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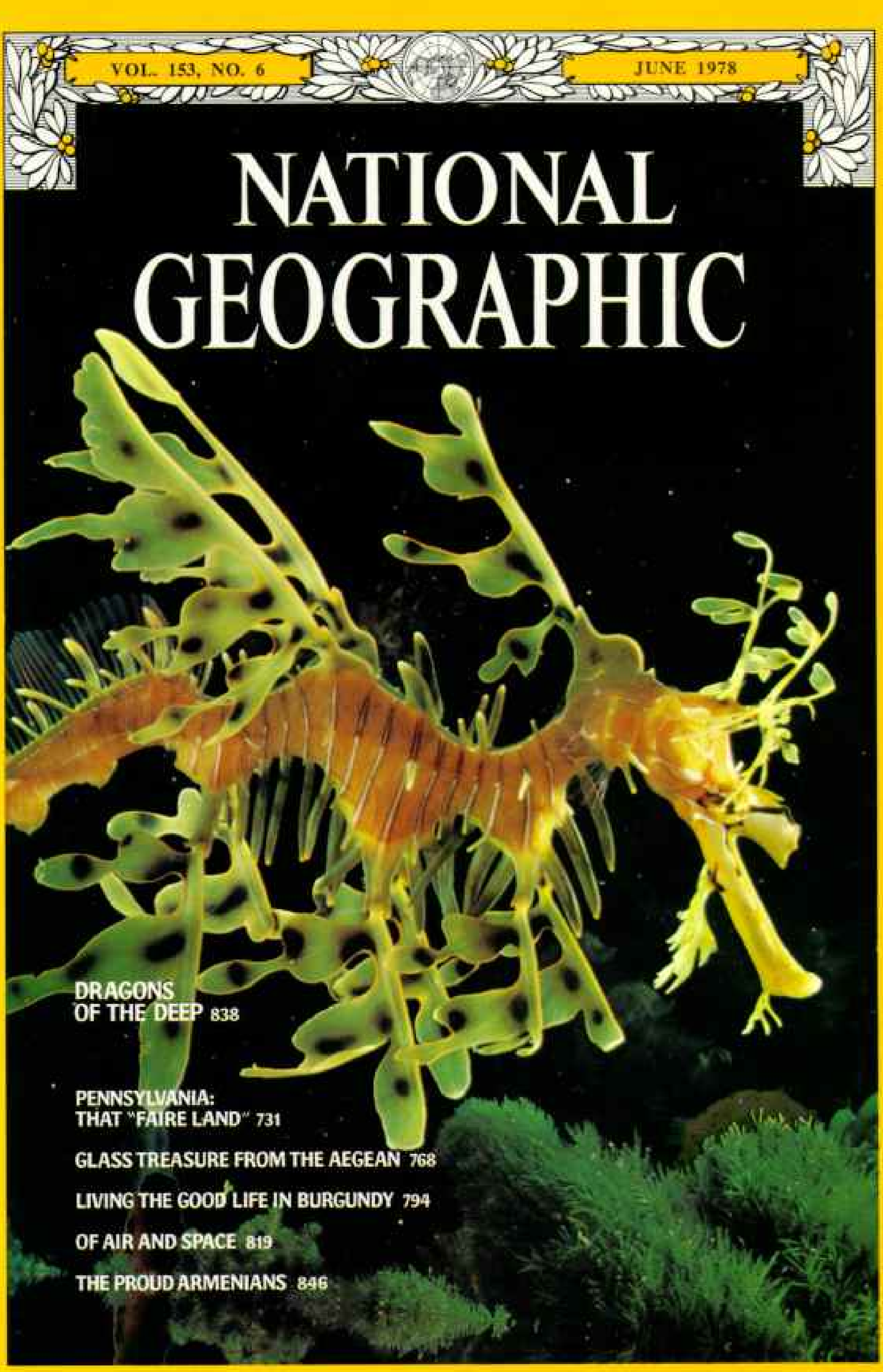

DRAGONS OF THE DEEP 838

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

"THE NEWEST VESSEL in the ghost fleet," remarked a colleague as we looked over proofs of this issue's article on the fabulous "glass wreck" of the 11th century. It was an apt comment. Since 1961, when the Society's Committee for Research and Exploration helped support marine archeologist George F. Bass in his excavation of a 1,300-year-old Byzantine wine ship, a small flotilla of Greek, Roman, and other ancient vessels has been retrieved from watery graves and set to sail once more in the minds of men. Their study has contributed to a spectacular increase in our knowledge of ancient mariners and their ships.

In five years, more than 650 research projects in 26 disciplines have been approved by the committee, representing an expenditure of $6,875,000. This magazine is often the fortunate recipient of articles resulting from that support. Some are of historic importance, like those of the late Louis S. B. Leakey and his wife, Mary, and son Richard. Mary's latest discoveries in Tanzania include the fossilized tracks of a knuckle-walking primate and probably of a hominid that lived some 3½ million years ago.

As an editor who enjoyed *Star Wars* and *Close Encounters of the Third Kind*, I am following with interest the research of Dr. Krzysztof Serkowski of the University of Arizona's Lunar and Planetary Lab. Using optical means, he hopes to detect large planets around stars similar to our sun.

Meanwhile, photographs taken with the 158-inch telescope at Kitt Peak National Observatory are being used to make an atlas of the Andromeda galaxy, that vast spiral of stars that swirls "nearby" in space.

Looking backward into time as well as outward into space, the Society supports the research of Dr. James A. Jensen, whose amazing dinosaur discoveries in Utah and Colorado will be published soon.

Meanwhile, the work of Jane Goodall with free-living chimpanzees and of Dian Fossey with mountain gorillas goes on, along with exploration of Maya and Olmec ruins in Central America, a Mycenaean acropolis in the Aegean, a search for Britain's earliest humans. The list is long and varied. But each item promises an increase in knowledge of the world in which we live—and good reading for years to come.

Gilbert M. Grosvenor

NATIONAL GEOGRAPHIC

THE NATIONAL GEOGRAPHIC MAGAZINE VOL. 153, NO. 6

June 1978

William Penn's Faire Land 731
Colossus of productivity, the Keystone State still cherishes its role in the nation's beginnings and preserves vast sweeps of forest and mountain. Gordon Young and Cary Wolinsky roam Pennsylvania.

Treasure From the Aegean 768
Preserved by the sea for 1,000 years, priceless Islamic glassware is salvaged from a shipwreck in a Turkish cove by marine archeologist George F. Bass. Photographs by Jonathan Blair.

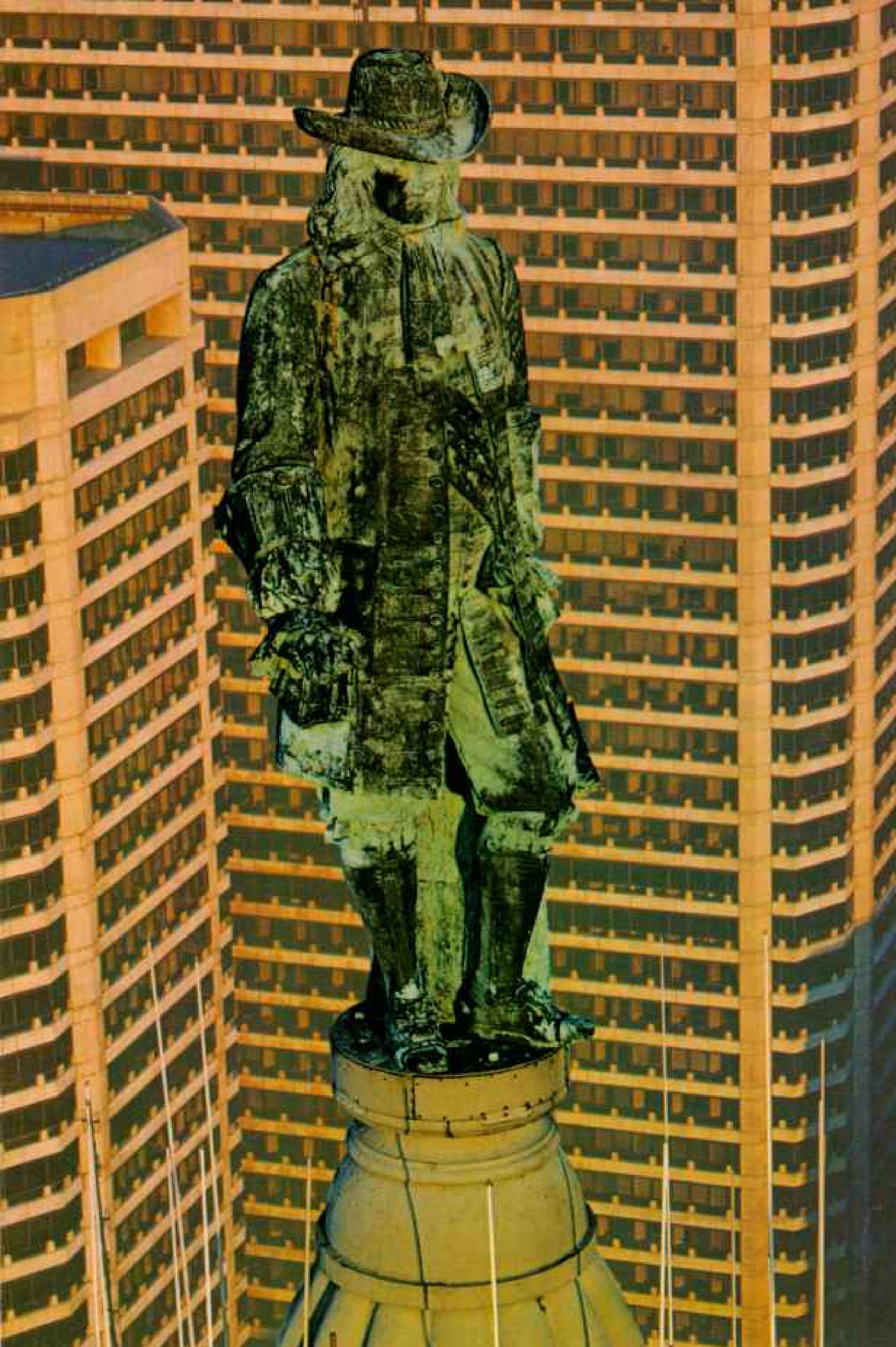
Living the Good Life in Burgundy 794
Only the bonhomie of its habitants exceeds the rich history and vaunted wines of this bountiful region of France. William Davenport and Robert Freson discover.

Uncle Sam's Museum With Wings 819
The Smithsonian's monument to man's conquest of air and space is drawing visitors by the millions. Director Michael Collins, a former astronaut, introduces a pictorial tour, with photographs by Nathan Benn, Robert S. Oakes, and Joseph D. Lavenburg and text by Michael E. Long.

Bizarre Dragons of the Sea 838
Terrifying in name and visage only, 12-to-18-inch-long relatives of the sea horse thrive off Australia's southern coast. A picture story by Paul A. Zahl.

The Proud Armenians 846
Though uprooted from their ancestral homeland, a far-scattered people have not forgotten their traditions or their faith. Robert Paul Jordan tells their story, photographed by Harry N. Naltchayan.

COVER: *Like drifting weed, a leafy sea dragon blends with plants of Australian waters. Photograph by Paul A. Zahl.*



PENNSYLVANIA

Faire Land of William Penn

By GORDON YOUNG
SENIOR EDITORIAL STAFF

Photographs by CARY WOLINSKY
STOCK, BOSTON

THE "KEYSTONE STATE," it is called—locking together the other building blocks that form the original 13 states. And like any keystone, the Commonwealth of Pennsylvania from its beginnings has been subject to stress.

Founded by a gentle Quaker as his "Holy Experiment," it became a battleground for three major wars. Settled by people who wanted only to worship God and till the land, it became, for a time, a series of industrial fiefdoms. Lashed by storms and floods, violated by opportunists who plundered its resources, struggling against today's economic pressures, it has endured.

More than endured. Within Pennsylvania's roughly rectangular borders lie great cities and sophisticated centers of culture, together with vast areas of rugged wilderness. Plus seaports, rail centers, turnpikes, all of the nation's active anthracite mines, and many of its giant steel mills. The Keystone State is an industrial colossus, whose aging limbs are now suffering a touch of arthritis.

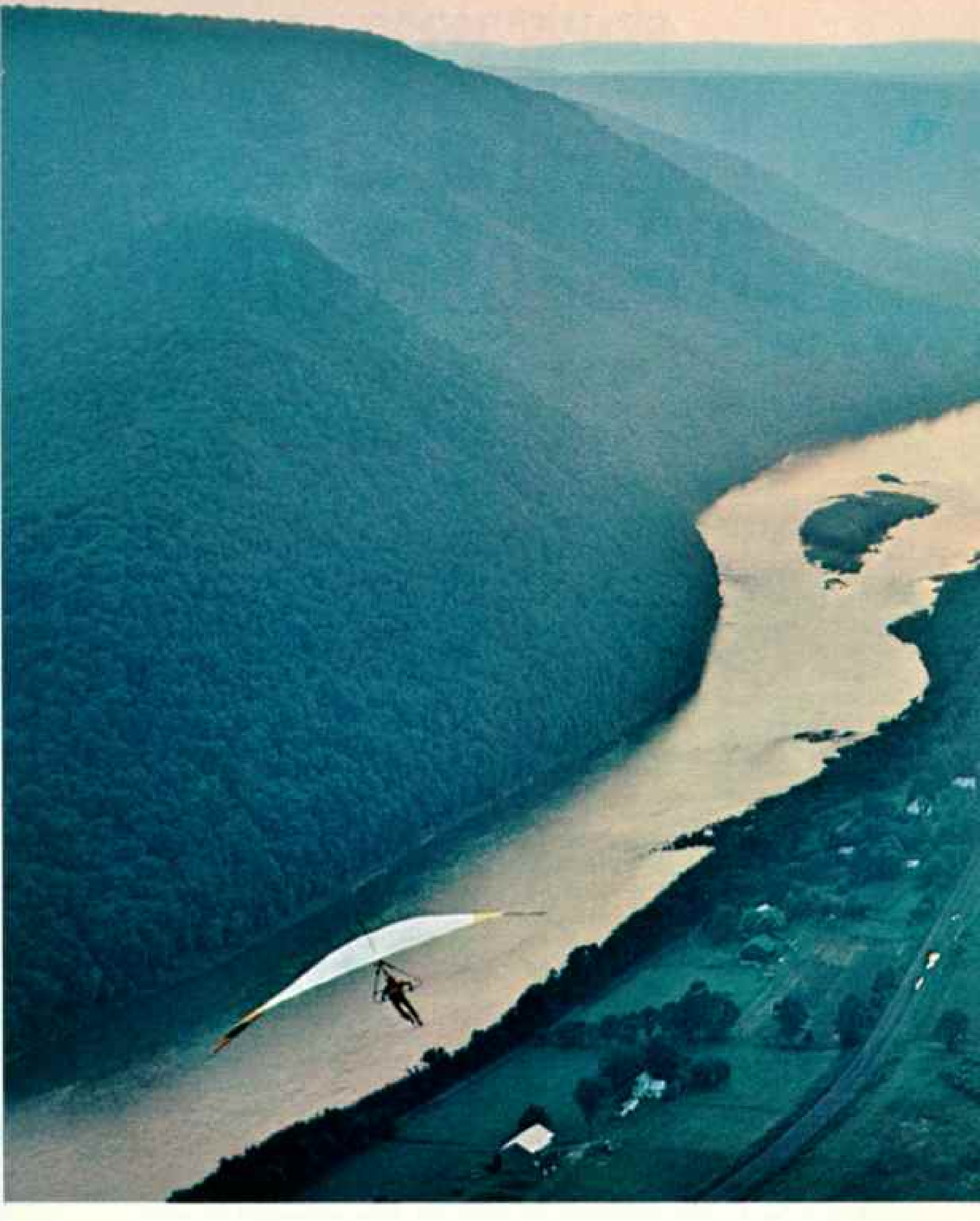
It began with a Quaker idealist named William Penn. Almost three centuries ago his king granted him a tract of land, decreeing that it be called "Pennsilvania." Penn's dream was to make of it a haven for all who wanted to worship God in their own ways.

"Let the Rivers and Creeks be sounded on my side of Delaware River," he instructed his commissioners, "in order to settle a great Towne . . . ." Philadelphia: "City of Brotherly Love."

As my taxi moved down Philadelphia's broad, treelined Benjamin Franklin Parkway, the cabby mulled over that Brotherly Love business. "Well, there's more of it here than there used to be—but there's still parts of this city I don't like to drive through after dark. Generally, Rizzo keeps the lid on. He was a hard-nosed cop—and he's that kind of mayor. Maybe it takes somebody like him to keep a city like Philly from coming apart."

Not everyone in Philadelphia agrees, for Frank Lazzaro Rizzo has, in his two terms, become one of the nation's most controversial mayors. *(Continued on page 736)*

Father of Pennsylvania, William Penn shaped the land's destiny with a belief in piety and diligence. His royal grant was blessed with forested mountains and lively waters, bountiful coal and oil, and fruitful soil. Those who peopled the colony forged a state of mind and commerce, religious tolerance, ethnic richness, and industrial productivity. As his "City of Brotherly Love" rises behind him, Penn today endures in weathered bronze atop Philadelphia's City Hall.



Before night conquers, a dying sun drops a pearly sheen on the Susquehanna River's West Branch and burnishes the wings of a hang glider in silent flight above the village of

Hyner. Exploring Chesapeake Bay in 1608 for gold or a passage to the Orient, Capt. John Smith discovered instead the Susquehanna, later a pathway for settlers.

Pennsylvania

Wellspring of history and forge of industry

Lake Erie
PRESQUE ISLE STATE PARK
Erie
Erie Triangle purchased from the Federal Government in 1792 to provide the state with lake frontage for a port
NEW YORK
To St. Lawrence Seaway and maritime markets
Allegheny
Nation's first commercially successful oil well, Titusville, 1859
Oil Creek
Grand Valley
Drake Oil Well
Titusville
Pleasantville
Meadville
Pymatuning Reservoir
Oil City
Cross Fork
Hyner
Sharon
Youngstown
OHIO
Slippery Rock
CEMENT
MORAINE STATE PARK
Butler
Punxsutawney
West Branch Susquehanna
Barge route via the Ohio to Gulf of Mexico
Beaver
Aliquippa
Shippingport
Ohio
TOURISM
Pittsburgh
IRON AND STEEL
BITUMINOUS COAL
Homer City
Horseshoe Curve
Altoona
Allegheny Mountains
ALLEGHENY PORTAGE R.R. NAT. HISTORIC SITE
Johnstown
IRON AND STEEL
Latrobe
Ligonier
New Stanton
Washington
W. VA.
PA. TURNPIKE
BITUMINOUS COAL
French and Indian War starts at Fort Necessity, 1754.
Uniontown
FORT NECESSITY NATIONAL BATTLEFIELD
Monongahela
Mt. Davis (Highest elevation in Pa.) 979 meters 3,213 feet
Bedford
Fort Bedford Park and Museum
Chambersburg
Mason-Dixon line
Appalachian
WEST VIRGINIA | MARYLAND

A WEDDING OF CULTURES, Pennsylvania fostered the birth and growth of a nation. Hungry for freedom and land, Swede, Dutchman, and Englishman settled the Delaware Valley; German and Swiss tilled fertile farmland, and the restless Scotch-Irish pushed the frontier west. In Philadelphia the Founding Fathers first convened the Continental Congress and proclaimed independence. Retaining their colorful heritage, Pennsylvanians worked mine and factory, building a state that prospered in industry and commerce.

AREA: 45,333 square miles; rank, 33rd. POPULATION: 11,862,000 ECONOMY: Manufacturing, farming, mining MAJOR CITIES: Philadelphia, 1,817,100; Pittsburgh, 458,650; Erie, 127,900; Harrisburg (capital), 58,300.

NEW YORK

Tioga

Owassee Rapids

LEONARD HARRISON STATE PARK

Pine Creek Gorge
(Grand Canyon of Pennsylvania)

Pine Creek

Williamsport

Lock Haven

Susquehanna

Mountain

Elk Hill
821 meters
2 693 feet

Carbondale

Delaware

Scranton

ANTHRACITE COAL

Wilkes-Barre

Matamoras

N.Y.

N.J.

Pocono Mountains

DELAWARE WATER GAP NATIONAL RECREATION AREA

TOURISM

Stroudsburg

The Appalachian Trail winds from Mt. Katahdin, Maine, to Springer Mountain, Georgia.

Sunbury

ANTHRACITE COAL

PA. TURNPIKE N.E. EXTENSION

CEMENT

IRON AND STEEL

Easton

Allentown

Bethlehem

Pottsville

LIMESTONE

NEW JERSEY

Lewistown

Juniata River

Washington defeats British after crossing the Delaware, December 25, 1776, and valiantly holds his army together during winter of 1777-78 at Valley Forge.

New Hope

Washington Crossing

Trenton

Hershey

Lebanon

Reading

Harrisburg

PENNSYLVANIA TURNPIKE

Schuylkill

Pottstown

IRON AND STEEL

Carlisle

TOURISM

New Holland

VALLEY FORGE NATIONAL HISTORIC PARK

CHEMICALS

Lancaster

Bird in Hand

Paradise

Philadelphia

York

Strasburg

TOURISM

OIL REFINING

Camden

Battle of Gettysburg, July 1-3, 1863: turning point of the Civil War

Gettysburg

GETTYSBURG NATIONAL MILITARY PARK

FARMING

Susquehanna

Kennett Square

Chester

Delaware

MARYLAND

Wilmington

Atlantic Ocean

shipping trade

Baltimore

MD.

