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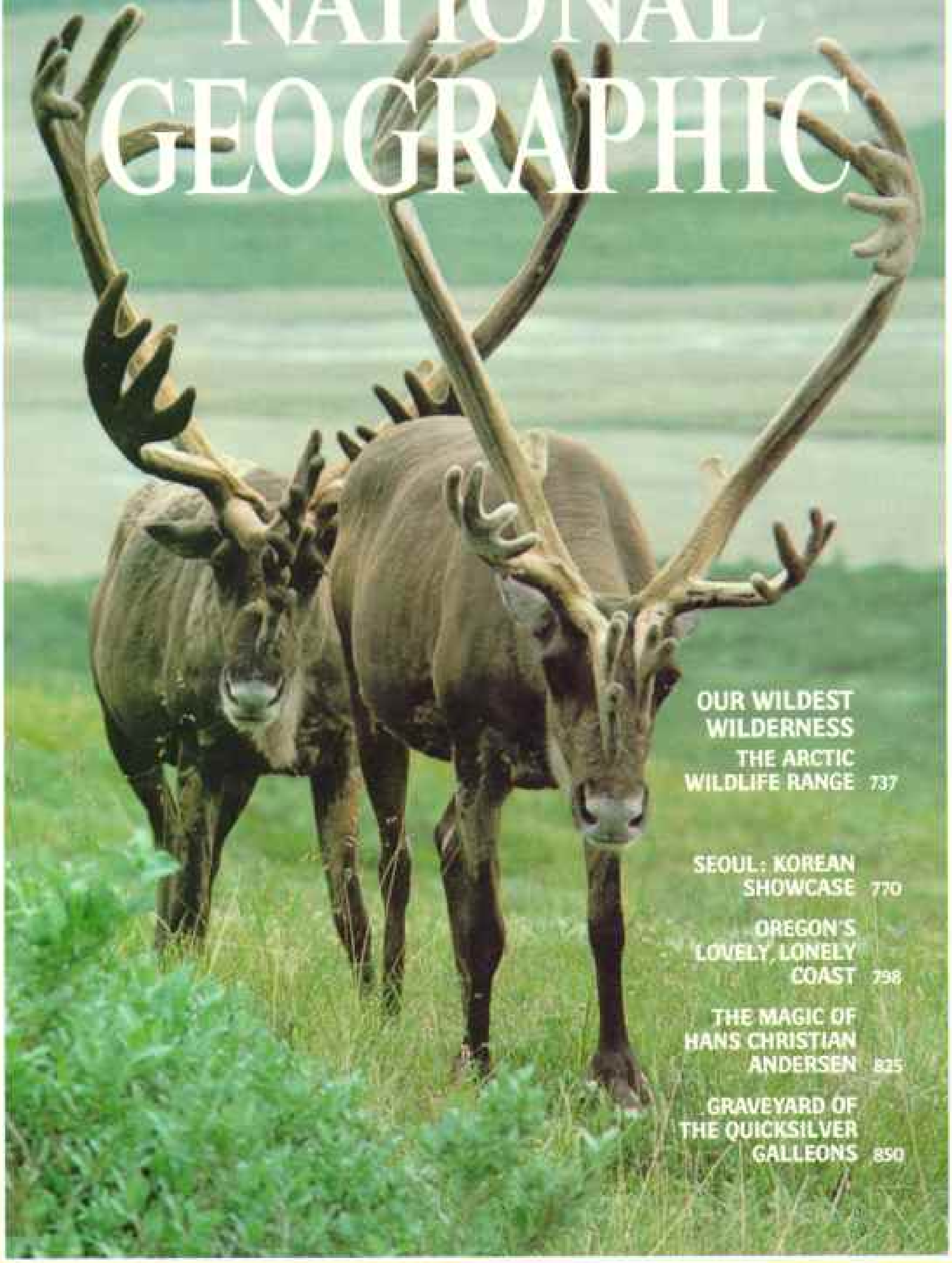

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WITHIN 2° of latitude centering on 69°N—a mere 140 miles—there exists in Alaska a world of natural splendor that sates the soul with its chiseled peaks, immaculate water, clarified air, sweeping tundra, and truly wild and beautiful fauna, including one of the largest remaining herds of caribou. Here, within the boundaries of the Arctic National Wildlife Range, the ecosystems of river valley, forest, mountain, and plain are all assembled in glorious harmony.

Symbolically, the range looms even more awesome. During a visit there last summer, I visualized it as a microcosm of our world—a crossroads of dilemmas that will surely dominate North America in the early 1980's. That paradise is rich, so I heard, in oil, gas, and other minerals. The drive for energy self-sufficiency will force harsh conservation choices, not only between caribou and gas lines, but between ranching and mining, dams and fish, wilderness and wildcat wells.

Interwoven with the history of the wildlife range is a fabric of complex politics involving oil companies, conservation groups, native land claims, and governments. During the 1970's major issues were distorted by special-interest groups that seemed to paralyze our governmental process. Tragically, people in the 1970's became disillusioned; the credibility of their governments and corporations both suffered.

The "cynical seventies" also battered institutions that once so firmly cemented society, including state, church, family, and school. Are they reformed enough to withstand the stresses of the 1980's?

How do we renew faith in ourselves?

Through conservation and sensitivity in energy development we can preserve our wildlife ranges. Through mutual trust the United States, Canada, and Mexico could forge a North American alliance to emulate the European Community. Surely North America is blessed with creative peoples, abundant resources, and the world's most advanced technology.

We have always drawn strength from our natural heritage. The grandeur of places like Lake Schrader in the wildlife range inspires our spirits and firms our wills. Of such stuff was the best of the past made, and of such stuff is the hope of the future made.

Gilbert M. Grosvenor

NATIONAL GEOGRAPHIC

THE NATIONAL GEOGRAPHIC MAGAZINE VOL. 156, NO. 6

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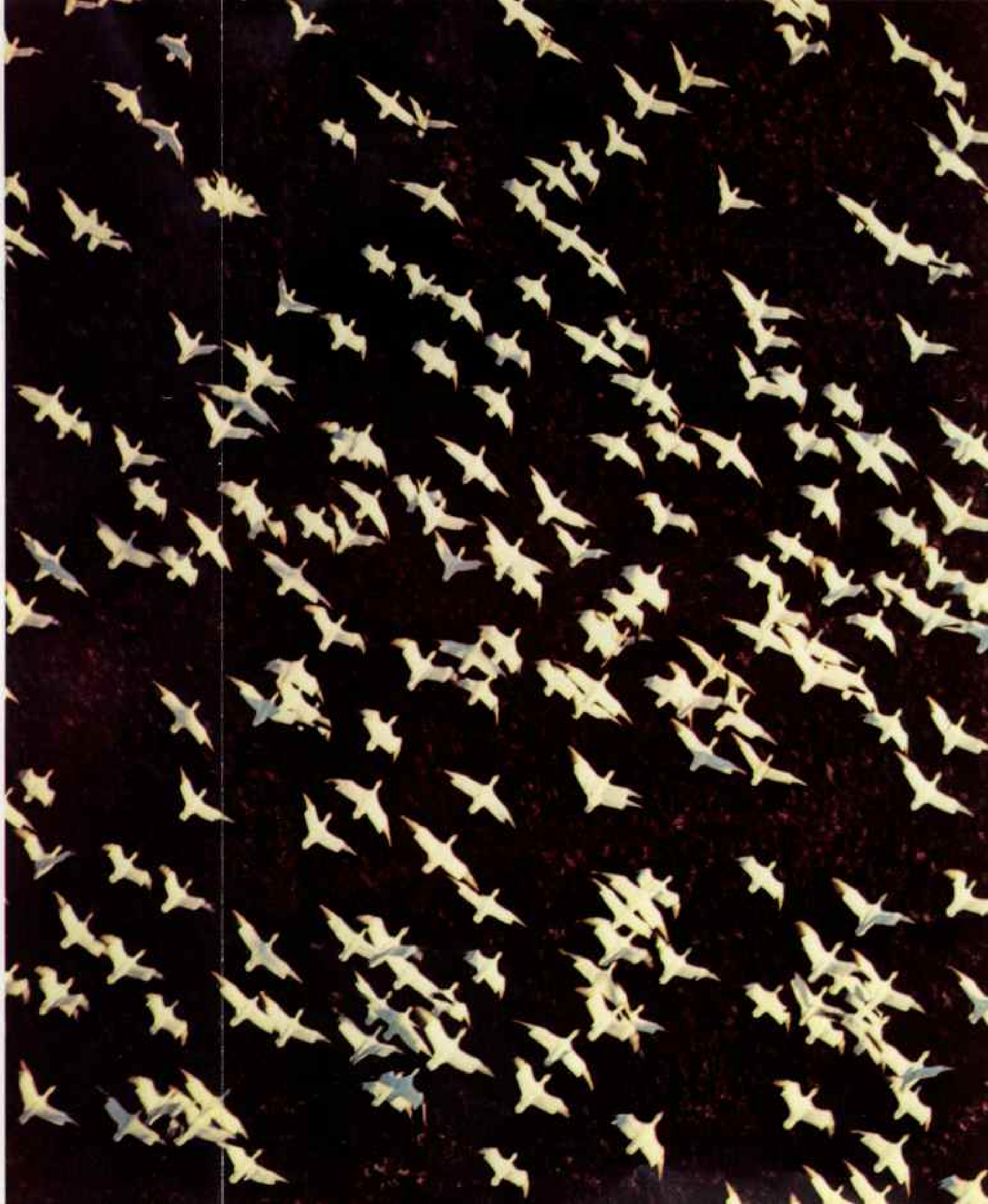
COVER: *Caribou graze in the nation's largest wildlife refuge. Photograph by Stephen J. Krasemann.*

ALASKA'S ARCTIC
NATIONAL WILDLIFE RANGE

Our Wildest Wilderness

They come by land and ice,
by sea and air—untamed
citizens of the world.
Swirling bands of caribou graze,
give birth, and move on.
Flurries of snow geese drift
above a bleak terrain of
astonishing vitality:
the largest wildlife sanctuary
in the United States.



OUR WILDEST WILDERNESS

"So Empty, Yet So Full"

By DOUGLAS H. CHADWICK

Photographs by LOWELL GEORGIA

IT WAS NOT LONG till I began to lose my sense of time, for the colors of evening never gave way to darkness. Instead they traveled, amber, rose, gold, around the mountaintops and became the colors of dawn as I trekked down the valley. I passed gorges that opened into awesome unnamed side valleys whose ends I could not see. I crossed and recrossed the river on bridges of turquoise ice, their edges crumbling away in the late May breakup. I hiked on, sometimes on snow, sometimes on bare, wind-scraped ground, and always past new peaks and canyons. When not moving, I lived as if I were a lichen, curled small and out of the fierce, freezing wind behind some boulder or low rise, facing the sun to absorb whatever warmth I could.

Alone, with no familiar sign of man in all these miles, I found my sense of place becoming blurred too. I paused to eat from a tin of sardines and rubbed the oil on my wind- and cold-chapped lips. Then I checked my map and the route I had taken.

"Where do you want to start?" local bush pilot Walt Audi had asked when I arrived in the northeastern corner of Alaska to explore the Arctic National Wildlife Range. So much was there to see in this largest component of the United States National Wildlife Refuge System and so short the arctic summer that I had answered: "Just hurry and get me out into the middle of it."

Walt took me at my word. Landing his plane on skis, he dropped me off at a frozen lake almost exactly in the center of the Arctic Wildlife Range. Which meant I was suddenly at the heart of a wilderness more than one and a half times the size of Vermont, with perhaps a dozen other people in it at the time, and surrounded by millions more primeval acres—Alaskan bush to the south and west, Canadian wild spans to the east, and the Arctic Ocean's ice-caked Beaufort Sea to the north (map, pages 744-5).

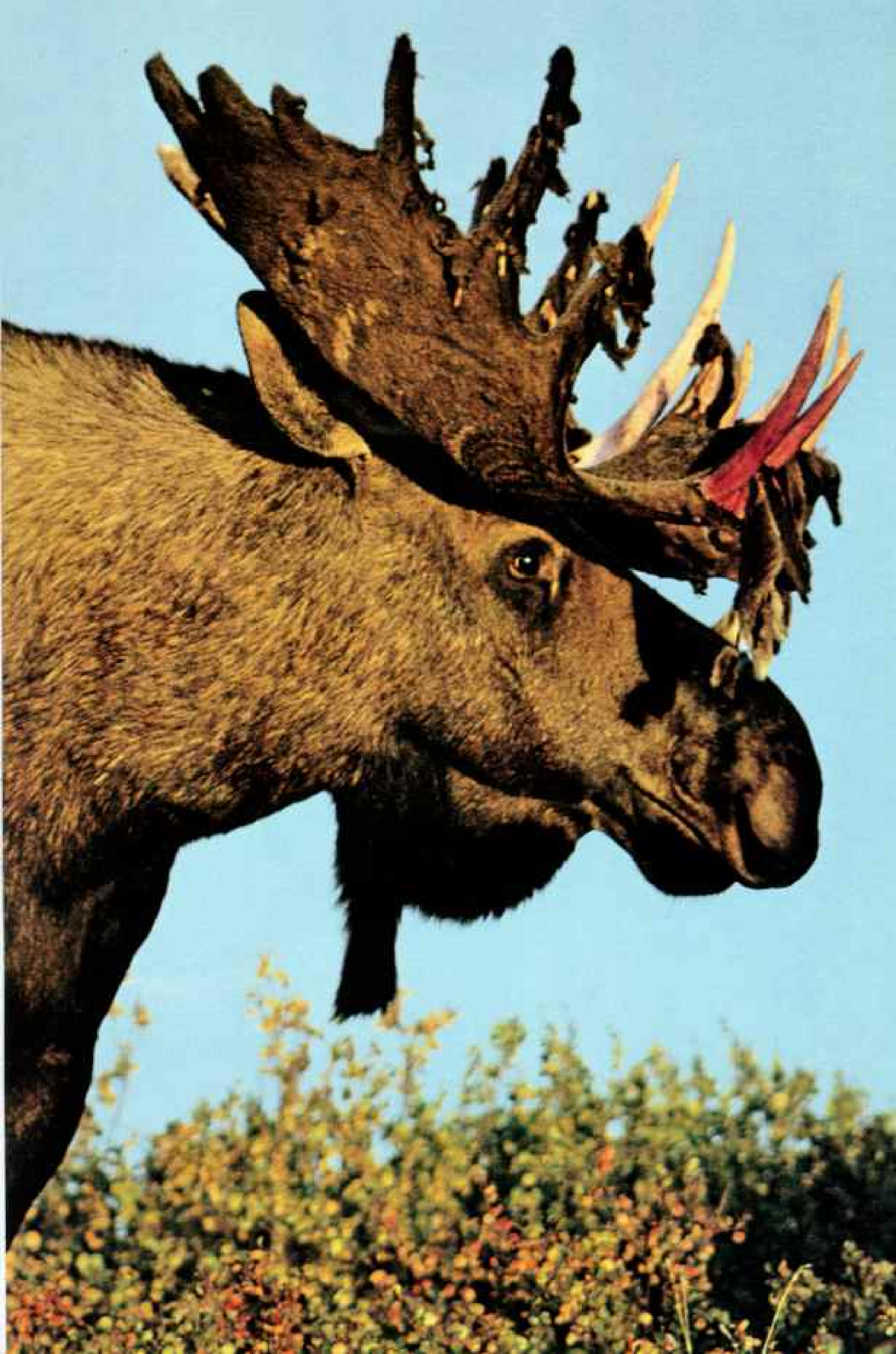
Long country, but I had a short set of directions. Head north. Follow the river. The 600-mile-long rampart of the Brooks Range bristles east to west across Alaska, and its highest section, with 8,000- to 9,000-foot turrets, bisects the Arctic Wildlife Range. From there, rivers flow south to the Yukon River or north to the Beaufort Sea.

My guide was the north-flowing Hulahula River, named when a 19th-century sailor saw its wriggling course and recalled warmer meanders in Hawaii. I knew that fifty miles from its headwaters the river would lead me out of the mountains. Just where they taper into the foothills, I would find a frozen lake. And in four days Walt Audi would circle down to pick me up . . . or maybe it was three days now.

Often, as I clattered over the gravels of the nearly mile-wide floodplain between treeless slopes, I was keenly aware of my loneness. But then around the ribbed hillsides would come *(Continued on page 746)*

Kingly rack *of a bull moose sloughs velvet, a blood-rich covering that nourishes the antlers during annual growth. Weapons unsheathed, bulls compete for cows, then, after mating, shed their antlers. Some 500 moose inhabit the range, most on the south slope where forage—tree leaves and twigs and shrubs—is more plentiful.*

STEPHEN J. KRASEMANN



Frosted by June snow, *mountain spines and valleys alternate across the central region of the wildlife range. Ignek Creek, a tributary of the Canning River, braids through an ice field* (**left**)*, common along arctic waterways where springwater freezes and builds layers as thick as ten feet.*

Final days of flowering on the tundra bring out a halo of seed filaments on the dryas (**below**) *and a scarlet blush on the alpine bearberry* (**bottom**)*. Tundra plants rarely rise more than a foot, their growth dwarfed by the arctic environment.*

Porcupine River

STATE LAND

CARIBOU WINTER

PRESENT BOUNDARY OF
ARCTIC NATIONAL WILDLIFE RANGE

CANADA
UNITED STATES
YUKON TERRITORY
ALASKA

Sheenjek

Brooks

Mount Isto
2,761 m
9,060 ft

2,207 m
7,240 ft

2,699 m
8,855 ft

2,745 m
9,020 ft

Kongakut

Lake Peters
Lake Schrader

Turner

Ekaluakat

Aichilik

Jago

Hulahula

Demarcation Bay

Egaksrak

CARIBOU SPRING CALVING GROUNDS

SOUTH

Sadlerochit

Kaktovik

Barter
Island

Scale varies in this
perspective view

View above
looking south

Arctic National Wildlife Range

Preserving frontier for the future, 8.9 million acres in northeast Alaska were set aside in 1960 as a refuge for arctic animals requiring large tracts of land and for world-ranging birds that nest along the coast.

The dominating Brooks Range descends to tundra on the North Slope. The south slope, sheltered from ocean

Yukon River

Porcupine caribou herd travels as much as 600 miles to summer grazing on the North Slope. Females arrive first to calve. In fall the 100,000-member herd treks to winter grounds south of the Brooks Range and in Canada.

PROPOSED BOUNDARY OF ARCTIC NATIONAL WILDLIFE RANGE (HOUSE)

G R O U N D S

Arctic Village

PROPOSED BOUNDARY OF ARCTIC NATIONAL WILDLIFE RANGE (SENATE)

2,452 m
8,045 ft

R a n g e

2,152 m
7,060 ft

1,792 m
5,880 ft

Trans-Alaska pipeline stretches some 800 miles from Prudhoe Bay to Valdez. The northernmost 360 miles of a road paralleling the pipeline, though not open to the public, is the only road reaching Alaska's Arctic coast.

Canning River

Tamayariak

Point Thomson

Prudhoe Bay

Prudhoe Bay

Beaufort Sea

winds, grows more varied tundra and forests of small trees.

Proposals to increase range acreage and grant wilderness status stir debate. Oil flows from Prudhoe Bay, 60 miles to the west, and may also underlie the coastal plain of the range. Yet vast numbers of animals cannot be relocated nor can their habits be changed.

(Continued from page 740) bands of frost-colored Dall sheep, and I would follow them up crumpled ridgelines into hidden basins. Nor was it always easy to sleep with the cackling of the ptarmigan in the middle of their mating season.

A golden brown grizzly watched me skirt a sandbar. A gyrfalcon scythed the air high above the braided waterways. Freed from the constraints of time and place, I could sense myself stretching out somehow, until I began to feel like the country around me—so vast and empty, and yet so full.

Soon after we met at the frozen lake, Walt Audi deposited me, along with photographer Lowell Georgia, at the edge of the Jago, a large river east of the Hulahula. Down on the coastal plain, some twenty miles inland from the Beaufort Sea, the horizon was huge—looking north, we could see it curve to fit the earth. And it was moving!

Thousands upon thousands of caribou, more large animals than I had ever observed or imagined, grazed and trotted around us. Their brown-and-white coats matched the winter-pressed tundra and the patches of remnant snow of early June.*

We hiked up a slight knoll to meet John Russell and Rick Farnell, two Canadian biologists working for the Yukon Wildlife Branch. They had been monitoring these caribou since the animals left their far wintering grounds in the Yukon and Northwest Territories.

"A good year," John announced as he squinted through his telescope. "I count eighty calves for every hundred cows."

The reddish spindle-legged babies I watched were able to keep up with their mothers within a few hours of birth. Rick said they would be able to outpace me within two or three days.

Separate groups of pregnant females accompanied by yearlings were the first to cross from the Yukon into Alaska. After giving birth on the coastal plain of the range, they would be joined by the males and spend the summer grazing on the North Slope. In September some inner rhythm would turn these members of the deer family southward. Traveling in thousands of closely spaced bands, they would return to wintering grounds in Canada and Alaska.

It is a marathon annual circuit, across swollen rivers, ice fields, mountains, and marsh; many animals cover 1,200 miles to complete it, for reasons still best understood by them. It is also an ancient circuit. The trails of untold caribou generations pattern the Arctic like a geologic force.

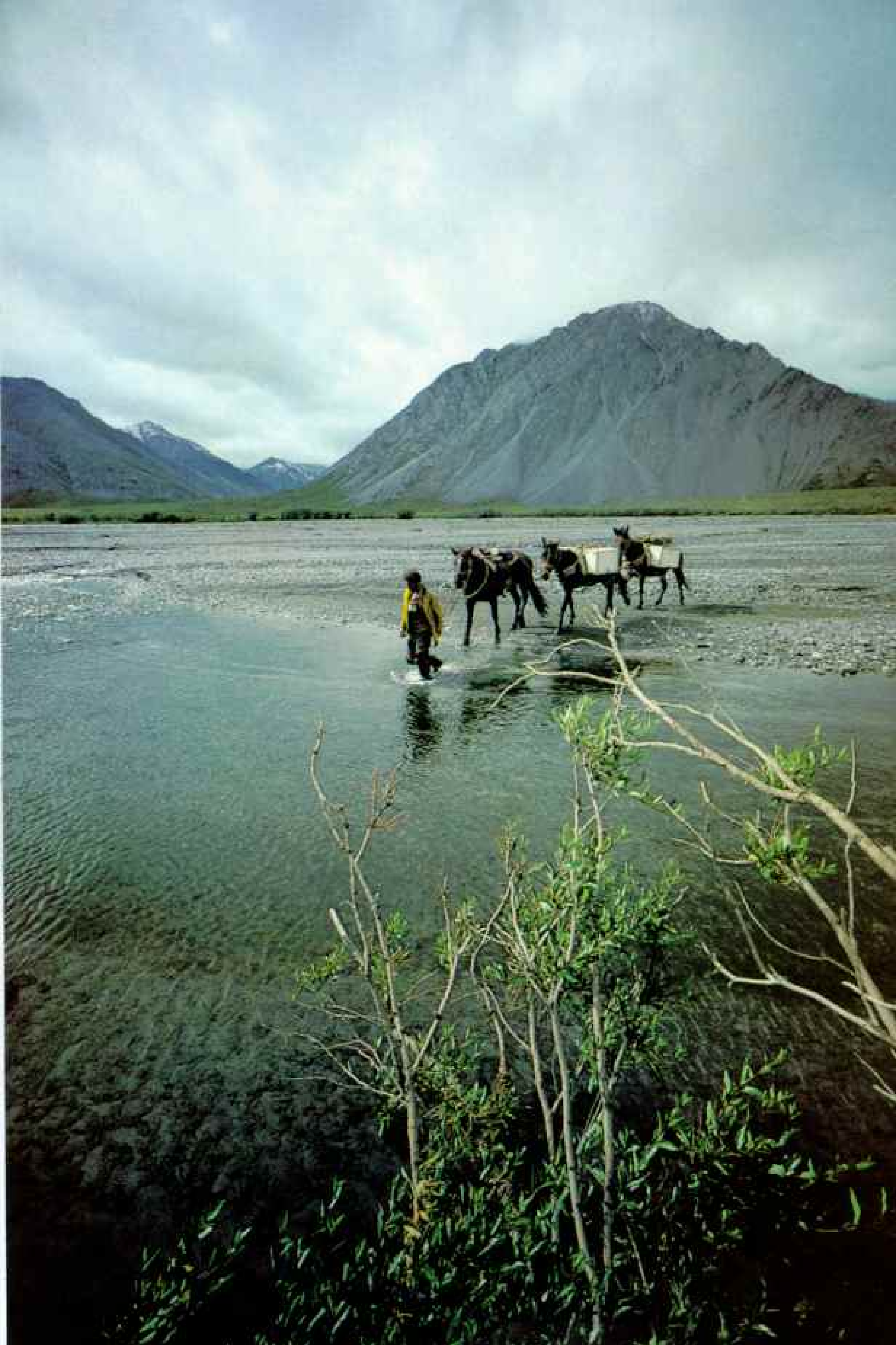
"These caribou belong to the North, not to any one state or province," John Russell said, and he went on to tell me how the United States and Canada are developing a joint caribou-management policy. For its part, Canada intends to create a national park or reserve to complement the Arctic Wildlife Range, (Continued on page 752)

*Jim Rearden wrote of the vast herds of caribou in the December 1974 NATIONAL GEOGRAPHIC.

STEPHEN J. KRASEMANN

Human migrator *Joe Want leads a packtrain across the Sheenjek River* ***(facing page)*** *on his annual trek to the mountains to work as a guide for Dall sheep hunters. Though the range is a wildlife refuge, some hunting and trapping are allowed.*

Mouthfuls of foliage stockpiled by the mountain-dwelling pika ***(above)*** *will dry into hay, winter food for the small mammal, which stays active under the snow.*



Oasis in an icy land, *cottonwoods grow where logically they shouldn't: north of the timberline (**left**). Though the North Slope is almost devoid of forest, this clump flourishes near the Canning River. The trees evidently owe their existence to nutrient-rich groundwater and the windbreak afforded by an adjacent bluff.*

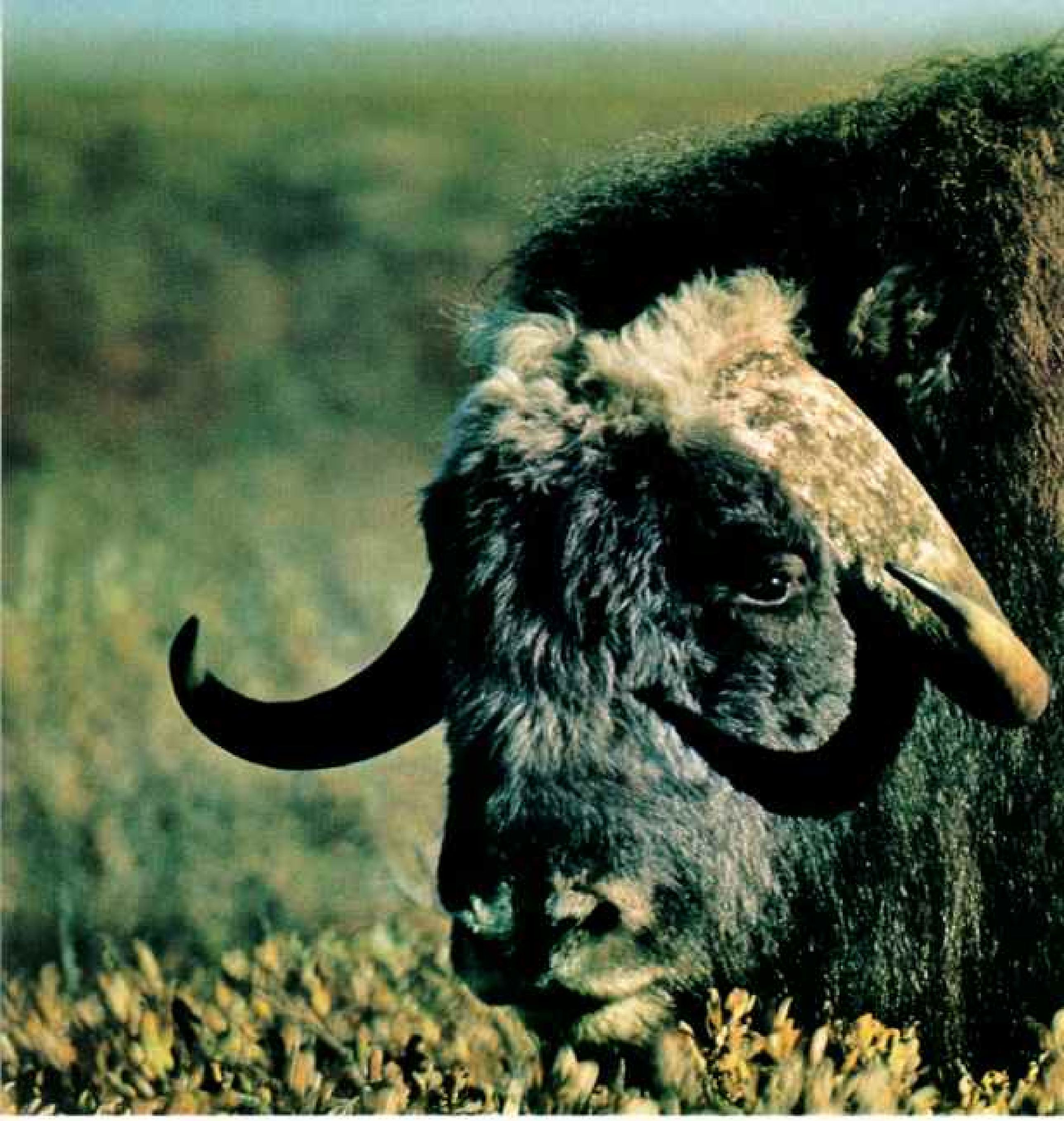
*The lack of trees on the North Slope doesn't deter Lapland longspurs, who prefer to make nests in tundra grass (**below**). These vulnerable homes make for short parenting periods; the young move out of the nest only nine days after birth, behavior that probably developed to elude predators.*

*Young semipalmated sandpipers, such as a chick whose leg was banded for a study of fox predation (**bottom**), foil enemies another way. Their markings camouflage them so well, noted one ornithologist, that they are invisible at three feet.*

***Autumn embers** of marshy coastal tundra glow in early September (**facing page**). Though able to withstand winds churning off the Beaufort Sea, tundra is fragile. Impressions made by water pools, and tracks of man and animals, remain for decades.*

*Mirroring the seasons, a rock ptarmigan in mottled plumage blends with summer foliage (**right, center**). The bird dons white dress as winter approaches (**top**). The dense white feathers provide insulation as well as camouflage when ptarmigans burrow in snow for warmth. Feathered feet act as snowshoes when the birds emerge to feed.*

*Despite protective coloring, ptarmigans often fall prey to the keen nose of the red fox (**below**). Wrapped in a thick winter coat, the red fox can sleep on open ground. Its hair-covered footpads also help prevent heat loss. In the strongest winds the animal seeks natural shelters, but dens only during spring breeding.*



(Continued from page 746)

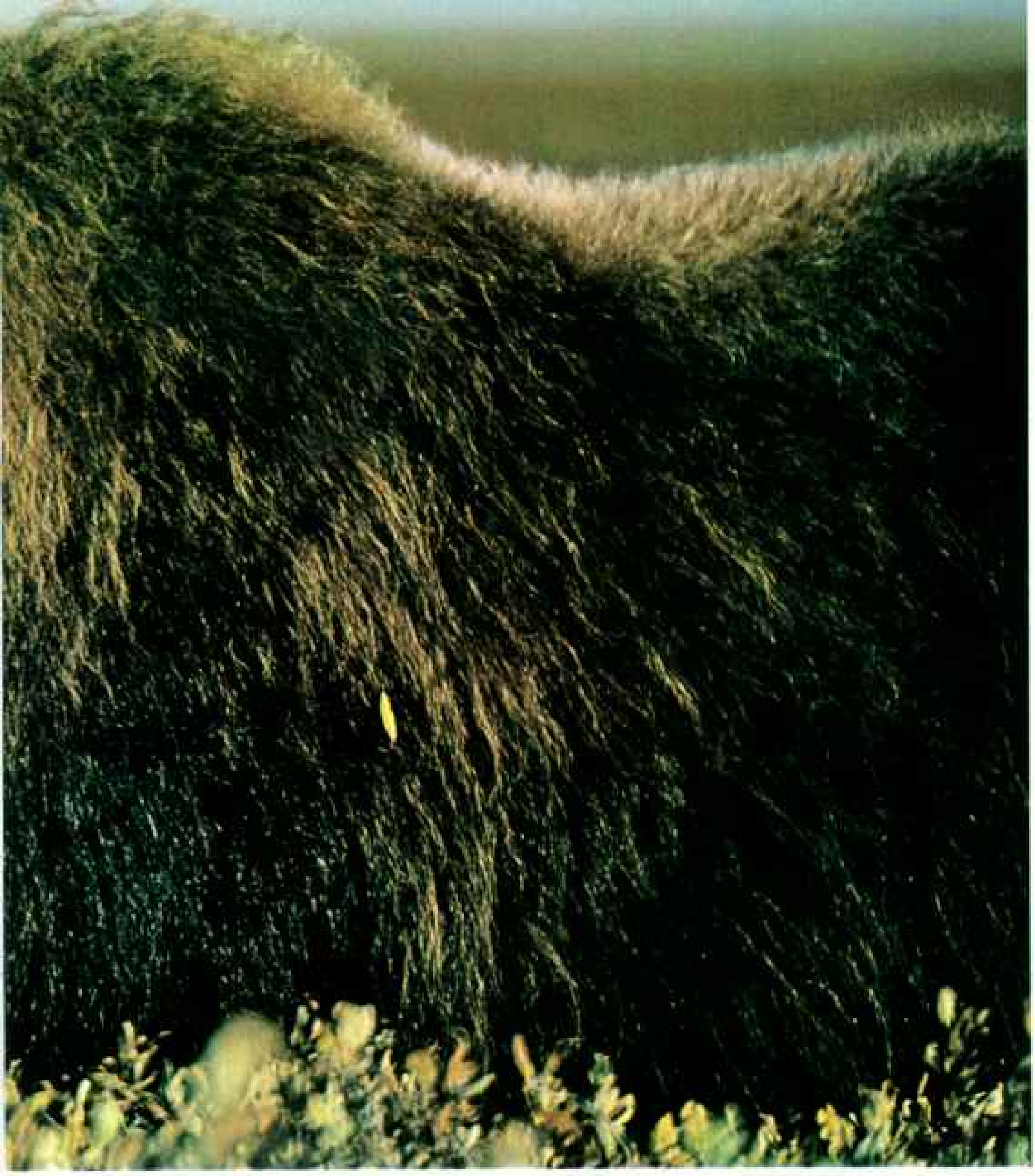
deal with a major new road, along with oil and gas exploration in the herd's territory.

but it must also

SHORTLY after leaving the calving grounds, I bumped down to a tundra landing in Walt's fat-tired Super Cub to visit another team of biologists, this one led by Mike Spindler, who works for the Arctic Wildlife Range.

Mike's camp perched on a pingo, a blister-like hillock raised by ice. It was the only dry ground I could see in this boggy landscape near the center of the refuge's Beaufort Sea coastline. Enormous as the Arctic Wildlife Range is, Mike soon made it even grander.

"You already know the scale of caribou movements," he began as he swept off the tent table with a duck wing and laid out his charts. "The wildlife range is also an important denning area for polar bears, and some travel from here as far as Siberia. Arctic foxes turn white in winter and follow the bears over the ice to scavenge their seal and



An old face returns: *The musk-ox, hunted to extinction in Alaska by the mid-19th century, roams protected today, thanks to transplanting. Oxen resettled on the North Slope in 1969 are descended from stock brought from Greenland fifty years ago. Three herds totaling about 130 graze tundra by the Sadlerochit, Jago, and Tamayariak Rivers year round, insulated by thick coats that inspired the Eskimo name* umingmak—*bearded one.*

walrus kills. The seals themselves, the beluga and endangered bowhead whales, and several fish species all come from distant parts of the ocean to summer in the bays and estuaries along this coast. Arctic char spawn in the North Slope river systems."

The fluting of sandhill cranes and red-throated loons accompanied our conversation as we sploshed through curious terrain, where permafrost action had wrinkled the tundra into a latticework of polygons, each enclosing a shallow pond. One of the larger

ponds mirrored a whistling swan and its mate for life. The elegant pair had been drawn by the incredible expanse of tundra wetlands that makes the Arctic Wildlife Range such an important nesting ground for many species of migratory birds.*

Phalaropes whirled in the shallows to stir up their meal of insect larvae and crustaceans, as Mike told me how mallards and pintail ducks spend their winter in California, the cranes in the Southwest, Lapland longspurs in the Great Plains, golden plovers in Argentina, and wandering tattlers as far south as Ecuador.

