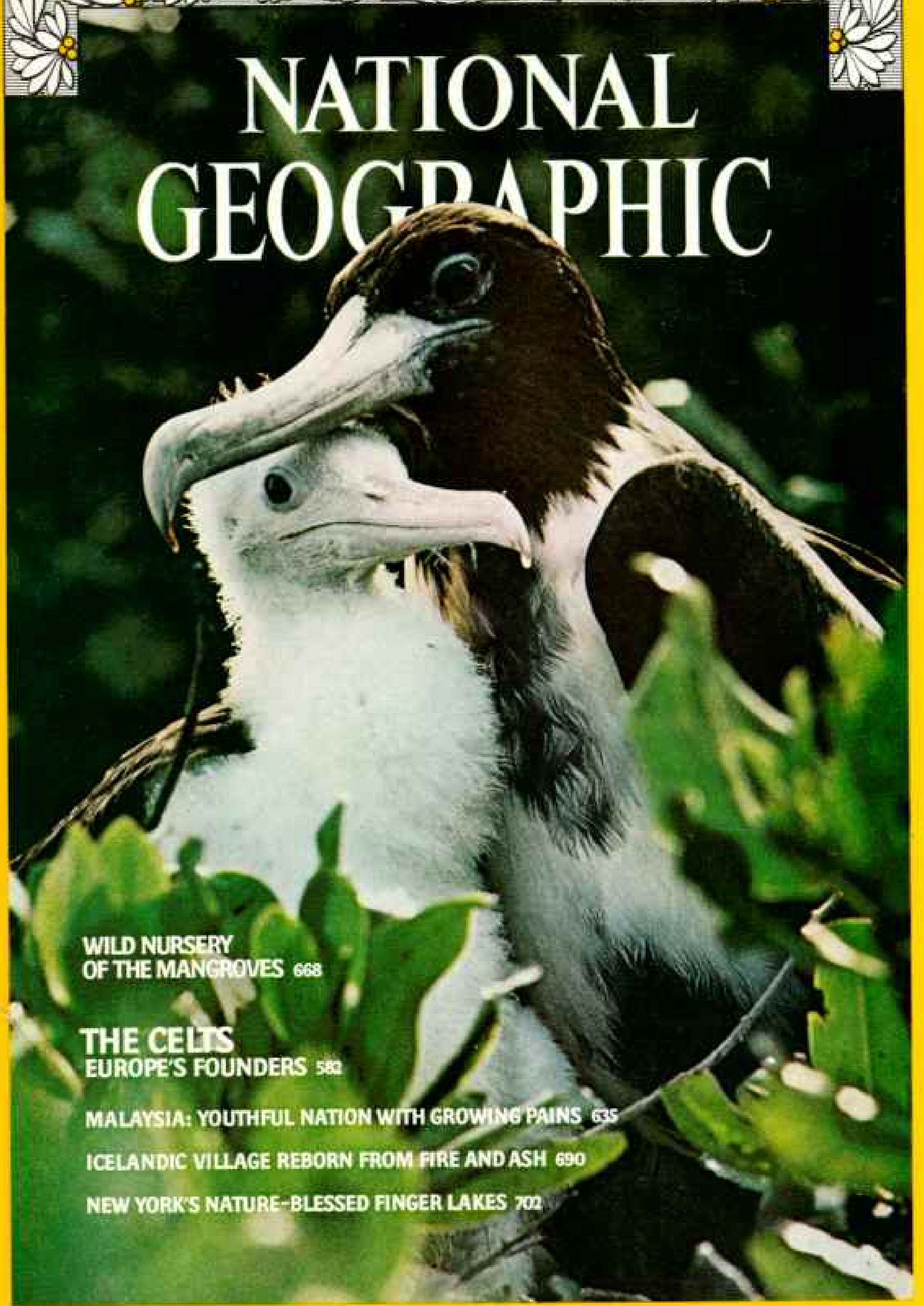
DOUBLE SUPPLEMENT: MODERN EUROPE AND THE ANCIENT CELTS

VOL. 151, NO. 5 MAY 1977

NATIONAL GEOGRAPHIC



OFFICIAL JOURNAL OF THE NATIONAL GEOGRAPHIC SOCIETY WASHINGTON, D.C.

AS THIS MONTH BEGINS, May Day will mean different things to different peoples. While Communist countries parade, Roman Catholic nations will begin a month of celebrations honoring the Virgin. In Celtic Europe the day was called Beltaine, and on its eve huge fires sprang up to honor the coming of summer. The season thus opened would close on Samhain, the festival we celebrate at Halloween, when herds returned from pasture, rents fell due, and rites were performed to appease the spirits of the dead, permitted at this season to wander among living men and perhaps cause mischief.

The study of the Iron Age has been largely neglected in our century. Only now are we beginning to realize that our debt to the Celts extends a great deal further than Halloween and kissing under the mistletoe. Celtic scholars (who, it may be said, enjoy a good donnybrook among themselves, much as did the people they study) have long recognized that Western technology springs from the iron cutting edge of Celtic swords, tools, and plowshares. In the first millennium before Christ, well before our intellectual forebears in Greece and Rome had reached their prime, the Celts of Europe north of the Alps were laying the groundwork for much of the culture that flowered in later times.

Despite the achievements of the Celts, Roman legions and Germanic tribes eventually overwhelmed them, and their domain was reduced to the western fringes of the Continent.

Yet there was something about the Celts—some poetry of mind, fey, superstitious, melancholy, ribald—that enabled the culture to endure. The last century saw a Celtic revival sweep Europe, and now once again there is lively interest in Celtic arts, in Celtic languages, even in demands for separatism.

In Ireland, Scotland, Wales, Brittany, and other Celtic domains, there is new pride in the ancient heritage, and political movements are stressing greater autonomy, confederation, and opportunity to stress ethnic identity.

The many Geographic staff people who worked on the article that leads this issue found the track of the Celts leading from the dawn of European history to a hilltop in modern Cornwall. Thus, the story that began so long ago is not yet ended. The old spirit of the Celts burns again with the holy fires of Beltaine and Samhain.

Editor

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THE NATIONAL GEOGRAPHIC MAGAZINE, VOL. 151, NO. 5

May 1977

COVER: *Mother frigatebird shelters a nestling in a mangrove rookery on Florida's Marquesas Keys, the birds' only known U.S. nesting ground. Photograph by Bianca Lavies.*

the Celts

By MERLE SEVERY

PHOTOGRAPHS BY JAMES P. BLAIR

PAINTINGS BY ROBERT C. MAGIS

ALL NATIONAL GEOGRAPHIC STAFF

IT IS MIDSUMMER EVE. The sun, ending its long journey through northern skies, sinks over the sill of the sea beyond Land's End. A breeze quickens. A hush falls over celebrants gathered on this hilltop in the far west of Britain.

The Grand Bard of Cornwall steps forward and delivers an invocation. Then, in a language revived in this century by scholars, comes the command: *"Tan y'n cunys lemmyn gor uskys*—Now set the pyre at once on fire."

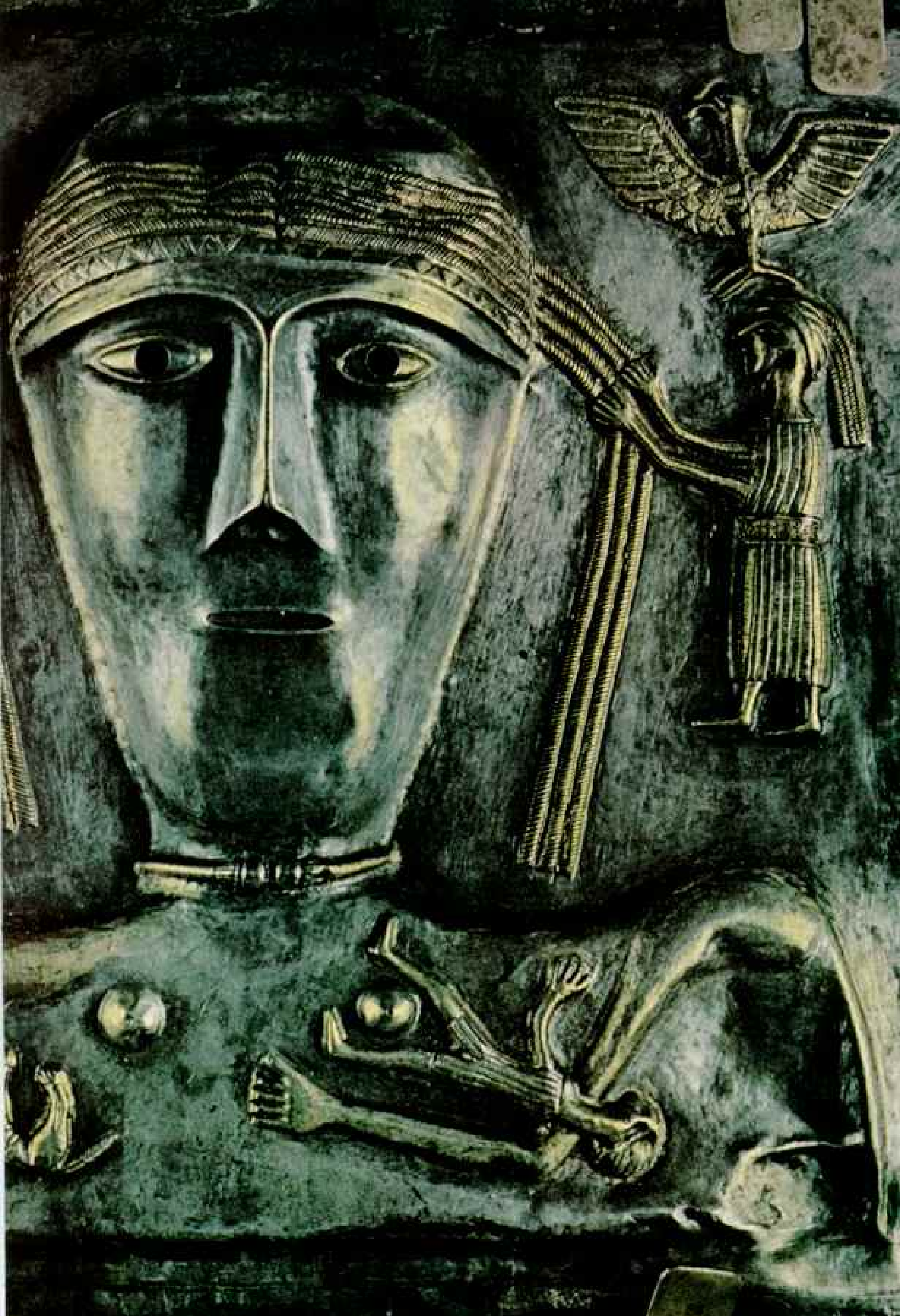
Flames leap to consume the darkness.

The Lady of Flowers edges near to cast a symbolic bunch of herbs: "Thousandfold let good seed spring. Wicked weeds, fast withering, let this fire kill."

Such are the "sacrifices" the Federation of Old Cornwall Societies consigns to the bonfires at its annual revival of a Celtic rite, "according to the custom of our forefathers." Not animals. Nor humans on raging "bone fires" that ancients lit on high places to rejuvenate the life-giving sun, to purify man and beast, to ensure fertility.

A goddess stares from the side of the Gundestrup caldron (pages 612-13), fashioned in silver by Celtic craftsmen some two thousand years ago. Skilled warriors and metalworkers, Celts created Europe's first civilization north of the Alps.

CALLIGRAPHY BY PHYLLIS GOODHUE, ADAPTED FROM THE "BOOK OF KELLS"



Children link hands and circle right, in the ritual direction of the sun, making dancing shadows against the wall of flame. Voices sing in the ancient tongue of Cornwall.

Comely in a Cornish kilt, Janet Fennell pours out her passion for the Celtic past—and her vision of its future.

"I have learned to speak Cornish because I am Celtic. I taught my daughter to speak it, so she will feel Celtic too. We are Celts—not English, not Anglo-Saxons. We must make our heritage live, as must the Irish, the Welsh, the Bretons, the Scots, and the Manx. We possess something sacred and beautiful that must not die."

With sable hair burnished in the flame light, with fiery eyes and fervent mien, Janet made a figure as romantic as her words. And the glow of revival almost exorcised troubled voices I had heard in the Atlantic islands and peninsulas on Europe's Celtic fringe. I had found fires of "Celtic" nationalism fueled by political, economic, and social discontent.

Plagued with common woes today, perceiving a shared ancient culture through the lustrous prism of centuries, peoples with motives as mixed as most ancestry link hands under the banner of Celtic unity. Some, like my friends here in Cornwall, and in Ireland, and on the Isle of Man, work quietly to renew language, music, and festival. Others in Scotland, Wales, and Brittany press for autonomy. All seek a sense of identity. Once scorned as backward peasants, often punished for speaking languages learned at their mother's knee, many today take pride in their difference.

"We have a different culture," Janet went on—"different traditions and values. We are more intuitive, mystic, melancholy, impulsive. We are more attuned to nature, less

Cut into a chalk hill, a gigantic horse commands the site of a first-century B.C. Celtic fort at Uffington, England. Visible from 20 miles away, the 360-foot-long figure probably staked a territorial claim. Unlike the highly organized Greeks and Romans, the Celts, with their sense of individuality, never

materialistic." Indeed, the Celts have left us haunting love tales, wondrous sagas, poetic bardic lore—not to mention the mesmerizing imagery of Yeats, Synge, Joyce, Dylan Thomas, and others of a more modern day.

On that fiery Midsummer Eve in Cornwall, as pinpoints of yellow light flickered into flame from hilltop to hilltop, one could feel the magic of that timeless land steeped in legends of King Arthur, where the wizard Merlin seems to cloak in myth each stone circle, each Celtic cross, each ancient field and hamlet and headland. From one end of Cornwall to the other, and in Brittany across the narrow sea, a chain of beacons set the night on fire, as in those dark distant days when the Celts spanned the Continent. (See **Celtic Europe**, a supplement to this issue.)

"*K*elt or *S*elt? Which is the right pronunciation?" friends asked when I set out to explore the more than 2,500 years of Celtic heritage.

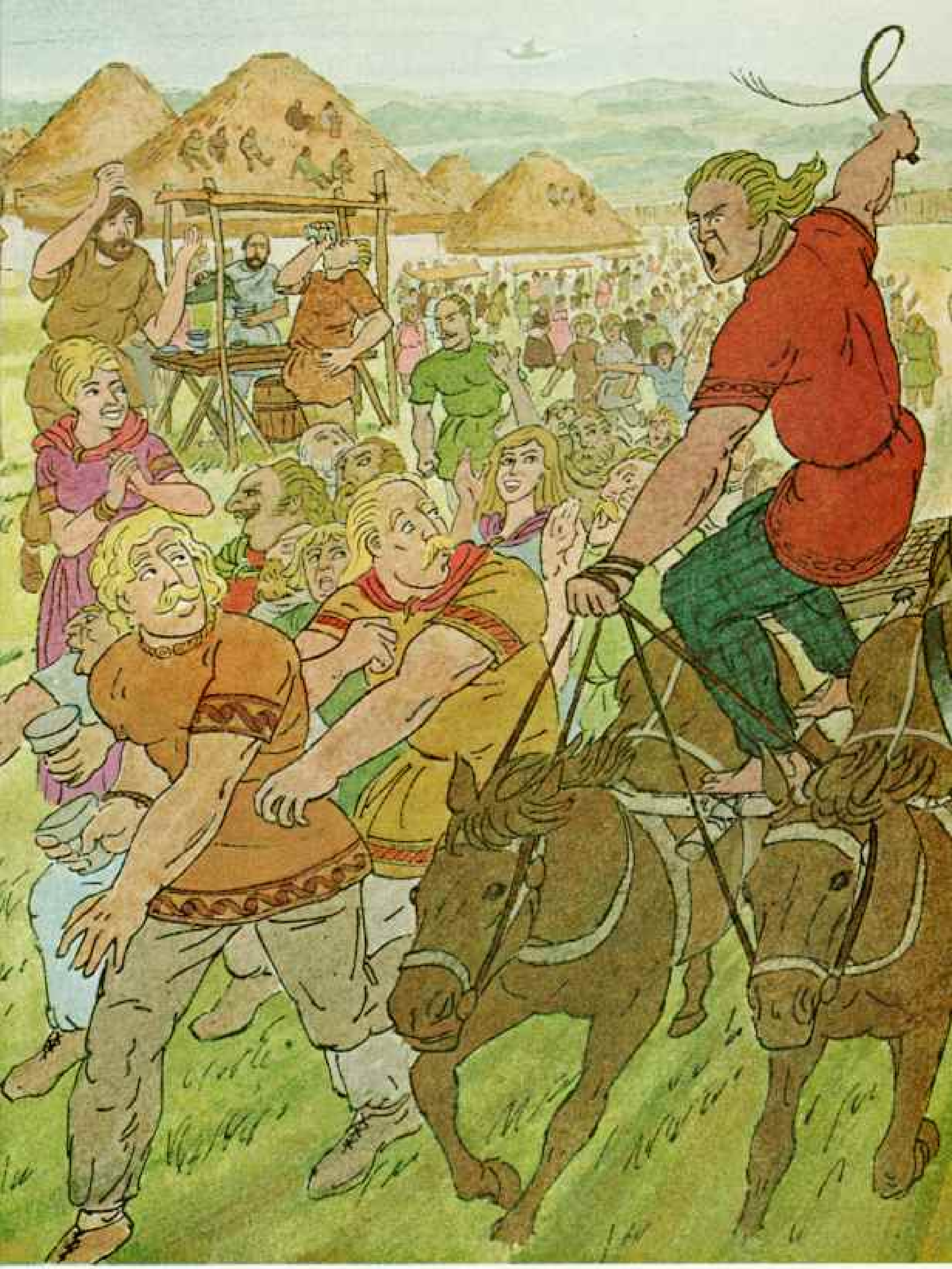
Either. To the Greeks they were Keltoi. Germans call them Kelten; French soften it to Celtes. Irish leave their *K*eltic homeland and root like *k*razy for the Boston *S*eltics.

"Who were the Celts? What were they like?"

The Celts were a group of related tribes, linked by language, religion, and culture, that gave rise to the first civilization north of the Alps. They emerged as a distinct people in the eighth century B.C.—about the time Homer was composing his *Iliad* and *Odyssey*, the Olympics were starting, and legendary Romulus and Remus were founding Rome.

The Celts were energetic, and most inventive. They introduced to northern Europe the use of iron. Iron for tools and weapons, abundant, more efficient than bronze in felling men and forest, tilling the soil, providing transport. And in seven centuries of cultural dominance,

coalesced into a political empire. Yet these tribes are known as a distinct people because of similarities in language, religion, and material culture. At its height in the third century before Christ, the Celtic realm extended from the North Sea to the Mediterranean and from the Black Sea to the Atlantic.



Thundering down the stretch, furiously driven chariots clash in a horse race, the main event of a Celtic tribe's annual assembly. The action takes place around a 600-yard track at the hill fort called Pilsdon Pen in southern England. Expert horsemen, Celtic warriors were

as rash in sport as in battle. In the thick of competition, a driver would often run back and forth on the bar between the horses as his chariot hurtled forward. Riotous merry-making prevailed at these festivals, though it was a serious offense to break the peace.

they created Europe's first major industrial revolution, its first common market, its first international court of arbitration.

Celts introduced soap to the Greeks and Romans, invented chain armor, were first to shoe horses and give shape to handsaws, chisels, files, and other tools we use today. They developed seamless iron rims for their wheels; set our standard 4-foot-8½-inch railroad gauge with the span of their chariots; pioneered the iron plowshare, the rotary flour mill, a wheeled harvester two millennia before Cyrus McCormick—and secured women's rights centuries before late bloomers began to roast male chauvinist pigs.

Celts measured time not in days but in nights, divided months into a bright half and a dark half, and created an art style of uncanny beauty that endured 1,500 years. From their imagination emerged Arthurian and Grail legends, and the romance of Tristan and Iseult, so Celtic in its ardent beginning and tragic ending. They also devised a cagey put-off for paying up: Since Celts saw no real break between life and death, a debt could be carried over into the otherworld.

At their height, around the third century B.C., their sway extended from the "end of earth," Cape Finisterre in Spain, all the way to the Black Sea, and from the North Sea to the Mediterranean. Map names trace their spread along Celtic rivers: Danube, Rhine, Seine, Thames, Shannon. In Celtic settlements such as London, Lyon, Geneva, Strasbourg, Bonn, Vienna, Budapest, Belgrade, Coimbra, Ankara. Paris recalls the Parisii, a Celtic tribe, and Rheims the Remi. Helvetia, poetic name for Switzerland, comes from the Helvetii; Belgium, from the Belgae. The Boii descended into Italy, left their name in Bologna, made their home in Bohemia.

Celts seemed wild-haired barbarians to Greeks and Romans. This figure appears on a Roman pottery shard.

To the Romans, Celts were Galli. And the Gauls of Caesar's Gallic wars were related to the Gaels of Ireland and Scotland, to the Celts of Galicia in Spain and Galicia in Poland, and to the Galatians in Asia Minor, to whom St. Paul sent an Epistle.

So the Celts were not on the fringe but central to Europe's rise. I'd find their culture surfacing in many surprising survivals.

AT MEDIEVAL Charles University, clustered about the Old Town Square in Prague, in Bohemia, I met Professor Jan Filip, patriarch of Celtic prehistory. The vigor of his stride belied his three score and 16 years.

"Where did the Celts originate?" I asked. "From what ethnic roots?"

With his strong hands he made a swath through Europe's heartland, from Bohemia and Austria through southern Germany and Switzerland to eastern France. "Here, at the dawn of the Iron Age, a confederation of tribes known later as the Celts emerged from a prehistoric complex of related peoples.

"We know these ancestors by their burial practices. Nearest in time are the Urnfield people. Their large cremation cemeteries show a farming folk settling about 1200 B.C. amid the Tumulus culture, whose burial mounds are contemporary with the Bronze Age Mycenaean civilization in Greece. And before them came the Corded Ware or Battle-Ax people of 2300 B.C. Philologists think these people were the first Indo-European speakers to enter central Europe.

"Modern archeology has achieved a new and fuller picture of the Celts before they burst upon the European stage. While they never managed to forge an empire, a stable state, or even an absolute ethnic unity, they laid the economic, social, and artistic foundations of northern European civilization. We owe a great debt to this Celtic heritage."

An early snow was spreading a white pall over the vast prehistoric cemetery at Hallstatt as I hiked up a hanging valley in the Salzkammergut region of Austria. Here, beginning in 1846, systematic excavation

revealed two thousand Iron Age graves, the greatest assemblage then known. It yielded long, heavy swords, daggers, axes, caldrons, pottery, and jewelry with striking geometric and animal motifs.

More sumptuous grave finds in this style—often including a ceremonial wagon to speed the warrior to the otherworld and a haunch of boar to feast him en route—later came to light near princely citadels of the sixth and fifth centuries B.C. along the upper Danube and Rhine. Wine amphorae from Massalia (Marseille), founded near the mouth of the Rhône by Greeks in 600 B.C., a gold spoon, and garments embroidered in silk hint at the ostentatious wealth at the Heuneburg, a Hallstatt chieftain's stronghold, still being excavated in Württemberg.

But it was the simpler graves at Hallstatt, opening a window on an early industrial community that traded salt mined at the head of this remote and lofty valley, that named an archeological age.

My companion that snowy day at Hallstatt was Dr. Fritz Eckart Barth of Vienna's Natural History Museum. We climbed to a tunnel cut into the Salzberg, Salt Mountain, where men have burrowed for 3,000 years.

We squeezed into a shaft hacked out by Celts and reopened by Barth's crew. With his light he traced a heart-shaped lump of rock. I ran my fingers over it and licked them. Salt. But why the heart shape?

"Cut this down the center, crack out the lobes, and you get two chunks. Each just fits into a miner's backpack," said Dr. Barth.

In Hallstatt's museum I had seen a leather backpack, pick and spade, firebrands that lit the miner's toil, leather cap, shoe, even pieces of the rough-woven tunic he wore. But I was a couple of centuries too late to meet an ancient Hallstatt miner in the flesh. Dr. Barth took me to the place where in 1734 miners discovered a Celt buried in salt. "Probably caught in the avalanche of about 300 B.C., which filled the shafts. It preserved him like a salted fish." Miners carried him down to the village. But superstitious villagers feared this "devil," and the priest cast him out. A pagan, he could not receive Christian burial in the churchyard. "So we don't know where he ended up," said Barth.

During the Hallstatt period, Celtic culture flourished in much of Europe. From Spain and Britain all the way to Hungary, hill forts and fortified settlements rose—serving not just as chieftains' citadels, refuges for man and beast in time of peril, and religious sanctuaries, but increasingly also as centers of commerce, production, and population.

Mont Lassois, near the headwaters of the Seine, I found hauntingly lonely. Only hints of rampart amid the brambles told of life twenty-five centuries ago in this citadel in eastern France. I looked down over the clustered red-tiled roofs of the village of Vix to a field along the tree-shaded Seine.

There in 1953 René Joffroy made one of this century's most exciting finds. In the mud and snow of that river-invaded field he discovered vestiges of a Hallstatt tumulus 138 feet across and perhaps 20 feet high. Gallo-Roman settlers had leveled it centuries ago, quarrying its stone for houses and a road that passes nearby. At center he uncovered a burial chamber. Amazingly, it had not been rifled.

Around 500 B.C., in summer when the river was low, a woman about 30 years old was laid to rest on a funerary wagon in a wood-lined pit in the sand. Decked in brooches and surrounded with riches, she wore an arc of gold on her head. A Celtic princess!

In the museum at Châtillon sur Seine I studied that elegant diadem, ending in knobs graced with winged horses in Scythian style; the amber jewelry, the silver bowl, bronze basins, the black-figured Attic cup, the splendid Etruscan beaked flagon. But I marveled most at the bronze krater with archaic Greek warriors and chariots marching around its rim—the most stupendous Greek wine-mixing vessel ever found. Its very size intoxicates: Thirteen feet around, it stands as tall as a man and weighs 460 pounds.

Bespeaking the Celts' wealth and love of finery, the treasure of Vix attests to trade links with the Etruscans in north-central Italy and the Greeks in southern Italy. It also shows how high women stood in Celtic society. Three sumptuous burials are known near Vix: Two are of women.

What did the Celts give in return for this krater and the wine to fill it? Mont Lassois' wealth derived not from the usual Celtic trade in slaves or iron or pork but from tolls, René Joffroy said. Controlling the head of navigation on the Seine and the tin route from Britain, the fortress could exact heavy tribute.

Here Cornish tin coming upriver by boat was transshipped by packtrain over Alpine passes or down the Rhône corridor to Massalia, and thence to the bronze workshops of Italy. Merchants gathered to exchange the goods of two worlds.

"So this splendid krater most likely was a diplomatic gift by the southern merchants to assure that the route would stay open," concluded Joffroy. "And like diplomatic gifts today it might have been kept for display and never used for mixing wine."

But with that punch bowl's 1,200-bottle capacity, I couldn't help thinking what bacchanals the princess could have thrown. I consider it a tribute to the Celtic thirst.

ON THE SEVERE WINTER of 1853-54, lowering waters in Lake Neuchâtel in Switzerland uncovered votive offerings at a site called La Tène, The Shallows. Excavations in 1880-85 and 1907-17 produced 2,500 weapons, utensils, and scabbards with refined, curvilinear designs that were distinct from the earlier, geometric Hallstatt style.

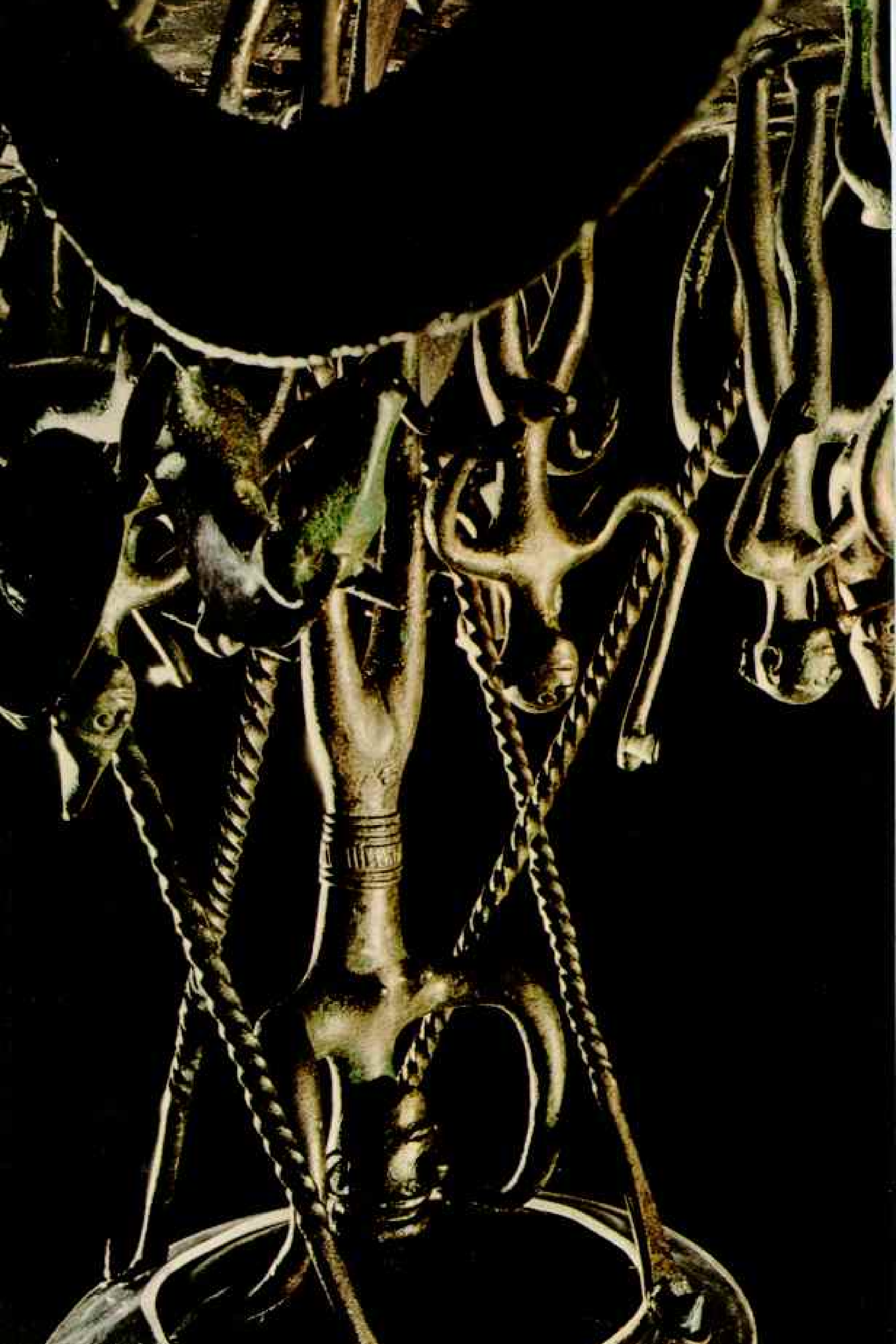
Archeologists, who had named the early Iron Age north of the Alps (about 800-500 B.C.) after Hallstatt, the Austrian site, called the later Iron Age (about 500-50 B.C.) the La Tène period, after the Swiss site.

Early in the La Tène period, coinciding with the Golden Age of Greece, there was a wave of Celtic expansion, probably due to overpopulation and social tensions. Younger sons of chieftains would set out with part of the tribe to carve out swordland of their own.

The sword they wielded was a masterpiece of forging—varying hardnesses of carbon steel layered into a long and narrow blade, sharp-edged and flexible. Little wonder that the smith, who wrought miracles with fiery metals amid showers of sparks, was considered a wizard. *(Continued on page 600)*

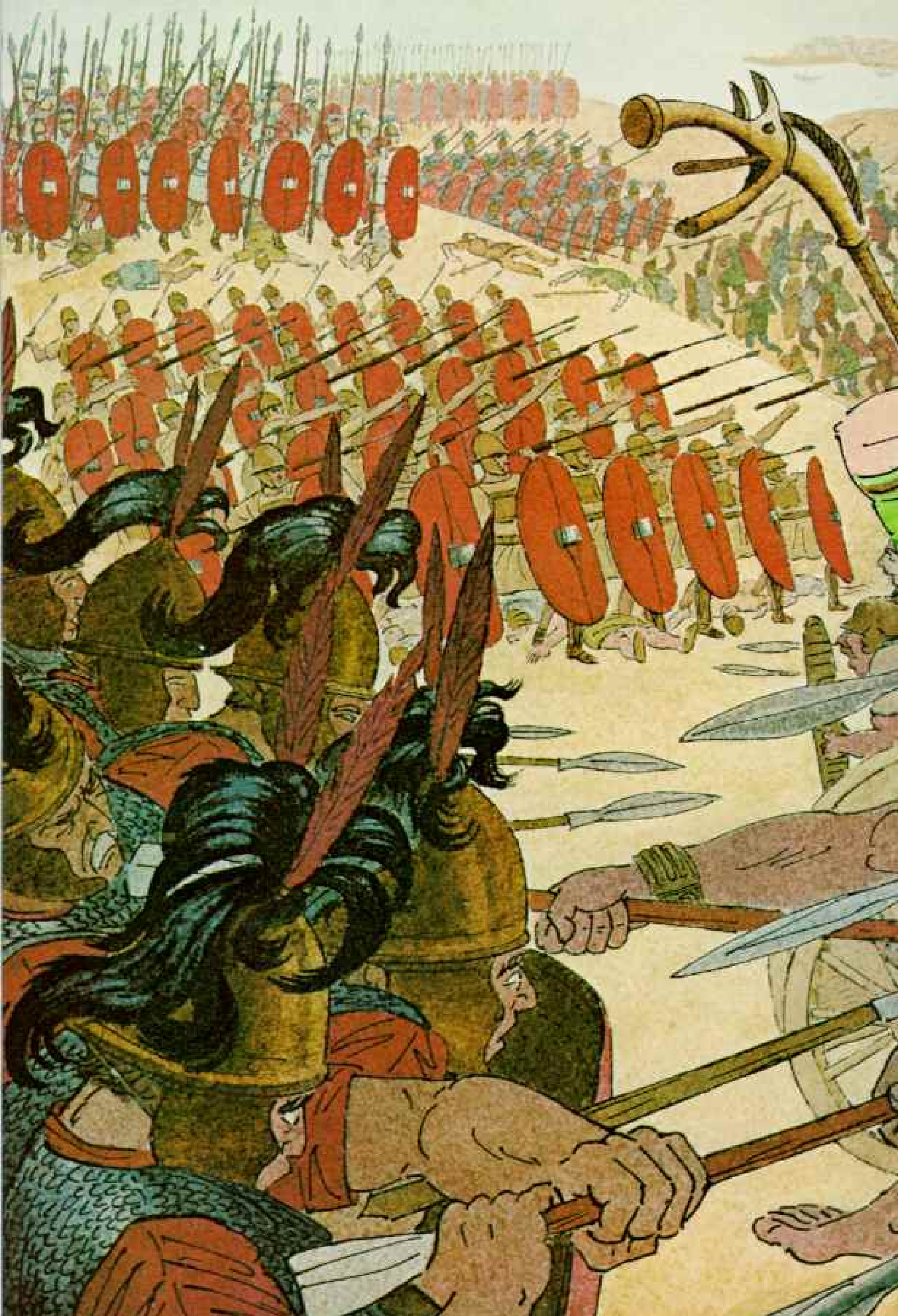
Presiding at a stag hunt, a ten-inch goddess towers over her warriors on a miniature bronze cult wagon from Strettweg, Austria. The cart was buried with a chieftain in the seventh century B.C. By then metalworking was transforming the Celtic world, especially in art and in the use of iron for weapons and tools.

ERICH LESSING, MAGNUM



Ready for battle, a Celtic warrior was an awesome sight. From his side hung a dagger and sword; in his hand he clutched a spear and wooden shield. His long hair, stiffened with lime, bristled like a horse's mane. Some warriors fought naked.

The Celtic obsession with warfare showed even in ceremonial objects, such as an iron and bronze helmet (**above**). A bronze shield (**left**) was thrown into the Thames as an offering to a river deity. On the hilts of swords, fanciful heads appeared (**right**), lending esthetic grace to lethal purpose. Much of the fighting centered around fortified settlements called oppida. Maiden Castle in England (**below**) once sheltered 5,000 people. Despite its seemingly impregnable series of earthworks, the fort fell to the Romans in A.D. 43.



"**Madly fond of war,**" according to one classical source, the Celts charged into battle, challenging opponents to single combat. Their tactics met with disaster in 225 B.C., when Celtic forces were caught between two Roman armies near Telamon in Italy. The Celts enjoyed early success, capturing the head of a Roman consul. But the Roman troops, sparked by deadly javelin throwers, eventually crushed the less disciplined Celts. For the next two hundred years the Romans regularly battled Celtic forces in Europe.

Feasting and fighting often mixed when a chieftain threw a victory banquet for his warriors (**above**). Sitting on skins, listening to song, the warriors drank vast amounts of wine and mead and tore at pieces of meat. The favorite dish was boar, and the chief presented to his finest warrior the hero's portion—usually the thigh. Often the choice was challenged. Boasts and taunts flew until daggers were drawn in sometimes deadly combat.

The king must die! In ancient Ireland when a monarch showed signs of aging, or could sire no offspring, or if the fortunes of his tribe were failing, he was ritually slain. Inside a ring of human skulls, the naked king would face a Druid—a Celtic priest. Druidesses, elaborately tattooed, presented offerings and sacrificial animals. After stabbing the king, the Druid predicted the future by studying the convulsions of the body and the squirting of blood.

Riot of shape and texture, this inch-wide gold bead from Hungary exemplifies the profuse decoration common to Celtic art. Borrowing elements from classical and eastern art, Celts added imagination and superb craftsmanship. The resulting style was a dazzling mix of complex designs and abstract forms, far from the symmetry and naturalism of Greek art.

(Continued from page 590)

Celts now used the two-wheeled war chariot, and cavalry in tactical units of three—a noble and two companions. Tribal foot soldiers, armed with spears and slings, bore tall wooden shields adorned with metal bosses.

It was in this wave of expansion that Celts fell upon the cities of the classical world, shocking them by the force of their assaults, their reckless courage, their thirst for plunder. In 387 B.C. Gauls sacked Rome. Others pushed eastward along the Danube, traversed the Balkans, and in 279 B.C. pillaged the famed Greek sanctuary of Delphi.

Some 20,000 Gauls crossed the Hellespont into Asia Minor, settling around Ankara, a region henceforth known as Galatia—whence St. Paul's Galatians. Six centuries later St. Jerome found the Galatian speech similar to that of the Treveri he had heard at Trier on the Moselle. In demand as mercenaries, Celtic bands ranged as far afield as Sicily and Egypt.

Much about these warriors caught the classical eye. Gallic he-men bleached their hair, adorned themselves with jewelry, loved loud tunics and checked cloaks. That their "barbarian" speech would grate on Greco-Roman ears was only to be expected of outlanders who wore not the "civilized" toga but the trousers of a horse-riding people. Some wore chain mail. Others fought naked. Clad only in torques, or sacred collars, and bracelets, with limed locks stiffened like a horse's mane, and sporting formidable mustaches, Celtic champions would strut before the foe, brandishing their arms, boasting of their prowess, hurling taunts and insults.