VA.

Chesapeake Bay

DELAWARE

MARYLAND

Dover

Delaware Bay

Washington

D.C.

Annapolis

(Continued from page 731) He swept to power on a law-and-order platform. "We've got to take the electric chair out of storage," he announced. "I will personally pull the switch if they run out of people who want to do it."

His hotly debated actions prompted liberals and minority groups to petition for his recall, but the move failed. When I visited his city, the outspoken mayor was still in charge.

Cricket Bats and Rowing Sculls

Stormy politics aside, the City of Brotherly Love is a comfortable place, with quiet surprises for the stroller. When I paused to watch downtown street repairs, I was startled to see that streetcar tracks were being replaced, rather than removed. This city is too conservative, it seems, to recklessly dispose of its trolley cars.

Yes, tradition is important here. The crack of cricket bats still resounds from spacious Fairmount Park. Rowing sculls still glide along the Schuylkill River. And on occasions of state, Philadelphia's First City Troop—one of the country's oldest military units—dons deep-blue, silver-buttoned tunics, jackboots, and plumed helmets to clip-clop through the streets on horses borrowed from the police department.

But, decades ago, a comedian made a comment that the city has yet to overcome. "I went to Philadelphia one Sunday," said W. C. Fields, "and it was closed."

The tourist business is still not what it might be. "Many visitors think of this as a one-day town," Richard J. Boyle, director of the Pennsylvania Academy of the Fine Arts, told me. "They come to visit Independence Hall and the Liberty Bell, and leave. Too bad; Philadelphia has much more to offer.

"The city's special cultural flavor began with the 18th-century intellectuals," Mr. Boyle said. "But the Quaker heritage has kept it on a very human level." That explains the many museums along Benjamin Franklin Parkway, as well as universities, a busy ballet company, and the outstanding Philadelphia Orchestra.

In addition, the city has a special character that I've found nowhere else. The neighborhoods I visited seem to have an unusual sense of cohesiveness. Society Hill residents fight successfully to keep their old Belgian-block streets. The artisans who occupy many of the old shops on nearby South Street protect its character by luring other craftsmen there. Kensington-area residents stage an annual parade to raise money for hospital improvements.

Like most cities, this one has its pockets of decay. But a black city councilman, Joe Coleman, is fighting Philadelphia's urban blight on a broad front.

"We have thousands of abandoned houses in this city," he told me. Five years ago, through his efforts, the Urban Homestead Program was set up. "Roughly three hundred old houses have been rehabilitated by new owners," Mr. Coleman said, "and more than a hundred are under way. We offer loans to get the renovation projects started; later on, when the houses meet building codes, bank mortgages are available."

For still another view of Philadelphia—the husky, shirt-sleeve workingman's city—stroll along its industrial waterfront. You will find scores of docks, scores of factories, scores of freighters flying foreign flags—for this is the nation's largest freshwater port complex, handling more than seventy-five million tons of cargo annually. William Penn chose wisely when he sited his City of Brotherly Love between two rivers, the Schuylkill and the Delaware.

Not One of Your Run-of-the-Mill Burgs

Some 260 miles west, where three other rivers meet, lies Pennsylvania's second city (map, preceding pages). Pittsburgh: note that final *h*, for it says something about steel town. Almost a century ago, Pittsburghers rebuffed geographers' attempts to standardize all the "burgs" in the nation.

It lacks Philadelphia's grace, this city built on steel, for the men who shaped its growth were not gentle Quakers but practical financiers and industrialists. Some of their names—Carnegie, Mellon, Frick—now grace monuments of culture, philanthropy, and recreation, but Pittsburgh's citizens still focus on industry.

I have lounged on a bench at Point State Park, where two of the rivers—the Monongahela and the Allegheny—merge to form the Ohio. The vista from there was of Mount Washington, crested with handsome homes

and luxurious restaurants. No matter that the intervening view was of the polluted Monongahela, backed by rusting railroad sidings, and that Mount Washington was known in earlier days as Coal Hill. River and railroad both helped Pittsburgh grow. And where would the city be, without coal to feed the hungry steel mills?

Where Many Ethnic Worlds Meet

The view from the top is spectacular. I visited one of those high-perched restaurants in the company of Jamie Van Trump, whose Edwardian mien and white mutton-chop whiskers are familiar to most Pittsburghers through his weekly television appearances. Jamie, who classes himself as an architectural historian, is vice-president of the Pittsburgh History & Landmarks Foundation (page 758).

"This is a city of ethnic neighborhoods," he told me. "Poles, Slavs, Italians, Scots, Irish, and others. Their ancestors came here to dig coal or work steel."

He stared down at the city's Golden Triangle, with its skyscrapers (pages 756-7). "The Scotch-Irish and Welsh were the ones who moved up in the steel jobs—into the offices over there. Why them? Because they were the ones who could speak English."

Jamie does his best to save—or, at least, record—the churches in ethnic neighborhoods. "It's important to make the ethnic groups conscious of what they have, before they lose their identities in this great mechanistic society of ours," he said thoughtfully.

And then he gave me an elfin grin. "After all, I'm part of an ethnic group myself; I'm an old Dutch-Scotch-Irish WASP."

Dusk was falling. Soon the tall lighted buildings in the Golden Triangle were reflected in the rivers. Behind them, a carpet of tiny diamonds stretched as far as we could see—the suburbs.

"About a century ago," Jamie mused, "someone called this place 'hell with the lid off.' But our air started clearing a bit back in the 1940's, when city regulations made homeowners stop burning soft coal."

Today Pittsburgh's skies are even bluer. That new clarity, though, comes both from regulations and from competition—lower-priced steel from abroad has resulted in a 20 percent cut in steel production.

Inevitably the hard-pressed steel companies have reduced their work force as well as their production. Of some 21,000 layoffs in the steel industry nationwide, 10,000 have been Pennsylvanians.

"Most of those laid off were laborers," a Jones and Laughlin Company steelworker told me. "The experienced people were kept—though a lot of them were moved down a notch or two and get less pay. Morale is way down in the plants. Everybody's living just a day at a time."

Later I wandered into a South Side tavern, where much of the talk was in Polish, and frustration filled the air like smog. These were steelworkers, the ones most threatened by the impending further layoffs. For protection they turned to their union, the United Steelworkers of America.

Strike, some said angrily. If they try to lay even one more of us off, we'll close the damned plant.

And the infuriating answer from cooler heads was this: We'd be playing into their hands—the company could turn its strike losses into tax advantages, and besides, they would save the cost of layoff benefits if we left the plant on our own.

Environmental Issues Stir Concern

The steel giants face war on another front, too. Environmentalists accuse them of ignoring pollution regulations. The issues are complex and highly technical, but they boil down to this. . . .

- Obey the law, say the environmentalists, by cleaning up pollutants that still pour from your plants.
- Give us more time, the companies reply. Cleanup techniques are still unproven, and we lack the money to implement them.

. . . And so the battle of words and writs goes on.

Many times as I traveled through the state, I heard another serious complaint: Industry is moving out of Pennsylvania, down to the sun belt, where costs are lower. Our tax base keeps shrinking, and unemployment goes up.

It is a problem common to much of the Eastern Seaboard, but in Pennsylvania the illness of two major industries—steel and anthracite coal mining—intensifies it.

Three years ago I roamed northeastern

Pennsylvania and found few mines in operation.* Shafts long unworked were flooded; the cost of pumping them out was too high to justify going back into production. Some strip mines were producing—carefully regulated, for state mining laws were strong enough to become the model on which most federal legislation is based.

Quality Coal Goes Begging

Was the industry still in the doldrums? In Pottsville I asked George Sterling, chief of anthracite surface mining in the state's Department of Environmental Resources.

"It sure is," he replied. "Last year's production [1976] was only 5,200,000 tons. This year we'll be lucky to see five million. The cost of mining is going up—and the coal market here is going down."

Curious. Anthracite is a relatively clean-burning, low-sulfur coal. Why should it be hard to sell in this energy-hungry nation?

"A lot of domestic plants have converted to oil or gas for environmental reasons," Mr. Sterling said. "And the steel industry, which used to be an important customer, has cut production. I've never seen so much coal piled up in the valley—the operators just can't get rid of it at a profit."

He breathed a sigh. "Right now there are fewer than a thousand people underground in the anthracite industry. The main thing that keeps us afloat is the overseas market. For instance, we ship to United States Air Force bases in West Germany."

Still, there is some hope. "Coal doesn't deteriorate," he pointed out. "It will be there if demand increases. A few plants in the valley are getting into gasification—converting the coal into a clean commercial gas. Maybe

*See "Will Coal Be Tomorrow's 'Black Gold'?" by the author, NATIONAL GEOGRAPHIC, August 1975.

Peacock proud and ready to strut, a mummer sparkles at Freedom Week festivities in Philadelphia (**left**). Rooted in medieval ritual, the parade had its beginnings in colonial times and blossomed in the early 1900's. Thousands of mummers parade in fantastic finery on New Year's Day. Freedom Week celebrators (**right**) also relive the nation's first manned balloon flight—from Philadelphia in 1793.

Aluminum and old brick meld into a pastiche of boutiques and eateries in Philadelphia's NewMarket (**facing page**). The development accompanied a restoration of seedy but restorable colonial homes in the now chic Society Hill neighborhood. Restoration of a different kind is practiced by Milton Street (**below**), who holds his "master key"—the bolt cutters he uses to illegally open vacant homes for squatter families. Street runs his Walk-In Homestead Program from a North Philadelphia storefront and says he has found homes for 300 families. But government authorities say many of the families are being evicted.

that's where the industry's salvation lies."

Not long after I talked with Mr. Sterling, the nation's bituminous miners began what proved to be a protracted strike, which by late winter threatened factory shutdowns and power brownouts. But it did create new demand for those piles of anthracite.

Though small mining operations are closing down because of expensive health, safety, and environmental rules, I did find one independent mine, run by a very independent miner—wiry, rough-hewn Ted Spewock of Latrobe (pages 752-3).

Ted started his mine in 1960 and hired some miners to help him. With fewer than four employees, he was not subject to the Federal Coal Mine Health and Safety Act.

"But they changed the law in 1969 and made it cover operators with even one employee," he told me, "so I laid off everyone and started working the mine myself. I get out about three tons a day and sell it at the tunnel mouth for home furnaces."

He growled, mostly to himself. "There are just too many mining laws made by people who don't know how to mine coal."

He is not entirely alone in the mine. Smokey, an aged pony, helps by hauling the cartloads of coal to daylight. "My seam is about 48 inches thick," Mr. Spewock said, "and old Smokey is 43 inches tall, so he clears the ceiling. Couldn't use a bigger pony."

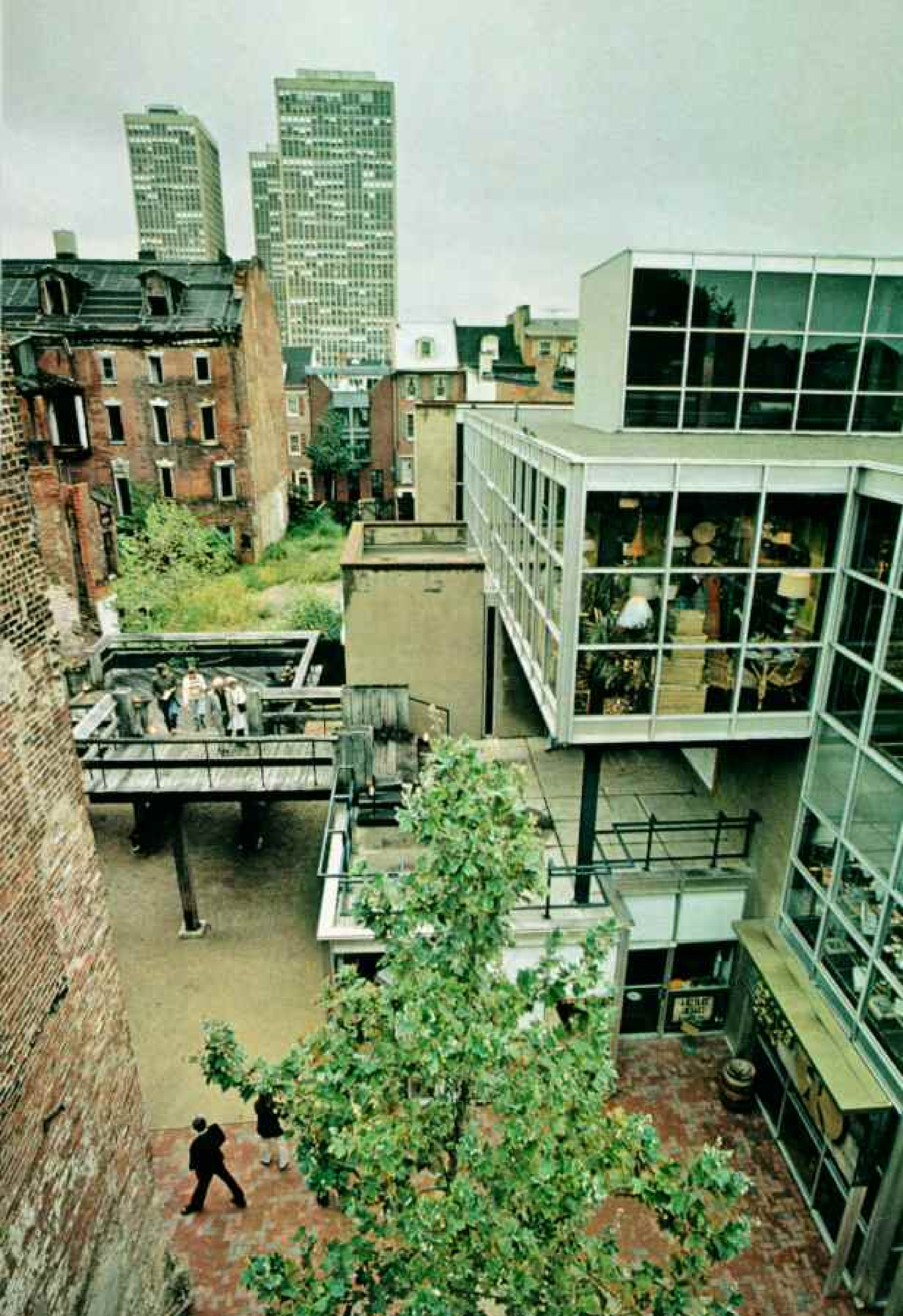
One of his attractive daughters came into the living room, and Mr. Spewock grinned at me. "Six daughters and no sons. Never did manage to raise myself a helper."

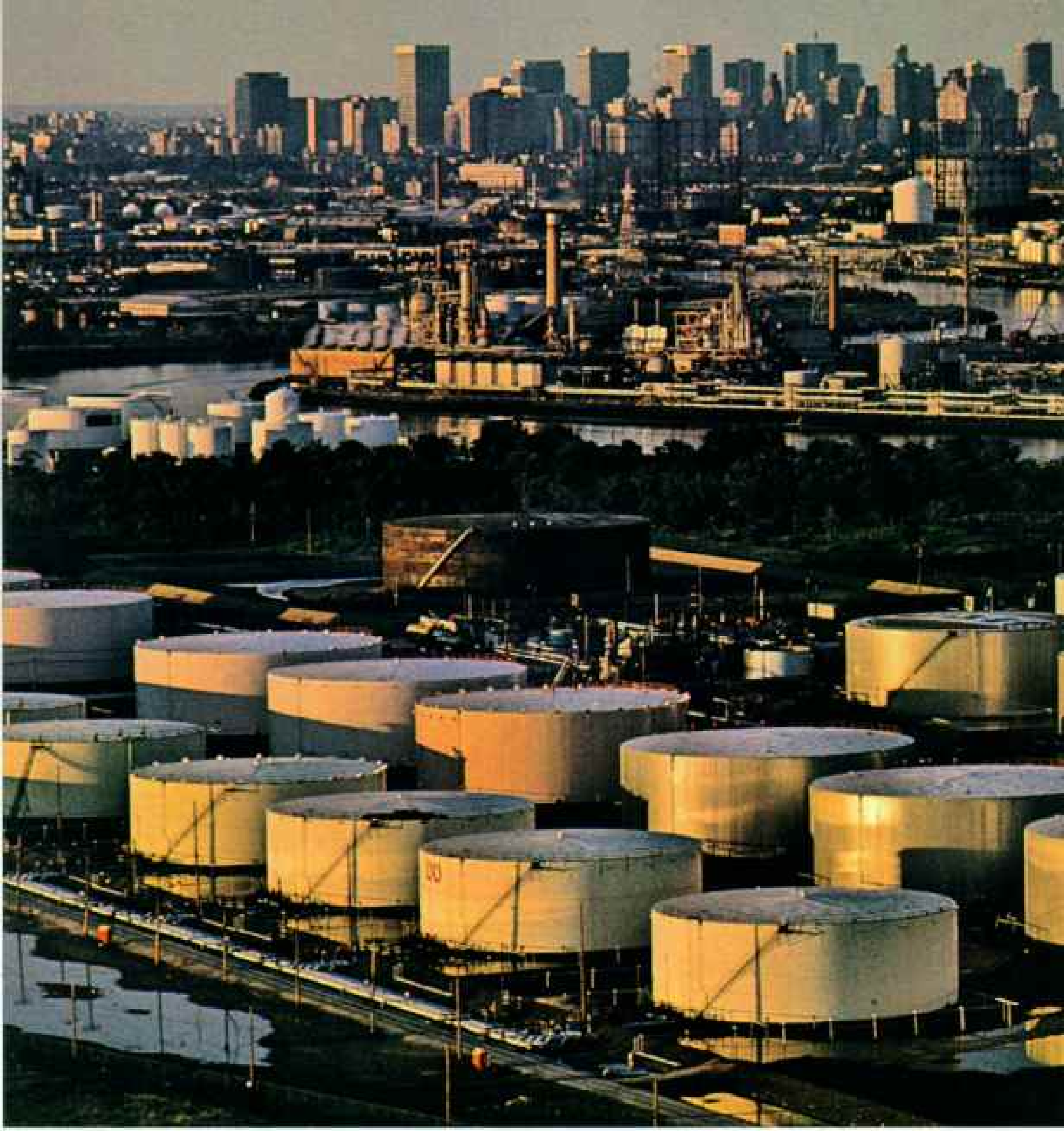
"Colonel" Drake Drills Historic Hole

Not much more than a century ago—when the commonwealth's major sources of energy were wood and coal—the nation's first commercial oil well was drilled, near Titusville. In those days petroleum was sought as a substitute for coal in making kerosene, or coal oil.

It was in 1859 that "Colonel" Edwin Laurentine Drake sank that first well. Drilling began in mid-August. Near the end of the month, at a depth of 69.5 feet, the well began to produce oil.

No military unit had bestowed "Colonel" Drake's title upon him; one of his backers, believing that a bit of status would help their project, arranged it. And Drake was not an





Ready to slake the energy thirst, oil storage tanks dot the Schuylkill River bank across from refineries in Philadelphia, the East's biggest producer of

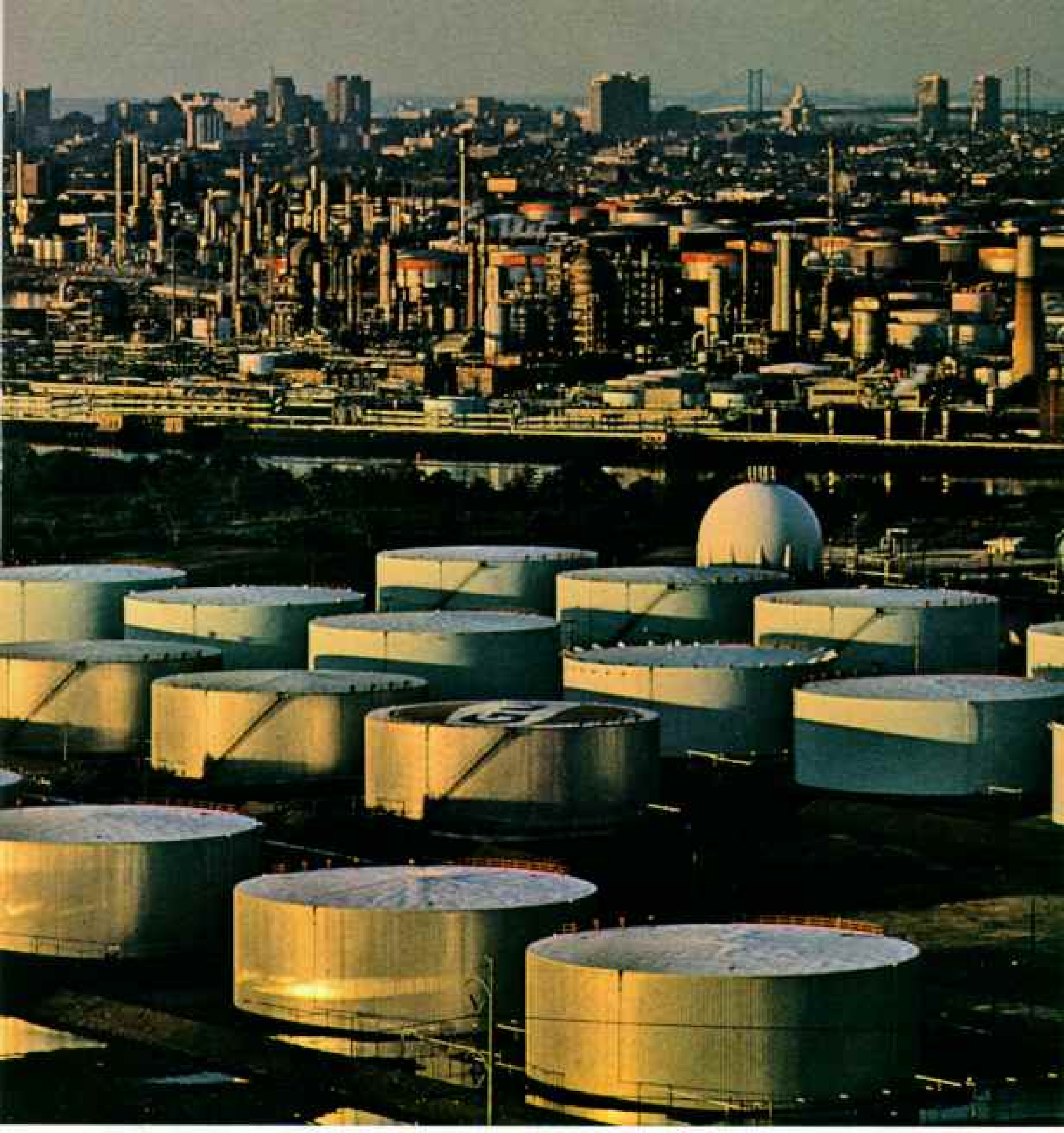
engineer, but a former railroad conductor.

