are signals to start reducing *now*. Remember, in 98 percent of the cases, *overweight* is due to *overeating*.

This does not mean that you have to give up all the foods you enjoy most. It does mean changing your eating habits to avoid unneeded calories.

Before you start dieting, *consult your doctor*. Try to do exactly what he tells you, especially about eating the *protective foods* that supply proteins, vitamins and minerals.

Many combinations of foods provide these essential nutrients. Here is a list to follow every day while you are dieting and daily thereafter:

Milk . . . at least a pint daily—preferably skimmed or buttermilk—including that used in cooking, or in milk products like cheese.

Meat, fish, poultry, eggs or cheese . . . two to three servings daily. Have meats roasted, broiled or boiled. Use lean meats or cut off the fat.

Potatoes . . . one daily serving, baked or boiled.

Cereal and bread . . . one slice of whole-grain or enriched bread at each meal.

Vegetables . . . eat at least three vegetables every day including one leafy green or yellow. Eat all the vegetable salad you want. Be sure, however, to use only lemon juice or vinegar dressing.

Fruits . . . two servings daily, including citrus or other sources of vitamin C, such as tomatoes. Skip the syrup that comes with canned fruits.

Butter or margarine . . . three small pats daily, including that used in cooking.

If you plan your reducing diet around these foods and avoid rich desserts, fried foods, gravies, sauces, cocktail snacks and second helpings, those extra inches and pounds will vanish.

Your new eating habits . . . if you stick to them *permanently* . . . may keep your weight down to the right level . . . and increase your chances for better health and a long, active life.

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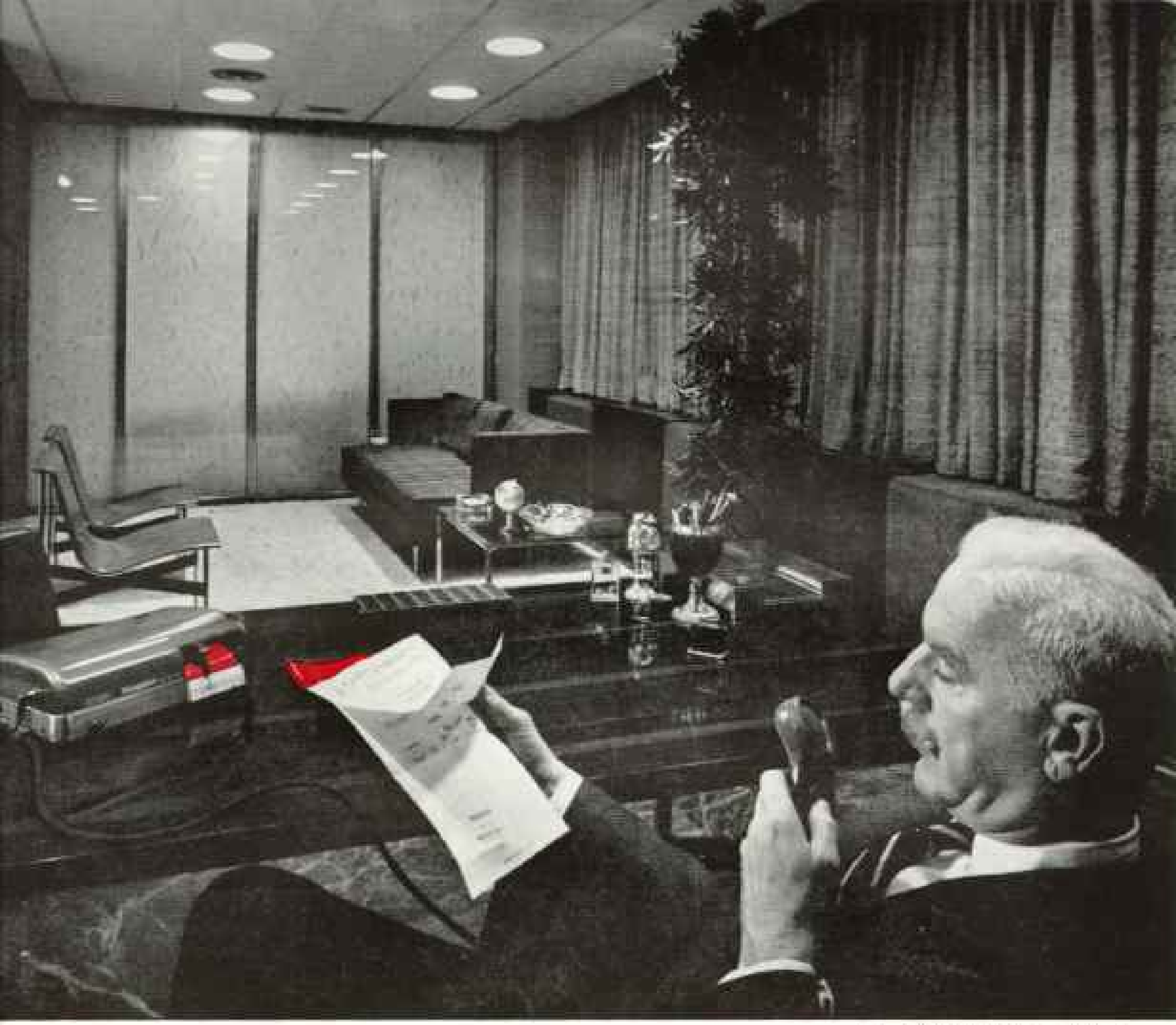