They not only looked big, some *were* big. Near Milan, a city the Celts founded, Italians recently unearthed the skeleton of a warrior who stood six feet five. Certainly they were magnificent physical specimens. For one thing, they exercised girth control. A fat warrior was fined.

The Celtic assault, when it came, curdled the blood: the blare of giant boar-headed war trumpets, the clatter of chariots, the hammer of hooves, the whir of slingstones, the thud of spears, the shock of shields, the clang of swords, the neighs and shouts and screams.

"The whole race . . . is madly fond of war," comments the Greek geographer Strabo. And Diodorus Siculus, the Greek historian, tells us, "They cut off the heads of enemies . . . and attach them to the necks of their horses." Singing in triumph as they carried off these trophies, they nailed them upon their houses. "They embalm in cedar oil the heads of the most distinguished enemies, and preserve them carefully in a chest, and display them with pride to strangers. . . ."

In Marseille and Aix en Provence in France I saw niches with skulls and rows of stone heads from the Celtic shrines of Roquepertuse and Entremont.

Feasting when not fighting, or hunting, or trying to outdo one another wrestling, gaming, or racing their treasured horses, hot-headed Celtic warriors often turned feasts into bloody brawls. Gathering in a chieftain's hall, sitting cross-legged on wolf skins, they would consume prodigious portions of wild

boar. And guzzle wine, beer, or mead until they fell "into a stupor or a state of madness," reports Diodorus.

Jugglers or buffoons entertained in the light from the blazing hearth. A bard, strumming a lyre, would recite bold deeds of his host. Guests would top one another's tales of valor. Tempers flared; drawn swords glinted. Presenting the traditional hero's portion was a chief of protocol's nightmare (page 597). Greek historian Posidonius tells us: "When the hindquarters were served up, the bravest hero took the thigh piece, and if another man claimed it, they stood up and fought in single combat to the death."

But if we think these men rough, here's what Roman historian Ammianus Marcellinus says of the gentler sex: "A Gallic woman, fighting beside her man, is a match for a whole troop of foreigners. Steely-eyed . . . she swells her neck, gnashes her teeth, flexes her huge white biceps, and rains wallops and kicks as though from the twisted cords of a catapult." And when Queen Boudicca of the Iceni took the warpath in her chariot, she shredded Roman legions and burned Londinium—Roman London—to the ground.

Not that all Celtic women were Amazons, nor that all Celtic men looked like "The Dying Gaul," that famous Hellenistic statue of a Galatian warrior. Many were short and dark haired. "The tall, fair-haired, blue-eyed warriors described by classical writers were probably a ruling caste spread thinly over indigenous populations," Professor Filip had pointed out. But this Celtic aristocracy, imposing its language, artistic tastes, and way of life on the populace, set the style of civilization consolidated in the economic expansion that followed the La Tène conquests.

MANCHING, capital of the Vindelici tribe in Bavaria, burgeoned inside a four-and-a-half-mile wall, its thousand acres nearly as extensive as Republican Rome. Sited to control two trade arteries, where the east-west route along the Danube intersects that between the Northern European Plain and the Adriatic, Manching traded grain from its 160 storage pits, smelted and smithed iron and copper, tanned hides, milled flour, produced colored glass and painted wheel-made pottery, and minted gold and silver coins. Door locks on the narrow wooden houses guarded private property.

Craft specialization, improved tools, and standardized design, artfully blending form and function, spurred mass production of metalware and ceramics for export from such proto-industrial settlements. Artisans and merchants in search of patrons and profits crisscrossed the Celts' continent-wide common market. The horseshoe, a La Tène invention, indicates tracks now extended across rocky terrain, cruel to unprotected hooves.

Religion was another bond in Celtic society. Each tribe had its local deities and cults; hundreds of names of gods and goddesses are known to us. But their roles and rites had much in common—just as the priestly caste of Druids was a pan-Celtic institution. Druids exercised great political influence, forecasting the future, fixing auspicious times for enterprises, educating the young nobility, conserving traditions. Once a year they met in solemn assembly in Chartres, tribal center of the Carnutes, in Gaul. There they settled disputes between nobles, and even mediated conflicts between tribes. To enforce their judgments, this supertribal court wielded the weapon of excommunication—exclusion from the sacrifices central to Celtic religion.

Tacitus tells us of the bloodstained Druid altars of Anglesey in Wales. Caesar describes mass human sacrifice in Gaul: "Some of the tribes make colossal wickerwork figures, the limbs of which are filled with living men: these images are then set alight and the victims perish in a sea of flame." No matter that burnt offerings on such a scale were only in times of crisis—plague, famine, or invasion—and the victims often criminals or prisoners of war. The Romans, having themselves given up human sacrifice (though still massacring captive men, women, and children and reveling in blood sports), expressed shock.

Béat Arnold, a young Swiss archeologist, was discussing that period as we stood overlooking Lake Neuchâtel, the Bernese Alps rising snow crowned beyond, the wall of the Jura rising darkly at our backs.

"We know of 258 prehistoric sites around this lake," he told me. "It's incredible what archeological treasures must lie *under* those waters!" Arnold recently had retrieved an example: the best-preserved early Celtic ship

Trophy, charm, or ornament, the human head figured prominently in Celtic life. Warriors hung enemy heads on their houses as a show of prowess, and Druids, believing that the head harbored the soul, placed skulls in sanctuaries to ward off evil. Masklike faces appear on an axle pin (**bottom**), the handle of a flagon (**left**), and a pottery vessel (**top**). A life-size sculpture (**following pages**) depicts a god looking forward into the otherworld, and backward into the realm of the living.

yet found. He pointed out the spot 70 yards offshore where he and his scuba-diving team had excavated the 60-foot, single-masted cargo vessel, preserving the pieces for reconstruction. Aerial photography had exposed its shadowy outline on the lake floor. Sailed, or towed by men bending their backs alongshore, big flat-bottomed barges like this, with large cargo capacity yet shallow draft, could negotiate the chain of rivers and lakes that funneled goods from the Mediterranean into the heart of Europe.

La Tène commanded a strategic channel on that route—where Neuchâtel's waters flow out northeastward toward the Rhine. Today it is a vacation camp, crowded with trailers and pleasure boats. But I could imagine it thronged with Celtic traders and bargemen, paying tolls to a Helvetian chieftain or making offerings to appease the temperamental gods of the waters.

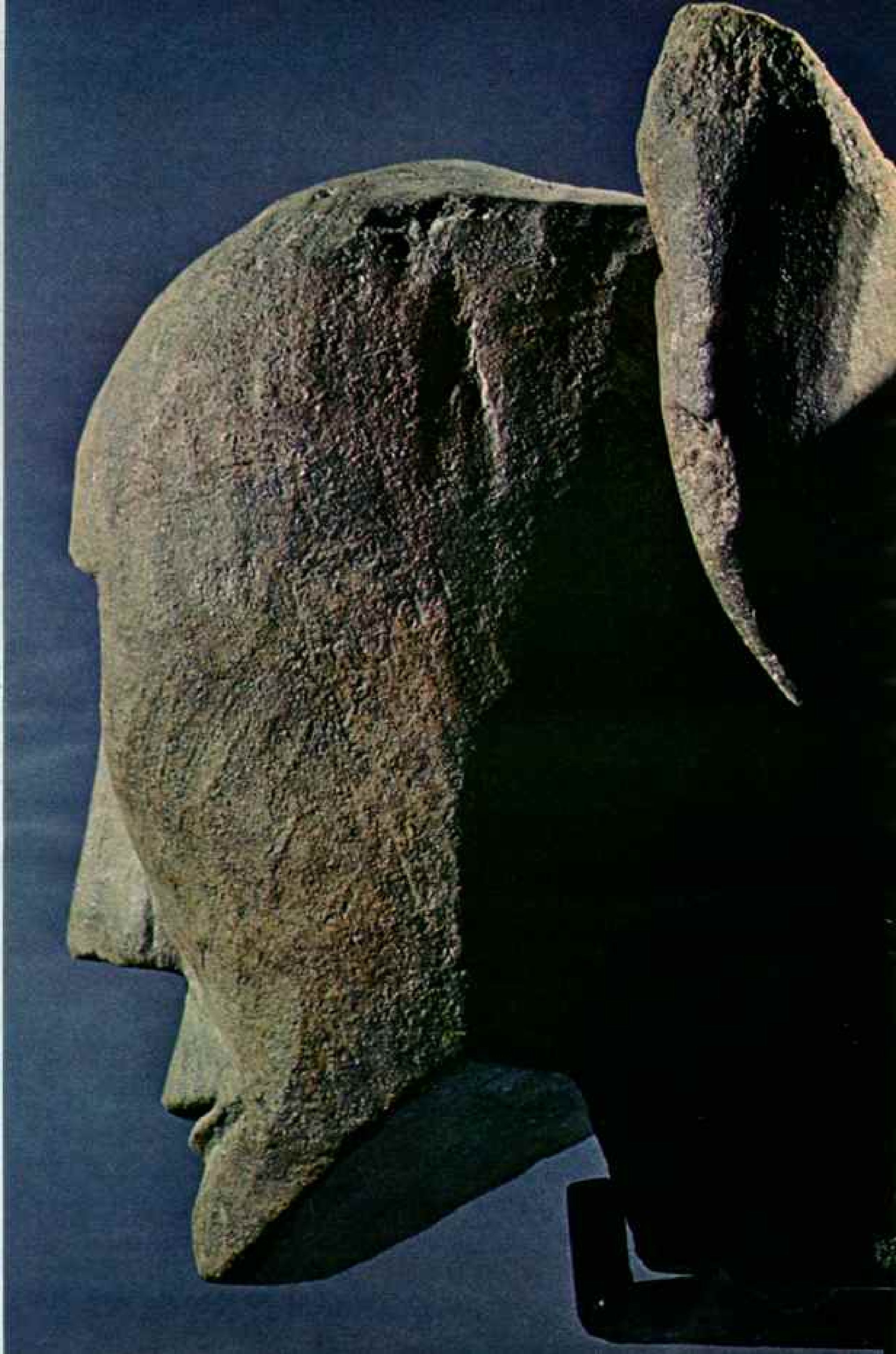
Three of Europe's greatest rivers, flowing into three different seas, start near one another in the Celtic heartland. High in a Black Forest meadow I sipped from a German spring whose waters wend 1,776 miles to the Black Sea. A hundred paces from this fountainhead of the Danube lies the watershed of the Rhine, which ends its 820-mile course in the North Sea. At the foot of a Swiss glacier just 15 miles from the Rhine's source I witnessed the icy birth of the Rhône, which 505 miles later warms its waters in the Mediterranean. Along these rivers I traced the trade routes and avenues of expansion of the Celts. And from one end of Europe to the other, I found exquisite Celtic art objects in that style named for La Tène.

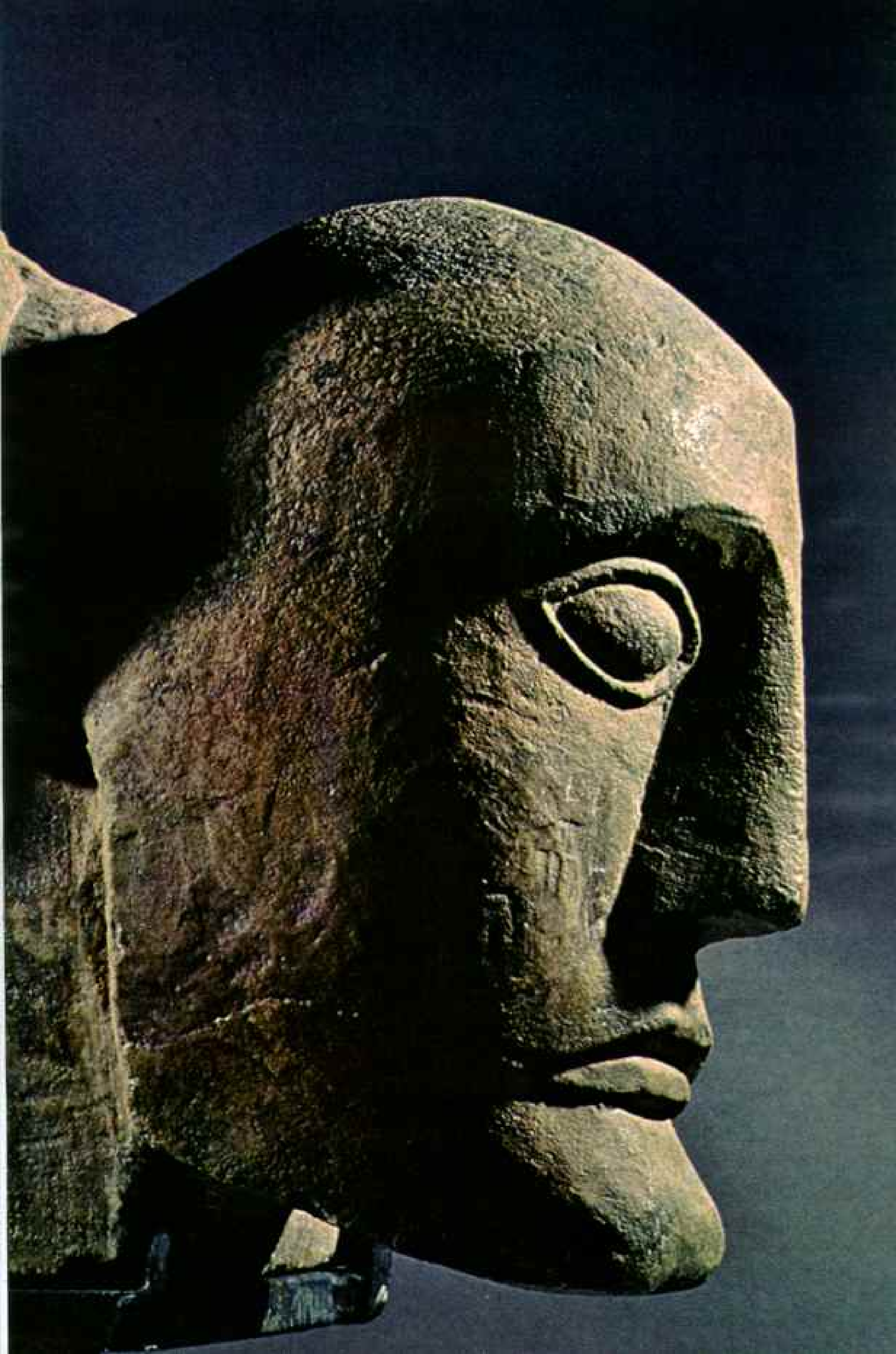
Art for the Celt was not on the fringe, but central to life, imparting both surface decoration and supernatural power to scabbard and ceramic as well as to brooch and bracelet.

To 19th-century eyes that considered the classical "Apollo Belvedere" the paragon of art, this enigmatic, sinuous exuberance seemed outlandish. But with perceptions conditioned by 20th-century Matisse and Picasso, I found it fresh and fascinating.

"That's what makes Celtic archeology so exciting. Celtic art is abstract art, much like modern art. It speaks forcefully to us today."

Dr. Miklós Szabó, in the forefront of East European scholars working to make known the Celtic heritage of the Carpathian Basin,





was talking with me in the Fine Arts Museum in Budapest, Hungary.

"Celtic art bridges two ages, mixes east and west, the natural and the supernatural. Little wonder it is ambivalent," Dr. Szabó continued. "Janiform sculptures from Britain to Hungary symbolize this: two-headed gods looking in opposite directions, ruling over life both here and now and beyond the grave. Celtic art—like Celtic sagas and folklore—transcends the bounds between reality and fantasy.

"We find the same motifs engraved on Celtic chieftains' sword scabbards in Hungary, Switzerland, Yugoslavia, and Britain," Dr. Szabó went on. In fact, similar motifs can be found in the exquisite filigree on Ireland's eighth-century Tara brooch and Ardagh chalice, in the illuminated pages of the ninth-century *Book of Kells* (page 620), and in sculptured tenth-century high crosses—an amazing continuity of art style.

In the sixth century B.C. the Scythians, nomads from the Russian steppes, invaded central Europe. A Scythian-type culture had long flourished on the Great Hungarian Plain, Dr. Szabó reminded me. "Trade diffused steppe traits westward, thus influencing Celtic art and society."

RIDING EASTWARD across that Great Hungarian Plain, I reflected on the Celts' debt to the steppe cultures. These gave more than just stylized animals in consummate gold craftsmanship. They gave that animal central to Celtic heroic society—the war-horse. With it came distinctive bronze bits and harness trappings—even the horseman's trousers, the *bracae*, or breeches, that startled Roman eyes. And the head-hunting that made Roman hair stand on end. The Scythians fashioned skulls of foes into cups and drank from them. Chieftains lined such trophies with gold—as would the Gauls. They gilded the skull of a Roman consul whose army they had destroyed and used it for libations at a shrine, "as their custom is," reports the Roman annalist Livy.

Wagon burials of Hallstatt chieftains were an eastern trait; also the art of fighting on horseback. Spirited horses on Hungary's pusztas, or plains, today echo the hoofbeats of the famed Gallic cavalry.

A warrior's horse was his badge of nobility; commoners fought on foot. In rank and role in society and personal allegiance to his chieftain, the Celtic knight foreshadowed the feudal knight in the Age of Chivalry (itself named from *cheval*, French for "horse"). Horses were in the Celts' blood. In their religion too. Epona, the horse goddess, is represented more widely than any other Celtic deity. At racetracks today Celts still seem to worship the horse.

Looping south and then eastward, the Danube cuts through the Carpathians. The name of that passage—the Iron Gate—and the belching smokestacks and rising slag heaps of Bulgaria recall Balkan gifts to Celtic metallurgy. Here, even as early as in Asia Minor (traditionally honored as the sole cradle of the metallurgical revolution that heralded the Bronze and Iron Ages), people long skilled in mining and smelting local copper alloyed it with imported tin to "subtly mold the breathing bronze" 3,500 years before Vergil cast that line.

Balkan metal-founding techniques, spreading westward, underpinned Celtic technology. And astonishing Thracian gold masterworks, rich in animal motifs and symbolic ornamentation, are emerging from an estimated 15,000 Thracian burial mounds and tombs to document another source of Celtic inspiration. This links Celtic art with the ancient Near Eastern art tradition, as well as with later Persian influence resulting from Darius the Great's conquest of Thrace in 513 B.C.—two decades before the Athenians defeated his army at Marathon.

Eastern influence shows in the embossed silver Gundestrup caldron, that marvelous mélange of mythic beasts, gods, and heroes in sacrificial rites (pages 582-3 and 612-13). Found in a Danish peat bog, it was created perhaps by Danubian Celtic artists at Singidunum, today Belgrade.

Following the Danube across the Romanian plain, I came to where the river decants its sediments—80 million tons a year—in a vast and marshy delta and flows through a triad of mouths into the Black Sea.

By that sea an ancient city stands open to the sky. Strolling Histria's empty streets and plazas, I seemed to hear voices: the ghosts of history telling of its founding by Greek merchants 26 centuries ago. Of its trade with the Scythians, and with tribes up the Danube, an

active corridor. Telling of Alexander the Great.

In 335 B.C. Alexander marched north from Macedon in his Danubian campaign against the Getae. Defeating them and burning their capital, he recrossed the river to his camp. There Celtic envoys arrived from the Adriatic —"people of great stature and haughty disposition," wrote the Greek historian Arrian. Knowing of the Celts' valor, Alexander asked what Celts feared above all else.

That the sky might fall on their heads, came their reply.

Boastful chaps, muttered Alexander. He had expected they would fear *him* most.

LESS THAN THREE centuries later, the sky did fall on their heads. When Julius Caesar catapulted to fame and power over the bleeding corpse of Gaul, it was the beginning of the end for Celtic hegemony across the Continent.

What triggered it was the migration of the Helvetii from their cramped homeland around Lake Neuchâtel. Heeding some Celtic Horace Greeley, the Swiss tribe in assembly decided to go west to seek broader lands on the Atlantic coast of Gaul. They set about it in thorough fashion, producing surplus crops for two seasons for their journey, rounding up cattle, building wagons by the hundreds, burning their 12 oppida, or fortified settlements, 400 villages, and thousands of homesteads to strengthen their resolve not to look back.

To the Romans this migration posed a threat: Dislocation of tribes in Gallia Comata (Long-haired Gaul) might put pressure on Rome's Mediterranean coastal province, her link with Spain. To Caesar, new proconsul of that province, it was a golden opportunity. He hurried north to block the passage between the Alps and the Jura where the Rhône leaves the Lake of Geneva. When the Helvetii slipped through a gorge, his legions pursued them into free Gaul, savagely massacred them, sent the remnants reeling back to pick up their lives anew amid the stubble of their scorched farms. A census on the eve of departure tallied 368,000 Helvetii and allies. Caesar reports that 110,000 got back.

Caesar now proceeded, in eight years of campaigns, to "pacify" Gaul, making the desert Romans called peace. The self-styled savior of Rome fought some 30 battles, took more than 800 towns, killed by his own count 1,192,000 men, women, and children.

Firsthand he learned the formidable virtues of the *murus gallicus*, the boxlike grid of timbers filled with rubble and faced with stone that girded many Celtic oppida from the Iberian Peninsula to the Carpathian Basin. The "Gallic wall" of Gergovia, capital of the Arverni in the Auvergne, repulsed Caesar. And only Herculean engineering feats enabled him to breach that at Avaricum (today Bourges) and slaughter the 40,000 habitants within. This was in the crucial year of 52 B.C., when Gaul at last rallied behind a young Arvernian chief, Vercingetorix.

Vercingetorix succeeded in raising the countryside in revolt, rabble as well as aristocrat. His strategy, unlike haphazard tribal raiding, stressed scorched-earth tactics: Put Gaul's own towns *(Continued on page 611)*

DRAWINGS OF GOLD COINS BY PAUL BREDDIN (LEFT AND CENTER); DAVID DOUGLAS DUNCAN

Spoils of war introduced coinage and a new medium of art to Celtic lands. In the third century B.C. tribes began minting coins based on classical models. The horse on a Macedonian coin (**left**) became on Celtic money a stylized shape (**center**), not unlike the figure seen in a recent work by Picasso (**right**).

Deities in animal form were revered by the pagan Celts. One of the most venerated creatures in the divine menagerie was the horse, reflecting its value in battle and sport. The horse goddess—widely known as Epona—ranks high among the Celtic deities. Art objects featured the horse, such as a four-inch bronze ornament from England (**right**) and a lead figurine from Austria (**below**).

Another prominent totem beast was the bull, its head shown on the ends of a 15-pound silver-coated torque, or sacred collar, from West Germany (**above**). In Irish legend a Druid, after drinking a bull's blood and eating its flesh, could identify the next king in a dream.

to the torch to prevent Roman troops from living off the land. Fight guerrilla warfare to cut off Caesar's supplies and reinforcements. Avoid pitched battles in which the fiercely independent Gauls, incapable of sustained combined actions, would stake everything on a single impulsive throw, lusting for glory—whether in victory or defeat.

But the Celtic cards were stacked against Vercingetorix. Many Gauls made the sacrifices he called for. Some couldn't. Others wouldn't. And when initial successes were followed by disasters, he withdrew with 80,000 Gauls to the oppidum of Alesia, "rocky hill" in Celtic.

Along the hedgerowed and forest-browed border of the Burgundy wine country I drove northeastward from Bibracte, where an assembly of Gallic tribes, clashing spears on shields, had acclaimed Vercingetorix their leader. I headed to where Mont Auxois rises peacefully among its ring of hills, bracketed north and south by rivers. On its shoulder clings the medieval village of Alise Sainte Reine—Alesia.

Immobilized behind his ancient Maginot Line here at Alesia, Vercingetorix waited. The Romans did not keep him long. Before the Gauls' unbelieving eyes, the legionaries ringed Alesia with fortifications, nine and a half miles around. Futilely, Vercingetorix hurled his elite horsemen at the entrenching Romans. Just before the ring closed, he slipped his cavalry out by night to summon relief from tribes far and wide.

Now Caesar's position grew critical. While starving out the fortress in front, he was vulnerable to attack from the rear by a levy en masse from all Gaul. Again he set his legionaries to the spade. Around the ring to keep Gauls in, they *(Continued on page 616)*

So chariots could roll swiftly over the rough roads of early Europe, Celtic blacksmiths invented the technique of forging iron tires, with the help of forced-air furnaces. At foundries, craftsmen hammered iron strips into circular rims that, when heated red-hot and applied to a wheel, would shrink to fit tightly. By 500 B.C. blacksmiths, highly regarded in Celtic society, were manufacturing most of the basic iron tools in use since then.

Treasure from a Danish peat bog, the silver caldron of Gundestrup (**below**) shines as one of the most striking and widely studied of Celtic relics. Scholars trace its origin to eastern Europe in the second century B.C. and believe it may have come to Denmark as war booty.

The 27-inch-wide bowl, buried in pieces as a votive offering, was not unearthed until 1891.

The outside plates feature a gallery of deity heads, such as a fertility goddess and her attendants (pages 582-3). Inside is a pageant of cult scenes. The Celtic horned god, Cernunnos, dominates one plate (**above**, in a Danish museum replica) as he holds court among his wild charges. Scholars disagree on the meaning of the procession (**right**). Some suggest that amid fanfare a slain warrior is being submerged in a life-restoring caldron.

Unshadowed by men in marriage or war, women attained a high place in patriarchal Celtic society. According to marriage laws, a woman continued to control all her personal possessions after she was married and could take them away should the bond unravel. If the wife's property exceeded that of the husband, the woman governed the household without the man's interference.

Celtic women, like the men, were vain. Eyeing themselves in elaborate bronze mirrors (**left**), they would tie on long, gaudy cloaks, paint their faces with herbs and berry juice, and wear ornaments such as silver brooches and bracelets (**below**). Little is known about the social life of Celtic women. A six-inch bronze statue from France shows a woman dancing (**right**).

The feminine touch was hardly gentle in battle. Wives frequently joined their husbands in war, inspiring wide-eyed accounts of their valor. The most famous woman warrior, Boudicca, burned Roman London in A.D. 60.

(Continued from page 611) raised another to keep Gauls out—this time 14 miles around! Between the two perimeters Caesar laid in food and fodder and readied his 40,000 men to fight in two directions simultaneously.

In the National Museum of Antiquities at St. Germain en Laye I had studied a model of those fearsome siege works: "minefields" sown with log-anchored iron hooks to rip and break legs; brush-covered "tank traps" with fire-hardened stakes embedded to disembowel man and mount; the "barbed-wire thicket" of sharpened forked logs legionaries called "tombstones." Then formidable double ditches. Finally the bristling earth-and-log ramparts topped with palisades and backed by redoubts and towers.

At Alesia the late September sun slid behind gray clouds, chilling me as I surveyed that scene where events of late September in 52 B.C., so distant, seemed so close.

The relief force arrives—more than a quarter of a million Celts from at least two score tribes. Though an agonizing six weeks in coming, disorganized, poorly deployed, this is a stupendous assemblage. The Celts fight bravely. But it is the headstrong, headlong heroism of Long-haired Gaul against the cold, methodical butchery of the clean-shaven legions of Rome.

Starving Celts, trying to break out of Alesia, die in the traps, on the tombstones, in the ditches, on the inner walls. Relieving Celts recklessly fling themselves on the outer ring. At one point they almost crack the barrier. But Caesar in his red cape swiftly moves reinforcements to stem the breach. His cavalry, at the strategic moment descending from wooded hills at the Celts' backs, turns the repulse into a rout.

Then, the climactic scene of Gaul's independence: Vercingetorix emerges alone from the gates of Alesia—tall, proud, resplendent in silver and enameled armor on his caparisoned horse. He rides down that hill, makes a ritual sunwise circle around the dais where Caesar is seated surrounded by the standards of his legions. Then he dismounts, flings down his weapons, and sits in silent submission at the feet of his conqueror.

Caesar sends him to Rome chained like a wild beast, six years later drags him from his cell, parades him through the Forum in a great triumph, then has him strangled.

IN THE WAKE of conquering legions, Gallic civilization literally went downhill. Augustus, for example, moved the Celts from the hilltop stronghold of Bibracte to the accessible river-plain city he named for himself, Augustodunum—Autun. Roman mortar knit Gallic dry-stone walls into triumphal arches, temples, amphitheaters, baths, and villas, just as the network of Roman roads and standardized administration tied Gaul into Rome's empire, open to Syrian traders and salvation cults from Greece, Egypt, Persia, and Palestine.

But though Romans found settlements of timber and made them stone, and Gallic magistrates adopted the toga and the name Julius, Roman Gaul remained Celtic Gaul in disguise.

Generally the new cities preserved the name and function of the old tribal centers, market and ceremonial towns for a countryside where life went on much the same while Celtic tongues and minds shaped Latin into French. The Gauls, a naturally superstitious race in Caesar's view, and "completely addicted to religious observance," continued to worship their Celtic deities, but gave them Roman names and sometimes sacrificed at Roman altars raised over Celtic shrines. Christianity in turn adopted these, together with many ritual elements.

From the three score Gallo-Roman cities, seats of bishops from the third and fourth centuries, churchmen sought to convert the *pagani*, dwellers in the *pagi*, the country districts, where pagan survivals color belief to this day. Like other Celtic regions, France, with one metropolis and more than 37,000 townships, is still essentially rural, with scattered villages and farmhouses. And with countryfolk fiercely attached to the soil their ancestors have worked for millennia.

Living at the mercy of nature's whims provides fertile soil for animistic beliefs—that guardian spirits of stream, tree, and mountain have to be propitiated, that omens are to be read in a shooting star, in hoofbeats in the night, in the ramblings of a village idiot. Worship of triads of goddesses, the "mothers" dear to the heart of common folk, survived as the belief in fairies. Old habits are hard to break—like the Celtic warrior who boasted of killing an enemy every day of the week. On becoming Christian, so as not to profane the Sabbath, he killed two on Saturday.

The Celts today

CARETAKERS of Celtic heritage, men of the Aran Islands speak the same tongue and struggle with land and sea in much the same way as their forebears did more than two thousand years ago.

A scattering of places still hang on to a Celtic legacy. The ancient languages survive in modern forms on the west coasts of Ireland and Scotland, in Wales, and also in Brittany, where Celts from England fled from Saxon invaders. In these areas thatched houses, simple farming tools, and robust folklore and customs hearken back to prehistoric days. These spots exist as Celtic time capsules largely because they were not occupied by the Romans. Cornwall celebrates the Celtic past with language revivals and festivals.

Keeping tradition afloat, Welshman Bernard Thomas navigates the River Teifi in his tub-shaped coracle, a kind of boat Celts paddled. Among the last to make these small boats, Thomas crossed the English Channel in one in 1974. Today canvas, not hide, covers the wicker frames, and the vessels are used mainly for fishing. A similar-looking craft is seen in a plaster copy of an ancient Celtic figurine (**right**).

For ambitious ventures, the Celts relied on a larger boat known as a curragh. According to Irish legend, in the sixth century A.D. the seafaring monk St. Brendan sailed a curragh to new lands across the ocean, perhaps even to America.

The blessing of horses echoes rites to the goddess Epona. Chartres, where Druids gathered each year, is a center of pilgrimage to this day. Nîmes remained the city of Nemausus, god of the healing fountain. Borvo, god of hot springs, gave his name to spas and the royal house of Bourbon. Springs of curative and fructifying power have been Christianized as holy wells throughout France.

In Dijon I studied votive offerings found at the oak-shaded shrine of the goddess Sequana at the headwaters of the Seine, named for her. The wooden limbs, kidneys, and bronze genitalia represented bodily ills for which supplicants sought cure. Most touching was the sculptured head of a girl with eyes closed by blindness. I fervently hope that faith in the goddess restored her sight at this pagan Lourdes.

In the fifth century A.D. the *furor Teutonicus* fell upon Gaul. But long generations of Roman peace and rule had given Gallo-Roman civilization the strength to absorb and mold her Germanic conquerors, already partially Celticized through contact with the La Tène culture in the forests of Germany centuries before. The Franks and Burgundians left their names in France and Burgundy. But what emerged from the medieval crucible was not a Germanic culture but one sufficiently Gallic to provide the many survivals so wittily played upon by the creators of Astérix the Gaul (pages 632-3).

"THE BIGGEST nonevent in Irish history is that the Romans never got here," my companion was saying. "Nor the Saxons. So we remained Celtic. We kept our peculiar patterns of society and customs, our Celtic approach to life."

Making a swing round the Celtic fringe of Eurasia, I had arrived in Galway, in western Ireland, where "the next parish is Boston." Etienne Rynne joined me for a drop in the King's Head after lecturing on Celtic archeology at the university—a small, quick man with a rush of words on him, and ideas battling for place of honor on his tongue.

"Our disunity saved us," Etienne went on. "When the Vikings stormed ashore, there was no central government to conquer, and no towns. So the Vikings built their own—Dublin, Cork, Limerick—and lived apart.

"Then the Anglo-Normans came. They built castles but couldn't conquer the country either. It's hard to, with 150 kings. You kill one, and his brother, ten miles away, takes over the chieftainship and starts up again. The result? For hundreds of years there were two Irelands: Gaelic Ireland in the countryside, Anglo-Norman in the towns. The old Celtic society persisted down to the 17th century. Mountjoy and Cromwell destroyed it with scorched earth, removal of Irish 'to Hell or Connaught,' and the planting of Protestant Scots and English in Leinster and Ulster."

"**Work of an angel,**" mused a visitor to Ireland in 1185, entranced with the beauty he saw in the manuscripts of the monasteries. Carrying on the rich decoration of Celtic art, these medieval Gospel texts, with their illuminated pages, reached a zenith of splendor in the *Book of Kells*, a ninth-century work on view at Trinity College in Dublin. Labyrinths of circles and swirls abound, as on a monogram page (**above**). To create this lavish art, monks toiled in scriptoria (**right**), with drawing instruments and vivid paints.

This was followed by the potato famine of the 1840's, which halved Ireland's Gaelic-speaking population through starvation and emigration.

The fate of Gaelic Scotland was equally tragic. It was mortally wounded in the Jacobite Rebellion of 1745. After the Highlanders' defeat at Culloden, the clan system was broken up, the bagpipe banned as an instrument of war, and the kilt outlawed. Then the infamous Highland Clearances replaced men with sheep and hunting ranges for gentlemen's sport—whence so many Gaelic speakers in Nova Scotia (New Scotland). In Scotland today the old culture clings only in the western Highlands and islands. As in the Gaeltacht, the Gaelic-speaking west of Ireland.

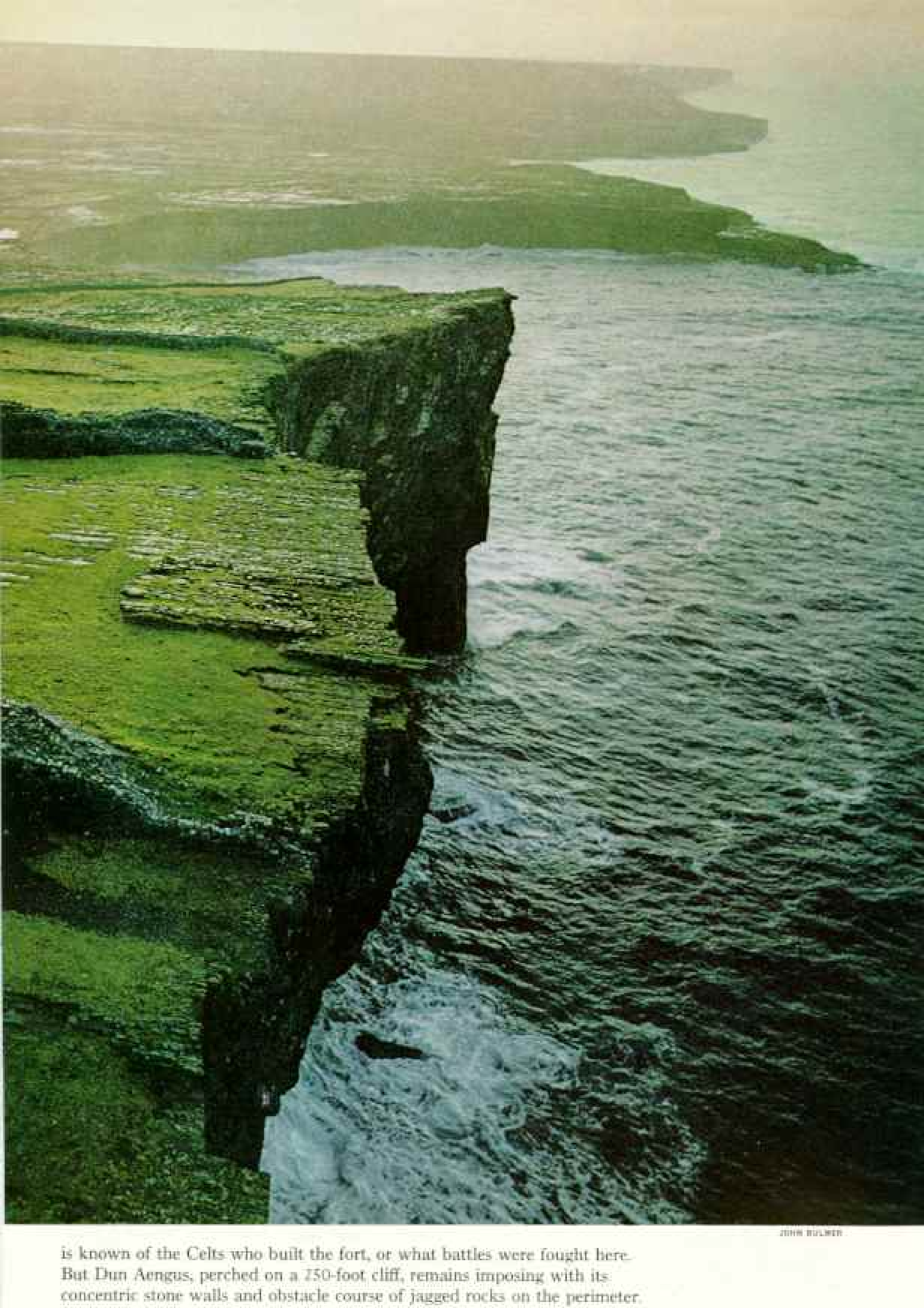
"Anything you recognize as Celtic in 20th-century Ireland?" I asked Etienne, putting a listening ear on myself as the bartender splashed another round into our glasses.

"A lot. The folklore. The pagan survivals. The fairies, or good people. Some will say 'I don't believe in them'—but they're there! Until recently there was fear of the power of curses, of second sight, of changelings—that the fairies would substitute a sickly, wizened child of their own for yours unless you protected the cradle with fire tongs. Fire and iron are potent magic, and if you lay the tongs in the form of a cross—well, that's taking no chances and hedging your bets.

"People still kill a sheep or a cock and sprinkle the blood on the threshold and the four corners of the house. Then they make the sign of the Cross with it on the forehead of each person in the house. This takes place on St. Martin's Eve, November 10, but one could hardly call it Christian. Nor must any wheel turn on St. Martin's Day. The rite of wheel turning goes back at least to pagan Celtic times—as can be seen on a sword scabbard from the Hallstatt cemetery or on the Gundestrup caldron.