Still, he possessed the most precious of all attributes—luck. He sank his well in probably the only spot in the county where he could reach oil at such a shallow depth.

Drake's success touched off a frantic flurry of oil prospecting. I roamed a museum built at the site of the well and visited the reconstructed derrick and enginehouse, wondering if today's energy crisis had touched off another boom. And so I headed for Oil City, farther down Oil Creek, to find out.

Clarence Pelaghi, executive editor of the *Derrick*, an Oil City newspaper, shrugged. "Not an oil boom. More of a mild resurgence. Pennsylvania crude brings almost $15 a barrel, so there's a lot of activity. But it takes a big investment to get started today. Most of the action is by the large oil companies."

And then Mr. Pelaghi shattered my

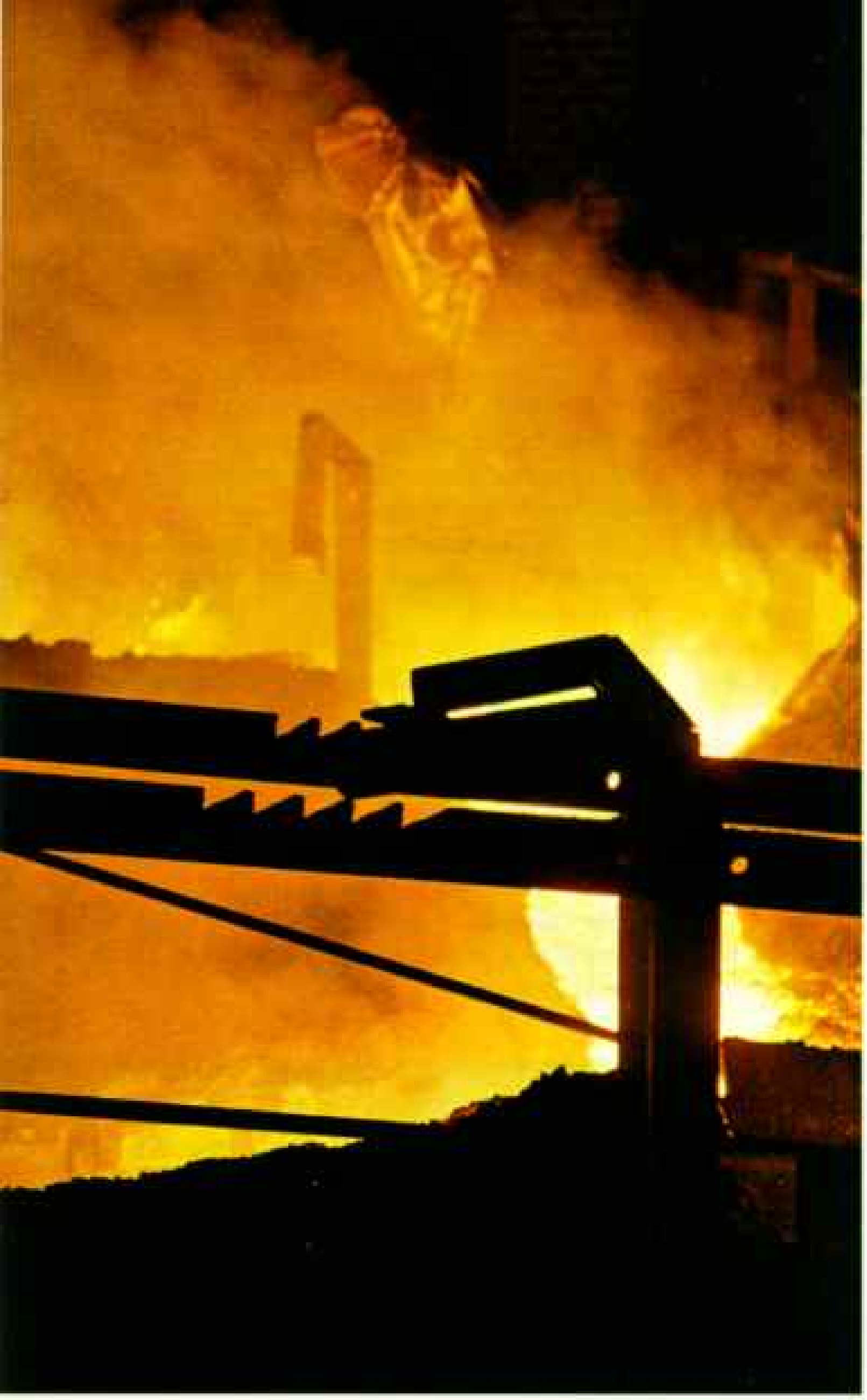


petroleum products. The city's docks and nearby ports on the Delaware last year logged the largest tonnage of any freshwater port complex in the nation.

visions of Texas-style gushers. "Remember, almost all the wells in Pennsylvania are 'strippers'—producing less than ten barrels a day. You have to *work* to get oil out of the ground around here. Usually the operator drills extra holes around his stripper well and pumps water and other solutions down them. The liquid forces the Pennsylvania crude to an area where his stripper pump can get more of it."

Is it worth it? Certainly, for Pennsylvania crude is a remarkably good base for lubricating oil, and is relatively easy to refine.

Colonel Drake's Titusville well is only one of Pennsylvania's energy "firsts." Eighty miles away, near Pennsylvania's western border, the nation's first large-scale commercial nuclear power plant went into operation twenty years ago, feeding its kilowatts into area power grids.



Feeling heat from the pressure to give women equal job opportunities, the Pennsylvania steel industry is changing its masculine image. Agusta Cruise, 45, deals with danger (**left**) as she directs a 2,300°F river of steel into ladles at the Jones and Laughlin plant at Aliquippa, near Pittsburgh.

A head shorter but higher in rank than a burly associate, 23-year-old Barbara Palma supervises the movement of pig iron at Aliquippa (**lower left**). Off duty, she's just an attractive woman hoisting a beer with friends at a Pittsburgh bar (**lower right**). Though a foreman for three years, she says some male coworkers still resent it. "One told me, 'I have a daughter your age. Why aren't you at home with kids?' " Even her father, a former steel-union officer, initially chafed at her rise in management. Both first-generation Italians, her parents now "are proud of me, although they don't come right out and say it."

But steel has a worry that overrides gender and union-management differences: An industry slump has caused thousands of layoffs. Steel ails from lagging demand, bills for costly antipollution equipment, and fierce foreign competition. And hard times for steel spell trouble for the whole economy of Pennsylvania, the biggest producer in the nation.

What does one do with an aging nuclear plant, I wondered, as I headed for Shippingport, Pennsylvania.

But Shippingport Atomic Power Station has acquired a new lease on life and chalked up another Pennsylvania first. Recently equipped with a special reactor core, it is the nation's first light-water breeder reactor.

Theoretically that core should "breed" more fissionable fuel—in this case, uranium 233—than the reactor uses. If it is a success, the concept can be used in other light-water reactors—virtually all commercial atomic power stations are of that type. Our uranium supplies will last longer, and the process does not create significant amounts of plutonium, a substance that is potentially explosive in both weaponry and words.

Even at best, Shippingport's new core will breed slowly. "It will be a matter of years," Carl Goldstein of the Atomic Industrial Forum remarked, "before we'll know whether or not it really is producing a surplus of fuel."

Meanwhile the state stands fourth in the nation in the use of nuclear power, with five reactor units in operation and six more under construction.

Producing a New Breed of Rabbit

Pennsylvania's appetite for electric power is understandable. In manufacturing it ranks fourth in the nation. Near New Stanton, 25 miles southeast of Pittsburgh, an immense silver and blue auto factory should, by now, be spawning Volkswagen Rabbits and employing a sizable percentage of New Stanton's work force.

Making an informal survey at a downtown lunch counter, I found most New Stanton residents very happy to see the German firm come. But mixed with the enthusiasm was a fear that the town would grow too dependent on the giant factory.

My waitress didn't share those views. "The plant hasn't even opened yet, and already real estate prices are way up here in town. There'll be new stores, homes, motels; more money floating around."

She sniffed. "I don't see what there is to worry about. How can you have too *much* of a good thing?"

Nature gets another chance at Moraine State Park (**below**), where the 1977 Boy Scout National Jamboree camps on land reclaimed from coal mining. Pennsylvania passed the nation's toughest strip-mining laws, spurred by William Guckert, who inspects a mine (**above**) before his retirement as state reclamation chief in 1977.

One good thing that Pennsylvania has is lots of greenery. And so it should, for the name means "Penn's woods."

Three-fifths of the state remains forested, much of it rugged wilderness—perhaps nowhere more so than in the spectacular Grand Canyon of north-central Pennsylvania. It hasn't changed much since William Penn's Holy Experiment began; deer outnumber the human residents up there almost 15 to 1, and a two-foot trout is still a possibility.

At the bottom of the 1,000-foot canyon I sat in the bow of an aluminum canoe, staring nervously through driving rain and flying spray at the rapids ahead.

Suddenly we were in the midst of it, dodging haystacks and souse holes. "The river's in concert pitch today," roared Ed McCarthy, my guide, as we careened through Owassee Rapids on Pine Creek. I turned to give him a damp and unconvincing smile. This boiling booby trap of a rapids was rated by Ed as "for expert canoeists only."

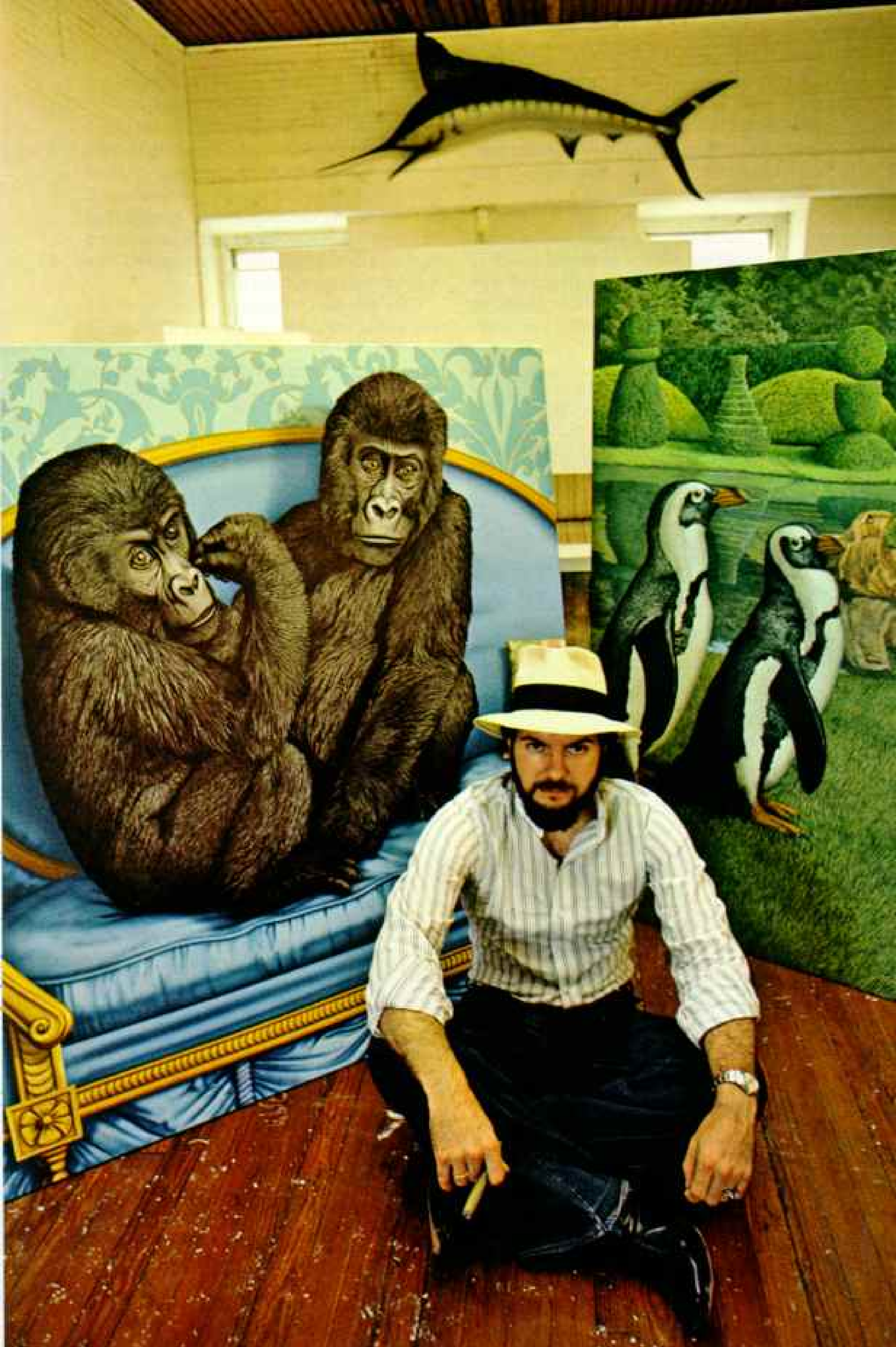
But Ed McCarthy is an expert; he has made this white-water run a thousand times. And even the rain could not obscure the flaming foliage of southern Appalachian and northern hardwoods mingling on the Grand Canyon slopes.

Back home that evening, safe and drying before a roaring fire at the McCarthys' Antler Inn, I realized what a memorable ride it had been. And I wondered why more city dwellers from the Eastern Seaboard had not discovered this area. They will, I'm sure. But for now, Pennsylvania's Grand Canyon country is an outdoorsman's Eden.

Nineteenth-century Pennsylvanians were more concerned with canal barges than with canoes. They watched, alarmed, as New York State's Erie Canal pushed westward. Already New York City had outstripped Philadelphia in size. The canal would widen the gap, unless Pennsylvania created its own western transportation link.

They planned a mixture of rail lines and canals that would stretch from Philadelphia

Rattlesnake roundup ends with a sacking contest in Cross Fork (**above**). Another sporting event—the annual Rolling Rock steeplechase benefiting crippled children in Pittsburgh—begins with a feast spread in the trunk of a Rolls-Royce (**left**).



Gorillas in the parlor and other startling fantasies mark the works of Tom Palmore (**left**), one of Philadelphia's leading artists. The more orthodox "Christ Rejected" by Benjamin West graces the Pennsylvania Academy of the Fine Arts (**above**). Residents also relish the Philadelphia Museum of Art's vigorous community outreach program of public murals, free art instruction, and special exhibitions.

Single-handed entrepreneurs also glean Pennsylvania's riches. Rather than comply with what he considered meddlesome federal safety regulations for coalmine employees, Ted Spewock of Latrobe (**right**) let two helpers go and now works his mine at Ligonier with help only from his pony, Smokey.

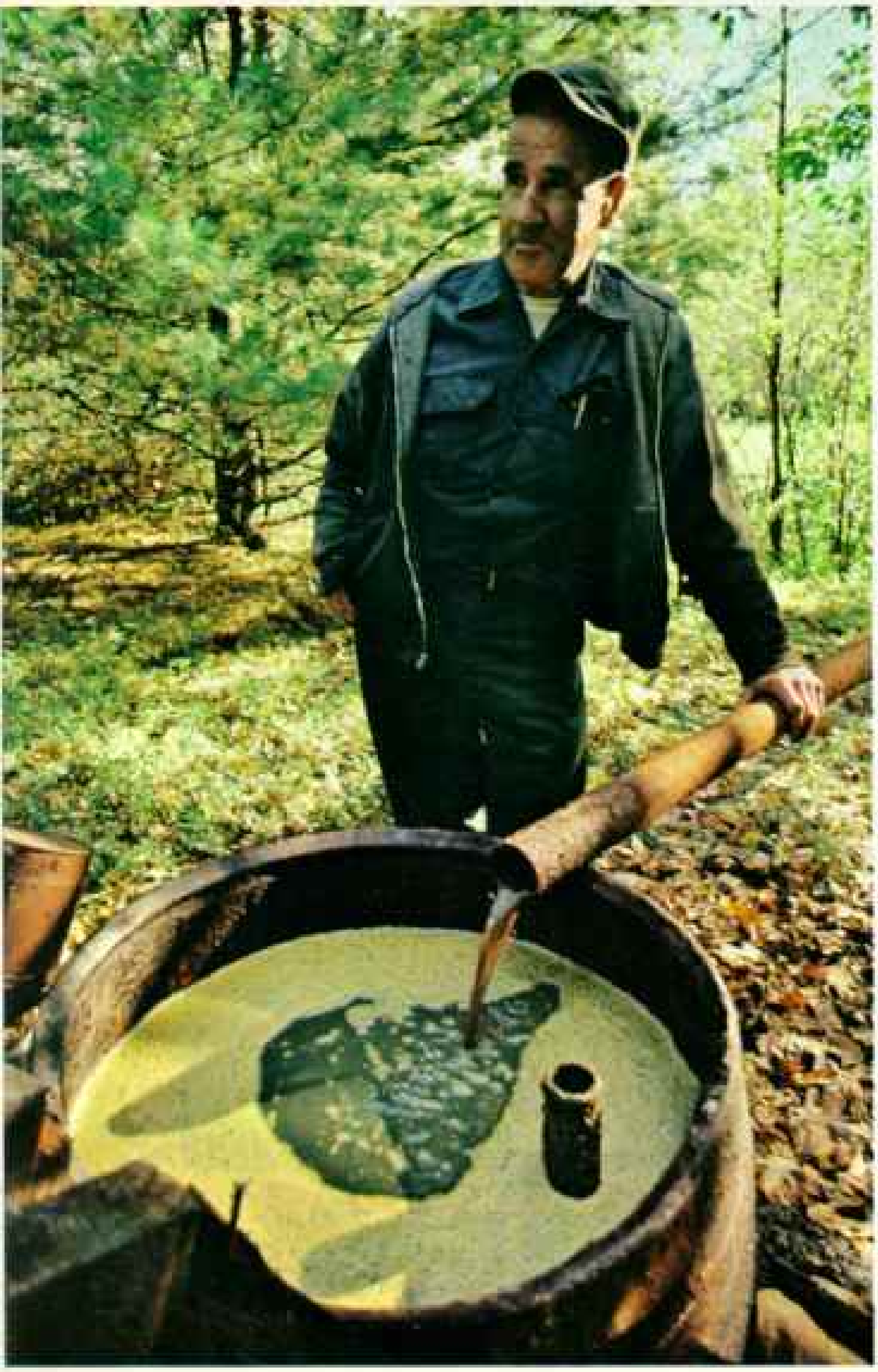
Although employed by the Quaker State Oil Refining Corporation, Blaine Luke of Grand Valley (**below**) also tends his own oil fields, where his 25 wells together yield an average of one barrel a day. This adds almost $5,400 to Luke's annual income.

to Pittsburgh. But how could the Allegheny Mountains be conquered?

Near Altoona, at the Allegheny Portage Railroad museum, I found the solution. Canal barges, built in watertight sections, were lifted from the water onto railway cars. In stages, then, the cars were winched up over the mountains by stationary steam engines. On the other side, the barge segments were launched and reconnected.

The ingenious system worked. But it required 12 winches and 12 different teams of horses and 9 locomotives and a work crew of 54 people.

The portage operated for more than two



decades, until rails were laid around Altoona's famous Horseshoe Curve and trains could cross the mountains on its relatively gentle grade.