The wheatears and yellow wagtails carry their songs to Africans, and the arctic terns fly to the edge of the other ice cap, in Antarctica. Sometime in early September, nearly a quarter of a million snow geese from the Soviet Union's Wrangel Island and from east of Canada's Mackenzie Delta converge on the wildlife range to feed on roots and berries before heading south.

As Mike talked on, I envisioned a thread carried by each bird, fish, and mammal in its travels to and from the Arctic Wildlife Range, and a miraculous fabric took shape that knitted together the continents and seas of the world. Ave Thayer, the tall, soft-spoken outdoorsman who serves as the manager of the refuge, had already told me, "What we have here is really a global wildlife resource, and we have an international responsibility to protect it."

ONCE this land's native people lived along the coast in small family bands and often moved to camps in the mountains when game was more plentiful there. Then toward the mid-1800's whalers and other *taniks*, or white men, arrived, and the Inupiat Eskimo began to gather into larger, more permanent settlements centered around increased trade.

Two hundred and fifty miles above the Arctic Circle, just inside the northern boundary of the Arctic Wildlife Range, is tiny Barter Island. When I arrived there in mid-June, its village of Kaktovik, now home to some 150 Inupiat, was thawing and bustling beneath the continual sunlight it enjoys from mid-May to late July. Kaktovik is one of the two main points of departure for journeys into the range; the other is the Athapaskan Indian community of Arctic Village, 45 miles southwest of the range.

The old way of life of the Inupiat—Real

*See "The Mysteries of Bird Migration," by Allan C. Fisher, Jr., in the August 1979 NATIONAL GEOGRAPHIC, with accompanying supplement map.

Pieces of a puzzle *for archaeologists, metal-tipped arrows mark an Eskimo hunting camp whose members died mysteriously in the mid-19th century. The remains of 20 persons, as well as sleds and other articles, were found along a caribou migration route near the Turner River. Scientists say the caribou may have failed to show up one year and the people starved. But other theories are being weighed, including death from smallpox, a disease introduced by whalers.*

*Less mysterious artifacts sit at an abandoned military building at Demarcation Bay (**right**). Tens of thousands of such discarded metal drums litter the coast. Under a Young Adult Conservation Corps project, yet to be funded, they will be picked up, crushed, and recycled.*

People—is not always easy to discern now that outboard motorboats have replaced native kayaks and the yap of dog teams has given way to the snarl of snowmobiles. Yet nomadic ways persist. Rarely were all the villagers at home when I was there. Some of them had gone out with rifles onto the ice to stalk *ugruk*, the bearded seal. Others were hunting waterfowl or netting fish. Later they would travel into the hills after caribou and sheep.

Listen to the sounds coming from the community hall. It is a modern metal Quonset hut, but the wailing voices and stamping feet within are joined in the songs and dances of the hunt. And listen carefully to the three men talking together at the back. One wears a baseball cap in the latest casual style of the Lower 48, but these Americans are not speaking English. They use their own Eskimo tongue.

When then Secretary of the Interior Fred Seaton established the Arctic National Wildlife Range in 1960, it was to protect an unusual diversity of arctic and subarctic habitats and the migrations, mating, and birthing of wild creatures that take place within them. By providing room for the great cycles through which the living world renews itself, the formation of the Arctic Wildlife Range also helped ensure that those food chains that sustain the indigenous American culture of the Inupiat and its traditions would be preserved.

How long will it last, the special balance of old and new I saw in Kaktovik? The massive oil-drilling complex of Prudhoe Bay throbs and churns just sixty miles west of the wildlife refuge. More offshore drilling for oil and gas may begin, possibly within a year, at Point Thomson, ten miles from the Arctic Wildlife Range. And there is strong pressure to explore and develop other potential reserves along the coast of the refuge and within it as well. What will the Real People have to barter to become full members of *this* modern world?

THOUGH THOUSANDS of feet higher than the coastal plain, the mountains of the Arctic Wildlife Range begin their summer two to three weeks earlier. Rock faces absorb immense quantities of the sun's energy, while North Slope lowlands shiver next to that colossal refrigerator, the wind-swept pack ice. So I was not surprised to feel warmth on my own face when in mid-July, after flying out of Kaktovik in a freezing fog with my wife, Karen, the plane landed on the south slope of the Brooks Range.

Warmth, and something else I had not experienced in some time: trees—cottonwood and short, conical spruce typical of this northern edge of the forests. It would have been shirt-sleeve weather except that along with summer had emerged the scourge of the Far North: endless squadrons of gnats, blackflies, deerflies, and mosquitoes, all humming a bloodthirsty tune. Thick shirts covered our arms and bulky head nets protected our faces as we sweltered uphill toward a low pass.

Going uphill with a packsack is never easy work. And the Arctic is the only place I know of where you can climb a sharp slope and still be boot-top deep in marsh. The slow-growing tundra communities of lichens, mosses, sedges, and prostrate shrubs are natural sponges. Less than a tent stake's length beneath them is a hard-frozen layer of ice and soil called permafrost that may be as much as 2,000 feet deep.

Like the caribou, which lose as much as a quart of blood a week to the insect hordes, we learned to eat and walk facing into whatever breeze was available. When a good wind kept the bugs strung out in a funnel behind me, I could pause to marvel at my surroundings. Peaks and ridge blades jutted and thrust and fought for space in the sky. Below them, the earth's own aurora of wild flowers flared across hills and gullies. In the red spectrum alone I recognized dwarf fireweed, Lapland rosebay, and the lovely but unfortunately named woolly lousewort.

Hot-dogging *on a frosty Fourth of July, an Inupiat child digs in at the annual picnic on Barter Island, once a trading post for whalers and nomadic Eskimos. The tiny outpost in the Beaufort Sea is shared by a U. S. Air Force radar station and the 150 Inupiat of Kaktovik, a self-governing town within the wildlife range.*

Celestial fireworks burst when charged solar particles strike earth's atmosphere, creating the aurora borealis. A September aurora ***(right)*** *illuminates fishing boats off Barter Island.*

OUR PLAN was to hike a short distance up the south slope, cross the crest of the Brooks Range, which is also the Continental Divide, and then follow the north-flowing Kongakut River by kayak. After three days we came to where the Kongakut, whose Inupiat name means "place where people herd the caribou," became wide and deep enough to float. There we rendezvoused with Lowell Georgia, who had flown in with the folding kayaks we would need to negotiate the Kongakut.

It was a pleasure to travel by river power for a change. In places, we drifted with lures spinning through deep pools that murmured stories of salmon-size and salmon-delicious char. Elsewhere, the river cut through thick ice fields, and we threaded between sinuous, gleaming walls, thoughts of fish dinner forgotten for the moment since a turn into the wrong channel could sweep us under the ice.

After three river days the braided channels poured together into a canyon, and the water whitened between boulders. A heavy rain dampened visibility, and gusts of wind plucked at our bows and once turned me backward in the middle of booming rapids. Another time I looked back to see Lowell's boat teetering high and dry atop a rock.

The following day our patched-hull expedition was in *(Continued on page 761)*

The well-turned headgear *of Dall sheep makes them prized trophies for hunters and photographers. In rutting season, horns clash as rams fight over ewes. The*

STEPHEN J. KRASEMANN

animals forage on grassy slopes by day, spending nights on outcroppings to thwart predators. On the range, 400 mature rams may be taken during fall hunting season.

(Continued from page 756) more serious trouble. For hours our exhilaration matched the heavy rain, head winds, rapids, and onset of hypothermia. But then two boats overturned and gear tore loose from its fastenings. We fought the battered boats free from the rocks and dragged them to shore, more aware than ever of how isolated we were in this vast place far from any permanent human habitation.

But why had we come, if not to be dependent upon our own resources and, in so doing, discover more about them? There are circuits and juices in every person that are the heritage of millions of years of evolution and survival in wild country. They need exercising. Add a twinge of fear and wonder, and they can bring the world into focus with astonishing clarity.

In such a setting, far from the clutter and clang of modern life, you find your senses opening wide, flowing easily, like the river, touching everything—the configuration of lichen on a shed moose antler, the sorting of stones in the gravel bars, the change in earth music each time the wind blows around a new corner. And you realize that this may be the real treasure that has been preserved here—the awareness of how intensely alive your mind, your body, and the world around you can be.

Bob Marshall knew, the great American conservationist who in 1937 proposed setting aside such a large, unspoiled tract of north country as the one we were now within. It was he who said, "In Alaska alone can the emotional values of the frontier be preserved."

We finally managed to piece together something that resembled the original boats enough for Lowell to comment, "They might even float." Back into the water they went, and the next day we shot out of the canyon and down into the foothills.

NEAR WHERE the Kongakut River empties into the Beaufort Sea is Demarcation Bay and a coastline marked with the weathered flotsam of history—old Eskimo hunting and fishing camps, the outposts of early white whalers and traders, and graves with wooden markers.

When the caribou have moved east after spring calving, (Continued on page 766)

A too-soft landing *mires a plane taking the* NATIONAL GEOGRAPHIC *team on a caribou-watching sortie. Touching down on skis alongside the Jago River, the plane sliced a channel in mushy snow, requiring half an hour's work to free it.*

Sun, snow, and shadow accent the peaks of the Brooks Range ***(facing page)****. Upon the crest of the Brooks in the wildlife range, the Continental Divide reaches its northernmost point, where water flows north to the Arctic Ocean or south and west to the Bering Sea.*

With spread-eagle immensity, *a polar bear lays claim to a whale carcass. Brute strength, keen noses, and surprising speed make polar bears the supreme predators of the range, where only Eskimos may hunt them. Ice floes on the Beaufort Sea* ***(above)*** *are no problem for the bears, agile both in and out of water. Man isn't so lucky. In summer the coast is usually kept ice free. But when strong winds blow ice ashore, Eskimos find hunting and fishing difficult, sometimes impossible.*

STEPHEN J. KRASEMANN (ABOVE AND RIGHT)

No mortal hand *engraved this lichen-encrusted rock near Hulahula Canyon* ***(left)****. After subterranean pressure fractured it two ways, the rock was reborn when molten quartz filled the fissures.*

Fur protects, enhances—and imperils. White shading helps camouflage the ground squirrel ***(right)****. Ear tufts adorn the lynx, Alaska's only native cat* ***(above)****. Rare color makes the "blue phase" arctic fox* ***(top)*** *lucrative for trappers.*

(Continued from page 761) the North Slope can seem terribly empty as you look out over its unbroken expanse. But to four young researchers camped near Demarcation Bay—Robert and Elizabeth Burgess, Declan Troy, and Sandy Elder—it rustles with life. Immersed with Robert's team in the micro-worlds of lemmings and voles, snowy owls, longspurs, snow buntings, and shorebirds, I recalled the theme: so vast and empty, and yet so full. Before we had covered more than two or three acres, I lost count of all the bird nests Robert and Declan located and the chicks whose legs they banded with small aluminum rings.

"This little hummock of tundra may only be about eight inches high, but it makes a mountain of difference to a nesting longspur," Sandy said as he parted the grasslike sedge leaves to reveal a tiny cup woven from dried stems and old molted ptarmigan feathers. It held five pink gaping mouths. "Tunneled into the hummock like this, the featherless young won't be cooled too quickly by wind when the mother is off getting food; and since the nest faces south, they'll have extra warmth when the sun is out."

Then I gently held the astounding packet of long-legged fluff that is a semipalmated sandpiper chick. It was so light I felt no weight at all, only warmth. Though hatched the day before, the precocious shorebird had been scooting about on its own after insects when we found it.

Robert, a graduate student at the University of Alaska at Fairbanks, was interested in the effect of predation by arctic foxes on nesting birds and small mammals. We looked up from our nest counting to see a fox padding along the edge of a pond with a young bird in its mouth. Using binoculars, we followed the fox to its den, a mound of earth from which nine bright-eyed, sharp-toothed kits scrambled to see what their mother had brought: tundra become insect become bird become fox food in her jaws.

IN EARLY AUGUST I once more found myself on the south side of the Brooks Range. My guide for a trip to the high country of the south-flowing Sheenjek River was Joe Want, a true Alaskan character who describes himself as "One hundred and seventy-five pounds of twisted steel and sex appeal." It is no easy job to keep up with this pack string: Molly, Dolly, Trooper, Shakey, the mules; and Tank, the horse. But you can learn from their boss, Joe, where the sheep come for salt and which plants the grizzlies like to dig in wet meadows. In the evening at

DOUGLAS H. CHADWICK

camp, there is harmonica music and a verse or two from Edward Paramore about the frozen Far North and lusty men for whom "its icy arms hold hidden charms. . . ."

It was overcast when I reached the upper watershed, barely one step ahead of the pack-laden mules. End-of-summer mountainsides were painted in broad strokes: ocher cliffs, gray talus, yellowing willow brush, and russet tundra. Near a small waterfall I left Joe and climbed to a ridge where I could look around at the cold blue lips of glaciers overflowing the core of the wildlife range—the highest peaks in the Arctic Circle outside Greenland.

Clouds settled lower onto the slopes, and the wind carried an unmistakable smell: winter. Late that evening of August 6, it began to snow, frosting my clothes and promising more ice for the patient glaciers.

By October, nearly continuous daylight would give way to darkness at six in the evening. First the North Slope would whiten with migrating snow geese; then would come lasting whiteness. Finally, from late November through half of January, nights would be lit by the shimmering neon of the aurora borealis. Coastal temperatures would reach as low as 60° below zero F—160 degrees below the body temperature of the *umingmak*, musk-ox, the great carpeted Ice Age beast that paws through the snow for food then.

Joe planned to stay in the Sheenjek to guide trophy sheep hunters from August 10 until the snows arrived and forced him out. The Arctic Wildlife Range is part of the National Wildlife Refuge System,* administered by the U. S. Fish and Wildlife Service; fishing, hunting, and trapping are allowed within the framework of the state's regulations. The hunters of sheep, grizzlies, moose, wolves, and caribou make up the largest group among the four hundred to six hundred nonnative people now visiting the Arctic Wildlife Range each year.

Four to six hundred people. Each year in my home state of Montana, more than a million and a half people pass through Glacier National Park, one-ninth the size of the Arctic Wildlife Range. When I returned, Glacier was going to seem more tame than before, no matter how wild those visitors think it.

WITH WINTER on the way so early, it was time for me to say good-bye to Joe Want and, soon after, to the Far North. Memories have a way of fading like the blue silver colors of a freshly caught grayling, but if I close my eyes, I can still hear and smell and see one very special scene: the time in early July when the caribou merged into one gigantic herd to begin the first stage of their trek eastward.

For days the animals had been congregating on the coastal plain, and the growing bands began to pulse with their imperative to move. As Lowell and I waited for them behind a distant hill, Walt Audi, our ever timely pilot, mailman, and grocer, landed his plane on the riverbank.

*See the March 1979 NATIONAL GEOGRAPHIC for a series of articles on U. S. refuges.

Pitfalls and pests *await those who test the Arctic's rigors. Author Chadwick uses a campfire to dry a book* ***(right)****, drenched when a kayak capsized in the rushing Kongakut River. Repairing boat damage, photographer Georgia and the author's wife, Karen, wear head nets* ***(left)*** *to keep mosquitoes at bay.*

Dawn doesn't wait *for dusk in the arctic summer. At 3 a.m., the rallying sun doubles its aura on placid Lake Peters. A contrail from a polar flight leaves a fleeting trace of man over a land where his marks—so far—have been scarce.*

"The movement has really begun," Walt told us. "They must have covered twenty miles since yesterday. But it looks like they're going to pass just north of here this year. I'd better get you to some place near them, and quick. A fogbank's rolling in off the sea." And with that, he and Lowell roared off in his tiny two-seat plane.

Walt returned for me twenty minutes later, but after he stopped and I loaded my gear, the engine failed to turn over. We discovered that a battery terminal had cracked off. Borrowing one of the .44 Magnum cartridges from my last line of defense against bears, Walt extracted the lead bullet and heated it on a spoon over a camp stove. With the molten lead he soldered the terminal into place, and we headed aloft.

By this time, however, fog had temporarily obscured Lowell and the only hilltop smooth enough for Walt to set down on. Knowing the thick, wind-stirred soup could last for days, I feared I would miss the spectacle of the moving throng. Then, suddenly, through a clearing in the mist, I saw them.

Backed up on one bank of the river were not just the thousands I had seen before, but tens of thousands, flowing together as a single organism. And as we flew over the milling animals, we saw even more coming toward us. Across the Aichilik River and then the Egaksrak, and the Ekaluakat, wherever the mist parted to reveal the world below, were still more massed caribou, until the usually unflappable Walt began to shout: "Look at that! There must be sixty or seventy thousand down there!"

I'm sure there were at least that many. Biologists estimate the Porcupine herd to contain 100,000 or more animals, making it the largest in Alaska. I watched 10,000 of them surge across a river. Cold water exploded as big, dark-coated bulls with heavy antlers in velvet, yearlings, and calves at the heels of their mothers leaped and swam together. It was a vision of prehistory, of the continent before man, of the Great Plains when herds of buffalo crossed the Missouri.

When first they saw the bison, I'm sure many of our forefathers said: There is so much land there and so many animals, what could ever happen to them?

FOR YEARS, the U. S. Fish and Wildlife Service has sought to enlarge the boundaries of the Arctic Wildlife Range to the west and south and designate much of it wilderness as an added measure of protection.

President Carter has supported that goal, and still does despite his recent call for

stepped-up exploration and development of fuel reserves to help achieve national energy independence.

A bill, H.R. 39, preserving 129 million acres of federal lands in Alaska as national parks, forests, wildlife refuges, and wild and scenic rivers, passed the House of Representatives in May 1979 by a six-to-one margin. Nearly ten million of those acres are additions to the Arctic Wildlife Range, and 13.4 million of the new total of 18.8 million acres are designated as wilderness.

The measure now awaits action in the busy Senate. There, the debate over the future of our last frontier promises to be loud and long as developers, conservationists, native peoples, and Alaskan states' rights advocates urge their own positions.

There may be, as some say, room in the Arctic Wildlife Range for pipelines and caribou, roads and wilderness. But will this then still be our largest refuge in its truest sense—a place that provides one of our last, best chances to cherish and understand the earth without irreversibly changing it? My wish is that the solution Congress ultimately reaches will count the solitude, the grandeur, and the lives I found in the Arctic National Wildlife Range high, very high, among the riches of our land. □

Seoul: Korean Showcase

ARTICLE AND PHOTOGRAPHS BY
H. EDWARD KIM
NATIONAL GEOGRAPHIC STAFF

EVENING RUSH-HOUR traffic jams City Hall Plaza. Amid the sea of people heading for home, a young boy in a school uniform holds on tight to his grandmother in her traditional long white dress. He points to the new 38-story hotel dominating the cityscape. "Look! That's the tallest building in Seoul!"

The old woman twists her head skyward. "It makes me dizzy just to look at it."

I, too, look and remember the old ten-story Bando Hotel that used to stand on that site; it was the tallest building in Seoul when I left home twenty years ago. I also remember the blue sky of October and the crisp clear air when I was growing up here. Now I see only an orange disk filtered through the gray western sky, blanketed by smog.

It is hard to imagine that only two and a half decades ago this capital city of the Republic of Korea (South Korea) was a heap of rubble. Fought over four times by contending armies during the Korean War, Seoul

***High-rise monuments** of a rebuilt city tower over children in Seoul, capital of the Republic of Korea. Battered into rubble during the Korean War, Seoul was hub of Asia's fastest growing economy during most of the 1970's.*

was reduced to a shell where refugees huddled in makeshift huts. By the time of the armistice in 1953, I had had my share of tragedy. My brother was killed in action. Our house was burned to the ground.

In 1960, fresh out of high school, I left Seoul to go to college in the United States. The postwar social and economic chaos, compounded by government corruption, seemed to offer little future in Korea. So I put down roots in America. My interest in Korea faded. What little I heard of my countrymen from the news media wasn't much to be proud of: the "Koreagate" scandal involving payoffs of U. S. congressmen for favors to Korea; the "Moonies," allegedly brainwashing young Americans to convert to the Reverend Sun Myung Moon's Unification Church; and human-rights issues in Korea itself—press censorship, the stifling of dissent, and the harassing and jailing of opposition politicians and student agitators by a strong-arm government.

These emotional issues have so tarnished Korea's image that when I told a Washington, D. C., neighbor I was returning to Seoul, he asked with concern, "Is it safe?" A Korean friend in New York City told me to watch what I said in Seoul. I felt uneasy.

Booming City Rises From Ruins

Returning, I find one of the 15 largest cities in the world, bursting at the seams and reflecting a boomtown atmosphere as the capital of a newly industrialized nation growing at an unprecedented rate.* Seoul's eight million people—20 percent of South Korea's population—circulate 70 percent of the nation's currency. Combining the functions of a Pittsburgh, Detroit, New York, and Washington, Seoul boasts a fourth of the republic's manufacturing, 45 percent of its motor vehicles, half of its 80 universities, 60 percent of its hospitals, and 98 percent of the central government's offices.

I find vital, ambitious, friendly people experiencing prosperity, facing problems for the most part with cheer. I speak freely and have no fears for my safety. Still, I feel uneasy. Twenty years away from Seoul has made me a stranger in my own home.

So stunning is the physical change that I must take the cable car to the top of Nam San hill in the heart of Seoul to get my bearings. My eyes trace the curve of the Han River. Amid the phalanxes of high-rise offices and apartments laced by elevated expressways I make out the old palaces that link the Seoul of today with the Korean past.

Archaeologists have evidence that people were living here by 3000 B.C. But the story of the present city begins some 600 years ago. A century before Columbus set sail for the New World, Gen. Yi Song-gye overthrew the Koryo Dynasty and ascended the throne in Songdo (Kaesong), which is now in North Korea. Yi soon found that small Town of the Pines unsuitable for his grand ambitions for the kingdom of Choson, Land of Morning Calm. So he sent for geomancers to find the most auspicious site for a new capital. After searching for a place where the energies of wind and water and earth augured well for the future, they chose a settlement named Hanyang in a quiet valley, half encircled by the Han River.

General Yi—known later as King Taejo of the Yi Dynasty—conscripted thousands of laborers and set about building palaces and shrines and surrounding his new capital with a great fortified wall. Legend has it that one night when Taejo was trying to decide where to build this wall, it snowed, leaving a circle of white on the hills around the city. There the rampart was raised, about ten miles long, bristling with battlements and watchtowers and pierced by eight great gates. Called Hansong, Fortress on the Han, the city remained the capital of the Yi Dynasty for more than five hundred years. After Japanese colonial rule (1910-1945), it was officially named Seoul, simply "the capital," when the Republic of Korea was established *(Continued on page 779)*

*Peter T. White reported on South Korea in the September 1975 NATIONAL GEOGRAPHIC.

Ruffles and chiffon *highlight the creations of designer André Kim (center), shown by film star Chang Mee-hi, at right, and model Chun Won-ki. "Korean women have always appreciated beautiful clothes," says Kim, who draws on traditional native styles. "Now they can often afford to buy what they once could only admire."*

DRAWN BY JANE WOLFE
COMPILED BY BRIAN M. MORGAN
NATIONAL GEOGRAPHIC ART DIVISION

Echoing the glory *of Korea's past, Toksu Palace buildings nestle amid a landscape jammed with hotels and offices. The original palace was occupied by King Sonjo, of the Yi Dynasty, during 16th-century Japanese invasions. The palace, rebuilt at the turn of this century, now houses a contemporary-art collection.*

*The Yi Dynasty held sway from 1392 until 1910, when Japan annexed the country; liberation followed World War II. Dynasty founder Gen. Yi Song-gye, later called Taejo—"great original ancestor"—shifted the capital from Kaesong to Seoul. Later he erected a fortified wall around the city (**map**); some of it still stands.*


지하철

***Ready to roll** in a vast fleet of new cabs, women taxi owners **(left)** wait to receive their licenses at a special ceremony. They had responded to a government campaign seeking to bring more women into the work force. Traffic regularly clogs downtown thoroughfares **(below)**, with chaos barely checked by traffic police, such as this smartly dressed director of the rush hour **(below right)**.*

Korea's first entry in the world auto market is the Pony, a sleek compact with Italian styling and a Japanese-designed engine. Korean manufacturers built 200,000 cars in 1978 and plan to produce 1.2 million by 1982—a realistic expectation in a nation whose gross national product jumped more than 150 percent between 1974 and 1978, to 46 billion dollars.

Economic planners have steered the country from reliance on textiles and other light export industries into more ambitious fields, such as chemical and steel production. The Hyundai group—maker of the Pony—now runs one of the world's largest shipyards.

Twisted in the flame *of an alcohol burner, a lipstick gets a final gloss at the Amore cosmetics factory* ***(above)****. Korean women now comprise nearly 40 percent of the nation's work force. Dr. Kim Okgill* ***(top)*** *rose from undergraduate to president of Ewha Women's University, with more than 8,000 students the world's largest for women.*

(Continued from page 772)

in 1948.

The statue of Adm. Yi Sun-sin, who defeated two Japanese invasion fleets in the 1590's with his "turtle" ships—the world's first ironclads—looks down Sejong-ro, a 16-lane avenue lined with ginkgo trees. Rising six stories beside it, the Sejong Cultural Center combines traditional and modern Korean architecture. Roof columns are patterned after those in ancient palaces, and granite reliefs depict the Korean motif of floating angels playing wind instruments. Since the center opened last year, the New York Philharmonic, Royal Ballet of London, and Vienna Boys' Choir have performed there.

At the far end of the avenue looms Kyongbok Goong, Palace of Shining Happiness. There rise the domed capitol building, erected by the Japanese in 1925, and the National Museum, with its five-story blue pagoda, built in 1972. Behind the palace, at the foot of Pugak Mountain, stands the Blue House, the presidential mansion.

On a hot line to the future, *businessman Kim Jin-soo* ***(above)*** *fills orders for building materials. Korean contractors are at work on dozens of overseas projects, including a billion-dollar port in Saudi Arabia.*

Renowned calligrapher Kim Ki-soong ***(left)*** *learned the ancient art from his grandfather fifty years ago.*

This is one of my favorite parts of Seoul. I want to photograph the area from a vantage point to show the statue, the clear broad avenue, and the architectural contrast and harmony that sum up more than five hundred years of history and influences. But it is forbidden. Ever since 31 North Korean guerrillas infiltrated Seoul in 1968 and charged down the hill toward the Blue House in an effort to assassinate President Park Chung Hee, photographing much of the city has been limited, especially where the presidential mansion can be seen.

Seoul lives literally under the gun. With the Demilitarized Zone only 25 miles north as the missile flies, with Seoul only a two-and-a-half-minute bomber flight from North Korean air bases and within range of artillery, security is on everybody's mind.

Serfs, Not Enemy, Burned Palace

I head for the Palace of Shining Happiness. It is a good day for a walk. Sunlight sets the yellow ginkgo leaves to gleaming against the blue sky. A guide holding a flag leads Japanese tourists across the courtyard of the main throne hall, Kunjong-jon, Hall of Government Restraint.

During the Japanese invasions of the 1590's this palace, a maze of 500 buildings, was burned, not by the enemy but by Korean serfs who wished to destroy official records of their servitude. Only ten buildings remain of the palace, rebuilt in the mid-19th century. But much of the charm of this vibrant city lies within the walls of such colorful palace buildings.

Schoolchildren in their uniforms line up to tour the National Museum. This impressive structure, a composite of copies of three Korean temples listed as national treasures, houses many of the works currently being shown in the "5,000 Years of Korean Art" exhibit now touring the United States.

Dodging through congested streets, I search out the one where I used to live. A bustling, commercial district with shops and restaurants has replaced the great residential district of Suha-dong with its traditional L-shaped, tile-roofed houses. I find the street I lived on. It is so much smaller than memory recalls. I am disappointed to find the place so changed, to find no trace of the warmth that nourished me.

Strips of beef sizzle *over a charcoal burner at a restaurant where the specialty of the house is* bulgoki*—beef marinated in a mixture of spices and soy sauce. Hungry*

for success, office workers often return to their desks for a few hours after dining out.

In the spring of 1952, when Seoul was retaken by United Nations forces, my family was among the first authorized to return. We found our house demolished like most buildings in the city, and bodies of soldiers everywhere in the streets. I recall my father rebuilding the house while my sisters and I played in the rubble. That winter was so cold that water left at bedside froze by morning. To keep me warm, my mother made pants and jacket from an army blanket.

We were no different from others trying to survive in the middle of a war that created such suffering, and which I, for one, didn't even understand. But our love for each other sustained us, and the home my father pieced together gave us a sense of security.

Chauffeured Cars, Jewels, and Hot Dogs

I stroll the streets of Seoul and find the charm of a once small city disappearing under the facade of Westernization. The huge districts of Chamsil, Yongdunggpo, and Youido, on the southern fringe of Seoul, are studded with new high rises. Children at neighborhood street corners enjoy coin-operated video games on TV screens, and businessmen swing golf clubs at local practice ranges before going to work.

On the crowded streets of Myong-dong, Seoul's downtown shopping district, a gleaming thirty-thousand-dollar car pulls up in front of a department store. The chauffeur rushes to hold open the car door.

"Wait here," commands a woman in a mink stole, wearing a jade pin, a pearl necklace, a large diamond ring as well as two other expensive-looking rings, and carrying a Gucci bag.

"Who is she?" I ask.

"Probably nobody special," my boyhood friend Lee replies. "We have a class of nouveau riche who enjoy showing their wealth off. You should see some of their houses, filled with antiques and paintings. Not necessarily decorated tastefully, but everything is expensive." Lee chuckles and adds, "It's a free country. They can do what they want with their money."

A couple of coeds, laughing and enjoying fried hot dogs on sticks, pass by, arm in arm. A young couple with two small children looks in a shop window. The woman admires a $150 silk blouse. "That's half my

monthly paycheck!" the man exclaims. Then he smiles, "I'll buy you the blouse when I become a millionaire."

Winter is coming. The warmth of the midday sun is dispelled by the Siberian wind as night falls. Vendors appear pushing carts laden with roasted chestnuts, dried squid, and the tangerines grown on Cheju Island. Workers returning home stop at streetside pubs on wheels—plastic canopied and lighted by flaring carbide lamps—to snack on rice wine and stewed squid.

Workers Face 23 Percent Inflation

I overhear snatches of conversation: complaints about the spiraling inflation—23 percent annually by government figures—and skyrocketing prices of housing. Without rent controls on apartments, many workers are hard hit. The vendors voice little concern. Many earn more than the white- and blue-collar workers they serve.

A darkened street leads me to Mukyo-dong, a district well known for nightlife. The narrow alleyways offer a variety of entertainment, from inexpensive wineshops for students to swank disco dancing. I settle into a wineshop in the courtyard of a traditional tiled house.

The young crowd, college students with their books and soldiers in uniform enjoying a night off, cluster on wooden benches and around tables enjoying *makkolli* and *pindaeduk* (rice wine and mung-bean pancakes garnished with fresh vegetables and pork). The decor is rustic—dried vegetables and farm implements—and the atmosphere loud, comfortable, carefree. A coed in blue jeans, jogging shoes, and football jersey takes out a cigarette and asks for a light. When I was growing up in Seoul, young ladies patronizing wineshops or smoking would have caused quite a stir.

With 13,000 persons per square kilometer—and with projections that the city's population in ten years will pass Tokyo's—Seoul is experiencing acute growing pains.

Take the traffic problem: moving an estimated twelve million passengers daily. Seven out of ten use the city's 5,500 buses. It is common to see 140 to 150 passengers riding a bus designed for 60. I decide to try the bus to the South Gate during rush hour.

Each one that comes is already jam-packed, but people run to catch it. When I reach the door handle, the bus is already moving. Two people behind me push me aboard. Pressed in like bean sprouts, with hardly room to move my feet, I pitch and lurch with my fellow passengers as the driver makes sudden stops and unpredictably switches lanes. The bus attendant somehow manages to collect the 50-won (10-cent) fare. At my destination I have to elbow my way to

Cleanup crusade *enlists girls in their school uniforms to scour littered streets—a price Seoul pays for development. Adults also join the voluntary government campaign. Other such programs focus on recycling and energy conservation.*

the door from the middle of the bus. In the process I lose a coat button and my polished shoes get stamped on and scuffed. When I tell a friend, he grins and says, "It's our daily routine. You get used to it."

To handle the traffic, street construction is going on everywhere. Existing roads are being widened, new roads created, a subway system is being built. Mayor Koo Jachoon describes the problem at his office filled with planning charts:

"Seoul uses only 13 percent of its area for roads, compared to more than 20 percent in New York City. Yet Seoul has 170,000 of the nation's 380,000 registered motor vehicles. By 1985 we expect the city to have one million. With money to spend, more people are thinking of buying their own cars. You see families going for a Sunday drive along the Han River and to nearby scenic spots."

A remedy now being considered for the traffic problem includes restricting construction of high-rise buildings in downtown areas and moving certain businesses to the suburbs. The plan also calls for more parking facilities, mandatory car pools during rush hours, and staggered commuting hours for students and business and government workers.

The six miles of completed subway line handle only 6 percent of the city traffic. Construction of the entire 86-mile system is in full swing. Work goes on 24 hours a day to complete it by 1983, two years earlier than planned. Then it should handle 50 percent of the city's traffic.

Air pollution is another headache. It gets worse during the winter months as the use of *yontan*, pressed-coal briquettes, increases for home heating.

Kim Jung-hyun, Director General of the Environmental Pollution Control Bureau, has been too busy to take a vacation since this office was created two years ago. "Automobiles contribute some 20 percent of the air pollution," he tells me. But this is on the increase, so it will be mandatory to install antipollution devices. "Coal is our biggest problem. Coal-burning industries and the Han River power plant together contribute more than 50 percent." Plans call for gradual change from coal briquettes to natural gas for home heating, and for relocating heavy industries outside the city.

As in the United States and elsewhere throughout the world, the energy crunch is on. President Park calls on citizens to practice frugality. The government promotes a Let's Walk campaign. Notices on elevators state that they are programmed to skip the first three floors and, above that, to stop only at every other floor. Gas stations now close on weekends and holidays. The populace, schooled to accept hardships and directives from on high, complies with little complaint.

Korea's countryfolk, *reproduced in miniature* ***(above)*** *by dollmaker Kim Young-hee, echo the traditional side of a culture in transition. From a living-room studio* ***(facing page)****, Kim fashions the figures from dyed mulberry-bark paper glued to wire frames. A graduate student in sculpture, she enjoys watching people "identify with the lives of their ancestors" through her dolls.*

Secret Garden an Oasis of Calm

I take a leisurely walk through the Yi Dynasty Secret Garden, Biwon, another of my favorite places in Seoul. The little pavilion in a pond, the examination hall surrounded by gnarled pines, and the winding pathways lined with maple trees—it is simply a beautiful spot. The wall around the garden insulates me from the bustling city; tranquillity prevails. I hear the last of the dry autumn leaves falling in a gust of wind. I recall happy childhood days, picnicking with my family under these cherry trees in the springtime and collecting crimson maple leaves with my friends in the fall.

Our ancestors had a deep appreciation for nature's beauty and a taste for the quality of life, to create and enjoy such a masterpiece. And they often had the luxury of time and space, which modern Koreans don't have. Seoul's park space is less than five square meters per person, compared to 19 in New York. The desire to escape concrete walls has brought about the creation of rooftop gardens with trees and flower beds attracting birds and butterflies.

President Park has launched a cleanup campaign. I see thousands of students, government workers, and private citizens going around the city collecting cigarette butts, beer bottles, and trash. The president himself joins in picking up litter.

Later, on a hillside on the outskirts of Seoul, the atmosphere is picnic-like. Mayor Koo Ja-choon and hundreds of city-hall employees in tennis shoes and khaki caps emblazoned with the round symbol of the

Scrawled in blood *on a placard, the message "Death to Kim Il Sung"—President of North Korea—keynotes a 1978 demonstration in Seoul* ***(left)****. Sparked by the discovery of a third North Korean tunnel under the Demilitarized Zone, the rally reportedly drew a million* ***(above)****. The passage—large enough to funnel a thousand soldiers under the border every hour—was bored through granite more than 240 feet below the surface. Military experts believe at least a dozen more tunnels remain undetected.*

Since the Korean War ended in stalemate in 1953, a shaky truce has prevailed between North and South. With an invasion force only 25 miles away, Seoul remains highly vulnerable.

Ever conscious of the threat, officials stage monthly air-raid drills, as well as several blackouts each year which darken the city within one minute ***(right)****.*

New Community Movement prune and fertilize young pine trees that they planted on Arbor Day in the spring. It is now Forestation Day, the first Saturday of November.