"The holy wells—they're very important. We have three thousand of them. Most are dedicated to saints now, but pagan rites linger. People still make sunwise circuits of wells,

Only the sea invades Dun Aengus today. This massive prehistoric fort would have defied intruders to Inishmore, largest of the Aran Islands. Now centuries of erosion from the seething ocean have gnawed at even the innermost wall. Little



JOHN BULMER

is known of the Celts who built the fort, or what battles were fought here. But Dun Aengus, perched on a 250-foot cliff, remains imposing with its concentric stone walls and obstacle course of jagged rocks on the perimeter.

offering a pin or a coin, or leaving a strip of cloth in the belief that when the cloth rots, the rheumatism, the eye problem, or whatever will be gone."

Some women make offerings for fertility, to overcome "the sterile curse." The waters of one Cornish well, however, were reputedly contraceptive. Another gave mastery in marriage to whichever partner drank first. (One newlywed dashed there, a ballad tells us, only to find his bride had taken a bottle of the water to the church!)

"Note the way we count," Etienne plunged on. "Go outside here to the Saturday-morning market, and you buy eggs by the score or the half score. An 80-year-old man is *ceithre fichid*—four twenties—just as the French say *quatre-vingt*. Ancient Celts counted in twenties. And they reckoned time by nights. Our fortnight, remember, is 14 *nights*.

"The Irish calendar is yet another Celtic continuity. Our spring, for example, begins not on March 21 but on February 1. The Celtic festival marking it, Imbolc, is now St. Brigid's Day. She herself replaced a Celtic goddess, and nuns guarded a vestal fire at her shrine well into the Middle Ages. You'll see her rush crosses, a swastikalike design

Heroes rule the pages of Irish legend. Like such epics as *Beowulf* and the *Iliad*, Celtic tales also teem with feats of bravery and strength. Though not transcribed until the Middle Ages, Irish heroic literature goes back to the oral traditions of pagan Celts. Overgrown with exaggeration, the tales manage nonetheless to give a valuable glimpse of early Celtic life-style.

The superhero of the Ulster tales is Cú Chulainn, who demonstrates his prowess when he woos the woman Emer. Leaping into a fort, the young warrior kills the father and strikes down groups of men in single strokes. Then grabbing his love and her foster sister, he vaults the walls, carrying their weight in silver and gold as well (**left**).

Magic also appears in legends. Aoife, a jealous sorceress with a golden wand, transforms her stepchildren into swans for 900 years (**below**). Punished, she became a "demon of the air."

representing the rays of the sun, placed in houses and byres to ward off evil.

"Our summer begins on May Day—Beltaine [fire of Belenos, a pan-Celtic god]. On its eve countryfolk would make two fires of furze. Then, armed with sticks, they'd drive the cattle between them, through the purifying smoke, before taking them out to wild pasture. Cormac, a scholarly ninth-century king-bishop of Cashel, describes the Druids as having also done this."

Halloween. That was the eve of Samhain, the great festival on November 1 signaling the end of the grazing season and the start of the Celtic new year. All fires were put out and relighted, and according to the *Dinnshenchas*, a medieval collection of "the lore of prominent places," firstborn children were sacrificed before a great idol to ensure fertility of cattle and crops. Samhain eve was a night of dread and danger. At this juncture of the old year and the new, our world and the otherworld opened up to each other. The dead returned, ghosts and demons were abroad, and the future could be seen.

In America it's trick or treat. But behind such Halloween games as bobbing for apples lie Celtic divination arts to discern who

would marry, thrive, or die in the coming year. Behind the masks and mischief, the jack-o'-lanterns and food offerings, lurk the fear of malevolent spirits and the rites to propitiate them.

"Take our sagas," Etienne continued. "They're Europe's oldest vernacular literature after the Greek and Latin and are said to 'open a window on the Iron Age.' The Irishman today can still recognize himself in them. We're still often considered drunk with words. We love to exaggerate, to boast, to argue, to show off, much as did the ancient Celts.

"No English understatement for us. Our turn of phrase, sense of humor, attitude to law and order are quite different. We won't wait at a red light if no car is coming. We'll cross—something an Englishman rarely does, a German never. To them, the law is the law, sacrosanct. To us, the law is there—but. The mentality is different."

I thought of the Le Goarnic family's 20-year fight for the right to give Breton names to their children, denied legal existence under Napoleonic law. Of outlawed plaques with the Breton symbol for Brittany on so many cars in Brest. And of riding with a professor in Rennes. He turned into a one-way street. "It is forbidden to enter," he said, pausing at the sign pointing the opposite direction. "*Voilà*, we shall ascend the forbidden street."

Peter Harbison, an energetic archeologist with a boyish shock of hair as unruly as the old Irish, had told me what an Irish stationmaster had said when a German visitor took him to task for not synchronizing the clocks at either end of the platform. "And why would I be wanting two clocks if they both told the same time?"

"Our sports are rowdier. In fact, there's nothing we enjoy more than a good free-for-all," confessed Etienne. "Look at the traditional stick-and-ball games of the Irish and the English: hurling and cricket. One is among the fastest and roughest stick games in the world, while the other must surely be the slowest and most genteel. And hurling has a 2,000-year Celtic ancestry."

Controversy is a Celtic trait even older. To this day the Irish always seem to be running to court. Indeed, that instinct to litigate initiated the wave of Celtic piety, learning, and artistry that revitalized medieval Europe—the upshot, tradition relates, of history's first copyright case.

St. Columba, borrowing a precious psalter, copied it in secret. Angrily claiming the copy, the owner went before the king of Tara, who judged: "To every cow belongs her calf, to every book its copy." Columba called his tribe to arms, invoking the aid of "Christ my Druid." In penance for the carnage, he went into exile among the heathen Picts and Scots, vowing to save as many souls as had perished in that battle. And from the famous monastery of Iona, which he founded about 563, Columba evangelized Scotland, once reputedly holding at bay with his cross a raging water beast—the Loch Ness monster.

I had visited the holy isle of Iona, where Macbeth and murdered Duncan rest in its graveyard of kings. And in the Royal Irish Academy in Dublin I had seen the Psalter of St. Columba. I even turned those precious vellum pages, studying the initials with their spirals, scrolls, pointed ovals, and animal heads. Restrained, these Celtic motifs, but bearing the seed that would burst forth in decorative intoxication in the *Book of Kells*, created by a later generation of Columba's monks, perhaps at his monastery on Iona.

CELTIC ART TREASURES

To prepare this article, the National Geographic Society photographed material from numerous European collections. We would like to thank the following for their generous support:

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MUSÉE BOBÉLY, Marseille, France (pp. 604-5).

COLLECTION OF MARIE E. P. KÖNIG (p. 607 left).

LANDESMUSEUM FÜR KÄRNTEN, Klagenfurt, Austria (p. 608 lower).

MUSÉE HISTORIQUE ET ARCHÉOLOGIQUE DE L'ORLÉANAIS, Orléans, France (p. 615).

BOARD OF TRINITY COLLEGE, Dublin, Ireland (p. 620).

NATIONAL MUSEUM OF IRELAND, Dublin (p. 627).

"This sixth-century Psalter of St. Columba is the earliest surviving Irish manuscript," Professor David Greene, the academy's president, was saying. "One of the oldest manuscripts in all Europe." And holding it, I felt close to the hotheaded saint whose fervent followers brought Ireland's golden age to the Continent, enriching Western civilization.

With angels on high and tormentors below, the crucified Christ wears a robe instead of a loincloth in an eight-inch bronze plaque from Ireland. Christianity and St. Patrick arrived in the fifth century.

ON THE OLD GAELIC society, as sagas relate, a mother gave her male child his first food on the tip of her husband's sword, vowing he should find no death but in battle. Even in the grave the Irish never stopped fighting. Kings would ask to be buried upright, sword or javelin in hand, facing the foe. Connaughtmen were invincible, driving out the men of Ulster—until the invaders dug up the old king and broke the spell by reinterring him head down.

Since cattle were the coin of old Ireland (three cows bought a maidservant), many of the "bristling battles" and "head harvests" of "thirst-maddened swords" in the sagas were nothing but glorified cattle raids. Indeed, the national epic, *Táin Bó Cúalnge*, with its fury of feats by the Irish hero Cú Chulainn (who, like Achilles, chose a short life long in fame over a long life short in fame), translates as the "Cattle Raid of Cooley."

Monasteries were frequent targets. Why? When you hit a monastery, you hit the king (whose brother often was hereditary abbot) and the tribe (which stored its food there).

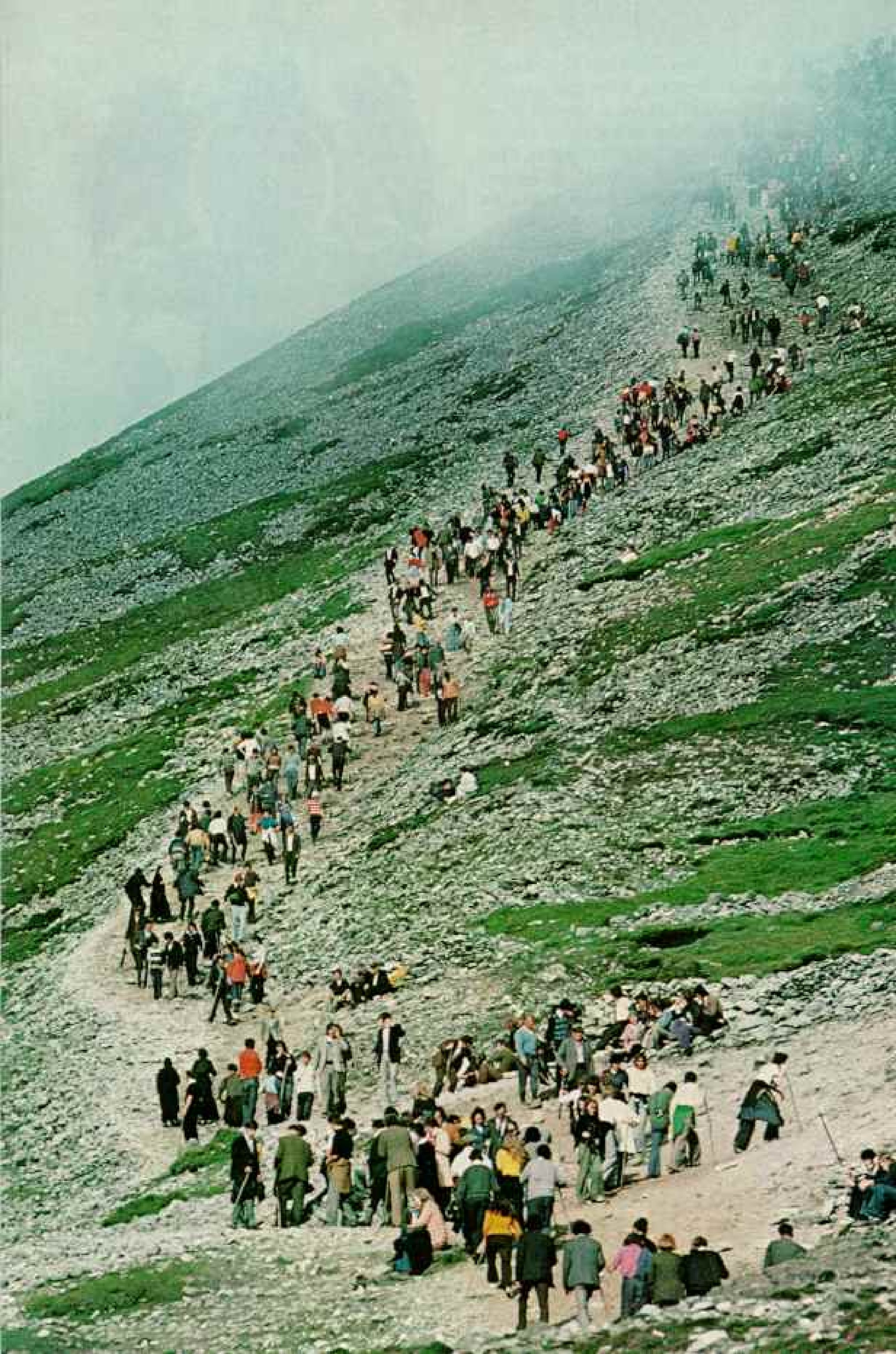
"The Vikings raided monasteries to restock their ships, because these communities, often quite large, were the nearest thing to towns in Ireland," Etienne Rynne had told me. "While they were at it, they'd grab chalices and kill monks. This gave the Vikings a bad name, since the chroniclers were monks. But long before the Vikings, the Irish were at it. Monasteries even warred on one another."

Clonmacnoise, whose serene ruins grace the verdant upper Shannon, was struck by native Irish at least 27 times to the Vikings' eight. Thrice it was sacked by Feidlimid mac Crimthainn, ninth-century abbot-king of Munster, who, in the darkest days of invasion, never raised his sword against the heathen Vikings but instead burned and plundered some of Ireland's greatest monasteries.

"Renowned as a warrior, he came to be revered as a saint, his feast day celebrated August 28," Professor Francis Byrne of University College, Dublin, added with a chuckle. But then the Irish often lace their holy water with irreverent spirits. Asked why he had burned the cathedral at Cashel in 1495, Gerald, Earl of Kildare, explained that he thought the archbishop was in it.

Modern Celts can be very ascetic. They like their pilgrimages harsh—such as climbing Croagh Patrick the last Sunday in July on bare, bleeding feet. The custom of going to the heights at this time is a survival from the pagan festival of Lughnasa, folklorist Máire MacNeill explained to me. Ancient Celtic farmers, pinched by "Hungry July," would ascend to await wonderworking Lugh, "The Shining One," who overpowered a primitive earth god to win the harvest for his people. They also believed the land would only be fruitful if the king of Tara, ritually mated with a goddess personifying Ireland, remained virile, without blemish, and broke no taboos.

The clergy claim that a three-day vigil on



a tiny island in Lough Derg in Donegal is the harshest penitential exercise in Christendom. I had gone out to that island and circled the vestiges of beehive huts of early Celtic monks —but not barefoot and fasting, doing Stations of the Cross at three in the morning.

"You freeze with cold during the night. No shoes, back to the wall, renouncing the Devil, and walking around on those cruel, cold stones. I think they sharpen them," folksinger Dolly MacMathúna told me in the comfort of a Dublin restaurant. "And if you doze in the church, a nun comes around and gives you an unmerciful thump. Then, in the morning, an awful thing. You get this beautiful smell of rashers from the priests' house. Bacon and eggs! And yourself still fasting all these three long days.

"And yet they come by the thousands each year. Many return six, eight, ten times. They really enjoy self-inflicted punishment, as surely the old Celtic saints did."

If time moves slowly on the mainland, it seems to stop on Inishmaan, middle of that trio of limestone molars jutting from the mouth of Galway Bay. I found lodgings at Mrs. Mulkerrin's with the young curate and a schoolteacher, lonely reminders of sixth-century Aran's hive of saints and scholars.

How did he deal with a crofter's blaming a withered potato crop or sick cattle on a neighbor's evil eye, I asked Father Joseph Kearney at dinner of an evening. Or such practices, recorded in the west of Ireland, as making a curse while turning a cursing stone against the sun. This boomeranged if unjust but, if a widow's curse, plagued the oppressor's family down seven generations.

With patience. A Celt from the region himself, he knows how many Celtic traditions Christianity has swallowed, and how much Celtic belief underlies common attitudes.

The very day I arrived on Inishmaan, a woman died. I arranged with Joe Lovett, the

The path of penance is harsh for Irish pilgrims, who, like their Celtic ancestors, struggle up the rock-strewn flank of Croagh Patrick (**left**) in County Mayo. Here St. Patrick reportedly vanquished the legendary snakes that plagued Ireland. In commemoration, as many as 70,000 Christians climb the two-mile trail to the summit the last Sunday of each July. Many walk without shoes, arriving at the prayer stations (**above**) with bleeding feet. At this same place and time pagan Celts celebrated Lughnasa, the harvest festival.

schoolteacher, to accompany him to the wake. Soon we were off down the pitch-black path to the last house before the sea. We entered the back entrance and threaded the hallway into the room where the corpse sat propped up primly in bed, nightcapped and gloved, hands crossed. Candles softly lighted the crowded room; the deceased must never be left in the dark or alone.

Where was the carousing? In County Clare I heard that some wakes went on a week. Here was no drinking, no singing, no amatory games to symbolize procreation to offset death, no dancing with the corpse to give the deceased a memorable send-off, grateful for "the party of her life." Only quiet conversation, the women seated along the walls of her room, the men chatting and smoking in the hall and the kitchen. At dawn tea was served, and the neighbors slowly filed out.

Later in the morning there would be the rasping of saws and the ring of hammers as a coffin was built beside the house. And in the wane of day, the slow shuffle of feet as she was carried on men's shoulders up the stone-lined path to the church, the villagers behind in respectful procession. No wailing, no rending of garments. Only the sob of the sea and the keening of gulls.

Even in the storm-lashed Aran Islands, stronghold of Gaelic where English is spoken "mostly to pigs and to dogs," old customs are falling to the steep mortality of the years.

The 20th century had flown me to Inishmaan. An ancient curragh took me away. But not before Joe Lovett had said, "Irish luck to you," and Father Kearney recited:

May the road rise to meet you,
May the wind be always at your back.
May the sun shine warm upon your face,
the rains fall soft upon your fields,
and, until we meet again,
May God hold you in the palm of his hand.

With two young islanders I walked a long lane down to the sea, the treeless landscape an endless crisscross of little stone boxes imprisoning blades of precious grass frugally grazed by lean cattle, their bones sticking out with the dint of hunger. We met no redheaded woman on the way, no cross-eyed person, saw no black snail first thing that morning, so our start was auspicious. And there was as much blue in the sky as would make trousers for a man—a sign of good weather.

With more than passing interest, I watched my two boatmen fix holes in the curragh's black-tarred canvas bottom, melting the tar with an open flame and pressing it over the holes with a smooth stone. Then they marched the bent boat over the mossy rocks, looking like some prehistoric beetle, and upended it sunwise in the surf.

"One we missed," said Padraic Faherty cheerily as water geysered up through the bottom. I thought of St. Enda's stern test of his monks' sanctity here. He would order them into the naked framework of a curragh, pious tradition holds. If the water came in on them, it was a sign of some earthly stain, and I would chance no such trial. But Padraic simply whittled a stick, tore a patch of cloth from his shirttail to put over it, drove it into the hole, and we were off, the mournful creak of the tholepins reminding me that islanders not only can't swim, but fatalistically won't move to save anyone else from drowning—the sea is claiming its own. But "we do only be drownded now and again," men of Aran say, and I clutched what grain of comfort can be gleaned from the adage, "A man will not be drowned if he is to be hanged."

I looked at those two young islanders bending to the oars—one in his twenties, the other just at the edge of manhood. I knew that they, too, would soon go into exile, seeking a new life across the sea. Like generations of Celts before them, each would add a bright strand of individuality to life in other nations. And bear an aching hunger for an ancestral land so poor in livelihood yet so rich in beauty and legend and memory. * * *

Relic of a saintly age, a stone marker wears the outline of a Latin cross, carved more than a thousand years ago by Irish monks on storm-swept Skellig Michael. Between 500 and 800, the Celtic Christian Church in Ireland took the form of monastic centers. The island still preserves the beehive huts and oratories used by the holy men. Most early monasteries passed into ruin after raids by Irish tribes and Vikings.

"Vive les Celtes!"

ACCORDING to the history books, the Roman army had subdued Celtic settlements in Gaul by 52 B.C. According to a modern comic strip, however, the year is 50 B.C., and the Roman steamroller is being single-handedly stumped by an untamed village of zany Celts. Behind this delightful sabotage of history are two Frenchmen—Albert Uderzo, illustrator,

and René Goscinny, author—whose madcap David and Goliath version, now published in some 20 languages, is among the most popular comic strips in the world. The cast of characters includes Astérix, the cunning little protagonist; Obelix, deliverer of monumental stones; Getafix, a Druid who brews magic potions; and Cacofonix, a tin-eared bard. Artist Uderzo, pictured here with a model of Astérix, drew this segment especially for NATIONAL GEOGRAPHIC. He believes the French love of fashion, talk, drink, and freedom owes much to the Celtic character. "Read what Caesar says about disunity and lack of discipline among the Gauls," Uderzo adds. "They couldn't agree on anything. We still can't." □

IN 50 B.C., THE LEGIONS OF ROME OCCUPIED ALL OF THE KNOWN WORLD.

JULIUS CAESAR, THEIR INSATIABLE CHIEF, AT THE SUMMIT OF HIS GLORY, WAS EVER SEEKING NEW CONQUESTS.

ARE YOU QUITE SURE THERE'S NOTHING HERE?

A NICE PEACEFUL VILLAGE...

THE ROMAN SOLDIERS STATIONED NEAR THIS VILLAGE OBSERVED THAT THESE GAULS WENT ABOUT UNCONCERNED, LIGHTHEARTED, AND MERRY.

YE GODS THE SENSE OF HUMOR OF THESE GAULS TOTALLY ESCAPES ME!

...AND THE CLEVEREST AT UNCOVERING HIDDEN ROMAN SPIES.

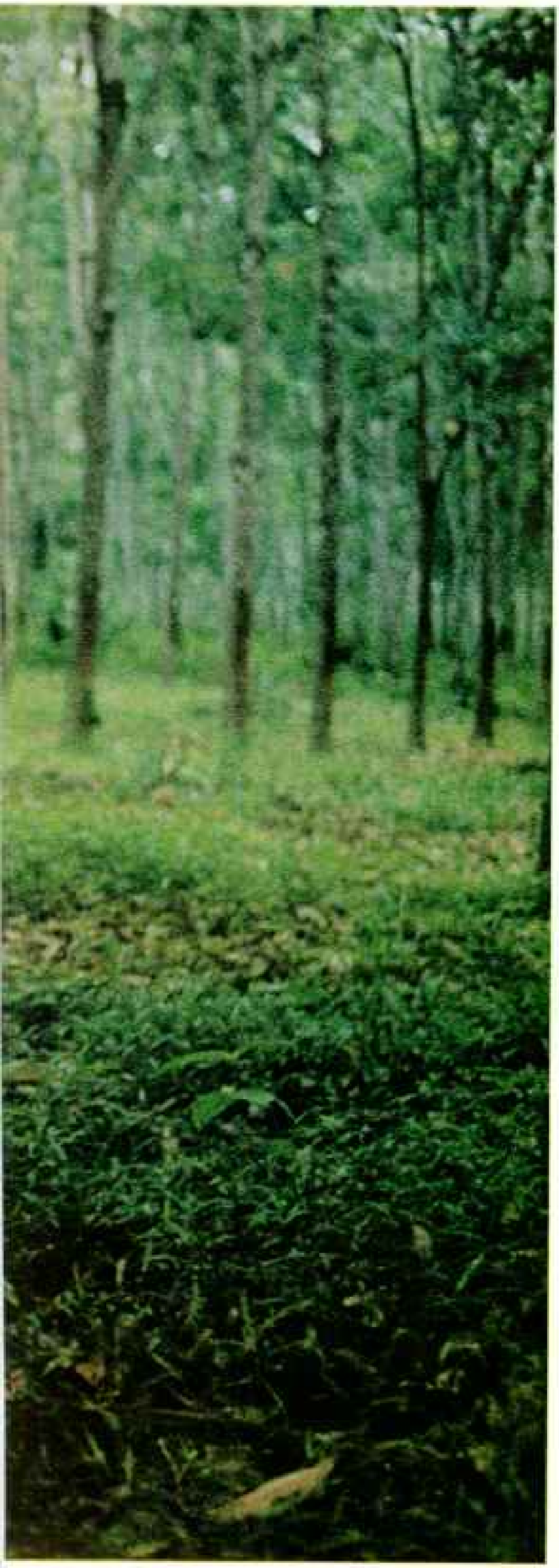
BY JUPITER, HOW IN THE WORLD DID HE DETECT MY CAMOUFLAGE?

I'VE TOLD YOU, GEORGE!!!... REAL OAKS DON'T REEK OF GARLIC!

HISTORIANS HAVE OFTEN PONDERED AND QUESTIONED THE USE THAT THESE STONES WERE PUT TO.

NOT ONLY DO HISTORIANS DISAGREE ABOUT THEIR USE, BUT THE ROMANS ALSO DISAGREED FREQUENTLY...ESPECIALLY AS OBELIX UTILIZED THEM.

MY LORD! THERE'S NO DOUBT THAT FRIVOLITY PLAYS A HEAVY ROLE IN THE HUMOR OF THE GAULS!



MALAYSIA

Youthful Nation With Growing Pains

By WILLIAM S. ELLIS
SENIOR EDITORIAL STAFF

Photographs by
DAVID ALAN HARVEY

NIGHT CAME to the rain forest, not in a falling of darkness but in a fusion of shadows. Then, on that sultry Tuesday late in the Lenten season, there was blackness, and the pit vipers began to stir on the ferny ground.

Two hours had passed since we'd climbed the tree to the high-hide, where we waited for the appearance of wildlife at a nearby salt lick. The young Chinese naturalist who stood watch with me said that we could expect to see gaur at around seven o'clock. We also hoped for a tiger or a black panther or, lacking those, a tapir—anything other than the ubiquitous wild pig.

There was reason, certainly, to expect memorable sightings, for this was the Malay Peninsula, the Golden Chersonese, a land of

Helping to reap his nation's wealth, a farmer taps a rubber tree by the light of a headlamp. The world's major producer of natural rubber and tin and a stable corner of Southeast Asia's economic jungle, Malaysia nonetheless must cope with racial tensions and Communist insurgency.

faunal riches. By midnight, though, only a single sambar deer had come within range, and then for no more than a minute or so before dancing off in a series of hoofy pirouettes.

But we heard the voices: the raucous courting call of the argus pheasant; the braying of hornbills; the gibbering of gibbons; the distant, muffled bellow of . . . an elephant? Perhaps. Elephants are here in large numbers, feasting on the fruit of the oil palm, scratching against the ironwoods, taking relief from the heat in the coffee-colored rivers.

It was a night scored too with chirps and lovely gargled trills; a night short on sightings, yes, but sorcerous with sound.

Time and time again, during a lengthy stay in Malaysia, I was drawn into that jamboree of tropical growth. And I always came out with a newfound sense of the bullishness of the jungle. It is invested with rank indifference to the well-being of those who wander through its dank corridors.

Yet there are persons who take refuge there. Mostly young and of Chinese origin, they are Communist insurgents working to tear the fabric of stability that sets Malaysia apart from the recurrent chaos of Southeast Asia. Jungle-based insurgency in Malaysia is not a new problem, but after nearly two decades of independence, the movement has freshened and acts of terrorism have become bolder.

Estimates on the number of rebels vary

Cloak of jungle fog provides perfect cover for small bands of guerrillas, chiefly Thai and Malaysian Chinese. An army officer deploys his men near the Thai border (**above**), where signs (**below**) define the battle zone. National policy favors native Malays and keeps Chinese out of many government jobs. Angry and frustrated, some join the rebels.

between 300 and 2,000. Even a force of the higher number would be, seemingly, of inconsequential size when related to an overall population of more than twelve million. But terrorist activity here is like a grain of sand in the eye: It irritates, it's hard to find, and, because lives are taken, it brings tears.

Old Allies Became New Enemies

It really began more than a quarter of a century ago, during World War II, when the Japanese invaded and occupied the country. Resistance forces, including Britons, Malays, and Chinese, grouped in the jungle. For two and a half years they rallied with bullets and bombs against the Japanese presence.

Among members of the resistance forces was a Chinese leader named Chin Peng. His services were highly valued by the British, and later, with the war over and the country reestablished as a protectorate of the British Empire, Chin Peng chose to remain in the jungle. As head of the Malayan Communist Party, he directed a new resistance, this time against colonial rule.

The country gained independence in 1957 and was known as Malaya until 1963, when Sabah, Sarawak, and Singapore, all former British colonies, united with it as the new federation of Malaysia. Two years later the federal legislature cast Singapore out of the union; it is now a separate nation.

The federation today is made up of 13 states, and each likes to maintain a certain detachment from the capital city of Kuala Lumpur (map, pages 640-41). All but four of the states are ruled by sultans or other members of royal families. Here, as elsewhere in the world, the trappings of the sultanates are not what they used to be, but neither are they completely without flair. The Sultan of the State of Johor, for example, is chauffeured around in a yellow Rolls-Royce. The marriage in 1976 of the daughter of the Sultan of Pahang was cause for a four-day celebration, during which more than 2,000 persons attended a state banquet.

Monarch Devoid of Real Power

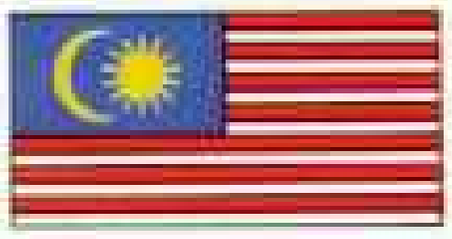
Once every five years the royal rulers get together and elect from among their number a king of Malaysia. Although His Majesty, the Yang di-Pertuan Agong, is recognized as the supreme head of the country, the essentials of governmental functions are left in the care of the prime minister and two houses of parliament.

There have been six monarchs. The latest was installed in February 1976, and a splendid ceremony it was when a short, portly man known, named, and titled Duli Yang Maha Mulia Seri *(Continued on page 643)*

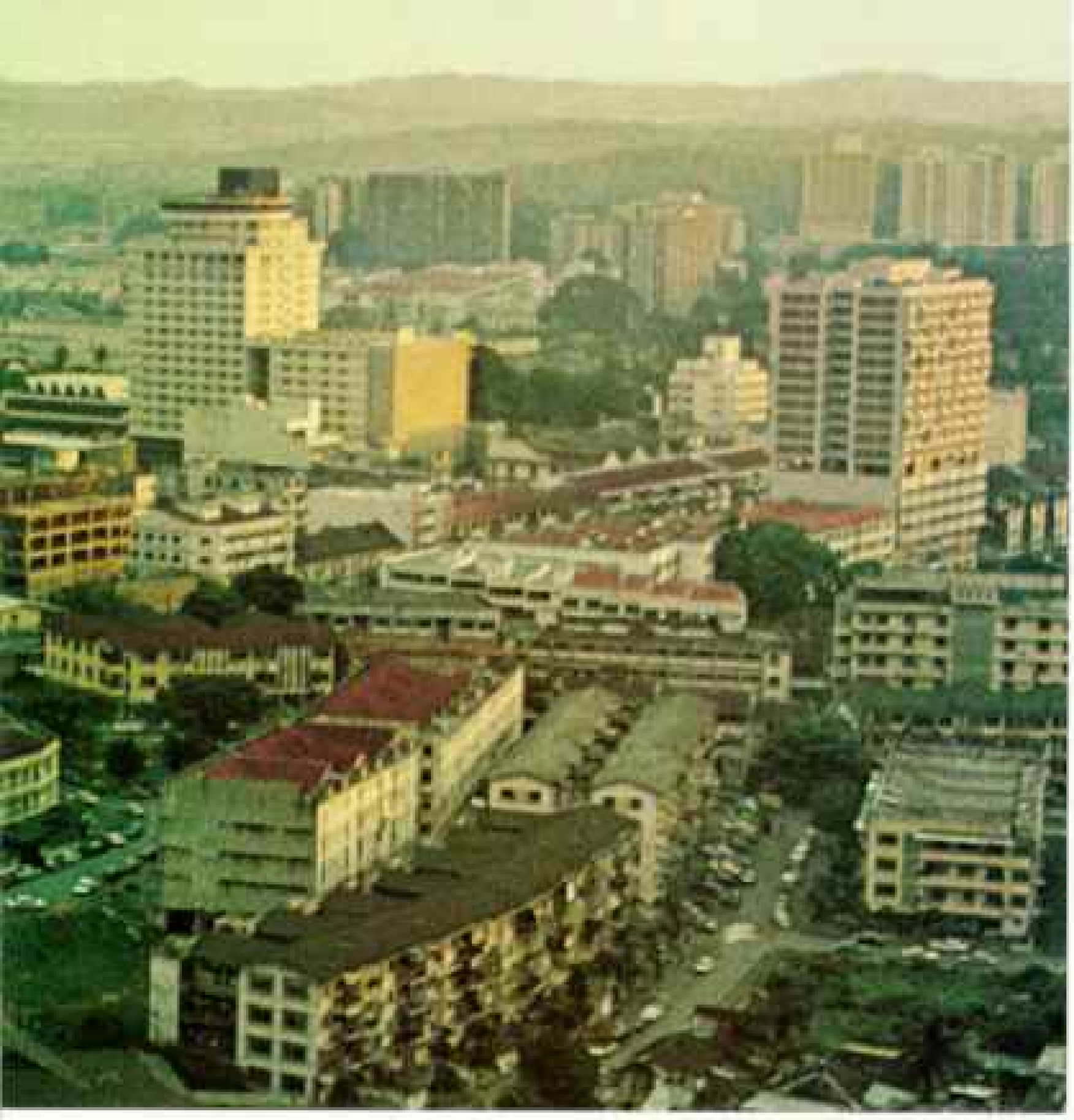
Problem children cavort in a river in the Kerau Game Reserve (**above**), where elephants are held to prevent them from destroying oil palms—and farmers are prevented from destroying the elephants. Malaysia produces 42 percent of the world's palm oil, used in margarine, soap, and shortening. But elephants crave the palms' fruit and trample the trees to get at it. The country's richly varied wildlife includes the world's rarest ape, the orangutan. One toys with a flower (**right**) near a rehabilitation center that prepares orangs once held as pets for a return to life in the wild.

MALAYSIA

Eighty-five percent of Malaysia's population lives on the Malay Peninsula, 400 miles from the States of Sabah and Sarawak on the island of Borneo. West Malaysia gained independence from Britain in 1957. Sarawak, Sabah, and Singapore joined the nation in 1963, but Singapore was voted out only two years later.



AREA: 127,316 square miles. **POPULATION:** 12,249,000. **LANGUAGES:** Malay, Chinese, Tamil, English. **RELIGIONS:** Islam, Buddhism, Hinduism, Christianity, animism. **GOVERNMENT:** Federal constitutional monarchy. **ECONOMY:** Rubber, petroleum, tin, palm oil, timber. **MAJOR CITIES:** Kuala Lumpur, capital (pop. 750,000); Pinang (pop. 280,000). **CLIMATE:** Tropical; heavy rainfall from northeast and southwest monsoons.



Child of tin, Kuala Lumpur has grown in just over a century from a sprinkle of trading shacks for Chinese tin miners to a barrage of skyscrapers; new ones seem to leap up overnight. The Malaysian capital fans out over 94 square miles of what once was jungle. In the past decade an onslaught of 100,000 rural migrants swelled the population to 750,000. In 1969, Malays, fearful of the growing political power of the nation's Chinese, rioted in the streets. Several hundred people died, and fires left thousands homeless.

States of Malaysia

WEST

1. PERLIS
2. KEDAH
3. PINANG
4. PERAK
5. KELANTAN
6. TERENGGANU
7. PAHANG
8. SELANGOR
9. NEGERI SEMBILAN
10. MELAKA
11. JOHOR

EAST

12. SARAWAK
13. SABAH

EMPORIUM
THONG
HWA
東華百貨
GRANDRAT
TOONG
LOONG
東隆公司布莊

(Continued from page 638) Paduka Baginda Tuanku Yahya Petra Ibni Al-Marhum Sultan Ibrahim mounted the royal dais in the throne room of the Dewan Tunku Abdul Rahman in Kuala Lumpur and made the start of his reign official by removing the Kris of State from its sheath and pressing it to his lips.

It was all done in the name of Allah, for Islam prevails in Malaysia. Brought by Arab and Indian traders, it had become firmly entrenched by the 15th century.

Guerrilla Switches Targets Again

The year of independence was also the year that Chin Peng began his third campaign of insurgency, this time against the new state, thrusting for Communist control of Malaysia. Terrorist activity has increased in recent times because, among many other reasons, there is bitter dissension among the Communists. Two major factions of the party are engaged in what amounts to a grim competition of death and destruction.

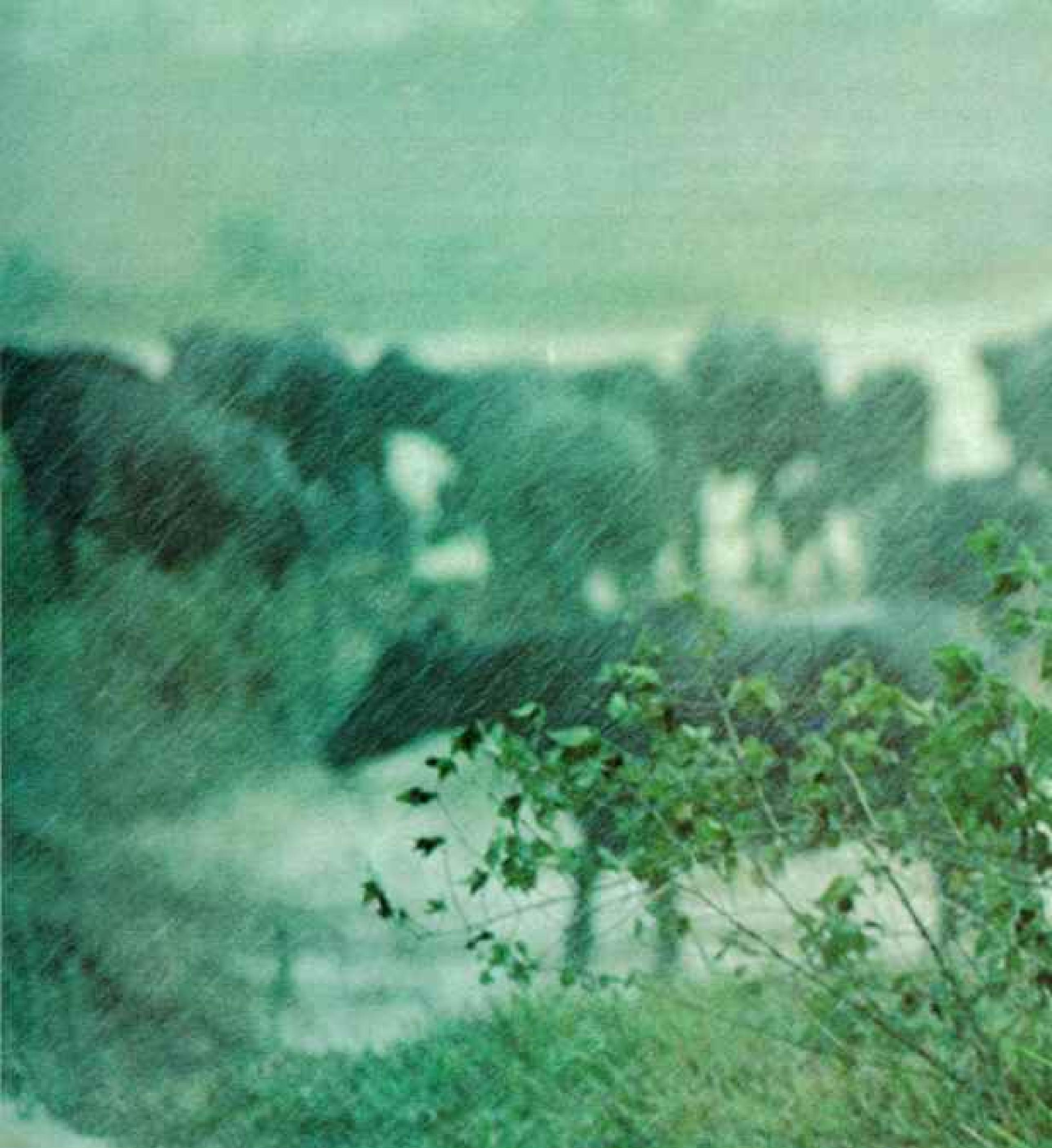
"One group blows up a bridge," a government security official explained, "so the other group, to prove it is stronger, blows up a train. One assassinates a policeman, so the other assassinates two policemen."