Global Outlets for Transport System

Pennsylvania has been an innovator in the transportation field since the Queen's Road linked Philadelphia and Chester in 1706. Today an impressive network of highways crisscrosses the state, including the half-billion-dollar, 470-mile-long Pennsylvania Turnpike. Pittsburgh's rivers link it with mid-America's waterways, terminating on the Gulf of Mexico. Foreign freighters tie up along the wharves of Philadelphia.

And at Erie, too. The day I visited the city by an inland sea, a blustery fall wind was raising whitecaps on Lake Erie, peppering fishermen on the city docks with spray, and sandblasting late vacationists on the beaches of Presque Isle State Park.

But where *were* those salt-stained ships with their foreign flags?

"About seventy foreign ships come in here each year," the port director of customs told me in his downtown office. "Five are due this week." He checked a file. "A British containership docked today. Tomorrow, a freighter from India arrives."

But Erie's industrial docks are tucked away at the end of a long waterfront. The only ship most visitors see is the *Niagara*, flagship of Capt. Oliver Hazard Perry. In 1813 its guns blazed away at British intruders and won the Battle of Lake Erie. Now it rests in a lakeside cradle.

Consider the irony: Pennsylvania—conceived by a Quaker as a land of peace—has been an arena for the French and Indian War, American Revolution, and Civil War.

At Fort Necessity, in southwestern Pennsylvania, a log palisade marks the site of young George Washington's first major battle and only surrender (to the French at the start of the French and Indian War). Farther east, near Philadelphia, is Valley Forge; an older, more battle-hardened Washington wintered there in another war.

In a Place of Terrible Beauty

Those wars, for me, had ended the day I closed my high-school history books. Until I visited Gettysburg, Civil War engagements were dusty chess matches. Blue moved here; gray moved there.

And then I walked among the silent cannons at the Gettysburg National Military Park, and my detachment melted.

It is a great and terrible place, that patchwork of green meadows and woods where North America's bloodiest battle occurred. No general picked the site—it just happened to be the spot where Lee's Army of Northern Virginia ran into Union cavalrymen. Both armies moved in. Three days later, when they disengaged, the dead and wounded totaled more than forty thousand.

Little Round Top, Devil's Den, Culp's Hill, Cemetery Ridge—guidebook in hand, I made the rounds and came away deeply stirred. *This* was no chess match; heroic men killed other heroes here. No visitor can leave this battlefield unmoved.

And now to a transplanted war: Five centuries ago the Houses of Lancaster and York battled each other for possession of England's throne; York's symbol was a white rose, Lancaster's a red one.

The Wars of the Roses still go on in southeastern Pennsylvania—a gentle conflict, actually more of a friendly rivalry, between the cities of York and Lancaster.

But the symbols are there. Drive the Route 30 bridge across the Susquehanna and you'll find white roses planted at the York end of the bridge, red ones on the Lancaster side.

Retreat Brings Fame to Lancaster

Curiously, each city was capital of the nation for a time. In the calamitous year of 1777, when British forces threatened Philadelphia, the Continental Congress was on the move. It paused first in Lancaster, but only for a day, then moved on to York for a stay of eight months. The Articles of Confederation were adopted there.

History buffs visit both cities. In general, though, York is a bargain hunter's town; its fabric outlets, especially, draw shoppers from hundreds of miles away.

Lancaster and its environs attract many tourists. They come to ride the Strasburg Railroad to Paradise, sate themselves on Pennsylvania Dutch food, and eye the soberly garbed men and women who lead the kind of lives that William Penn himself would recognize and approve.

The Amish: You see them on the roads, driving their handsome little black horse-drawn carriages. Each buggy sports a bright orange triangle on its rear—a safety device recommended by the highway department.

In the Farmer's Market at Bird in Hand, near Lancaster, I met a gentle middle-aged egg seller named Melvin Stoltzfus and gained a small insight into Amish life.

He uses no modern mechanical devices to tend the 8,000 chickens on his farm, for he is Old Order Amish. "We try to back off from modernization," he told me. "We are taught to live simply and be happy with it."

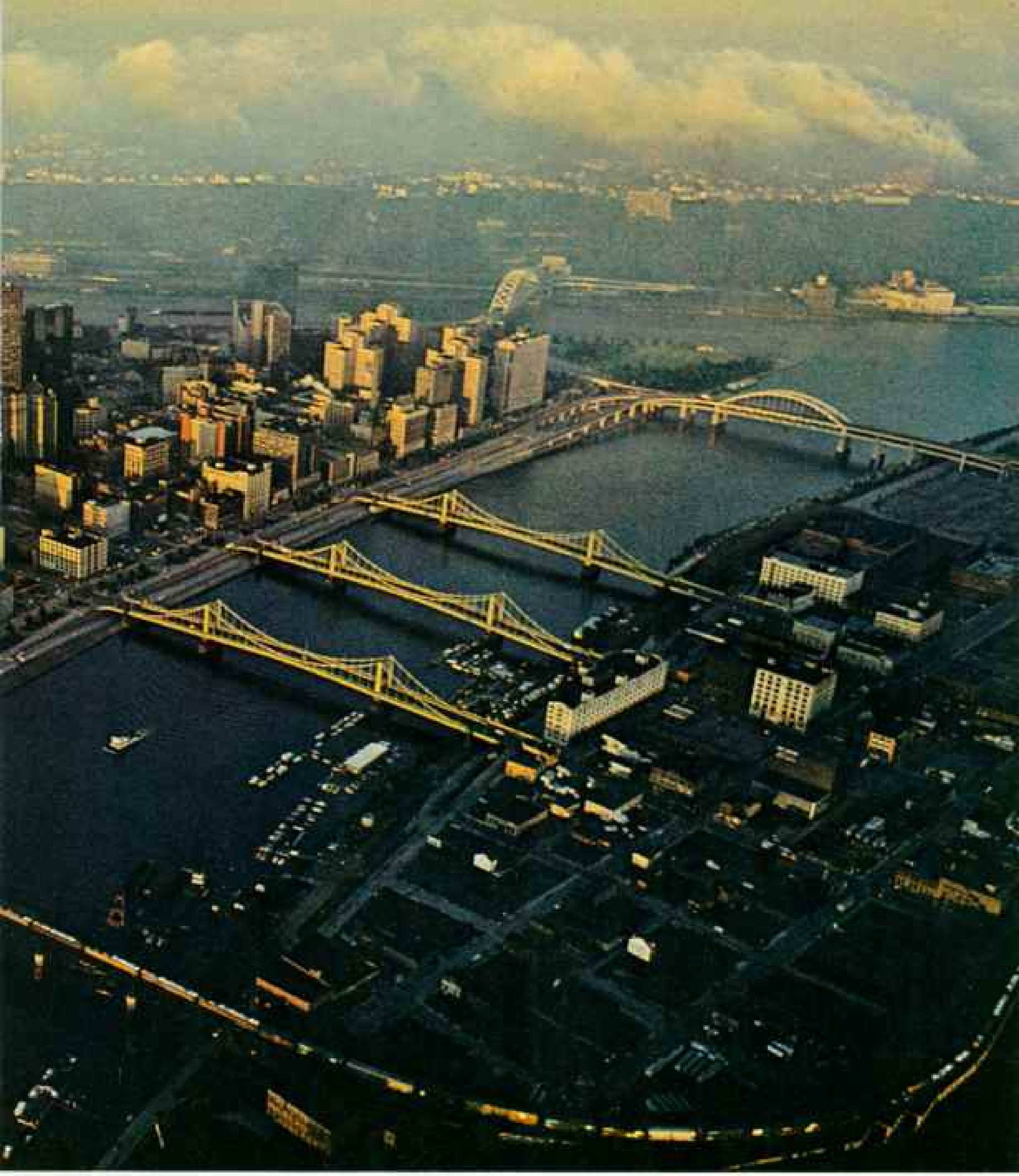
Quietly Mr. Stoltzfus made it clear that he

A country road takes its own sweet time weaving up a multicolored slope to hills in sparsely populated Tioga County. Though heavily industrialized, Pennsylvania is three-fifths timbered, a transition zone between northern and southern forests. It also claims some of the nation's most productive farmland, particularly in southeast areas, and yields bounties of dairy products, corn, mushrooms, fruit, and tobacco.

Arms of a sinewy city stretch up and out as dawn rouses Pittsburgh. Industrial muscle grew naturally here, fed by nearby coalfields and river-linked markets. The Allegheny, foreground, and the Monongahela, above, merge into the Ohio at right, where skyscrapers rise in the Golden Triangle. Before a cleanup drive, streetlights burned at noon in the "Smoky City."

was not trying to publicize his sect—only to answer my questions in a spirit of Amish hospitality. "We don't try to convert others," he said. "Only to live our own way."

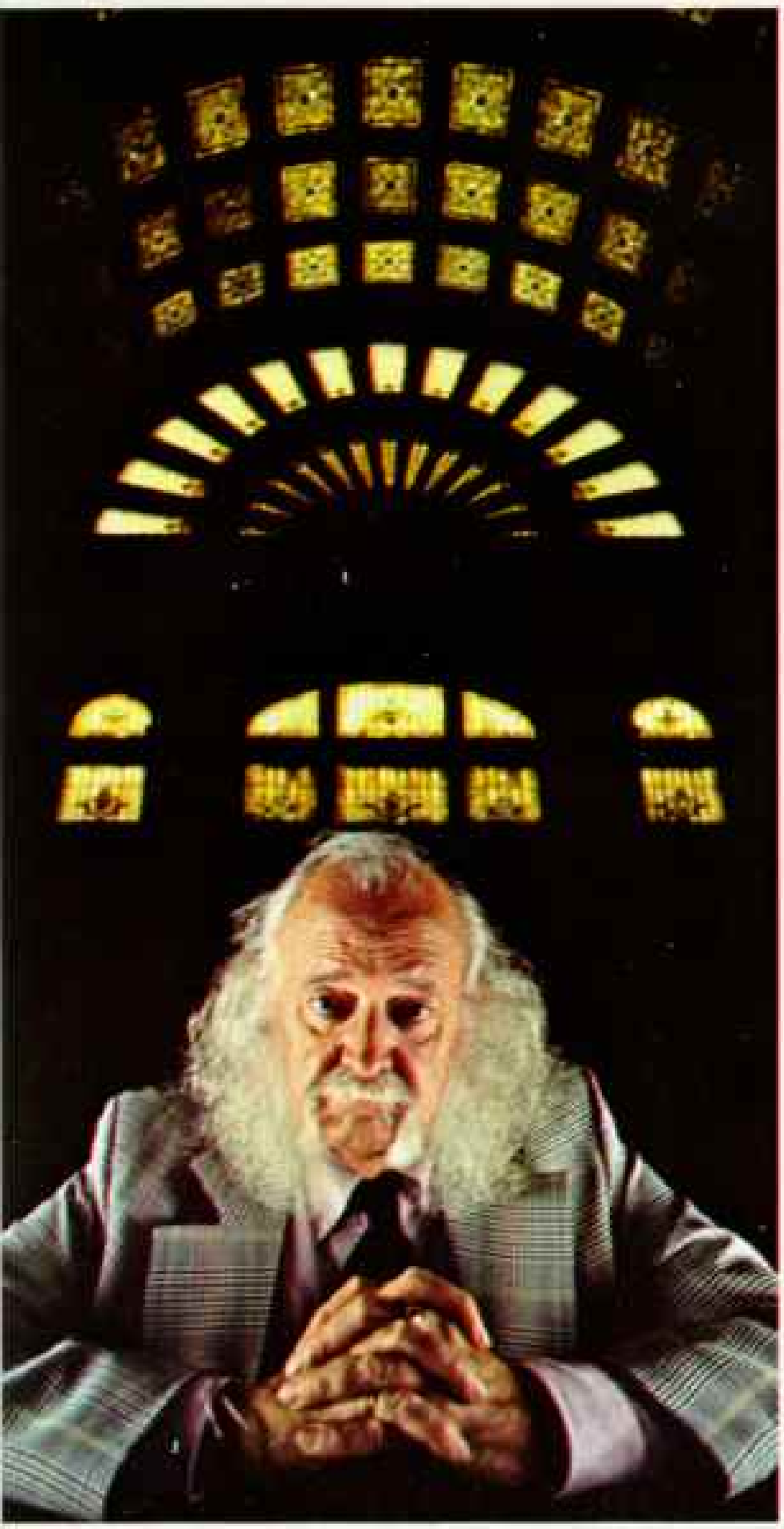
The Commonwealth of Pennsylvania imposes no unnecessary obstacles; the Amish have their own teachers and schools, for example. Their children get eight years of education, focusing on the three R's—reading,

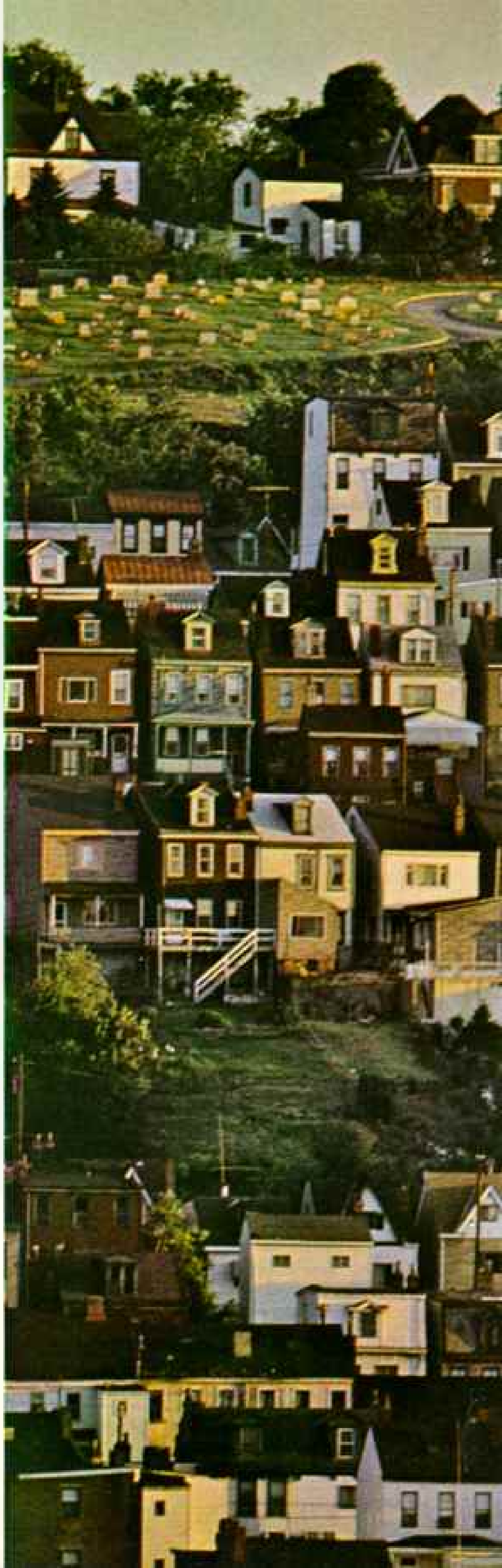


writing, and arithmetic. With that, school days are over for most. But not their education. "They learn by doing," said Mr. Stoltzfus, himself the father of three.

He told me that the sect—Anabaptists—came to Pennsylvania in the late 1600's, seeking freedom of worship. They are generally known as Mennonites, but some have grouped themselves under other labels, such as the Amish or the Brethren. To all, prayer still plays an important part in daily life.

Non-Amish—"the English," as Mr. Stoltzfus terms outsiders—surely lead a more comfortable existence with air conditioning, electric appliances, and automobiles. But it is difficult not to feel a twinge of unchristian envy for the close family ties and quiet stability of Amish life, and for the





Patriarch of preservation, Jamie Van Trump of Dutch-Scotch-Irish descent is the architectural historian for the Pittsburgh History & Landmarks Foundation. It is credited with the large-scale Station Square restoration project, which will center on the Pittsburgh & Lake Erie rail station (**above**). The foundation is converting part of the building into a restaurant, but the railroad plans to continue using it for its commuter train. With the air cleansed, homes in this old, largely ethnic neighborhood (**right**) overlooking the Monongahela are now coveted for their vistas.

lovely land on which the Amish live it.

During the summer, a drive through the farmlands of southeastern Pennsylvania pleasures the eye. This is highly productive land, wisely tended. Its livestock, dairy products, vegetables, and grains account for much of the commonwealth's 1.8-billion-dollar annual bounty from its farms.

Some Farmers Ignore the Sun

Even in the snows of winter, one harvest continues. I visited Kennett Square, near the Delaware border, to take a flashlight tour of the Phillips Mushroom Farms.

They grow in darkness, those curious delicacies, giving off carbon dioxide rather than oxygen. Once they sprout, the plants reach harvest size in only two or three weeks, but that mushrooming growth is deceptive. Months pass during the preparation of pasteurized compost beds and in waiting for the first tiny buttons to appear.

"At least these big cinder-block buildings protect your mushrooms from the weather," I remarked. "Farming is usually more of a gamble."

Don Phillips gave me a forgiving look for my ignorance. "Remember, we're raising fungi on those beds. They're attractive to *other* fungi, too. If anything gets in that compost except mushroom spores, we're in trouble. Mushroom flies are another danger; they can eat us right out of business."

Kennett Square began its rise to fame as the nation's mushroom center—the area ships 50,000 tons a year—back in the early 1900's. "There were quite a few greenhouses in the area," Mr. Phillips said. "One of the growers wondered what he could do with that dark, wasted space under his seed flats, and tried mushrooms. It caught on."

You find innovation, it sometimes seems, wherever you turn in Pennsylvania. John W. Aungst, Jr., administrator of the Lancaster County Historical Society, pointed out two innovations that played a large role in shaping the infant United States.

"The Kentucky rifle originated in this area," he said. "Quite a few Lancaster County gunsmiths turned them out, but Robert Baker and his son, Caleb, were probably the first. They set up shop in 1719."

He reached for one of the handsome, long-barreled weapons leaning against the wall in a corner of his office, and hefted it. "The old European rifles hurled an ounce or so of lead in the general direction of the target. Not very accurate. But this Kentucky rifle was lighter, used much less powder, and fired a smaller ball at a higher speed. A good marksman could hit his target at 200 yards or more. Yes, this gun played a big role in opening the West. And it was still in use when the Civil War came along."

Why *Kentucky* rifle?

Mr. Aungst grinned. "They were popular in Kentucky. But I think the real reason is that the word 'Kentucky' was a generic name for the frontier in those days, and this was primarily a frontiersman's weapon."

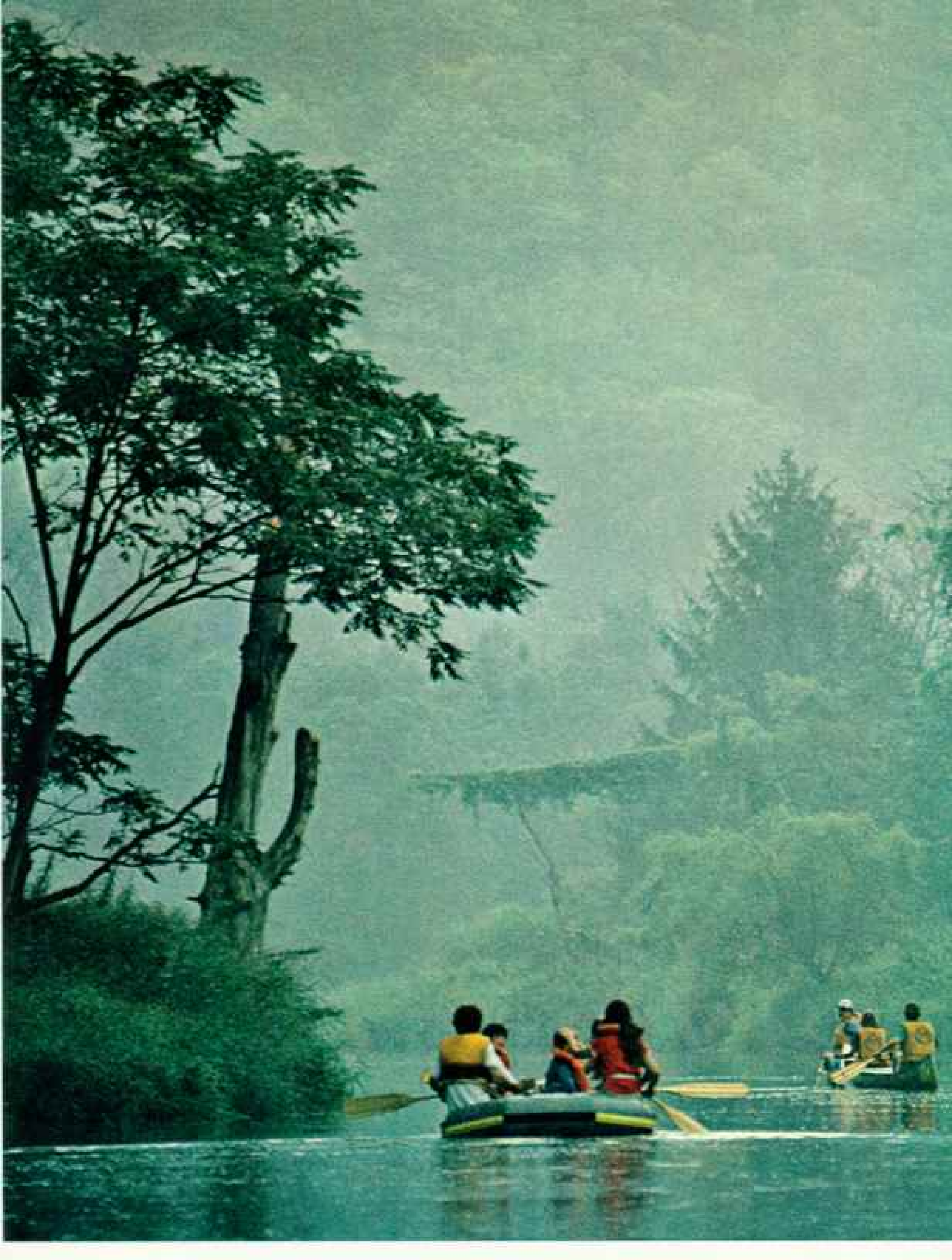
Wheels for Winning the West

The other invention on Mr. Aungst's mind had a curious grace of its own. "Conestoga wagons came from this area, too," he said. "The upswept ends of their cargo beds meant that cargo would jostle down toward the center of the wagon instead of falling out. Those big iron-rimmed wheels could take the pounding of a long, rough ride. And another thing: The cloth top of a 'prairie schooner' flared out at each end to protect the driver and his load in bad weather."