"Planting a seed is important, but we must not forget the cultivation if we are to get the benefit of the tree," Mayor Koo comments. He lights a cigarette. When finished, I notice, he shreds it to leave no litter.

The face of the city is important. But what about its soul? Some Koreans now express concern that the flood of Western influences is diluting their Korean traditions. They are determined to revive their disappearing heritage.

"Korean society has survived drastic changes since the onetime 'hermit kingdom' opened its doors to foreign powers a century ago," Dr. Sun Keun Lee, President of the Academy of Korean Studies, tells me.

"When I was just a boy, the Japanese burned our history books," Dr. Lee continues. "They wanted to take away our cultural identity—to undermine the traditional Korean value system based on Confucian culture." During their 35-year rule, they attempted to turn Koreans into second-class Japanese, uneducated workers to toil for Japanese masters.

Passion for hiking *lures thousands to the mountains each weekend; these outdoor enthusiasts wait for a Sunday-morning bus* ***(facing page)****. On lunar New Year's Day a couple wears traditional Korean attire* ***(above)****. Celebrants hold feasts to honor their ancestors and visit elderly friends and relatives.*

Postwar Chaos Led to Problems

When Korea was liberated at the end of World War II, it thus had no trained managerial class. Little wonder that there was economic chaos, that Seoul later mushroomed without adequate planning, creating a multitude of today's problems.

In the postwar era Koreans became exposed to the influence of Western culture. For years after 1945, Soviet forces occupied the north and U. S. troops the south, and separate governments were formed.

South Koreans welcomed the cultural heritage of their American allies, who returned to their aid in time of national peril, the Korean War, and who put billions of dollars into helping rebuild the war-shattered nation. Traditionally agrarian, Korea in the early 1960's underwent an industrial revolution, copying Western scientific development and material goods indiscriminately. Korean architectural traditions were ignored, art treasures neglected; many were dispersed and shipped abroad.

Fortunately the traditional passion for education remained, enabling Korea to pull itself up by its educational bootstraps. At the same time the nation has performed miracles with its economy.

Han Dong-won, Deputy Director of Public Information at City Hall, who makes $500 a month after 18 years in government, has witnessed that change. "It's not as it was when I started. I see bright people coming in who are better educated, who have a deeper sense of responsibility toward their duties than in earlier days. These young

Trailing ribbon *of new subway construction slashes through the Chamsil district south of the Han River. Officials estimate the 86-mile system will carry 50 percent of the city's traffic by 1983.*

*The new housing development it bisects reflects the city's effort to keep up with its exploding population. But architect Kim Swoo-Geun (***right***) deplores the anonymous, impersonal style of many new buildings. Where buildings may rise tomorrow, a vacant lot serves as a driving range (***left***).*

workers are a challenge. I find myself spending much time studying. Let's face it. If I am to stay useful in my position, I have to run to catch up, the world is changing so fast."

It's Friday afternoon, raining. The tearoom on Chong-ro is crowded and smoke-filled. Conversation mutes the popular tune, "Yes, Sir, I Can Boogie," coming over the loudspeakers. Two businessmen pass papers to each other. One pulls a handful of zippers from a bag full of samples.

The hostess seats me at a table with two young men, whose large black schoolbags rest on an empty chair. "College students?" I ask. They exchange glances. "We should be," one says. Chang Min-soo and Lee Kyung-mo are two of thousands who have failed the college-entrance exam. They must go through an agonizing, embarrassing year preparing for the exams next year. Chang applied for business administration at Yonsei University and Lee hoped for engineering at Seoul National University, both top schools with tough competition. "We are the failures," Lee says bitterly. Of the 500,000 Korean high-school graduates who took the exam in 1978, only 110,000 will find places in a university.

I, too, went through the exams in Seoul, and I know the pressures. Success in Korea

depends largely upon the school one attends, and on one's connections. In this tightly knit society people identify with their family, their school, and the organizations to which they belong. Families of lower income will make great sacrifices to get their children onto the right educational track. The first six years of schooling are compulsory and paid for by the state. After that the family pays, and it becomes an investment in the family's future.

Not every success in today's Korea, of course, is through the old school tie.

Flashing strobe lights blind my eyes as dancers in short dresses do the "hustle" on stage. The smartly dressed audience of about 750 tap their feet. The World Cup dinner theater presents magicians from Taiwan and the Philippines, the graceful traditional Korean fan dance, country-and-western songs by Korean cowboys, and a string ensemble playing the "Blue Danube."

As fast moving as the entertainment on stage is the man behind this popular downtown establishment. Jung Sang-hae, still in his 30's, already has made millions. In his roomy office, equipped with a piano and sound system, Jung, in corduroy Levi's and open shirt, tells me: "Look, I am young, and I have made good in business. I'm not necessarily smarter than others. But I like to work, and in this society it gets results."

Jung picks up the phone and calls for a singer and violinist to come to his office. They perform "Santa Lucia." Jung Sang-hae sits back, eyes closed. The song over, he smiles. "If it weren't for moments like this, I wouldn't be in this business."

His enthusiasm is infectious. But I wonder where the Korea I once knew fits into this new whirl.

In Search of a New Culture

Kim Swoo-Geun, a leading architect, shared with me his concern for Korean identity in this fast-changing society. "Look at the palaces with graceful tiled roofs and the humble thatched houses in the country. They blend so well with the land. We must come up with a culture today that can also be the pride of coming generations."

The present generation works long hours at low pay (the average daily wage for unskilled industrial workers is $6.20), but this boon to Korean export trade may be ending. Workers are growing more interested in free time and company benefits. The nation is experiencing its first labor shortage.

The government, I'm told, has decided to curb the manpower export to the Middle East to meet the growing demand for skilled

Company athletes *pray for health and success at a traditional Kosa ceremony during their firm's annual outing. Confucian principles of loyalty and patriotism, deeply rooted in Korea, extend to corporate affairs.*

After saluting the flag, employees will open the World Cup dinner

workers at home. Employers no longer say, "help wanted." They phrase it, "We cordially invite you to be a member of our family," and add such inducements as "plush free dormitory," "fat bonus," "free bus service," "plenty of holidays and paid leave."*

Fifteen hundred employees of Daewoo Electronics assemble radios for Zenith of the United States and cassette tape recorders for Telefunken of Germany. The export price for the Zenith set is about one-third the retail price. Half of the workers are girls in their late teens with no high-school education. They make about $150 a month. The company offers free lunch, medical care, and scholarships. One out of four girls attends night school, the company providing transportation and school uniforms.

Call Her a "Household Manageress"

One of the reasons my father decided to sell his house and move into an apartment after my mother died was that he could no longer find help to maintain the house. One of my sisters tells me that if you are lucky enough to find household help, she'll likely ask if you own a car, washing machine, refrigerator, and whether the house is air conditioned. And she's not called a maid anymore. *Sikmo* (kitchen woman), the centuries-old name, has given way to *kajongbu*, or household manageress.

Unjonsu used to be the common name for drivers. Today their employers run the risk of losing them, and would-be passengers may be ignored if they call them that. Now a driver expects to be addressed as *unjon kisa* (vehicle operating engineer).

I am enjoying this evening out with my dear boyhood friend Jin-soo; we reminisce about school days and catch up with each other's news. The Scotch is good, and the setting relaxing: a U-shaped sofa around a large low table in a tastefully decorated private room. Two attractive hostesses keep our glasses full and will sing and dance with us if we wish. Spending about a hundred dollars a person to drink in one of hundreds of such plush salons in Seoul isn't for everyone. But it is popular among businessmen for conducting after-office-hours business or for socializing.

I turn to Jin-soo. With his white silk shirt sleeves rolled up and designer tie loosened, he is all smiles. A dealer in construction materials, he tells me that success in his business requires long hours. His 8-year-old son

*Subsequently, the international oil crisis led to slowed economic growth and the possibility of a nationwide unemployment problem.

theater, featuring disco dancing, magicians, and country-and-western music.

thinks he's a bad father because he stays out drinking until the midnight curfew. To all appearances he is a typical, well-educated, Westernized Korean businessman. He lives in an apartment with his wife and two children, and his life-style seems not much different from that in the United States.

The Past Exerts a Strong Grip

But he can't escape his traditional upbringing. Like others among my friends, Jin-soo believes a woman's place is home, rearing children and tending the household. Other than family gatherings, he seldom takes his wife to social functions, and he doesn't discuss business at home. He frowns on young women smoking and expects total obedience from his children.

"In this society one does what he is expected to do," Jin-soo tells me.

"What happens if one doesn't?" I ask.

"Ah, you are not supposed to question like that," he says with a grin. "You have been away from home too long."

But I have not forgotten. Korean values are rooted in family tradition. This emphasizes the devotion of children to their parents and attaches the prime importance to the father-son relationship. Koreans are taught that filial piety is the basis of all conduct. Parents are absolute. Even though a son believes he is right, he should not disobey the wishes of his parents.

In spite of Westernization young Koreans remain bound by the Confucian ideals of work and study, life and play—though they often express disinterest in their Confucian heritage. A recent national survey revealed that 70 percent of the men and 80 percent of the women preferred to depend on matchmakers rather than romance to find their mates. Marriage is more of a union between families than a joining of individuals.

I look out at the curfew-darkened city from my hotel window—empty streets dotted with streetlamps. The clock on a bank building shows it's 2 a.m. I have been sitting here, sleepless, pondering. Seoul wears a Western look and life-style. Yet its values—the framework of family ties, for example—are as deep-rooted as the palaces, shrines, and monuments embedded in the matrix of the modern city. This produces tension and conflict, an identity crisis.

Am I not going through that same crisis?

My father, who just celebrated his 82nd birthday, predicts that I will return to Korea to live. My sisters say I wouldn't be happy here. Have I changed that much? Is this why I don't feel quite at home here? When my

mother passed away two years ago, I was in the Arizona desert on an assignment. I feel I have failed her in not being there during her final days. I feel a strong obligation to remain with my father during *his* remaining years. Do I feel this way because of my Korean upbringing? There is no easy answer.

Why do I feel ambivalent about the human-rights issues? That Korea still makes it a crime to criticize the government (and scores are in prison today for that offense) runs counter to the democratic principles I honor in America, where the individual's right to free speech is taken for granted. Yet I can understand the South Korean Government's fears for its security.

And the Korean in me can understand that Korea has always had a relatively authoritarian government. Its Confucian culture stresses hierarchy and harmony, communal obligations, and the duties of the individual toward a paternalistic state. Authority descends; it does not rise from below. From the president on down to the policeman who sternly enforces the laws, just or unjust though they appear to Western eyes —and to some Koreans—the concept is one of rulers and ruled, masters and subjects.

"What we have here is a controlled society, and the government leads the people," is the way one friend puts it.

"Disciplined liberties, that's what our society needs," my father lectures me, and I recall more discipline than liberty in my years of growing up in his household.

Even influence buying finds me riding the fence. The American in me resents bribery. As a Korean, I understand that an exchange of gifts is a time-honored custom.

Rumble of Tanks Is No Dream

Another night I am awakened by the roar of tanks. "I must be dreaming," I tell myself. The clock reads 1:15 a.m. Between the tall buildings I make out dark shadows of tanks passing by the City Hall Plaza. The next morning a friend tells me that periodically the military conducts troop exercises in the city during the midnight to 4 a.m. curfew.

South Koreans feel a constant threat from North Korea—bombers and missiles, 2,500 tanks and a half-million-man army. Antiaircraft batteries and soldiers are constantly alert on the hills ringing Seoul and on rooftops. Once a month everybody participates in a civil-defense drill.

I meet a student and ask her about her university. She answers me in detail. But when I ask her about students' concerns over the security, she leaves abruptly. Later she calls to apologize for her rudeness, saying she thought I was a North Korean agent.

Tunnel Discovery Enrages Millions

At an October 1978 rally in Youido Plaza, an estimated one million citizens roar in fury against a newly discovered North Korean-built tunnel, 74 meters under the Demilitarized Zone. Never have I seen so much humanity in one place. "Down with Kim Il Sung, the Mole," the demonstrators shout.

Military experts estimate a thousand or more soldiers could jog through the tunnel in an hour; two other corridors were found in 1974 and 1975, another in mid-1979.

An intensive manhunt is on. All bridges to Seoul are blocked; soldiers and police check all vehicles. The Counter Infiltration Operations Command announces that North Korean agents have killed four civilians. The Korean War is still going on.

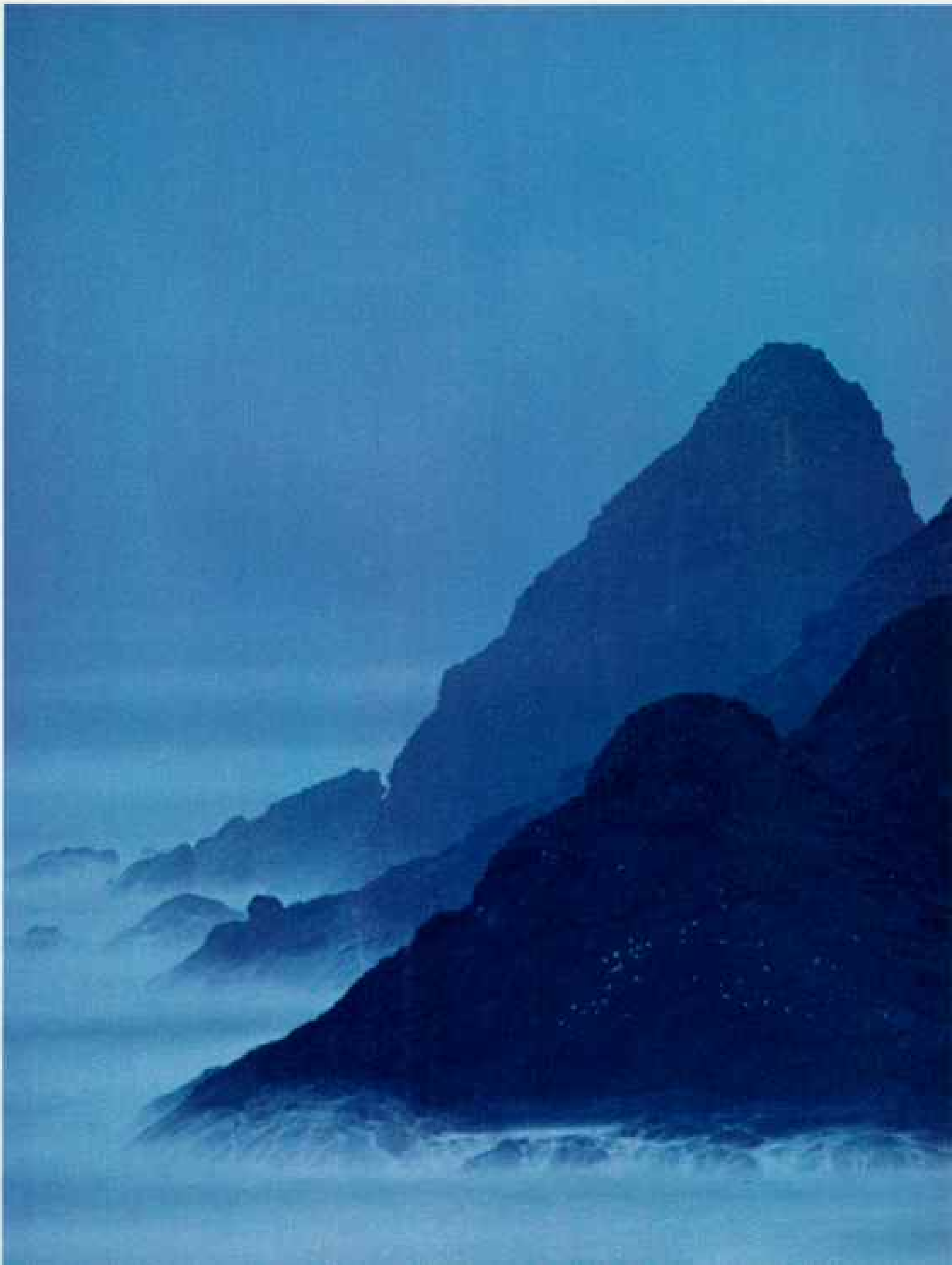
Although the two Koreas face each other at the conference table, unification is still remote. An estimated five million people in the South have relatives in North Korea and no way of learning their fate.

Embattled from without, undergoing a transition in culture within, Seoul embodies the enduring qualities and energies of the Korean people. At 5:30 every evening I hear the national anthem played through the city. I see people in their offices and pedestrians on the streets stand at attention facing the national flag. I hope that their unity and determination will meet the challenge to find a place—a peaceful place—in the sun. □

Light and dark entwine *in the ancient Oriental symbol of life's harmonious duality—day and night, fire and water, male and female. From a tragic recent past, Seoul and its children follow a path toward prosperity but enter a world of new pressures brought on by rapid development.*

Oregon's Lovely,

***Nature offers few handholds** along the precipitous Oregon coast, where Heceta Head Light north of Florence flashes an automated warning to mariners every ten*



Lonely Coast

By MARK MILLER
Photographs by
COTTON COULSON

seconds. Winter's pounding surf and perpetual drizzle—more than 100 inches in some areas—prompted a local wit to observe: "Oregonians don't tan. They rust."


BEECH-NUT
CHEWING
TOBACCO

A *HOARY TENET* of Oregon coastal folklore holds that a vessel on which canned provisions are stored upside down will never return. Upside-down cans will throw off the compass, and the contents of the cans will turn to poison. Any boat with upside-down cans will capsize and sink.

An old fisherman told me this, and mainly in deference to him I wrote it down. When he learned that I would go to sea the next morning—a Friday—aboard a fishing boat, he shook his head gravely. It would be very bad luck to leave port on Friday, he said.

By Friday afternoon I was as superstitious as a medieval peasant. At breakfast I had found peach cans upside down in the galley. The seas had been calm; now we were rolling in a howling gale miles offshore. We had hooked only three salmon, the engine was missing, spray hit the wheelhouse with the sound of flying gravel, and swells higher than the top of the wheelhouse tipped the 40-foot *Fortune* over onto her rails.

Nicholas Burton, the boat's 33-year-old owner, spun the helm to port, into the wind, toward Japan. He is a big man with black curly hair and an untrimmed beard, and his big cigar and green fatigues made him resemble a Cuban revolutionary.

Braced in the wheelhouse and struck dumb by the fury around us, I marveled at my sense of well-being two days before when we had trolled under clear skies and a warm September sun, hooking 55 salmon worth more than $1,600. I had joined Nick's three crewmen in the work of baiting hooks, playing out the weighted lines from power winches, hauling them up every 15 minutes to unhook the catch, cleaning the fish, and laying the opalescent carcasses on ice in the hold—all the while bracing one leg and then the other against the tilting of the deck.

But on this Friday I knew we were in trouble as we surfed down the back of a huge swell. I was genuinely frightened, for the coast of Oregon is one of the world's most treacherous (map, page 804). Its shore is a rock-studded, 362-mile-long graveyard of ships, mariners, and sea travelers that perished in Pacific waters seldom warmer than 50°F (10°C), in which a swimmer without thermal protection will die within two and a half hours. When Nick guided the *Fortune* between the rock jetties of the Chetco River mouth at Brookings long after midnight, I gave silent thanks. Somewhere out in the storm that night, two men and their trawler had disappeared without a trace.

The coast of Oregon faces the longest unimpeded stretch of open ocean on earth—without islands or reefs to buffer the impact of waves born in the seas off Japan, 6,000 miles away. In storms they rise to the height of boxcars, slamming into crevices like pistons and compressing air to rock-cleaving pressures as high as five tons per square foot. Under this relentless hammering much of the coast has crumbled, and remnants of an earlier coastline stand marooned offshore, jagged pillars called sea stacks.

When It Rains . . .

I entered Oregon's coastal region from California, where the two states share lush oceanside grazing land populated by muddy sheep. The southernmost hundred miles of Oregon's Pacific edge are unusually rural, for only a few unpaved logging roads link it with the interior. Locals perpetuate isolation by refusing to vote funds for a highway.

I had not been in Oregon an hour when it began to rain. Oregon's coastal rains are legendary. Novelist Bernard Malamud called them "ubiquitous, continuous, monotonous, formless." Rain falls an average of 166 days a year, as much as 100 inches along the ocean and 130 in the Coast Range. Leaden skies for two months at a stretch can bring what some call the "Oregon blues."

"I don't pay it no mind!" said an old-timer in Pistol River, perched under the dripping eaves of the general store. "If a man's got a purpose in life, his head works right.

Rough-and-ready fisherman *Terry Cornett waits out bad weather at a Charleston café, and remembers other such times at sea. "One night a storm broke and the Maydays came over the radio—bam, bam, bam. We lost three boats." Still, the former Texan says, "They'd have to hog-tie me to get me away from Oregon. If you came out here and saw the ocean and all those pretty trees, you'd understand."*

November swells *pursue a sailboat approaching Bandon harbor. On June 5, 1579, an English vessel sought shelter in a tiny cove farther north; her captain later wrote*

of "many extreme gusts" followed by "vile, thicke, and stinking fogges." Thus Francis Drake became the first recorded visitor to complain about the Oregon weather.

Oregon coast: rugged and rain-swept

Trouble with you people"—meaning anyone not born in Oregon—"you been affected by *modernness!* I'm a farmer. I know what I am. Farmer! Proud of it. I don't have *time* for problems! Too busy!" He reclined happily in his chair, a rotund little man in pinstriped overalls and a billed cap bearing the trademark of a fertilizer company.

Like many south-coast old-timers he cherishes the notion that the rest of the country has gone to hell. In 1941 voters in one southern Oregon county and four northern California counties joined in a serious attempt to secede from the Union and form the state of Jefferson. Pearl Harbor suspended the revolt, but the sentiment lingers.

Between California and the boiling mouth of the Rogue River at Gold Beach, U. S. Highway 101 follows a cliff-hanging 35-mile route along the tan shoulders of mountains rising out of blue water to heights of 2,000 feet. Where the slopes are timbered, it looks as if the Pacific had pummeled its way to the base of the Colorado Rockies.

I found Gold Beach crowded with fishermen. The Rogue is a renowned sport-fishing stream. Anglers come for the spring and fall runs of Chinook salmon and steelhead trout. In a riverside lodge I saw two fly-fishermen come to blows over the relative merits of the Royal Coachman and the Wooly Worm. "This kind of thing gets very religious," said

***The dramatic confrontation** of ocean, beach, and forest spans 362 miles. Driving the coast on U. S. Route 101, travelers pass park after park, seemingly not much farther apart than the rollers offshore.*

*Timber, fishing, and tourism are the major industries. The Pacific yields albacore tuna, Chinook and silver salmon, black cod, halibut, and succulent Dungeness crabs, here emerging from the pot (**right**) at the Embarcadero Marina Resort and Hotel in Newport.*

The crop of summer tourists includes some who buy houses or land. But not everyone stays. "I call them boomers," says an Oregonian. "They boom in when the weather is good and boom out when it turns bad."

Paul Hoobyar, a guide for one of the 42 outfitters offering float trips down the Rogue in high-sided dories.

From Gold Beach the highway ascends steeply. I rose through fog and rain, broke into brassy sunlight, then slipped in and out of the weather for 28 miles as the road wound through dripping forests and windy slopes, and I skirted secluded beaches.

Some 262 miles of the Oregon coast is beach, and most of the seventy state parks and waysides offer camping or ocean access. But many south-coast beaches remain inaccessible, walled off by precipitous headlands that knife into the Pacific.

Unemployment a Constant Threat

Oregon has but 11 coastal harbors, and only one, Port Orford, is a natural deep-water port requiring few man-made improvements. During summer southwesters, though, the bay is too rough for the sixty-boat fishing fleet, so they're all hoisted from the water and stored on rolling cradles. On a stroll along the dock, I stopped to read an employment notice for a crane operator. A dock official told me the job was filled; half a dozen young men behind me walked away.

The closing of a plywood mill in Port Orford and a sawmill in Powers some twenty-five miles inland had put several hundred people out of work. Of Oregon's 2.5 million people, 170,000 live west of the Coast Range, where heavy dependence on timber-related industries holds unemployment rates above the state average of 6 percent, often pushing it to nearly 10 percent.

"It's best to bring a skill appropriate to this area," said Barbara Risberg, an experimental biologist for the Oregon Department of Fish and Wildlife, busy examining the day's catch. A slippery stream of salmon, red snapper, and black cod flopped onto the buyers' scales, while Barbara recorded their species, took scale samples for age determination, and checked the salmon for the fin markings identifying hatchery fish.

To compensate for the loss of spawning streams to development, logging, and pollution, Oregon's 32 hatcheries release 74 million fingerlings a year. Barbara was monitoring the catch to determine how many hatchery fish were surviving. As she worked, a succession of onlookers stood by, most of them dolefully unemployed.

"A lot of urban people come here inspired by the geography," she said later, "but completely unprepared for the limitations of a rural, raw-materials-based economy."

Urban émigrés find not only jobs in short supply but also the joys of art. So they create their own. I stood on the Port Orford beach one gray morning to watch dance instructor Justina Springer and her troupe perform a

ballet in homage to the coast. She had choreographed it in the studio she founded in what was once the town's general store. Trained in her native Michigan and the National Ballet in Washington, Justina also studied in Paris before her travels brought her to the coast in 1972.

"I fell in love with the place," she said, "but I wasn't going to live without dance." After buying and renovating the general store herself, Justina began her classes with two children. Now she has forty people dancing in seven weekly classes—"people who in their former lives might never have gotten involved," she said.

In his former life Phil Clausen was a dairy farmer in the Coquille River Valley east of Bandon. He is now a prolific sculptor of Oregon myrtle, a close-grained hardwood that polishes to a rich golden brown. I met him at his Riverton home, a combination studio-gallery-lumberyard on the low grassy banks of the Coquille. In his 50's, Phil entered art with the confidence of an inspired primitive,

choosing as his chief tool a chain saw. As we talked one smoky October evening, an uprooted stump floated by, and Phil ran down to his boat. In minutes we were alongside it. Phil gets most of his wood that way, by scrounging. But to his practiced eye this piece was inferior; so he let it drift on through the lilac dusk to the sea.

"Resourcefulness is a trait you find in many people on the coast, particularly the old-timers," said Bill Bradbury, a lanky veteran of public television news reporting in

*"**That hippie house,**" complained some of the neighbors when a bearded architect and his bearded helpers arrived in 1970 on exclusive Salishan Spit (**above**) to build a free-form house for Bill and Marie Gregory (**left**). "Who says that walls have to be straight?" asked Bill, an accountant.*

Not Portland industrialist John Gray, developer of Salishan, who broke a deadlock in the architectural committee. "Looks like fun. Let's do it," said Gray.

San Francisco. From the house he is remodeling in a sleepy valley east of Langlois, Bill ranges all over Oregon videotaping profiles of people and places that are widely broadcast in the Pacific Northwest. He tends his stand of timber as an investment, a resource he can count on to offset the risks of being an independent producer.

"I'd say that self-sufficiency and independence are the virtues prized most among the coast's rural people," Bill told me. "There's a strong tradition of hospitality and helping your neighbor, but everybody wants to succeed on his own, somehow. It's like canning your own garden vegetables instead of buying them at the store.

"It's not a precious affectation," Bill said. "It's an effort to stay in control of your life economically while enjoying a degree of independence."

Most newcomers share Bill's feeling for independence, and such virtues are deeply rooted in local tradition. In cattle rancher Sam Dement and his wife, Dorothy, I found the embodiment of native self-reliance. Sam is a fourth-generation Oregonian. Tall, lean, gray-haired, and permanently tanned, he appears much younger than his 59 years. He and Dorothy spend much of the year on their 3,300-acre ranch in the mountains east of Sixes, a town consisting of a general store-cum-post office.

The ranch is a chain of high meadows stretching 15 miles through timberlands in sight of the sea. I arrived at roundup time an hour before dawn. The kitchen was already crowded with family and friends who had come to help out. Platters of scrambled eggs, sausage, bacon, and toast circulated around the table as the talk turned to beef prices.

"For years they fell below our production costs," Sam said. "When that happened, we went to work in the sawmills, did some carpentry, cut a few trees to sell. That was after we did our ranch work. We got by."

Parts of the ranch have been in the family for four generations. The house and barn were built in 1875 of hand-hewn white cedar. The house was once a hotel on the stagecoach route between Port Orford and Myrtle Point, then a paddle-steamer stop on the Coquille. It has no electricity and no telephone. Kerosene lamps provide light, and Dorothy cooks on a wood-burning stove. The house is warm, cluttered, and neat.

Ups and downs *of beef prices make ranching a marginal operation for Howard Leatherman and others near Powers. "But with land values increasing, anyone who wants to sell out and get out can do just fine," he says.*

Over the living-room fireplace hangs a massive myrtle-wood oxen yoke. In the front hall 14 cowboy hats hang on wooden pegs above a row of pointed-toe boots.

Cattle must be rounded up before the heat of the day drives them into the brush; so in the first blue light of dawn we trucked our horses up into the mountains, then rode up several miles to where the herds grazed on steep meadows. Bright yellow flowers swayed everywhere on slender stalks.

"That's tansy ragwort," said Sam. "It poisons horses and cattle, but sheep can graze it. Problem is, coyotes have nearly wiped out my sheep. We used to poison coyotes with a selective strychnine compound outlawed now. We're allowed to trap and hunt them, but neither works. I used to have 350

"**Pond monkeys**" *herd Douglas fir logs at the Coos Head Timber Company sawmill in Coos Bay (**right**). One man rides a Log Bronc, a boat with a swiveling outboard motor set amidships for nimble maneuvering.*

One of the world's largest ports for forest products, Coos Bay shipped 400 million board feet of lumber in 1978. In addition, nearly four million short tons of wood chips, like these being loaded aboard the Akaishi Maru *(**below**), were exported to Japanese pulp mills. The chip material was formerly burned as waste.*

*Japanese seamen (**bottom**) import their own chips—golf shots practiced aboard ship before a game ashore.*

ewes—I've got only 33 now. And the coyote population is abnormally high. That's an example of a counterproductive environmental law that sounds good to cityfolk."

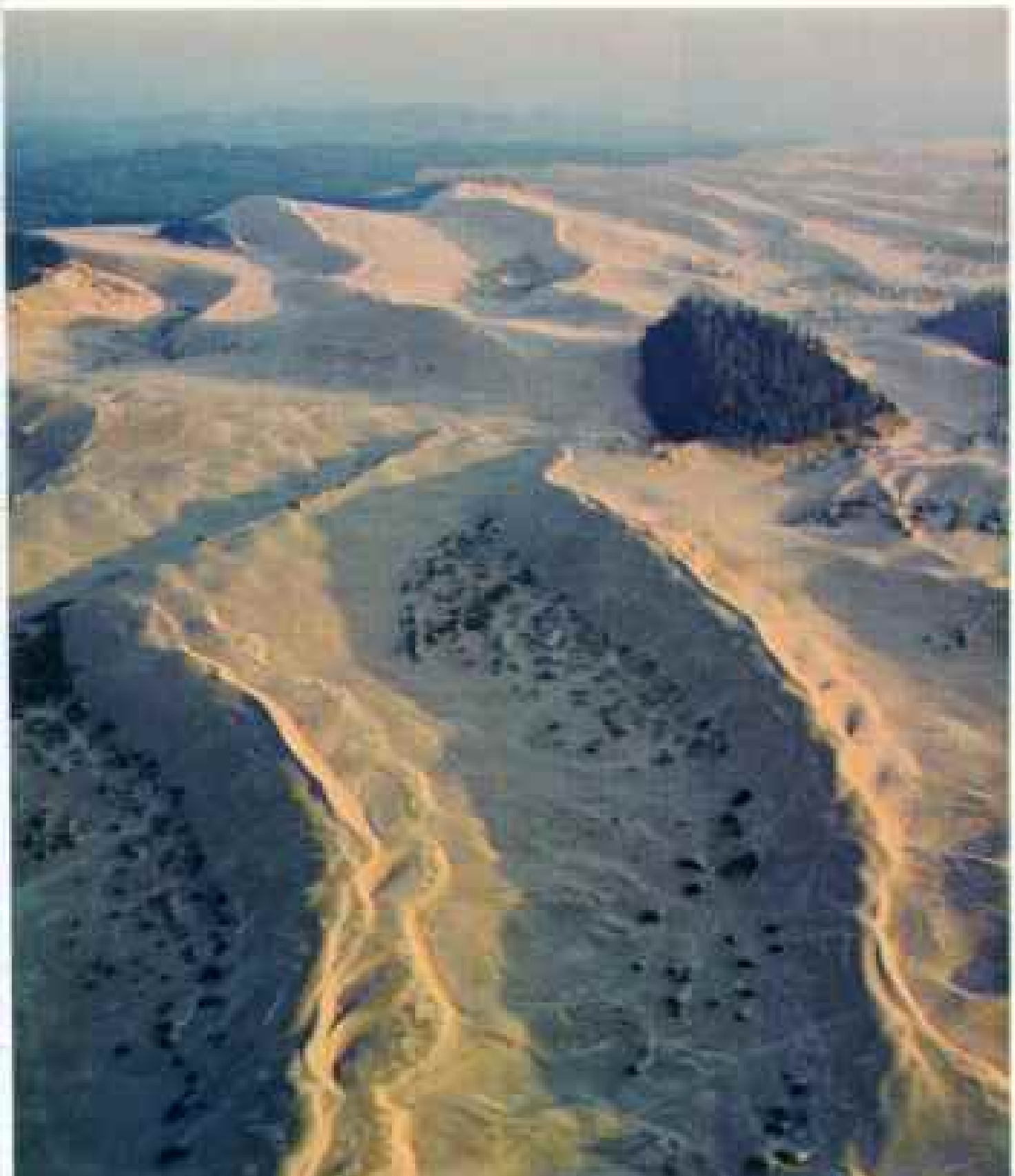
After the cattle were corralled, we sat in the shade of madrona trees to enjoy Dorothy's picnic lunch and a thirty-mile panorama of hazy blue mountains. Most of the forest land around the ranch belongs to Georgia-Pacific, which together with Weyerhaeuser, Boise Cascade, Crown Zellerbach, Louisiana-Pacific, and other large wood-products companies owns most Coast Range timber, Oregon's finest. A few small family operations survive.

"That's because we're not supportin' stockholders," said Buck Waterman, who, with brothers Andrew and Dave, operates Waterman Logging, Inc., at Myrtle Point. When I finally located their mailbox, Buck and Dave were preparing to cut a Douglas fir. The brothers, all around 60, range over their hardscrabble 1,100-acre tract in search of trees that have grown up since the land was logged in 1931. I rode along with Buck on the fender of his skidder, a roaring yellow machine with huge tires and a variety of low gear ratios for towing logs over rough terrain. With a young helper, Dave Winkelman, Dave clanked along behind on a massive International tractor to clear a path for the removal of the big fir.

It stood in a steep shaded ravine. In doughboy hard hat, young Dave cut a wedge from the tree's base, then a single cut on the opposite side, into which the elder Dave drove two plastic wedges.

The chain saw snarled briefly, and the back cut opened slowly like a yellow mouth, then yawned with a sharp crack as the fir, limbs snapping, fell to earth with a loamy thud. The forest was abruptly brighter.

Buck walked the tree's length to estimate its value: at 20 cents a board foot, $200. At



"Hadak!—Go!" *Jim Tofflemire and his Siberian huskies race across the sand dunes near Coos Bay, practicing for the Oregon Dune Mushers' Mail Run from North Bend to Florence.*

Nobody "wins" the noncompetitive run, "but everybody gets a plaque," says Tofflemire. The North Bend fireman initiated the event last year to commemorate the days when traffic moved along the coast only by schooner, stagecoach, and steamboat.

*Most of the run takes place at the Oregon Dunes National Recreation Area, site of some of the world's highest coastal dunes (**left**).*

"Sometimes we run on the beach, but the dogs get bored," says Tofflemire. "They want to see what's over the next hill on the dunes."

the same time I was counting its 137 annual growth rings, a sentimental pastime for which loggers have little inclination.

Leaving the Waterman tract, I found myself harrowingly tailgated by lumber trucks all the way to Coos Bay, where much of the coast's timber is processed into lumber and plywood. One of the world's largest ports for forest products, Coos Bay ships more than half a billion tons annually (pages 810-11).

Sprawling dockside mills that run day and night spew out wood chips onto steaming piles that are larger than the mills themselves. Formerly burned as waste, the wood residue from which the chips are made was a serious source of air pollution. Now—a lucrative solution—they are sold to pulp mills, mainly in Japan, accounting for roughly three-quarters of the port's export tonnage.