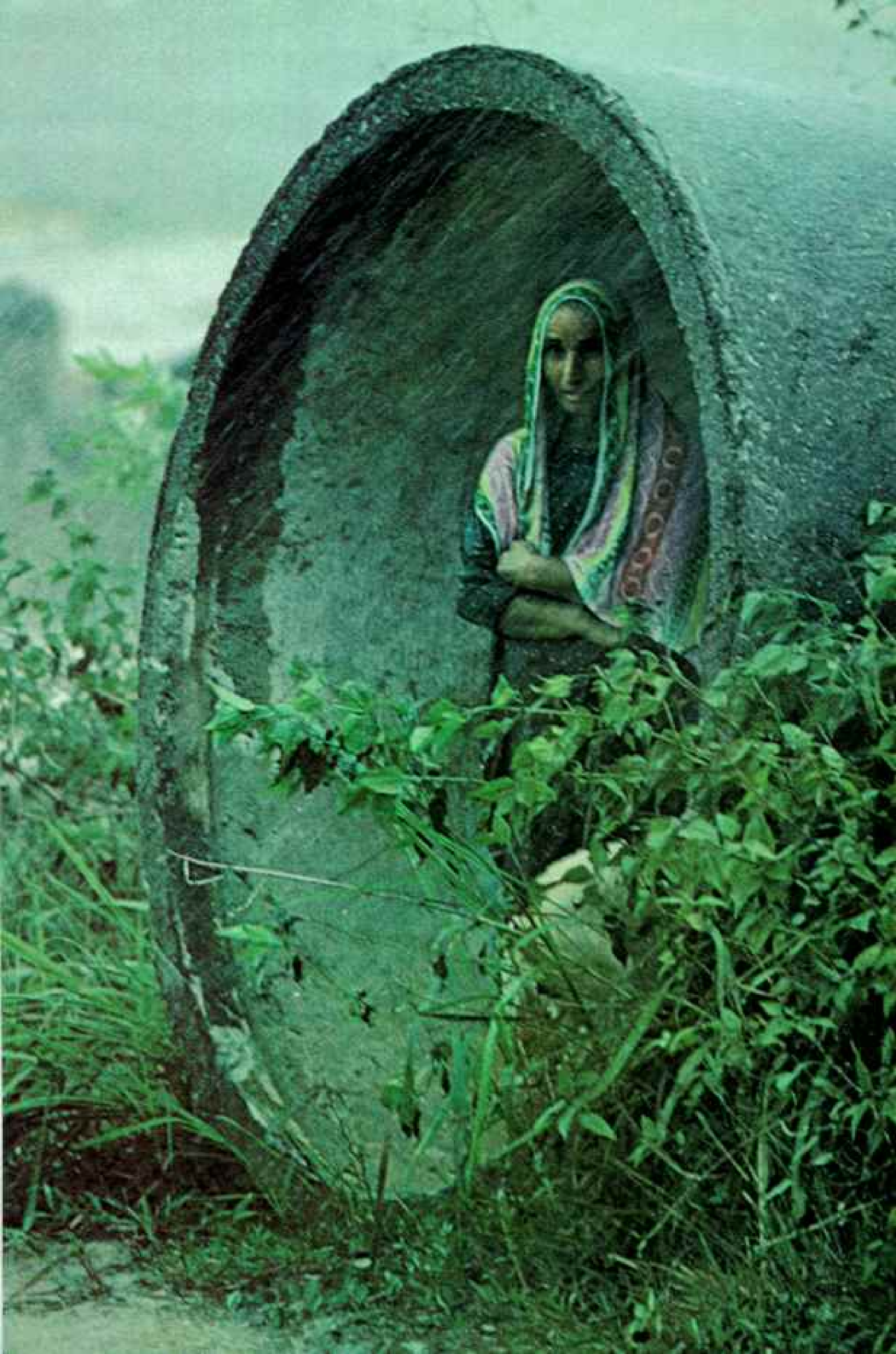
With two-thirds of the Malay Peninsula given over to jungle, there is considerable hiding room for the rebels. Four hundred miles away, across the South China Sea, lies East Malaysia—the states of Sarawak and Sabah—and that is no less heavy with the growth of the ancient rain forest. What is left is a rim of civilization between trees and seas. And it is a captivating place on which the blessing of prosperity has been called down.

Prosperity because Malaysia is the world's chief supplier of natural rubber. It also produces the most tin and palm oil. Crude oil is there too, as are the pepper plants that, in Sarawak alone, brought in 135,000,000 ringgits ($55,000,000) in 1976. Exports of timber —the boldly (Continued on page 647)

Haggling long into the night, vendors in Kuala Lumpur's Chinatown display their wares (**left**). Showy beads attract both Chinese and Indian Malaysians (**above**). One in three Malaysians is Chinese, and likely to be a merchant. One in ten is Indian, a group that has given the country many of its doctors and lawyers.

Through a monsoon veil, an Indian woman peers from the shelter of a length of conduit (**following pages**). She tends water buffaloes while village men work in a nearby town.





"**Son of the soil,**" as a Malay is known, glows with love and pride as he holds his daughter (**left**). For this sun-weathered fisherman, day begins at dawn (**below**), as boats wait for the tide—but his little girl may know a different life. Mostly subsistence farmers or fishermen, Malays account for about 50 percent of the nation's population yet reap but a morsel of its wealth. The government wants Malays and other native groups to control 30 percent of the economy by 1990, through land grants to grow rubber trees and oil palms, and through education to bring them into commerce and industry.

grained jungle hardwoods—have soared. In Kuala Lumpur the steely bones of new construction pattern the skyline (pages 640-41).

So the Malaysian ringgit stands as a very sound piece of currency, and, even as a terrorist bomb is blowing away chunks of the national monument in Kuala Lumpur, foreign investors continue to demonstrate their confidence in the economic stability of the country. Some say that it will not last, that the swells of strife and turmoil washing down from Thailand will engulf the nation, that if the Communists do not bring about the downfall of order, then the growing animosity between Malays and Chinese will.

Understand, there is a difference between Malays and Malaysians. The former are a race of people referred to as *bumiputra*—"sons of the soil." They are, for the most part, the poor of Malaysia, the paddy farmers, the village dwellers, the fishermen. Malays comprise about 50 percent of the population. Next in numbers are the Chinese, with 34 percent. They control the finances; living mostly in urban areas, they are the bankers and entrepreneurs, the shopkeepers and real-estate barons. The remainder of Malaysia's population consists mainly of Indians, the minority who serve not only as laborers and rubber-tree tappers, but also as the elite among the nation's physicians and lawyers.

Official Partiality Raises Ire

It is official government policy to favor the Malays and indigenous tribes in social and economic matters, to the extent that by 1990, it has been decreed, they must control at least 30 percent of the national economy. They are given preference for top jobs in both government and private industry. Indeed, the discrimination is no less severe on lower levels, where, for example, licenses to operate taxicabs are issued chiefly to Malays. So it is too with federal land grants and public housing.

Fury in the South China Sea, a storm bears down on men on a fish trap off the

"I love this country as much as any Malay, and I will fight for it. But only if I am treated as an equal. I would like to get married, but because I am Chinese, I am unable to rent a suitable place for us to live. A good job is out of the question. Is it any wonder that most of the rebels in the jungle are young Chinese?"

He was in his late 30's, a short, wiry man born in Malaysia to Hokkien-speaking Chinese. We were on the east coast of the peninsula, in a town called Kuala Terengganu, walking along the wide white beach late at night, talking, letting the surf of an eastern sea lick at our feet. He was a gentle person, but that night his despondency bore a cutting edge of bitterness. There was nothing to hope for, he kept repeating, nothing to hope for.

A Time of Ballots and Bullets

And he recalled the troubles of 1969, following an election in which the solidly entrenched party of power was jolted by the returns. Fearing that minorities were about to take control of the government, Malays gathered in the streets. Between six and seven o'clock in the evening of that day—it was May 13—a van was stopped, set afire, and its two Chinese occupants slain. The racial violence had begun, and before long, much of Kuala Lumpur would be in flames.

Malay Peninsula. Bamboo pilings in a V shape funnel fish into nets.

"In fairness," he said, as we stopped to inspect the tracks of a giant leatherback turtle in the sand, "the blame for the troubles of 1969 must fall on both sides. The Malays who controlled the government were not racists, but they didn't like the idea of having to give up some of their power. On the other side were the Chinese fat cats, and they were fearful of change because it might endanger their financial empires. They clung to the status quo, and it took a riot to shake them loose.

"Of course the Malays deserve a break; they are the majority, and most of them are very poor. But government policies to favor them were written into the constitution of the country, and they should have started implementing them a long time ago—slowly, over a long period of time, to allow for adjustments all around. It's one thing to close the door slowly on the Chinese, and another to slam it in his face."

Calm Island Belies National Unrest

Offshore, the lights of fishing boats fell on the water in splashes of orange. Out there, too, I knew, was the island of Tioman. It is a piece of Malaysia no more than 25 miles long and half as wide, and it sits in the South China Sea like an emerald—all beaches and palms and flights of gawky birds overhead.

Down the middle of mountainous Tioman runs a ridge of peaks matted with jungle growth. Orchids grow there like crabgrass, and they are wild and beautiful things that smite the sunlight with bursts of color. There are no cars, no trucks, no combustive noises at all save that of a motorbike or two. And that's good, because the beaches of Tioman are a lure for walking, especially in early evening when breezes are skimming the heat off the air.

Between 1,500 and 2,000 persons live on the island. Almost all of them are Malays, and they know little of the frictions troubling the mainland. They grow vegetables and catch fish enough to feed themselves, and somehow they collect the money needed to buy rice and salt. Now and again a tropical storm will batter their houses, or a python will slither into one of the villages to kill a goat, but there haven't been any major problems since the 1940's, when the Japanese came ashore and claimed the island.

The largest of the villages on Tioman is Kampong Tekek, and the chief administrator, or *penghulu*, of the island lives there. His name is Abdul Talib bin Mahmood. He is 46 years old, and, with a pencil-line mustache and black hair parted in the middle, appears cast for an urban role. But he is very much a man of the island.

New Hotel a Boon or Bane?

"Yes," he said, "Tioman is paradise. We have a school and a medical clinic, and the mail arrives by boat once a week. There is no crime—that is, nothing more serious than the stealing of chickens. And now the government has ordered the hotel to share its electricity with the people." There are mixed emotions about the new (and only) hotel on the island. Some villagers feel it will be of economic benefit; others do not like the idea of the hotel controlling so much land (more than 700 acres).

It is possible to travel to Tioman by single-engine aircraft, but, like Venice, it is best approached from the sea; for then the enchantment of the island is at eye level, and therefore the more easily absorbed to flood the soul.

No less moving is the sight of Mount Kinabalu in the Malaysian State of Sabah. The mountain, highest in Malaysia, at 13,455 feet, rises in an area of primeval splendor. The rain forests are old beyond comprehension, and among the animals dwelling within them are some of the rarest on earth. They include, for example, the orangutan of Borneo. Also there are more than five hundred species of birds, and squirrels that fly, and cobras that spit venom at the eye with terrifying accuracy.

And the flowers: orchids of a purple as pale as cigarette smoke; the giant rafflesia with its unfortunate odor; and that boutonniere for the macabre, the insect-devouring pitcher plant.

Sabah, the Malaysian Outback

Of all the states, Sabah has the most tenuous ties with the central government. That is due, for one thing, to distance, as no state is farther removed in miles from Kuala Lumpur. It is also due in large measure to a man named Tun Datu Haji Mustapha bin Datu Harun, a former longtime chief minister of the state who made repeated secession threats. He regarded Sabah as his own fiefdom, and he spared himself no luxury. (Among his purchases while in office were two Boeing 707 aircraft.) After eight years as chief minister, Mustapha was finally forced by Prime Minister Datuk Hussein Onn to step down, but not before he had instilled in the people of the state a spirit of independence.

Secession noises in Sabah rise and fall according to economic conditions. When the market is good, the volume is up—when bad, it's down. The oil reserves offshore from the state are extensive, and there has been a considerable increase in production over the past year. That, coupled with Sabah's vast resources of marketable timber, would seem to indicate that the state's bedevilment of

Prayerfully touching the hand of a reclining statue of Buddha, a worshiper in Kuala Lumpur celebrates Vesak Day, which marks three events: Buddha's birth, his day of enlightenment, and his death. During the full moon in May, Malaysia's Buddhists, mainly Chinese, pay homage to the founder of their faith with song and prayer, an evening procession, and the releasing of doves.

the central government will not die easily.

Sharing the north of the island of Borneo with Sabah is Sarawak (the tiny self-governing Sultanate of Brunei is sandwiched between Sarawak and the South China Sea*), and it too is oil-rich. But, knowing of its characterful past, it is difficult to think of Sarawak solely in economic terms.

White Rajas Ruled for a Century

Until as recently as 1946, Sarawak was the private domain of a family dynasty, as it had been since 1841, when an Englishman named James Brooke was named raja by the Sultan of Brunei as a reward for having put down a local insurrection. The raj was passed on to other members of the family before ending in favor of rule by Britain. Piracy and headhunting were abolished, and, all in all, the White Rajas served Sarawak well.

The Brookes are gone now, and for the most part forgotten. Still, there are encounters with the past to be had in Sarawak. On a Wednesday in late March, I set out in a longboat on the Skrang River. Less than thirty minutes after getting under way, the rains fell, and the rock-heavy drops plunged into the river until the surface was like marzipan. They beat too against the leathery elephant-ear leaves of the jungle growth that crowded the banks, setting off music with the timbre of kettledrums. It was a long four hours before we reached our destination: a longhouse settlement of Ibans, or Sea Dayaks, onetime headhunters of northern Borneo.

We docked at the foot of a steep hill on which the exposed roots of a litchi tree served as steps. Nearby was an aged woman standing in the river and bending down until her arms were fully submerged. I asked what she was doing, and the reply was that she might be probing the bottom in search of a rock suitable for filing teeth. This part of Malaysia, clearly, seemed more sheltered from the storms of clashing ideologies and the moneyed fallout of a vibrant economy.

Tebat longhouse stood over the hill and several hundred yards back in the jungle. We approached it along a path freighted with muddy pigs and bilious roosters. A bird in a distant tree was calling to its mate in a voice not unlike the skirl of bagpipes. There were only a few men about, for it was shortly after five o'clock in the afternoon when we arrived, and the day's work in the rice fields would not end for another hour.

But the headman was there. His name was Chaong, and he was mending a fishnet in the soft light that spilled through an opening between the longhouse veranda and the inner communal area.

Longhouses are measured by the number of doors. This one, Chaong said through an interpreter, was 17 doors, which means it contains private quarters for that number of families, all under a single roof. A total of about a hundred persons live in Tebat. Outside their rooms, they shared a veranda running the length of the house, half of which was elevated and reserved solely for the men of the community. It was here that they gathered after the evening meal to smoke and drink and, in general, partake of the pleasures of salon sociability.

I dined that evening in Chaong's quarters, with his wife and children and also his mother. As we ate, a parade of dogs passed through the room, all of them small, with bones straining against the skin. This angered Chaong. He opened a trapdoor in the floor and hurled them through, one by one, to the ground five feet below.

Visit Is a Heady Experience

Later we sat on the raised platform and drank rice wine. On the ceiling, almost directly above me, hung a net filled with blackened skulls. The last head to be taken in what is now Sarawak, as far as can be determined, was during World War II. I looked around and wondered if any of the Dayaks in the house had participated in a successful hunt. Had he done so, the hunter would probably have tattoos decorating his hands, for that was how head-hunting success was recorded in the old days. I saw none. Still, there was an old man who would look at me and then at the skulls, and, getting my attention, he would smile as I once saw an ornithologist smile when he showed me his collection of stuffed wrens.

Tebat is not completely isolated from the workings of the central government. There is a small school in the area that many of the children attend. The Malaria Eradication Program officer pays periodic calls. And there

*See "Brunei, Borneo's Abode of Peace," by Joseph Judge, NATIONAL GEOGRAPHIC, February 1974.

are communiqués from the government, cautioning the people not to aid Communist rebels. For the most part, though, Sea Dayaks still living in longhouses have few needs other than what the jungle and rivers provide.

Government Pushes for Integration

The government is working to change that, but most of its efforts are centered on the non-Malay native peoples of the peninsula. "Our objective is to integrate them with the rest of the population," Dr. Baharon Azhar bin Rafei said. "That is not to say that we want them to discard their own culture. No. What we are working for is their social and economic development. We believe that with a better standard of living, the chances of integration's succeeding will be improved."

Dr. Azhar is director general of the Department for Orang Asli Affairs. Orang Asli is the name given to indigenous non-Malays on the mainland peninsula. "We personally feel the term aborigine has taken on a derogatory connotation," he explained, "so we decided to use Orang Asli, meaning the 'original people' of the country."

The Orang Asli population stands at about 60,000. The majority are subsistence farmers. "We hope to get them interested in going into commercial operations involving the use of such natural products as timber and rattan," Dr. Azhar told me.

During the 12-year "emergency," when the Communists warred against British rule, about 20,000 Orang Asli in the jungle were under the domination of the rebels. With independence, the government set out to win them over to its side. "At that time," Dr. Azhar said, "the main objective of our department was, you might say, psychological warfare. Now we feel the way to offset the Communist threat to these people is to alleviate their social and economic problems. On the whole, the reception we have received among them has been pretty good."

There remain, however, a substantial number of Orang Asli who prefer to live as their fathers lived—to take a wild pig when meat stocks are low, to fish, grow some rice, have children and give them love. And this: to walk free in the jungle and, never having known fear of it, to rejoice in its presence.

Where the jungle ends, and the land is groomed, there rises the rubber tree. It grows tall and slender, and its union with the earth is rewarding. The rubber tree is found in most parts of Malaysia, positioned in neat rows and screening out the sunlight with its leafy crown. It is the backbone of the nation's economy, as well as a source of livelihood, directly or indirectly, for more than three million persons there.

"Between 43 and 44 percent of the world's total supply of natural rubber is produced in Malaysia," Dr. B. C. Sekhar said. "That production utilizes more than four million acres of land."

Dr. Sekhar is controller of the Malaysian Rubber Research and Development Board. His knowledge of the industry is encyclopedic. In particular, he is primed to answer questions about the impact of synthetics on the natural-industry business. "What synthetics can do with petroleum as a base, they can do much better with natural rubber as a base," he said. "We have never accepted the belief that synthetics are superior to natural rubber."

No other tropical commodity is as heavily researched as rubber, and most of that work is being done in Malaysia. Thus, the rubber tree there today is vastly superior to any ever grown before. Perhaps the most significant development has been a thumping increase in the yield of latex per tree. "We found that by applying hormones to the tree we can delay clotting and therefore increase the flow of latex," Dr. Sekhar said.

Before independence, research was directed at benefiting the planter who presided over many thousands of acres. But such cobwebs of inequities under colonialism are being swept away; it is with the Malay planter of five to ten acres in mind that the rubber researchers are going about their work.

Tin Aplenty, but Problems Too

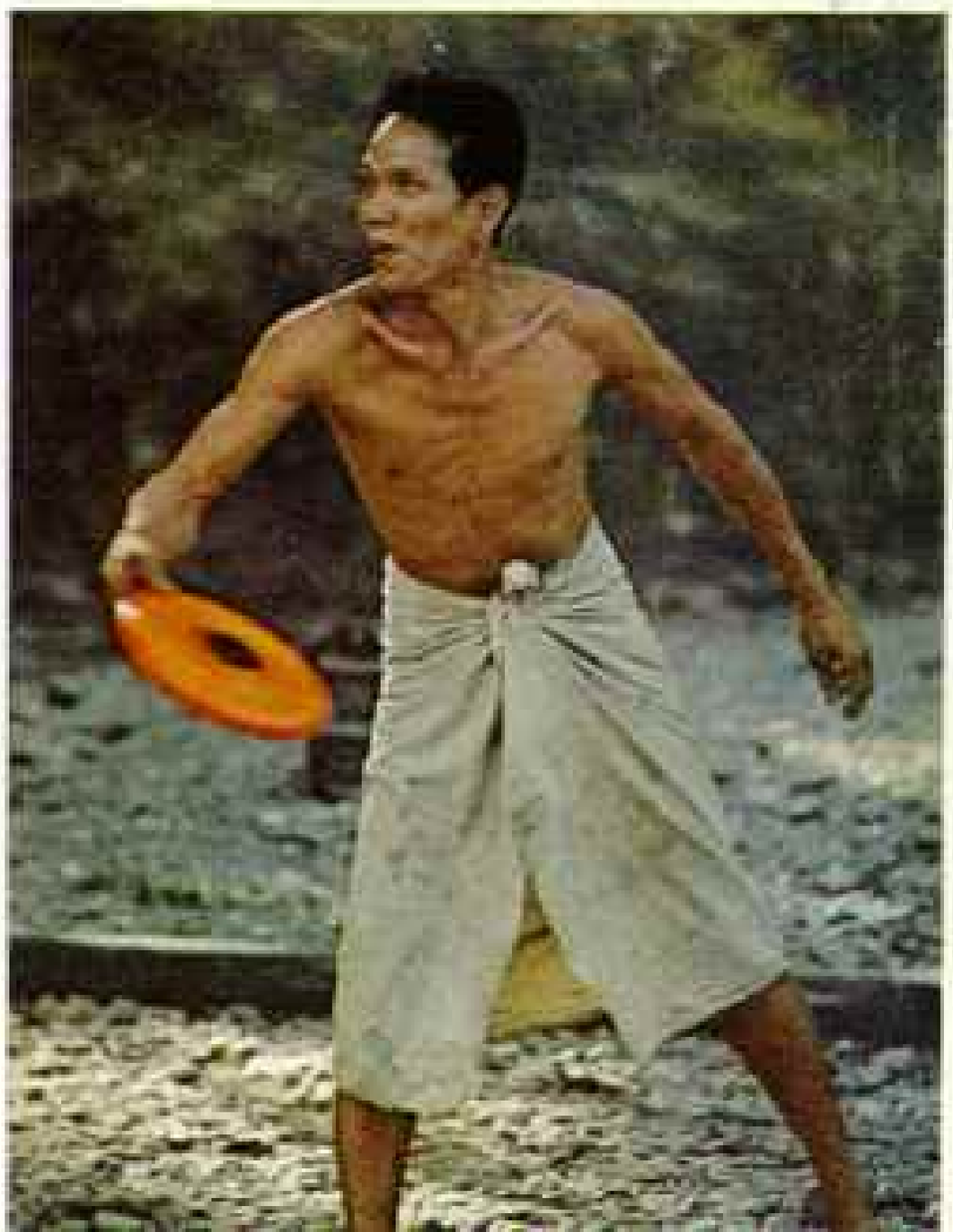
That Asian earth that takes the shallow roots of the rubber tree is rich with tin ore. The tin-mining industry in Malaysia has a long history in which Chinese have played leading roles. Indeed, it was Chinese merchants who founded Kuala Lumpur as a trading post to serve the miners, who were also Chinese.

Like rubber, more tin is produced in Malaysia than any other place in the world—by underground and open-pit mining and by dredging. The *(Continued on page 657)*

Grisly trophy is displayed by an Iban, or Sea Dayak. His tribe gave up head-hunting after World War II, and many Ibans have settled in towns, gone to school, and become aggressive businessmen. But a few, like these, tread the paths of their forefathers,

revering the heads and offering them food. Otherwise, some believe, the heads will eat their owners.

Togetherness is a way of life in an Iban longhouse (**above**), where village families live in separate rooms under the same roof. These native Malaysians proved quick masters at throwing a Frisbee (**below**) brought by photographer Harvey.



Rx for unemployment: Since Pinang (**above**) became a free-trade zone in 1970, its jobless rate has dropped nearly 50 percent. A new local industry assembles electronic components, which are exported duty free. Rubber and tin fill the holds of freighters in the harbor.

Snap goes the sobriety of a class studying Islam when the teacher leaves the room (**left**). The religion reached the peninsula along with Arab and Indian traders in the 14th century. Today virtually all Malays claim it as their faith.

small gravel-pump mining operation is widespread in the country, and almost always under the ownership of a Chinese. There has been no stronger lure than tin to draw the Chinese away from the cities.

In some cases, however, they do not have to travel far. The largest opencut tin mine in the world is on the outskirts of Kuala Lumpur. It has been in operation for seventy years. "We estimate we can mine here for another five years," an official of the operation told me. "After that we will have run out of ground." Even now the pit is more than 500 feet deep and half a mile wide.

Hauling of the material is subcontracted to Chinese, and the trucks they have assembled to do the job are miracles of endurance. They emit great clouds of fumes, and the noise of the ancient engines in the open-pit is like the rumble of thunder.

In other ways, too, tin mining today in Malaysia is a patchwork operation, mostly through circumstances not within control of the industry.

"We are very heavily taxed, the most heavily taxed industry in the country," E. L. Dempster, president of the States of Malaya Chamber of Mines, said. "Also inflation has hit us badly. The increase in oil prices has struck hard at the operator of the small gravel-pump operation, while the rise in electric rates—they have almost doubled in recent months—has done the same to dredging units. There simply isn't enough power to keep up with the phenomenal industrial growth in Malaysia."

On top of all that, the production of tin in the country in 1975 was the lowest in ten years, with a total tonnage of 64,364. The number of persons employed in the industry —just under 40,000—is also at a ten-year low.

But How to Deal With Elephants?

The government is taking an increasingly active role in the affairs of industries dealing in products of a natural resource, such as rubber and tin. There is a government agency to watch over development of crude-oil production, for example, and another for palm oil. Sometimes the interference can become heavy-handed (a major oil company set to explore in Malaysia was scared off at one point before reaching agreement with the government) but, for the most part, it is a soft approach to what certainly will be major government participation in the future.

There are some things, however, that seem beyond the control of bureaucrats, like the Malaysian wild elephant as he tramples through thickets of bamboo and rattan, choosing trees with the girth of a dachshund for pickup sticks, and doing it all in the shadows of the deep jungle's triple canopy of growth. Often, though, the animal ventures out into the open in quest of food. It is then that the damage is done.

Malaysia's wild elephants—there are between 500 and 700, most of them in the State of Pahang—have caused an estimated 25 million dollars in damages to crops since 1969. In past years the method of controlling the animals was simply to kill as many as possible. But that was before Encik Mohammed Khan became the country's chief game warden.

"There was a time when my department

would kill between 20 and 30 elephants a year," Khan told me. "That number has now been reduced to four or five."

Khan is a dark, heavyset man who finds poetry in the flutter of a Malay lacewing butterfly. His concern for wildlife runs deep, but at the same time he is sharply aware of the need for controls to protect crops. Thus there has come into being the Great Elephant Roundup, a program designed to relocate the animals in areas where they are not likely to cause much trouble.

A team of 22 men, including experts from India, was assembled. This was the plan: Ride tame elephants into the jungle, and when encountering a wild one, lasso it and tow it away. Nothing more than that—the classic cowboy maneuver. For two months they lumbered through the rain forest on their mounts before concluding that, one: wild elephants do not submit passively to the lasso, and, two: throwing a rope in the rain forest is like pole-vaulting in a telephone booth; there's just not enough room.

So the team turned to tranquilizer guns, and that proved more effective. Within two weeks an elephant was captured, and now they have relocated more than ten. Banditry by elephants continues, however, and, as always, the most tempting of loot is a football-size cluster of reddish fruit they can find among the leaves of short, young palm trees.

Malaysia's Oil Also Comes From Trees

Something valuable is extracted from the pulp of the fruit. It's called palm oil, and to Malaysians it is a commodity that plays a vital role in the economic well-being of their country. The palm-oil industry accounts for 16 percent of Malaysia's export earnings. Today, throughout the country, more and more land long given over to rubber trees is being cleared and replanted with oil palms. Also, vast tracts of virgin jungle are being stripped of their covers to answer the rising demand for even more acreage on which to grow the tree with its profitable fruit.

The oil of the palm, which is obtained by crushing the fruit, is used in a variety of commercial products, such as margarine, shortening, and soap. About 22 percent of all the palm oil produced in Malaysia last year was exported to the United States. Pressures have been brought on Congress by the soybean-oil interests in the U. S. to institute import curbs on the competitive commodity (palm oil is cheaper than soybean), but the imports continue.

"We believe in free enterprise," said Ivan C. H. Wong, marketing executive for the Malaysian Palm Oil Producers Association. "Palm oil is very competitive, and the fact that the United States bought so much more of it in 1975 than in the previous years indicates that the price was relatively favorable as compared with that of soybean oil. People don't buy palm oil because they love palm oil—but let me say that restaurant owners and fry cooks will tell you that palm oil is best for cooking."

Modernity Crowds Out Old Mysticism

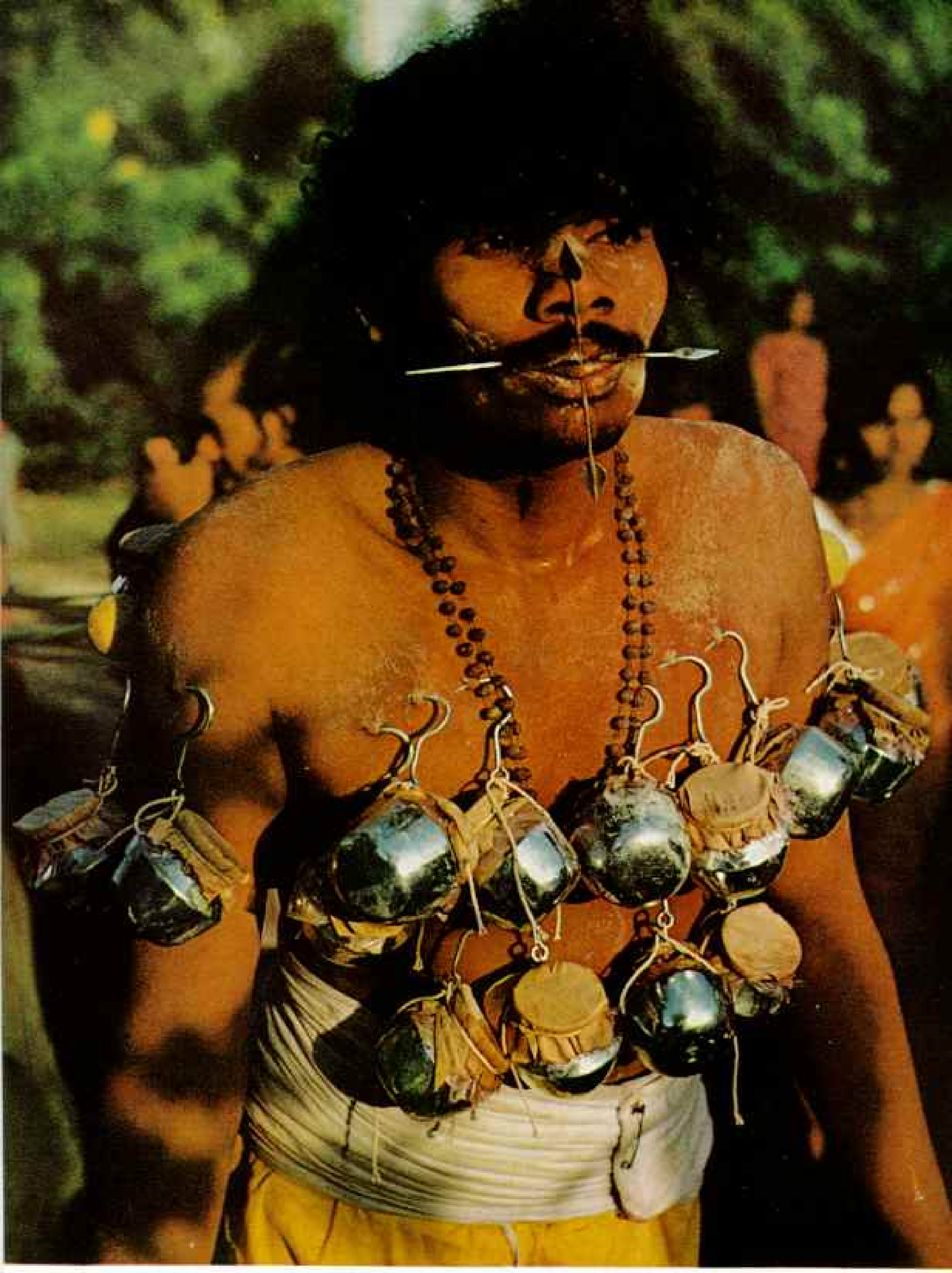
Wong is a young Chinese with talent enough to protect him (for the time being, anyway) from the government's campaign to put Malays in such jobs. Charts and graphs are his forte. The pencils on his desk are at needlepoint sharpness. Calculations are arrived at not by borrowing from the lessons of high-school mathematics, but by a flurry of finger action on an electronic instrument.

As I sat with him in his office in Kuala Lumpur, the Communist menace seemed light-years away. Also missing there was the sense of the mystic that pervades Malaysia, the legacy of a past in which the wills of divinities were interpreted through the supernatural. The *wayang kulit*, or shadow play, is still performed in some parts of the country, but not in the same moralistic spirit as long ago, when the hand to manipulate the puppets was thought to have reached down from the heavens.

And Haji Ahman Haji Abdullah is still on call to keep the rain away.

That's his line of work—keeping the rain away; not stopping it altogether, but preventing it from falling on a certain area. Having arrived in the capital from his village home, he was confident of success. His assignment: Keep the course dry for the duration of the Malaysian Open Golf Tournament.

I came across him on the seventeenth hole, chanting and burning incense. He was 84 years old then and had been practicing his specialty for more than forty years. His services are sought mostly for sports events, but he also works *(Continued on page 662)*



Shedding no blood and feeling no pain, an entranced Hindu endures lances and hooks that pierce his skin. Thus he fulfills a religious vow during the ceremony of Thaipusam.

Malaysia at play: Spinning homemade tops has long fascinated Malays—and to them, it's far more than child's play. At the Festival of Tops and Kites in Pekan (**left**), a contestant shows tooth-gritting determination as he hurls his red fighting top into a circle, trying to knock out one of the others. In a variation, men also compete to see whose top will spin the longest. The record stands at an hour and 47 minutes! There's an unusual angle to the festival's kite flying. The object: to fly the kite as near as possible to 90 degrees, straight overhead.

After a long day of tending the nets, a fisherman unwinds by playing *sepak raga* (**left**), another popular Malay sport. Players try to keep a rattan ball from touching the ground, using any part of the body except the hands. For keener competition, a net is used and volleyball rules apply.

Small fry too young for organized sports can always improvise. What could be more fun than pole-vaulting from the gunwale of a fishing boat into the shallows (**right**)?

weddings. Watching him invoke the spirits to banish wetness from the greens and fairways, I was, of course, more than a little skeptical, and all the more so when I noticed dark clouds moving in.

They passed, however, as if indeed touched by the perfume of his incense. But it is the magic of a turning planet that causes the monsoon winds to join off Melaka (formerly Malacca), on the southwest coast, and to set up blows that drove ships of sail between the South China Sea and the Indian Ocean.

It was there that Malaysia recorded one of the proudest periods of its history—that of the Malacca Sultanate. From those years of opulence and fertility of intellect came some of Malaysia's finest literature and much of the genesis for its present-day political organization. As the center of power on the peninsula, and perhaps the most important city in Southeast Asia, Malacca drew the attention of much of the world. The Ming Emperor Yung Lo sent an envoy, Admiral Cheng Ho (the Three-Jewel Eunuch), and thus was forged the first Chinese link with Malaysia. Certainly the Portuguese were interested: They captured the city in 1511 and held it for 130 years. For the next 150 years the Dutch were in control, and then it was Britain's turn.

Different Eras Still Evident

Today the city wears its history in its architecture. The Stadthuys, most likely the oldest Dutch building in the East, was erected sometime in the middle of the 17th century. With masonry walls as thick as battlements, the structure remains sound and in use. Nearby is Christ Church, also from the Dutch period. Constructed of salmon-colored bricks, the church dates from 1753, and the old tombstones laid in the floor give testimony to the hardships of the times. For example, one Anna Maria Evans is remembered "having departed . . . age 24," to be followed in death, within 15 days, by her three children. All were victims of diphtheria.

The Portuguese are remembered not by buildings, but by a settlement of people—descendants of the seafarers who came ashore more than 400 years ago. The brightly colored houses are clustered on 13 acres at the water's edge. The language of the settlement is Papia Kristang, a tongue based on Portuguese, African, and Malay. The population is several thousand, and that includes Rita Lai, a lovely, dark-eyed 10-year-old who approached me as I was sitting on a pier eating a spiced crab and asked if I would like to hear an old Portuguese song.

She fidgeted as she sang, as 10-year-olds are wont to do, but her voice was like bells softly struck. I bought her a spiced crab and she sang it again.

A Tourist Mecca—and More

Old Malacca gave its name to a fine body of water that washes the country on the west from top to bottom. And nowhere is the surf of the Strait of Malacca more joyfully received than on the beaches of Pinang.

Pinang: a vacation island, yes, but more. A medley of nationalities pushes through the streets of historic George Town, the principal city (now named Pinang), past rows of shops so brimful that the goods spill onto the sidewalks. Trishaws roll in all directions, as the drivers, their knees Ferris wheels of churning, steer courses through the gassy pollution of more modern transport. At night some streets are closed to traffic and given over to push-cart merchants and food stalls; and hordes of people are there to eat and buy and brush away the fat bugs that beat themselves senseless against the kerosine lanterns.

The allure of Asia is electric in Pinang. The Buddhist and Hindu temples, the mosques, the Chinese clan houses, the villages built on stilts, the street-wise Nepali who, in a croaky whisper, offers to sell you a stunning star sapphire for two dollars—all are part of the Pinang scene. Most of all, the island has beaches, and they are among the best in the world.

Germans and Scandinavians are there, boiling their fair skins in the sun. Australians are present, too, but forever hying off in quest of beer. The Japanese descend on the beaches in groups and march about in high spirits, leaving wide swaths of packed sand in their wake. Singaporeans enter the water with a sprint and leap, happy to be sprung from the confines of their overcrowded island. Most of all, there are Malaysians on those beaches of the nation's premier resort.

The first free-trade zone in Malaysia was established at Pinang, and that has resulted in the development of a flourishing electronics industry. Exempt from the usual import

and export duties, electronic materials are brought to Pinang to be assembled by the large labor force of mostly young Chinese women (average wage: $1.60 a day), and then shipped out as components for television sets, transistor radios, and phonographs.

Pinang's breeze-swept beaches were in my thoughts on a day of particularly oppressive heat, when haze hung in the sky like soiled gauze and the sun was runny. I had stopped at a village on the east coast of the peninsula in search of a coconut. The only ones I found were in the tops of trees that rose to more than forty feet. No matter, for Mamat bin Dollah and his wonder monkey, Majid, were on hand to solve the problem.

"He's 6 years old," Mamat said. "After capturing him in the jungle, I had him trained within two months." What the monkey, a macaque, is trained to do is climb coconut trees and pick the fruit. "I will now give him a command to climb the tree, pluck a coconut, and throw it down. Not just any coconut, but a young one with meat tender enough to eat."

And so it was—the command, and Majid was up the tree in a flash. Coconuts were crashing to the ground all around us. His master ordered him down. "I hire him out to plantations to harvest coconuts," Mamat said. "He works very well, but when he's tired, he stops, and nothing I do will get him back on the job."