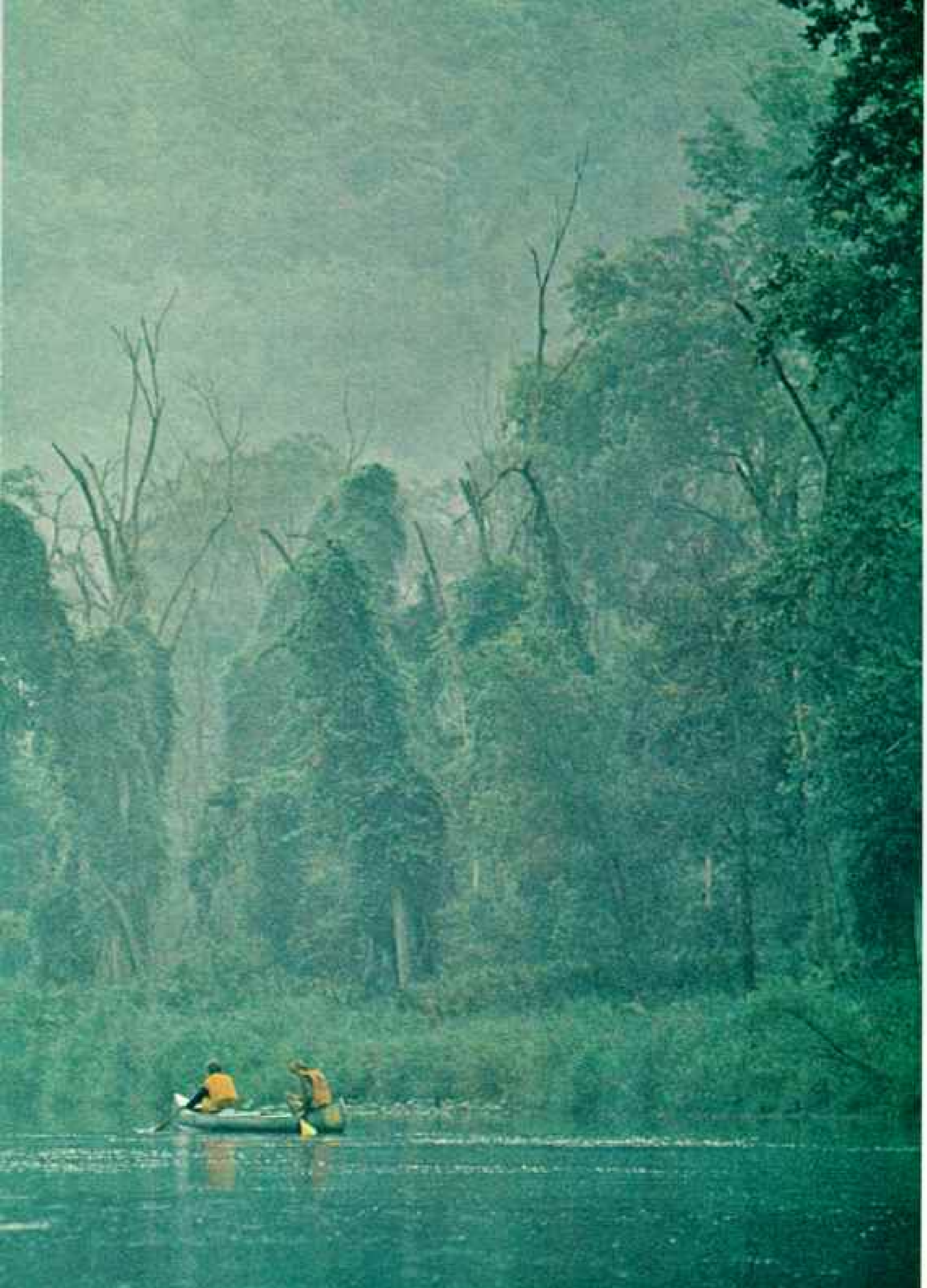
Ninety miles northeast of Lancaster lies Stroudsburg—a town for all seasons. Skiers pass through in winter, bound for the slopes of the nearby Pocono Mountains. Fishermen arrive in the spring, hunters in the fall.

Stroudsburg gets its full share of summer folk, too. Some head for the scenic Delaware Water Gap just to the east, others for the Poconos. The attractions are fishing, hiking, tennis, golf—and for newlyweds, mountain hideaways *(Continued on page 764)*

Drooping from an anesthetic, a Thoroughbred is eased onto an operating table at the Kline Orthopedic and Rehabilitation Center in the town of Kennett Square. Part of the University of Pennsylvania School of Veterinary Medicine, the center boasts several unique facilities, including an overhead monorail for transporting animals and a postsurgery water bed consisting of a floating raft with leg protectors.



Through a hushed and verdant garden, expectant adventurers on Pine Creek shoot toward danger around the bend—the white waters of Pennsylvania's



Grand Canyon. Rapids running is but one way to tap the water world of the state, whose valleys glisten with lakes for boating and fishing.

offering such amenities as heart-shaped bathtubs built for two.

I moved on to Harrisburg, to the Pennsylvania State Capitol, and found anything but a honeymoon atmosphere there. Voices were being raised in heated arguments about finances.

No Cheers for This Parade

The building was a besieged fortress. Unpaid state workers marched back and forth outside, proclaiming their displeasure on placards. Meanwhile, in the second-floor legislative chambers, state leaders were locked in battle over the yearly budget—already forty days past the deadline.

A harried Governor Milton J. Shapp shook my hand, shucked his suit coat, and settled back to answer my questions. We were interrupted every few minutes by one of his aides, who gave the governor a whispered report on the latest vote tally.

"Why the budget delay?" I asked. "Simple procrastination?"

The governor ran a frustrated hand through his thin gray hair and growled.

The old way is the only way for Amish folk (**above**), who hold to life-styles long discarded by the worldly, often including a ban on driving cars. Here they bid intently on a horse for buggy pulling at an auction in the Pennsylvania Dutch burg of New Holland (**left**). "Dutch" refers to people of German descent, among them members of a number of sects, such as Mennonites, Amish, and Brethren, that left Europe seeking religious freedom.

"Politics," he said, and left it at that.

He switched to other topics then. To the Senior Citizens Program, of which he is very proud, and to the governor's hot line, which any Pennsylvanian can use to ask for help in solving a bureaucratic problem.

"It keeps us clued in on where we're going wrong," the governor told me. And then a grin erased that harried look. "About once a month I man one of the phones myself. It really shakes him up when a citizen calls to complain about a delay in getting his car license and finds he's talking to the governor!"

Next he turned to history. "You know, in the last century this state was ravaged. The Pennsylvania Railroad, the steel barons, and the banks dominated it. Up in the coal district there were mostly one-industry towns—the coal barons didn't want their miners tempted by factory jobs."

Hardly the kind of freedom that William Penn had in mind, I reflected.

"These days, I think a government should operate like a competitive industry," Governor Shapp continued. "To me that means being sure that its customers are satisfied

with the kind of service they're getting."

At interview's end I walked downstairs and trod the silent marble hall toward the door. Suddenly, long-unpaid state workers by the hundreds burst into the corridor, chanting "Pass the budget! Pass the budget! Pass the budget!"

But it was another full week before the legislators agreed and the check-printing machines began to operate again.

Getting Used to Disaster

Poor Johnstown. When I arrived, it was still reeling from its latest immersion, 11 weeks earlier. At least half the stores on Market Street were still closed, and the city was filled with reconstruction workers.

"We've had three major floods," Ted Zellem of the Johnstown *Tribune-Democrat* told me. "In 1889 the big dam went out. In 1936 a quick spring thaw and heavy rains put us under again. This last flood was caused by one torrential rainstorm."

Three floods; three causes. No one has come up with a way to flood-proof *this* city.

Johnstown is a steel city. But Bethlehem Steel, its largest employer, laid off 4,000 workers after the flood, in a retrenchment that added to the trauma.

I drove into the suburbs to view the worst damage and found my way blocked, in Hornerstown, by a gaping hole in the street, where a torrent had washed asphalt away.

Frank Sandusky, a retired steelworker who lives nearby, had been luckier than most. "I lost my car and my back porch, but the house came through in pretty good shape. You should have seen the water coming down the road out front—it looked like it was moving seventy miles an hour."

He pointed to a rubble-filled lot. "There used to be a white house there. It just disappeared."

As I left the city, Johnstowners were stolidly shoveling away mud, picking up the pieces of their interrupted lives, and totaling their casualties: 76 dead, nine still missing.

Penn's "faire land" has often come to terms with tragedy, but Pennsylvanians know their share of peace as well.

Now and then from the quiet village of Pleasantville, in northwestern Pennsylvania, comes the clash of steel upon steel. *En garde!* Someone over there is crossing swords with Dartanion again.

But I approached him armed only with a ball-point pen and notebook, wondering why a Renaissance man would choose to settle in this quiet little community.

Dartanion L. Alexatos—fencer, deep-sea diver, rodeo rider, shark fisherman. With equal skill he handles an épée, artist's brush, and wood-carving chisel. I found him in his antique and curio shop, restoring an old chest of drawers. He threw me a complacent grin when I asked my question.

"Sure, I've seen some lively towns in my day. But I came to Pleasantville because there's peace. It's a safe place to raise kids. The woods are close by, and you just can't beat the hunting and fishing. Where in this world does life offer more than all that?"

A Lesson in Contentment

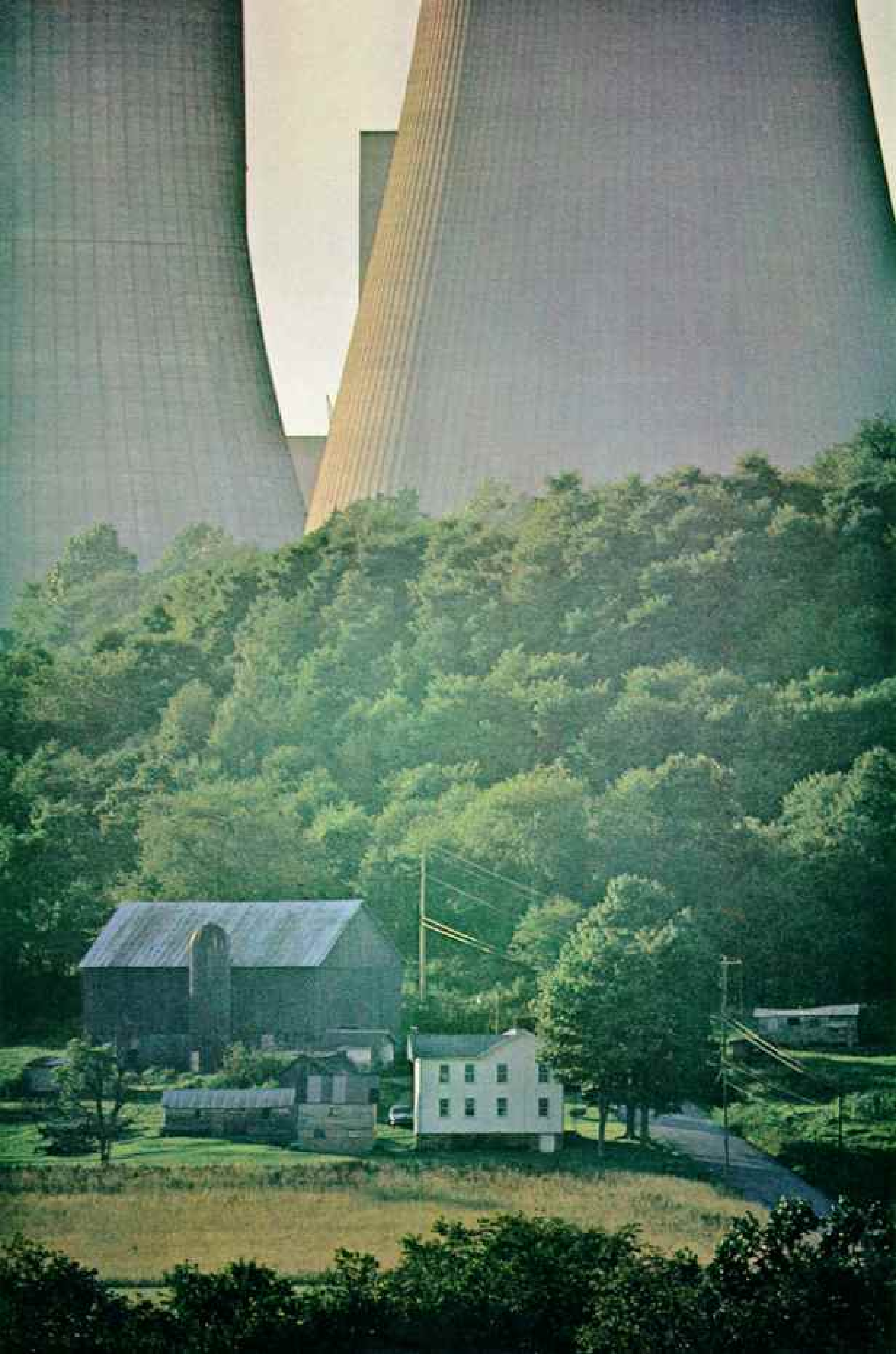
Many a less-traveled Pennsylvanian agrees. You find them in little towns and villages all over the state. Like Dartanion, they have seen some basic truths that a city dweller glimpses only dimly; they are content.

I think most visitors feel it, too, and leave Pennsylvania convinced that the Keystone State—for all its stresses and strains—has more stability than the place they call home. Perhaps it is the sight of those Pennsylvania Dutch farms—picture-postcard examples of what a farm should be—the Amish buggies, the fat livestock, the green woodlands.

Dartanion, greatest swordsman in all Pleasantville, aimed true when he spoke to me of Pennsylvania's unmistakable attractions—peace, safety, the opportunity to lead the kind of life he loves in the nearby woods.

"Where in this world does life offer more than all that?" □

Dollhouse in Goliath's backyard, a farm shrinks below the 391-foot cooling towers of the Homer City power-generating station 45 miles east of Pittsburgh. The giant plant was built next to a coal mine to cut fuel-transport costs. Coal, oil, and nuclear power have made Pennsylvania's name almost synonymous with energy output and industry's roar, but its tidy farms and forested wilds preserve a sense of the peace and solitude of yesterday.



Glass Treasure From the Aegean

By GEORGE F. BASS, Ph.D.

Photographs by
JONATHAN BLAIR

WEDGED into the base of a great submarine ridge, the chunk of glass shone dimly in the half-light at 110 feet. As I reached to pull it free, my finger spurted a small plume of green blood, its familiar red color filtered out by the depths.

In the excitement of discovery I scarcely noticed the cut; during the weeks that followed, such wounds would become commonplace. Each time my diving partners or I cut a hand or finger while exploring the bottom of that small harbor on the Aegean Sea, we were rewarded with another masterpiece of the ancient glassworker's art. More important still, we were rewarded with priceless new knowledge of man's early attempts to conquer the sea.

In this case the sea had conquered man, though we do not yet know how. During that first dive I was not even certain that the remains of a ship lay beneath me. I had been shown the site four years earlier by a retired Turkish sponge diver named Mehmet Aşkın. At that time I was surveying Turkey's coastline for significant early wrecks, a project organized by our Institute of Nautical Archaeology and financed with National Geographic Society research funds. My

Clouds of silt rise as a diver flippers along a metal mapping grid with a bulbous bottle

just plucked from the sea's treasury. Here, off Turkey's Aegean coast, archeologists are reaping a bonanza in medieval glass from a 1,000-year-old shipwreck.

partner and co-founder of the institute, Michael Katzev, meanwhile was conducting his brilliant recovery and restoration of a 2,300-year-old Greek cargo ship at Kyrenia, Cyprus.* The vessel, reconstructed in Kyrenia's Crusader castle, survived the Cyprus conflict of 1974 without mishap.

Mehmet Aşkın had guided me in a chartered boat to a remote anchorage known as Serçe Limanı—Sparrow Harbor—off a peninsula jutting into the Aegean north of the island of Rhodes (map, page 772). There my friend Yüksel Eğdemir, a commissioner of Turkey's Department of Antiquities, made several dives while I remained confined aboard the boat with a cold.

"There's glass everywhere down below," Yüksel announced, surfacing from the first dive with a rainbow of brightly colored shards in his hands. "You can't fan away the sand without cutting your fingers. It's a good site, George, a really good one."

Subsequent dives turned up several amphorae, large clay jars used to carry oil or wine. Their shape and character suggested a date in the Byzantine period of Turkish history. After examination I estimated their date in the 12th or 13th century A.D.

*See "Last Harbor for the Oldest Ship," by Susan W. and Michael L. Katzev, in the November 1974 GEOGRAPHIC, and "Resurrecting the Oldest Known Greek Ship," by Michael L. Katzev, June 1970.

Author George Bass, who has written two previous GEOGRAPHIC articles (September 1968 and July 1963) and produced four books, is professor of anthropology and geography at Texas A & M University.

I made a careful note of the site and the discoveries, then continued with my survey. Work on other wrecks occupied the next four years, but Serçe Limanı remained in my mind.

Were the glass and the amphorae that Yüksel had seen simply jettisoned cargo—perhaps by some long-ago captain? Or was an actual wreck lying there? Serçe Limani is notorious for its treacherous winds, and there are several known wrecks in the area. Yüksel's discoveries might represent yet another sinking. In the spring of 1977 I determined to find out.

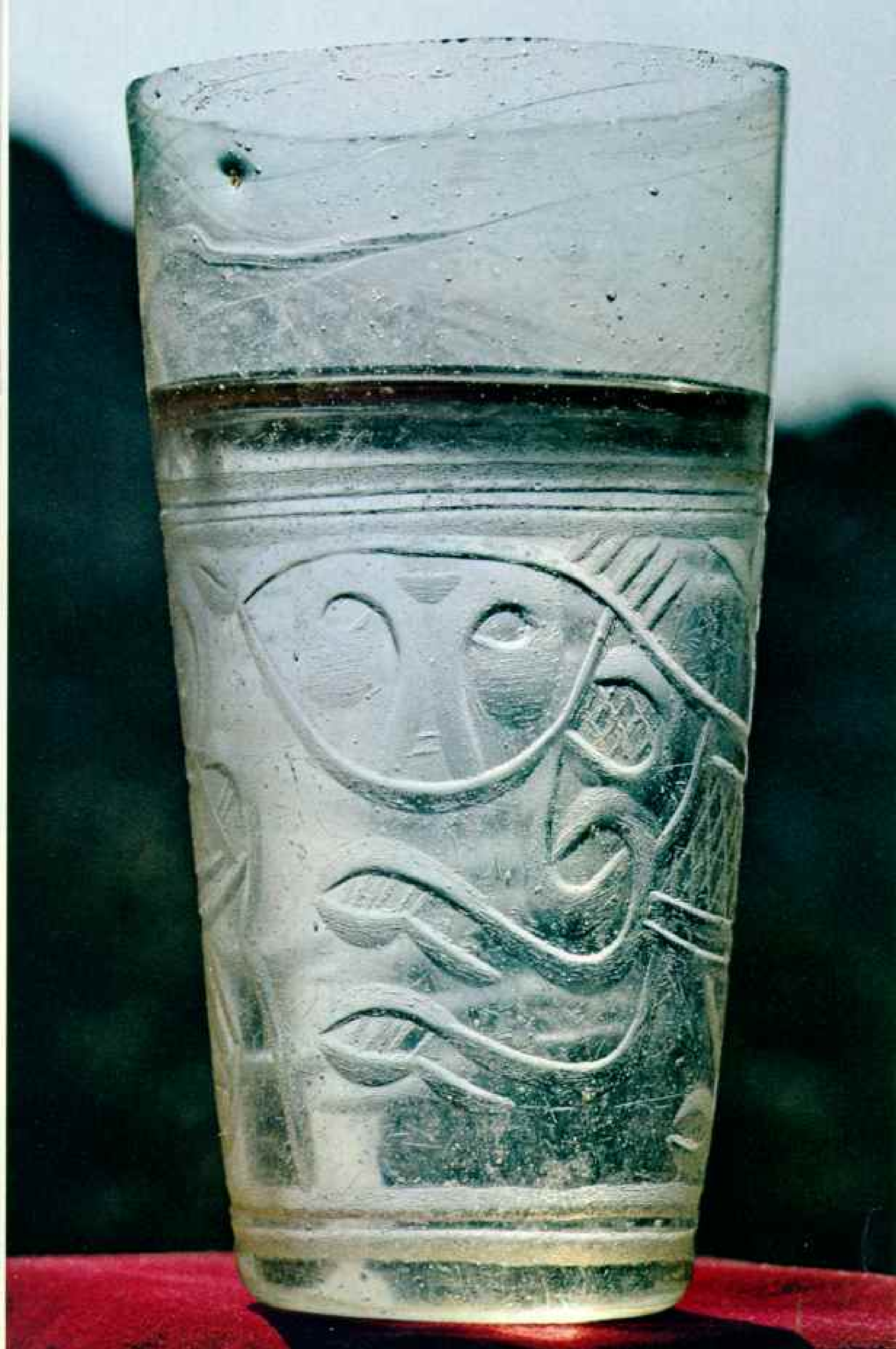
Undersea Detective Work a Gamble . . .