"By turning waste into a product, we've pushed foreign sales from Coos Bay way up," port administrator Steve Felkins said. "Each year we ship about four million tons of the chips, valued at forty dollars a ton."

Despite this industrial presence, Coos Bay's sloughs and marshlands remain rich in wildfowl and marine life, and on the bay's North Spit can be found a most dramatic seashore landscape. As I walked toward the ocean side of the spit, a forty-foot sand dune blocked the way. I plodded up over its rippled slope only to find another. After ten minutes of this I pulled out my map and located myself at the southern tip of a dune system that extends 55 miles north and inland almost three miles. Built of sand carried by rivers that cut through the sedimentary and volcanic Coast Range, these great natural formations are among the highest oceanfront dunes in the world, rising hundreds of feet above the water to bury whole spruce-pine forests. Most are included in a national recreation area.

Newcomers Found a Hard Life

One of the rivers responsible is the broad, deep Siuslaw, which I followed upstream from its mouth at Florence to the logging town of Mapleton. It was drizzling again, and I wanted a good cup of coffee. A stubble-faced retiree recommended "the hippie café," conceding that the food was excellent.

It was, most of it produced at Alpha Farm, a cooperative community founded eight years ago near Deadwood (right). Guided by Quaker principles, Alpha's 13 original residents shared not only a strong religious faith but their money as well, and bought an old farmhouse and 280 acres in a narrow, wooded valley. When I stepped

*"**There are spirits here,**" says Ken Kesey (**left**), author of* One Flew Over the Cuckoo's Nest *and* Sometimes a Great Notion. *Kesey gazes at storm surf reflected in the window of his house near Yachats. "You can almost see the Indian canoes on the ocean in the rain," he told the author. "Can you imagine how it broke their hearts when the white man came with a sky full of sails?"*

*Life seems just begun for Steven Paget, Robin Hruska, and Dan Forest (**right**), embracing after a day's work at Alpha Farm near Deadwood, a community founded on Quaker ideals. "We're like a family that shares each other's emotional, physical, and spiritual needs," says Forest.*

into the Alpha-Bit Café and Bookstore, two of the founders, Jim and Caroline Estes, were behind the counter.

"During our first year the pipes froze," said Caroline, "and for the first three years our only heat was from the fireplace. We didn't know *anything*, but the Lord watches out for fools."

Hardly fools. To earn capital for expansion, the members won a $15,000-a-year mail-route contract to serve a thousand families along the 200 miles between Mapleton and Junction City. They are also producing sandals, custom knives, and pottery for sale at the café, and have begun to plant long-neglected fields in hay and mint. Alpha's current population of twenty recently celebrated the completion of a new house they built themselves using lumber milled from their own trees.

Jim Estes, a genial man in his 50's, works as a copy editor for a Salem newspaper, donating his salary to the community and commuting to the farm on weekends to share in

the labor. His wife, Caroline, told me, "We're all pretty strong individuals, but we know that working together we'll achieve a special kind of freedom."

It was similar utopian aspirations that settled Oregon when hundreds of families fled the panic of 1837 and came west over the Oregon Trail. By midcentury there were nearly five thousand pioneering Americans south of the Columbia.

The entire Oregon territory had gone unexplored for more than 200 years after

Secure from the surf, *juvenile Steller's sea lions perch on Center Rock in Sea Lion Caves north of Florence. Dozens of others snooze elsewhere in the privately owned grotto. In the summer the animals breed on the rock ledges outside the cave, the only mainland rookery of Steller's sea lions in the contiguous 48 states. Visitors view the sea lions from behind a chain link fence about fifty yards away.*

Francis Drake skirted the coast in 1579. Capt. James Cook made the first recorded landfall, near present-day Newport, in 1778. Twenty-five years later President Thomas Jefferson dispatched the Lewis and Clark expedition that reached the mouth of the Columbia in 1805. In 1811 John Jacob Astor established Oregon's first permanent white settlement, the fur-trading post of Astoria. Britain also coveted the region, and Yankee trappers and English trappers of the Hudson's Bay Company glowered at each other until Britain, shrinking from the possibility of another American war, abandoned her territorial ambitions.

"We'd of whupped 'em," Newport fisherman Dutch Niemi assured me. Dutch and his wife, Mo, whose Newport waterfront restaurant is famed for its clam chowder, count themselves wistfully as old-timers. Mo arrived in 1935, but Dutch had already survived nine years there.

"Most of the old gang is gone," Mo lamented. "They were a hardworking, brawling bunch. The waterfront was where the mill workers, fishermen, and sailors came to party. They partied real hard."

"We used to fight a lot," Dutch told me. "But we never killed anyone—those were more peaceful times. We just softened 'em up for life."

Whales Enliven Winter Months

It was raining again when I pushed north. Offshore the gray swells occasionally erupted with plumes of vapor—the exhalations of gray whales migrating between feeding grounds in arctic seas and winter havens 4,000 miles south in the Pacific lagoons of Baja California. The round-trip odyssey continues from November through May as the huge creatures cruise the sea at about four miles an hour.*

Just northeast of Pacific City it began to snow. When I reached Beaver, the farming valleys had turned from sod black to white. I was in Tillamook County now, the home of Oregon's dairy industry. Although the lush pasturelands are only a few miles upriver from the coast, for the first time on my journey I did not feel the overbearing presence of

*Biologist Theodore J. Walker described his 23 years of firsthand observation of the California gray whale in the March 1971 GEOGRAPHIC.

***In top hat and tails**—"my working clothes"—Tom McKegg sweeps chimneys*

at Bandon, and fires the imagination of small children who "sometimes ask if I'm a magician or a bad guy." McKegg learned his trade at a sweeps school in Vermont.

the sea. It rains as much as a hundred inches here, and a seven-month growing season produces a carpet of rich grasses grazed by the herds producing the county's 25 million gallons of milk each year—much of it used to make the natural cheddar cheese for which the region is famed.

The sun broke through 25 miles north of the stolid little city of Tillamook, once a booming lumber capital, whose prosperity built its collection of august public buildings and sedate Victorian homes—consolation prizes for wives lonesome for the genteel comforts of the distant East. At the sudden radiance of that rare light, I slammed on the brakes and jumped out of the car simply to luxuriate in it. Across a pasture, a Lincolnesque young man on a rusty tractor was doing the same thing, eyes closed, face uplifted. I walked over to chat, and he invited me aboard the tractor. Soon we were lurching across the field toward his herd of 104 Holsteins.

Leonard Martin, a 27-year-old out of Iowa, milks ninety cows every morning and evening, and otherwise administers to them on 120 acres of leased land. He hopes to settle someday with his wife, Virginia, and their 2-year-old daughter, Claire, on a farm of their own.

Virginia picked some chamomile from her herb garden and brewed us tea in their mobile home. "This valley is too beautiful for mobile homes," she regretted, "but some day we'll do better." She passed Leonard his cup. "This is soothing," she said. "Len works too hard."

Leonard pondered this a moment, studying a bandaged hand cut on barbed wire. "So long as I'm working for us, it's all right with me. I'm proud of producing food. It's honorable work. But why land's so expensive and prices so marginal—I don't know."

Little Trace of Holocaust

I drove north once more, through thick forests of Sitka spruce and western hemlock. It looked to me like natural wilderness, but was not. In the bone-dry August of 1933, friction sparks from a dragged cable ignited Oregon's worst fire of the century. Burning along a 15-mile front, it incinerated 12 billion board feet of virgin timber. The trees around me were the result of careful forest management, a massive replanting effort by lumber companies and the state.

Speckled beauty, *an Oriental hybrid lily spreads its recurved petals at Strahm's Lily Farm in Harbor (**left**). Mrs. Ruth Strahm holds the bud of another lily about to bloom—an occasion of some excitement since "with new seedling hybrids there are nice surprises," she says. "The colors vary, and the flowers can be from 6 to 14 inches across. People come here just to see them bloom."*

*At the Cowan Brothers Farm in Harbor (**right**), Mexican workers lie prone on a creeper—a slow-moving tractor—to weed young Easter lilies. Mild temperatures, copious rain, and a sandy loam promote the flowers' growth.*

I came down to flat terrain, and then the Clatsop Plains opened out onto the Columbia River's broad reach. It was an expansive view, one that inspired the ornate bay windows of the Victorian residences gracing Astoria's steep hillsides.

Storm warnings were up, and the city's waterfront was crowded with fishing boats and burly men in high rubber boots. Nets lay along the docks. The powerful odor of fish oil mingled with the sharp briny smell of the blowing fog. Diesel engines coughed and died, wrenches clattered on decks, and bits of conversation in Finnish and Norwegian floated through the evening. The majority of Astoria's 11,000 people share Scandinavian roots, a bond that they renew each year at Christmas and Midsummer Day through the observance of old-country celebrations.

Although Astoria's fur trade fell off with the decline of the beaver population, its seagoing traditions are as strong as its cultural heritage, and are commemorated in the dazzling collection of paintings, ship models, and marine artifacts of the Columbia River Maritime Museum founded by Rolf Klep. A dapper, decorous man in his 70's, Rolf spent 23 years in the United States Naval Reserve while working as a technical illustrator for magazines. "This museum isn't merely a place of local significance," Rolf stressed. "It addresses the whole of the Northwest's maritime experience."

Not far from the museum, in a waterfront area set aside for the preservation of historic vessels, the battered *Columbia Lightship No. 88* rocks at her moorings, retired in 1961 after 50 years on station off the Columbia River bar. Her replacement, the last manned lightship on the West Coast, was retired in October this year.

Killer Bar Still Feared

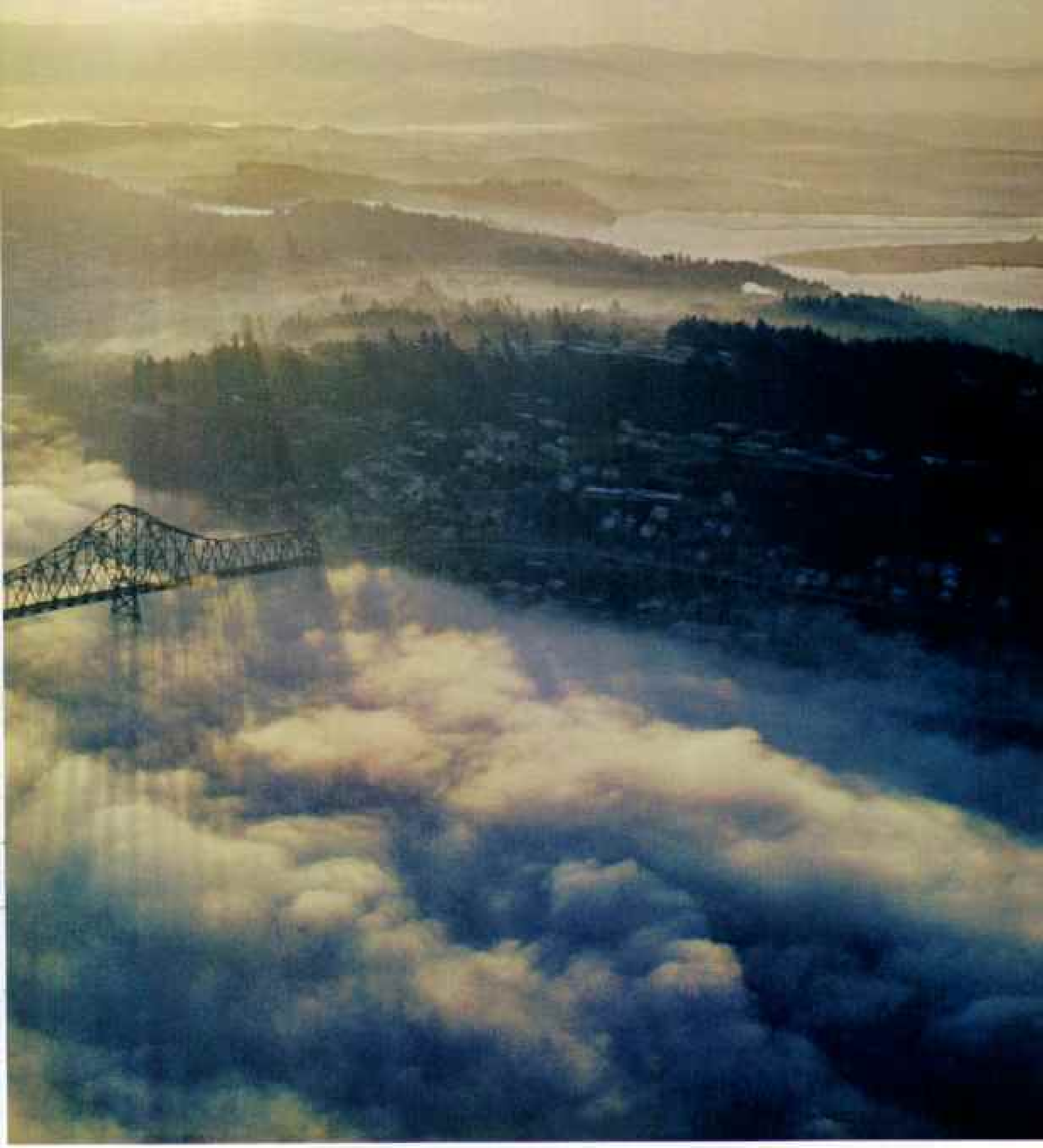
A strong westerly was whipping the sea and the Columbia into whitecaps. Riding low, a Japanese freighter pushed toward the river's bar, at six miles one of the world's longest, and probably the most dangerous. Incoming tides and ocean swells collide with the river's current over sandy shallows to form breakers as high as 35 feet. Since the river's discovery in 1792, nearly 2,000 vessels are known to have been damaged or wrecked there, at the cost of at least 1,500 lives. Navigational aids and dredging have reduced the risk somewhat, but the state of

A batting of fog *mantles the Columbia River at Astoria. Downstream, at the river's mouth, storms come with sudden fury. "It can be flat as a tabletop, and two hours later all hell will break loose," says a ship dispatcher.*

Thus delight mingles with danger along the Oregon coast—and the lively people who live there like the combination.

Oregon still requires ships crossing the bar to have their own pilots or to take aboard pilots—all former boat captains whose daring needle-threading specialty is considered the zenith of the seafaring profession.

Oregon's coast ends at Clatsop Spit, a mile-wide peninsula of blowing sand and bent beach grass eight miles west of Astoria. From there a rock jetty armored with thirty-ton stones extends three miles out to sea,



sheltering the river mouth and accelerating its flow to help scour the channel bottom of sand. Punched in the chest by that 6,000-mile sweep of wind, I scrabbled over boulders the size of automobiles as ten-foot swells hissed by. I went out far enough to look back southward along the coast, now disappearing into a vapory dusk.

The sun had fallen behind a blue black line of clouds, the wind smelled of rain, and spray began to hit me in the face. Small-craft warnings were out. Heading in, a small fishing boat surfed for a moment on a frothy swell before slipping over the crest and behind. Tonight there would be another storm and more rain. It had rained intermittently for eight days. Yet here, on America's edge, many people would feel just a bit more alive because of it—and they would have it no other way. □

THE MAGIC WORLD OF HANS CHRISTIAN ANDERSEN

By HARVEY ARDEN

NATIONAL GEOGRAPHIC STAFF

Photographs by SISSE BRIMBERG

THERE'S A WORLD, just around the corner of your mind, where reality is an intruder and dreams, the bad along with the good, have a disconcerting way of coming true.

You can get into this world in many different ways: by tumbling down a rabbit hole or climbing up a beanstalk, by riding a Kansas cyclone over the rainbow—or opening a book of fairy tales by Hans Christian Andersen.

Of all the travelers who have journeyed to that enchanted realm of once upon a time, none—to my mind—has come back with treasures more glistening than this unlikely Dane, who wrote, "Life itself is the most marvelous fairy tale."

Born in 1805 into seemingly inescapable poverty, he lived to become the darling of European society and the confidant of kings. Though he never learned how to spell very well (he probably suffered from the reading disability we now call dyslexia), he revolutionized Danish prose style by infusing it with lively folk idioms, and he wrote stories that have been beloved by readers in well over a hundred languages.

And yet he suffers a curious sort of neglect—a literary giant relegated to the nursery, often in bowdlerized translations that bear but sad resemblance to his masterful originals.

When I tell friends that I'm writing an article on Andersen, the typical reply is:

"Oh, I *loved* him as a child. Didn't he write . . . now let me see . . . was it 'Little Red Riding Hood' . . . 'Sleeping Beauty' . . . ?"

I shake my head. Those happen to be from Charles Perrault's *Tales of Mother Goose*.

"Then it must be 'Snow White' . . . ? No? 'Hansel and Gretel' . . . ? 'Rumpelstiltskin' . . . ?"

But those were all collected by the brothers Grimm.

"Try 'The Ugly Duckling,' " I say.

"Of course!"

Man and swan become one *in the enchanted world of Denmark's Hans Christian Andersen, seen here in his familiar top hat. The writer's unlikely rise from back-street poverty to universal fame is mirrored in his immortal story "The Ugly Duckling." "It doesn't matter about being born in a duckyard," he wrote, "as long as you are hatched from a swan's egg."* HENRIK TILEMANN, 1865

"And 'The Emperor's New Clothes.'"

"How could I forget!"

"Then there's 'The Little Mermaid.'" I go on, rattling off some of the familiar titles now: "'Thumbelina'. . . 'The Red Shoes'. . . 'The Staunch Tin Soldier'. . . 'The Little Match-Seller'. . . 'The Nightingale'. . . 'The Princess on the Pea'. . . 'The Snow Queen'. . . 'The Tinder-Box'. . . ."

"Oh, isn't that the one where the soldier climbs down the hollow tree to get the witch's treasure and finds the three dogs . . . the ones with eyes as big as teacups and mill wheels and . . . what was it the third one's eyes were as big as. . . ?"

"The Round Tower in Copenhagen," I answer. "Nearly all of Andersen's stories have Danish settings."

"Well," they confess, "I do remember Danny Kaye playing him in the movie—a kind of Pied Piper of fairy tales with a lapful of kids."

I point out to them that Denmark considered making an official protest over the American movie, claiming that it veered sharply from the facts of Andersen's life. What's more, Andersen couldn't bear having children sit in his lap while he read his stories to them.

"I SUPPOSE," they smile sagely, "that your article will begin, 'Once upon a time. . . .'" But Andersen rarely began a story with that stock phrase as the Grimms and many others so often did. Unfortunately, the popular mind has bracketed the names Grimm and Andersen as if they were hardly distinguishable. Yet, in truth, they differed enormously.

The Grimms, Jacob and Wilhelm, older German contemporaries of Andersen, were folklorists and philologists who set down almost verbatim fairy tales and folk myths they collected in the early 1800's. They began the stories with "Once upon a time. . . ." because they heard them that way.

Whereas the patrician Grimms stooped to eavesdrop on the lore of the lower classes, Andersen sprang *from* those classes. He didn't study the world of fairy tales; he grew up *in* it.

Though he often wove themes from folk myth into his stories, he was no collector or verbatim recorder. Rather, he was a creator, a poet, a true original—what the Danes call a *digter*.

His openings launch you slam-bang into the action:

Left, right! Left, right! . . . Down the country-road came a soldier marching. Left, right! Left, right! . . . he met an old witch on the road. Oh! she was ugly—her lower lip hung right down on her chest.

Even in translation, the storyteller's voice comes through in literary stereo.

But—excuse my imagination—isn't that Andersen now, over there, emerging from the shadows, a tall, gangling man in a top hat and black coat? He's carrying a walking stick and traveling bag. A warm smile plays on that extraordinary face of his—a face many have called ugly with its thrusting nose and knobby cheekbones. Yet such gentleness and sensitivity lurk there, especially in the heavy-lidded eyes, that a second glance reveals not ugliness at all but a rough beauty almost impishly reworked.

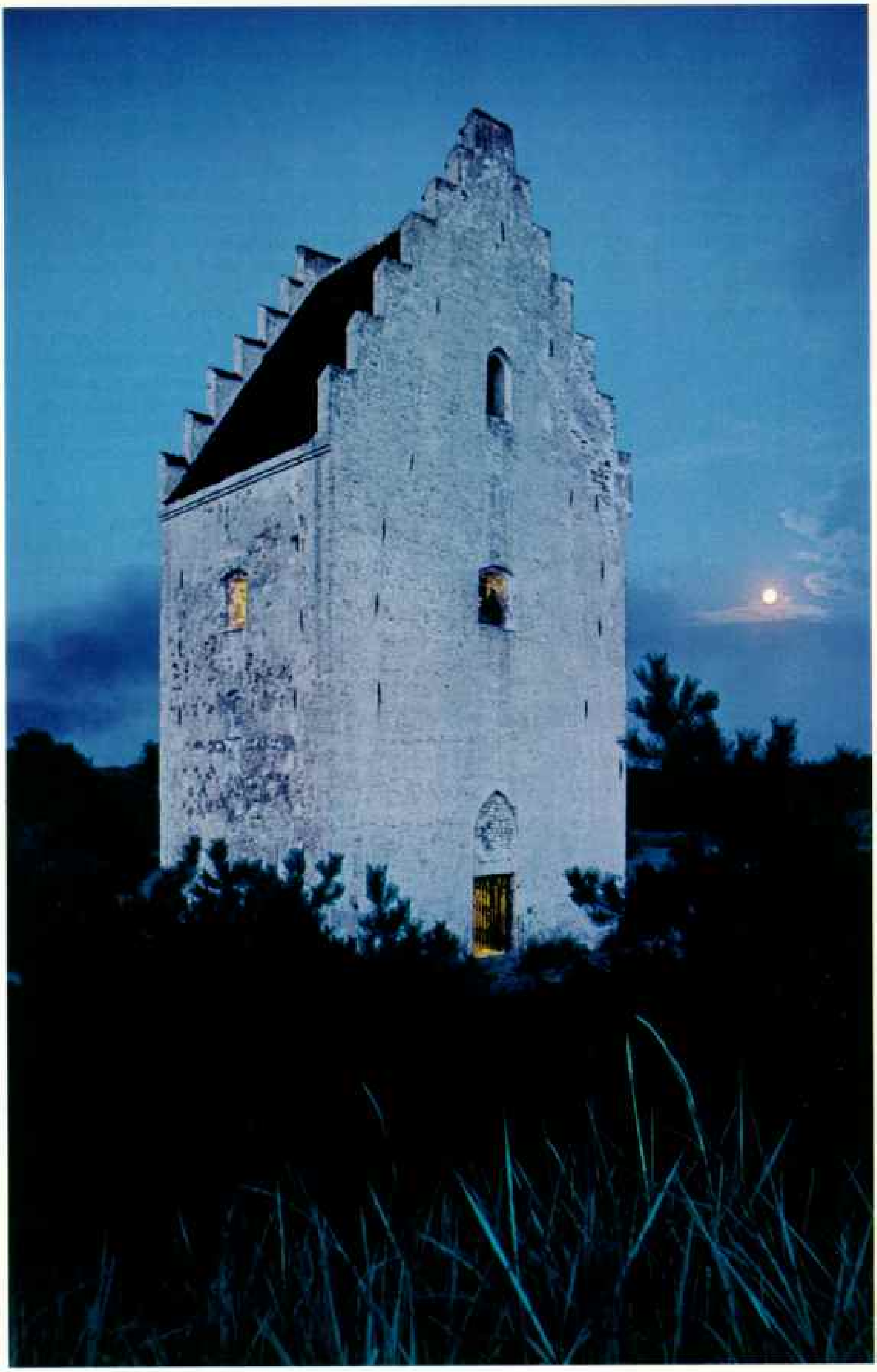
He's waiting for us, impatient, holding out a long-fingered hand. We reach out to take it and instantly—as if in one of his tales—we find ourselves transported.

Winds roar. Clouds rush by. Lands and seas pass under us. At last, softly as falling leaves, we're dropped onto a shadowed seacoast. Denmark!

It's Midsummer Eve, the night when witches of old were up and about on their dark errands. This time of year, during Denmark's brief summer, the sun sets barely below the horizon, and all night long the sky glows with an eerie half-light. The Danes call them *de lyse nætter*—the bright nights—and there's a special urgency about them, a profound expectancy of something just about to happen.

Over there, atop that jagged cliff, a light

Fact and fantasy entwine *in Andersen's fairy tales—and in the Danish milieu that shaped his mind and art. The famed sunken church, half buried by advancing dunes on the Jutland Peninsula near Skagen, figures in magical fashion in his long tale "A Story of the Sand-Dunes." He proudly confessed, "I am the most Danish of authors."*



flickers eerily in the night wind. Coming closer, we see the light is a bonfire. But what's that burning in the flames? A witch!

Yes, they still burn witches in Denmark, though nowadays they're figures stuffed with cloth or straw. It's all taken about as seriously as Halloween in the United States.

God-fearing Danish families come out to watch from thatch-roofed homesteads nearby. A small boy claps with delight as flames creep up to consume the witch. But now he steps back, terrified. Sparks have suddenly lighted up her eyes. Smoke curls from her nostrils. A tongue of flame darts out from her mouth.

Andersen takes our hands again, transporting us to a farm a few miles inland. Amid the fields of waving grain rises a small hill topped by arthritic oaks. Actually, it's a Bronze Age grave mound, but local lore calls it Elverhøj—Elves' Hill.

We drop behind a row of grain. In the ghostly twilight, blue shadows play games with the imagination. Perfume scents the air, wafted from the blossoms of nearby elder trees. A breeze brushes your cheek, soft as a butterfly's wing. A butterfly? Not, perhaps, the wing of some will-o'-the-wisp hurrying to the Elf King's ball?

From nightmares to daydreams, *the pendulum of Andersen's genius swings between the dark and light sides of the human psyche. Near Helsingør, Denmark, a witch dummy is burned—a modern and lighthearted Midsummer Eve custom. But witches along with goblins, elves, trolls, and ogres are often dark forces in Andersen's tales. On the lighter side, many of his 160-odd stories are peopled by innocents such as "The Snow Man"* **(facing page)**, *who falls in love with a red-hot stove.*

REMEMBER. Reality has only a loose grip here. In Denmark, a native ground of the fairy tale, the world of once upon a time is here and now. But listen to Andersen himself describe the strange goings-on in "The Hill of the Elves."

Three lizards are talking (in lizard language, of course):

"Goodness! What a rumbling and mumbling is going on in the old Elf Hill," said one lizard. . . .

"There's something going to happen in there," said another. . . . "The Hill's been standing on four glowing pillars. . . ."

Said a third lizard . . . "They're expecting visitors in the Elf Hill, distinguished visitors. . . ."

"Who are to be invited?" asked the night-raven. . . .

The old Elf King's housekeeper replies:

"The merman and his daughters. . . . All old trolls of the first class . . . and the river-sprite and the goblins . . . the grave-pig, the death-horse and the church-lamb. . . ."

"Brah!" croaked the night-raven and flew off to do the inviting.

Elf girls were . . . dancing in shawls woven of mist and moonlight. . . . the floor had been washed with moonlight and the walls rubbed down with witches' lard. . . . The kitchen was crammed with frogs on the spit, snake-skins stuffed with little children's fingers and salads of toadstool seeds, moist mouse-noses and hemlock. . . . Rusty nails

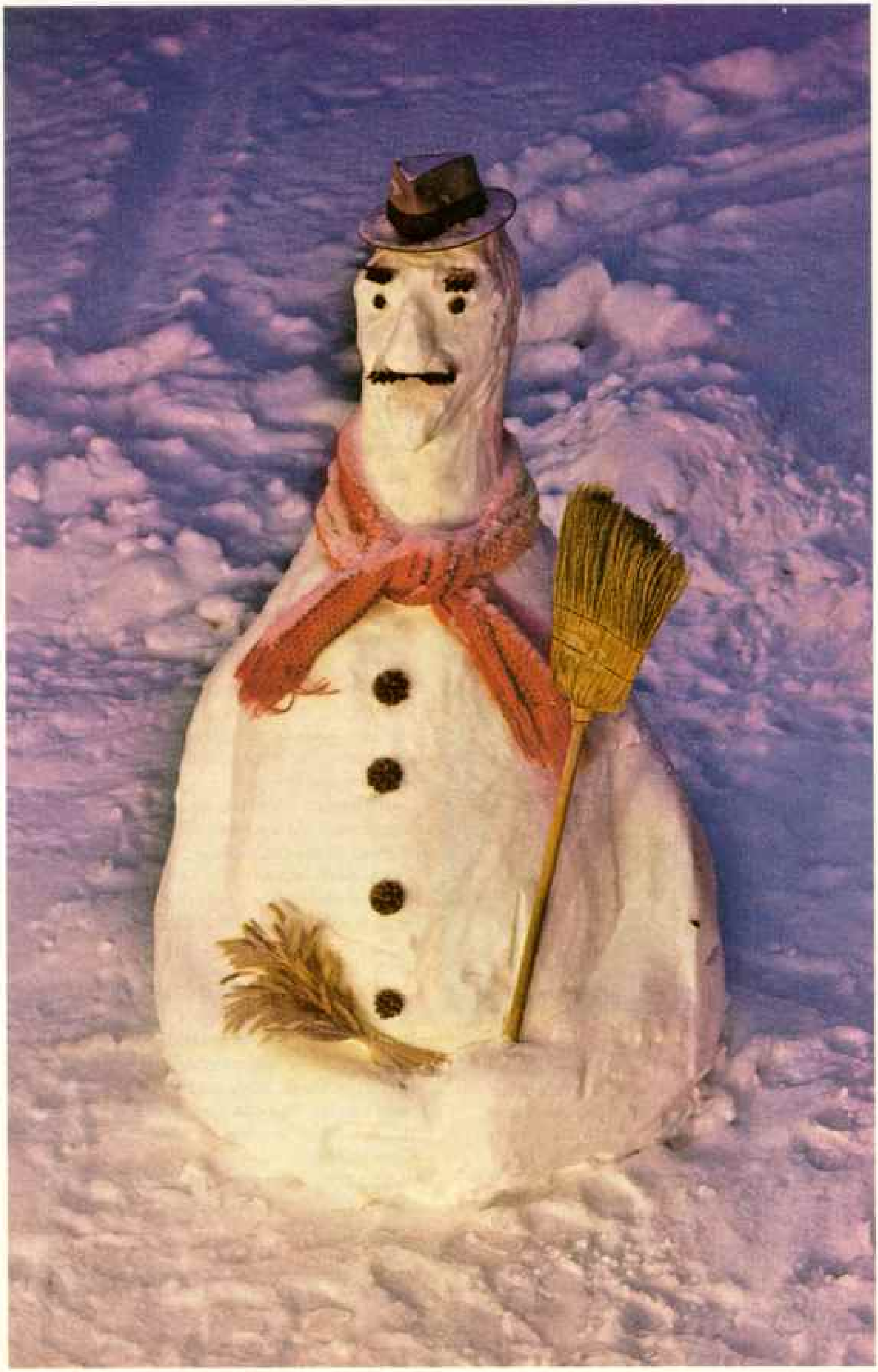


ILLUSTRATION BY KAY NIELSEN

"The world's far too big!" *cries out the porcelain heroine of "The Shepherdess and the Chimney Sweep." Eloping through a chimney with her porcelain lover, the shepherdess—with a touch of human frailty—decides to turn back at the last moment, overwhelmed by the prospect of going out into the world. At a Shrovetide party near Copenhagen, costumed children (**facing page**) bring the same Andersen characters to endearing life.*

and bits of stained-glass window were for nibbling. . . .

Andersen's startling inventiveness gives the story three-dimensionality. We *see* the Elf Hill, propped up on its glowing pillars, seething with activity as its tenants prepare for a conclave between Denmark's Elf King and the old Norwegian Troll.

And the detail! Elf maidens dancing in shawls of mist and moonlight . . . snakeskins stuffed with little children's fingers. . . . But, go, run, grab yourself a copy of Andersen, and enjoy.

MEANWHILE, back at Elverhøj, the sun is already rising—though it's not yet 4 a.m. Better move back there just a bit. You don't want to get too close. They're closing up the hill now. Anyone caught inside after sunup, it's said, will never be seen again. . . .

With the pink and blue dawn, our scene shifts again. This time Andersen transports us to nearby Gisselfeld Manor. Once more, let him describe it:

Summertime! How lovely it was out in the country, with the wheat standing yellow, the oats green, and the hay all stacked down in the grassy meadows! And there went the stork on his long red legs, chattering away in Egyptian, for he had learnt that language from his mother. . . .

Bathed in sunshine stood an old manor-house with a deep moat round it, and growing out of the wall down by the water were huge dock-leaves. . . . The place was as tangled and twisty as the densest forest, and here it was that a duck was sitting on her nest. . . .

Of course—the opening of "The Ugly Duckling." It was here at Gisselfeld that Andersen, a guest of the owner, had the inspiration for his most universally loved story. The scene is quintessentially Danish: a manor, a moat, dock leaves, storks, ducks, wild swans. You can find many similar settings within an hour's drive of today's Copenhagen.

The transition from the phantasmagoric night of witches and elves at Elverhøj to the sunbright morning of ducklings and swans at Gisselfeld has taken us between the two poles—the dark and the light—of Andersen's fairy-tale world.

The eternal bachelor, Andersen longed throughout his life for a wife, children, and domestic fulfillment. Instead, ever unsuccessful at love, he lived alone in quarters near Copenhagen's waterfront. Specially angled mirror ***(right)****, outside the window of his apartment at Nyhavn 67, allowed the introverted poet to peek unseen at his "wide world." A year before his death in 1875 at age 70, Andersen poses in his study* ***(below)*** *for one of the hundreds of photographs taken of him.*

WELLER OF HANSEN, SCHOU, AND WELLER, 1874

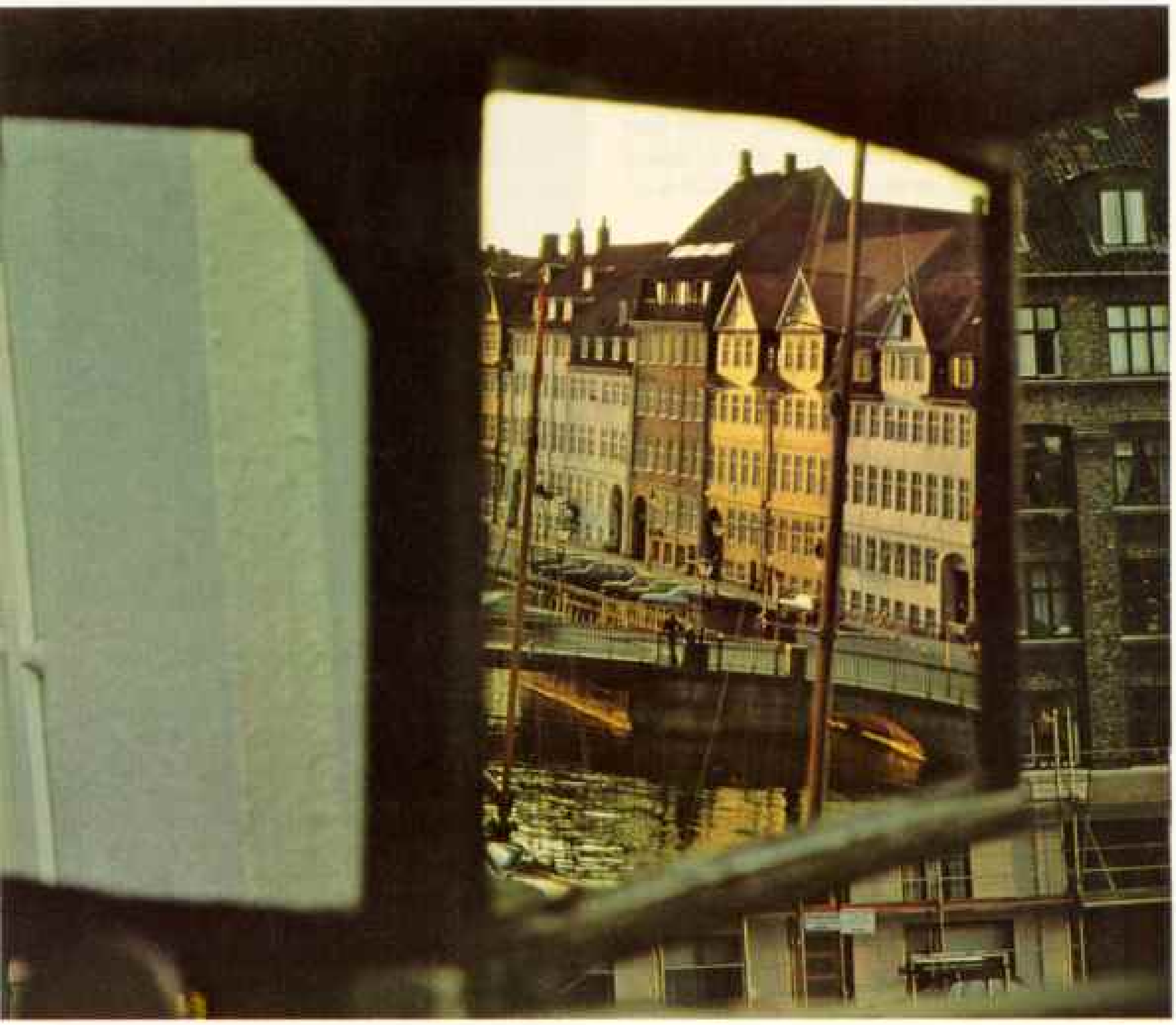
The light realm springs from the Danish countryside itself, with its barnyard heroes and free-flying spirits—swans, storks, ravens. Andersen's human characters, likewise, are typically Danish—simple soldiers, peasants, students, farmwives, Copenhagen councillors, and, of course, kings, queens, princes, and princesses.