Apparently such a time had arrived: Majid was commanded to climb again, but he didn't move other than to turn his face and let us see that it was set in a silly, simian sulk.

Tea Reserved for Local Consumption

There is a job in Malaysia that lets the worker escape the heat, that places him or her on a cool, green hill in a place where it seems that the air has been borrowed from a Scottish summer. The job is picking tea leaves in the Cameron Highlands.

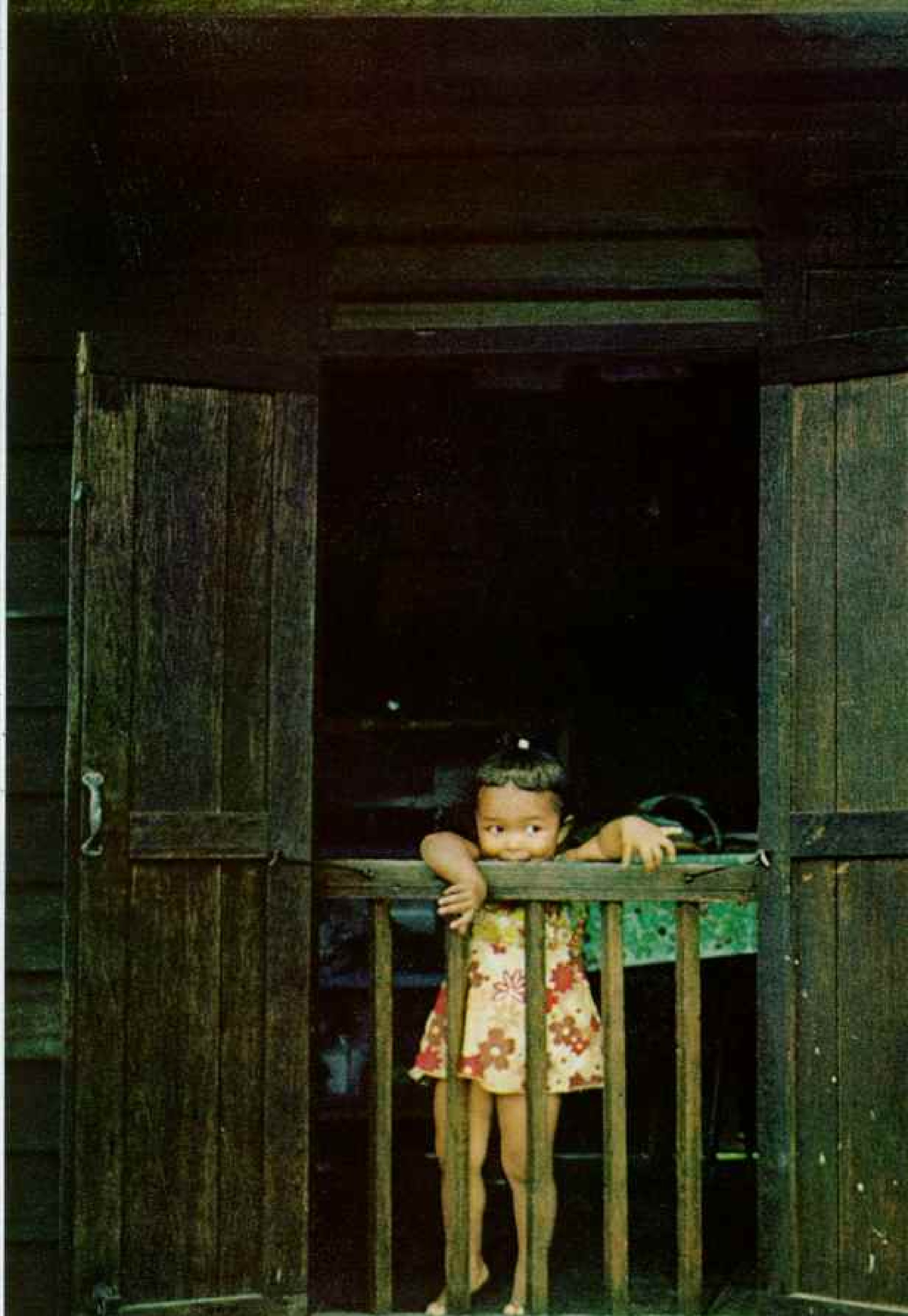
The highlands region is in the interior of the peninsula, where mountains lift the jungle growth to thousands of feet above sea level. It is along the slopes of a plateau that the tea bushes grow, within sight of resort hotels. Tea is not a major crop in Malaysia, but it is one with tradition. Almost all the tea produced is for consumption in the country—in places like the café I frequented in Kuala Lumpur's Chinatown.

It was small and open across the front. On one wall was a sign cautioning customers, in four languages, not to spit on the floor. The owner was at the cash register, and only in cases of extreme emergency would he leave that post. His wife cooked, his son served the food, and his daughter cleaned the tables.

A cousin—he was a middle-aged man who babbled on and on about the poor quality of sandals these days—was assigned to circulate through the premises with a flyswatter in hand and bang away at any winged thing

Taxi for toddlers: Makeshift safety bars protect the twin sons of Mensun Sungit (**above**), a schoolteacher, as he ferries them across a shallow river. Some of his people, the Bajaus, still live and rear their families on fishing boats.

Impish eyes peer from the doorway of a rubber farmer's house (**following pages**). The resident spotted dove is prized as a good-luck symbol.



that dared alight. He centered his warfare on my table. *Blap, blap, blap.* It wasn't the growing collection of dead flies that bothered me, but rather the vinegar and soy sauce that jumped out of the bottles and fell on my shirt with each swatter strike. I complained. The following day, as I was having my tea, I felt the presence of someone behind me. It was the cousin, smiling as he pulled back the pump of a gleaming new flit-gun.

Many Malaysians are like that. They strive to please. Like the young man who was working on the sidewalk across the street from the café where I sat—striving to please the spirit of a newly deceased relative by constructing a papier-mâché bicycle to accompany the body to the grave.

Agreeing Not to Disagree

And like the newspaper editor carefully reviewing each piece of copy scheduled for the next edition—striving to please the government by not printing critical material.

There is censorship of newspapers in Malaysia, but it is self-imposed, brought about by the need to have licenses to publish reissued by the government each year. In the summer of 1976, however, stories began appearing in some newspapers calling attention to the seriousness of the Communist threat. The implication was that the prime minister was not doing enough to snuff out the rebel movement. This move by the press was an outgrowth, in large part, of political-party disunity, but it did serve to bring the issue of insurgency into the open.

Another problem: Young Malays have been sent abroad in large numbers for training and higher education against the day when the bumiputra policy to favor them in jobs is implemented to the fullest. But, again, the government's timing was off. That day is still years away, and now the country has a surplus of well-educated young people who, if they are employed at all, hold minor jobs.

"Prime Minister Hussein has been faced with the necessity of playing the most astute kind of politics," the editor of an English-language newspaper told me. "For one thing, there is the Communist problem. So far it has remained a problem involving Chinese; it will be much more serious if the rebel movement becomes a cause for the poor. If he tries to appease the Chinese by straying too far from the bumiputra policy, he will then anger the Malays to the point where they may rise up in revolt. He's on a tightrope, and his premiership is a balancing act."

Forecast: Rough Sailing Ahead

Rain was falling when I left the editor's office. A trishaw operator pedaled to my side. He was skinny and asthmatic, and the guilt of hearing him wheeze as he worked to get me to my hotel was too heavy. After traveling a block, I paid him off and started to walk—to walk and think and find a truth.

Whatever happens in Malaysia, with its ethnic jumble, it is not likely that a miracle of harmony will emerge. Nor is it likely that there will be an end to voices of dissidents rising from places of sanctuary. □

Tin Pan Alley: In the Kinta River Valley, earth's largest alluvial tin field, women wash the ore in age-old fashion (**right**). The lion's share of the world's tin—and the finest in quality—comes from Malaysia. Skilled workers turn pewter into graceful vases at the Selangor Pewter Co. (**left**), one of the few Malaysian firms that refine the country's bulk tin into finished products; most is exported as raw ingots. The company, Chinese owned, says it employs workers of all races, an advertisement that Malaysia hopes will become far-reaching as the nation grows from adolescence into adulthood.

Leapfrogging to a new foothold, a red mangrove reaches across a sandbar in Florida Bay. Once considered a nuisance by Floridians, the irrepressible tree is now esteemed as a nursery for marine life and a haven for water birds.

The Tree Nobody Liked

By RICK GORE Photographs by BIANCA LAVIES BOTH NATIONAL GEOGRAPHIC STAFF

I STILL RECALL the dredges and the bulldozers working in the red mangrove swamps near my father's house. I never thought their destruction was much of a loss. Mangroves were scrub: junk trees. The peculiar aerial roots, which, like spidery legs, prop the mangroves up in the mud, made the swamps seem forbidding. Swarms of mosquitoes and clicking, crablike creatures lurked within. The mud often stank. "No one likes the mangroves," John Steinbeck once wrote. And in Florida, until very recently, he was right.

Few people complained as stands of mangroves along the state's southeast coast were replaced with sea-walled housing developments, hotels, and shopping plazas. Today most of Florida's red mangroves are part of a lush fringe extending along the southern Gulf Coast. They embrace the Ten Thousand Islands, wrap around Everglades National Park, and reach to the tip of the Florida Keys (map, facing page).

In the past few years the red mangrove has made a lot of friends. "It is the sacred tree of Florida," says Bill Merribue of Naples, president of the Collier County Conservancy.

Sacred enough for a Miami federal judge to order a trailer-park developer in the keys to restore to its natural state a mangrove swamp he had dredged without proper permit. And at Marco Island, south of Naples, the U. S. Army Corps of Engineers recently denied the Deltona Corporation permission to develop some 2,000 acres of mangrove wetlands it had already sold for luxury homesites. That decision, if upheld in the courts, could force Deltona to refund tens of millions of dollars or offer purchasers property of comparable value.

It was the work of two biologists at the University of Miami, Eric Heald and William Odum, in 1969, that inspired this renaissance of the red mangrove. Working in the heat and muck of the North River, in a remote part of the Everglades, the two men demonstrated that in estuaries the unloved red mangrove is actually the basis of an elegant food chain that supports much of south Florida's unique and wondrous animal life.

Red mangroves, they showed, shed more than three tons of leaves an acre each year. As these leaves decompose, they are eaten by the little crabs, worms, and other small creatures that form the lower links of the food chain. In some southwest Florida estuaries, mangrove leaves provide a large percentage of the diets of these animals. The little creatures in turn become prey for larger fish and many of Florida's tropical birds.

Red mangroves offer more than food. They provide a safe, irreplaceable wildlife habitat, both on land and, around their roots, in the water. Moreover, they break up storm waves, and their spidery roots stabilize land vulnerable to the sea. Old-timers say the mangroves are one of the safest refuges in a hurricane.

Rediscovering *(Continued on page 675)*

Stemming the tide of Florida's land development, the U. S. Army Corps of Engineers recently called a halt to further mangrove destruction at Marco Island (**left**). At stake, said conservationists, was the future of the area's fragile ecosystem. Though the landmark decision is being appealed in court, few now deny the importance of the red mangrove to Florida's commercial- and sport-fishing industries.

FRINGING both Atlantic and Pacific shores, the hardy red mangrove thrives and proliferates in estuaries and lagoons. Both protector and nourisher, it is an irreplaceable link in the complex food web of the south Florida coast.

The red mangrove, vital habitat for wildlife

A pandemonium of fish—big mangrove snappers and others—gathers amid tangled prop roots at high tide to dine in one of the world's richest marine environments.

As the tide recedes, it carries detritus and microorganisms to nearby shallows that become nurseries for many of southern Florida's commercial fish and shrimp.

(Continued from page 670) the red mangrove, *Rhizophora mangle*, became an excursion of surprise. As I expected, mosquitoes still abound in the mangrove swamps, along with clouds of Florida sand flies, or midges, which Dr. Eric Heald describes as "all jaws; a set of teeth with wings." But the mangroves also host a panoply of life that I had grown up never knowing.

Aquarium of Life Surrounds Roots

With Billy Schwicker, a young jack-of-all-trades and mangrove enthusiast, I put on snorkel and mask off a mangrove island near Big Pine Key to explore from below the tangle of prop roots that make the mangroves look as if they are walking on the water.

It is like diving into an aquarium. Schools of rainbow-colored fish, jellyfish, translucent minnows, and little yellow-and-black-striped sergeant majors glide about the mangrove roots. Dozens of immature mangrove snappers peer out at us from their refuge in the roots. In shallower waters clusters of sea anemones and tiny fish are attracted to the food and protection within the mangrove stilts. Hermit crabs (page 680) scavenge along the bottom for organic debris that has washed from the island.

Since there is a breeze to keep the mosquitoes bearable, we trudge ashore through knee-deep muck. We contort our way through a jungle gym of roots to a small sand ridge at the island's center. It is teeming with life. Thousands of tiny shrimplike amphipods leap and burrow about in the sand.

There is a flap of big wings overhead as a breathtaking great white heron takes off. Florida's magnificent four-foot-tall great whites nest in these fertile mangroves of the keys.

As we pole our boat between islands, I notice many six- to twelve-inch-long green pod-like objects bobbing in the water. I have seen them many times before, stranded with seaweed on beaches and well out at sea—the seedlings of the red mangrove tree.

These ready travelers are one of nature's more remarkable seedlings; they give the red mangrove its extensive range: along the west coast of Africa, from northern Brazil through Central America to the southern coasts of Florida, and on the Pacific coast from Ecuador to Baja California.

In the spring the red mangroves blossom

Shapers of new islands, oyster bars at Rookery Bay provided both foundation and design for homesteading red mangrove trees (**facing page**). Getting their nutrients from water, these trees can root on convenient intertidal surfaces—oyster beds, sandbars, even coral reefs. Conversely, a cluster of coral has attached itself to a root (**above**).

Aggressive colonizers, red mangroves owe their far-flung presence to seagoing seeds that germinate while still on the tree. The flowers (**left**) bloom for a few weeks in the spring and then fall, making way for a fruit (**top**) that harbors a single seed embryo. A seedling shoot soon sprouts from each fruit (**above**) and grows to a length of six to twelve inches before dropping from the tree. Falling on land, it may put down roots immediately; otherwise, it will float with the current in a horizontal position. Gradually the root tip becomes waterlogged, causing the seedling to shift upright.

In this manner it may drift for many months before going aground in shallow water, where it can take root (**above**). Borne on equatorial currents, seedlings have even crossed the Atlantic. As the tree matures (**below**), its prop roots take in oxygen, and transmit moisture and nutrients to the trunk and branches. They may also trap silt and debris that aid in stabilizing the shoreline.

with yellow flowers that produce more than three hundred seeds per tree during the summer. As the seedlings ripen, they drop, some like darts into the mud below, where they may take root.

But more end up in the water, where they sometimes drift horizontally for hundreds of miles, remaining alive as long as a year. Gradually their root ends begin to absorb water, and the bottom-heavy seedlings turn upright. Roots and top growth may even shoot out while the seedlings are still adrift.

Eventually the pioneering seedlings beach, often on a sandbar or oyster bar. If the landing site proves suitable, roots soon anchor them to the ground, and rapid growth—as much as two feet in the first year—begins.

By about the third year a young tree starts to sprout its own forest of arching prop roots. Red mangroves often root in mud lacking in oxygen, so aerial roots allow the exchange of gases needed for respiration.

Gradually the young tree forms its own seeds, and in about ten years the bar becomes a thriving colony of red mangroves. The roots catch silt and debris, and land forms in the center of the colony. Here, on these higher locations, other types of mangroves, such as the black, *Avicennia germinans*, the white, *Laguncularia racemosa*, and the buttonwood, *Conocarpus erectus*, may begin to take over from the reds. But the reds continue to spread outward, colonizing and often stimulating the growth of new land at the sea's edge.

Coastal Groves Form Murky Jungles

The great coastal red mangrove belt at the lower tip of the Florida peninsula differs dramatically from the mangrove islands I saw with Billy in the keys. In the keys the islands sit scattered amid clear green sea. But along the coast the mangroves look like a primeval jungle that has been cut into a maze of small, closely connected islands by endless, twisting channels of murky water, stained a rust brown by tannins in the mangrove bark and leaves. Here, where the Everglades meet the sea, the mangrove ecology becomes estuarine rather than oceanic.

The view from the air is striking. To the north, mangrove-fringed estuaries reach like green fingers into the distant yellow saw-grass plains of the Everglades. Mangroves here may grow 80 feet tall. Below, when the tide is out, hundreds of white ibises and other wading birds speckle the glistening, fecund black mud, stalking its overladen cache of crustaceans and other marine life.

Mangroves are what botanists call halophytes, plants that thrive in salty conditions.

"It is not so much that mangroves need salt water," explained Dr. Heald. "The salty soil keeps out other plants that would be more efficient competitors. The mangrove is no wonder tree in the amount of leaf material it produces. Its value is that it grows where no other tree can."

Fallen Leaves Colonized by Fungi

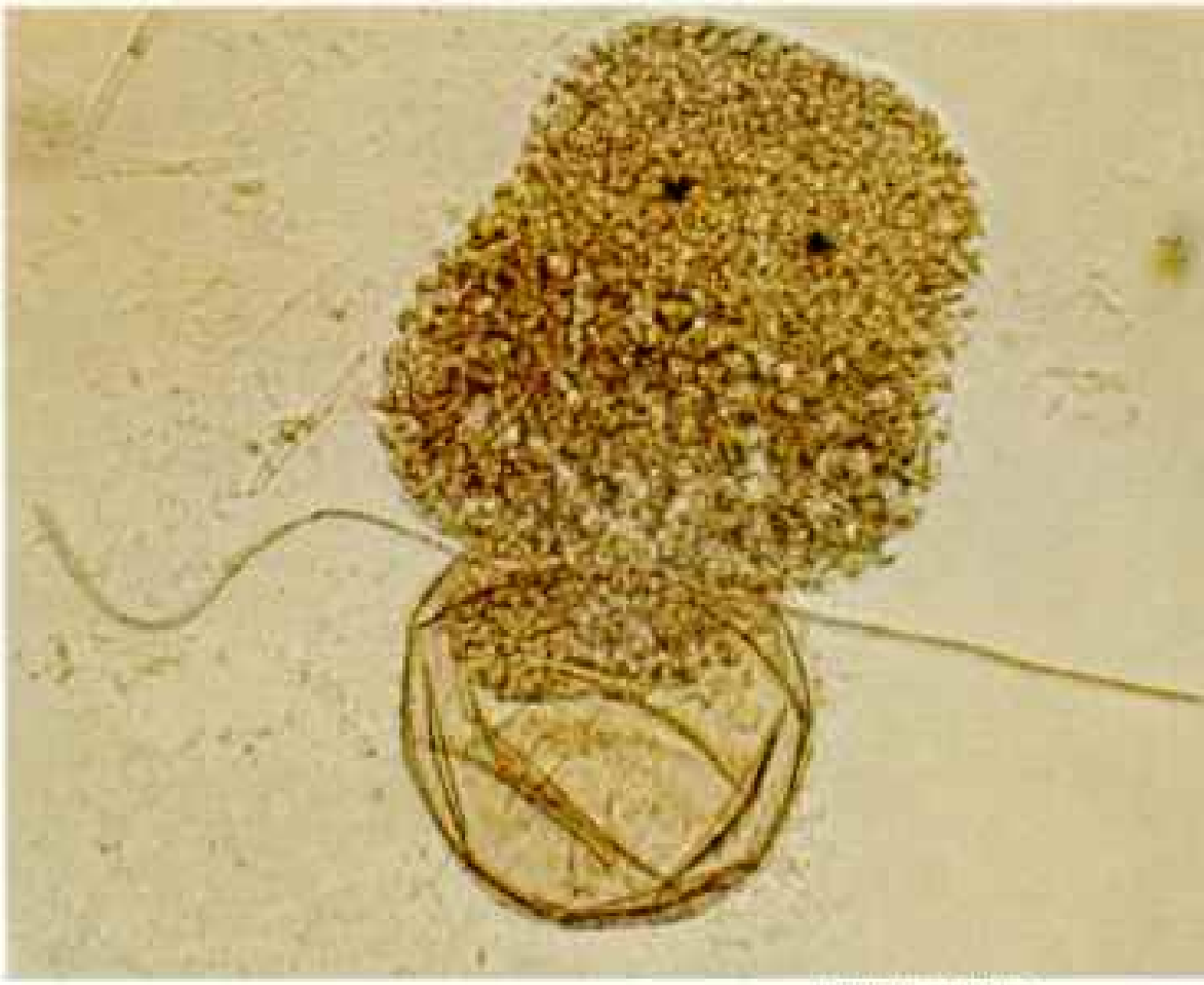
Bacteria and fungi begin to colonize the red mangrove leaves even before they fall. But the work of marine microbes is most important. The leaf has a waxy outer layer, or cuticle, which, as an adaptation to its hot, salty environment, keeps it from transpiring too much water. The microbes invade through tiny cracks in this cuticle. They usually attack a leaf within 24 hours after it falls.

"These are among the first marine colonizers," said University of Miami biologist Manny Master, showing me a picture of a fungus named *Phytophthora vesicula*. Master and others in Dr. Jack Fell's laboratory at the university's Rosenstiel School of Marine and Atmospheric Science are studying the gradual breakdown of the red mangrove leaf.

"Different fungi live on the leaf at different times," Master said. "These phycomycetes have spores that swim like sperm right to the leaf's stomata, or pores. There they grow filaments called hyphae that bore through the cell wall to reach the carbohydrates inside."

Phycomycetes stay on the leaf for two or three weeks until the particular cellular nutrients they thrive on are exhausted. They coexist with and are succeeded by protozoa, bacteria, and some hundred other fungi, about fifteen of which are of major importance in degrading the leaf. Most of these fungi, unlike the phycomycetes, are immobile. They float and attach to the leaf by chance.

The bacteria and fungi look to the naked eye like a slimy brown film on the leaf. This film attracts a hungry host of tiny animals, mostly nematodes and other little marine worms, as well as microscopic crustaceans called copepods. Biologist Rose Cefalu Hendrix in Dr. Fell's laboratory scraped the slime



MAGNIFIED 250 TIMES

Climbing out of its egg sac, a baby turbellarian, or flatworm, looks for its first meal. It is one of the first carnivores in the mangrove food chain. Often less than 1/25th of an inch long when full grown, these voracious creatures inhabit the film of fungi and bacteria that forms on dead mangrove leaves during organic breakdown. Comprised almost entirely of digestive sac, flatworms swallow animals up to half their own size, such as nematodes and copepods. Their two eyespots probably can detect light.

off a leaf and put it under a microscope for me.

She pointed out a hard-to-detect, transparent flatworm called a turbellarian (above). "Its two little eyespots are about all you can notice. It changes shape as it swims. It is all stomach inside. It just opens its mouth and sucks in prey."

Small crabs and amphipods soon begin to gnaw at the leaf, both consuming it and breaking it down. Gradually the leaf falls apart, and its particles drift about. These particles, called detritus, are by then rich morsels for a wide variety of marine life.

"As the leaf particle becomes more and more infested with microbial life, it becomes richer in protein," explained Dr. Heald. "Take two particles of identical size, one six months old and one twelve. The shrimp that picks up the older one would get better nutrition."

Mullet "Graze" on Bits of Leaves

The particles may be eaten and excreted and eaten again many times by different animals: sea worms, little mollusks, shrimp, crabs, and more crustaceans than I dreamed exist. These animals become prey for small fish, like grunts, pinfish, and snappers, that are later eaten by larger fish.

Some larger fish, notably the commercially important striped mullet, feed on mangrove detritus directly. They scour the bay bottoms in schools, taking in mouthfuls of mud and filtering out the enriched mangrove particles.

These grazing mullet are primarily what keep food in Sonny Strickland's mouth. Sonny is one of a handful of full-time mullet fishermen who work the glaring waters around the Ten Thousand Islands, a no-man's-land of mangrove-jungled sand keys and oyster bars.

The ancient Calusa Indians first lived in this labyrinth of islands. Long after the Calusas vanished, hardy white settlers established a few outposts, like the colorful fishing village of Chokoloskee. The mangroves also attracted outlaws. Murderers and thieves could hide out in these islands for years, confident that the law would never even try to track them through the maze of blind creeks and impenetrable mangrove roots.

Sonny, it is said, knows these islands better than anyone.

"This boat ain't built for guidin'. This here's a workin' boat," he apologizes as we set off toward Lostmans River. His boat is five years old and looks fifty.

Fishing has been miserable lately, Sonny complains, eyeing the horizon for a muddy patch of water that would indicate a school of feeding mullet. He also keeps an eye on the birds.

"Them ole pelicans," he says, pointing to a couple. "I watch them a lot to guide me to the fish."

To eat and be eaten: a sober fact of wildlife in the mangroves. An injured killifish, itself grown fat on detritus-nourished amphipods, falls prey to a scavenging blue crab (**above**). The crab in turn is a toothsome favorite of man—as a hard-shell delicacy or in its soft-shell stage after molting.

Stoking up on a pink shrimp, a hermit crab (**left**) protects its soft abdomen by residing in a discarded mollusk shell. Nearby cruises a mangrove snapper (**right**), much prized by Florida fishermen.

Down the hatch of a young pink shrimp goes a tiny mosquito fish—an unusual meal for these small crustaceans that support Florida's multimillion-dollar shrimping industry. Born off the Dry Tortugas, the light-shunning creatures—then only speck-size—migrate a hundred miles to mainland mangrove estuaries, where they reach adolescence. Returning to the Tortugas, they spawn and begin the cycle anew.

Marine eccentrics: Sea horses, like this one that has tethered itself to a stem in Rookery Bay (**below**), are hatched by their fathers, who carry eggs deposited in their brood pouches by females. Like chameleons, these fish can change color to suit their surroundings. Shrimp larvae and other plankton are sucked in through their tubelike mouths. Two decorator crabs (**facing page**) camouflage themselves in hydrozoans—plantlike animals—snipped off with scissor-like claws.

When Sonny finally spots a school, he drops one end of a 425-yard-long net into the water and runs the boat wide open in a broad circle that he hopes will ensnare the fish. As he hauls in the net, a scowl forms on his face.

"Little bitty rascals," he grumbles. We watch the few small mullet in the net slip through the mesh as he pulls in. "This is what I call a water haul. Nothin'!" The next try turns out only a bit better. "Fish are as scarce as I ever seen 'em."

Sonny expects the fishing to improve once the rainy season gets started upland in Big Cypress Swamp. "Fishin' here is like farmin'. You need rain for both."

Sonny was right about the rains. The annual slow overflow of Big Cypress rainwater into these islands flushes mangrove detritus out of the backwaters. It also freshens the bays and estuaries, creating a desirable salinity for the migrating young of many marine creatures. This salinity level chemically encourages mangrove particles to clump and settle rather than wash out to sea.

The mangrove wetlands thus become vast, bountiful nurseries. And when the little creatures arrive to feed and grow bigger, larger predators, including such sport fish as snook, tarpon, and snapper, soon follow.

The fabled fishing in these waters has indeed been off for the past five or six years.

During that same period, nearby drainage canals built by land developers have short-circuited much of the overflow out of the Big Cypress.* The canals deliver poor-quality water in sudden bursts that shock the estuaries, shorten the period of freshwater inflow, and reduce their capacity to support life.

No one can prove that these changes have decreased the amount of estuarine life, but most biologists I talked with believe that the correlation is more than coincidence.

Marco Island Ruling a Legal Milestone

Just north of the Ten Thousand Islands lies Marco Island, the resort and retirement-home community where mangroves have won their most significant victory to date. Marco, once fringed by mangrove swamp, is today a tidy network of sea-walled canals and beautifully landscaped modern homes.

The Army Corps *(Continued on page 686)*

*See "Twilight Hope for Big Cypress," by the author, NATIONAL GEOGRAPHIC, August 1976.

"**I was here first!**" Attracted by the area's abundant fish, white ibises dispute the ownership of a branch (**above**) on a mangrove island in Rookery Bay, where, at sunset, thousands of water birds contend for space (**below**). Big birds roost on the top canopy, while smaller ones settle for the underbrush. A plentiful food supply, coupled with the efforts of conservation groups —the Audubon societies in particular— have kept southern Florida a birdwatchers' paradise. Many species, such as the reddish egret and the roseate spoonbill, almost vanished around the turn of the century when their plumes were prized as adornments for ladies' hats.

In the Marquesas Keys a downy young frigatebird (**right**) will mature to become an aerial pirate, snatching food from boobies and terns. Also known as the man-o'-war bird, the species established its first U. S. nesting grounds here in the late 1960's.

of Engineers' controversial decision to halt further development and thereby save two big mangrove tracts on Marco is a milestone for all this country's wetlands. The corps essentially ruled that wetlands are too valuable a public resource to be squandered for developments that are not clearly in the public interest. (The value of Florida's mangrove wetlands for fishing, tourism, and recreation has been estimated at about $4,000 per acre per year.) Owners of wetlands, it would now appear, can no longer do whatever they want with their property.

Mangrove Nurseries Yield Shrimp

Few people are as pleased by the corps' decision as biologist Bernie Yokel, director of the Rookery Bay Marine Research Station, tucked into the 5,500-acre Rookery Bay Sanctuary, a splendid preserve of mangrove coast and islands just a short boat ride north of Marco Island. Bernie, a jovial, outspoken defender of mangrove purity, has no use for new neighbors. He understands too well the importance of the mangroves.

"Almost all the game fish and commercial species in the Florida mangroves go back to the open sea to spawn," he explained.

The most commercially important of these are the pink shrimp, which, as adults, support at least an 18-million-dollar-a-year industry. Hatched in the Dry Tortugas, nearly a hundred miles away, these shrimp mature in the mangrove estuaries of Florida Bay and Everglades National Park. The juveniles migrate back to the Tortugas, where shrimpers scoop up some 16 million pounds each year as the adults spawn. Nearly 75 percent of this country's pink shrimp grow up in these mangrove nurseries.

"One female pink shrimp may produce 500,000 or more eggs," said Bernie. "Spawning occurs all year, but the bulk of the larvae are produced in late spring and early summer as specks you can hardly see. Those specks make this incredible migration back

Perfect cover for tricky raccoons, the gnarled roots of a coastal mangrove swamp foil the most dauntless of coonhounds. At low tide, thousands of coon oysters—one of the predator's favorite foods—can be found clinging to mangrove prop roots.

to the estuarine nurseries. They come in by the hundreds of millions. In the fall, if you take a light out at night, it's just fantastic to watch the juveniles swimming back to sea with the tide."

Mangrove-leaf detritus is a major part of the juvenile pink shrimp's diet. One of Bernie's favorite game fish, the redfish, or channel bass, in turn relishes pink shrimp. Bernie explained the redfish's shrimp-hunting technique. "These shrimp are nocturnal; they bury up in the mud during the day. The redfish angles its body along the bay bottom at about a 35-degree angle. It has little sensing filaments at the ends of its pectoral fins that help orient it in water that is often turbid. It extends the fins downward, and when the sensors touch bottom, the redfish knows it's at the right angle. It moves its lower jaw back and forth on the bottom until it senses a crustacean. Then the fish snaps it up, crushes the shrimp in the back of its mouth, and swallows."

One of my most common catches as a boy was the sheepshead, so named because it eats with sheeplike teeth, cropping little crustaceans off the mangrove roots.

Birds Included in the Food Chain

In all, Bernie estimated that some 75 percent of the game fish and 90 percent of the commercial species in this part of Florida depend on the mangrove system. And the food chain does not end in the water. Cruising the channels of Rookery Bay, Bernie showed me many of the birds that rely on mangrove-fed prey. Along one shore was a roseate spoonbill, whose striking pink coloring comes from a carotenoid, a chemical in shrimp and other crustaceans it eats. The bird was weaving its spoon-shaped bill back and forth, stirring its dinner up out of the mud.

A little snowy egret sat on a log, peering into the water and occasionally making a jab. "They are great ambushers," said Bernie. "They rely mostly on little filter-feeding fish —sardines, herrings, and anchovies."

Near extinction in 1947, when numbers shrank to 50, the tiny Key deer has made a comeback. More than 600 now feed in mangrove thickets in a 7,000-acre refuge. Throughout the mangroves, rat snakes (**upper**) keep alert for birds and rodents.

The mangroves are also the only trees around that these birds can roost in.

With Ted Below, a Naples man intrigued by brown pelican research, I visited a little mangrove island that seems to be the most popular roost. The branches were dotted by doleful-eyed pelicans staring out at us, now and then stretching their beaks upward to clean out their pouches.

"At night there are fifteen thousand birds on these islands," Ted said. "Nine species nest in there. The big birds, like the cormorants and the pelicans, use the top of the canopy; they need it as a platform from which to take off. Smaller birds can scuttle about the brush inside. The obvious advantage of a roost like this is that only one bird has to take alarm and the whole island gets excited."

Most of the birds this morning were out feeding. Only those pelicans that were full from a previous day's meal were at home. As Ted explained, a well-fed pelican can sit in the mangroves and watch the boats go by several days before hunger strikes again.

Natural Enemies Still Invade

In many roosting islands like these, a persistent spoiler of the red mangrove food chain has recently been observed. Along Rookery Bay the roots of some mangroves were dangling above the water as if they had been cut off. Bernie peeled open one of these roots and pulled out a little crustacean that looked something like a pill bug.

"This fellow is a wood-boring isopod called *Sphaeroma terebrans*," he said. "It eats into the ends of the prop roots. That can keep roots from growing and therefore keep the mangroves from marching on into the water."

The isopod itself does not kill the tree, but sometimes, without the support of its prop roots, a red mangrove topples into the water during storms.

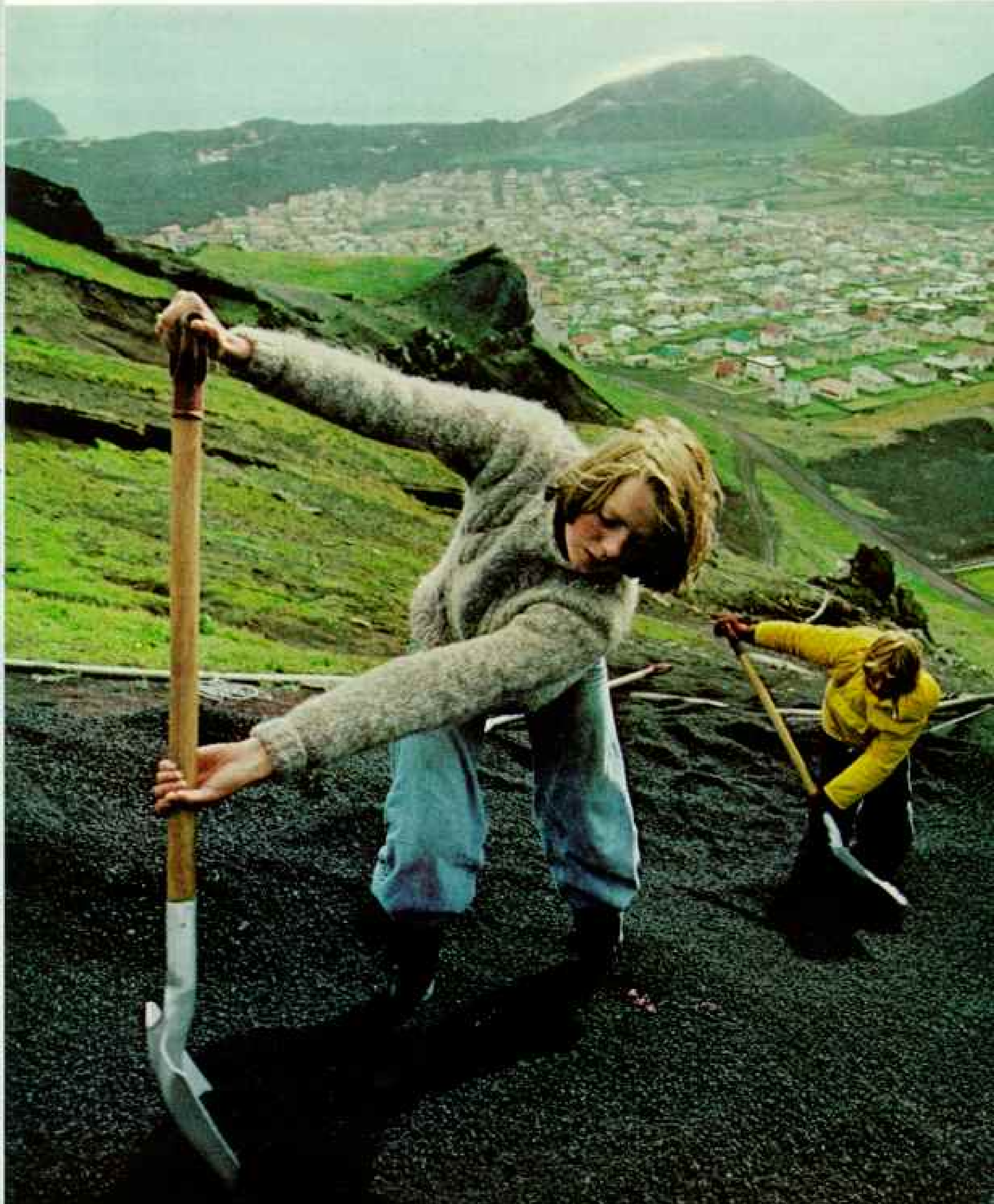
The isopod has been a problem on the southwest Florida coast for several decades, but not yet in the keys. It is ironic that this pest, one of several that plague the trees, should be gaining ground just when the last of Florida's red mangroves finally seem to be safe from the dredges and bulldozers.

But for the red mangrove's newfound friends there is some consolation. At least from now on, the mangroves will only have to cope with natural enemies. □

Padding their nests with mangrove leaves flown in from another island, a colony of brown pelicans spares the foliage from its own trees. Situated safely off shore, their island rookery offers a measure of protection against egg-robbing raccoons and rodents—and from man himself. These and many other imperiled tropical water birds find one of their most secure U.S. sanctuaries among Florida's remarkable mangroves.

Vestmannaeyjar: Up From

By NOEL GROVE Photographs by



the Ashes

ROBERT S. PATTON
BOTH NATIONAL GEOGRAPHIC STAFF

Hillside cleaners shovel ash off a slope above Vestmannaeyjar, on the Icelandic island of Heimaey. Following a five-month deluge of lava and ash in 1973 (**below**), villagers have fought to salvage their community with a monumental cleanup.

"WE LIKE OUR HILLS GREEN," Halla Svavarsdóttir said simply. I was following the determined teenager up the back of Fiskhellanef—Fish Cave Ridge—to one of the last pockets of tephra on the slopes above the village.

After the 1973 eruption in Iceland's Westmann Islands, the people of Vestmannaeyjar decided to clear not only their streets but their blotched hillsides as well. Halla and her friends had worked as cliff cleaners for the past three summers, scooping the black, crinkly volcanic froth onto a chute that carries it down to waiting trucks. Now the ash is almost gone.

"In some ways I am sorry," Halla said. "I will miss working up here. You are above everything."

Above everything. Above the gaily colored houses that spill down the slope to the edge of the harbor. Above the beige cliffs that thrust out of the jade sea that surrounds the main island of Heimaey and the smaller knobs around it. Above the lava that began pouring

from the earth on January 23, 1973, and raised a new mountain during the next five months. It towers 705 feet, black and still steaming, next to the grass-robed symmetry of old Helgafell, the dormant cone that helped shape this island some 5,000 years ago.