With Turkish Government approval I assembled a team of 20 outstanding Turkish and American divers and scientists. Last June we set off from the Turkish port of Bodrum with another good friend, fisherman Mehmet Turguttekin, in three small boats. Anchoring our wooden diving barge inside the harbor, we built a camp ashore sturdy enough to withstand Serçe Limanı's ferocious winds.

My discovery of the glass chunk occurred on my first dive, in company with Oğuz Alpözen, also a commissioner from Turkey's Department of Antiquities. In addition to the glass, we uncovered amphorae, seemingly of the type I had dated four years earlier. Though exciting, the finds still did not prove the existence of a wreck.

"Do you think *(Continued on page 774)*

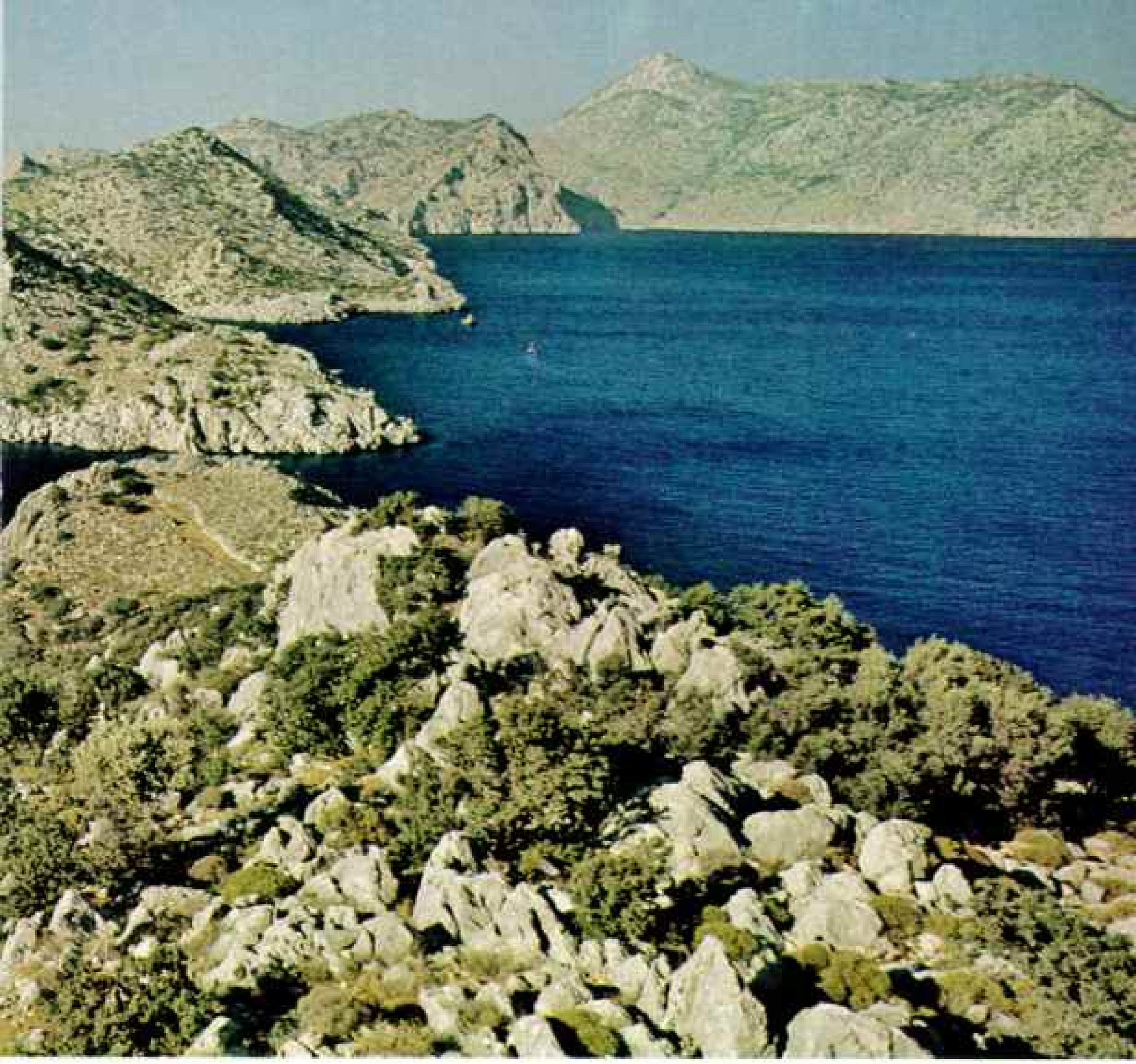
MIRACULOUSLY intact, a delicate cup (**left**) and a tumbler with engraved Picasso-like lions (**right**) come from a trove that has so far yielded 30 exquisite vessels of glass—all resembling in decoration and shape those of the 11th-century Muslim world. Fragments of finished ware and chunks of cullet suggest the cargo of the ship was largely glass. Though presumably Islamic, her nationality is still uncertain because Greek-inscribed amphorae and coins also recovered point to ties with the Christian Byzantine Empire.



Turkey's marine graveyards

Often a caldron of savage winds, the seemingly placid harbor of Serçe Limanı (**above**, left) lured more than one ancient ship to its death. The "glass wreck" lies 110 feet under the diving barge in the background.

No stranger to these waters, expedition leader and author Dr. George Bass (**right**, in light-blue shirt) breaks for lunch with his team, mostly Turkish scholars and students. Over the years Dr. Bass and his associates have pioneered many underwater-excavation techniques. At nearby Yassı Ada they excavated Roman and Byzantine wrecks dating from the fourth and seventh centuries, and off southern Turkey a 3,000-year-old Bronze Age ship.



there's really one down there?" I asked Oğuz after we had surfaced and returned to the diving barge.

"*İnşallah,*" he answered with a quizzical smile. "As God wills."

I could only second the wish. Archeology is always a gamble, and I was gambling heavily at Serçe Limanı. The cost of such an expedition, with diving gear, compressors, a recompression chamber for possible cases of the bends, plus food and other equipment for 20 people, is sizable.

To finance the project, I had staked funds not only from our Institute of Nautical Archaeology but also from Texas A & M University—the institute's headquarters—from the Corning Glass Works Foundation, and from the National Geographic Society. Unless we found a ship along with the glass and the amphorae, the funds could be wasted.

. . . And the Gamble Pays Off

My concern proved to be short-lived; on the very next dive the gamble paid off. Following Oğuz's and my initial exploration, two longtime colleagues, Dr. Frederick van Doorninck of Texas A & M and Robin Piercy of the institute, went down to continue the search. Within twenty minutes—the limit we had set for dives with minimum decompression on the way up—the two men surfaced with an air of excitement that I have

PAINTING BY STANLEY MELTZOFF

rarely seen in all my 17 years of underwater archeology.

"It's there, the ship's there!" Fred announced triumphantly as he and Robin clambered back aboard the barge. "At first we couldn't see anything but sand; then our eyes adjusted, and we made out several amphorae and a lump or two of glass.

"But still no ship, until the very end of the dive. Then suddenly there it was, almost as if it had materialized from empty sand—the definite lines of a hull."

As Fred talked, Robin had been sketching in a notebook, and at length he held it up.

"The bow is here," he said, indicating a spot with his pencil, "and just beyond it is a

FROM SODA, sand, and raw-glass cullet comes an array of glassware in this re-creation of a medieval Islamic glassworks. While his son stokes the firing chamber, a master glassblower moves through four major production stages, from left to right. First he inflates a gather of molten glass with his blowpipe, then shapes the bottom on a flat stone. After transferring the bulb to a metal rod and reheating it, he opens the mouth with a wooden tool. Finally he places the vessel in an annealing oven, where it may stay overnight, attended by an assistant. His wife, at right, packs selections of glassware for a sea-trading merchant.

pile of what appear to be iron anchors. Then there's a mass of ballast stones and more amphorae. The stern is here, and in between there's an immense amount of glass."

I was astonished at the sketch, not only for its detail but also for what it revealed from a single dive. I recalled the time I had worked with a full diving crew on a Roman wreck elsewhere in Turkey; it took three months before we even knew which end of the ship was which.

"Telephone Booth" Aids Search

With our target firmly located, we spent the next few days shifting the barge to a point directly overhead and readying our equipment for underwater excavation. One of the most important items was our "telephone booth," a Plexiglas dome that could be lowered to the seafloor and secured with weights. The dome was equipped with a telephone line and compressed-air hoses running to the surface, so as many as four divers could stand inside, dry from the chest up, breathing fresh air.

Next we laid out a metal grid across the bottom over what we expected would be the area of the wreck. With the grid as a reference we could then map the entire site, pinpointing each item as it was removed.

For the initial reconnaissance of Serçe Limanı I had taken only half the team of 20, and now the others joined us: my friend Yüksel Eğdemir; Gündüz Gölönü, an artist and professor from the Istanbul State Academy of Fine Arts; several members of our institute staff; and a group of young Turkish divers from Istanbul's Bosporus University, formerly known as Robert College. We were later joined for a brief time by my old friend Jack Kelley, chairman of the board of our institute.

On my next dive I uncovered an exquisite sample of what the wreck was soon to yield. Gently excavating sand in my assigned area of the grid, I encountered the base of what I took to be a broken bottle, buried several inches below the surface. So far in our brief surveys we had seen only shards of glass, evidence that our ship may have met a violent end.

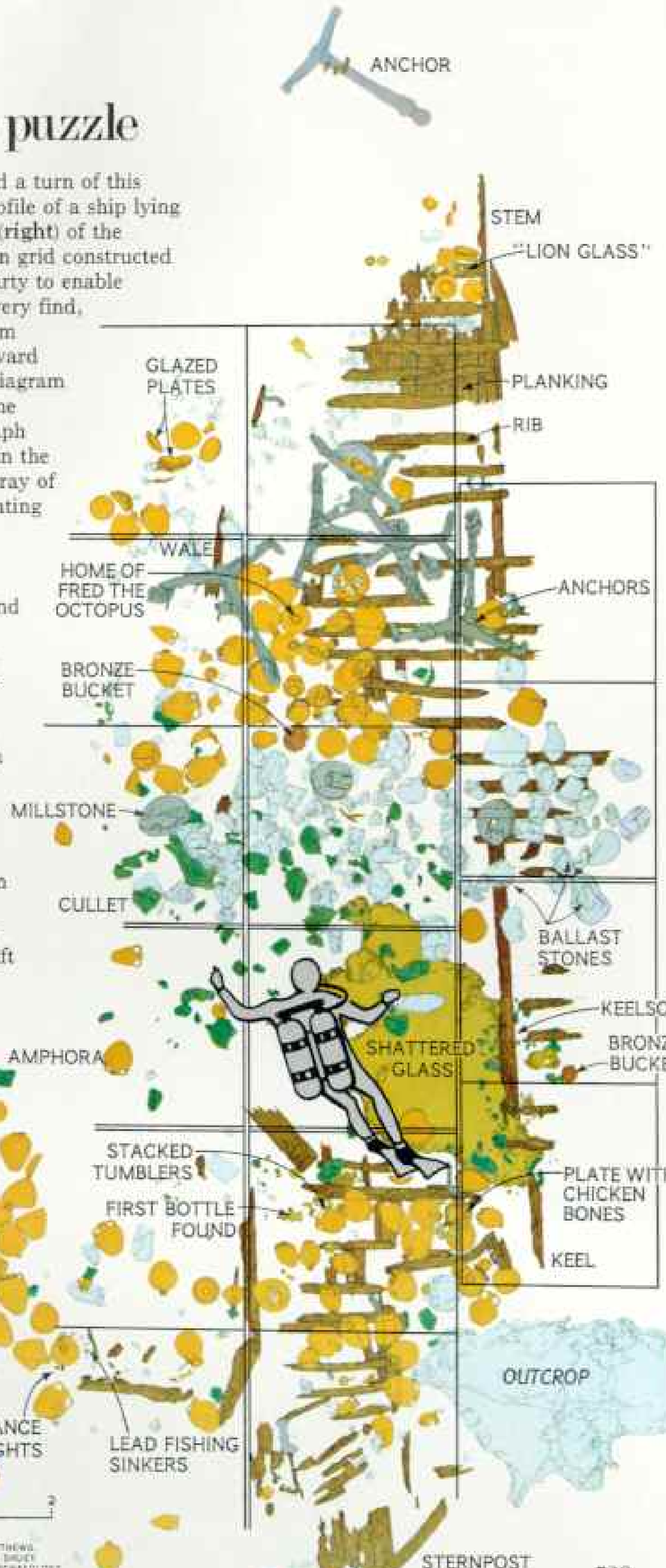
As I probed deeper, I expected to find jagged edges, but none appeared. At length the bottle lay fully *(Continued on page 786)*

PENDING EVICTION from his home in an old amphora, a meddlesome octopus nicknamed Fred became something of a team mascot, despite his habit of grabbing things from the divers. Here Dr. Frederick van Doorninck retrieves a fragment from the creature he discovered (**above**).

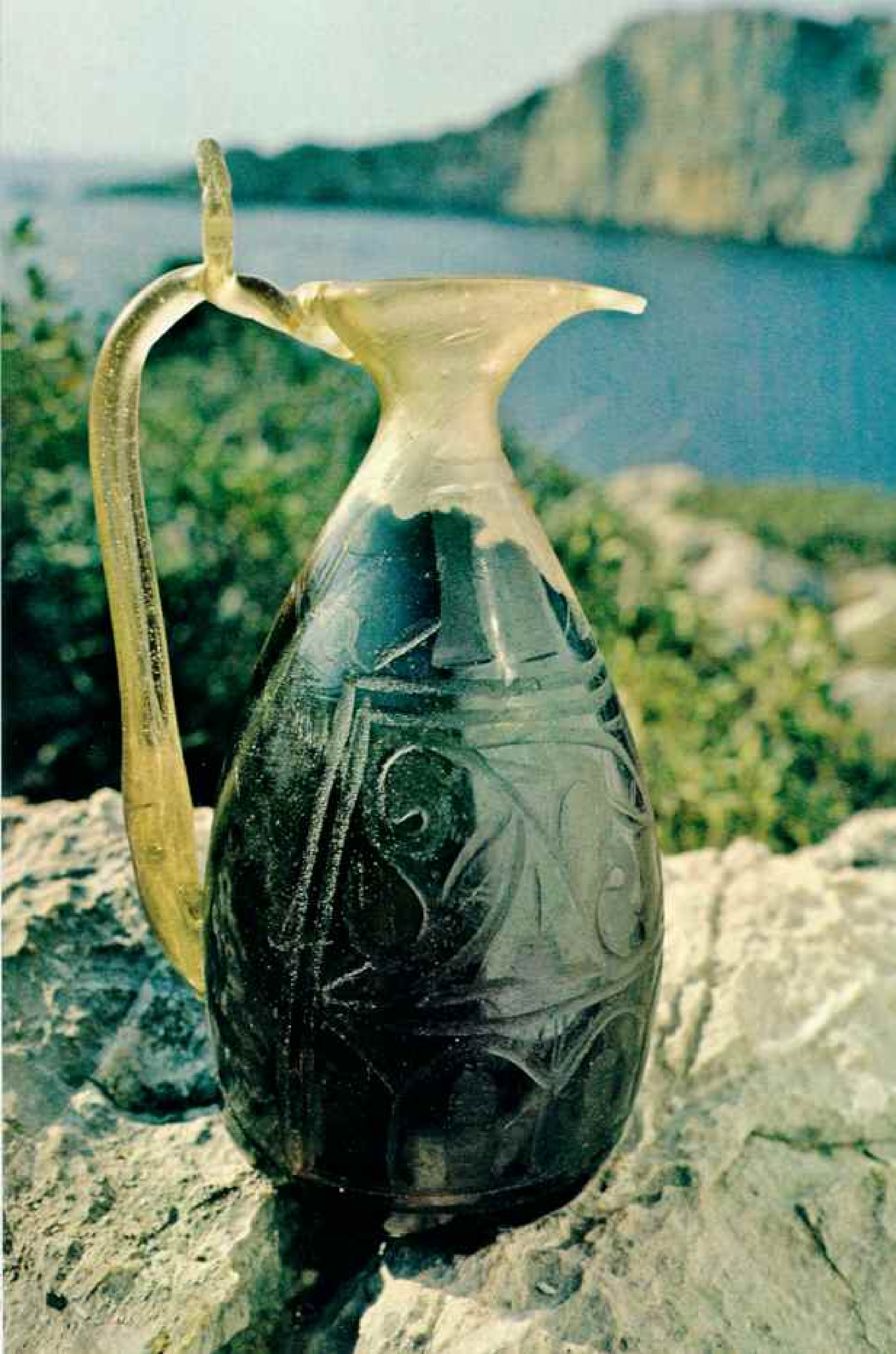
Strewn throughout the wreckage, thousands of glass shards had to be pried from the seabed. As a result, divers suffered cut and bleeding fingers. But a greater hazard in these 110-foot depths was the bends—an often crippling, sometimes fatal malady brought on by too rapid a decrease in pressure. To avoid it, two divers on their way to the top with a morning's bounty (**facing page**) pause at a decompression stop ten feet under the barge. They gulp air from hoses lowered from above as they pass regular breathing gear to the next shift.

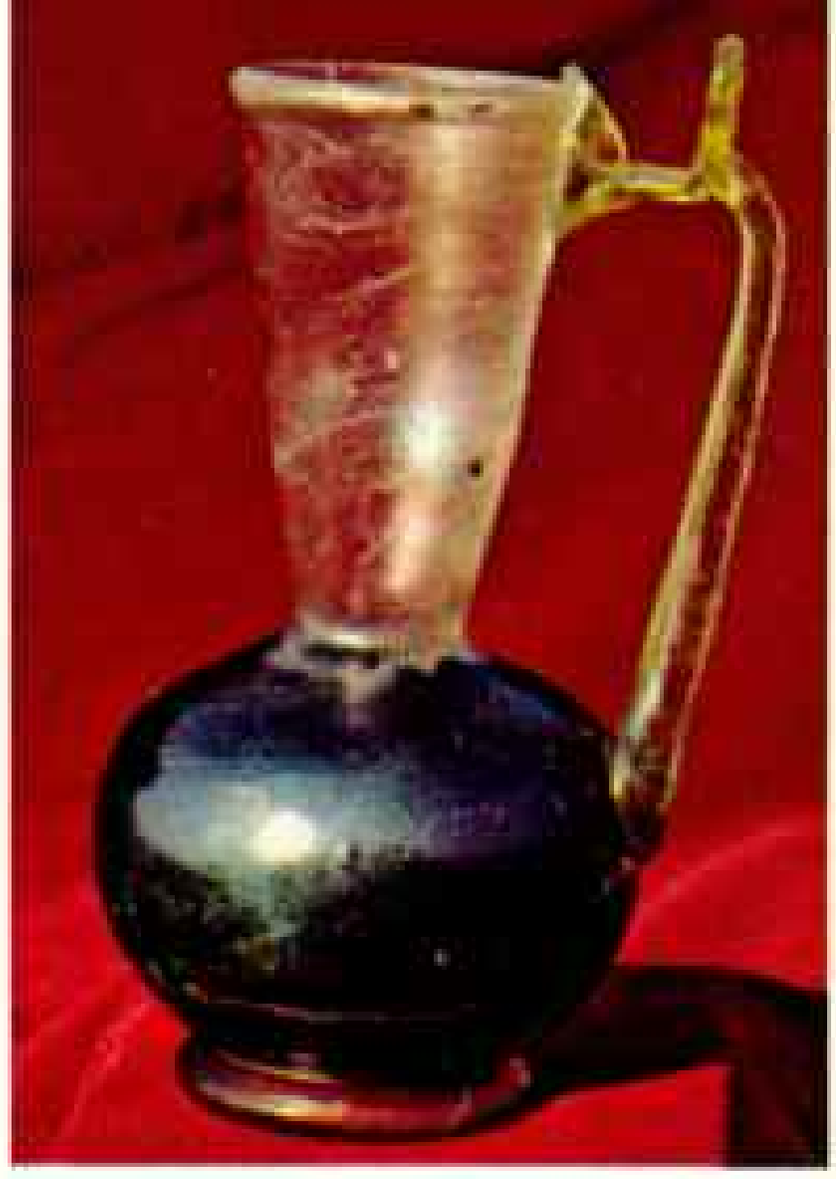
Piecing the puzzle

A little imagination—and a turn of this page—will reveal the profile of a ship lying on its side in a drawing (**right**) of the wreck site. Under an iron grid constructed by the author and his party to enable the precise plotting of every find, the wreckage sweeps from curving sternpost to forward stem. The diver in the diagram corresponds exactly to one hovering in the photograph (**overleaf**). Below him, in the hold area, a glittering array of glass fragments, representing nearly 200 forms and a rainbow of colors (**left**), was dug from the sand. Downslope, to the left and above deck level, an assortment of amphorae and other items suggests that the ship may have had a topside cabin. As the vessel's configuration took shape on paper, it appeared to the excavators that they may have come upon one of the earliest known "modern" ships. Unlike Greek and Roman ships of early vintage, this craft apparently had its hull planking built on a framework of keel and ribs, rather than the reverse.