The dark realm draws in part on Norse myth for its dramatis personae—all those myriad animistic beings, separate from both men and gods, who managed to slip away and survive in the northern folk mind after Christianity toppled the Norse deities—Odin, Thor, Frey, and others—after A.D. 1000. Among these lesser creatures were the dwarfs who lived in the hills and mountains and the elves who dwelt in darkness underground near the homesteads of humans. From these evolved the trolls, the sprites, and the goblins of later folk myth who all found a home in Andersen's commodious imagination.

IT'S FITTING that Andersen was born in Odense—a town whose name means "shrine of Odin." When he was a boy, ostensibly Christian townsfolk put out hay on the hill of Odin for the god's eight-legged horse, Sleipnir.

Situated on the rustic isle of Funen, Odense is today Denmark's third largest city, with a population approaching 200,000. But when Andersen was a youth, it was a town of perhaps 5,000, whose chief distinction was that a Danish crown prince resided there.

At my own arrival in Odense, a dense sea fog clamped down over the landscape. At the same time, the temperature dropped far



below freezing. At 2 a.m.—as if a wand had been waved—the night air rang with the faintest tinkling. It was the sound of tiny ice crystals—frozen fog—falling to earth and coating every last leaf and blade of grass with icy rime.

Andersen wrote of it in "The Snow Man":

All the trees and bushes were covered with hoar-frost; it was like a whole forest of white coral. . . . everything sparkled as if it had been sprinkled over with diamond dust. . . .

It's Denmark's chilly climate that gives so many Andersen tales their frosty edge.

AT THE CORNER of Hans Jensensstræde and Bangs Boder, just off downtown Odense, stands the small red-tiled house where, tradition says, Hans Christian Andersen was born. The neighborhood has been lovingly restored to its 19th-century ambience. It's downright chic—and expensive—to live here today. But in Andersen's time this was a teeming back street where several working-class families were crammed into each tiny house.

The Andersen home now anchors an impressive museum of Anderseniana.

"In winter it's quiet here," assistant curator Erling Gormsbøl told me. "Most visitors this time of year are Danish schoolchildren. To them Andersen's life is as familiar as George Washington's is in your country. In summer the foreigners arrive by the hundreds of thousands. From England, Germany, Sweden, Norway, America—*everybody* loves him."

Such fame for the son of a cobbler and a washerwoman was almost unthinkable in Andersen's time, when class barriers were all but insurmountable. The child who

would someday do the unthinkable and vault those barriers was born in "a small mean room" on a bedstead his father had crafted from a funeral bier; bits of black cloth still stuck to the frame—a detail worthy of an Andersen story.

SOON AFTER his birth the family moved a few blocks away to a one-room flat—still standing on Munkemøllestræde—"almost filled with the shoemaker's bench, the bed, and my crib."

His autobiography continues: ". . . on the roof . . . in the gutters between it and the neighbor's house, there stood a great chest filled with soil, my mother's sole garden. . . . In my story of the 'Snow Queen' that garden still blooms."

Nearly all the details of his youth became grist for his stories. For most of us, childhood is a garment we outgrow and put aside. For Andersen, it was a lifelong coat of many colors from whose fabric he cut the brilliant patches of detail that brighten his tales.

From his father, it's said, Andersen took his penchant for fantasy and melancholy. The older Andersen, a cobbler who had dreamed as a youth of becoming a scholar, built his son a puppet theater and read aloud to him from works such as *The Arabian Nights' Entertainments*.

From his illiterate mother the boy took his lanky physique, deep religious faith, and admixture of superstitious beliefs.

When his father lay dying, the mother sent 11-year-old Hans Christian to a wise-woman, or witch, for consultation. The witch told him that he would see his father's ghost on the way home if the father was going to die. The terrified child saw no ghost, but his father soon afterward died anyway. "The Ice Maiden has taken him," his mother said. The deathly Ice Maiden reappeared decades later in Andersen's story of the same name.

A few drops of madness, too, were mixed in the potion of Andersen's personality. His paternal grandfather was mad—literally. The old man would wander through the streets, muttering, and bands of boys would jeer after him. The young Hans Christian hid, terrified that the other boys would realize *he* was the madman's kin.

His grandmother tended the garden in a

Mementos of a mythmaker: *The Hans Christian Andersen Museum, traditionally considered Andersen's birthplace in Odense, houses memorabilia from his extraordinary life. Andersen's famous luggage* ***(below)*** *includes a leather box for his top hat and a long, thick rope—for escaping fires by window. Another display* ***(right)****: portrait of a woman friend, flower bouquet adorned with Andersen's own paper cuttings, playing cards, and a fan on which Andersen inscribed such sentiments as, "I love you, Denmark, my fatherland."*

local poorhouse and insane asylum. There the lad would go to play. One day, through a chink in a door, he saw a young woman, almost naked, hair flowing loose over her shoulders. Suddenly, she thrust her arm out at him through a hatch, her grasping fingers coming only inches from his face. He crouched there in a near faint until attendants found him.

Uneasy with other children, unhappy at school, unable to hold an apprentice's job for more than a few days, he spent most of his childhood alone—reading, cutting out

COURTESY H. C. ANDERSENS HUS, ODENSE

Stepping free, *a paper cutting made by Andersen—with a visage like his own—depicts the stock theatrical character, Pierrot. Actors at Tivoli park in Copenhagen (***facing page***) still give pantomimes like those Andersen saw as a boy. Enraptured with the theater, he tried his hand as a singer, dancer, actor, and playwright. But only away from the confines of the stage would his imagination soar free.*

puppet clothes, acting out tragedies of his own invention in which the stage was littered with corpses at the end. No wonder, then, that the visit to Odense of a Copenhagen theatrical troupe brought his future into focus. He decided he would become a stage performer—an actor, dancer, and singer.

Already he was known locally as the "Funen nightingale" because of his lovely soprano voice. Often, while his mother washed clothes in the Odense River, he would stand on the bank and sing aloud so that his lilting tones carried to the homes of the rich along the stream.

He had heard an old wives' tale that China lay straight beneath the river, and he dreamed that a Chinese prince might hear him singing and take him back to his kingdom—a kingdom Andersen later evoked in his story "The Nightingale."

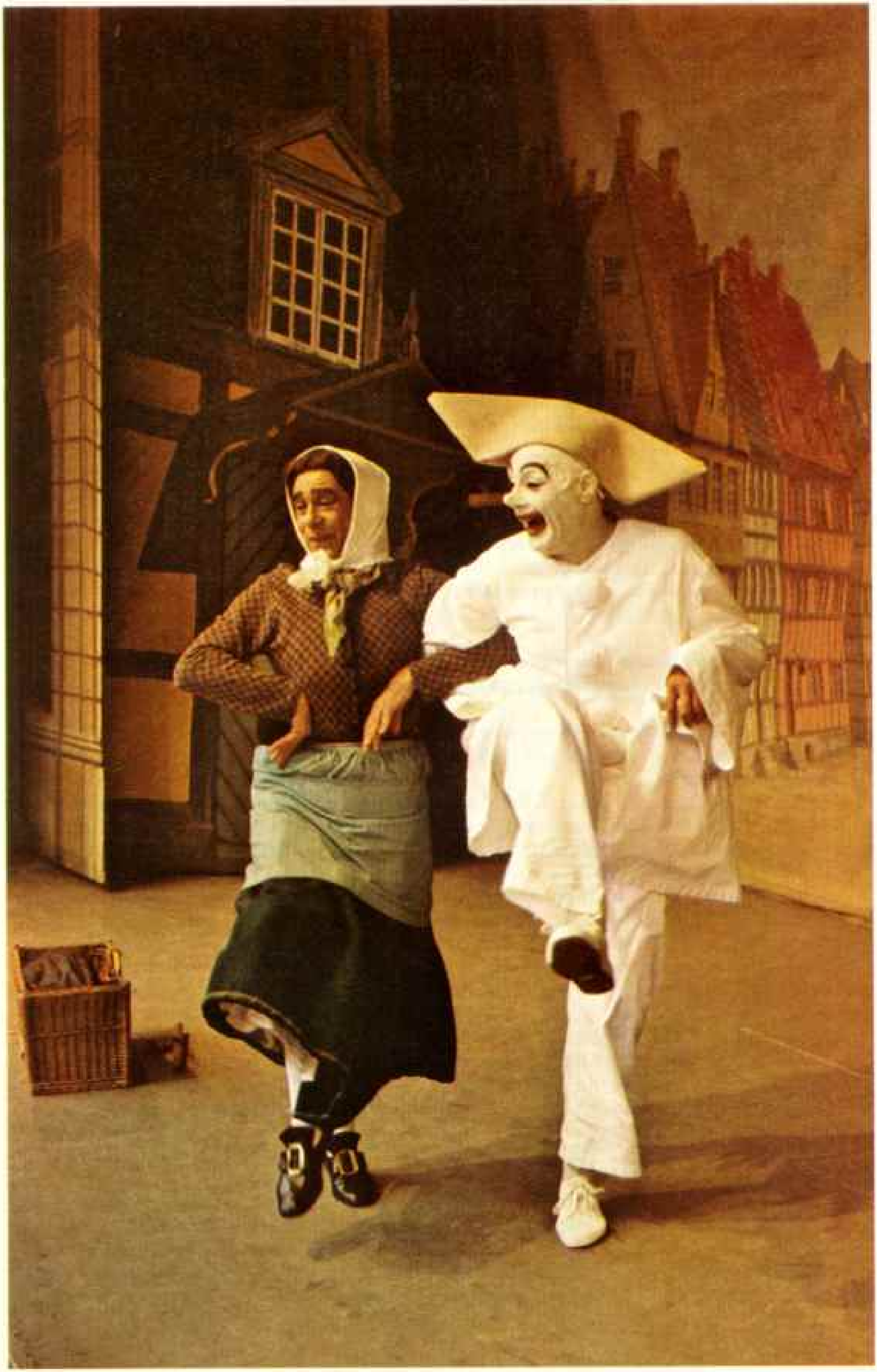
STARING pensively at the grassy riverweed being combed downstream by the slow green current, he made believe that the river was "a high-road for the sea people"—the mermen and mermaids of northern folk myth.

He would describe the sea people's world in his immortal "The Little Mermaid":

Far out at sea the water's as blue as the petals of the loveliest cornflower, and as clear as the purest glass; but it's very deep, deeper than any anchor can reach. . . . Down in the deepest part of all is the sea King's palace. Its walls are made of coral, and the long pointed windows of the clearest amber; but the roof is made of cockleshells that open and shut with the current. . . .

Outside the palace was a large garden with trees of deep blue and fiery red; the fruit all shone like gold, and the flowers like a blazing fire. . . . The soil itself was the finest sand, but blue like a sulphur flame. Over everything down there lay a strange blue gleam. . . .

In such a setting, precise in every fantastic detail, is played out the moving story of the little mermaid who longed for a human soul. Today her statue on the Copenhagen waterfront (page 847) is Denmark's best known landmark. Though strands from the story are woven from Danish folklore and Norse myth, the specific characters, settings, plot, and intensely evocative atmosphere are



Andersen's own—first conjured in the wonderful imagination of the lonely cobbler's boy from Odense.

AT AGE 14, Hans Christian was confirmed. Once again the details of his life would be transmuted into art. His new leather boots squeaked as he walked down the cathedral aisle. So proud of them was he that he made them squeak as loudly as possible, only to be conscience stricken by the realization that his mind was more on his boots than on God. The episode would live again in his famous story "The Red Shoes":

The whole congregation stared at Karen's red shoes . . . and when Karen knelt before the altar and put the gold chalice to her lips, she thought of nothing but the red shoes. . . . and she forgot to say the prayers."

After confirmation the 14-year-old boy determined he would give the actor's life a try in Copenhagen. It seemed madness to his mother, who wanted him to become a tailor.

What, she asked, would he *do* in Copenhagen?

"I will become famous!" he replied. "First you go through terrible suffering, and then you become famous."

His mother consulted a wisewoman on the matter, hoping to dissuade him. But the wisewoman announced:

"He will become a wild bird, flying high, admired by all the world—someday Odense will be decked out with lights for him."

With enough money for a few weeks at most, the boy set out for Copenhagen by coach. Over his shoulder—like so many of the characters he later wrote of—he carried a bundle of his earthly possessions. He was off to seek his fortune. Before him lay the wide, wide world. . . .

"Right here is where he got off the coach," Bo Grønbech told me as we stood on the low hill called Frederiksberg in Copenhagen, looking down on the gracefully spired city with its green-patinaed copper rooftops. Bo, chairman of Copenhagen's H. C. Andersen Society, has lived and breathed Andersen for most of his 70 years. He smiled when I first asked him about "Hans Christian Andersen."

"That's what you Americans call him. To the English people, you know, he's plain Hans Andersen. Here in Denmark we call him simply H. C. [pronounced Ho Say] Andersen. Or just Andersen. We never use his whole name—and neither did he."

Bo waved a finger like a wand over the city that stretched below us, with its great green parks and mazelike cobbled streets, its skyline still charmingly antique in aspect despite the slablike masses of occasional modern buildings.

"When Andersen arrived here in 1819," Bo said, "the city was still enclosed by an earthen wall. At night the gates were locked and the keys were taken to the king, who supposedly kept them under his pillow while he slept.

"Can you imagine the boy's excitement as he walked into the great city he'd dreamed of so often back in Odense? He headed almost immediately for the Royal Theater, walking right down here through the park grounds of Frederiksberg Palace."

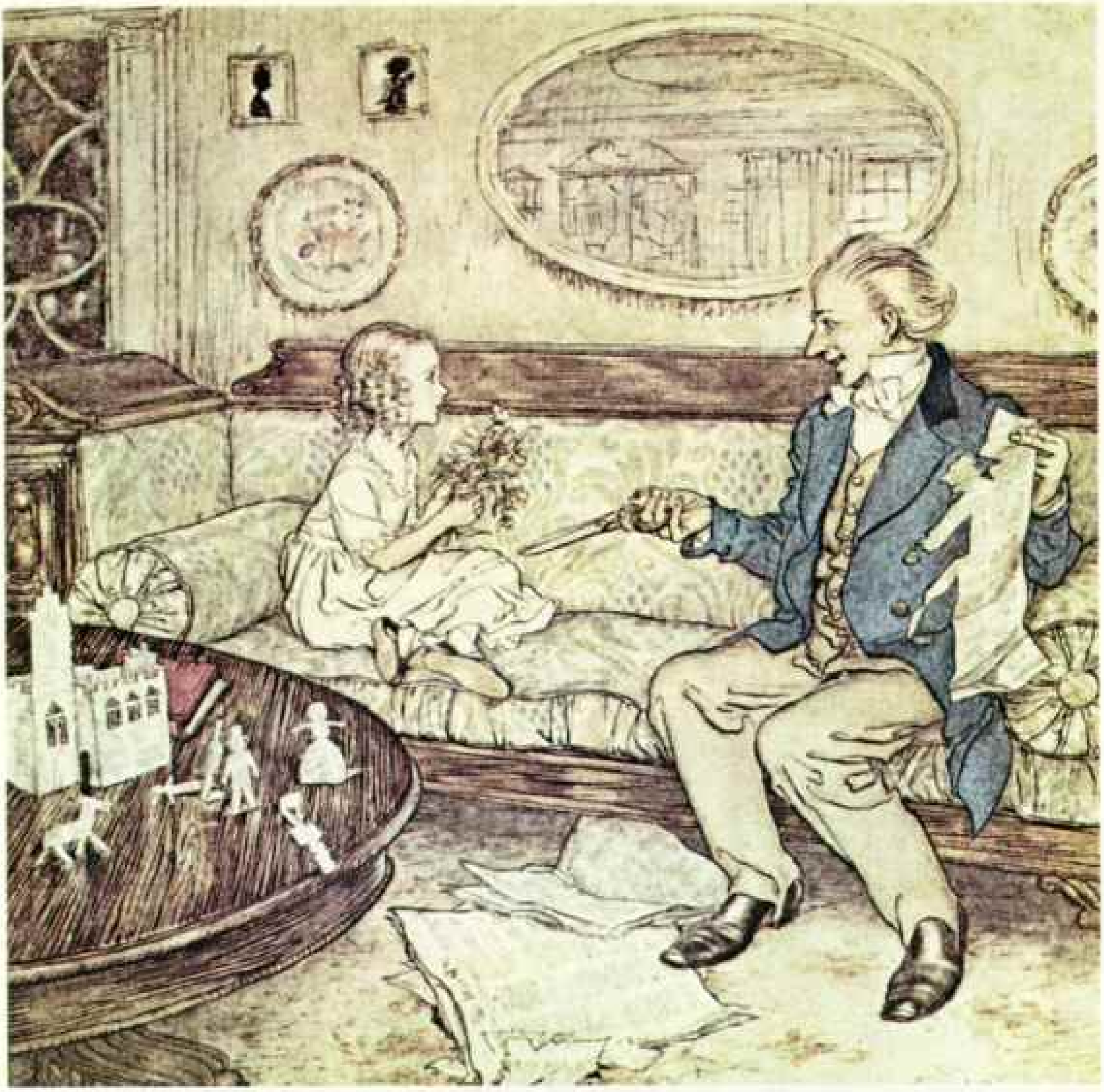
Bo and I followed the gently winding path through a lovely tree-shaded park. Across a lagoon loomed an incongruous apparition—a red-lacquered Chinese pagoda.

"That's the old Chinese tea pavilion that was built by King Frederik IV," Bo said. "It probably gave Andersen his idea for the Chinese Emperor's palace in his story 'The Nightingale.'

"When the gawking boy reached the Royal Theater, he walked all the way around it time after time. A ticket tout saw him and offered him a ticket to the next performance. Andersen thanked him and took it without realizing he would have to pay for it. The ticket tout snatched it back, amazed at the boy's innocence. It was an innocence Andersen never really lost."

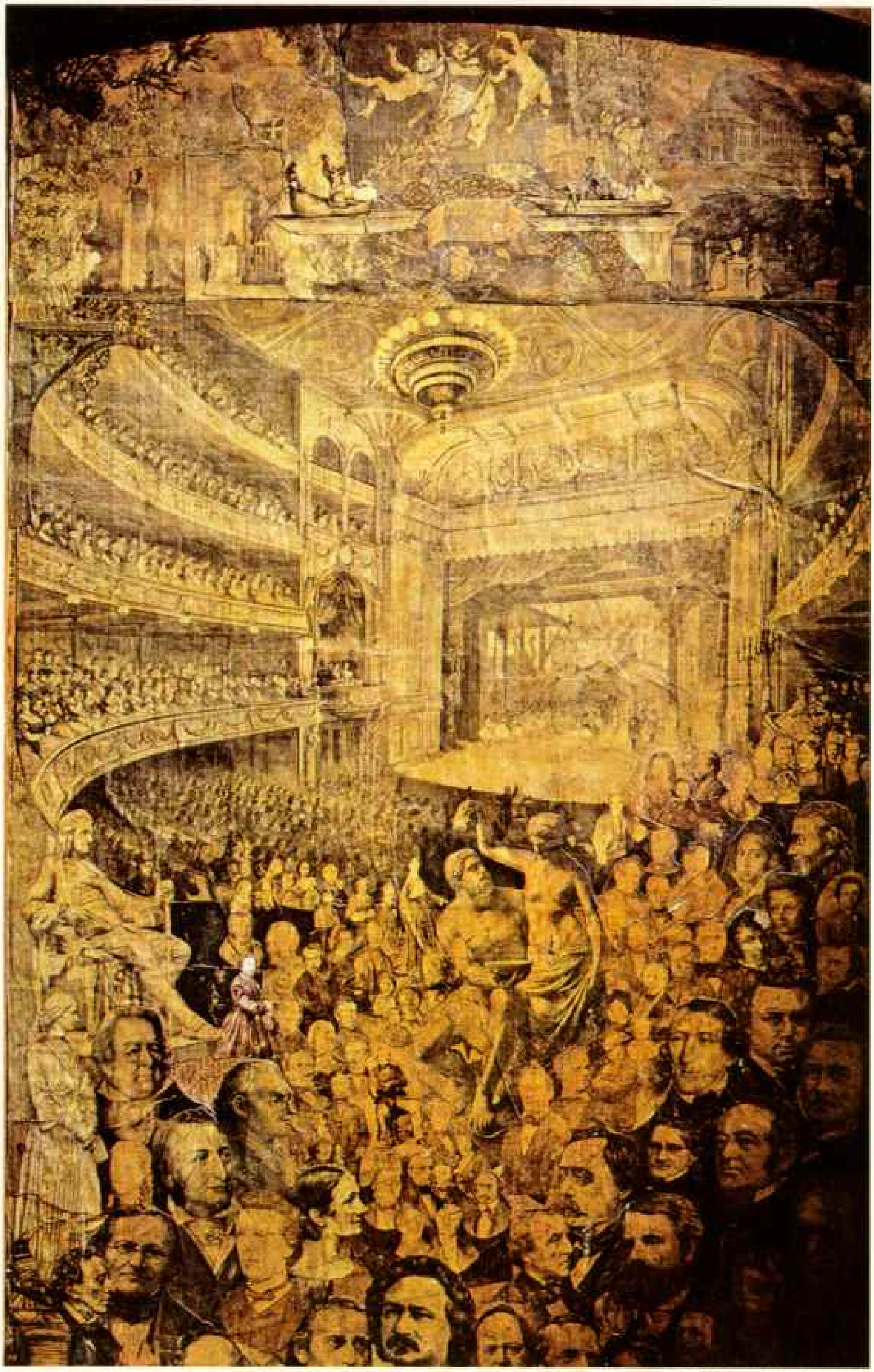
YET THE BOY was anything but shy. Determined to have a life in the theater, he would knock on the doors of theatrical celebrities, announce his name, and then begin to sing, dance, and recite to the utter astonishment of everyone present. One contemporary described such a visit:

"I was surprised to see a lanky boy, of a most extraordinary appearance, standing in the doorway, making a deep theatrical bow right down to the floor. . . . Round his neck he wore a *(Continued on page 844)*



COURTESY BARBARA RACKHAM EDWARDS

*"**Trifles**"—so Andersen termed the fairy tales that he dashed off between ponderous sentimental novels and travel books. As it turned out, his literary magic worked best in the miniature form; his longer works are rarely read today. Andersen's first thin volume of fairy tales appeared in 1835. Among its stories was "Little Ida's Flowers." The illustration by Arthur Rackham (**above**) shows Andersen making paper cuttings as he spins fanciful tales for little Ida Thiele, whose great-great-granddaughters, Anja and Katja (**right**), evoke their ancestor's memory with flowered crowns.*



COURTESY H. C. ANDERSENS HUS, ODENSE.

Life's a stage: *At the age of 14, Andersen arrived in Copenhagen with a bundle over his shoulder—like many of his fictional heroes—and headed straight for the Royal Theater. On its boards many of his sentimental dramas would be staged—often to critics' jibes. In old age, Andersen created a montage* ***(left)*** *showing the theater filled with Danish notables, including himself, extreme lower left. Today's Royal Danish Ballet rehearses* ***(above)*** *on the same stage seen in Andersen's montage. A young dancer* ***(right)****, blessed with the kind of physical beauty that Andersen lacked, applies his makeup.*

Steadfast soldiers *of the Danish Royal Guard weather a snowstorm en route to Amalienborg Palace, the queen's residence, in Copenhagen. Despite the operatic uniforms, the guardsmen are famed for their bravery and recall "The Staunch Tin*

Soldier," who weathered all dangers through love for a paper ballerina. Illustration by Kay Nielsen ***(left)*** *depicts the tin soldier's creation: "He had only one leg, because he was the last to be made and there wasn't enough tin to go round."*

(Continued from page 838) gaily colored calico scarf, so tightly tied up that his long neck seemed to make an effort to escape: in short, a truly surprising figure, who became even more peculiar when, with a couple of steps forward and a repeated bow, he began his high-flown speech with these words: 'May I have the honor of expressing my feelings for the stage in a poem written by myself? . . .'"

Such audacious naiveté won him notice as well as guffaws. Amused patrons donated some money for him and even found him a place in the Royal Theater's ballet school, where he soon had a walk-on role in a ballet, playing, of all things, a troll. He took home the program—it was the first time he had seen his name in print—and stared at it by candlelight long into the night. A copy of the program today hangs in the Royal Theater.

BUT ANDERSEN'S physical awkwardness inevitably doomed his stage career. And when his greatest asset—his soprano voice—finally changed, he decided on a new path to fame: He would become a poet, a writer, a digter. But first he needed a formal education. A highly placed patron won him a royal stipend to attend a provincial state grammar school. For six years the ugly duckling tended to the tedium of a formal curriculum. When he finally finished his studies at age 23, the transformation was complete. He had become the wild swan of his dreams.

Already, one of his schoolboy efforts, a poem entitled "The Dying Child," had won him international literary notice. Now he launched into a prodigious output of poems, plays, essays, travel books, and novels. Among the latter were *The Improvisatore* and *Only a Fiddler*, both thinly disguised fictional autobiographies that became best-sellers throughout Europe.

In those days foreign editions were pirated, providing few if any royalties. Andersen buttressed his finances by trying his hand at some "trifles," as he called them. His slender paper-covered volume of *Eventyr, fortalte for Børn*—Fairy Tales Told for Children—appeared in 1835. It contained four stories: "The Tinder-Box," "Little Claus and Big Claus," "The Princess on the Pea," and "Little Ida's Flowers." The first three reworked stories he had heard as a child. The last was wholly his own, as most of his tales would be from then on.

Andersen called these tales *eventyr*—a Danish word related to the English "adventure," with an added connotation of fantasy. In German, the word is translated *Märchen*. In English and French they are called fairy

***"She hadn't sold anything** all day, and no one had given her a single penny." Andersen's "Little Match-Seller" relates the last hours of a freezing street vendor who keeps warm by burning matches she intended to sell. Each time she strikes one, visions appear before her: a roast goose dinner, then a dazzling Christmas tree, finally the ghost of her grandmother, who "took the little girl into her arms, and together they flew in joy and splendour, up, up, to where there was no cold, no hunger, no fear. They were with God."*

tales (*contes de fées*), even though, as a rule, fairies are only a minor element in their plots, if they appear at all. "Fairy," which originally meant not a kind of fantastic being but a realm where such beings exist, is from the French word "fée," or English "fay," and probably derived from the Latin "*Fata*," the Fates of Roman myth.

Andersen never envisioned that his "trifles" would eclipse his serious literary works. He disagreed at first with the suggestion of H. C. Ørsted, the great Danish scientist, that if his novels made him famous, his fairy tales would make him immortal. But Ørsted proved prophetic.

Other volumes of eventyr soon followed—as they would, almost yearly, for the rest of his long life. None less than Charles Dickens, on reading them, wrote to Andersen:

"But whatever you do, don't leave off writing, for we cannot afford to lose any of your thoughts. They are too purely and simply beautiful to be kept in your head."

In all, more than 160 Andersen stories appeared. Almost every Christmas a new slim volume would be published. That most of these stories embodied elements from his own life was known to few of his readers. True, Andersen *was* the Ugly Duckling, he *was* the Little Mermaid, and so on. But his stories transcended their purely personal elements. They were universal in their appeal. Andersen's childhood became everyone's childhood.

"He had the power," Bo Grønbech explained to me, "of entering completely and utterly into the inner world of his characters—whether they were ducklings or snowmen or darning needles. He shows us their world not from the human point of view but from the point of view of the duckling or snowman or darning needle itself. He *becomes* his characters and endows each of them with a living soul—however inanimate they might seem."

And his stories repay the adult reader as well as the child. "I seize on an idea for older people," he wrote, "and then tell it to the young ones, while remembering that father and mother are listening and must have something to think about."

ILLUSTRATION BY ARTHUR RACKHAM. COURTESY BARBARA RACKHAM EDWARDS

IF YOU EVER happen to be in Copenhagen, be sure to visit the great open court of Amalienborg Palace. If the royal flag is flying, it means that the queen is in residence and that the Danish Royal Guard will be on duty there with towering black bearskin hats, operatic uniforms, and rifles at the ready.

One snowy February night I paused there watching one of the guards, who stood at rigid attention, unmoving as a statue, as the wind howled and the snow fell. He seemed a living counterpart, in spirit, of Andersen's "Staunch Tin Soldier," who weathered every catastrophe without wavering in his devotion for the paper dancing girl in the cutout castle.

Each soldier was the very image of the other, except for one who was a little bit different. He had only one leg, because he was the last to be made and there wasn't enough tin to go round. Still, there he stood, as firmly on his one leg as the others on their two. . . .

As I watched, the heavy snow almost completely whitened the bearskin hat of the real royal guard before me. His face was beet red from the cold. A white-gloved hand clenched his rifle. Don't take these rifles lightly. They're loaded.

When the Nazis invaded Denmark on April 9, 1940, they found that these royal guards were no walk-ons from a light opera

or fairy tale. As an armored Nazi column speared into the palace square in Copenhagen, the guards—outnumbered thirty to one—calmly leveled their rifles and commenced firing.

"Dead and wounded fell on both sides," recalls retired Chief Commander of the Royal Guard Herbert Leschley. "The guards would have fallen to a man if King Christian X hadn't ordered them to stop shooting. The odds were hopeless, I know.

"But the royal guards' heroism during those early moments of the German invasion will be remembered forever."

ANDERSEN was a frequent visitor to Amalienborg and the other royal palaces. He lived most of his life in bachelor's quarters only a short walk away on Nyhavn, near to the waterfront and his beloved Royal Theater. He often strolled through this same square and watched the royal guards with the same awe and admiration that I now felt. Looking up, I saw that the lights were on in the queen's apartment.

Andersen wrote: "I arrived with my little parcel in Copenhagen, a poor unknown boy, and today I have taken chocolate with the queen, sitting at the royal table. . . ."

*"**On many nights,** when the fishermen were at sea with their torches, she heard them speaking. . . ." An eel fisherman off Denmark's island of Funen evokes a scene from Andersen's "Little Mermaid," who forsakes the world of the "sea people" for a chance to win a human soul. Her famous image, cast in bronze, haunts the Copenhagen waterfront.*

For all of his fame and honors, he remained a lonely man throughout his life. Without a family of his own, he haunted the domestic hearths of the families of others. Half a dozen times he fell in love, but always was rejected.

Assuaging his loneliness, he spent much of his time traveling to other countries, where he was lionized and treated almost as royalty. On his travels through England and the Continent, he became infatuated with opera star Jenny Lind, the Swedish Nightingale. Spurning his impassioned advances, she held out the hand of sisterly affection. Sublimating his feelings, Andersen transmuted her into the Chinese Emperor's singing bird in "The Nightingale."

On a trip to Berlin he paid a visit to Jacob Grimm, who—to Andersen's mortification—didn't even recognize his name and had him turned away. A few weeks later, having realized his mistake, Grimm knocked on Andersen's door in Copenhagen and apologized profusely.

Ironically, a late edition of the Grimms' *Märchen* included, quite unintentionally, a retelling of Andersen's story "The Princess on the Pea."

IN 1867, at age 62, Andersen was honored by the city of Odense. Just as the old wisewoman had predicted 48 years earlier, the city streets were decked out with lights. The wild swan had returned to the duck yard of his beginnings.

Andersen's pleasure, however, was marred by a piercing toothache. Even so painful an experience he put to literary use. Perhaps no better description of a toothache exists than in the marvelous philosophical tale of his last years, "Auntie Toothache." There he describes the hero's pain as a kind of orchestral concert, with each note of agony being separately played by "trumpets and kettledrums, piccolos, and a trombone in the wisdom-tooth."

It was on another winter's day that I visited Andersen's grave in Copenhagen's Assistens Cemetery. Despite eight inches of new snow on the ground, a fresh path had been dug to his grave site. On the simple stone, the word *Digteren*—The Poet—had been inscribed. Andersen would have liked that, for he always felt inadequately appreciated by his own people.

I remember a conversation in Copenhagen with a local publisher and a physician. We were talking about Andersen and the dozens of masterpieces he produced, and of

his universal fame—far transcending that of any other Dane (only the semifictional Hamlet comes close, with the great existential philosopher Søren Kierkegaard, perhaps, a distant third).

Both the publisher and physician seemed a bit uncomfortable with my lofty praises for their countryman. At last the publisher turned to the physician, and squinting one eye, asked:

"Do you think . . . I mean, do you *really* believe, that Andersen actually *was*—er—a genius?"

The physician shrugged. "Could be," he said. "Could be."

Andersen once wrote sadly: "A poet is always a poor man in his own little country. Fame is therefore the golden bird he has to catch. Time will tell if I catch it by telling fairy tales."

And time told.

It happens that, in the same cemetery, though at the opposite end, lies the grave of Søren Kierkegaard. Although the two renowned Danes lived in Copenhagen at the same time, they apparently never met. However, they knew of each other well enough. Kierkegaard's first book, in fact, was a bitter denunciation of the alleged sentimentality pervading Andersen's work.

As always when criticism came his way, Andersen was deeply hurt. Here was the Poet being denounced by the Philosopher. Both have won fame more enduring than any tombstone. But—I suppose it means nothing—I couldn't help noticing that no path had been dug through the snow to the Philosopher's grave.

CARED FOR, as usual, by friends, Hans Christian Andersen passed away on August 4, 1875. "It was a happy death," said the woman who tended him in his last hours. Free from pain, he had slipped away from this all-too-real world in his sleep.

Once, in old age, he had written to a friend: "I wish I were only twenty, then I'd take my inkpot on my back, two shirts and a pair of socks, put a quill at my side and go into the wide world."

That's where he's to be found now, out in that wide and wonderful world he knew so well, just around the corner of your mind. I see him standing there still, cloaked in mist and moonlight, with top hat and traveling bag, quill and inkpot, crooking his finger for us to follow.

Better hurry now. He's waiting. □

"Death horse" of Norse myth, *like these at a reconstructed Iron Age village at Lejre, figured in Danish pre-Christian sacrificial rites as early as A.D. 200. They appear, too, in Andersen's tales and underline his profound debt to northern folklore, whence came many of the magical creatures that fill his unforgettable world.*

GRAVEYARD OF THE Quicksilver

By MENDEL PETERSON

Galleons

Photographs by JONATHAN BLAIR

POURING MERCURY under forty feet of ocean off the Dominican Republic, Capt. Tracy Bowden of the salvage ship Hickory *winnows out lighter sand from a cargo essential to the Spanish Empire. Mercury—quicksilver—was used to amalgamate gold and silver from New World ore. But the 1724 shipment from Spain, packed in cases at left, was lost when the galleons* Guadalupe *and* Tolosa *perished in a hurricane.*

FORTY FEET below the surface I hovered weightless above the somber skeleton of a ship, a Spanish galleon lost two and a half centuries ago.

As I drifted lower, a pinpoint of light caught my eye, a silver droplet gleaming from among the ship's timbers. Reaching down with one finger, I touched the droplet. It gave under pressure, then suddenly burst into a dozen smaller beads.

Mercury. That magical, fluid metal known to the ancients as quicksilver, for its brilliance and its curiously elusive properties. As the tiny beads scattered under my touch, I noticed other droplets of mercury lodged among the remains of small wooden casks stored in rows near the bottom of the ship's hull (preceding pages).

I glanced at my diving partner, Tracy Bowden, and he nodded. Clearly the droplets were no leftover sample of mercury carried aboard ship by some long-ago crewman or passenger. They were the remains of cargo—a major consignment of mercury bound from the Old World to the New for a vital purpose—the recovery of gold and silver. As surely as if each cask bore an imprint of the ship's name, the droplets identified the sunken vessel: *Conde de Tolosa*, pride of Spain, tomb of nearly 600 souls.

Turning from the wreck, Tracy and I slowly began our ascent. Above us the surface of the sea heaved and rippled in the sun like some vast crucible of molten silver. It was a poignant image, for silver and gold had cost *Tolosa* her life. The year was 1724, and her grave an obscure West Indian bay.