From the gash in its northeast face to the restless sea, the new volcano has built a russet, cindery desert, spotted by fumaroles. To the east it has added a square mile to the island. In the west it has obliterated the outskirts of the village of Vestmannaeyjar.

"But look, where we have planted grass," Halla said, pointing to slopes behind the village where ash lay too deep to be removed. "Once that was black. Now it is green."

The people of Vestmannaeyjar, I have found, do not dwell on misfortune. As an observer during the eruption I had been amazed at the coolness with which they battled the calamity that threatened their fishing village six miles off Iceland's southern coast.* Upon my return to a community once again throbbing with activity, it became clear that the little island commands a loyalty and devotion that few nations will ever know.

When hell boiled through a crack at Vestmannaeyjar's back door, villagers were evacuated to the mainland to await the fate of their island. "I painted only one picture while I was living away," artist Gudni Hermansen told me, "and it was a poor one."

Optimism Buoys Icelanders

Scientists on the mainland gave the new cone the official name of Eldfell—Fire Mountain. The word translates into English as "volcano," admittedly an uninspired name in a country built up by volcanoes and visited by eruptions 14 times in this century. Islanders preferred the name Kirkjufell, or Church Mountain, since the eruption took place near

*See "A Village Fights for Its Life," by Noel Grove, NATIONAL GEOGRAPHIC, July 1973.

Twice-buried graves received the mournful benediction of a Madonna, hem-deep in ash and snow (**left**), when the author visited Vestmannaeyjar during the eruption. With the shroud removed, flowers and grass again carpet the cemetery (**right**).

At the time of the catastrophe nearly all the 5,000 islanders moved to the mainland. Only one life was lost—a fisherman killed by toxic gases.

More than a third of the homes were destroyed by fire, lava, or heavy ash. At eruption's end, villagers clamored to return to their three-by-four-mile homeland, a major fishing port and a bastion of artistic activity. An emergency fund, created by the Icelandic Government and bolstered by international donations, aided in reconstruction.

NATIONAL GEOGRAPHIC PHOTOGRAPHER EMORY KRISTOF (LEFT)

Rivers of molten rock added nearly a square mile to Heimaey, largest of the Westmann Islands off Iceland's southern coast. Still steaming (**upper right**), the new cone, named Eldfell—Fire Mountain—forms a ragged twin to Helgafell, inactive for some 5,000 years. Eldfell's discharge nearly closed Vestmannaeyjar's harbor, vital to the livelihood of Icelanders like this fisherman (**below**). But it stopped just in time—and actually improved the port's protection.

the island's first Christian shrine. Losers in the name battle, they did not belabor the point. An Icelander, descendant of Norsemen, wears exuberance on his coat sleeve and resentment under a cloak of indifference. Not even the bleak new lava field stirs many complaints from the villagers.

"I think it has rather nice shapes," said my friend Páll Steingrimsson, as we walked one day toward the slaglike heap that rises sharply to a height of eighty to a hundred feet. Willing guide and interpreter during the eruption, Páll was once again my companion during this return visit. "I don't mind looking at the lava," he added, "because it reminds me of how hard we fought to save our town."

And fight they did. I remember dozens of rescue workers scooping ash from rooftops before the weight could crush the beams, then returning to clear the same roof two days later. Other crews worked around the clock to cover up empty windows after flaming lava bombs broke through glass panes and started fires.

But the most dramatic fight, a life or death struggle for the town, centered on saving the harbor. Like a mailed fist, molten lava had

National Geographic, May 1977

pushed toward the port entrance, threatening to seal it forever. Loss of the harbor would have closed the fish-processing plants and driven fishermen to the mainland, drying up the main sources of livelihood in Vestmannaeyjar. The loss would have touched the Icelandic economy as well. Fishing accounts for 80 percent of Iceland's exports, and a tenth of the catch comes from boats operating out of Vestmannaeyjar.

Quick-cool Effort Works

Firemen with hoses sprayed cold seawater on the surging flow of lava, hoping to quick-cool it into a dam and divert the flow away from the harbor. "This tactic may have slowed it only a little," said physicist Thorbjörn Sigurgeirsson, architect of the strategy. "But perhaps it made the difference in the end." Dramatically the lava had pushed into the mouth of the inlet and stopped 175 yards short of the cliffs on the other side, not only sparing the harbor but actually improving its protection from east winds.

When the eruption stopped on June 26, 1973, a third of the 1,200 village houses and one of the fish-processing plants had been destroyed by fire, ash, or lava. Construction boomed as islanders clamored to return—so far, about 80 percent of the previous population. "I have work lined up for the next two years," I was told by a big, friendly-faced carpenter, Óli Gränz.

Trucks and loaders were shipped to the island to clear the ash that lay an average of five feet deep. Foot by foot, the village was bared. Although I had lived there nearly two weeks during the eruption, I now strolled through a greened and flowered community I had never known; it was like seeing a coal miner's face scrubbed for the first time.

Ash can be removed, but the lava that spilled from perhaps thirty miles deep in the earth is now a permanent part of the landscape. A portion of it has been tapped and the heat piped to warm thirty houses and Vestmannaeyjar's fifty-bed hospital.

"If the system works adequately, we may enlarge it to heat the whole town," said Mayor Páll Zóphoniasson at his office in the municipal building that had served as command headquarters during the eruption. "There may be enough heat in the lava to last more than thirty years."

Blasted by blowing ash, a window in the home of Sólveig Kristjánsdóttir offers a dim view of the outside. In 1976, winds of nearly a hundred miles an hour raked tephra from Eldfell's slopes, damaging buildings and returning deep, black drifts to a town that

had already dug itself out. To stabilize the new terrain, islanders sowed some fifty tons of grass seed on a mixture of ash and soil.

An inexpensive heat source, until one considers the price paid for obtaining it. What, I had long wondered, does a volcano cost, including damage, lost work time, rescue operation, and rebuilding?

"On the 1973 basis," the mayor answered, "about 20 million dollars. Double that to account for inflation and devaluation."

Forty million dollars—a staggering sum for a nation of little more than 200,000 population that had a national budget of only 280 million dollars in 1973.

International donations swelled an emergency fund set up by the Althing, the Icelandic parliament. Scandinavian neighbors led the donors with more than 13 million dollars in contributions. Other countries accounted for some two million dollars more.

Town Seems Safe Now

Could it all happen again? Since 1963 eruptions have occurred twice within 14 miles of each other—the Surtsey upheaval that lasted until 1967 and the one at Heimaey. For the answer I went to volcanologist Dr. Sigurdur Thórarinsson, a scientist whose nation is his laboratory.

"The town of Vestmannaeyjar is likely to be safe," he said in his office at the University of Iceland in Reykjavik, "because the volcanic fissures all follow a line running from northeast to southwest. So a new fissure would probably open either south of Helgafell or out to sea to the north.

"Eldfell was only an average eruption," he said in retrospect, "and not as scientifically interesting as Surtsey, which began on the seafloor and built a new island. Also, the lava flow at Eldfell was only 1.5 kilometers long, whereas the Laki eruption in 1783 had 65 kilometers of lava.

"The biggest lesson appears to have been in observing how people can react in an emergency."

Within the shadow of the booming volcano I had seen how the people of Vestmannaeyjar had responded to this challenge from nature. Now I would discover why.

"Vestmannaeyjarians are very special people," said Sigmundur Andrésson in his bakery, as he squeezed his fist around a blob of dough. The shape of a bread roll squirted out between his thumb and forefinger and plopped into a greased pan.

Land so fresh it still smolders beneath the surface draws 1,500 tourists a month during the summer. Unlike the ash, which can be moved or seeded, such lava fields may remain jagged and barren for centuries.

When the eruption forced Sigmundur to move his heavy ovens and pans off the island, he found an even more promising business in the mainland town of Eyrarbakki. When the eruption stopped, however, he moved them all back. "At Eyrarbakki, everyone went somewhere else on the weekends, and the place became a ghost town. There was no sense of community. Here we don't have many theaters and museums so we must make our own entertainment and art."

Landscape Inspires Artists

The island, I had observed, is a hotbed of artistic sensitivity. In an exhibition of Vestmannaeyjar art several years ago, 24 painters showed their work, a high proportion for a village of slightly less than 5,000. During my visits I have also encountered netmakers who sculpt, farmers who write poetry, and fishermen who compose anthems about their island home.

In explanation, the artist Gudni Hermansen had led me to a view of the quiet harbor, the roiling sea beyond, and the high cliffs swarming with seabirds—puffins, razorbills, fulmars, and guillemots.

"Everywhere on the island are intriguing forms, shapes, and movement," he said.

Life, as well as a sense of community, has returned to village houses that for a time had stood hollow and deserted. I had shared one with rescue workers during the eruption, and I stopped by this time to thank its owners, whom I had never met. Ingibjörg Johnsen invited me to join her family for dinner. We ate on a broad dining table covered with white linen, in the room where I had typed my notes on a board slung over beer cases while the volcano boomed outside.

"People are not quite the same yet," said Mrs. Johnsen. "They seem less quiet, somehow more restless than before."

Memories of the eruption are tinged with uneasiness, fear, and defiance. "The other day I heard something that I couldn't identify right away, and the thought of another eruption flashed through my mind," Didda Kristinsdóttir, wife of Gudni Hermansen, had told me. "I'm not afraid of another eruption, but I can't forget the sound of the volcano the night it began. The noise filled my head."

One afternoon over coffee, biscuits, and cheese in her kitchen, Kristín Helgadóttir told me of the restless year spent in Reykjavik before she and her husband could return. "I will never go back to Iceland to live," she said, as though the mainland were in another hemisphere. "Not even if an eruption comes right up through this floor," she said, pointing to the kitchen linoleum, "will I ever leave this island again."

As if social life on the little island were not close enough, the villagers move into a tent city for three days each summer for the Vestmannaeyjar festival, an annual Icelandic celebration that commemorates the establishment of home rule in 1874, a significant step in total independence from Denmark.

On a slope leading down to the sea on the south end of the island, they set up rows of identical white tents until the grassy meadow

looked like a military encampment. "It gives us an excuse to get closer for a few days each year," said Eygló Óskarsdóttir as she tended a coffeepot and plate of sandwiches for callers to her family's tent.

The wind came up with the dark—about 10:30 p.m. on this August night—until the surf boomed on the rocky shore. Rain slashed out of the blackness at midnight, just as festival officials lighted the house-size bonfire. Wild flames, chill wind, and laughing faces swaying and singing in the glow—the perfect symbol of this land of fire, ice, and unquenchable exuberance.

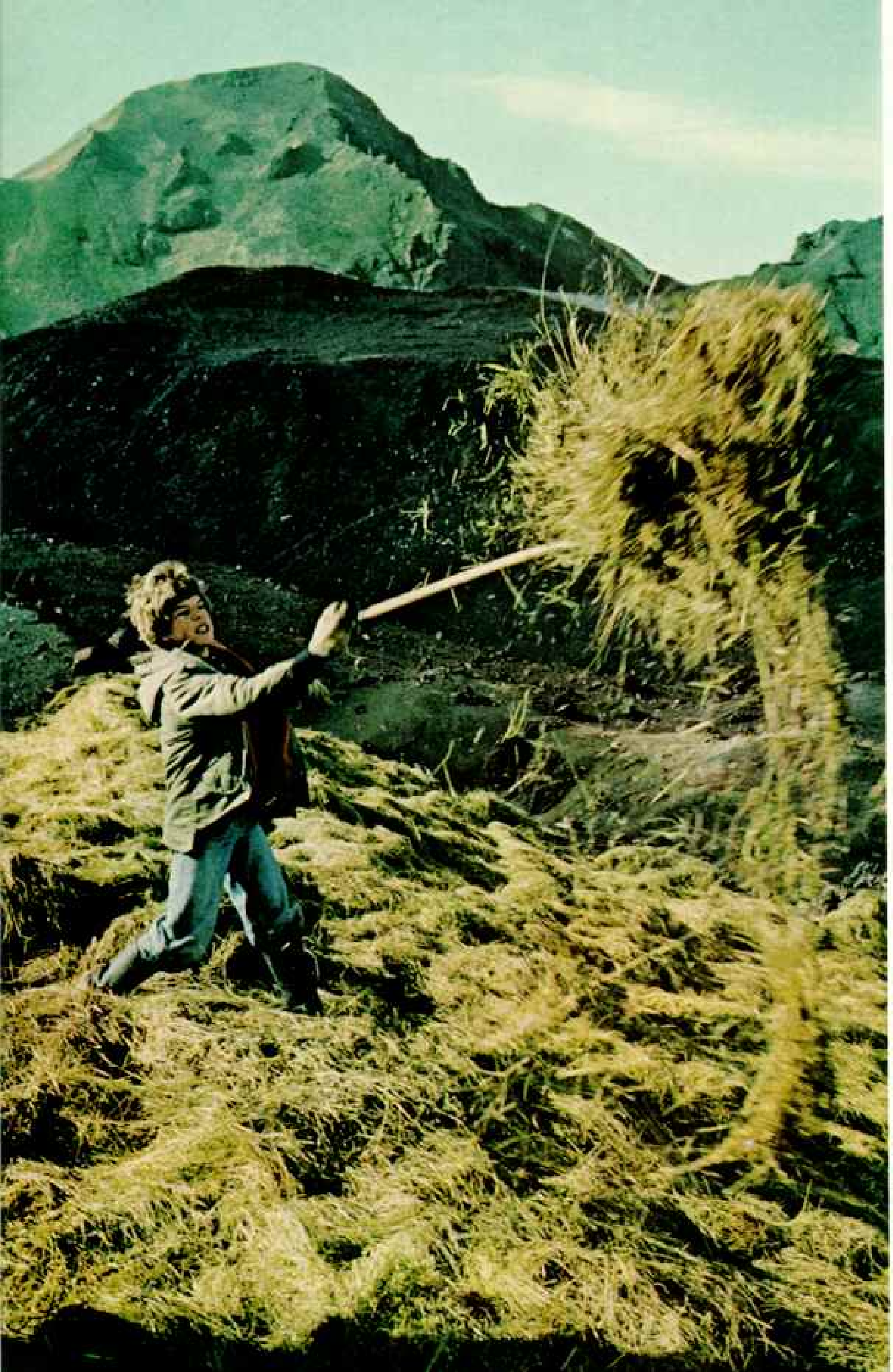
Beer, *brennivin* (an Icelandic liquor), and song flowed generously throughout the night, as it had during the eruption, when rescue workers had seemed determined to drown their concerns in a torrent of music. At 6 a.m. on the second day of the festival, I entered one of the six-by-eight-foot tents where the gaiety continued unabated. More people pushed in behind me, for singing is as natural as breathing to a Vestmannaeyjarian, and the sound draws them like a magnet. Was it the wind that rattled the tent roof? Or was it the vibration of voices thundering "When the Saints Go Marching In" and the Icelandic ballads with their heavy rhythms?

More people pushed in, and I was crushed sideways against someone sitting on a table. A guitar brushed my neck, and I turned to see its owner strumming faithfully while being crammed sideways toward me. In a half crouch I jammed one arm against his chest so he could finish accompanying the rollicking ballad. "Thank you," he said when the song was finished, and still in that slanting position, he offered me his flask of brennivin.

Puffins Nest on Virgin Earth

Plates of smoked puffins were available at most of the tents. The plump seabirds are a favorite dish of the Vestmannaeyjarians, and the hunting season ends, not by coincidence, just before the festival.

A few days earlier Páll Steingrimsson and I had been riding the swells in a rubber dinghy just off Heimaey's new coastline when he pointed to the shore and shouted, "Look,



the puffins are nesting in the new lava!" With their color-striped, chisel-like beaks, red-rimmed eyes, and black-and-white formal coats, the stubby birds preening and strutting on the rocky ledges resembled tuxedoed clowns. To the Westmann Islanders, they are a symbol of life.

During breeding season the birds swarm like gnats around the cliffs, when they are not diving in the sea to catch small fish. Over centuries after an eruption, the accumulation of their droppings and the moss that grows on the lava form the soil that cloaks these sea hills in thick green grass. Hiding in that grass, men try to net the plump birds.

"Tomorrow," Páll had said, "we will go puffin catching."

On a rare cloudless day, the dinghy struggled over mountainous pea-green seas to the island of Hrauney, half a mile off Heimaey's northwestern shore. No landing site awaited us, only two ropes dangling from a sheer hundred-foot cliff. As the swells rose, the young islander at the helm rammed against the rock. We took turns grabbing the ropes and climbing them hand over hand as we walked up the cliff face.

Halfway up the spongy slope above the cliff, we reached the puffin catcher's hut and were greeted by Hjálmar Gudnason. A ship-to-shore radio operator at Vestmannaeyjar 11 months of the year, Hjálmar was one of the first to see the volcano spring from the ground on that fateful night in 1973. Now, in happier times, he led us to a notch on the grassy hillside, a perch for puffin catching.

Páll tutored me in the use of the oversize butterfly net with an 11-foot handle.

"Those flying with fish in their beaks are coming in to feed their young," he pointed out. "Let them pass. Those we catch are nearly all immature birds. The older ones have been tried for and missed, and they learn to avoid the nets." I ensured countless future generations with my strikeouts.

Making new terra more firma, a youngster scatters hay over a hot spot of tephra. The heat should cause the hay to decompose and the seeds within to germinate. Although it has enough minerals, tephra alone lacks organic matter to hold moisture for grass. One frost-coated shoot gains a foothold (**above**)—new life springing from the ashes of calamity.

Feelings for Home Run Deep

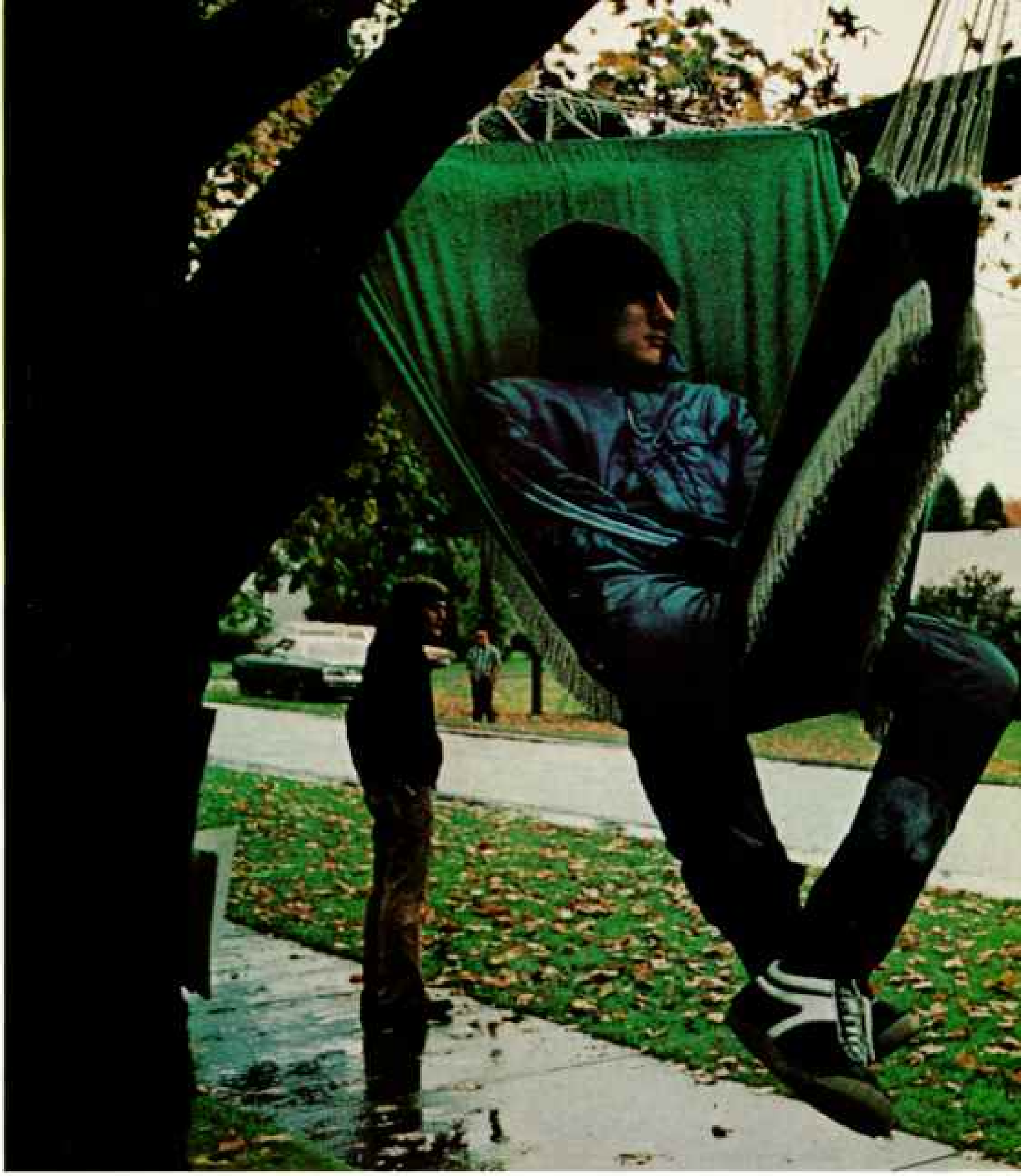
I had heard of Hjálmar's reputation as a trumpeter. Later in his hut, at the urging of his friends, he reached under his bunk and withdrew the gleaming instrument. Leaving the little shelter, he walked a dozen steps and faced the slope that curved before us like an amphitheater. Into the evening stillness he blew an American pop tune that alternated smooth melody with the lilting bounce of ragtime. Startled puffins on the slope rose in whirring flight. His second number lifted soft, soothing tones, and the birds circled back to roost, settling onto the sod-and-rock shelves.

As a lowering sun turned the sea from jade to pewter, I witnessed a remarkable concert by one island dweller to a host of others. Bell-clear tones echoed across the little canyon, and puffins in their formal wear waddled forward to stare with an eerie attentiveness at the man with the trumpet below them. Occasionally one stretched and fluttered its wings, as if in applause. When the last notes had died in the air, Hjálmar lowered his instrument and walked back to the hut.

"I recognized the first tune," I told him, "but what was the second?"

"It is a Vestmannaeyjar song, 'Heima,'" he answered. "It means 'At Home.'"

And they were. □



Time treads softly in the Finger Lakes region, where a youth in a tree-sitting contest

New York's Land of Dreamers and Doers

By ETHEL A. STARBIRD NATIONAL GEOGRAPHIC STAFF

Photographs by NATHAN BENN

views Cohocton's Fall Festival parade. He climbed down after 13 cold, wet hours.

LEANING ON THE BLACK BOX of a carriage that marked him as a Mennonite, Harry Fox told me why he had come to live in that scenic slice of central New York State fondly known as the Finger Lakes.

"This is fine farm country, as good as any in the East. I doubt a man could find pleasanter surroundings for his toil or for raising up a family."

Rachel Malin said much the same thing: "The woods offer their shades, and the fields their harvest. . . . this new world. . . . abounds with almost everything we could wish for."

Both settled on fertile slopes above a misshapen wishbone of water called Keuka Lake. But they will never meet. Harry moved in from Lancaster County, Pennsylvania, in 1975; Rachel migrated from Philadelphia almost two hundred years ago.

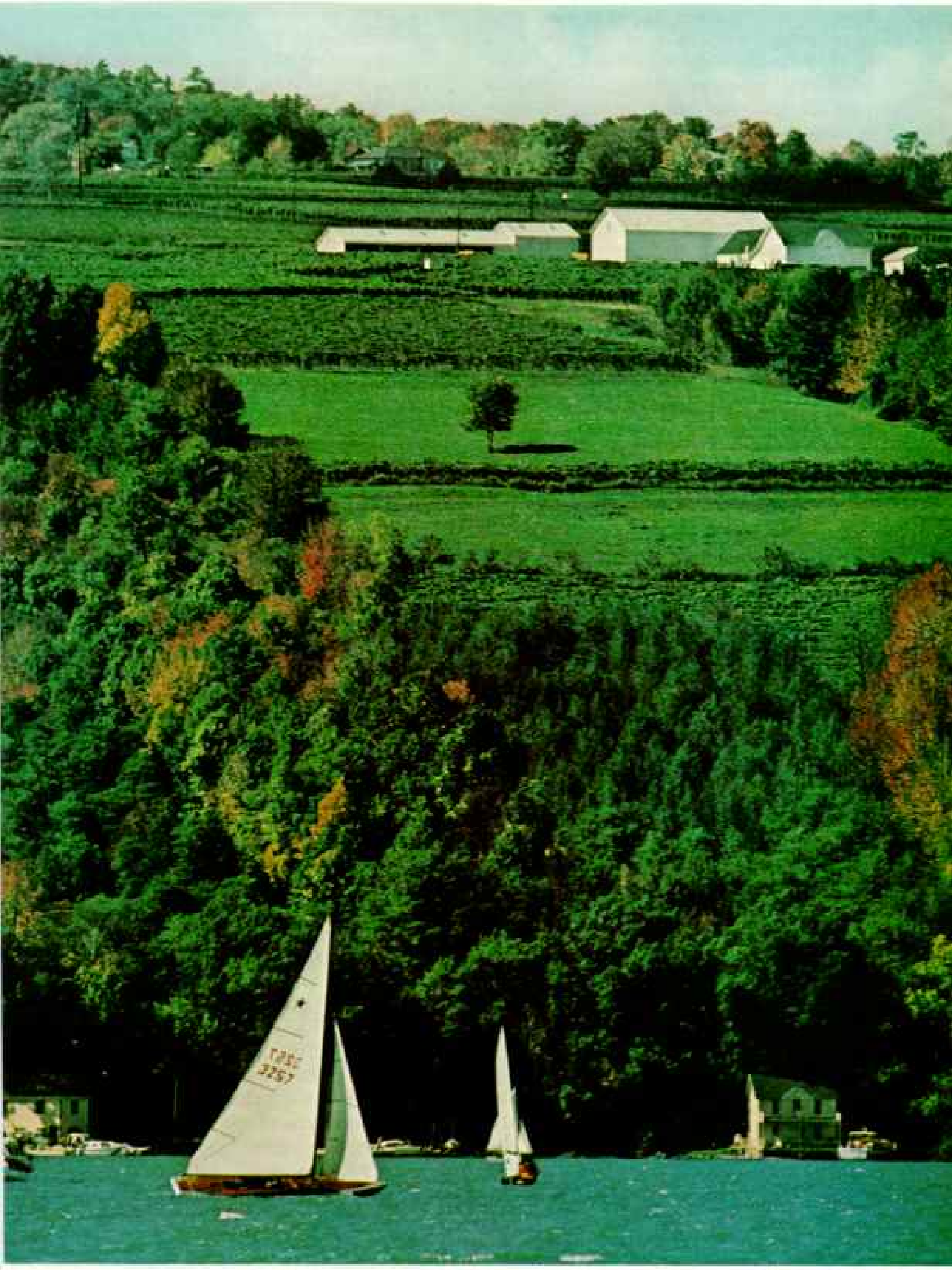
The similarity of their views is not surprising. For in this *(Continued on page 708)*

"Without parallel . . . in all the wide world," Cornell University geologist O. D. von Engeln called the distinctive, glacier-sculptured landscape of the Finger Lakes.

Here a mosaic of fields slopes down to the tree-lined shores of one of the eleven, Owasco Lake. Hundreds of waterfalls, glens, and gorges lend diversity to the area.

Landlubbers need not apply for Libby Wiles's job on Skaneateles Lake. The 18-year-old high-school senior delivers the mail on her father's boat (**above**), taking occasional dunkings in stride. The waterborne route serves hard-to-reach summer residents on the lake, which is a vacation retreat for several hundred families, many from nearby Syracuse.

Star-class sailboats race across Keuka Lake (**right**). Ample facilities for water sports, hiking, and camping help make tourism a 400-million-dollar industry.



(Continued from page 703) large low-census area, change comes more as a whisper than as the turbulent high wind that has toppled traditional life-styles elsewhere. Even the rush for rural real estate, evident in other places, has done little to disturb the status quo.

Not that anyone I met was seriously anti-progress. It's just that Finger Lakers are a pretty conservative lot, not easily convinced that bigger means better or that new notions always suit their needs.

By nature, they're about as free of sharp edges as the countryside they cherish. The Ice Age created its gentle contours some million years ago. Glaciers, grinding away at a plateau already veined with valleys, mounded some sections into whale-shaped hills called drumlins. Then, gouging debris from former riverbeds, the ice dug deep basins for a chain of dazzling lakes.

Nonconformists Find Fertile Ground

By definition, the Finger Lakes district is a movable feast. Some say it stretches westward from Syracuse to Rochester and south from Lake Ontario to the Pennsylvania line, an area covering 9,000 square miles and 11 slender lakes (map, page 710).

Others claim that only the environs of the six largest lakes—Canandaigua, Keuka, Seneca, Cayuga, Owasco, and Skaneateles—really count. Either way, the region nurtured a remarkable roster of dreamers and doers, introducing to 19th-century America such movements as women's liberation, spiritualism, and the Mormon faith. Here, too, the native grape put spirit in New York's famous wine industry. And the classes of Cornell and the glass artists of Corning made the local quest for quality known throughout the world.

The north-flowing Finger Lakes divide the district into two distinctive areas, each with its own cultural flavor. New Englanders opened the northern section. The towns they built, especially those along the route of the old Erie Canal, retain a Yankee flavor with their thin-spired churches, tree-shaded streets, and commercial blocks of mellow brick dating from Civil War times.

Most early immigrants brought along their God-fearing, straitlaced ways. But not all hewed to puritanical paths. Some turned the place into a hotbed of reformers, religious zealots, instant prophets, and self-styled mystics. Never have so many in so small an arena claimed so direct a line to the Almighty.

One of the first to stump for new-method salvation was Jemima Wilkinson, a Rhode Islander who said she had "left time"—died—briefly, returning to life with a special mandate to interpret God's will on earth. In 1792 her followers founded a New Jerusalem not far from Keuka's shores, where she parlayed her powers of persuasion into a personal fiefdom of more than 23,000 acres.

Joseph and Rena Florance now own the handsome hilltop house Jemima's devoted disciples built for her and staffed with handmaidens committed to her comfort.

"She called herself the 'Publick Universal Friend,'" Joe said, "and the story spread that she had only to say, 'The Friend hath need of these,' to part members of her sect from whatever struck her fancy."

Rena pointed to a stair landing above the center hall. "That was her pulpit. She'd appear up there in a flowing purple robe over a shirt and cravat. Being heaven-sent, she put herself above mere matters of gender."

Neither her estate nor her cult long survived the spellbinding spinster after she left time with a one-way ticket in 1819.

Prejudice Mellows Into Pride

Four years later a gangling farm youth from Palmyra testified that he had—with divine guidance—discovered inside nearby Hill Cumorah ancient gold tablets telling of a lost American civilization that knew Christ after His Resurrection.

The young man's story attracted more irate detractors than believers, so Joseph Smith and his followers, including a chairmaker named Brigham Young, were forced to migrate westward. But the faith Smith started—the Church of Jesus Christ of Latter-day Saints—fared far better than that of the Jemimakins.

"Local prejudice lasted a long time," I heard from Edythe Boyd. "It was still evident in 1930, when I converted. As a 16-year-old, I was ridiculed by my classmates and denied friendships because of my convictions."

Attitudes have softened since: The Mormon community around Palmyra now exceeds 500 members. And every July at Hill Cumorah more than a hundred thousand people of diverse faiths applaud a spectacular reenactment of the Smith experience.

With all its pageantry and pilgrims, Palmyra no longer knows the bustle of earlier times, when its tidy main street throbbed with the trade conveyed by the Erie Canal. Nowadays little traffic passes along the still-working sections of that once vital waterway or newer links that, together, form the New York State Barge Canal System.

"Railroads were siphoning off canal business back in the 1840's. Now trucking and pipelines are killing the trains." Peter Swider, 45-year-old skipper of the *Morania #6*, shoehorned 295 linear feet of tug and barge into the concrete cradle of Lock 25 at Mays Point.

As the barge rose, "Poughkeepsie Joe" Kopser checked the temperature of its cargo: 450,000 gallons of hot asphalt destined for Lyons, 20 miles farther west. Pete relaxed on his swivel stool. "There's many miles of roadway in those holds, enough to fill a whole train of tank cars. So here we are, paving the way for our own obsolescence."

Iron Horse Outpulls Mules

The battle between wheel and keel dates from 1825, when the 363-mile Erie "ditch" opened between Albany and Buffalo. Turnpike service soon bowed to boat and barge, and goods flowed to markets all but inaccessible before. But in a few decades the iron horse was outdrawing towpath mules, and the canalboat era plodded to a close.

The coming of trains stimulated growth of lake-end communities like Skaneateles, an appealing 19th-century village undiluted by serious updating. Marvelous old houses of great dignity and size attest to fortunes made from typewriters and teasels, a thistlelike plant once used to process wool.

Piloting one of the last of the lakes' mail boats, Phil Peterson filled time between dock-end deliveries with lively commentary on the Skaneateles scene. "If you found property for sale along here, it might cost you $150 a front foot. Two hundred years ago much of this Finger Lakes land was being given away—free tracts to veterans of New York's Revolutionary War regiments. Many who took them sold their holdings, sight unseen, to speculators for a few cents an acre."

Land deals and legal fees fattened the bank accounts of many early residents of Auburn, sited beside the outlet of lovely little Owasco Lake. Now a city of 36,000, it counts as major employers the world's largest rope-maker, a Japanese-owned steel mill, and a state prison that's been doing a steady, year-round business since 1817.

Cayuga Indians built their ceremonial longhouses here some four hundred years ago. They joined the Senecas, Onondagas, Oneidas, and Mohawks in the Iroquois federation, which functioned as an effective, representative government in "upstate" New York long before colonists settled on a similar association for their new nation.

Silver-haired and sixtyish, Adelphena Logan is both a product and promoter of Iroquois culture. "We know who we are and what our heritage is all about; it's the outsider who misrepresents us. For example, Hiawatha, an Onondaga like me, lived up near Syracuse, not Lake Superior where Longfellow poetically placed him. He was a real-life leader of our people who helped put together the federation and made it work.

"Which it did, keeping things pretty peaceful around here until 1779, when Gen. John Sullivan's Continental troops burned their way cross-country, driving away most of the Indian population for siding with the British during the Revolution."

If the Iroquois had been around Seneca Falls in 1848, they might well have wondered what the first national convention for women's rights was all about. Their women always had the upper hand in tribal affairs, choosing chiefs and demoting unsatisfactory ones.

Strong Women Make Their Mark

Looking somewhat like a small-scale Auburn, Seneca Falls straddles the old Genesee Trail near the foot of Cayuga Lake. Much of the original momentum for equal rights was sparked by two local ladies: Elizabeth Cady Stanton and Amelia Jenks Bloomer, whose name is better remembered for the baggy pants she wore than as a symbol of feminine freedom.

Archenemies of that old demon rum, both campaigned vigorously but in vain to have drunkenness declared grounds for divorce. "I guess it doesn't pay to be too civilized," Adelphena said with a grin. "My people settled that issue centuries ago. Any woman could banish her boozing brave from the longhouse, and it didn't take a court order."

From Amelia to Adelphena, Finger Lakes

Finger Lakes: 1. Conesus 2. Hemlock 3. Canadice
4. Honeoye 5. Canandaigua 6. Keuka 7. Seneca
8. Cayuga 9. Owasco 10. Skaneateles 11. Otisco

GODDARD SPACE FLIGHT CENTER, NASA

Like bear claws on an Indian warrior's necklace, the Finger Lakes dangle below Lake Ontario in a color-enhanced satellite image (**right**). The five nations of the Iroquois federation developed a representative government here some 400 years ago.

womanhood has provided an astonishing assortment of "movers and shakers." Among them: Margaret and Kate Fox from the hamlet of Hydesville, north of the canal town of Newark, who launched a lasting phenomenon with a bit of fancy footwork.

In 1848 the sisters began having rap-tap conversations with the dead. They were soon on tour, holding public séances that convinced thousands of their supernatural power. Forty years later they admitted hoaxing the whole show, cracking their toe joints to simulate messages from the beyond, though Margaret later recanted. By then, spiritualism, having attracted such notables as Horace Greeley and William Cullen Bryant, was here to stay.

The original Fox house is gone, but in its place stands a replica built by its owner on an inner compulsion he can only describe as a "calling." Rain blackened its unpainted clapboards as I awaited an answer to my knock.

A sepulchral voice inside asked my name and business. I replied. "Are you young?" came the next question.

"No. But why do you ask?"

I found out after 79-year-old John Drummond admitted me to a room casually arranged around some Maxfield Parrish

prints, two antique dolls in a high chair, an Edison talking machine, and a fired-up Franklin stove.

"Don't you know? Why, when a man is past his passion and marries a young maiden of virtue, their offspring will be prophets." He gave no indication that I was the answer to his prophet-sharing plans.

John is convinced that death, as we know it, would disappear if everyone followed his rather mystical formula for biological readjustment. He shuns those who communicate with the "underworld" and says he has twice been visited by a heavenly apparition. The Fox sisters couldn't have left *their* spirits in better hands.

As I drove east along the barge canal, downpours stained the rich soil the color of Dutch chocolate. Around Savannah, muck farmers dig bumper crops of potatoes from silt-filled fields beside the Seneca River. Swinging southwestward toward Phelps, I saw ten-pound cabbages the size of cannonballs. They feed area canneries that make this—some say—the "sauerkraut capital of the world."

By July, when redwing blackbirds perch like finials on the fence posts, highly cultivated midlands between Phelps and Penn Yan yield all the makings of minestrone—by the acre. One farmwife I met also plants almost as many sunflowers as garden seeds because "It's nice to watch something grow I don't have to can, pickle, or freeze."

To the east of Phelps, the trim and timeless city of Geneva crooks its quiet streets and pre-Victorian houses around the northwest corner of Seneca Lake. The community

appears little changed since 1849, when Elizabeth Blackwell received from Geneva (now Hobart) College the first medical degree ever awarded in this country to a woman.

Adding Punch to the Tearoom

Cornelius "Geneva Red" Dwyer has handled thousands of cases in his long, Runyonesque career, but none had to do with doctoring.

"Started with a speakeasy up in Lyons, where I was born. With Prohibition, running ale across from Canada cost $4.50 a case. Sold it for $18." The courtly 86-year-old chuckled over the memory as we dined at Belhurst Castle, a delightful rococo restaurant he owned for more than forty years.

"Hard stuff came from Bimini via Miami under a carload of grapefruit. Nope, the police never bothered me; I was a constable at the time. Course, there might have been a ruckus if anyone had caught me dumping all that excess grapefruit in the woods.

"This was a tearoom when I bought it. I livened up the beverage list a bit, put in slots and a casino, and ran it like a private club. No mobster ever muscled me; I've never done time and paid only one fine—for $100. So now it's legal to drink most anywhere, and it's the governments that used to hassle me and my cronies that have gone into big-time gambling. A really weird world."

Still erect and sure of step, Red wears his years as lightly as many senior citizens of the Finger Lakes. I was the only one to show surprise when 87-year-old Florence Stinson entertained the Crystal Valley Grange in Dundee with a series of pushups.

"**Spirits reach from beyond** to communicate with loved ones," the Reverend Marion Newbie instructs at Freeville's spiritualist camp (**left**). John Drummond (**above**) says an unknown voice told him to re-create the Hydesville house where Margaret and Kate Fox first reported messages from the dead.