DRAWN BY SHEILA MATTHEWS, CEMAL PULAK, AND LISA SHUEY OF INSTITUTE OF NAUTICAL ARCHAEOLOGY





HARDENED BY AGES of interaction with the corroding glass, seabed sediment in a clear-glass pitcher (**left**) and a jug (**right, top**) may require weeks of patient effort for removal. Many objects had deteriorated so badly that only the impacted silt held them together, but others —like this pinched-waist bottle (**above**)— seemed to have suffered little.

Though the art of fine glassmaking all but died out in Europe after the fall of the Roman Empire, it was kept alive and enriched by Muslim artisans before revival in Venice in the 13th century. But where in that vast Islamic world stretching from Spain to central Asia these masterpieces were produced remains a mystery. Chemical analysis may reveal, if not the regional origins of the objects, at least whether they were all manufactured by the same glassworks.

Byzantine connection: Used for carrying oil or wine, the ship's numerous amphorae (**above**) were Byzantine Greek. Bottles in the diver's hands, however, resemble those fashioned by Muslim craftsmen.

(Continued from page 777)

exposed, miraculously unbroken. It was a lovely piece of work, rounded at the base and pinched at the sides in an hourglass effect.

Not until Robin Piercy had photographed the bottle did I lift it gingerly from its resting place, only to find an even greater treasure underneath. In the small crater left by the bottle lay nested clear-glass tumblers, each paper thin and engraved with gracefully swirling patterns. Whether or not our ship had died violently, it is a miracle that the tumblers survived the plunge to the bottom and the eventual collapse of the hull.

Discovery Rate Picks Up

That first discovery set off a summer-long debate among members of our team over the date of the wreck and the origin of her cargo.

"These tumblers certainly aren't Byzantine," Gündüz Gölönü observed after a close inspection. "I would say they are Islamic, not Christian, from the patterns. But we need more samples to be certain." Gündüz tentatively estimated the date of the glass around the tenth century A.D., two or three hundred years before my own rough estimate for the amphorae.

As for further samples, Gündüz got his wish; they began to come aboard the diving barge almost daily. Our two commissioners from the Turkish Department of Antiquities, Oğuz Alpözen and Yüksel Eğdemir, developed a standard routine when one or the other returned from a dive.

"What did you find this time?" Oğuz would ask as Yüksel broke the surface.

"Oh, just another of those boring bottles," Yüksel would reply; then with a wink he would hand up another unique treasure.

The items ranged from perfectly preserved specimens of glassware to those so badly cracked or decomposed they were held together only by the impacted sand that had drifted inside them. My own assigned area of the grid contained whole masses of fragments fused together by sand and silt so that they resembled an array of glittering shark's teeth. Often I was forced to raise these lumps intact, to be painstakingly separated ashore with dental tools.

Despite the risk of cuts and infections, none of us wore gloves while diving. To an underwater archeologist touch is often as important as sight, especially when one is working amid a cloud of sand and silt stirred up from the bottom. Gradually we learned from experience how to avoid serious injury, but our hands always looked as if we were excavating a brier patch.

Fred van Doorninck had an additional obstacle in his area of the grid—a feisty octopus with a strong sense of territorial rights (page 777).

"He's living in an amphora up by the bow," Fred said after the first encounter. "He tried to pull the plastic labeling tags out of my hand." Then after another dive: "Now he's all over my camera so I can't shoot a single frame, and he's trying to pull my watch off. I think he considers us trespassers."

Eventually the octopus—whom we naturally nicknamed Fred—accepted us in his private domain. Oğuz even taught Fred to come out of the amphora and follow him over the wreck, changing colors like a chameleon as he glided from object to object. We soon learned, however, that when Fred turned a certain dark color he was angry, and it was best to give him a wide berth.

On one occasion Fred's territory was invaded by an even larger octopus, a monster whose den lay in some rocks above the site. Descending from its lair, it spread its tentacles easily across a two-meter section of metal grid and remained for a while, as if to say, "I'm the king of Serçe Limanı." Neither Fred nor we were inclined to argue.

Bends More Lethal Than Octopuses

A more subtle danger awaited unwary divers on the wreck. At a depth of 110 feet nitrogen quickly dissolves in the bloodstream, to be released in the form of deadly bubbles if a diver surfaces too rapidly. The condition is known as the bends, and a severe case can result in death.

I had set rigid diving schedules to avoid the danger, but once, after a dive, Gündüz Gölönü complained of an aching shoulder. At first I thought it was merely tired muscles from overexertion.

John Cassils, our team physician, thought otherwise. "Look," he said to me, "Gündüz's shoulder *may* just be strained, but it's possible that he has a touch of the bends. Let's slip him in the recompression chamber on oxygen and see if it helps."

John was right. Inside the chamber Gündüz was artificially returned to the pressure at sixty feet below the surface, and the pain in his shoulder disappeared. Slowly we returned him to pressure at sea level, so that the excess nitrogen in his blood escaped harmlessly. Fortunately for Gündüz, there were no lasting effects. The episode made even our veteran divers more cautious.

In thousands of dives we've made over the years, this was only the second case of the bends to occur, a record I am proud of.

Within the space of a few weeks we collected whole specimens or fragments of nearly two hundred different forms and shapes of glassware. The range and beauty of their colors dazzled us.

"If these were all made in the same glassworks," observed Don Keith, a colleague from the institute, "that glassblower had a lot of imagination."

Whence Came the Glass, and When?

Without chemical analysis, of course, no one could really answer Don's question; the glass might have come from a single works, from a small group of related factories, or from sources throughout the eastern Mediterranean. In medieval times, as in the present, artisans frequently traveled from country to country, taking their favorite patterns with them.

In many cases, however, the artisans themselves merely worked the raw glass produced by others. Among the ballast stones in the midship section of the wreck we discovered nearly half a ton of cullet—heavy chunks of glass such as the one I had first encountered, which were melted down by glassblowers to create a variety of products (pages 774-5). The cullet varied in color from blue and green to amber, often with swirling patterns resembling taffy.

"They were the raw material of the glass trade," explained Dr. Robert Brill, a world authority from the Corning Museum of Glass in Corning, New York, who paid a brief visit to Serçe Limanı. "One manufacturer of cullet might supply several glass factories, perhaps even in different countries. Chemical analysis should tell us whether the composition of your glassware and the cullet is identical. It might also tell the original source—Egypt, the Levant, or possibly even Persia—and whether a single glassworks produced the whole cargo."

To our treasury of glass we slowly added more prosaic items. From the area of the crew's quarters near the stern of the wreck we recovered an assortment of terra-cotta cooking vessels, swords, lead fishing sinkers, a set of bronze balance-scale weights, and even a large plate still heaped with chicken bones. A bronze bucket bearing Arabic script suggested that the ship's crew, like most of her glass cargo, was Islamic.

In the end, however, the ship herself emerged as the greatest prize. In her final plunge she had come to rest at the base of a rocky slope that had tipped her on her port side into a bank of sand. The sand had protected that portion of the hull, including the 30-foot-long keel, from shipworms that otherwise would have made short work of it.

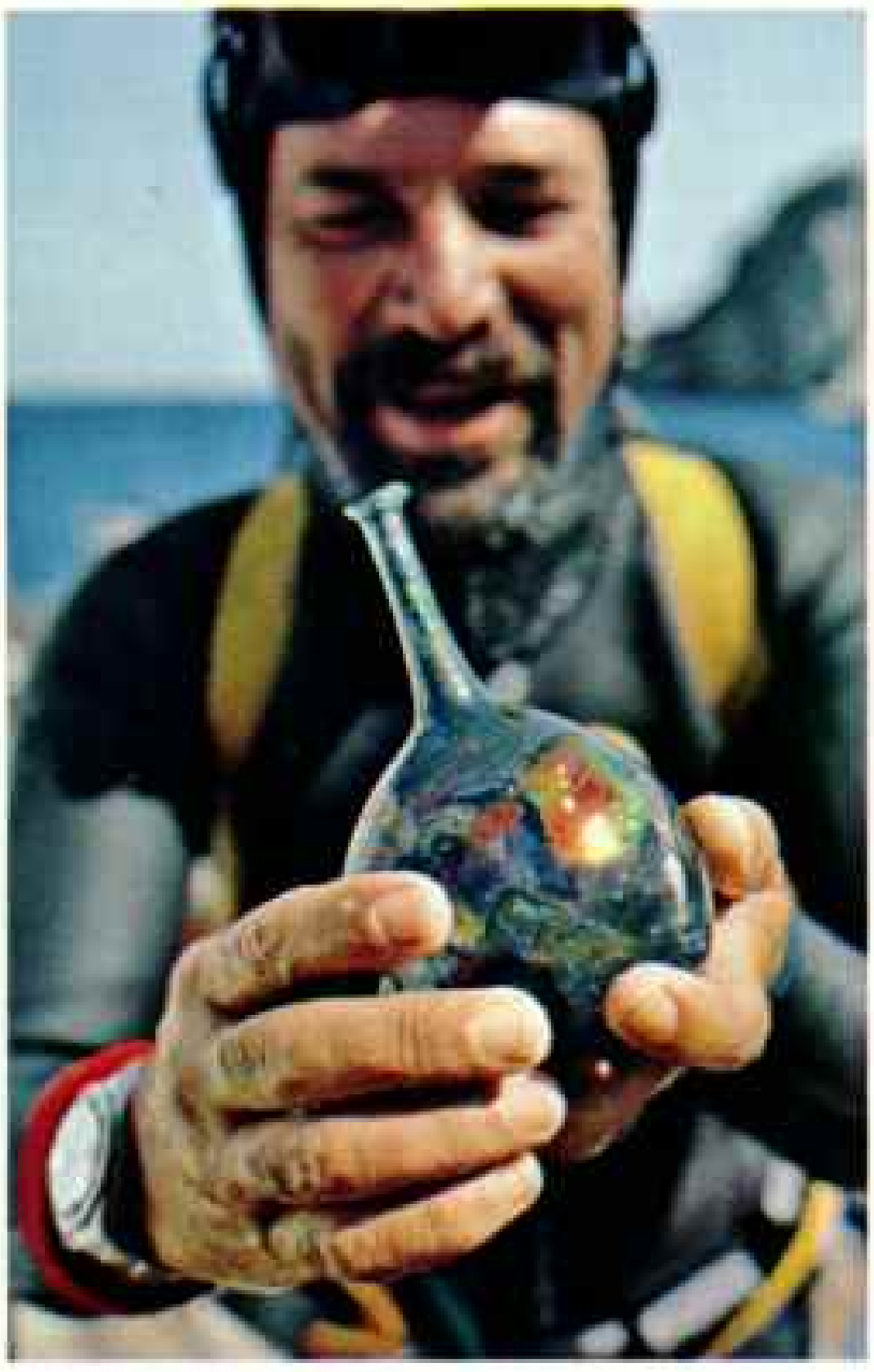
Fred van Doorninck and Don Keith undertook to draft an exact plan of the hull, and as it took shape, we realized it was like no other we had ever seen. Our young Turkish divers were unfamiliar with ancient ship construction, so Fred gave them a short course, using the plan as his textbook.

Oldest Ship of Modern Style?

"Early Greek and Roman ships," he began, "were built without an inner framework of ribs. The hull was fashioned from the bottom up a plank at a time, with each plank joined to the one below it by mortise-and-tenon joints. The ribs were inserted *afterward*, then joined to the hull, so the ship had no rigid framework to start with. It was a primitive system and it made for a relatively weak hull, something you'd hardly want in a storm or on a deep-ocean voyage.

"Gradually," Fred continued, "the system changed, as technology advanced and shipbuilders gained experience. Eventually they arrived at the technique still used today, constructing a rigid skeleton of keel and ribs, then adding the planks to it. It was an evolutionary process, and in time made possible the great age of exploration involving voyages far beyond the Mediterranean.

"But when did the change take place? No one is really certain, and of course it didn't happen overnight. At Yassı Ada here in Turkey we excavated a seventh-century wreck that appears to have been a sort of



COLORS DANCE in iridescence across a silt-filled bottle found in the stern area of the wreck by Yüksel Eğdemir (**above**), a Turkish official assigned to the expedition. Like an oil slick on water, membrane-thin layers of corrosion caused by chemical breakdown of the glass split light into colors of the spectrum.

Also found in the stern were a delicate mold-blown bowl (**right, top**) and a tiny bottle (**right, middle**) of the kind commonly used for cosmetics and medicines throughout the Islamic world in the 11th century. A bottle with a design engraved by a grinding wheel (**facing page**) represents the finest of the ship's glass, most found near the bow. In a technique still used today, some manganese was added to the molten glass to render it clear as crystal and free of color.

Fortuitous finds that helped the author determine the approximate date of the wreck, these glass balance-scale weights (**right**) were traced to the time of two Egyptian caliphs who reigned successively from 996 to 1035. More than a dozen Byzantine coins found near the keel were dated to the same time.

transition—it was built in the ancient way from the bottom to the waterline, but from there on up it was of modern construction.

"That's what's so exciting about this new wreck of ours," Fred concluded, holding up the plan. "It appears to have been constructed entirely by today's technique, from keel to gunwale. It's too soon to be sure, but the wreck of Serçe Limanı may just be the earliest known 'modern' ship."

Ship's Age Indicated by Coins

With this new development the age of our wreck became an even more vital question. We seemed very close to a final answer the day we discovered the coins.

They lay in an area alongside the ship's keel, a dozen or more badly corroded copper pieces whose imprint was still recognizable. One side depicted the figure of Christ with a Bible in His hands, and the other bore words in Greek.

"'Jesus Christ, King of Kings,'" Fred translated. "It's a familiar type of coin, but I can't remember the period when it was minted—somewhere around the tenth century or a little later, I think. If I had the right books, I'd know for sure."

Not long afterward Fred returned to the United States, and within a week we received a cable from him, relayed from Marmaris: "COINS DATE BETWEEN 970 AND 1030, POSSIBLY 989 AND 1020."

At last we had a rough date for our wreck, one that was to be corroborated later by still another find. Among the ship's cargo we recovered four beautiful glass balance-scale weights with Arabic script (page 788). In ancient times such objects were used to weigh coins and precious substances like gold or

AN ENIGMA, this sword hilt has so far defied regional classification by scholars, though its decoration shows strong Chinese influences. Most of the pottery, such as this two-handled clay vessel, also has yet to be identified. But Arabic script on a bronze bucket and a design on a water jar similar to those being cleaned with dental picks (**facing page**) support the theory that the ship is Islamic. Imitations of Chinese porcelain, like the bowl at left foreground, were popular throughout Islam then. After the summer of 1978, when the ship's timbers are to be carefully raised and treated with preservatives, the adventure of discovery will be replaced by tedious archeological chores. Years of restoration, cataloging, and research may pass before the full history of the ship is revealed.

gems, for the glass could not be shaved down as could metal weights.

By agreement with the Turkish Government all finds at Serçe Limanı were to remain in Turkish hands, though we were of course free to photograph them. On my return to the United States I sent the pictures of the weights to Dr. Michael Bates, Curator of Islamic Coins at the American Numismatic Society in New York. Dr. Bates confirmed my belief that the weights were Egyptian and dated them in the same period as the copper coins. Three were issued during the reign of the Egyptian caliph al-Hakim bi-Amr Allah, A.D. 996-1021. The fourth weight was issued by al-Hakim's successor, between 1021 and 1035.

Next Riddle: Is Ship Greek or Islamic?

While the coins and the glass weights give us a probable date for our wreck, somewhere in the early 11th century, they complicate the question of the ship's origin. The coins are Greek, and therefore obviously Byzantine, but the weights are Islamic. So are the bronze bucket and much of the cooking ware, suggesting an Islamic crew. But then the amphorae bear Greek inscriptions.

Both Greek and Islamic ships plied the waters between the centers of their empires—Alexandria, Egypt, and Constantinople, the heart of Christian Byzantium. Ships of other nations also frequented what today is Turkey's southern coast. On voyages to the western Mediterranean, Islamic ships often preferred to pay tribute to Constantinople for right of passage rather than take the more dangerous route along the North African coast.

In an indirect way our Serçe Limanı wreck even has ties with the Far East. On his visit to the site, Bob Brill, the glass expert from Corning, was accompanied by a specialist in pottery, Professor Frederick Matson of Pennsylvania State University. Examining our pottery bowls and cooking vessels, Professor Matson pointed to the streaks of glaze running down the insides.

"That's an Islamic imitation of T'ang Dynasty pottery from China," he said. "Trade with China dates from Roman times, and ninth-century Chinese pottery has been found in the Near East. Possibly in return for Chinese pottery, the Muslims sometimes traded what your ship was carrying—glass."

By the end of the summer season we had amassed a huge collection of glassware, shards, amphorae, and other artifacts—enough to keep us busy cataloging, restoring, and analyzing for years. Though it had been a season of spectacular finds, the most exciting discoveries will come from libraries, museums, and laboratories, far from our unknown ship's grave beneath the sea.

Loading our treasure aboard the diving barge, we prepared to tow it back to Bodrum, whose excellent museum had agreed to receive it.

We had left one item till the very last—the amphora in which Fred the octopus lived. Reluctantly we coaxed him out and brought the jar to the surface for the possible clues it might later yield. Oğuz reported that Fred had cheerfully taken up new quarters in a sheltered portion of the wreck.

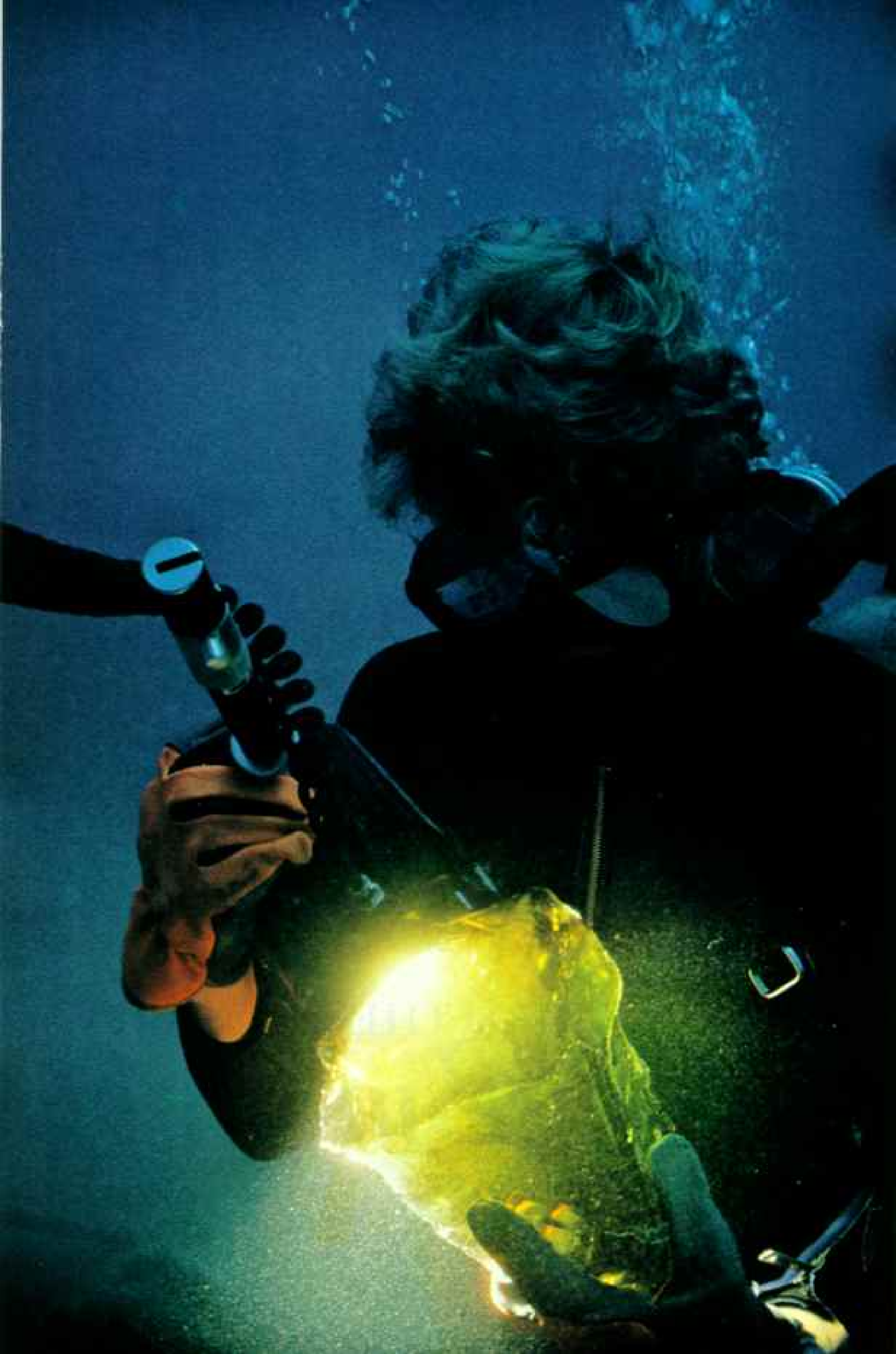
The Mystery—and Challenge—Remains

And there the hulk lies, under a protective blanket of sand, awaiting the day when it, too, is returned to the surface. With the hull carefully preserved and restored, we will learn a great deal more about its design and construction, perhaps filling major gaps in the history of early shipbuilding.