She had sailed from Cádiz, Spain, in July of that year with a companion vessel, *Nuestra Señora de Guadalupe*. The two ships were bound for Veracruz, Mexico, via Havana on a royal mission: to deliver a consignment of mercury for refining purposes to the Spanish Empire's extensive gold and silver mines in Mexico.

So vital was mercury to the recovery of treasure from the New World that the Spanish crown had decreed a royal monopoly on the metal. Between them *Guadalupe* and *Tolosa* carried 400 tons of quicksilver, enough to supply the mines for a full year.

In addition the ships carried more than 1,200 passengers and crew, all hopeful of safe passage through hostile seas, comforted by an arsenal of 144 cannons aboard. When the crucial moment came, the cannons would be a terrible liability.

The hurricane struck the galleons on the night of August 24 off Samaná Bay on the northeast coast of Hispaniola (map, page 857). All day the winds had gathered force, and by nightfall Francisco Barrero abandoned hope. Don Francisco Barrero y Pelaez had shipped aboard *Guadalupe* as silvermaster, the senior officer in charge of valuable metals such as mercury. An experienced seaman, Don Francisco thought surely his last hour had come as mountainous seas began to bludgeon *Guadalupe*, tearing the cannons from their lashings to hurl destructively about the deck, carrying away everything topside including masts, and finally driving the ship aground in Samaná Bay.

SILVER COIN BEARING PROFILE OF PHILIP II, KING OF SPAIN, DATED 1556

"We were all beseeching the help of God," he later wrote, "because quite naturally we felt we were doomed. . . ."

In fact, Don Francisco's precious quicksilver may have helped save *Guadalupe* from total disaster. Stowed far below waterline near the ship's keel, the cargo of mercury provided 250 tons of added weight and stability, pinning *Guadalupe* securely upright on her sandbar. Despite murderous seas, the ship's timbers held; a majority of the 650 passengers and crew managed to ride out the two-day storm. When it was over, 550 reached shore alive. Not so aboard the hapless *Tolosa*.

Separated from *Guadalupe* early in the storm, she was able to anchor at the mouth

of the bay and ride the tempest through the first terrible night. At dawn her luck ran out. The anchor lines parted, and she was swept into the bay, ricocheting helplessly from shoal to shoal. Larger but somewhat lighter in construction than *Guadalupe*, she could not withstand the jackhammer blows. She wrecked at last on a massive coral reef, shattering her hull and spilling her life into the sea. Of 600 people aboard, fewer than forty survived, seven by what can only be described as a miracle.

On her final plunge *Tolosa* remained nearly upright, with her hull and mainmast still joined together and the mast protruding above water. By incredible skill or luck—perhaps a combination of both—eight men battled monstrous seas to scale the mast and take refuge in the rigging (painting, right). There they remained, with only a remnant of sail to collect drinking water, with occasional bits of flotsam for food.

Though the shoreline of Hispaniola lay in view only three miles away, none of the masthead survivors dared run the intervening gantlet of sharks and currents. When Spanish salvage crews arrived on the scene from the distant capital city of Santo Domingo, they found seven of the men still alive. They had been in the mast for 32 days.

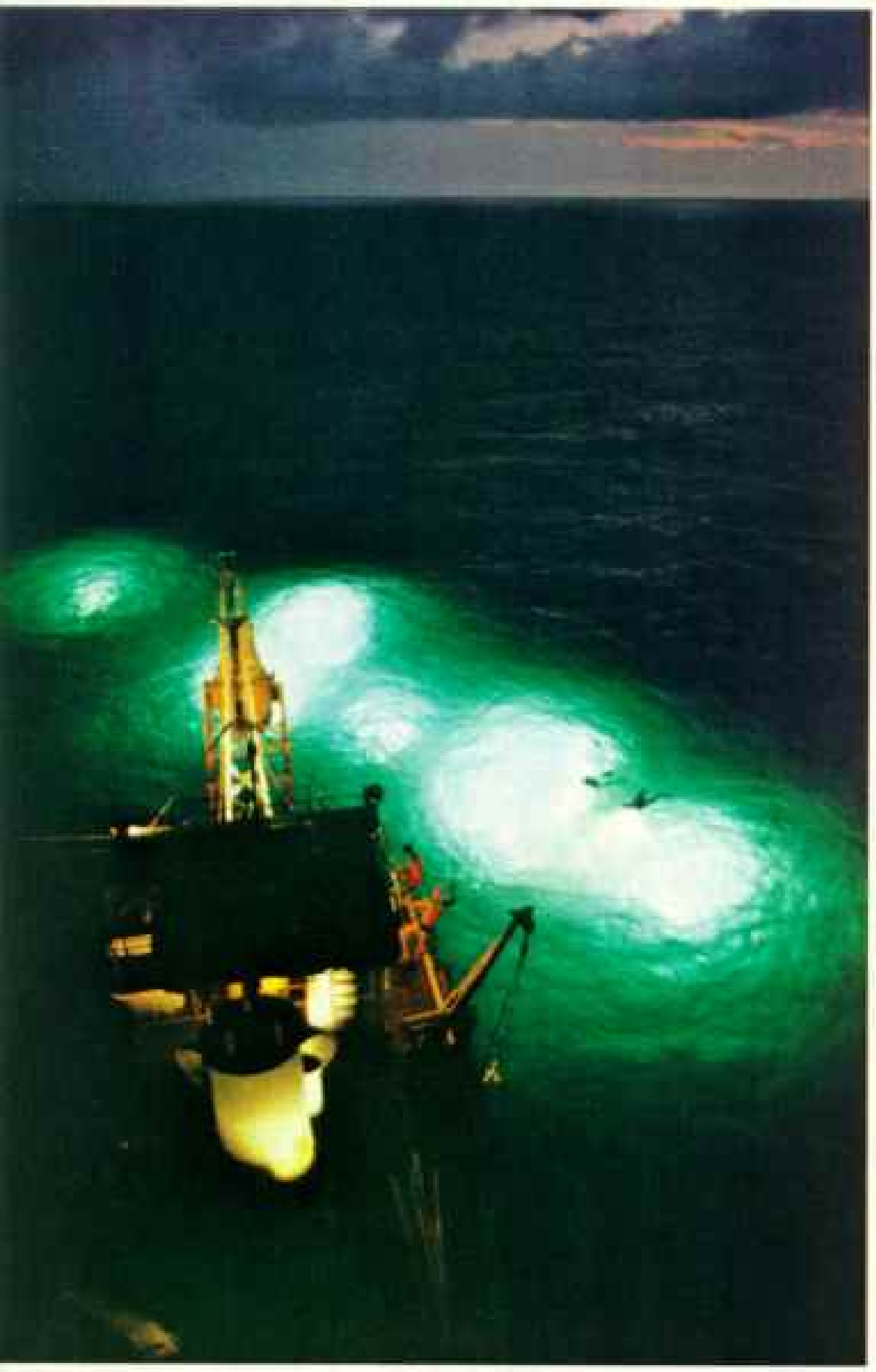
No one knows the final toll from *Guadalupe* and *Tolosa*. Many who reached shore died of hunger or exhaustion. Others reached Cap Haïtien, 240 miles away, in *Guadalupe*'s lifeboat. Among the survivors several hundred—including a Guatemalan woman who was seven months pregnant—set out on foot for Santo Domingo, 200 grueling miles' march along the coast. The indestructible Don Francisco, who survived the trek as did the pregnant woman, revealed a wry sense of humor in describing the ordeal.

MARooned on the mainmast when Tolosa broke up on a reef, survivors catch what rainwater they can and scavenge what little food drifts by. They can see the coast of Hispaniola, but dangerous currents run between. They watch a frenzy of sharks feed on the bloated corpses of livestock and their shipmates.

After 32 days, sails appear. Ships ordered from Santo Domingo to recover the mercury save seven men on the mast but nothing more.

PAINTING BY LLOYD K. TOWNSEND

UNDERSEA LIGHTS outline the shape and location of Tolosa *as Hickory's crew makes a rare evening dive. Weathering storms and even an earthquake, salvagers worked shifts of twenty days on, ten days off.*



A DIVER STRUGGLES with what may be part of Tolosa's *tiller (**facing page**). Above a box of grenades with fuses still in place swims a group of yellowtails, whose idea of a treat is a nip of human ear.*

"To be precise," he wrote afterward in a letter to Spain, "it should be pointed out that the food . . . was more appropriate to ending one's life than to conserving it, for we were reduced to snails, palms, and grasses, which we acquired at great cost of strength. . . ."

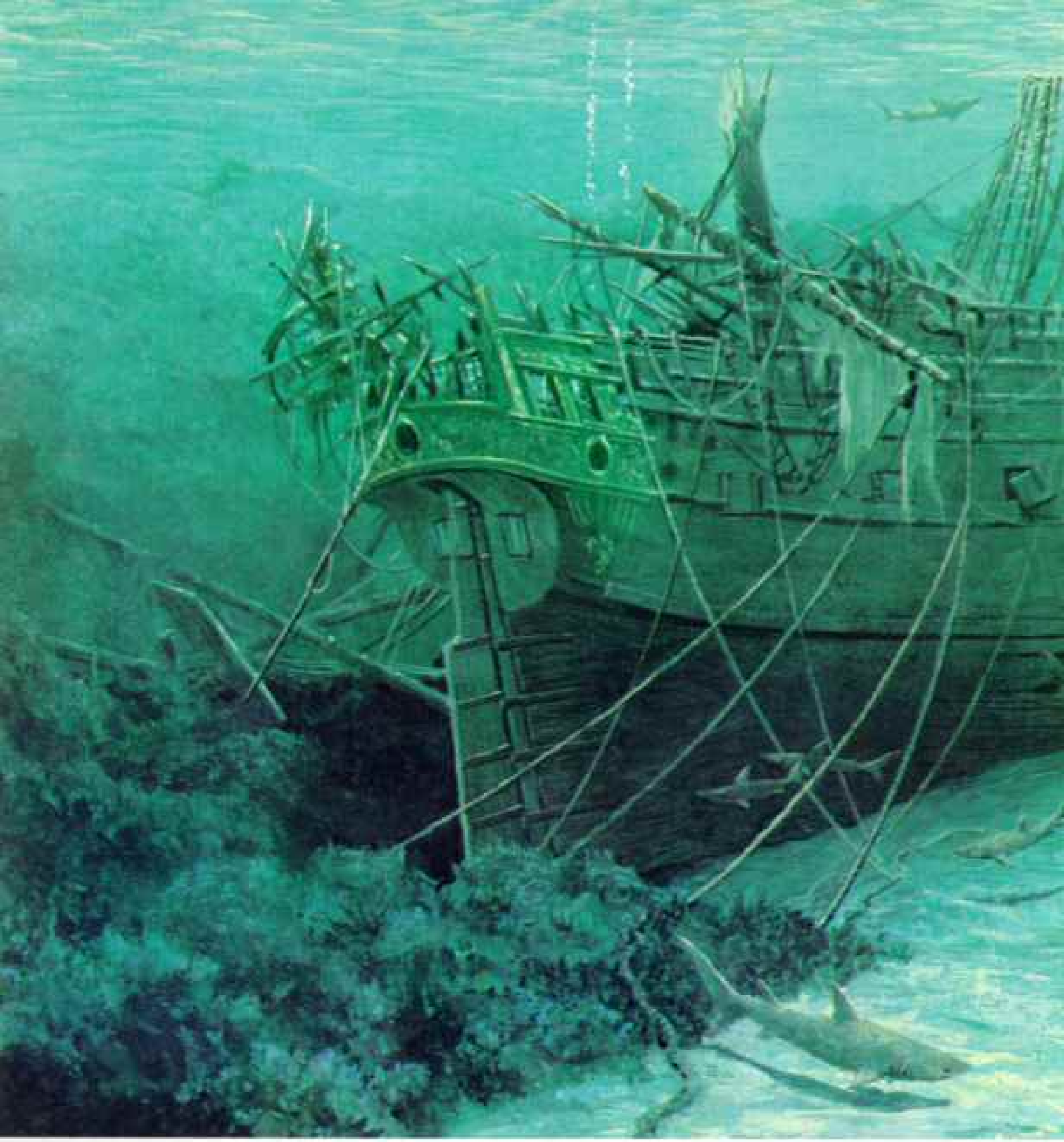
After futile attempts to retrieve the king's mercury, the Spaniards finally abandoned *Guadalupe* and *Tolosa* to the sea. There the ships remained for two and a half centuries, until divers like Tracy Bowden came to explore them. It was to be one of the richest underwater finds in archaeological history.*

MY INITIAL DIVE with Tracy was no more than an introduction to *Tolosa;* in the months that followed, I came to know her intimately. Much of that knowledge was acquired ashore, where the Dominican Republic—which today occupies eastern Hispaniola—has begun to catalog and display the incredible variety of artifacts recovered from the two ships.

Guadalupe was the first to yield her bounty. In 1976 Tracy's firm, Caribe Salvage, S.A., obtained permission from the Dominican Government to search the floor of Samaná Bay for historic wrecks. Harry Doan, president of Caribe Salvage, and William P. Strube, vice president of the firm, equipped a 130-foot retired Coast Guard buoy tender named *Hickory* as a salvage ship and commissioned Tracy to begin the search with a small team of divers.

Virtually the only clues to the whereabouts of *Guadalupe* and *Tolosa* were estimated positions *(Continued on page 860)*

*See Mendel Peterson's "Reach for the New World" and the supplement map "Colonization and Trade in the New World" in the December 1977 GEOGRAPHIC.



BEARING 400 tons of the King's Royal Mercury, crammed with more than 1,200 people, the heavily armed ships make smooth passage as far as Puerto Rico. Provisioned there, they set sail for Havana but cannot weather head winds at Cape Cabrón. Driven into Samand Bay, Guadalupe grinds onto a sandy bottom, while Tolosa ***(above)*** *is crushed against a reef. Most of the ship's company drowns as quicksilver leaks out. Without the mercury, even today worth almost three million dollars, Spanish bullion production fell off, convulsing the already shaky empire.*

PAINTING BY LLOYD K. TOWNSEND

The wreck lies buried *under an overgrowth of reef, where a diver* ***(following pages)*** *probes for remains of* Tolosa's *armament room. Prodding brought musket balls rolling out, trailing plumes of silt.*

(Continued from page 854) contained in survivors' accounts at the Spanish colonial archives in Seville. Allowing for minor distractions such as a full-blown hurricane and imminent death, one can forgive the navigators a small percentage of error.

Despite the difficulties, Tracy and his team ultimately identified the remains of one wreck as *Guadalupe*. "The wreck site tallied pretty well with the old accounts," he told me one day aboard *Hickory*. "The hull was buried beneath tons of sand, and as we gradually excavated down to the second deck, we discovered what the early Spanish salvors must have found: The timbers were so massive and the construction so solid, they denied access to the lower hold where the mercury had been stored.

"But there was another problem too," Tracy added. "*Guadalupe* carried a huge cargo of iron ship fittings in her hold for construction of a full-size vessel in the New World. Over the previous 200 years, you see, Spain had practically destroyed her own forests in the search for ship timbers. By 1724 timber was scarce at home and the Spaniards began turning to the colonies. *Guadalupe*'s cargo of ship fittings lay over top the area where the mercury was stored. There was just no way to get through it."

No matter. What *Guadalupe* had to offer was something infinitely more valuable to the historian than mercury: a detailed view of 18th-century colonial life. As each layer of sand and gravel yielded a fresh array of artifacts, the portrait of a typical Spanish colonist began to emerge.

The variety of goods was astonishing for a supposedly frontier society—gold jewelry and coins, buttons, crockery, silver and pewter flatware, olive jars, brass scissor handles from which the steel blades had

DANDY'S DELIGHT featured changeable ivory cane handles **(above)**. *The small, jewel-inlaid one nests neatly in the plainer handle and out of the covetous sight of street ruffians. A gentleman guarded gold doubloons such as these* **(right)** *with a pistol decorated with brass side plates.*

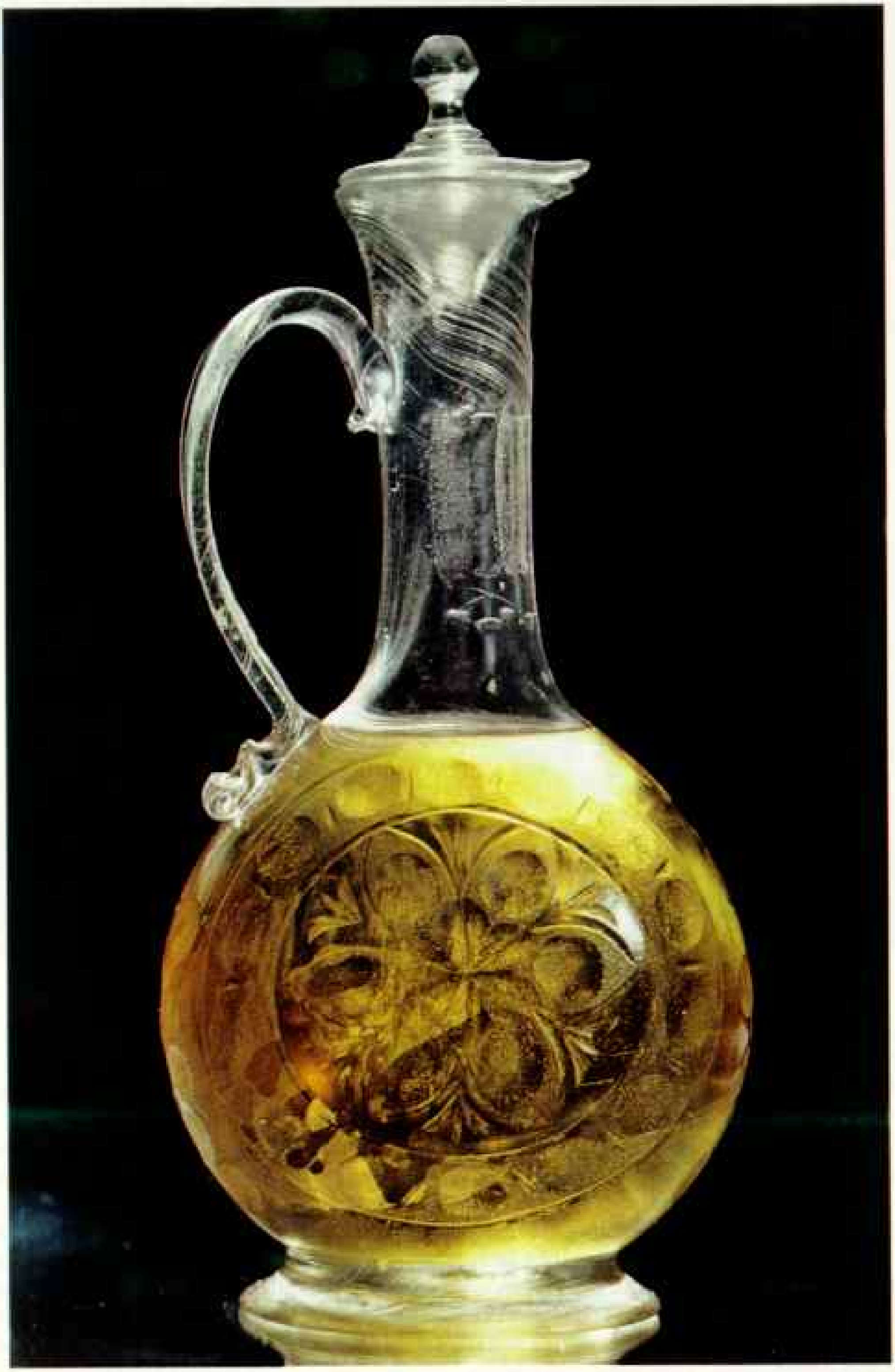
rusted away, delftware, dice, religious medals, brass lanterns—virtually everything to be found in a fashionable European household of the same period.

Some of the glassware was exquisite. Among more than 400 crystal drinking glasses recovered intact, most had been engraved. There were shot glasses, tumblers, wine bottles, and jugs—evidence that in the early 18th century, at least, the New World was no haven of temperance.

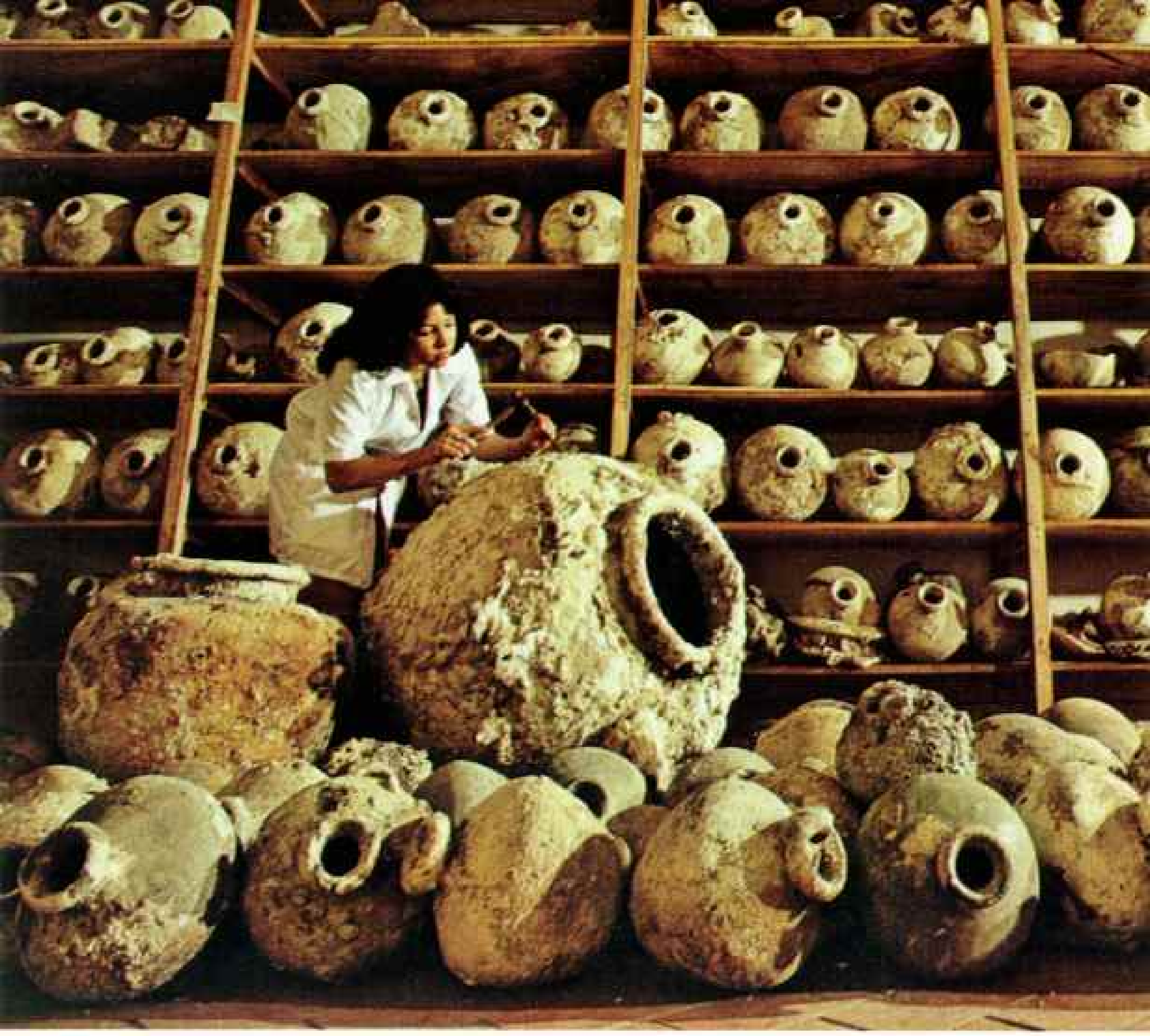
The most lavish engraving appeared on five magnificent matched glass decanters (following pages). Their origin remains uncertain, for by the 18th century Spain, Bohemia, and Germany all were capable of producing such superb glass. Some of the patterns of engraving are distinctly Chinese, a style thoroughly familiar to New World colonists. European engravers frequently copied such patterns from Chinese porcelain that reached the Old World via Manila galleon across the Pacific, then by transshipment overland through Mexico to the Atlantic trade.

TECHNICALLY, more than half of *Guadalupe's* cargo was smuggled goods, since they were manufactured outside Spain. Under Spanish royal decree the home country held an absolute monopoly on trade with her colonies: All imports must be of Spanish origin and be carried in Spanish vessels. In practice the system worked no better than England's despised tax on tea in the American Colonies, and produced the same inevitable result.

Ironically England, Spain's arch-rival in the New World, produced *Guadalupe's* finest example of pure craftsmanship. Near the stern of the wreck Tracy and his crew came across several brass fittings that obviously



*HISTORY A LA CARTE: Elegant tableware from the two wrecks reveals a previously unsuspected trade in luxury goods to the Spanish colonies. A wine decanter (**above**) was one of five found stashed beneath floorboards above Guadalupe's keel. Laws limiting Spanish ships to Spanish-made cargo were winked at, and contraband often exceeded legitimate cargo.*



belonged to a clock. "It took us a while to collect the pieces," he told me. "Of course steel parts like the mainspring had rusted away, but the brass was still in good shape."

The result was a disassembled bracket clock made by the renowned London firm of Windmills (page 870). So superb was the craftsmanship and so beautifully preserved are the fittings that the clock requires only replacement of a few steel parts to be reassembled in working order.

Other drowned items suffered the same minimal destruction. Two beautiful bronze swivel guns later found by Tracy and the team looked almost as if they had come from the foundry. Only the iron tillers, or handles used to train the guns, had long since corroded away in seawater.

AS SALVAGE on *Guadalupe* stretched to more than a year, the returns grew increasingly thin. "We felt we'd done a thorough job," Tracy recalls, "not only in finding and recording artifacts, but also in mapping the site. Dale Schleif, the team's draftsman, had produced a precise scale diagram of the wreck with all major features such as cannons and anchors. We talked it over with Harry Doan and the Dominican officials, and everyone agreed we'd done a fine job—or rather, half of one. It was time to look for *Tolosa*."

In the end, finding *Tolosa* proved easier than identifying her. The two vessels had gone down only $7\frac{1}{2}$ miles apart. After reviewing the survivor accounts and estimated positions, Tracy and his crew moored

A MOVABLE PANTRY packed stores for the long haul. Clay jars, here being cleaned ***(left)****, carried water, wine, olives, and pine pitch. After years of sea burial, only pitch and olive pits remained. A diver sifts out silt before taking a jar topside* ***(below)****.*

Hickory in the likeliest spot in Samaná Bay and began exploring the surface in a small boat with a sensitive magnetometer, searching for any unusual mass of iron on the bottom.

Skilled help ashore came from my old friend Jack Haskins, a gifted historian and student of underwater wrecks in the Caribbean. Jack's patient research at the Spanish archives in Seville had uncovered original documents confirming the identity of *Guadalupe*. The same documents played a major role in the study of *Tolosa* and provided valuable background for this article.

Patience paid off, and at last in June 1977 *Tolosa*'s massive cannons revealed her whereabouts to the magnetometer. In testimony to Tracy's skill and intuition, the wreck site turned out to be only a quarter of a mile from *Hickory*'s initial mooring. Within hours the salvage ship had inched through the intervening reefs and rode securely over the site. Now it was *Tolosa*'s turn.

Or so it seemed, though Tracy still had doubts. "She was an old ship, all right," he says of the discovery, "and the chances were ten to one she was *Tolosa*. We needed proof, and that meant mercury."

But proof eluded them. For two frustrating weeks the divers scoured the wreck, recovering samples of pewter, fine glass, and pottery. "Now and then," Tracy recalls, "one of the crew would swim over to me underwater with a particularly good find. I'd nod my head, meaning, 'That's nice, really nice,' but it didn't say *Tolosa*."

Toward the end of the third week Tracy was excavating among the timbers of the wreck with an air lift, a giant suction tube for clearing away debris. All at once a small barrel top emerged from the sand and disappeared up the tube.

"I got only a quick look at it," Tracy told me, "but that was enough. I'd seen old drawings of how the Spaniards packed mercury aboard ship. They stored it in leather sacks secured at the top with thongs, then stowed the sacks singly in small casks. The wooden top I'd uncovered wasn't big enough for a wine barrel. I thought, 'Maybe, just maybe,' and dug some more."

Within moments the rim of a cask appeared, and Tracy carefully vacuumed away the sand inside. At the bottom of the cask lay a crescent of small silvery globules. No string of pearls ever looked more beautiful.

FOLLOWING the discovery, *Tolosa* began to offer up a treasure as varied and fascinating as that of *Guadalupe*. Although the two vessels had perished together with similar cargo, the difference between them was striking.

Human nature accounted for much of the difference, for no two passengers carried the same possessions to begin life in the New World. One can only wonder at their source of advance information—whether colonial relatives, friends, or what passed for 18th-century travel agents. What inspired some colonist, for example, to pack an expensive pewter chamber pot for life in a land that abounded in earthenware models?

Others displayed more foresight. Among the items recovered from *Tolosa*'s stern section was an ingenious device fashioned of ivory plates that combined the functions of sundial, compass, and moondial (page 871).

Although I had appraised *Guadalupe*'s collection of salvaged artifacts for Caribe Salvage, I had never dived on the wreck itself. My only knowledge of that disaster stemmed from historical documents such as the ones Jack Haskins had uncovered in the Spanish archives.

In the case of *Tolosa* I was able to analyze at firsthand not only the manner of her death but also at least one factor that might have prevented it. Following my dive with Tracy to inspect the mercury, I accompanied him on a survey of the entire hull.

By then *Hickory*'s crew had put in months of excavation, and the wreck lay fully exposed on the seafloor. Beginning at the bow, Tracy and I slowly worked our way aft, examining *Tolosa*'s mortal wounds. Though some of the ship's timbers measured two feet or more in thickness, they had been snapped and splintered like twigs.

The keel was intact, and the great rudder with its lead sheathing lay amid a jumble of beams at the stern. Overall rose the somber outline of the reef that had disemboweled *Tolosa* and drowned her in seven fathoms.

Toward the forward part of the hull lay an item that might have saved the ship: one of two massive sheet anchors generally reserved for emergencies. Judging from accounts of the disaster, *Tolosa*'s crew had put one of the two anchors overside during the night of the storm, only to have the hawser part the following morning. Had they put both anchors down together, two hawsers would have shared the strain and *Tolosa* might have survived.

In retrospect the galleon was better equipped to resist man than nature. Of the 70 heavy cannons she had carried aboard, 33 were visible inside the hull or close by. Lesser armament included a chest of hand grenades (page 855), which Tracy and I inspected near the stern. The cast-iron spheres, each some four inches in diameter, resembled rows of picked fruit complete with stems in the form of wooden fuses. The likeness originally earned the missiles their name—*granadas*, the Spanish word for pomegranates.

Although *Hickory*'s crew had laid *Tolosa* bare, her bounty proved far from exhausted. During my *(Continued on page 873)*

REPOSSESSED RICHES on a field of pearls may have constituted the fortune of a single nobleman on Tolosa: clockwise from left, a gold medallion bearing the cross of the Order of Santiago framed by 24 diamonds, a cross with nine emeralds, a brooch with 37 clustered diamonds, a gold heart.

Emblems of faith *sailed with Tolosa and Guadalupe. A delicate gold cross* ***(above)*** *may be the symbol of the Holy Order of the Inquisition. A rear compartment on this bronze crucifix* ***(left)*** *serves as a reliquary.*

Lacelike *filigree encircles a gold medallion* ***(far left)*** *bearing the Virgin Mary's portrait and the inscription in Latin, "Mother of the Savior." Religious tokens, elaborate and plain, helped comfort the faithful on voyages imperiled by storms, enemy attack, hull-clawing reefs, and the indifferent sea.*

An adoration scene *embosses one of 400 brass and bronze religious medals found on the wrecks* ***(left)****. Most were struck in Italy. Such medals, an important part of the cargoes of manufactured goods sent to the colonies, were distributed to parishioners. Perhaps they traveled with Franciscan friars journeying to their New World assignments.*

Pocket calculator *of another age, this gentleman's piece* ***(above)*** *combined a moondial with* ***(left,*** *top to bottom) a horizontal sundial, a vertical sundial, and a compass, all on ivory plates that folded smartly into a card-size package. An antique even for the time, it dates from the late 16th century.*

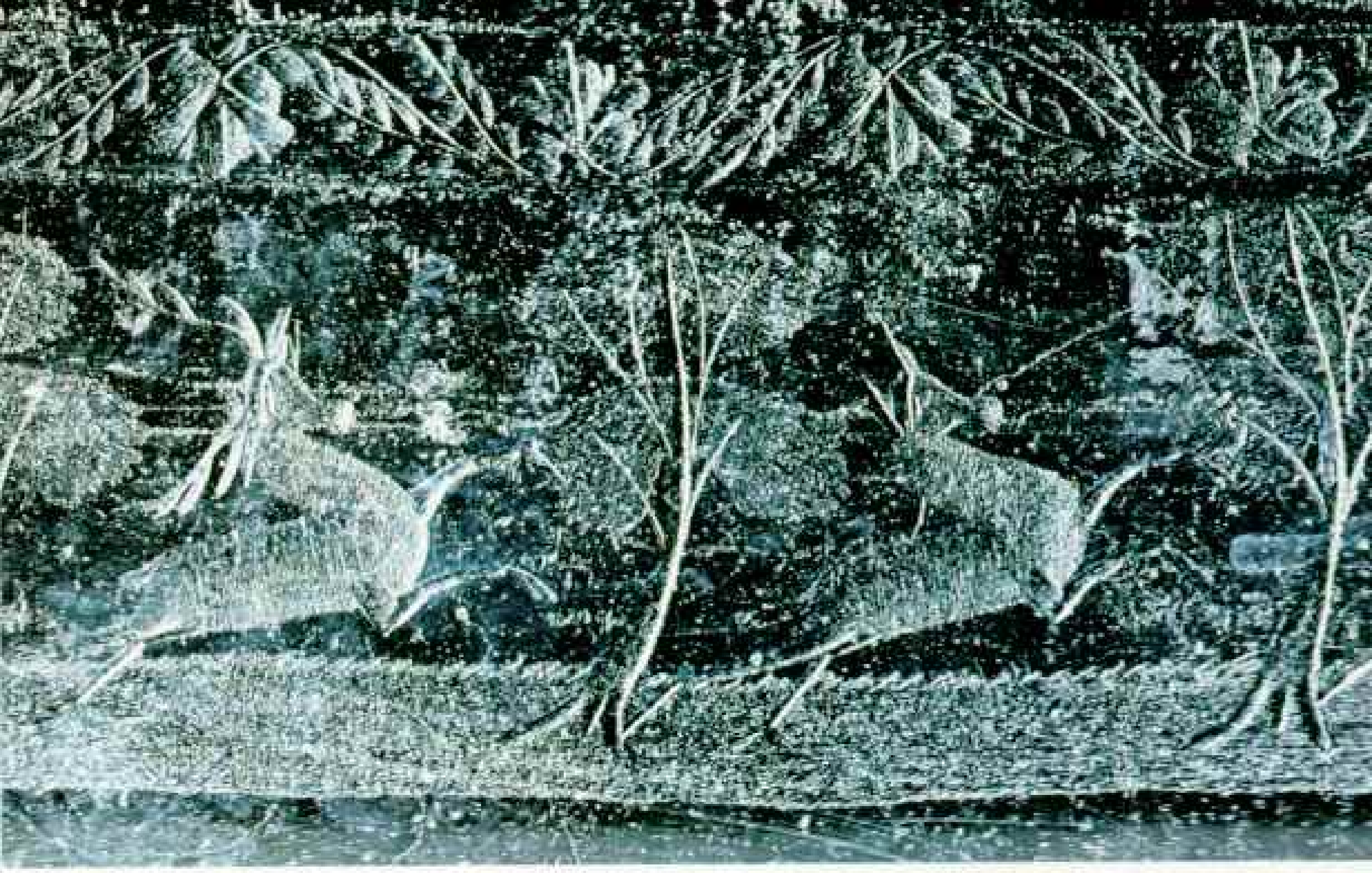
A bronze bell *cast in Amsterdam and dated 1710* ***(left, middle)*** *was either bound for a church in a New World parish or was the ship's bell of* Tolosa.