Paddles do the picking on a mechanical grape harvester (**right**), which plops the loosened Concords into a tractor-drawn bin. Processing the crop within 12 hours eliminates spoilage from injured fruit. When vines are narrowly spaced, or on hills, vineyards employ local pickers like Mrs. Gladys French (**below**), who earns up to 65 cents for each 30-pound box she fills. On a good nine-hour day, Mrs. French can load 90 boxes—more than a ton. "That's a day's work," she understates.

Largest U. S. wine-growing area outside California, the Finger Lakes yield an unusually wide variety, from celebrated champagnes to many kinds of table wines derived from European, native, and hybrid grapes. Much of the region's success lies in its sloping topography, which drains cold, dense air from hillside vineyards, thus reducing the risk of fall and spring freezes.

FRED WARD, BLACK STAR (RIGHT)

And I've never seen a bouncier bunch than the Yates County Kitchen Band. At a concert in Penn Yan's Red Jacket Park, members played their kazoos, washboards, and laundry tubs with enough gusto to please a Sousa. Average age: just over 76. "Lucille hates to miss these performances," said one octogenarian of another, "but the battery on her pacemaker was running low."

Westernmost of the larger lakes, Canandaigua ends where a same-name city of considerable age and appeal begins. Here Stephen A. Douglas trained for the law and suffragette Susan B. Anthony was sentenced for breaking it by voting before women won the franchise.

Puppy love comforts a student facing exams at Cornell University, one of 27 institutions of higher education in the Finger Lakes region. Both a private and land-grant university, Cornell offers top-rated programs in more than 100 fields ranging from veterinary medicine to nuclear physics.

Tender good-bye parts Hobart College graduate Mark Felix and Patricia Francis (**facing page**), a student at adjacent William Smith College. The Geneva schools share facilities and faculty.

Al Perrin's attachment to the lake is so strong that he located his modest auto repair shop on the public pier, where he can cast for trout a few feet from his doorway.

Several years ago this boyish, 45-year-old bachelor achieved a certain amount of fame by inspiring a lighthearted song by his good friends Erik Darling and Patricia Street. Darling, a fellow Canandaiguan, also helped write such top-rated tunes as "Walk Right In" and "Banana Boat Song."

"Erik called my song 'Al Perrin, at the End of the Month,' because that's when I pack my camper, borrow his canoe, and take off in January for the Florida Keys. Got the record out at my place if you'd care to hear it."

Driving along the west shore, Al pointed to a cluster of houses away from the water. "That's Perrinville: My parents, sister, and most of my seven brothers live there. But I decided I ought to get away from home." We stopped at his rented bungalow half a mile down the road.

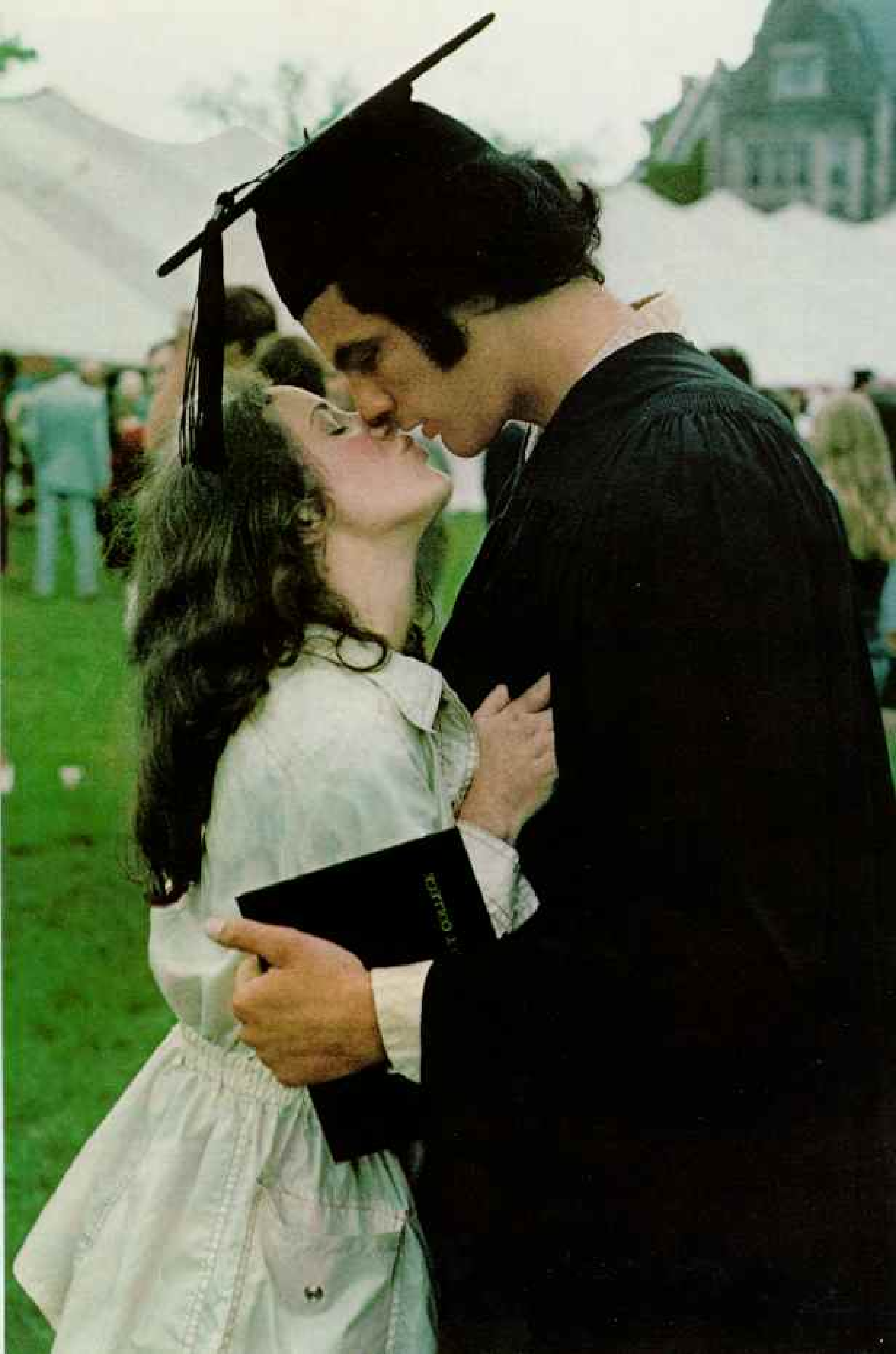
Nowhere Else Is Really Home

The song's lyrics make quite a case for Al's carefree Florida life. Why not make the change permanent? "You're looking at one good reason." He nodded toward the picture window. None of the many waterscapes on his wall matched that view: Hills fell in gentle folds into a lavender lake; a flaming afterglow garnished their ridgetops.

A lot of Finger Lakers do a lot of traveling; some even know foreign shores better than those only a lake away. But no one I talked with wanted to live elsewhere. "Try calling a February reunion of Finger Lakers in Florida, though," said one old-timer, "and you're going to need the Orange Bowl to hold them all."

South of Canandaigua, an imaginary east-west line passing through Penn Yan separates the northern counties from the southern ones, largely pioneered by Pennsylvanians. At this latitude the New England look has faded, and the landscape begins to rise and fall with greater variations.

Along the shores of Keuka, of southern Canandaigua and Seneca, vacationists vie with vineyards for control of the gentler slopes. While campers seem to have won the



Wood-and-wire contraption, *June Bug II* re-creates the motorcycle-powered biplane designed in Hammondsport by speed-loving Glenn Curtiss. The "father of naval aviation" piloted his flimsy craft in 1908 on the world's first pre-announced flight of more than a kilometer. *June Bug II* topped 40 miles per hour during its dramatic flight in Hammondsport's Bicentennial celebration.

waterfront, growers for wineries like Taylor, Pleasant Valley, Gold Seal, Bully Hill, and Widmer hold firm beyond the beaches.

The fruity, or foxy, flavor of wine from New York grapes is not for everyone, and there are strong and conflicting opinions on how local viticulture should be changed to meet a change in tastes. However, native strains like Delawares, Niagaras, and Concords (the principal source of kosher wines) still dominate the industry.

Despite the ever increasing popularity of

California wines, New York vintners are better off today than during Prohibition, when all grape squeezings went into jellies and juice. If a few gallons turned into something stronger, it surely wasn't wily Will Widmer's fault. He posted a warning on casks of grape concentrate that its reconstitution without refrigeration might cause it "to ferment."

Hammondsport's Pleasant Valley Wine Company has operated since 1861 under the first bonded winery license issued in the United States. Fifty years later a homegrown hero with Tom Swift tendencies received the nation's first license to fly.

Born in 1878, Glenn Hammond Curtiss was in a hurry most of his life. From sail skating and bicycle racing, he graduated to setting speed records on motorcycles he built in his Hammondsport shop. One of his motorcycle engines powered an airship in 1904; those famous World War I JN trainers called Jennies were Curtiss creations.

In 1907 Curtiss became associated with Alexander Graham Bell and a select group of air-minded associates in experiments. The next year at Hammondsport, the shy genius, not yet 30, lifted their joint-venture *June Bug* off a Pleasant Valley meadow in the world's first pre-announced flight of a kilometer or better. He actually flew more than a mile.

Tinker Toy Special Flies Again

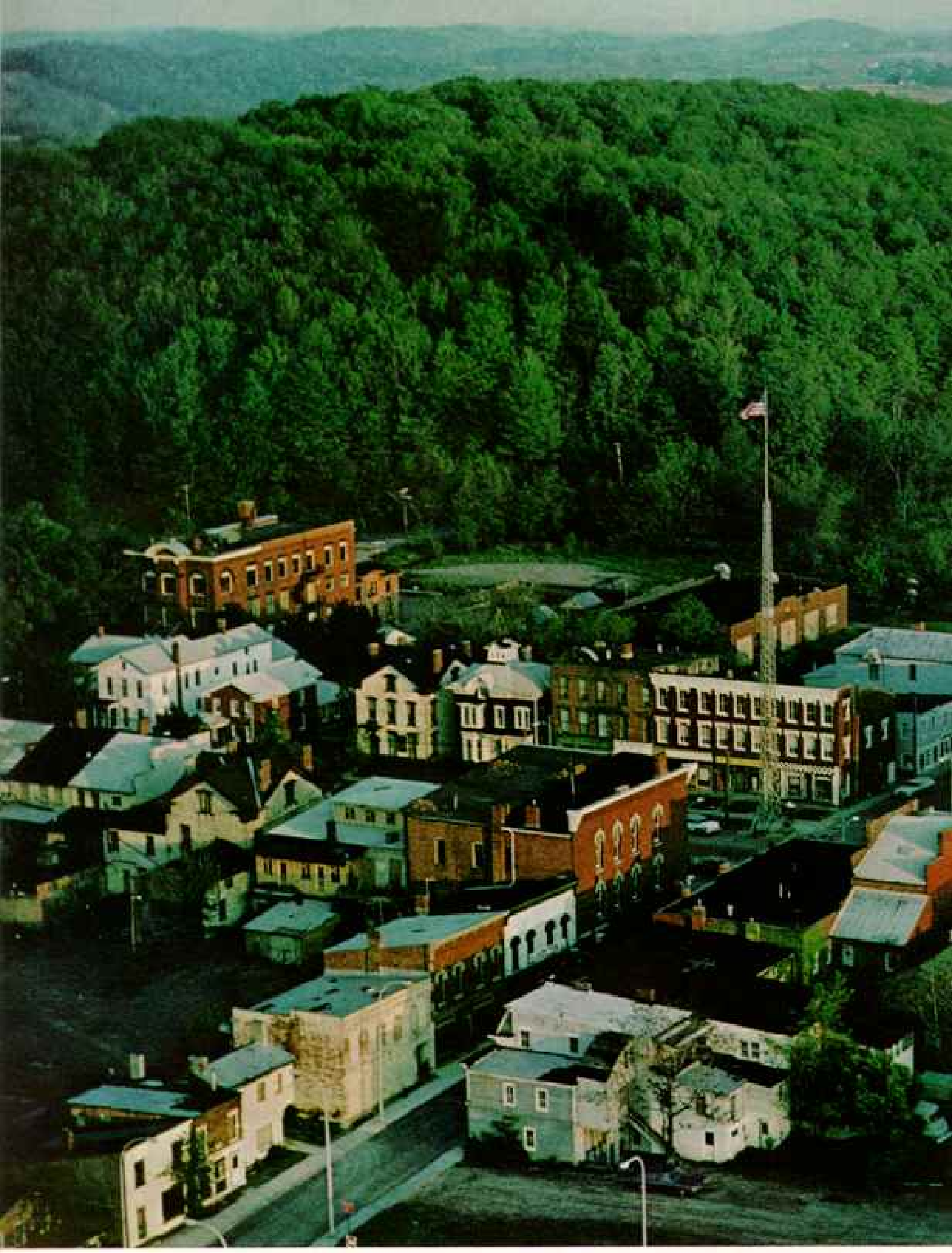
"We hadn't planned on duplicating that feat," said Mercury Aircraft President Joseph Meade, Jr., from the pilot's seat of an identical biplane. "Our idea was to build a static facsimile of the original as a Bicentennial project. But our volunteers got carried away."

Working from photos and rough drawings, his ten-man production team remained true to the Curtiss concept; the result looks as if elves of little aptitude got loose in the Tinker Toys (left). This second *Bug* flew fine, though tiny ailerons and absence of brakes—as with the original—made landing tricky. But nobody tampers with history in Hammondsport, not even for safety's sake.

At the head of nearby Seneca Lake, Watkins Glen has emulated Curtiss in turning speed into an economic asset. On a hilltop near town, a 3.37-mile track with 11 challenging curves attracts the world's driving elite to three major meets a year. October's main event, the Grand Prix of the United States, offers one of the largest purses in road racing —$350,000—for a test of skill and endurance that lasts almost two hundred miles.

Watkins's 3,000 residents take this annual invasion of some 100,000 spectators in stride, for the race has been an off-season bonanza ever since it was first held in 1948.

"It started out for amateurs only, run on regular roads in and around the village," said Malcolm Currie, executive director of the Watkins Glen Grand Prix Corporation. "Entries in those days included such notables as



Flag-waving community, Palmyra takes advantage of a new law allowing display of an illuminated Old Glory twenty-four hours a day. Once abustle with Erie Canal trade, the village now keeps pace with the nation's feminist movement, which was born in nearby Seneca

Falls in 1848 with the first national convention on women's rights. Palmyra's 3,776 citizens recently elected their first woman mayor, one of several in the region. "People felt I'd do a good job. They didn't care if I was a miss, mister, or ms.," says Her Honor, M. Katherine Davin.

yachtsman Briggs Cunningham, *New Yorker* cartoonist Charles Addams, entertainer Dave Garroway. We moved to the present course in '56, went professional two years later. We got the Grand Prix because we were ready with the right track at the right time."

Today, Formula One-class "big wheels" are as familiar to Watkins folks as the markings on a trout. And their little hometown, tucked in a back pocket of Finger Lakes country, is as familiar in Grand Prix circles as Monaco, Buenos Aires, Johannesburg, and other world-famous cities on a 16-nation circuit.

Diversity Marks Cornell's Curricula

An international reputation of broader scope and influence springs from a lofty bluff overlooking the city of Ithaca and Cayuga, longest of the lakes. Here Ezra Cornell, who made millions with the telegraph, founded a school of academic excellence "where any person can find instruction in any study." Today his university offers 2,000 courses each term, and it becomes ever more difficult to name a spot above, below, or on this earth some Cornellian hasn't staked out for study.

Home base for all this activity is a conglomerate of 11 schools and colleges sprawling across 740 acres of Ithaca uplands. Sampling the Cornell scene, I dined at the student-run Statler of the world's first and foremost hotel school, and glowered back at peregrine falcons being raised at Sapsucker Woods to re-establish this vanishing species in the wild. After creating the image of a fictitious Greek island on a computer-graphics screen, I pedaled the half-mile length of a circular tunnel enclosing the world's largest electron synchrotron.

In such a cerebral environment a collection of human brains came as no surprise. Among the Cornell specimens, most donated by scholars and writers of some note, the largest belonged to a multi-murderer hanged in 1871. So much for overachievers.

At Lansing, north of Ithaca, things also happen "far *below* Cayuga's waters." "We're now mining 2,000 feet down," said amiable Jack Stull, an official of the Cargill Salt Company. "Some of our old tunnels under the lake go two-thirds of the way across. Actually, most of the Finger Lakes recline on a vast bed of salt."

Dust as dense as fog shrouded the eerie underworld Cargill has created. "It won't hurt you," Jack assured me. "It's salt and soluble. Nobody has sinus trouble down here. What a place for a time capsule: Salt sops up moisture and nothing rusts. Any equipment we leave behind when we exhaust this

"Let the youngsters have their pools; I've got my porch," laughs Mrs. Ella Murphy. "Born right here" in Geneva, she has seen sprawling shopping centers force her favorite downtown stores to close. Yet the city of 17,000 still bespeaks the tranquillity that Mrs. Murphy and other Finger Lakers savor.

shaft should still work years from now."

Aboveground I headed for Harris Hill outside Elmira, where sailplaning has been a major sport since 1930 when the first national soaring championships were held here. A meet was in progress; sleek ships, lined up three abreast, awaited their turn for takeoff.

Backpacking a youngster, comely Ellen McMaster tugged on her tennis hat and went loping down the runway, leveling the wings of her husband's plane until it began to lift. Returning to the sidelines, she sank down beside me and two other sons. The boys stair-step in age up to 8.

"I'm better balanced for wing running with thirty pounds of kid aboard. As you see, the supply has been pretty constant. But I don't plan any more replacements." She beamed at her rosy-cheeked brood. "Looks like we'll have to change our style of wing running, or daddy'll have to get himself a new wife."

Coming: City of Artistic Endeavor

Drifting over the valley in motorless flight, my physicist-pilot, Marshall Hudson, banked to give me a better view of the Chemung River and the two major southern-tier cities it bisects: Corning and Elmira. In 1972 a flood raged through both communities, leaving in its wake a billion-dollar disaster.

Delicate strokes from a copper engraving wheel complete a crystal disk at the Steuben Glass factory in Corning. The barred owl, in an edition of only 30, costs $6,100. Each may take 200 working hours.

"Statistically, it shouldn't have happened," Marshall said as he spiraled lazily in an updraft. "But then, if you put one foot in the oven and one in the freezer, you are—statistically—comfortable."

At Corning, a sudden flood topped river dikes, crippling the major industry—Corning Glass Works and its artistic affiliate, the Steuben Glass factory. But they, like the city, recovered rapidly, improving as they rebuilt.

Mixing sand with imagination, Corning continues—as it has for well over a century—to make glass do things common sense says it can't. Which gives the firm a staggering product line of some 60,000 items.

Greatest crowd-pleasers in the Corning complex are Steuben's "glory hole" gangs. Teamed around fiery, gas-fed furnaces, they nonchalantly blow, spin, press, and trim gobs of molten crystal into gleaming works of art. One delicately cut design, in limited edition, sells for $7,000; the engraving alone takes more than a month of working hours.

"That's one reason for holding down the 'print run,'" said design coordinator Jack Hultzman, a third-generation glassmaker. "An engraver would climb the wall if he had to do the same design over and over again."

His educated eye picked out an almost invisible imperfection in a three-hundred-dollar vase of superb sparkle and simplicity. I thought about buying it at a markdown; none of my friends would notice the flaw.

"Smash it!" Jack ordered, and my hopes shattered with the glass. Steuben is as likely to let a "second" slip into circulation as Tiffany's is to put in a notions counter.

Battered City Gets Back on Its Feet

Twenty miles to the southeast, Elmira still dreams of the comeback Corning has already made. Here population drops as employment opportunities decline. Bare patches, left by high water and wrecking crews, give the downtown section a dreary, threadbare look that tends to eclipse significant improvements already made and others in progress.

Stanley J. Douglas, a county legislator and effervescent Elmira booster, speaks with optimism about the future. "Without the flood we'd still be talking urban renewal instead of doing it. Sure, we took an awful beating, but we also took a ten-year leap forward in the process. So what's another ten years if the job's done right. We needed more vitality here, more things going on, a more attractive city. And that's what we intend to have."

Elmira will probably fulfill Stan's expectations; people around the Finger Lakes don't discourage easily. For some seventy years, Skaneateles farmers made a big thing out of teasel growing, selling the prickly plants to raise the nap on woolen cloth. Ever since the bottom fell out of the market in the late '30's, one determined villager has been trying to find another use for teasels.

"Might make a back scratcher," he suggested. I tried one and itched for a week. If he doesn't solve the problem, some other Finger Laker may. After all, they figured out that the weed would thrive here in the first place. □

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Charting the Celtic realm

SINCE HER SCHOOLGIRL DAYS on a croft in Scotland, Dr. Anne Ross has been fascinated with the history of her Celtic ancestors. Today, as an archeologist at the University of Southampton in England, she pioneers the theory that the historical and cultural origins of almost all Europe go back to the Celts.

Firsthand research has taken her to many Celtic sites, such as the hill fort at Pilsdon Pen in England (**above**), where she walks with landowner Michael Pinny. The National Geographic brought Dr. Ross to the United States to consult on the article about the Celts (page 582) and to assist designer John F. Dorr (**left**) in preparing the supplement map that accompanies this issue. Your friends will want to read such vivid re-creation of the past. Nominate them for membership today.


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The hole is for our cartridges.

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In three seconds, just by inserting a new cartridge, you can change a ribbon without getting your fingers dirty.

mistakr
mistak
mistake

CORRECTS MISTAKES IN 10 SECONDS

The hole also accommodates a correcting cartridge.

So when you make a mistake, you can snap out the typing cartridge, snap in the correcting cartridge, type over the mistake, snap the typing cartridge back in and type the correct character—all in ten seconds or less.

FIVE COLORS

Cartridges come in black, red, blue, green, and brown.

If you're typing along in black, but you want to type a line in red for emphasis, snap out the black cartridge and snap in the red cartridge. In just three seconds you can see red!

NYLON FILM

EXECUTIVE LOOKING CORRESPONDENCE

The Smith-Corona electric portable with a film ribbon will give you the sharpest typing image of any portable.

When you want to type a letter that looks like an executive's, snap in the black film cartridge and type with real authority.

The black nylon is not quite so authoritative but is more economical. One cartridge lets you type about 325,000 characters.

FOUR YEARS OF COLLEGE AND BEYOND

We could make some remarkable statements about how we test out typewriters. But that's not necessary.

Most typewriter retailers have typewriters on display. Type a few sentences on a Smith-Corona. Snap a cartridge in and out. Smith-Corona looks and feels sturdy because it is sturdy.

So, for your high school graduate, we suggest you follow this simple formula:

Buy a doctor a Smith-Corona when he or she graduates from high school.

Buy a lawyer a Smith-Corona when he or she graduates from high school.

Buy a successful businessperson a Smith-Corona when he or she graduates from high school.

SCM SMITH-CORONA
SCM CORPORATION

Twindow insulating glass. comfort with a view.

Herculite K safety glass for patio doors.

Mirrored wardrobe doors of High-Fidelity float glass.

PPG glass gives you the world.

The hushed beauty of a snowfall. The serene shadows of a summer evening. The fire of autumn. The newness of spring. And even you at your beautiful best.

Only glass gives you all that. And PPG gives you more ways than anybody to share in the beauty of glass.

Our Twindow® insulating glass proves two panes are better than one. It helps reduce heat loss and condensation. So you have a clear, comfortable view practically all winter long.

Herculite® K tempered safety glass is safer than regular glass because it's stronger. And, if it breaks, it crumbles into small pieces that reduce the chance of serious personal injury. So it's ideal for patio and storm doors.

And our High-Fidelity® float glass mirrors give you—you, in an incredible variety of styles. One, shown above, hides a closet, then opens to give you a fabulous full-length, three-way view.

There's a world of things glass can do for your home, and nobody can do it better than PPG. Ask your builder or architect. Or write for a free, idea-packed copy of "All American Homes." PPG Industries, Inc., Dept. N-257, One Gateway Center, Pittsburgh, Pa. 15222.

PPG: a Concern for the Future.

PPG INDUSTRIES

1. OPERATION SAIL

2. U.S.A.

3. POLAND

4. GERMANY

5. DENMARK

6. ITALY

KIPP SOLDWEDEL GALLERY PRESENTS

Tall Ships on Parade!

The Fabled Tall Ships Of The World

In the February issue of National Geographic, opposite page 290, you saw the big black and white picture entitled "TALL SHIPS."

Now—"Kipp Soldwedel Gallery" 655 Madison Avenue, N.Y.C. 10021 offers this colorful print of New York Harbor "OPERATION SAIL," plus five more new selections of the ships themselves, or six in all for the price of five (see grid box below).

Frame—aluminum section in silver or gold (gold $1.00 extra).

Start your collection of Soldwedel works with one or more of these handsome lithographs. All lithographs are 21" x 28".

(Remember, the signed prints continue to increase in value.)

1. OPERATION SAIL An historic gathering of the "TALL SHIPS" for Operation Sail celebrating the bicentennial year of 1976 in the U.S.A.

2. U.S.A. "EAGLE" Host vessel for the 1976 U.S. Operation Sail gathering, owned and operated by U.S.C.G.

3. POLAND "DAR POMORZA" Poland's contribution to the tall ships that spread good will and worldwide peace.

4. GERMANY "GORCH FOCK" The winner of the 1976 STA/ASTA Race from Bermuda to Newport, R.I.

5. DENMARK "DANMARK" A rare view of the Danish training ship shortened down for a full gale off Cape Horn.

6. ITALY "AMERIGO VESPUCCI" Representing the pride of Italy and the Italian people everywhere.

Picture # above	Check your choice						Price Below	
	1	2	3	4	5	6	PRICE	TOTAL
Signed & framed							$55.00	
Signed & unframed							$40.00	
framed							$25.00	
unframed							$10.00	

SHIPPING COSTS: Add $1. for unframed prints
Add $2. for framed prints

SPECIAL OFFER — If you order a complete matching set of all 6 prints, pay for only 5.

KIPP SOLDWEDEL GALLERY
655 MADISON AVENUE, NEW YORK, N.Y. 10021

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Okay to charge it. *Fill in credit information.* *Please No C.O.D.'s*

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☐ Master Charge interbank

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Name _____

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Why did GTE put a street lamp
in a nice, simple phone company ad?

Because GTE isn't
a nice, simple phone company.

GTE is a group of companies.
23 of them are phone companies.
One of the others invented Sylvania
Unalux™ street lamps (they give
more light and use less power than
ordinary bulbs).

We're a lot more than a phone company.

One Stamford Forum, Stamford, Conn. 06904

"These big trucks scare me!"

Different ways of looking at trucks. To one a nerve wracking threat? To another a large ingredient in our nation's commercial health.

Trucks can be frightening. Some are massive: 55 to 60 feet or longer, weighing as much as 40 to 60 tons loaded. They sometimes crawl up hills, snail-slow. People complain that trucks tailgate, crowd them on narrow roads. Their slipstreams buffet small cars. They can be noisy, smelly, deadly in a collision. America has 24 million trucks. One for every four passenger cars. Many car drivers feel driving would be easier without trucks.

Others see trucks as essential to a healthy economy. They carry most of our meat, our fruits and vegetables, and the things we wear. They carry products all or part way to us from our factories. Filling shops with things to buy, trucks go wherever roads go — including 38,000 towns without railroads. And truck owners pay nearly 40% of road use taxes. Trucks help make possible the dispersed, decentralized living that characterizes most American communities today.

What to do? First we must all recognize that cars and trucks have equal rights to our roadways. And pay each other the courtesy those rights demand. Next we can work to maintain the quality of our modern roads and improve our outdated ones. That won't make traffic any lighter, but it can make it faster, safer, more economical and a lot more pleasant.

Caterpillar builds diesel engines to power America's trucks. We regard trucks and the roads they run on as critical elements in our total transportation system.

There are no simple solutions. Only intelligent choices.

CATERPILLAR

Caterpillar, Cat and the Cat are Trademarks of Caterpillar Tractor Co.

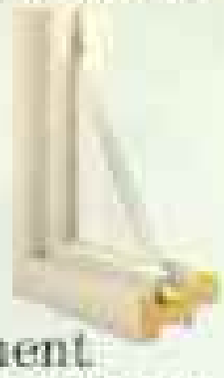
"I'd hate to do without them."

Wide open beauty for carefree living.

Andersen® Perma-Shield® Casement Windows are a beautiful way to make the most of a free-spirited lifestyle.

Their low maintenance makes them easy to enjoy.

For over their wood core lies an exterior sheath of long-life rigid vinyl. One that doesn't rust, pit or corrode. Doesn't chip, crack, peel or blister.



Perma-Shield Casement Windows are also easy on heating and cooling bills.

Because unlike the leaky, drafty kind, they're two times more weathertight than recognized air-infiltration standards.

It's this snug-fitting design and Andersen's use of a wood core (a natural insulator) that makes double-pane insulating glass practical.

There's beauty in color, too. Your choice of our deep, rich Terratone hue or classic white.

Want to know more? See your Andersen dealer today. He's in the Yellow Pages under "Windows." Or send this coupon.

To: Andersen Corp., Dept. 12, Bayport, MN 55003

Please send me more information about Andersen Windows and Gliding Doors.

I plan to ☐ Build ☐ Remodel

Name

Address

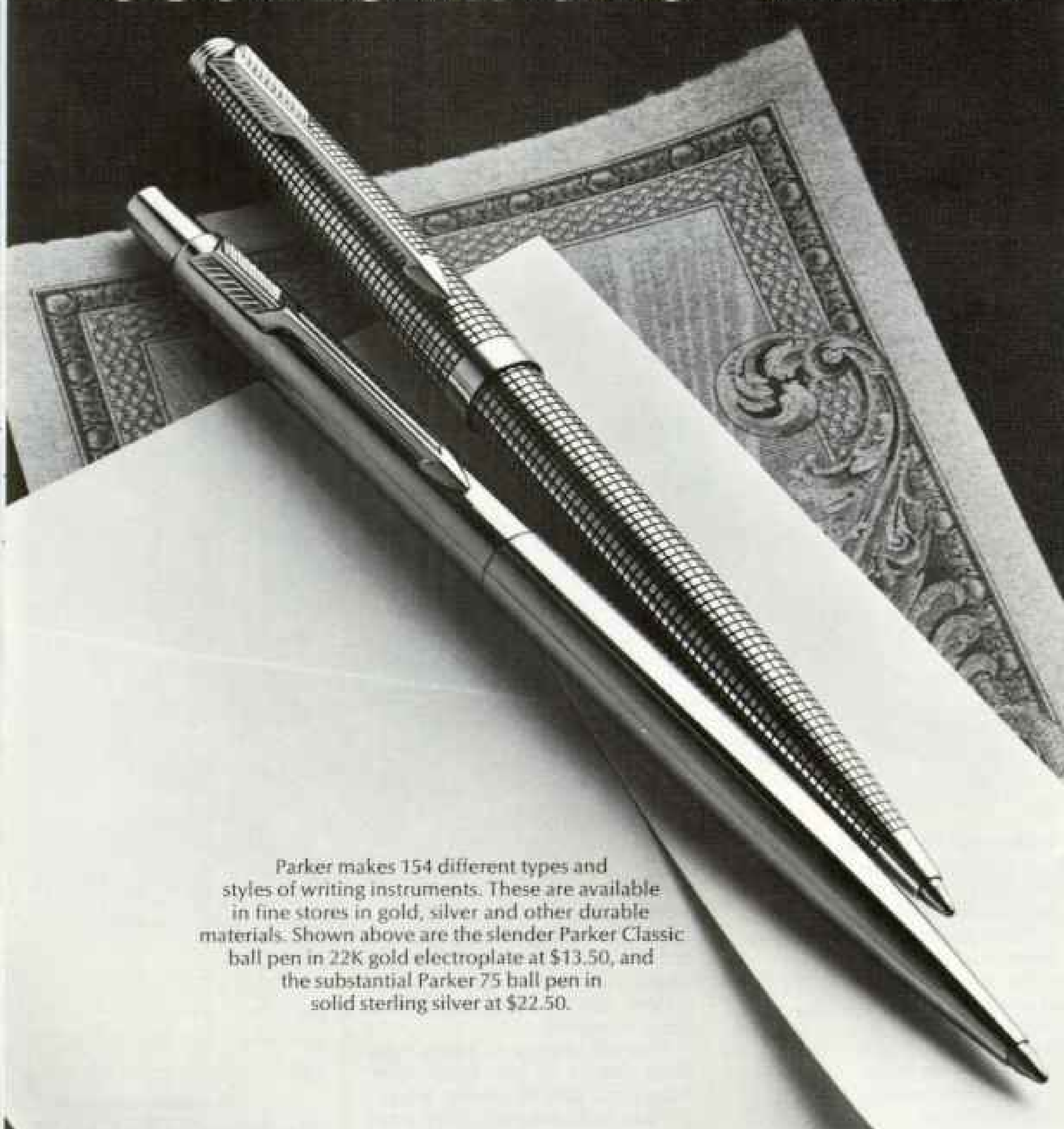
City

State Zip

The beautiful way to save fuel.®

Andersen Windowalls

How many other lifetime investments cost as little as $13.50?



Parker makes 154 different types and styles of writing instruments. These are available in fine stores in gold, silver and other durable materials. Shown above are the slender Parker Classic ball pen in 22K gold electroplate at $13.50, and the substantial Parker 75 ball pen in solid sterling silver at $22.50.

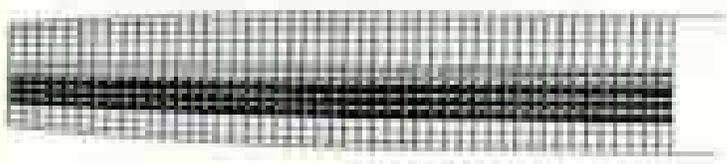
If you thought craftsmanship was dead, you owe it to yourself to inspect today's Parker pens. Few things at any price will perform so well so long.

Parker pens have been called "jewelry that writes" and "a minor miracle in engineering." Yet they don't cost a bundle of money.

Many of the differences that set a Parker pen apart are not immediately evident, but each contributes to its rare performance and confirms its quality in a world of diminished standards.

Whether you select the slim Classic ball pen, or the 75 ball pen, fountain pen or soft tip pen, each is a precision machine housed in an elegant casing. It still may seem extravagant to buy this much pen for yourself (we hope not). But its obvious worth and functionality make it apparent it would be an exceptional long-term asset.

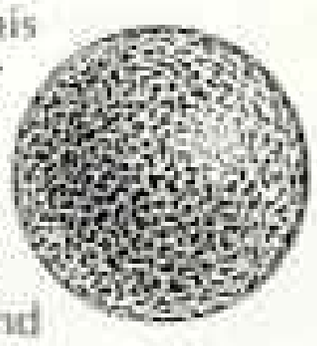
Here's why a Parker pen offers substantially more for your money.

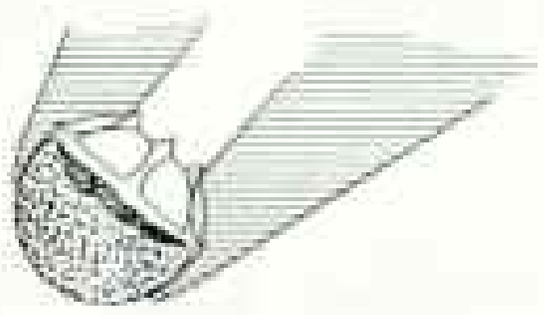


1. The distinctive Parker grid design was inspired by a leading London silversmith. Carved deeply into the case by a precise sequence of beveled cuts, the design is found on all sterling silver Classic and 75 ball pens, fountain pens and soft tip pens. The result is a metal sculpture that provides dozens of finger-fitting treads for easy, certain grip.

2. The arrow clip on the Parker 75 is a study in tenacity. Made of tough, resilient beryllium copper and created through nine separate stages of metalwork, it is tested to 20,000 snap actions. Clipped low and secure in a pocket, a Parker pen will not lose its grip.

3. The near-perfect sphere at the point of a Parker ball pen takes three weeks to make! This intricate bit of powder metallurgy is a Parker contribution to the art of penmaking. For smooth, even ink delivery, we make the ball round within ten/millionths of an inch. Microscopic texture on its tungsten-carbide surface is formed by something our scientists call "controlled crater geometry." Result is ideal grip on paper and a clean, even line. If you think no other ball pen writes quite like a Parker, it's not your imagination.

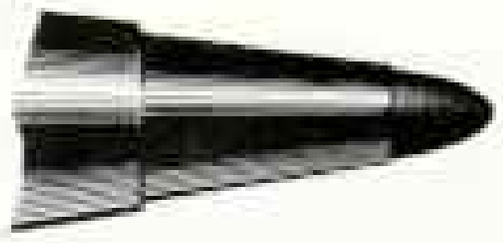




4. How well a ball pen writes depends as much on the ball socket as on the ball itself. If the lip of this nose-cone isn't strong enough, it will rub against the ball. Result: blobbing. Also, if the socket wears or corrodes, you will get an uneven, "goopy" kind of writing. The Parker ball socket is extremely tough, corrosion-resistant stainless steel. It must be this durable because the Parker ball pen writes months longer than the ordinary ballpoint and the socket has to stand up throughout all that extra writing life.

5. Like a fountain pen for writing with flow and character? Remember, the nib is the sensor of the fountain pen. For a smooth feel and even ink flow, it must have some flexibility. The Parker 75 nib is solid 14K gold, which has the flexibility and resilience necessary and resists corrosion.

6. Good as gold is for a nib, it would wear down in short order if it came in contact with the paper, a natural abrasive. This would cause a scratchy feel and uneven ink delivery. So the Parker 75 nib is tipped with a tiny pellet. This pellet is an incredibly tough alloy of ruthenium and platinum that wears *in*, to your touch, but won't wear out. Of the eight precious metals in the world, we consider it essential to use four in making the Parker 75 Sterling fountain pen.



7. Soft tip points can let you down. All too often they grow limp or splay. The Parker point is made of strong, individual strands of nylon bonded together by a special trace of epoxy glue.

8. A Parker even *sounds* different. When the cap snaps together with the working end, a positive clutch is engaged. This marries the two parts very firmly. The sound, in miniature, is not unlike the authoritative "thunk" made by closing the door of a fine sports car.

The only thing better than one Parker pen is a Parker pen set. And it's easy to make up exactly what you want. Just mix and match any Classic or 75 pen, ball pen, soft tip pen or gift pencil with any other.

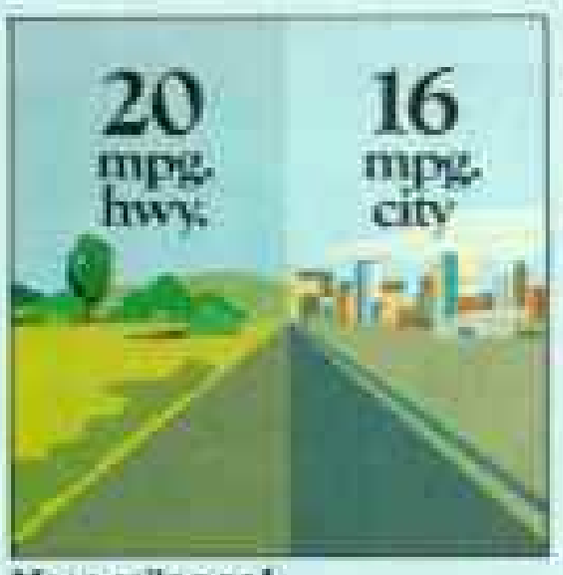
Every Parker pen is refillable and built to last. Because we expect you, or someone you're fond of, to use it not just for a few years but for a few decades.