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Eclipse roturies start at $59.50, reel type power mowers at $99.50.

IT CAN BE assumed that almost any mower will cut grass. But folks who buy an Eclipse expect more than this minimum performance. They expect—and get—low cost, trouble-free mowing year after year. That's why Eclipse is recognized as the standard of comparison . . . the brand most mower users plan to buy "the next time" for sure. User experience quickly points up the need for the kind of built-in quality only Eclipse offers.

The Eclipse extras

Feature for feature and dollar for dollar, you get more value from Eclipse. This is a direct result of the factory policy of building up to performance standards instead of parring quality down to meet a price. It stands to reason that skilled craftsmen—specializing in quality mowers—can provide a master touch not possible in factories where mowers are only a "sideline" product.

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It may cost just a few dollars more when you first buy an Eclipse. But user reports prove conclusively that the total cost of owning an Eclipse is less than for ordinary mowers. Eclipse mowers are built to last years longer and it's not at all uncommon for families to use an Eclipse for 15, 20 or even 30 years with very little maintenance expense. The rugged construction, the craftsmanship that is acquired only by half a century of specialized manufacture pays off for the user.

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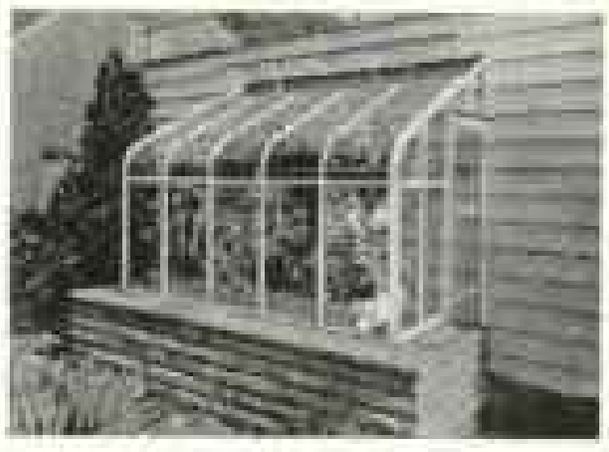

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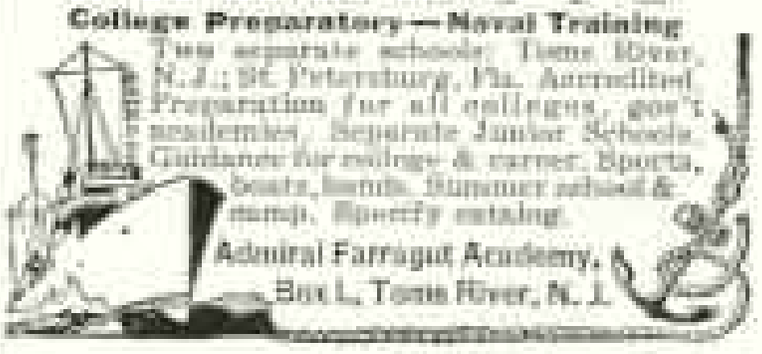