The sacred and profane *journeyed together. Two bullae* ***(far left, center)*** *sealed directives issued by Pope Innocent XIII. A saucy Bacchus* ***(far left, upper)*** *carouses on a wafer-thin sandwich of glass and gold leaf, a decoration once affixed to a glass.*

Though silent *for centuries, the London-made brass clock* ***(far left, lower)*** *could be restored to working order with cleaning and the replacement of steel parts corroded by seawater.*

THE TOAST of Tolosa *and* Guadalupe—*glassware of Spanish, German, or Bohemian origin—ranges in size from shot glasses to an engraved cobalt tumbler (***below left***) and pint beaker (***below right***).*

*A special camera unwrapped the endless chase circumscribing a beaker (***above***). Cradled to* Hickory *in wicker baskets, the glass was bedded in blankets and pillows for the choppy ride to port.*



(Continued from page 867) visit the divers continued to surface with impressive finds of glassware, ceramics, occasional coins, pewter and brass implements, and minor bits of jewelry. As it turned out, they were only the preliminary to an incredible treasure still to come.

EACH DIVER normally worked alone on a chosen area of the wreck, but none ever suffered from lack of company. Excavation of the seafloor invariably attracts a crowd of hungry residents eager to sample the myriad forms of sub-bottom life churned up by a digging tool or air lift. One such visitor came to regard *Tolosa* as a private preserve, and Harry Schafer had to take a firm stand.

"It was a four-foot barracuda," Harry explained at dinner one night. "He hung around the wreck until he thought he owned the place, and he'd challenge all comers. He took a liking to my work area, and when I came down every morning, he'd swim up to me with those great big jaws and glassy eyes and hang there, waiting for me to move another inch.

"So I'd hang there too, and after a while he'd back off, as if to say I wasn't worth a mouthful. I know that barracudas don't attack divers, but I was never quite sure *he* knew it. I can't say I missed him when he finally left us."

A second barracuda impressed *Hickory*'s crew with his feeding technique. "He liked mullet," Glenn Armold, one of the other divers, observed. "He'd herd them like a sheep dog into a tight ball near the surface, then he'd make a run on them and get two or three in a single pass. When he fed directly above us, we could tell without even looking. After a moment or two a faint shower of tiny silver scales would start raining down on us. It was pretty, but kind of depressing."

The groupers were both an annoyance and a faithful alarm system. "They grow pretty big, as you know," José Mancebo told me. José, a diver with the rank of sergeant in the Dominican Navy, was on long-term loan to *Hickory* as liaison officer. "I've seen groupers on the wreck weighing as much as 300 pounds," José continued. "That's a lot of muscle when you're competing with one for the same hole. But when the groupers suddenly disappear, it's a signal that something bigger, or at least meaner, is around—usually a nurse shark or a hammerhead. So far we've had no trouble with sharks, but it's

UNDOING A SEA CHANGE: The goblet on the left was simply wiped clean of a lead film seawater had leached from the glass. An acid bath will free the other of coral as well. But the most painstaking work of all will be scholarly analysis of the finds.

well to keep an eye out, especially on the groupers."

For sheer savagery per pound, few undersea creatures are a match for the moray eel. Steve George, another of *Hickory*'s divers, tangled with a moray one day and nearly came off the loser.

"I simply didn't see him," Steve recalls. "I was working below with an air lift, and he suddenly popped out of a crevice and got sucked into the tube. He wasn't hurt, but he was one plenty surprised and upset moray. When he came out the top of the tube, he didn't waste time; he dived back down and went straight for my chest. Luckily I had on a wet-suit jacket, and he couldn't get through it. I didn't give him time for a second try. I just dropped that air lift and took off for the surface."

Shortly before my visit Tracy had an experience as bizarre as any I have heard in 25 years of underwater work. The time was late afternoon on March 23, 1979, a date most Dominicans will long remember.

"I happened to be down alone on the wreck," Tracy told me. "The rest of the crew were topside cleaning artifacts or taking a break, and I was working with an air lift at the base of a submarine sandbank.

"Now and then the air lift would trigger a

small avalanche down the side of the bank, but that's normal. What *wasn't* normal was that the bank suddenly began to vibrate and the avalanches grew bigger; before I knew it, I was swimming in sand. There was an eerie sort of pulsing in the water that picked up speed and volume till it sounded like a distant machine gun.

"It occurred to me briefly that a large ship must be passing somewhere close by overhead, but I realized that couldn't be. No ship of any size could make it through the maze of shoals and reefs; otherwise *Tolosa* wouldn't be down there.

"By that time I'd begun to vibrate all over, not just my eardrums but my whole body. I glanced at my air-pressure gauge, thinking the tank on my back might have ruptured, but I had plenty of air. Just as I began to think of heading for the surface, the vibration stopped. I worked a while longer, then called it a day. As I came alongside *Hickory*, Steve George was waiting for me.

"'We were about to come down for you,' he said. 'The radio just announced there's been an earthquake ashore.'

"Looking back on it," Tracy concluded, "I should have known something was wrong even before the sandbank started vibrating. Seconds earlier all the fish disappeared."

AS THE FLOW of artifacts continued, one thought preoccupied every diver: mercury. Unlike *Guadalupe*, whose heavier construction had ruled out complete excavation, *Tolosa* offered some chance of recovering her major cargo.

"It's a question of geology as well as the ship's hull," Tracy explained to me after one dive. "Obviously the mercury is long gone from the casks and has seeped down through the wreck to the seafloor. What's underneath *that* remains to be seen. If it's a deep layer of sand, the mercury has probably dispersed and we'll never find it. But if there's a layer of bedrock not far below the surface, the mercury could be lying there in a pool just waiting to be pumped out.

"Assuming it hasn't been damaged by seawater, we're talking about a sizable amount of money. Mercury sells today for about $3.60 a pound, and *Tolosa* carried 150 tons of it. The total comes to more than a million dollars."

During a week last April while Tracy was ashore on business, *Hickory*'s crew abruptly lost interest in mercury. Near *Tolosa*'s stern, Tony Armstrong, one of the members of the team, uncovered a treasure so incredibly rich that it rivals the greatest underwater finds in history.

In quick succession Tony retrieved four pieces of diamond-studded gold jewelry and roughly 1,000 intact pearls. One of the pieces was a magnificent gold brooch set with 37 diamonds. Another brooch was set with 20 diamonds, and a pendant was decorated with eight emeralds and 22 diamonds. The fourth item was another magnificent gold pendant set with 24 diamonds and bearing the cross of the Spanish chivalric Order of Santiago (page 866).

At least one passenger aboard *Tolosa* was no ordinary colonist. The owner or owners of Tony's treasure represented either enormous wealth or high position, possibly in the church. But neither wealth nor high position weighed in the balance on that long-ago August day. Along with the ship's crew and lesser passengers, the distinguished knight of the Order of Santiago found a common grave beneath the sea.

At the time of Tony's find I had left *Hickory* for Santo Domingo to review the collection of artifacts from *Guadalupe* and *Tolosa* that was stored in the city's excellent Casas Reales Museum.

A week after the discovery Tracy returned aboard with Maj. Bolivar Pimentel, an official observer from the Dominican Navy, and other government representatives. Dinner that night was given to small talk and news from the mainland. Once the dishes were cleared, Tony's treasure was laid piece by dazzling piece before Tracy. For a long moment he stared in silence at the collection, then looked at Tony with a grin: "Fantastic, but did you have to pick the one week I was gone?"

Today the legacy of *Guadalupe* and *Tolosa* is shared by the Dominican Republic and Caribe Salvage. The most historic pieces remain in Santo Domingo, where experts in the techniques of preservation will work with support from the National Geographic Society.

In a historic move to ensure the safe recovery of future treasures from beneath his

nation's waters, Dominican President Antonio Guzmán appointed half a dozen countrymen to a group known as the Commission for Underwater Archaeological Recovery. All were distinguished citizens as well as unpaid overseers of their country's heritage: Vice Adm. Francisco Amiama Castillo, Pedro Borrell, Eugenio Perez Montás, Frank Moya Pons, Bernardo Vega, and Esteban Prieto Vicioso.

Work continues on *Tolosa*, though the main cargo lives up to its name—no sizable amount of quicksilver has yet been found.

For all its current value, the lost mercury in a sense represented a king's ransom when it went down. For without mercury to use in the process known as amalgamation, gold and silver refineries in the New World would have been reduced to a mere fraction of their output.

The result could have meant hardship or even ruin for the Spanish crown, a prospect put in ruthless perspective by Ferdinand II early in the 16th century. "Get gold," the sovereign ordered his agents in the New World, "humanely if possible, but at all costs get gold." The loss of *Guadalupe* and *Tolosa* in 1724 doubtless made for lean times in Madrid during the following years.

The tragedy of Samaná Bay, however, was essentially human, a fact underscored by nearly every item retrieved there. From more than a dozen visits to the collection at Casas Reales Museum in Santo Domingo, I have developed new appreciation for human detail as a key to history. Through their own possessions, some splendid and others ordinary, those who left the comfort of a familiar world for the challenge of an unknown one offer unique insight into a momentous chapter in our past.

Faith played a major role, whether of the kindly sort or as a tool of conquest. In the collection there are hundreds of religious medals, ranging from those of brass commonly destined for converts to creations of gold and silver worn by the faithful.

More than one pious soul elected to carry extra insurance in the form of an *higa*, an ancient Spanish talisman against the evil eye. The charm consists of a tiny human hand fashioned of black stone or clear glass, with the thumb extended through clenched fingers. Interpreted elsewhere merely as a gesture of mockery, the symbol is regarded by older Spaniards to this day as a means of warding off the curse of an enemy.

Tokens of love became mixed with those of malice long after the owners ceased to care. The Casas Reales collection contains a number of wedding rings, though no two of them match to suggest the loss of a husband and wife together.

But the most poignant item to me, among several thousand, is a silver bracelet totally without decoration on the outer surface (above). Recovered from *Tolosa*, the bracelet bears three words engraved in flowing script on the inner surface: "D.a Antonia Franco."

ELEGY IN SILVER, a bracelet inscribed with the name Doña Antonia Franco speaks of hopes and dreams drowned en route to another world.

Who she was no one knows, for passenger manifests have never been found for either *Guadalupe* or *Tolosa*. All we know is that Doña Antonia left Spain for a distant land and lost her life to a terrible storm in a bay whose name she probably never knew.

Was one of the wedding rings hers? Or did she sail for the New World in the joyful knowledge that on arrival she would receive one? Whatever her age or status, she had envisioned a new life beyond the sea that held only death.

Of one thing I feel certain: Doña Antonia Franco was a courageous woman. The voyage she undertook was not for the timid, but for those blessed with an instinctive measure of hope. Of such was the New World born, and with luck may be sustained. *Guadalupe* and *Tolosa* were both end and beginning. □

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Only the best go to the Olympics.

Nothing in the world of competitive sport can match the Olympic challenge. It is a challenge that demands not only the best in human athletic achievement, but a determination that can be summoned up to overcome seemingly impossible obstacles. Yet with all the talent, skill and dreams the Olympic Games focus into crystal clarity for a brief instant, there can be only a few who wear the gold.

For Peggy Fleming and Jean-Claude Killy the intensity of their gold-medal-winning performances on the ice and the slopes passed through them for a few moments of heart-stopping action most of us never feel in a lifetime. But the memories of the day live for them forever. In photographs.

It is because of the vital importance of the lasting visual record of these events that Canon has been selected Official 35mm Camera of the 1980 Olympic Winter Games. Under conditions of utmost severity, in a situation that decries compromise, Canon photographic equipment will be expected to deliver images that comply with one unyielding standard. They must be the best attainable.

Canon's support for the 1980 Olympic Winter Games goes far beyond the intimate sorcery of eye, hand and camera. It extends to every aspect of the photographic obligations that the Games entail. Supporting photographers whose livelihood depends on the images they record for posterity. With professional service and repair, systems support and supplementary or emergency equipment. Standing behind our commitment to being best, by offering the best assistance money, skill and human dedication can provide.

The quality standard for all Canon photographic products is something you may not see on the outside, but you'll come to appreciate as the years go by. It's the big difference between Canon cameras and others that seem to offer equivalent performance. And it's something that simply can't be faked.

It's inevitable that considering Olympian achievement calls to mind superlative statements. At Canon, we don't use superlatives lightly. We take being "best" very seriously.

And we'll be at Lake Placid to prove it.

THE OFFICIAL 35MM CAMERA OF THE 1980 OLYMPIC WINTER GAMES

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THE 1980 TOYOTA

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The completely re-thought, re-designed, re-engineered Toyota Corolla. Efficient aero-dynamic styling, handsome new interiors with more leg room, a peppier new 1.8 liter engine. And the same kind of total economy that

COROLLA.

made Corolla the best selling car in the world.
So turn the page and see what total economy will look like in the 1980's.

12 COMPLETELY REDESIGNED COROLLAS WITH STYLE AND TOTAL ECONOMY THAT ARE RIGHT FOR RIGHT NOW.

OH WHAT A FEELING!

TOYOTA

Today you need Toyota's world-famous total economy more than ever. But that doesn't mean you can't have a little fun—and when you drive an all-new 1980 Corolla, you'll have a lot of fun. Take the Corolla SR-5 Liftback (the red car above). The sleek aerodynamic styling does more than just look great. It helps reduce wind resistance too. Corolla engineers spent 425 hours on wind tunnel testing alone, and it shows.

Inside, the Corolla SR-5 Liftback has more leg room front *and* back than last year. The interior finish suggests a finely made touring car. A 5-speed overdrive transmission adds to the sporty feel and reduces engine RPM's at highway speeds. Even an AM/FM Multiplex stereo radio is standard.

Of course, while it's an extremely nice car, this Corolla Liftback may not be the perfect match for your needs. That's why there are so many other Corolla models to choose from—more than any other small car line.

2-Door Sedans, 4-Door Sedans, Sport Coupes, Wagons—a car for virtually every need. 12 Corolla models in all, including the new front-wheel-drive Corolla Tercel on the next page.

The SR-5 Liftback cockpit.

Peppier new 1.8 liter engine.

SR-5 Sport Coupe has reclining front bucket seats.

THE COROLLA TERCEL.
THE FIRST FRONT-WHEEL-DRIVE TOYOTA.

AT $3698, IT COMBINES TOYOTA'S LOWEST PRICE AND HIGHEST MILEAGE.

No other small front-wheel-drive car has more front leg room.
(SR-5 interior shown)

OH WHAT A FEELING

TOYOTA

The new Toyota Corolla Tercel. It isn't the first front-wheel-drive car. But it may be the best.
For one thing, the Corolla Tercel's 1.5 liter engine is mounted longitudinally—fore and aft. The advantages are substantial. In leg room. In serviceability. The Corolla Tercel even has an easy shifting 4-speed gear box.
Yet the Corolla Tercel Standard Sedan is still the highest mileage, lowest priced Toyota you can buy. The Corolla Tercel is rated at (33) EPA Estimated MPG, 43 EPA Estimated Highway MPG.

Remember: Compare this estimate to the EPA "Estimated MPG" of other cars with manual transmission. You may get different mileage depending on how fast you drive, weather conditions, and trip length. Actual highway mileage will probably be less than the EPA "Highway Estimate."
Corolla Tercel Standard Sedan is priced at only $3,698. Manufacturer's suggested retail price. Price does not include tax, license, transportation, California emissions, or optional equipment.

THE NILE

This ancient river has witnessed the rise and fall of civilizations. What can it tell us about the future? Let the eyes of Jacques and Philippe Cousteau guide you up the legendary Nile, as they explore its astounding beauty, fascinating cultures and mysterious past.

The Cousteau Odyssey
Dec. 9 and 10 8 p.m.

Most PBS stations

Jacques Cousteau and Philippe Cousteau were the executive producers for the Cousteau Society of The Cousteau Odyssey, a series of all-new specials for Public Television, produced in association with KCET, Los Angeles, under a grant to KCET from Atlantic Richfield Company.

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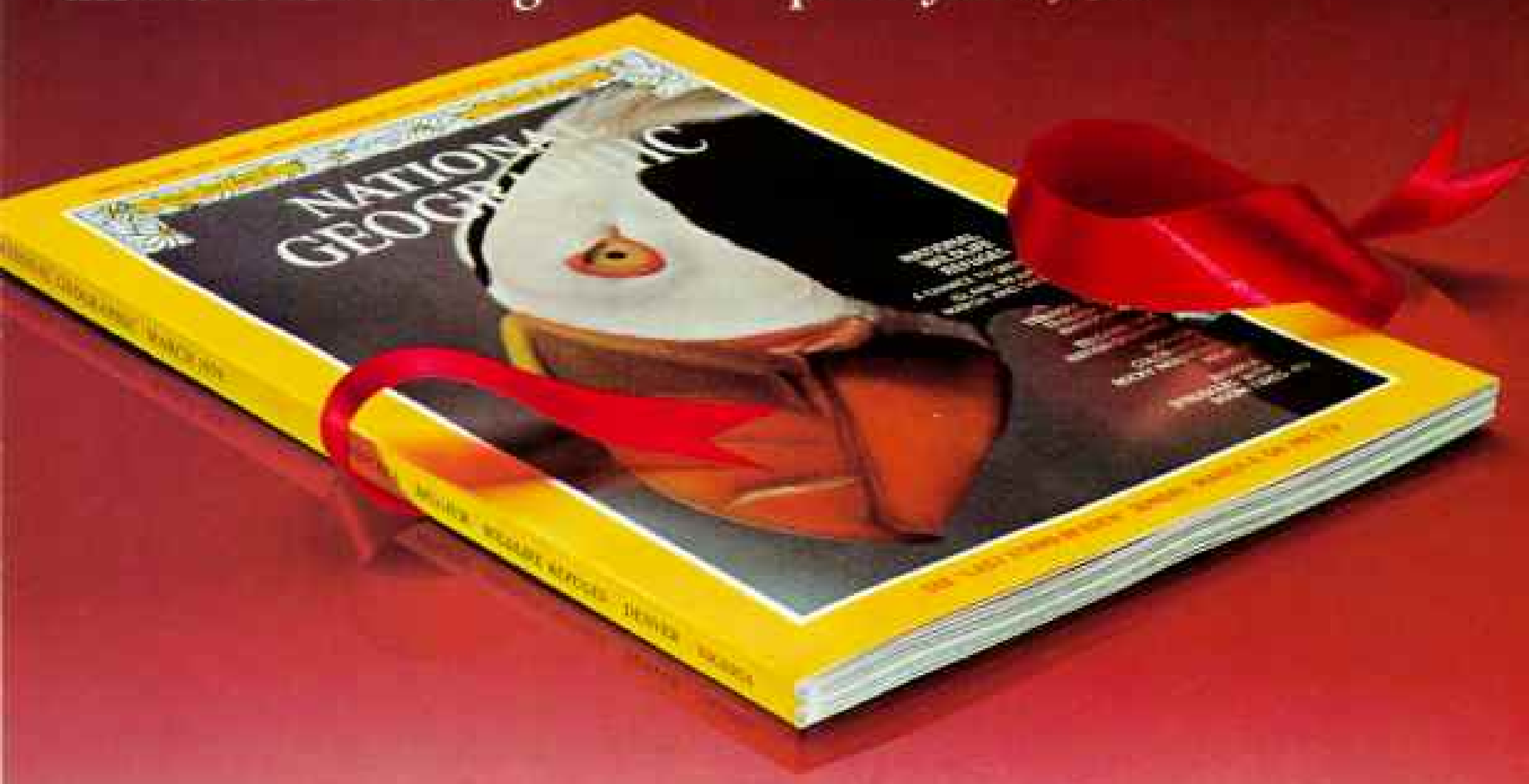

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Of lugging around a 35mm when you're not sure you're going to use it.

Of using a pocket camera and having to live with the results.

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Like a pocket camera, it's simple to load (just drop in a 110 cartridge), simple to use (point, focus and shoot), and small enough to fit in your pocket.

Like a 35mm SLR camera, The Auto 110 takes interchangeable lenses, auto winder, auto flash, and quality pictures you'll find hard to believe.

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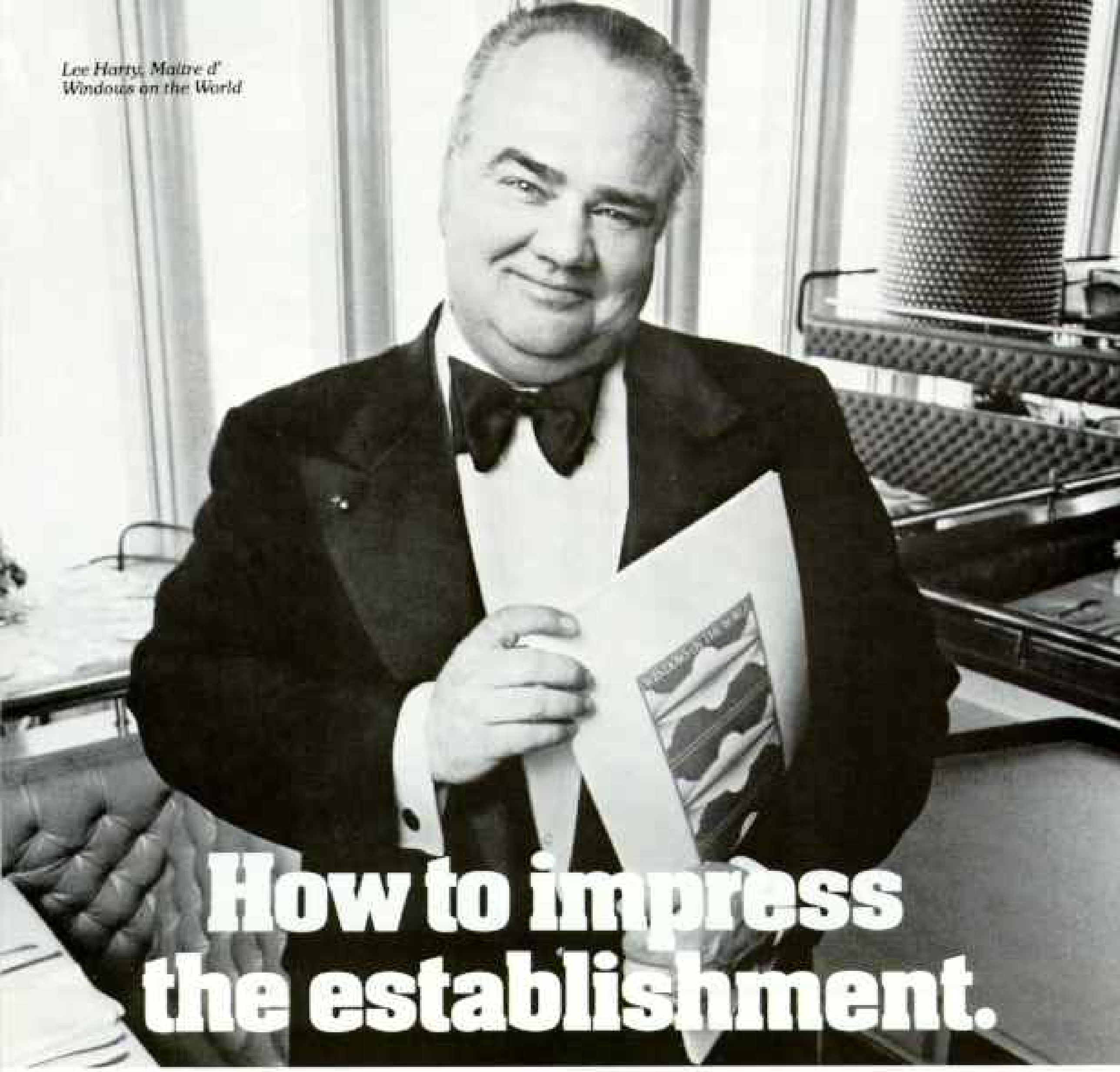


How to impress the establishment.

"We may be 107 stories high, but we're really down-to-earth. You see, at Windows on the World, the whole world is at home. What impresses us? People who know how to enjoy themselves. Whether they're having a half dozen impeccable clams on the half shell with a lusty Italian white. Or rack of young lamb with a pedigreed French red.

"And time after time, it's the Diners Club member who's enjoying these delights. And that's how I know one when I see one."

Diners Club members get more out of life. So it's only right they get more out of the card they carry. Diners does more things, in more places, than any other travel and entertainment card.

The Doublecard. Takes the advantages of a credit card. And doubles them. Diners membership entitles you to two cards. To separate business and personal charges, you can put your name and title on one, and just your name on the other. Or you can give the second card to a member of your family.

The card you can cash in on. Diners Club membership offers you the Diners Cash Advantage℠ — a separate reserve of cash of up to $15,000* from the Chase Manhattan Bank, N.A.

And these are just some of the things Diners Club is constantly doing to help the Club serve its members.

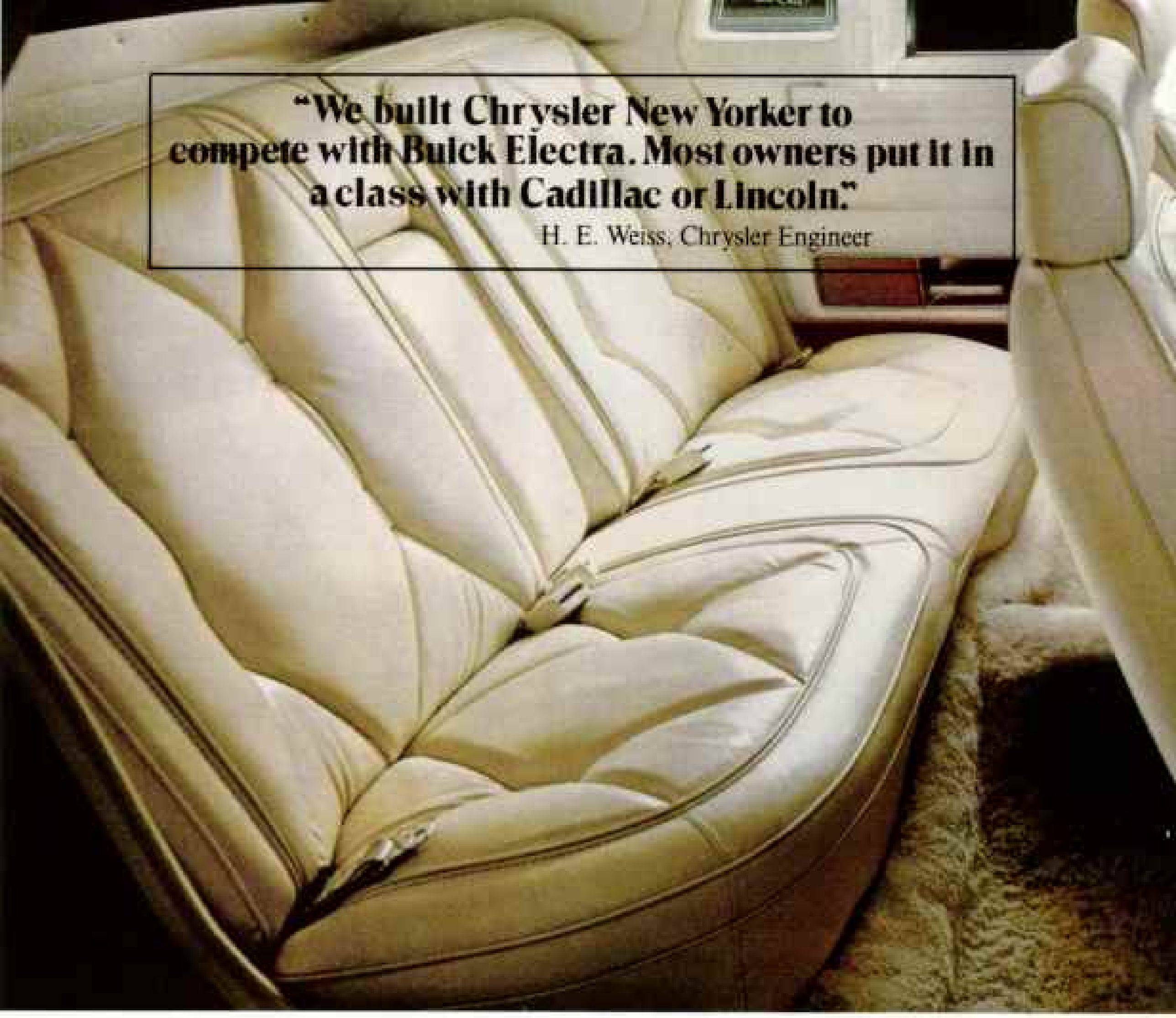
If you aren't a member, why not call our toll-free number for an application? We think you'd fit right in. After all, we know one when we see one, too.

*Maximum $2,000. Subject to legal restrictions.

THE DINERS CLUB MEMBER. YOU KNOW ONE WHEN YOU SEE ONE.

If you want to be one, call 1-800-525-7000

(In Colorado call collect 303-770-7252)



Here's what the engineers who built it say about the 1980 New Yorker Fifth Avenue Edition:

"It has the drivability; it has the smooth ride—the luxury that people want in an automobile."
John J. Hess, Chrysler Engineer

The 1980 New Yorker Fifth Avenue is the ultimate in Chrysler engineering. When the Chrysler engineers redesigned the New Yorker last year, they made it over 800 pounds lighter and more than a foot shorter—to keep pace with the priorities of today's automotive needs. Torsion-bar front suspension and the multi-leaf springs in the rear combine to cushion road shocks and smooth both braking and acceleration. 20-ounce cut-pile interior carpeting and sound insulation under the hood help reduce road and engine noise. So New Yorker rides smooth, quiet and comfortable. A fine-car ride in the long tradition of Chrysler engineering.

"It's a thoroughbred luxury car all the way from the plush interior down to the chassis."
R. P. Keller, Chrysler Engineer

Even engineered for the efficiency demanded in the '80's*, Fifth Avenue Edition still features luxury as standard equipment. Like this champagne interior with leather and vinyl seating. Air conditioning. AM/FM stereo sound. Individually adjustable front seats with passenger-side recliner. Power for windows, steering and brakes. Leather-wrapped tilt steering wheel. Door courtesy lights and rear-seat reading lamps. Tinted glass all around. And Fifth Avenue's champagne interior is elegantly accented with driftwood appliques on the instrument and door panels.

"The 1980 New Yorker has the best of everything we know how to put together in one car."
Charles Heinen, Chrysler Engineer

In styling, in quality of ride, in smooth performance, in engineering, Fifth Avenue meets the most demanding standards of luxury. With an impressive group of convenience and comfort options. The 1980 New Yorker Fifth Avenue Edition. It's the ultimate luxury automobile. And the ultimate in Chrysler engineering.

*EPA est. (19) mpg/est. hwy 23. Est. range (415) miles/est. hwy 483 with 21 gal. tank. Use est. mpg for comparison to other cars. Range ests. are determined by multiplying EPA and hwy ests. by fuel tank capacity. Your mileage and range may vary depending on speed, distance and weather. Actual hwy mileage and range will probably be less.

The 1980 Chrysler New Yorker
Fifth Avenue Edition

CHRYSLER

"SURE I WANT A MICROWAVE OVEN, BUT I HAVE NO PLACE TO PUT IT."

INTRODUCING THE NEW SPACEMAKER™ MICROWAVE OVEN FROM GENERAL ELECTRIC.

We designed it to install easily over your present range.

"Imagine, a microwave oven and range hood in one.

With my new GE Spacemaker oven I have the benefits of microwaving, and I haven't lost any

counter space. The Spacemaker oven fits in beautifully and has its own exhaust fan and light for my range below.

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I never dreamed how simple it would be to give my kitchen a custom look. The wood tones blend in beautifully with the rest of my kitchen. And with the Spacemaker oven in combination with my range, I now have two ovens in one convenient location.

"It has all the microwave oven features I need.

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"My Spacemaker oven has an extra-wide oven interior.

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Free.
How to get a grip on your business travel problems before they get out of hand.

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But there is something you can do.

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Straight-forward and easy-to-read, this kit is designed for one purpose. To help you, step-by-step, make a realistic evaluation of whether a company airplane can help solve your business travel problems.

And it promises you up-front answers to your most important questions about owning and operating a company airplane. How do you determine the need for one? What size should it be? Who will fly it?

The kit even helps you determine the net capital cost to your company of owning a business airplane, like the Beechcraft Baron 58TC shown here.

With this kit in your hand, keeping business travel expenses from getting out of hand will be a lot easier.

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Write on your company letterhead to: Beech Aircraft Corporation, Dept. A, Wichita, Kansas 67201. Ask for our free Business Flying Kit, and please mention if you're a pilot. If you'd rather call, make it collect and ask for Dick Schowalter, Jr. 316-681-7072.

Member of General Aviation Manufacturers Association

The Beechcraft Baron 58TC. A comfortable 6-seat airplane that can whisk you and your key people to thousands of business destinations at turbocharged speeds up to 300 mph.

WE PUT EVERYTHING WE KNOW ABOUT CAMERAS INTO OUR OM-2. INCLUDING OUR OM-1.

The miracle starts with the incomparable Olympus OM-2: the smallest, lightest, most sophisticated automatic full system SLR made. But the OM-2 doesn't stop at being the OM-2.

Because built into the body of every OM-2 is an Olympus OM-1. Endowing the OM-2 with its renowned ruggedness. Its disciplined full exposure control. And its true systems capability. This is an engineering marriage made in heaven. Two great cameras, integrated to highlight the brilliance of each, making one incredible accomplishment.

Consider the possibilities. On Auto, the OM-2 measures the light *during the exposure*. Even at a blazing five frames-per-second. How? Two sensors read the light that reflects off the film surface the instant the shutter opens.

And with the OM-2, the shutter remains open until the film has received precisely the proper amount of light for perfect exposure—then it automatically closes. How long can this go on? From 1/1000 of a second to over two full minutes. No other camera made is this sensitive and gifted.

Automatic isn't automatic. Flip a switch, and the OM-2 instantaneously offers the full exposure control of the OM-1. This includes full aperture coupled metering system that incorporates dual TTL metering cells.

This precise light measurement system links the aperture and shutter speed to the viewfinder readout. The result: totally controlled exposure and an SLR that's the obedient servant of any demanding photographer.

Hold the camera that holds together. The OM-2 is built to take it. A revolutionary network of shock absorbers and bearing rains, plus a unique air damper, increase performance in three critical areas.

Endurance. Under the stress of sustained high speed motor drive—five frames-per-second—the OM-2 comes through with flying colors. And without mirror lock-up.

Vibration. We won't sit still for vibration. So the OM-2 is virtually vibration free. Reduced vibration means sharper pictures, especially at slower speeds or with larger, telephoto lenses.

Noise. Quite often, a loud camera can make you miss a shot. With the quiet OM-2, the only noise you hear will be that of photographers applauding. In fact, in a recent magazine test the OM-2 was one of the quietest of all SLR's tested.

As advanced as the OM-2 is, it's just the start. Perhaps the most important feature of the OM-2 is its total acceptance of the ever-expanding *Professional OM System*. The system consists of over 300 different components, addressing every photographic option. The system includes: Thirty-three State-of-the-Art Interchangeable Olympus Zuiko Lenses. Swift, powerful five frames-per-second Motor Drive System with three different power sources. Economical three frame-per-second Rapid Winder. Flash Systems that provide fully automatic, off-the-film flash exposures.

Fourteen interchangeable focusing screens. 250 Exposure Film Back. Recordata Back with 4-channel printout. Macro-photo System including 4 Macro lenses, Auto Bellows, stands, and more. Photomicro System, for use with microscopes. The system creates images automatically, images that previously required complicated calculations.

So whether you prefer to operate in the world of automatic photography or with full exposure control, the Olympus OM-2 is the best of both worlds. Its vast possibilities are limited only by the photographer's imagination.

Our detailed OM-2 brochure will throw all the light on it you'll need. Write Olympus, Woodbury, New York 11797.

OLYMPUS OM-2

THEY BECAME LEADERS BECAUSE YOU HELPED THEM FOLLOW A DREAM.

For a long time there were far too few educated blacks in prominent positions for blacks to look up to. Maybe it was because for most blacks a college education was only a dream. But fortunately, your contributions to the United Negro College Fund have enabled many blacks to follow that dream. And to go on to become the kinds of leaders everyone can look up to.

When you give to the United Negro College Fund, you help support 41 private, predominantly black, four-year colleges and universities. Colleges that produce thousands of black graduates each year, who go on to become doctors, lawyers, teachers, accountants, engineers, scientists. People whose footsteps we can all follow in.

So support black education because today's student may be tomorrow's leader. Send your check to the United Negro College Fund, Box L, 500 East 62nd St., New York, N.Y. 10021. We're not asking for a handout, just a hand.

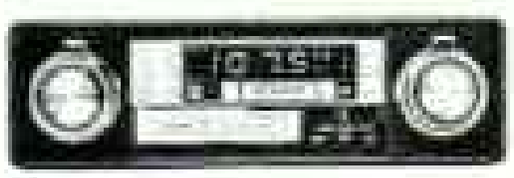
GIVE TO THE UNITED NEGRO COLLEGE FUND.

A mind is a terrible thing to waste.