PARKER
World's most wanted pens

GM

The New Chevrolet.

More of the things you want in a wagon.

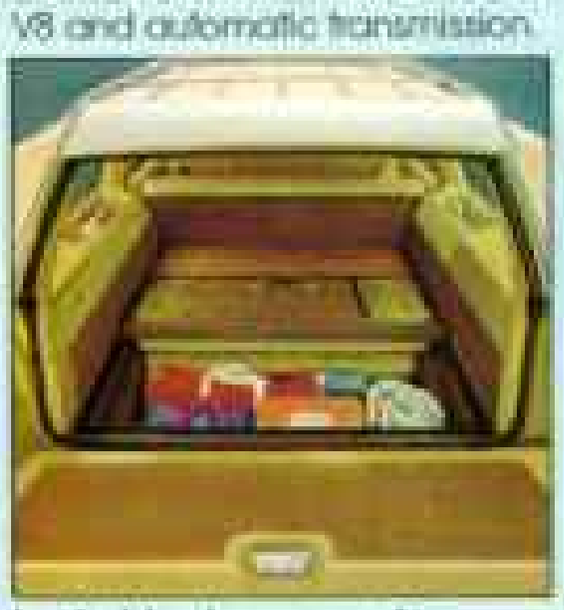


More mileage.* Compared to 1976 full-size Chevrolet wagons. EPA estimates with the new standard V8 and automatic transmission.

Convenient door-gate. Opens out like a door for people. Drops down like a gate for cargo.

Roomy cargo compartment. Takes loads up to 4 feet wide through a rear opening that's wider at beltline, higher overall.

Quick, easy seat conversions. A lever releases the folding third seat back. A button high on the side panel lets the second seat back fold forward.



Lockable storage under the floor. 8.0 cubic feet on 2-seat model. Less on 3-seat model (shown).

Lockable storage in the side. Over 2 cubic feet. Handy storage trays hold things that usually clutter seats and floor.

More manageable in city traffic. Compared to 1976 full-size Chevrolet wagons. Turning circle, curb to curb, is 3 feet shorter.

Eliminates excess inches and ounces. Uses space more efficiently. Something to appreciate as you slip into tight parking spaces.

Chevrolet

1977 Chevrolet Caprice Classic Wagon with available Estate equipment.

*The mileage you get will vary depending on your type of driving, driving habits, car's condition and available equipment. Mileage ratings are lower in California. All comparisons relate to 1976 full-size Chevrolet wagons.

The thinking person's guide to slide projection.

It's exciting when you really get to enjoy the dramatic beauty of your own color slides. There's nothing like seeing them projected. Which is why you should consider one of the many Kodak Carousel projectors.

They treat your slides gently.

Every Kodak Carousel projector uses gentle, dependable gravity to drop each slide into place. All now come with the Kodak Carousel Transvue slide tray with illuminated slide numbers so you can always locate a slide, even in the dark. Kodak Transvue slide trays make slide storage easy, too.

Curved-field lens makes slides sharper.

Chances are your slides come to you in cardboard or plastic mounts. With these mounts, the film image curves slightly at the center. Which is why we have developed a series of curved-field projection lenses called Kodak projection Ektanar C lenses. They compensate for the film curvature.

Different controls for different requirements.

Kodak Carousel projectors are available in a variety of models. Many models offer remote control slide change—both forward and reverse. Some models give you automatic focusing; and some models even offer automatic slide changing at selected intervals.

Know what your future options can be.

Everything from special-purpose lenses, stack loaders and slide clips, to special "presentation aids" for slide-to-tape synchronization are available for use on most Kodak Carousel projectors. See them at your photo dealer's. The 600H shown is less than $115. *Price is subject to change without notice.*

Kodak Carousel projectors

Kodak

Flying to London? Don't miss the Seven Wonders of Ireland.

Just this side of London are Seven Wonders so exciting, so unique, no visit to Europe is complete without them: the Seven Wonders of Ireland.

1. Medieval banquets in Irish castles. 2. Exotic scenery, like the world-famous sunset at Galway Bay. 3. Kissing the famous Blarney Stone. 4. The Singing Pubs of Ireland. 5. Shannon, the greatest duty-free shop of all. 6. Dublin's Fair City. 7. The Irish: warmest, friendliest people in the world.

Your travel agent can easily add all this to your London vacation by booking you one way,or round trip, on Aer Lingus, the 8th Wonder of Ireland. World-famed for its hospitality. Aer Lingus is also the only international airline with 747 service between Ireland and the U.S.

Aer Lingus
Irish Airlines

It's a great way to meet the Irish.

Partners in hospitality with Dunfey Family Hotels

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Printed in U.S.A.

An answer to rising energy costs comes up every morning.

The sun, the earth's greatest known energy resource, is today one sensible solution to ever-increasing hot water heating costs.

Grumman has harnessed the sun's energy for immediate delivery to you. Today, by installing a Sunstream Solar Domestic Hot Water System, you could save over 50% of your domestic hot water heating costs.

Where else could you make an investment that not only may immediately add value to your home, but also assure you of greater dividends as the cost of energy rises?

So, get the Solar Domestic Hot Water System built by Grumman, the company with a reputation for product reliability ...and remember if just 10% of U.S homes used this system, it would result in an annual savings of over 400 million gallons of fuel oil or over 53 billion cubic feet of natural gas.

Making solar energy make sense today.

GRUMMAN *Sunstream*®

For a further understanding of what solar energy can do for you, write Dept. 300, Grumman Sunstream®, 4175 Veterans Memorial Hwy., Ronkonkoma, NY 11779.

"I feel we can rely upon Firestone. They're fine. I don't even know they're there. And that's the kind of tires I like."

Carol Zweifel,
Police Officer

"I selected Firestones and I'm very happy with them. Do yourself a favor. If you've got to drive, drive on Firestones."

Hausmann DePass,
Inhalation Therapist

"What can you say about anything in life—it's the way you feel. I can't say anything more about a tire like Firestone except I'm comfortable with it."

Cliff Williamson,
Insurance Agent

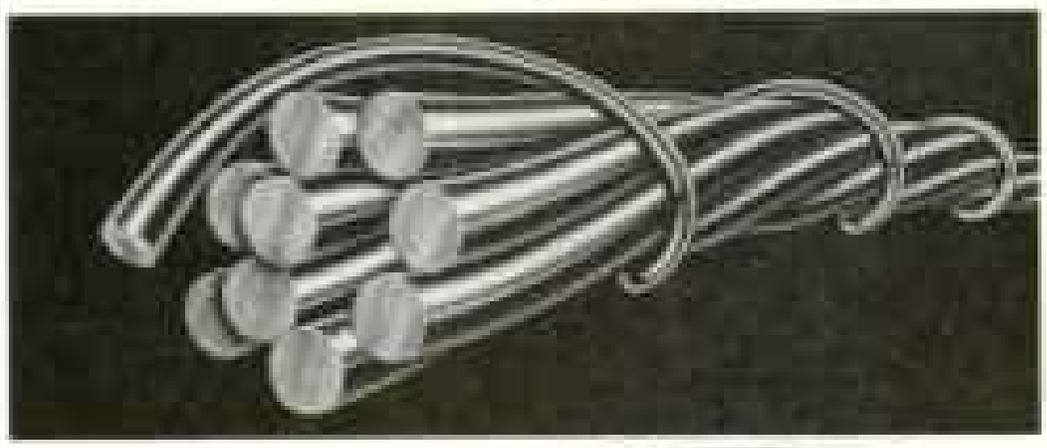
Friends like ours bring out the best in us...

Announcing the finest radial tire we've ever built:

FIRESTONE 721 STEEL BELTED RADIAL

At the Firestone Developmental Proving Ground at Fort Stockton, Texas, Firestone endlessly works at improving its steel belted radials. And it is here that the new Firestone 721 has become what it is. The *experienced* radial, with 5 million test miles behind it.

Our tire gets its name from a steel cord we put together a different way than we ever did before, with each cord wound in a seven-strand-plus-two-strand-plus-one strand method. In addition to the way it's wound, we now use ten strands of steel per cord where five were before. The result is a stronger cord for tire durability.



How can you have more peace of mind and take advantage of what we learn at Fort Stockton? By remembering that the safety of any tire depends on a lot of factors—on wear, load, inflation and driving conditions.

Our peace of mind comes from knowing we've done and are constantly doing our part, torturing tires in every important way we can think of to make them work hard and long and well for you.

Ask a friend about

Firestone

...and ask your dealer about the new Firestone Steel Belted Radial 721.™

"The people are so proud of what they're doing. And they take such delight in telling you about it. It gives you a feeling of history."

Thom and Carol Frazier talk about their honeymoon in Bermuda.
Especially their visit with the Band of the Bermuda Regiment.

"There's a special feeling you get, playing tennis in Bermuda. Right where it all began in our part of the world."

"What a nice plus, to be able to get to all this in an hour and a half."

"You hear Bermuda is full, yet you have the island all to yourself on your honeymoon."

Bermuda

Unspoiled. Unhurried. Uncommon.

See your travel agent or write Bermuda, Dept. 515,
630 Fifth Avenue, N.Y., N.Y. 10020 or Suite 1010, 44 School St., Boston, Mass. 02108

Take your wife

For the price of a dozen roses, you can show your wife Europe. On this side of the Atlantic.

The place is called The Old Country—Busch Gardens. And it's 360 acres of fun and romance nestled in a centuries-old forest just east of Williamsburg, Virginia.

Stroll the cobbled lanes of Britain.

Begin in a land of mandolin-strumming minstrels, twirling Scottish dancers, and dragon-chasing knights complete with shining armor.

Here you can take a contemporary look at classic tales in our double-size version of Shakespeare's famous Globe Theatre. Then let Bil Baird's high-stepping puppets dazzle you with their lifelike maneuvers. And for an eagle's-eye view of what's ahead, climb aboard our high-flying Aeronaut Skyride.

We dare you not to feel romantic in France.

Step into a world where sidewalk artists sketch, fresh-flower vendors stop to chat, and strolling fiddlers fill the air with Parisian melodies.

Browse for imported treasures in an open-air marketplace. Sample rare vintage wines in an outdoor café.

Prices subject to change

to Europe. $16.

Go ooh-la-la over our musical French Follies. Even race a compatriot for the checkered flag as you take the wheel of a Le Mans-replica motorcar.

In the village of New France you can plummet headlong into a pool of boiling rapids aboard our famous flume, watch skilled artisans create handsome collectibles right before your eyes, then pose for authentic take-home tintypes in costumes of decades past.

Cruise the Rhine at sunset.

Shake hands with our jovial Bürgermeister. Pick a steady mount for a turn on our antique carousel. Then plow the waters of Germany's legendary river aboard a ship called *Lorelei*.

And just across a spectacular wrought-iron bridge—the nonstop world of Oktoberfest.

Here you'll find rides to make you scream, squirm, squeal and shout.

Cap off your day with a visit to Das Festhaus, the biggest festival hall this side of Munich. Tubas blare, dancers twirl, and everyone has the time of their life!

Tour information.

Bring the kids if you like. Because at The Old Country, one low admission covers an entire day—$8.00 for ages four and up; three and under, free.

The Old Country is open weekends April 2-May 15 (open daily April 9-17). Open daily May 21-September 6. Open Friday through Tuesday, September 9-30. And all weekends in October.

For reservation information on any of the 4,500 hotel and motel rooms in the Williamsburg area, Virginia residents call (804) 220-3330, out-of-state residents (800) 446-9244 toll free.

Why not plan a visit now? Europe will never be closer. Or easier to afford.

I'd like to take my wife to Europe. In Virginia.
Please send me a free color brochure. 1-1

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The Old Country®
BUSCH GARDENS, WILLIAMSBURG, VA.

Send to: The Old Country—Busch Gardens, P.O. Box 77, Williamsburg, Virginia 23185

A good breakfast doesn't have to be high in cholesterol.

The proof is in the Special K Breakfast.*
A one-ounce serving of Special K with ½ cup of skim milk gives you 10 grams of protein** to start off your morning. Yet a serving of Special K with skim milk is low in cholesterol. Make a bowl of Special K a part of a complete breakfast. And get a good breakfast without a lot of cholesterol.

*The Special K Breakfast
4 oz. orange juice or tomato juice
1¼ cups (1 oz.) Kellogg's® Special K® high protein cereal
1 teaspoon sugar
4 oz. skim milk
One cup black coffee or tea

**5 grams from a one-ounce serving of Special K;
4 grams from ½ cup skim milk.

Kellogg's®
SPECIAL K

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For people who do a lot of saving.

You can save $331 by flying Icelandic to Europe.

If you fly Icelandic Airlines to Europe, you can save money.

Not just a little money. A lot of money.

For example, we have a 1 to 13 day fare of $525 from New York to Luxembourg that will save you $331 per person thru September 14.

That's a great saving.

And if your kids are traveling with you, we'll let them fly for half fare if they're under 12. So, if you have a big family, your savings will be even bigger on Icelandic. (A family of 7 can save $1,489.)

And you can't do any better than that when it comes to price. Or when it comes to service.

We give you hot meals, complimentary wine and after dinner cognac. All with a friendly smile.

So, if you're not flying Icelandic to Europe, you're spending more than you have to.

Icelandic Airlines, Dept. # NG
P.O. Box 105, West Hempstead, N.Y. 11552

See your travel agent. Or call: (212) 757-8585 (New York City). Outside N.Y. area call toll free: (800) 555-1212.

Please send information on Icelandic's low cost fares and tours to Europe.

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Address

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Icelandic

Lowest jet fares to Europe of any scheduled airline.

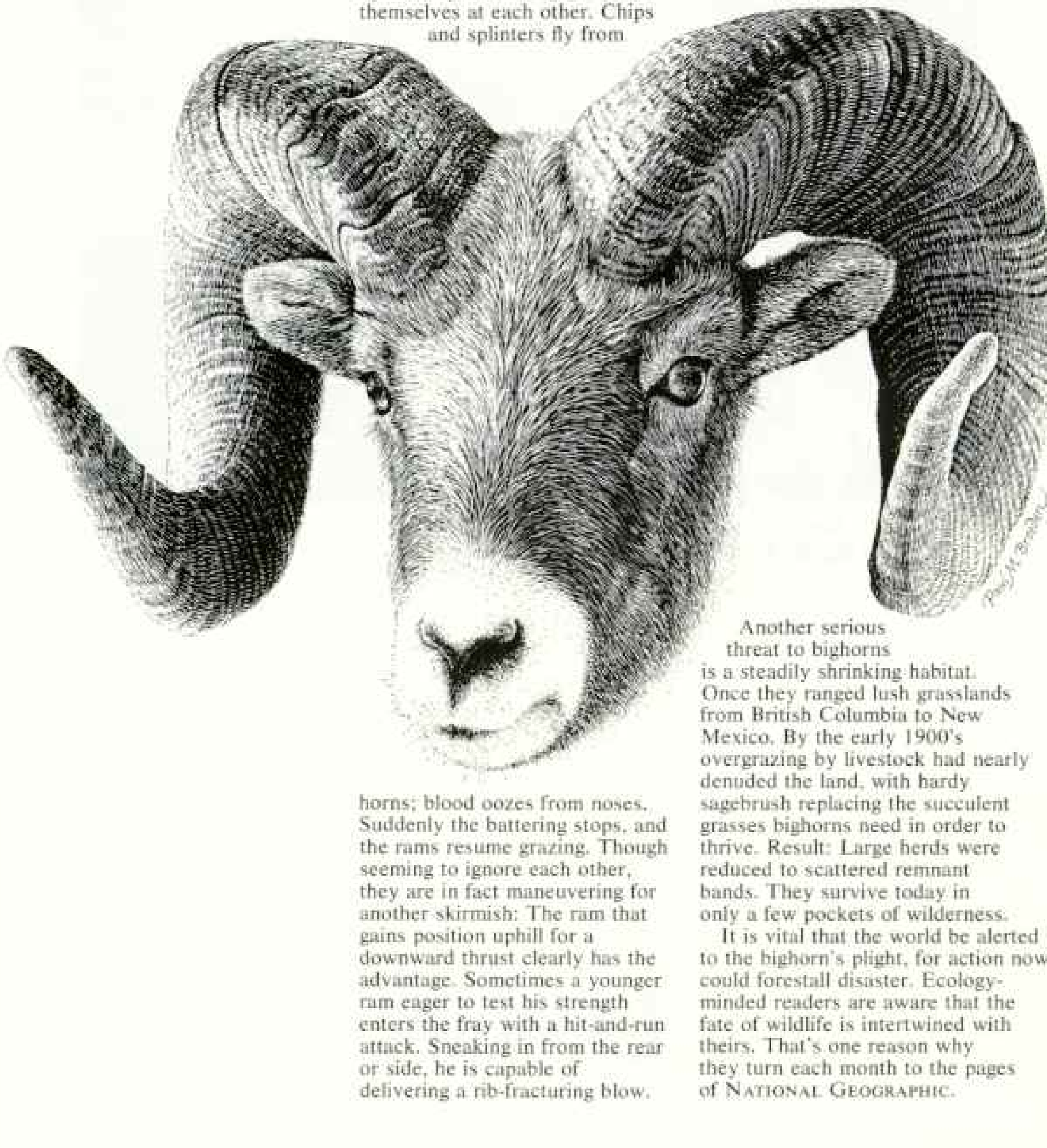
Heads crack as bighorns duel in the Rockies

Rocky Mountain bighorn sheep use their massive horns as percussion instruments. During the fall rutting season, when hormone changes bring on the breeding urge, 250-pound rams square off in violent head-butting matches to determine which gains leadership of the herd and pick of the ewes. Duelists rear on hind legs, then drop to all fours and, heads down, charge at full speed.

Crack! Horn crashes against horn, and the sound carries as much as a mile. Shock ripples the combatants' bodies. They bounce back, stand still, dazed by the impact, and again hurl themselves at each other. Chips and splinters fly from horns; blood oozes from noses. Suddenly the battering stops, and the rams resume grazing. Though seeming to ignore each other, they are in fact maneuvering for another skirmish: The ram that gains position uphill for a downward thrust clearly has the advantage. Sometimes a younger ram eager to test his strength enters the fray with a hit-and-run attack. Sneaking in from the rear or side, he is capable of delivering a rib-fracturing blow.

Headstrong rams have porous double-layered skulls that serve as shock absorbers and prevent serious injury. Most damage is to noses—hence the familiar "roman" look—and to horns. Few ever reach full curl. Those that do present inviting targets to hunters shooting for a prize trophy.

Gunners legally take some 300 bighorn rams each year in the United States, but many more than that are killed. Poachers goaded by fat fees—$3,000 or more for a head—are even invading one of the animals' last strongholds, the national parks.



Another serious threat to bighorns is a steadily shrinking habitat. Once they ranged lush grasslands from British Columbia to New Mexico. By the early 1900's overgrazing by livestock had nearly denuded the land, with hardy sagebrush replacing the succulent grasses bighorns need in order to thrive. Result: Large herds were reduced to scattered remnant bands. They survive today in only a few pockets of wilderness.

It is vital that the world be alerted to the bighorn's plight, for action now could forestall disaster. Ecology-minded readers are aware that the fate of wildlife is intertwined with theirs. That's one reason why they turn each month to the pages of NATIONAL GEOGRAPHIC.

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An official issue of the National Audubon Society.

Issued in strictly limited edition.
Subscription deadline: June 15, 1977.

THE NATIONAL AUDUBON SOCIETY is proud to announce the creation of a major series of porcelain plates portraying the world's most beautiful birds.

The first collection in this important series is The National Audubon Society Songbirds of the World Porcelain Plate Collection. This will be the *first* collection of porcelain plates ever to carry the name and official authorization of the National Audubon Society. To bring these exquisite porcelain plates to collectors and the public, the National Audubon Society has appointed Franklin Porcelain, a division of the world-famous Franklin Mint.

The *Songbirds of the World* collection will comprise twelve fine English bone china plates, each bearing an original work of art by one of the world's great wildlife artists—Arthur Singer. Mr. Singer has created these new works of art *exclusively* for this series. The plates will not be sold in any art galleries or stores. They will be issued in strictly limited edition and may be acquired by direct subscription only.

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Baltimore Oriole plate shown smaller than actual 10½" size.

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A strictly limited edition

The *Songbirds of the World* collection will be issued in strictly limited edition, and there is a firm limit of one set per subscriber.

Subscribers will receive their plates at the convenient rate of one every other month. The issue price of $55 for each fine English bone china plate will be billed in two equal monthly installments—and an attractive display stand will be sent with each of the twelve plates at no additional charge.

As the first series of porcelain plates ever issued by the National Audubon Society, *Songbirds of the World* is likely to be much sought-after by collectors in the future. Its desirability will be further enhanced by the beauty of the bone china plates themselves and the superb quality of the art which they bear.

These limited edition plates will be displayed in the home with great pride and cherished by every member of the family. In years to come, the plates will be equally prized by later generations—for the birds they depict will be loved and admired for as long as time.

All applications for the *Songbirds of the World* collection must be mailed by June 15, 1977. The total edition in the United States will be permanently limited to the exact number of valid subscriptions postmarked by that date—and this series of National Audubon Society porcelain plates will *never* be made available again.

There is no need to send any payment now. But the application below must be mailed to Franklin Porcelain, Franklin Center, Pennsylvania, by June 15, 1977.

Subscription Application

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Songbirds of the World

PORCELAIN PLATE COLLECTION

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Limit: One collection per subscriber

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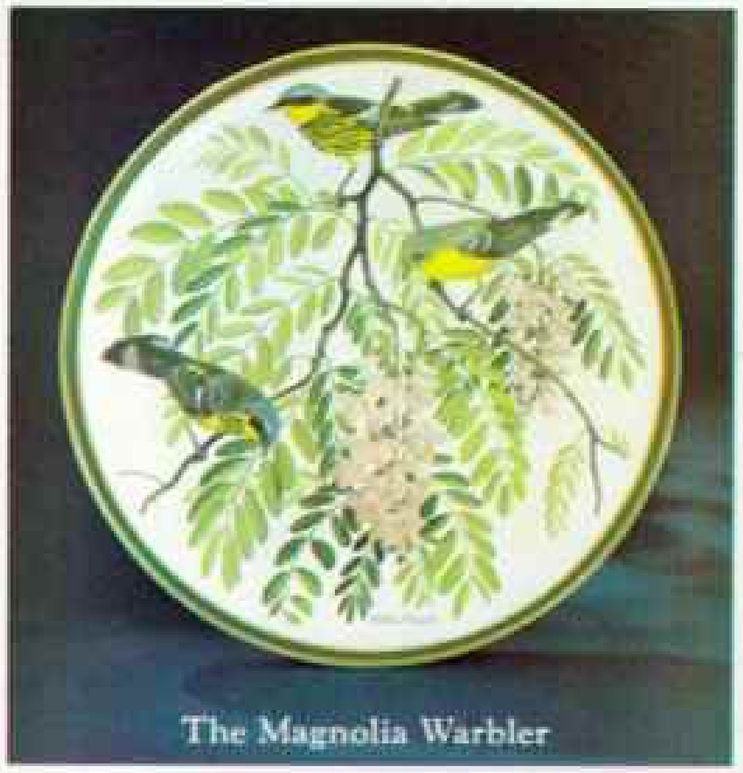
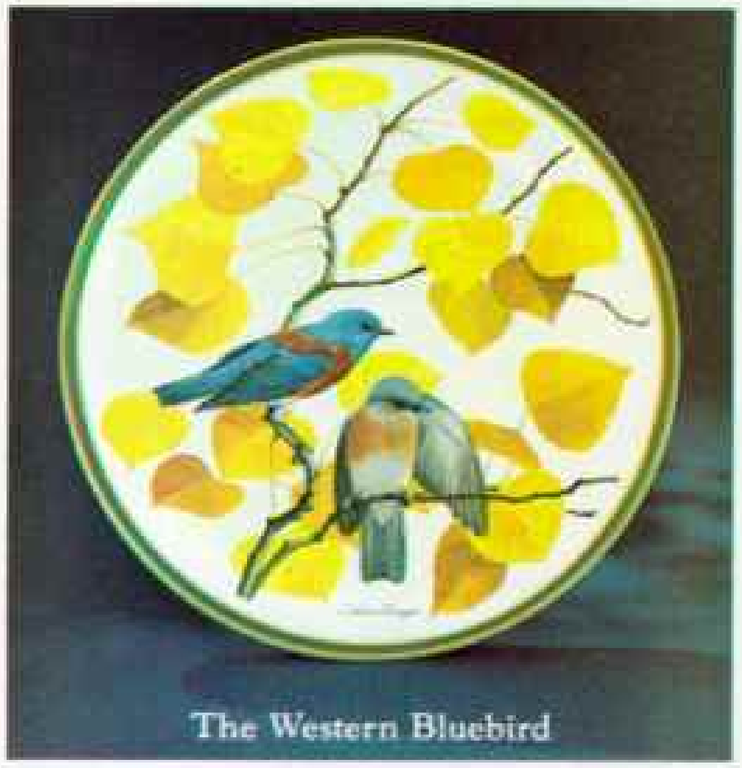
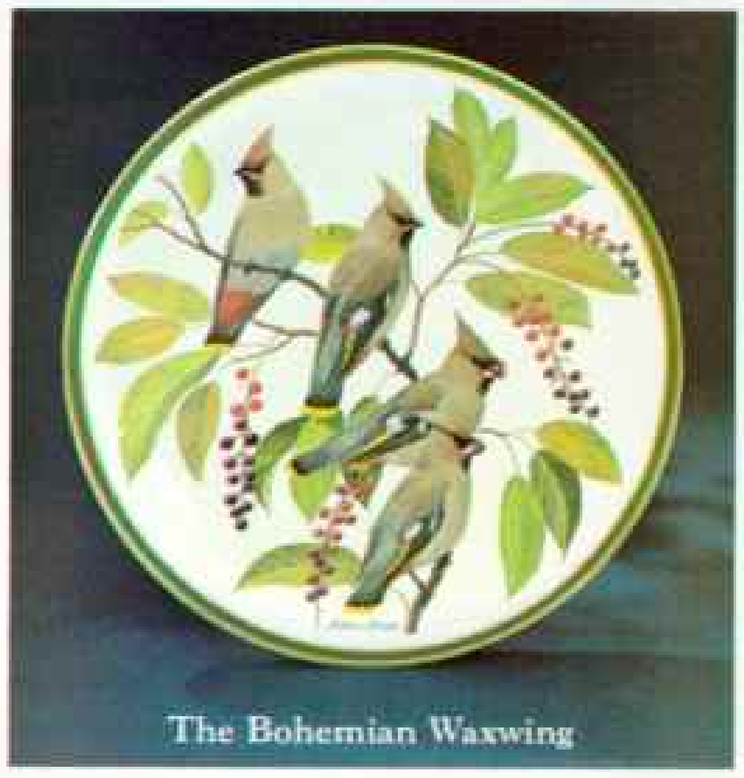
Also available in Canada, at $60. per plate, plus provincial sales tax. Mail application to The Franklin Mint Canada Ltd., 70 Galaxy Blvd., Rexdale, Ont. M9W 4Y7.



The Magnolia Warbler



The Western Bluebird



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These oil companies have the assets, the equipment and the expertise to explore and develop other avenues of energy efficiently. To me, it makes no sense to curtail or halt their progress by breaking them up into smaller, financially weaker companies unable to function effectively.

We need all the energy we can get. Every feasible plan must be considered. But along with each plan, its consequences for years to come.

Atlantic Richfield Company believes that one of our national goals must be a sound national energy policy, part of which includes encouraging those companies involved in the development of alternate energy sources to continue their work in that area.

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For a booklet with additional information on this issue, please write: Atlantic Richfield Company, Divestiture, P.O. Box 30169, Los Angeles, CA 90030.

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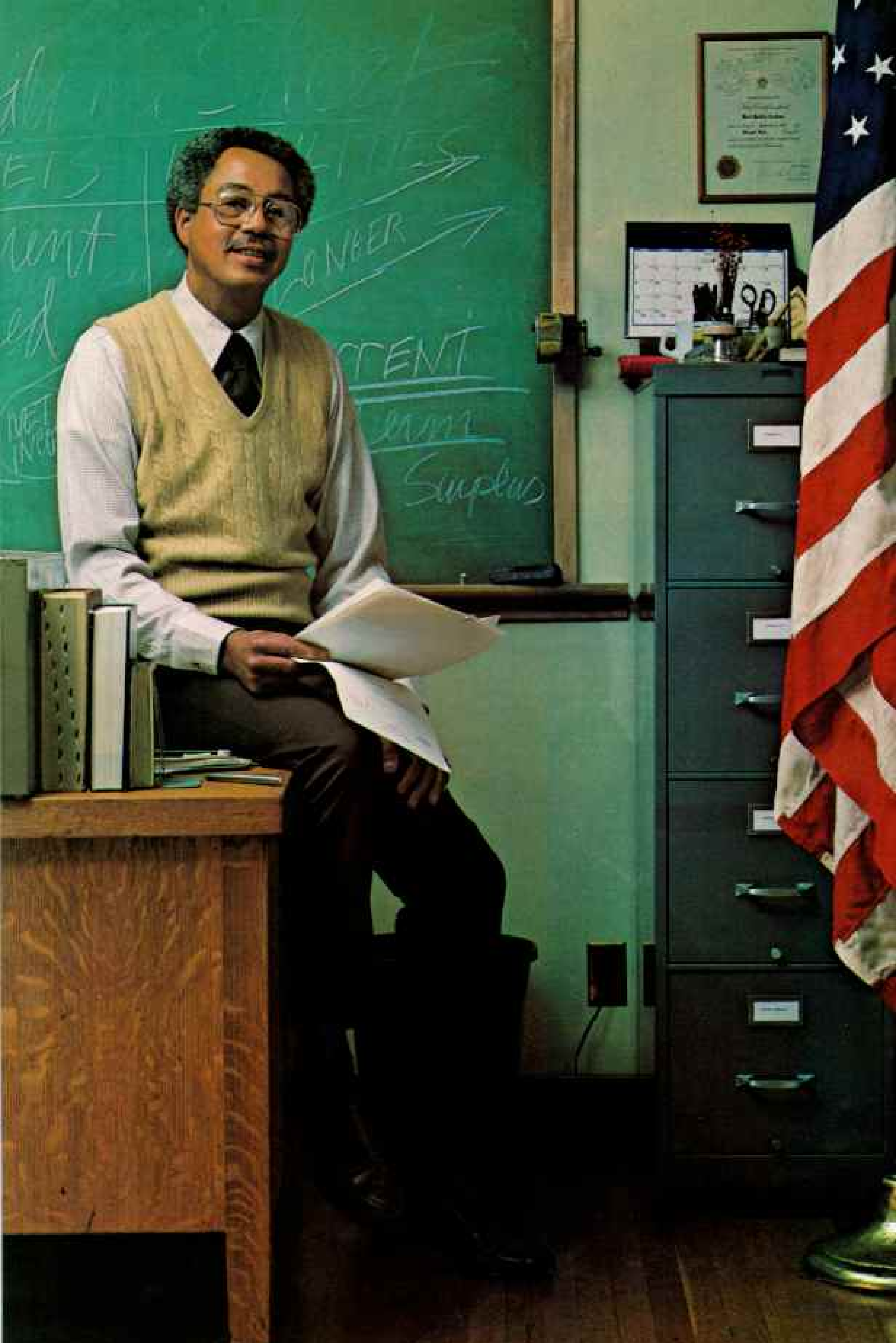
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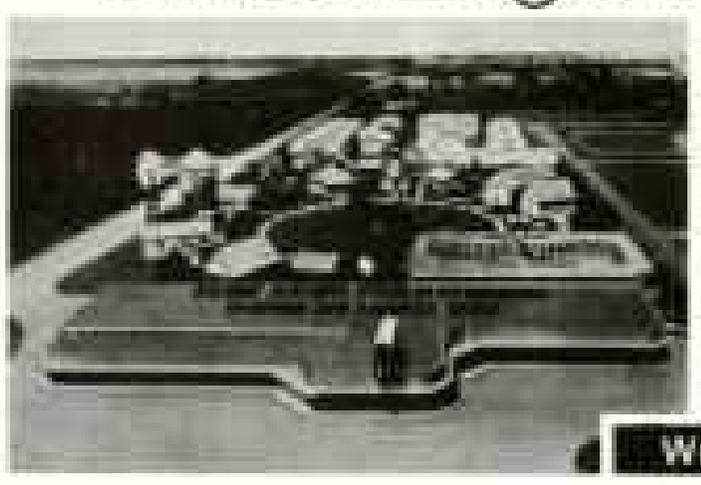

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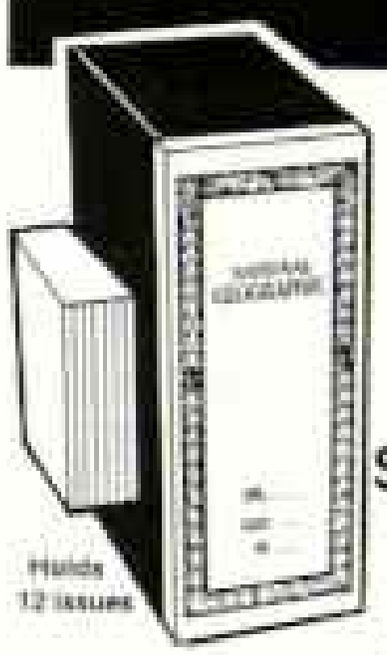

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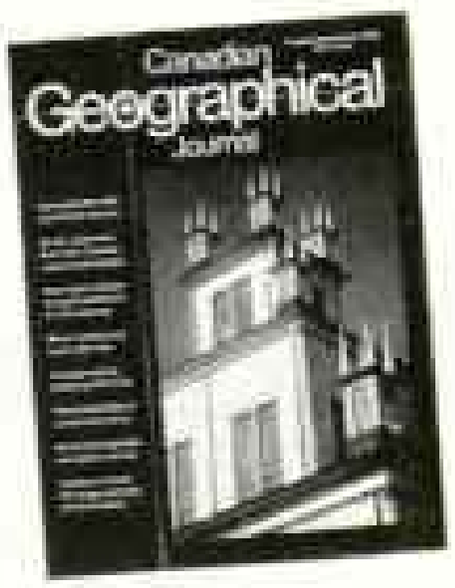

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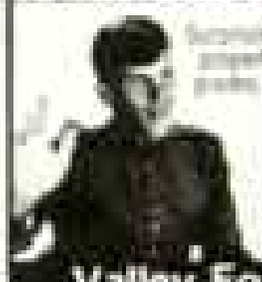

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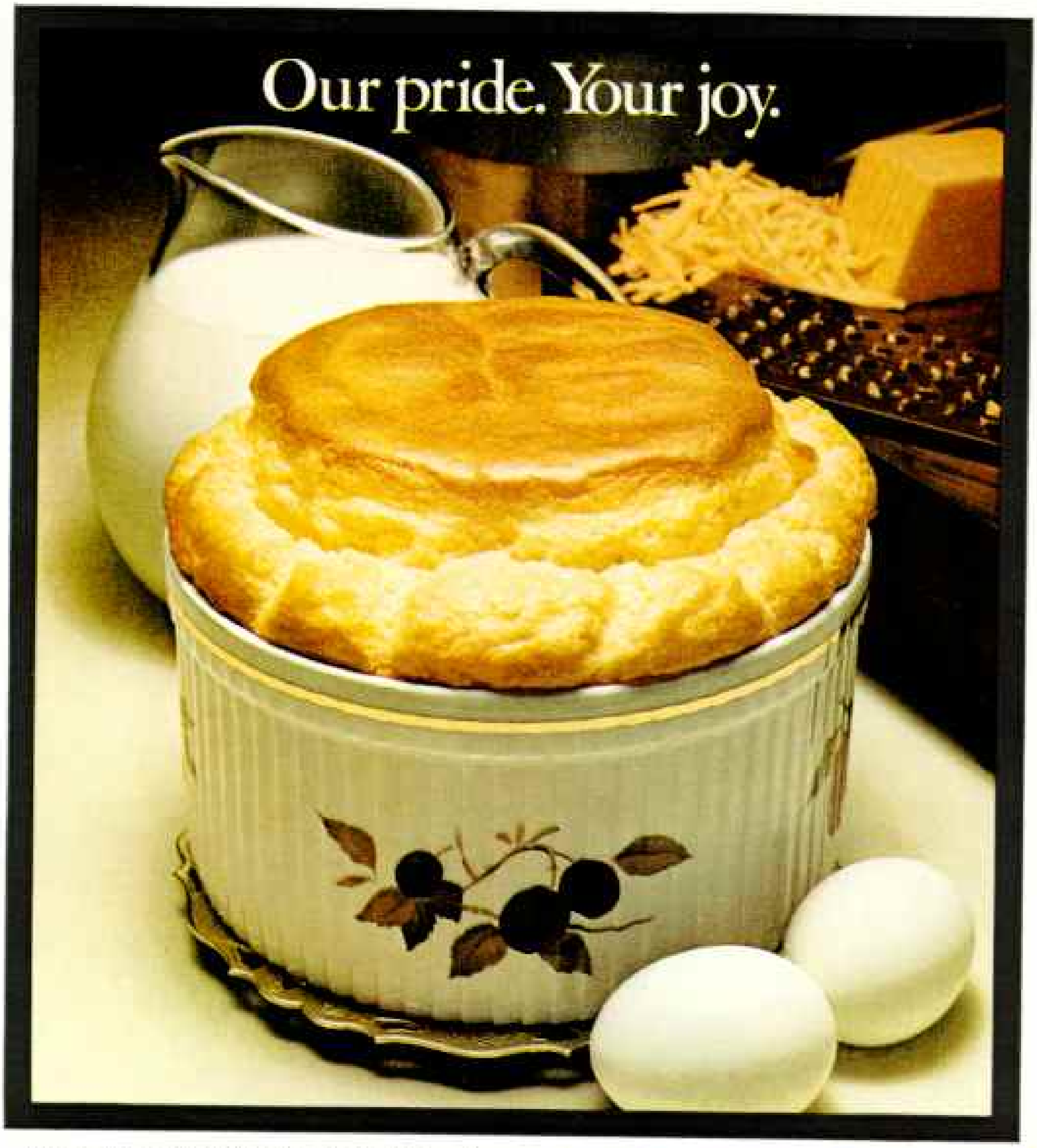

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TOP HAT CHEESE SOUFFLÉ

⅓ cup PARKAY Margarine
⅓ cup flour
1½ cups milk
1 teaspoon salt
Dash of cayenne
2 cups (8 ozs.) shredded CRACKER BARREL Brand Sharp Natural Cheddar Cheese
6 eggs, separated

Heat oven to 300°. Make a white sauce with margarine, flour, milk and seasonings. Add cheese; stir until melted. Remove from heat. Gradually add slightly beaten egg yolks; cool. Fold into stiffly beaten egg whites; pour into a 2-quart soufflé dish or casserole. With tip of spoon, make slight indentation or "track" around top of soufflé 1 inch in from edge to form a top hat. Bake at 300°, 1 hour and 15 minutes. Serve immediately. 6 servings

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