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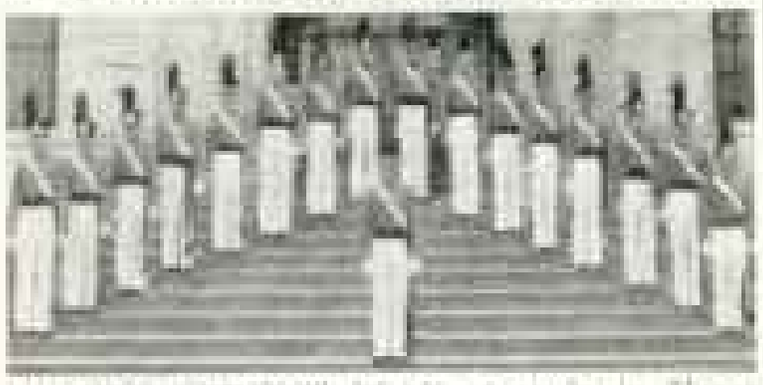

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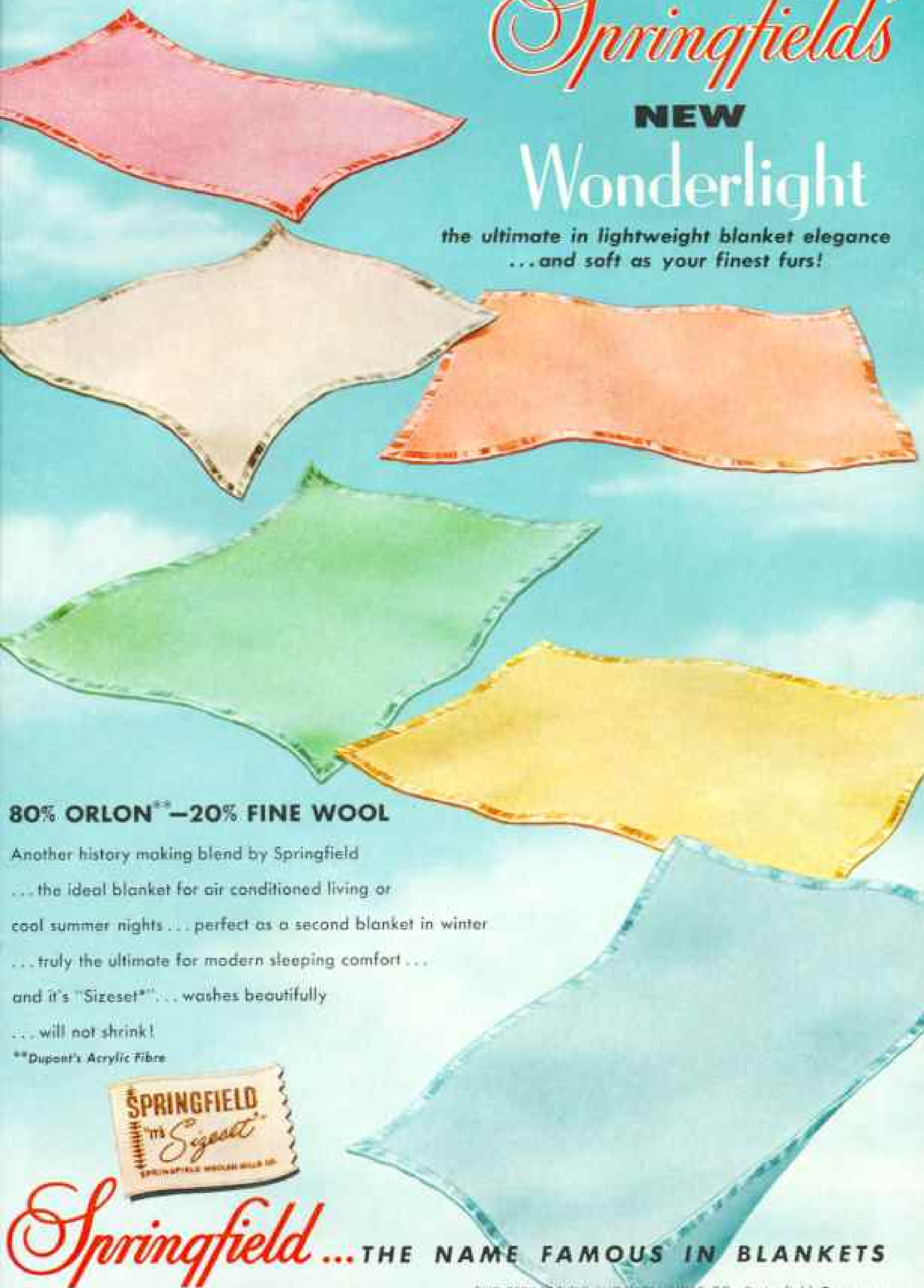

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