PHOTOGRAPHER: RON DE MULT

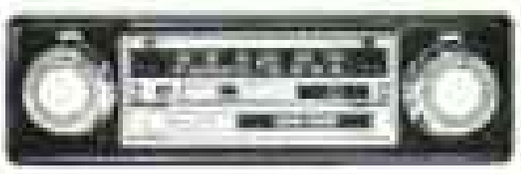
A Public Service of This Magazine & The Advertising Council

The car stereo buyer's guide to the Audiovox range* of sound systems for 1980:

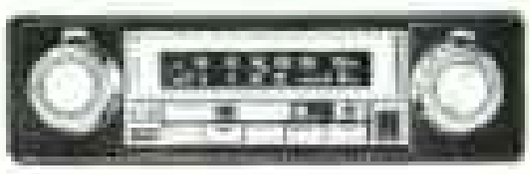


Model DGC-20
Electronic Tuning AM/FM Stereo radio with Cassette player and Quartz Clock

Model DGC-10
Digital Display AM/FM/Stereo radio with Cassette player and Quartz Clock/Calendar



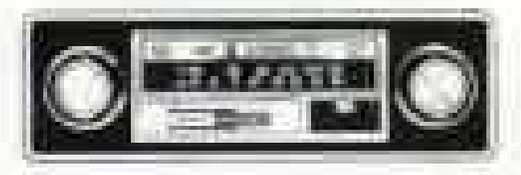
Model CAS-600A
Super Power Stereo Cassette player with AM/FM/Stereo radio. Dolby*. 40 Watt output



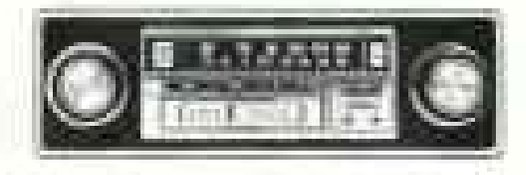
Model TPB-4000
Super Power 8-Track player with AM/FM/Stereo pushbutton radio. 40 Watt output

Model ID-900
Digital Display AM/FM/Stereo radio with Cassette player and Quartz Clock

Model ID-800
Digital Display AM/FM/Stereo radio with 8-Track player and Quartz Clock



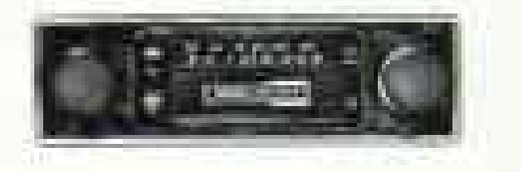
Model ID-675
Super Power Stereo Cassette player with AM/FM/Stereo radio. 40 Watt output



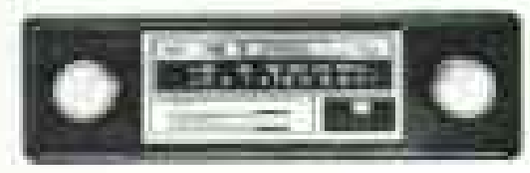
Model ID-625
Auto-Reverse Stereo Cassette player with AM/FM/Stereo radio. 4-Way balance

Model ID-500E
8-Track Stereo Tape player with Pushbutton AM/FM/Stereo radio. 4-Way balance

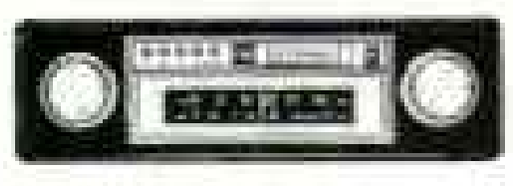
Model ID-725
Stereo Cassette player with Push-button AM/FM/Stereo radio. 4-Way balance



Model ID-605
Stereo Cassette player with AM/FM/Stereo radio. "500" Nose-piece for Import Cars

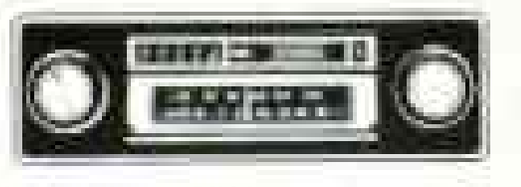


Model ID-610
Stereo Cassette player with AM/FM/Stereo radio. Locking cassette controls

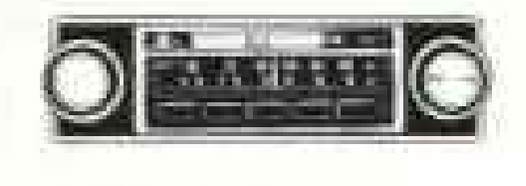


Model C-977A
8-Track Stereo Tape player with AM/FM/Stereo radio. Special 4½" deep chassis

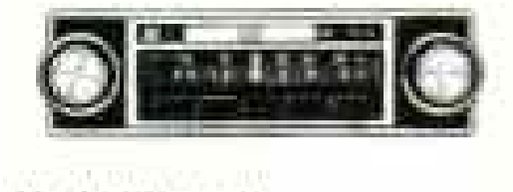
Model ID-600C
Stereo Cassette with AM/FM/Stereo radio. Locking cassette Fast-Fwd. control



Model ID-400C
8-Track Stereo Tape player with AM/FM/Stereo radio. 105mm Nosepiece. Track lights



Model ID-300B
AM/FM/Stereo Pushbutton Tuning radio. Stereo Balance control. Slide-Bar band selector



Model ID-200B
Pushbutton Tuning AM/FM radio with Slide-Bar AM-FM Band selector. 4½" deep chassis

Model UC-20
Underdash Stereo Cassette player with FM Stereo radio. F.Fwd/Rewind/Eject cassette control

Model C-988
Underdash Stereo Cassette player with Slide-Bar controls. Auto-Manual cassette eject

Model C-902A
Underdash 8-Track Stereo Tape player with Slide-Bar controls. Channel lights. Compact size

Available right now, a unique range of radios and tape players to fit every car.

You just want an AM radio? Audiovox makes it – and it's not a lot of money. You want the works? Cassette, 8-track, sophisticated electronics, speakers that can knock your socks off? Audiovox makes them. Still not a lot of money.

Audiovox is the largest specialist auto sound company in America. Their high technology specialization results in sensational sound reproduction at a reasonable price.

For further information, write to R. Harris, Dept.N.G., Audiovox Corp., 150 Marcus Blvd., Hauppauge, New York 11787.

Audiovox autosound systems are designed and developed by the audio research laboratories of Shintom Co., Ltd., Yokohama, Japan.

* *Because of space limitations, we illustrated only 20 models. Audiovox has 119 more plus 77 car speakers and a full line of auto sound accessories.*

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THE CARIBBEAN & MEXICO. $125.-$649.*

PLUS AIRFARE

Snow, rain, and sleet don't have to make you wet this winter. Eastern can fly you to the warm waters of the Caribbean and Mexico. We've got more vacation packages there than anyone for less than you ever dreamed possible.

1. ANTIGUA. $125-$649* PLUS AIRFARE. Spend 7 nights at your choice of a selected hotel on Antigua. Picnic on one of the island's famous white beaches or shop the bazaars on Market Street. You'll get a $5 chip to get you rolling at the Castle Harbour Casino. Round-trip airport transfers included. (Ask for IT9EA1FIZA.)

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For more information, call your travel agent. Or Eastern Airlines.

EASTERN HAS A WARM SPOT JUST FOR YOU.

*Prices are per person, double occupancy, and do not include airfare, meals, local taxes, service charges, and airport transfers unless indicated. Prices are effective 12/15/79-4/15/80 and are subject to availability and hotel space. All prices are subject to change. †Gas and insurance not included in car rental.

EASTERN

WE HAVE TO EARN OUR WINGS EVERY DAY.™

GM

Introducing the first Chevrolet Wagon with diesel power.

462 estimated miles on a single tank of fuel in the city, an estimated 682 miles on the highway.

You can also drive that same New Chevrolet Diesel Wagon with the fuel economy usually associated with a compact car—an EPA estimated 21 MPG, 31 highway.

And do it all with an engine that has no spark plugs to change, no distributor to replace, no carburetor to adjust.

Range figures obtained by multiplying the 22-gallon fuel tank capacity by 21 EPA estimated MPG (city), 31 highway for an '80 Caprice or Impala Wagon with available diesel engine. Not available in California at time of printing. See dealer for availability. *Remember: Compare the EPA estimated MPG with that of other cars. Your mileage and range may vary depending on speed, distance and weather. City mileage and range will be less in heavy traffic, your actual highway mileage and range will probably be less than the highway estimate. The New Chevrolet is equipped with GM-built engines produced by various divisions. See your dealer for details.

Plus a 22-gallon fuel tank.

A convenient 3-way door-gate.

A generous 87 cu. ft. capacity.

Lockable underfloor storage.

A 4' x 7.6' floor (rear seat down).

Stretch-out-and-relax comfort.

Second seat releases at a touch.

Plus side storage and utility trays.

Of course, what makes the new available V8 diesel engine especially attractive is The New Chevrolet it's available in—trim Caprice and Impala Wagons delightful to drive, remarkably pleasant to maneuver and park. Yet with a full measure of those virtues you buy a wagon for in the first place.

See your Chevy dealer about ordering The New Chevrolet Diesel Wagon today.

Chevrolet

THE NEW CHEVROLET WAGON. WE MADE IT RIGHT FOR THE '80s.

"I wish Arthur fit in here as well as the Stiffel lamps."

Stiffel. It's a perfect fit.

PERFECT.
If for some the very idea of perfection is unattainable, know that for Stiffel® it is a most singular goal. Each lamp we create is a meticulously detailed classic design. We use, of course, only the finest materials —brass, porcelain, crystal and wood. Then each lamp is carefully crafted, plated and finished, often by hand. Anything less would mean a lamp that is less than perfect. And for Stiffel, that would never do.

FIT.
The classic design of a Stiffel lamp makes it timeless. It has the innate flexibility to always be right, to always be a perfect fit. Among furnishings you own today. Or those you dream of for the future. The Stiffel lamp. A lasting investment, by design, to fit perfectly in your home.

The Stiffel Brochure, $1.00
The Stiffel Company, Dept. C,
700 North Kingsbury Street,
Chicago, Illinois 60610.

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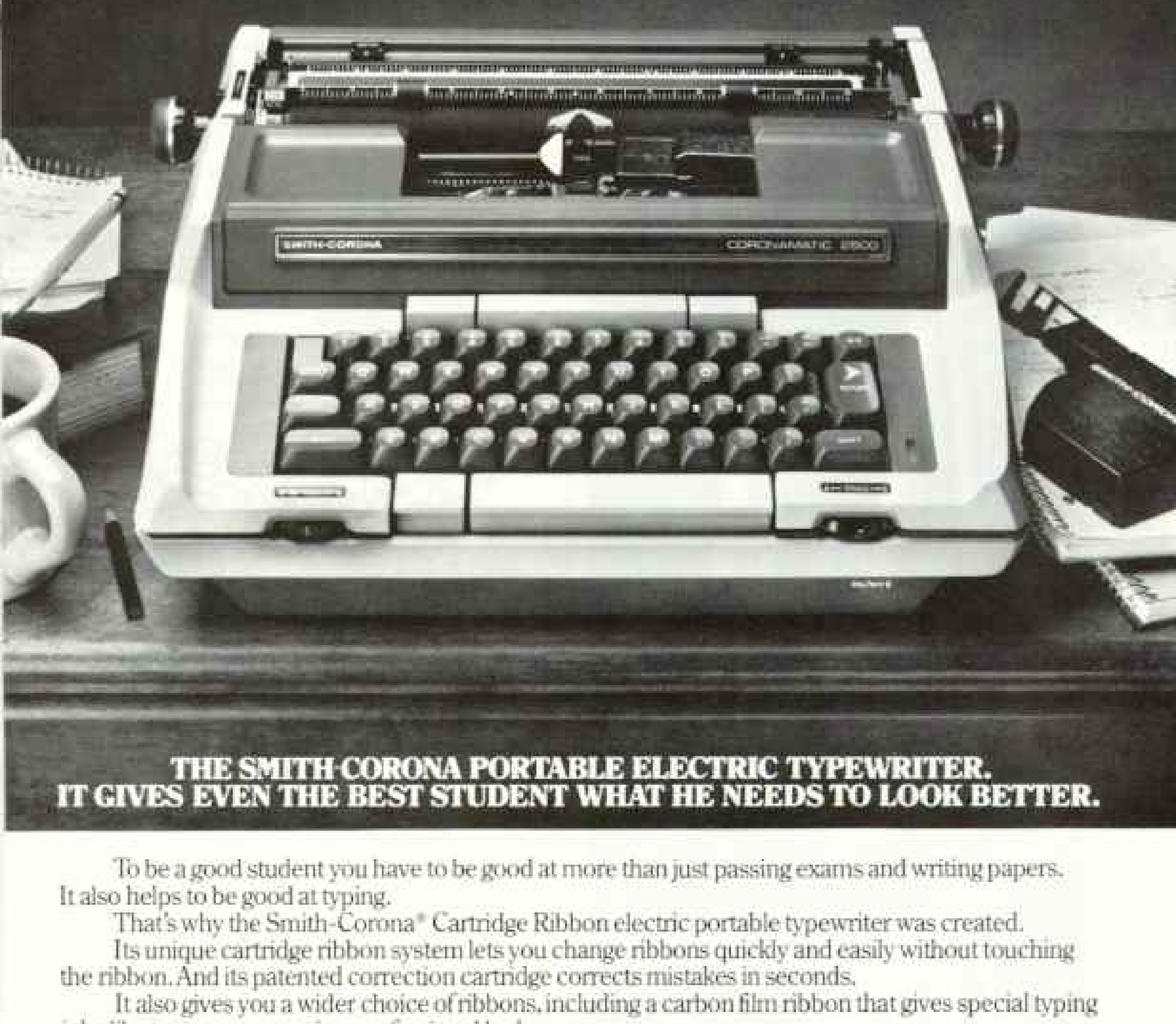
SMITH-CORONA ANNOUNCES A NEW FORM OF SCHOLASTIC AID.



**THE SMITH-CORONA PORTABLE ELECTRIC TYPEWRITER.
IT GIVES EVEN THE BEST STUDENT WHAT HE NEEDS TO LOOK BETTER.**

To be a good student you have to be good at more than just passing exams and writing papers. It also helps to be good at typing.

That's why the Smith-Corona® Cartridge Ribbon electric portable typewriter was created.

Its unique cartridge ribbon system lets you change ribbons quickly and easily without touching the ribbon. And its patented correction cartridge corrects mistakes in seconds.

It also gives you a wider choice of ribbons, including a carbon film ribbon that gives special typing jobs like term papers a crisp, professional look.

And with its rugged construction and solid engineering, a Smith-Corona electric portable should perform dependably and accurately no matter what the work load.

Give your student a Smith-Corona electric portable typewriter. It's the one form of scholastic aid within every parent's reach.

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SCM CORPORATION

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D. FREE DISTRIBUTION (Incl. samples) BY MAIL, or OTHER MEANS, (No News Agents)	89,093	83,156
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The new 1980 Honda Civic. We did it all over again.

The Honda Civic. It is the car that has in seven short years brought Honda to the forefront as a designer and builder of fine automobiles.

More important, it is the car whose engineering achievements helped make it the darling of a new generation of energy conscious Americans.

But, although the Civic has been an extraordinary success, history cannot stand still. Technology cannot wait while we rest on our laurels.

So, from the wheels up, the 1980 Honda Civic has been completely restyled. If you passed the old Civic by because of its size, the new Civic has over thirteen percent more interior space, adding legroom and shoulder room. It has twenty percent more window area for better visibility. It has improved suspension and a longer wheelbase for a smoother ride. All this without adding so much as an inch to the overall length of the car. Remarkable!

Since we know a good thing when we build it, the 1980 Honda Civic has the same simple layout that made our first Civic so widely admired — and copied. You'll still find such features as front-wheel drive, transverse-mounted engine, rack and pinion steering, and (on all hatchbacks) four-wheel independent strut suspension.

1980 HONDA CIVIC DX
1500 5-SPEED

36 EPA EST. MPG, 49 HWY. MPG. USE 36 MPG FOR COMPARISON. YOUR MILEAGE MAY DIFFER DEPENDING ON WEATHER, SPEED, AND TRIP LENGTH. ACTUAL HWY. MILEAGE WILL PROBABLY BE LESS THAN SHOWN. FIGURES ARE LOWER FOR CALIF. AND HIGH ALTITUDE CARS.

With pride we introduce the 1980 Honda Civic. Simplicity marches on.

HONDA

We make it simple.

Every Panasonic gives you a picture that's life-like. This Panasonic also gives you a picture that's life-size.

Panasonic brings you life in your choice of sizes. From our little 7" (meas diag) portable color TV with its brilliant color and realism right up to our biggest—the Panasonic Color Video Projection System—a super-real 5 ft. (meas diag) of picture so life-like you can't help feeling you're part of it!

Panasonic Projection TV, with a picture area nearly 10 times that of an ordinary 19" diagonal TV, transforms your living room into a screening room. A sports arena. A concert hall. You can even connect one of our Omnivision VI™ VHS™ six hour video recorders to it and replay great films. Favorite sports events. Or your own video tape masterpieces, wherever you made them!

Yet the Panasonic Projection TV folds into a compact one-piece unit that's just 27 inches deep. And it comes with Panasonic remote control tuning, so you can relax in your favorite chair for an evening of brilliant television viewing.

To keep the viewing brilliant, this Projection TV, like many other Panasonic TV's, has two electronic color control systems. VIR, which "reads" color information transmitted by the TV station. And, when a VIR signal is not available, the Panasonic ColorPilot™ system takes over to maintain accurate, true-to-life color from program to program, from channel to channel—automatically.

Whether you choose a 7", 10", 12", 13", 25", or 5-ft. Panasonic Color TV (all meas diag) you'll get a picture so life-like you'll feel like you're part of it. If you choose the 5-foot Projection TV, you'll get a picture so life-size, you may begin to feel it's part of you!

Cabinetry a simulated woodgrain TV picture simulated

Panasonic.
just slightly ahead of our time.

NEW COMPUTER SPACE COMMAND. NOW THE BEST ZENITH EVER IS EVEN BETTER.

The best Zenith ever–System 3.

With a Tri-Focus picture tube for the sharpest picture in Zenith history. With a Triple-Plus chassis, designed to be our most reliable ever. With Color Sentry for rich, real color automatically. With Electronic Power Sentry to protect critical components and save energy.

And now you can get System 3 with Computer Space Command.

The most advanced remote control in Zenith history.

Direct access to 105 channels, with the cable TV switch. Precise volume control. Even mute. Plus Zenith's exclusive Zoom for instant close-ups. Plus all Computer Space Command sets are cable-ready. No need for a converter.

System 3. The best Zenith ever. Now even better.

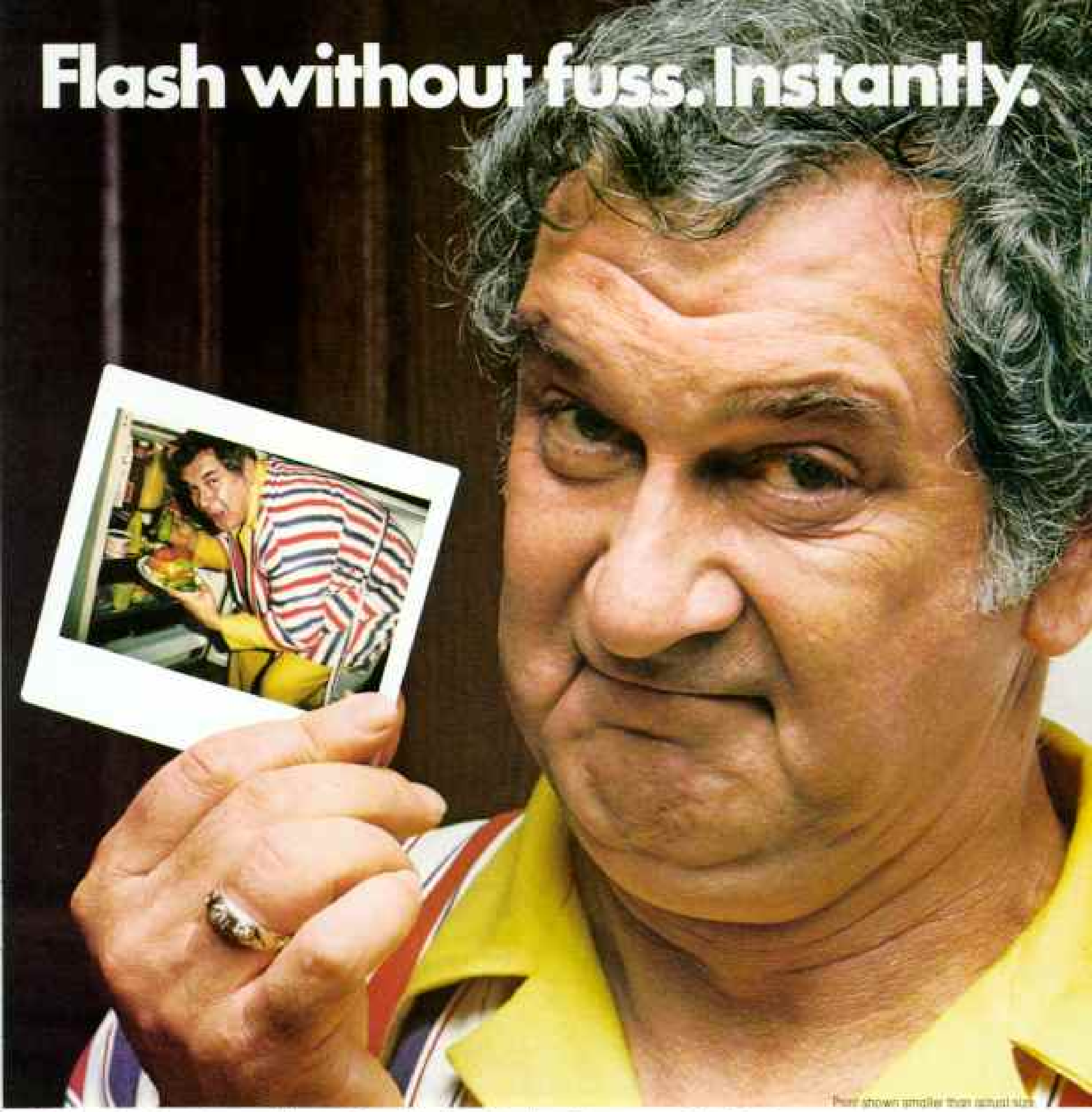
ZENITH

The quality goes in before the name goes on.®

SYSTEM 3

Shown: The Showcase, R25611X. Elite contemporary styling in a bronze-tinted acrylic cabinet. Metal finished frame on ears and ends. Brushed aluminum base. Stereo and TV picture.

Flash without fuss. Instantly.



Print shown smaller than actual size.

Introducing the Kodak Colorburst 250 instant camera with built-in flash.

You'll never have to look for another flipflash again.

Not with the new Colorburst 250 instant camera.

The flash is not only built-in, it's automatic. You can stop the action indoors or use the flash outdoors to fill in the shadows on close-up shots, all automatically. Just slide out the flash, aim and shoot.

The motorized camera delivers a rich color print that develops right before your eyes.

And there's never been a better time to buy the Colorburst 250 instant camera because for a limited time you can save up to $10.00 on all Colorburst cameras and Kodak instant color film.

See your photo dealer for details.

The more you take, the more you give.

OFFICIAL INSTANT CAMERAS FOR THE 1980 OLYMPIC WINTER GAMES

Some energy tasks are too big for small tools.

It will take an estimated $250 billion to develop the domestic energy the nation will need during the next five years.

Small companies can play a role in providing this energy, but many projects require the funds and technology that only large companies can furnish.

For example, in the Gulf of Mexico, Conoco and several other firms—large and small—are developing a petroleum field in over 1,000 feet of water, the deepest water in which petroleum has ever been produced.

Total cost of this project will be some $800 million—the bulk of which will be provided by the larger companies, allowing the small firms to join a venture they could not handle on their own.

This year, Conoco expects to spend almost $1.5 billion—two thirds of it in the United States—to develop energy and related petrochemicals. We also plan to put the additional income from decontrol of crude oil prices into developing more U.S. energy.

At a time when some people would limit the size of energy companies, we think it is worth noting the vital contribution that large companies are making.

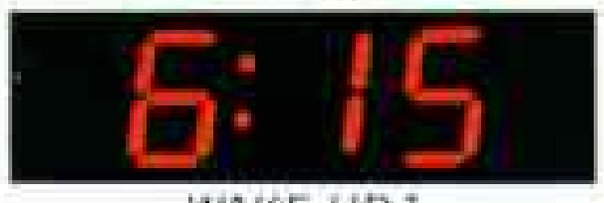
conoco

Doing more with energy.

THE COMPUTER RADIO.
AT 6:00 AM, IT'S SMARTER THAN YOU ARE.

TIME

Introducing The Great Awakening from General Electric. For starters, it's smart enough to let you set the time directly. . . no flipping around the clock.



WAKE-UP 1

You can program it to change stations for you. So it will rock you to sleep with Strauss, switch to your news station, and wake you at 6:15.

WAKE-UP 2

Then it comes back on to wake up your better half to Beethoven at 7:53. All with push-button ease.

ALARM OFF

When you forget to set the alarm. . . The Great Awakening remembers to remind you.

RADIO AM

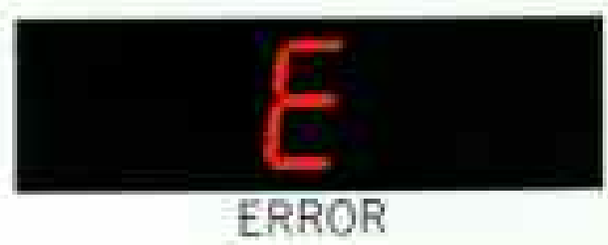
You can scan all the AM or FM stations by pressing a button or, to tune in one station, just punch in the frequency of your choice on the keyboard.

RADIO FM

You can also program up to six stations into the memory. And recall any one with the touch of a finger.

SNOOZ TIME

For a little extra sleep press the Snooz bar. It lets you sleep an extra minute or an extra hour. You tell the memory how long.



ERROR

The Great Awakening is so smart it even tells you when you've made an error. But it's easy to correct. . . just press a button.

WE BRING GOOD THINGS TO LIFE.

Model T-4880

GENERAL ELECTRIC


GM
Cadillac 1980

Eight reasons to own the most advanced Cadillacs ever built. (And one not to.)

1. They're even more elegant . . . even more efficient than last year. Outside, all-new styling features beauty with a purpose. With advanced aerodynamic design, fine tuned in a wind tunnel for improved fuel economy. Throughout, the 1980 Cadillac Coupe deVille, Sedan deVille and Fleetwood Brougham (shown) are designed with our nation's priorities in mind. With an EPA estimated (15) mpg and 23 mpg highway.

2. . . . with even greater range. Multiply the EPA estimates by Cadillac's available 25-gallon fuel tank (part of Cadillac's Long Distance Cruise Package) for an estimated driving range of (375) miles and an estimated highway range of 575 miles. *Remember:* Use the circled estimated mpg for comparison to other cars. Your mileage and range depend on your speed, trip length and weather. Your actual highway mileage and range will probably be less than the highway estimates. California estimates lower.

3. Roomier inside . . . 2" more rear legroom in the DeVilles. These magnificent automobiles are right for the times but all Cadillac in comfort.

4. Available Diesel-powered Cadillacs with an EPA estimate of (21) mpg and 31 mpg highway. Multiply these estimates by Cadillac's Diesel fuel tank rating of 27 gallons for an estimated driving range of (567) miles and an estimated highway range of 837 miles. In Calif., Diesel engine not available at time of printing. Cadillacs are equipped with GM-built engines produced by various divisions. See your Cadillac dealer for details.

5. Luxury cars you don't have to pamper. Cadillac owners already know it. And it was never more true than for these 1980 models. You don't have to pamper a Cadillac. It pampers you.

6. From heated side mirrors to three-channel garage door opener. They're two of the new features you can order for 1980. Plus an advanced theft deterrent system.

7. Quality that endures. The 1980 Cadillacs have the most extensive corrosion protection measures in Cadillac history.

8. Cadillac resale value . . . Total Cadillac Value. The 1980 Cadillacs represent a remarkably fine automotive investment. There's Cadillac's resale value. Cadillac's quality and comfort. That so many of its features are standard. That once you're in the club of Cadillac owners, it may cost less than you expect to stay in.

. . . One reason not to. Instead of owning a new Cadillac, you may prefer to lease one. Depending upon your situation, there can be advantages. Such as improved cash flow. Conservation of working capital. And others. Most Cadillac dealers do have attractive leasing plans. Lease or own . . . see your Cadillac dealer soon.

. . . An American Standard for the World.

Add another distinguished label to your wardrobe.

Targa by Sheaffer™

SHEAFFER EATON TEXTRON

Sheaffer Eaton Division of Textron Inc

"We weren't seriously thinking of replacing our stereo. Then we heard Yamaha."

"There was a noticeable difference in sound quality. Enough of a difference to convince us to own Yamaha now."

For almost a century, the Yamaha name has graced the best musical instruments in the world. It is also synonymous with audio components that set unmatched industry standards.

Take the components shown—the CR-640 receiver, the YP-B2 turntable, and the NS-244 speakers. Each is built with the most advanced technology and highest quality craftsmanship. Their visual beauty is rich and warm. Their sound is distinctly natural and truly adds to the enjoyment you expect from listening to music. And the price is surprisingly affordable.

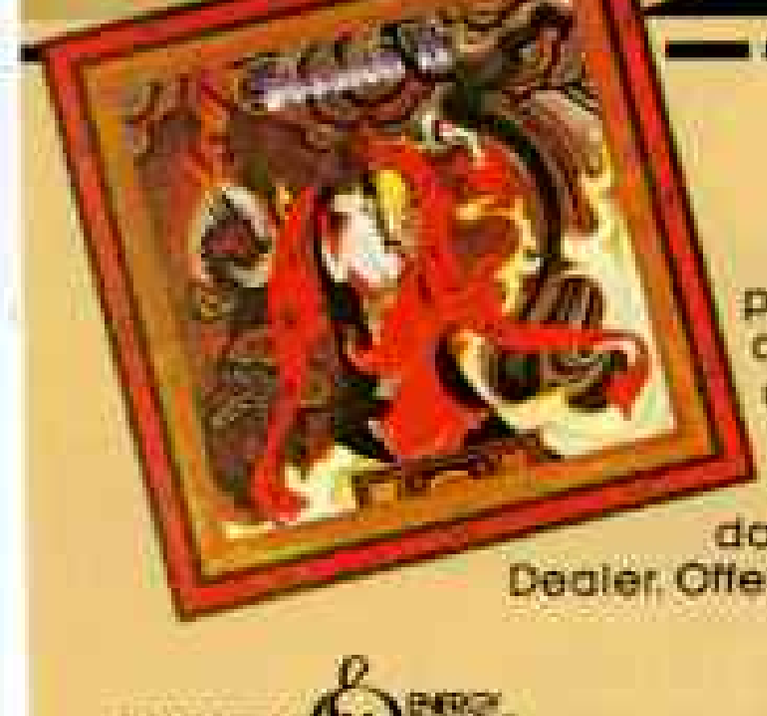
If you already have a stereo, and it's not Yamaha, you owe it to yourself to give Yamaha systems and components a listen. Now is the time to own Yamaha.

Plan to visit your Yamaha Audio Specialty Dealer this weekend and discover the difference for yourself. He's listed in the Yellow Pages.

YAMAHA

Yamaha International Corporation,
P.O. Box 6600, Buena Park, CA 90622.

Also available in Canada.



Free for the listening!

The Session II album, valued at more than $15.

Hear today's hot studio musicians play the sounds of tomorrow on this lavishly produced album. You can't buy the Session II record, but you can get it free with a demonstration of this Yamaha CR-640 component system at your Yamaha dealer.

Recorded with state-of-the-art techniques for astonishingly live ambience, Session II is destined to become a Collector's item. Quantities are limited, so don't delay! See the Yellow Pages for the name of your Yamaha Audio Specialty Dealer. Offer good thru Dec. 15 at participating dealers. Offer limited to one per household.

HOME STEREO 11 ENERGY FROM ENTERTAINMENT

YAMAHA

Nippon Gakki Co., Ltd., Japan

Lightweight aluminum saves energy in transportation.

Alcoa's TV commercial shows you how.

If you've ever wondered how something so big got off the ground, part of the answer is aluminum.

Aluminum's high strength and light weight made modern aviation possible.

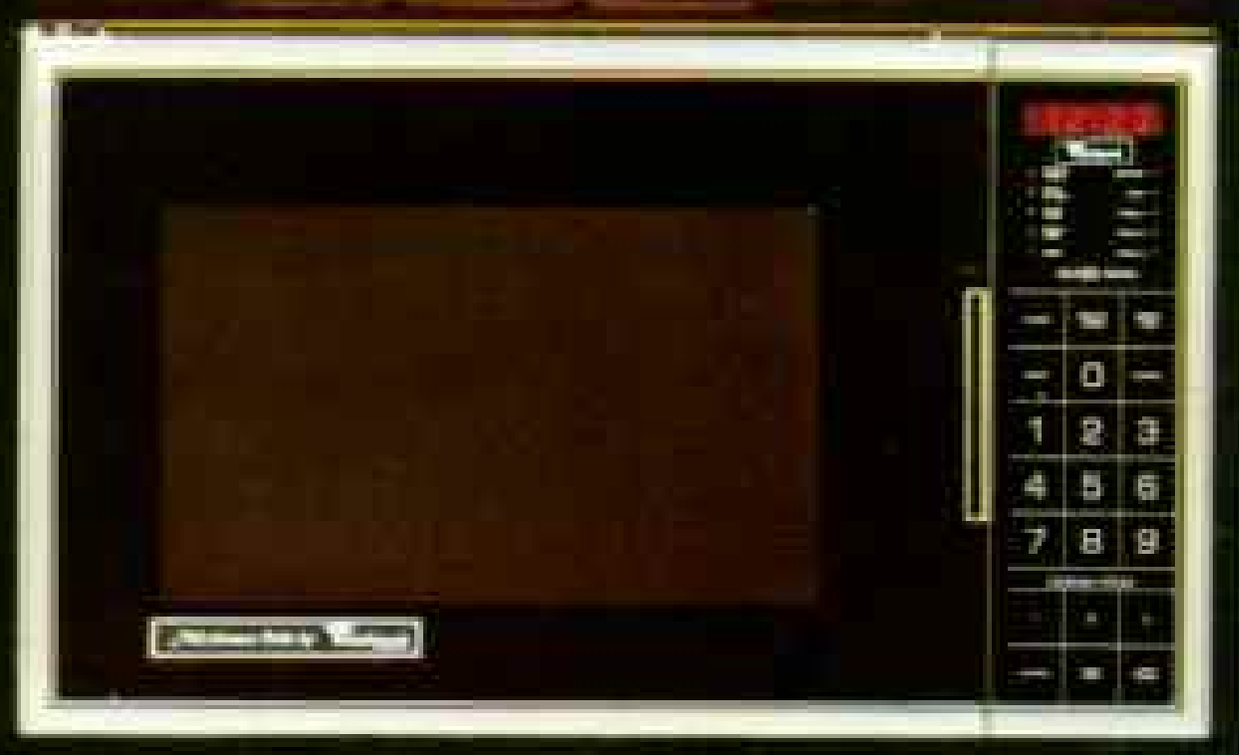
Aluminum is important to *most* forms of transportation. Because taking the weight off planes, trucks...

and now cars, saves fuel.

Aluminum in transportation.
It's a better way to get there—today.

We can't wait for tomorrow.
For more information write Alcoa,
359-M Alcoa Building, Pittsburgh, PA 15219.

What every other microwave oven is missing.



All microwave ovens are capable of cooking foods quickly. But at Whirlpool, we wanted to give you more.

That's why we designed the Mark Series Microwave Oven with our touch controls for simple operation. The right touches of your finger tell it when you want dinner. And it will compute the start time and begin cooking without your even being there.

We also add an automatic Meal Sensor™ temperature probe that continuously measures temperature and automatically turns the oven off.

We even include a special touch control cookbook with recipes tested and approved by the Better Homes and Gardens test kitchen so your meals taste as good as they look.

Then, most important of all, our microwave oven has something none of the others have. It has our name . . . Whirlpool. And all of the beautiful things that go with it.

Beautiful things like the Cool-Line® service. It's a toll free telephone service that will help with any problems or questions about cooking or operation.

And Tech-Care® service. Our nationwide franchised service made up of, we believe, some of the best service technicians in the world.

And our warranty that's written so it can be understood.

Beautiful things, yes. And we think that's exactly what you should expect from Whirlpool.

Whirlpool
Home Appliances

Quality. Our way of life.