With luck we will learn our ship's port of origin, her probable destination on the final voyage, and even the route she took. The crew's belongings and a reconstruction of their living quarters may give us an insight into who these people were, what life aboard their 11th-century craft was like, and perhaps how that life came to an end.

To me, as an underwater archeologist, such knowledge is even more valuable than the finest glass. □

IGNITED BY A STROBE LIGHT, particles of iron in a chunk of cullet light the deep with a candescent green fire as Robin Piercy brings it to the surface. Nearly half a ton of this raw glass was found in the wreckage. In some unknown glassworks it was destined to be melted down and fashioned into treasures of finished glass.



Plump offspring of Burgundy's vines are dandled in bassinets. Though once a monastic

LIVING THE GOOD LIFE IN *Burgundy*

By WILLIAM DAVENPORT

Photographs by ROBERT FRESON

center, this region of eastern France has always cultivated the earthy pleasures.

KING HENRY IV deemed the scenery in this place the most beautiful in all France. And another chronicler declared that the "streams, wines, fish, game . . . combined in this harmonious land to make the inhabitants happy."

King Henry referred to the east-central part of his kingdom, a region of fertile plains, sunbathed hillsides, golden vineyards, and wooded mountains. Once a powerful duchy, now a handful of departments (the Côte d'Or, Yonne, Saône et Loire, and parts of the Ain, Rhône, and Nièvre), it has kept its identity. Its name is Burgundy (map, page 798).

Here man's spirit soared to create some of the greatest churches and sculpture in Christendom. Here a Crusade started. Here the good earth produces many of the world's finest wines. Here, in a land of nature's plenty, more than one Burgundian told me, "You can live well even without money."

Exploring Burgundy for two decades, I

have come to agree with the accolades that have been heaped on it in the past and to relish their present-day echoes, trilled on the tongues of the proud and happy inhabitants. They make other Frenchmen wince by rolling their *r*'s: "les Bourrrguignons," they call themselves, Burgundians, the biggest bons vivants in France.

Cattle Mart: Study in Black and White

I heard a most precise echo last fall, at six o'clock of a September morning, as I drove through the rich pastures of southern Burgundy with Paul Pacaud. President of the Cattle Breeders of the Charolais, he was taking me to the weekly cattle market at Saint Christophe en Brionnais.

"We have everything in this country to make us happy," Paul said. "The three essentials—bread, wine, and meat. It's a case of small exploitation of our pastures and woodland. We have our wood, we have chickens, rabbits, and above all fine beef. Look at them," he said proudly as we passed a field where the creamy white Charolais cattle were grazing in the morning light. "The color of our land is green and white."

Black was added a few minutes later when we reached Saint Christophe. The cattlemen, who were mooring their white cows, bulls, and steers to the open stalls, were all wearing black smocks, black boots, and black felt hats or caps.

"It's our uniform," Paul said, donning a black smock himself.

We filed between a phalanx of white rumps. "Feel here," Paul said, pinching a steer's back on both sides of its tail. "We call this the *couard* [round]. Fat and tender. That's the best meat you can have. The best in Burgundy. The best in France. The best in the world."

Ah, perfection! With a sip and a swirl, André Noblet (**left**) beams his verdict. He has been dubbed a French Knight of Agricultural Merit for his nurture of Romanée-Conti, a vineyard many regard as peerless in all Burgundy.

As sunny in disposition as the Beaujolais made from their harvest, itinerant workers (**right**) chug homeward after a day's labor in the vineyards near Leynes.

Burgundy

A countryside of headwaters, where in 52 B.C. Gaul under Vercingetorix fell to Caesar, welcomed gentle Baltic barbarians of the fifth century who were fleeing a fiercer breed—the Huns. These Burgundiones gave name to a domain that under the Valois dukes of the 15th century rivaled England and the French monarchy. Here sunlight, soil, and Burgundian devotion have combined to produce some of the world's finest wines.

Paris ★

ENLARGED

SEINE
LOIRE
AUBE
Troyes
Sens
AUBE
YONNE
SEINE
Pontigny
CHABLIS
Chablis
Auxerre
Vix
Châtillon sur Seine
HAUTE MARNE
ABBEY OF FONTENAY
Montbard
LOIRE
Epoisses
BURGUNDY CANAL
Avallon
Vézelay
Clamecy
CÔTE D'OR
YONNE
Dijon
NIÈVRE
MORVAN
Saulieu
CÔTE DE NUITS
Gevrey Chambertin
Chambolle Musigny
Vougeot
Arcenant
Vosne Romanée
Nuits St. Georges
REGIONAL
NATURE
PARK
Autun
CÔTE DE BEAUNE
Chaux
SAÔNE
DOUBS
Beaune
Pommard
Meursault
MONT BEUVRAY
Volnay
Puligny Montrachet
Mercurey
Givry
CÔTE CHALONNAISE
Chalon sur Saône
JURA
SAÔNE ET LOIRE
Louhans
Tournus
Chapaize
Taizé
MÂCONNAIS
SAÔNE
Charolles
Cluny
Berzé la Ville
Montrevel en Bresse
LOIRE
La Clayette
Saint Christophe en Brionnais
Mâcon
Lèynes
Confrançon
Bourg en Bresse
AIN
BEAUJOLAIS
Villefranche sur Saône
AIN
RHÔNE
Lyon
RHÔNE
KILOMETERS 25
STATUTE MILES 25

Wine regions of Burgundy named thus: *CHABLIS*

PAINTED BY MED M. GEISLER
COMPILED BY ROSS M. UMBREIT
NATIONAL GEOGRAPHIC ART DIVISION

The buying and selling was going full blast, with a good deal of typical banter.

"Do you want to sell?" a man was asked.

"Yes, 5,000 francs."

"At that price, monsieur, *vous voulez rire*—you've got to be kidding."

"Then you're not serious."

"Please don't accuse me of frivolity. I offer you 4,500."

"All right, but she's a nursing mother; you'll have to buy the calf too. I refuse to separate a mother and child. A thousand francs for the calf."

"Will you take 950?"

"OK, but it's the biggest bargain since France got Burgundy."

By seven o'clock most sales had been concluded, and we repaired to the adjacent café for *le petit déjeuner*. What a breakfast! *Bouilli*, they called it: a boiled beef stew, served with great hunks of fresh country bread and carafes of red wine.

"Burgundians know how to eat," Paul said, sopping up his stew with the bread. "To know how to eat is to know how to live."

After breakfast we drove to Paul's farm in the hamlet of Chaux. Paul told me that the farmhouse dated from 1300 and that it had been in the Pacaud family for 300 years.

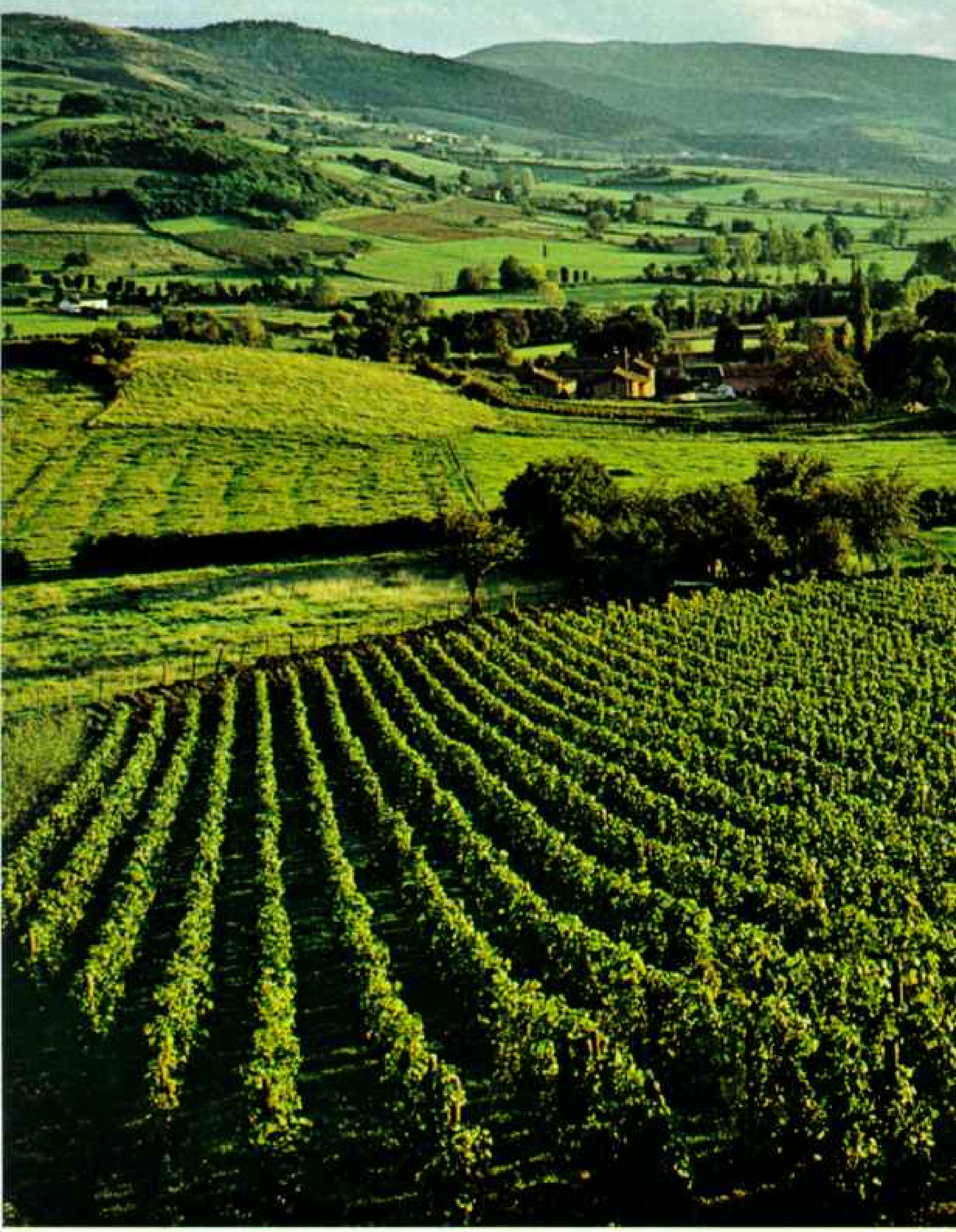
"I have 130 head on 200 acres here. That way I can do it all myself. It's good to keep small. You can control the quality."

The same kind of individualism goes into raising Burgundian poultry. I stopped one day at the market of Bourg en Bresse, capital of the Ain, a department whose farms and pastures are watered by streams from the snowy summits of the Jura Mountains to the east. The market was very animated, full of peasant entrepreneurs who had come into the big city to sell their horses, rabbits, ducks, butter, eggs, fresh cheese, but, most of all, the famous chickens known as *poulets de Bresse*.

Numbered Fowl Famed Worldwide

"Look at this chicken," one of the market women said to me. "Look at her red comb, her white feathers, her blue legs. She's as beautiful as the tricolor [the French flag], and she's got my number on her foot. If anything is wrong, let me know. I am here."

Strategic redoubt built in 1380, Château de la Clayette helped anchor Burgundy's southern flank against France during the Hundred Years' War. The trample of hooves from fine Thoroughbreds raised nearby now signals the sporting life.



"**Earth, sun, valleys,** nature fair and serene. . . ." The rustic landscape of the Mâconnais region, as here near Berzé la Ville, fed the imagination of romantic poet-politician Alphonse de Lamartine. Though he briefly led France upon the

abdication of King Louis-Philippe in 1848, that proved to be his last stanza in politics. From a life of fame and comfort, he lapsed into near poverty and obscurity, solaced to a degree by nostalgia for "the soil of his native Burgundy."

"Every single poulet de Bresse is numbered," Roger Miéral, head of the Interprofessional Committee for the Poultry of Bresse, told me. "A guarantee of quality. The appellation, poultry of Bresse, dates from 1936—a glorious date for a glorious accomplishment. The chicken's characteristics were established—like a pedigree. Now people appeal to us whenever they plan a big event. Persepolis! When the Shah wanted to celebrate the birthday of the Persian Empire, he called on us for poulets de Bresse."

Roger drove me to a farm at Confrançon, where M. and Mme Gabriel Fromont were raising poulets de Bresse on 15 grassy acres. They sell about 3,500 chickens a year, and average a profit of five francs ($1) a bird. Not a big cash income, but, in the usual Burgundian style, they raise their own beef, milk, cheese, rabbits, ducks, and vegetables—and they eat like kings.

Mme Fromont was making a gruel for their seven-week-old chicks. We watched them devour this paste of cornmeal, barley, wheat, and milk. Then they were released to gambol in the pasture with the cows.

"They love that," Gabriel said. "The best chickens are like the best human beings; they like liberty. They enjoy their role," he went on, as we watched them pulling up worms and eating insects. "It's a good arrangement. They eat the flies that annoy the cows. They're happy in their freedom, and they have an advantage over us; they don't know they're condemned to death.

"What a great life they have," he continued, leading us to what he called *la salle de finition* (the finishing room!), where plump chickens were becoming plumper in wooden pens on a diet of milk and corn. "These chickens are 16 weeks old," Gabriel said. "Now they have two weeks of eating until the sacrifice."

In Mme Fromont's kitchen we drank "a little wine of the region," and Gabriel expressed a typically Burgundian viewpoint.

"We have tranquillity here and we like our work. The world of technology realizes that something is missing. It's this sense of the value of individual work. We feel that something is watching over us, and we're grateful to nature and God."

Going to pot, two ruffled aristocrats are to be summarily escorted from Bourg en Bresse in a market-basket tumbrel.

Unlike the plastic-wrapped output of automated chicken technology, the renowned poultry of Bresse is hand raised, fattened, and delivered with certified lineage and cackle intact.

Celts Called on Classical Artistry

Burgundians, I think, have achieved a nice balance of material and spiritual values. Certainly God and nature did provide this region with major gifts: fertile soil, quarries of limestone for building houses and churches, and a topography that assured its strategic importance. For Burgundy is a watershed. Its main rivers flow in three directions: the Seine northwest to the English Channel, the Loire west to the

Atlantic, the gentle Saône south to join the Rhône in its powerful surge to the Mediterranean. As early as the Bronze Age, these river valleys formed the natural passage between the Celtic world and the classical world.

I saw dramatic evidence of this in 1953 when a farmer in the Burgundian hamlet of Vix plowed into a Celtic burial mound. He notified local archeologists, who dug down into a vault.

There lay the skeleton of a Celtic princess, her skull crowned with a diadem of 24-karat gold. She had been buried five centuries before the birth of Christ. Many trinkets and treasures were found in the tomb, and, most wonderful of all, a huge bronze krater of Greek design and manufacture, more than five feet tall, the largest ever to be recovered from classical civilization. Its handles were sculptured Gorgons. A frieze of warriors and chariots circled its neck.

How did it get there? Tin from the mines of Cornwall could have been shipped across the English Channel, up the Seine, then overland to the Saône, and down the Saône and Rhône to the flourishing Greek colony of Massalia (Marseille), and thence to Italy. There artisans, alloying tin with copper, may have created this splendid bronze vessel, and sent it back up through Burgundy, perhaps as a diplomatic gift to the Celts.*

Mergers Create Warrior-Farmers

The Celts became Romanized after Julius Caesar conquered Gaul in 52 B.C. They merged with the Burgundians when those Germanic barbarians migrated southwest into this region in the fifth century after a terrible defeat by the Huns.

"But their race had an extraordinary vitality," Professor Arthur Kleinclausz informed me at the University of Dijon. "Big, blond, and brave, they were not exclusively concerned with war. They also loved agriculture. For the Burgundians, missing a harvest was as bad as losing a battle."

These "good giants," as the professor called them, were invited by the Gallo-Romans to occupy and cultivate their fields, sharing the profits of the harvests. The Burgundians eventually abandoned their old religions and embraced Christianity, but without sacrificing the pleasures of the flesh.

"Great eaters of highly spiced foods," the professor concluded, "they relaxed from fatigue in interminable feasts."

That night in Dijon, Burgundy's queen city, my wife, Roselle, and I had one of those feasts. The dishes served at the Chapeau Rouge were highly spiced and replete with local products: the famous snails of Burgundy *(escargots de Bourgogne)*, grown plump in captivity on a scientifically balanced, albeit synthetic, diet; veal braised with three kinds of Dijon mustard; and a strong, savory cheese from Epoisses. Heady red wine from the Côte de Beaune accompanied all this. As I ended the meal, I found I had acquired a great fondness for Burgundy.

Burgundy's Secret Weapon? Wine

The experience helped me appreciate one of the famous episodes in Dijon's history. In September 1512, the city was under siege by an army of 30,000 invaders, mostly Swiss and Germans. The 6,000 Burgundian defenders were so outnumbered that the governor of Burgundy, La Trémoille, wanted to negotiate. The Swiss were uncompromising. They opened fire on the city and made breaches in the wall. At this desperate moment, local legend has it, La Trémoille had an inspiration. He led a procession of wagons out of the city. Each wagon contained a cask of wine. The Swiss and German soldiers were thirsty.

"Have a drink," said the Burgundians.

Soon the Swiss were in a negotiable mood. They got so mellow they agreed to abandon the siege in return for a ransom of more than a million francs—and a little more wine.

In its ducal palace, with the carved alabaster and marble tombs of Burgundy's former rulers, Dijon keeps some of the aura of its 14th- and 15th-century greatness. Then it was the capital of the Valois dukes of Burgundy: Philip the Bold, John the Fearless, Philip the Good, and Charles the Rash. Relatives of the king of France, they became nearly as rich and powerful as he. Through war and dynastic marriage they extended their sway to include most of present-day Belgium, Luxembourg, and Netherlands. But Charles the Rash rashly overextended himself, and when he was killed by a Swiss

*See "The Celts," by Merle Severy, NATIONAL GEOGRAPHIC, May 1977.

Sell before dawn, celebrate before noon: Traders at early Thursday morning sales of Charolais cattle rehash prices at a café in the Saint Christophe en Brionnais market. The

statuesque Charolais, with its finely marbled beef, has made converts of ranchers around the world for its hardiness on the hoof as well as its succulence on the plate.

army at Nancy in 1477, Louis XI annexed Burgundy to France.

The marble tombs of Dijon are more vainglory than glory. The real triumphs of Burgundy are spiritual, embodied in scores of Romanesque and Gothic churches.

The Romanesque churches and abbeys—Tournus, Cluny, Pontigny, and Autun, with its deeply moving sculptures by Gislebertus—nourish the soul as Burgundian food and wine sustain the body. And Sens, "the threshold of Burgundy," 72 miles southeast of Paris, is justly proud of the first Gothic cathedral in France (built from 1130 to 1164), a lofty marvel of sculptured space and luminous stained glass.

When Roselle and I bought a country house in Provence in 1959,* we drove the old north-south route through Burgundy between our Paris home and Provençal farm as often as we could. Our trips became a series of pilgrimages to *les hauts lieux*, the high places, or shrines, of Burgundy.

We came to love the Burgundian villages, the stone houses with their high-pitched roofs, dominated by the simple but splendid belfries of Romanesque churches. The limestone, quarried from the flanks of the Côte d'Or, becomes nearly as rich and varied in color as the wine from the same slopes. Almost as durable as marble, it is used for everything from cabins to cathedrals, imparting a glowing harmony to the old towns of Burgundy.

St. Bernard Launched Second Crusade

Vézelay is a prime example. If I had to sum up all the solidity and charm of Burgundy in a single village, it would be this historic haut lieu of 500 souls. One April day we walked up its steep medieval street of stone houses to the famous Abbey Church of St. Madeleine, built of the same material in the 12th century (page 813). On its famous tympanum and in its sublime interior, anonymous Burgundian architects and sculptors imbued stone with spirit.

On March 31, 1146, St. Bernard of Clairvaux was here, on the "inspired hillside" next to the basilica, urging the nobles of King Louis VII and a milling throng to sew the emblem of the Cross on their tunics and embark on the Second Crusade to retake captured territory. The saint was so eloquent that they ran out of crosses; he shredded his own garments to make more. The moral leader of his century, Bernard, a Cistercian monk, was Burgundian in spiritual fervor, most *un*-Burgundian in his repudiation of *la bonne chère*, the good food and drink of Burgundy. He was happy with a diet of boiled beech leaves.

Frail Leader Leaves Enduring Monument

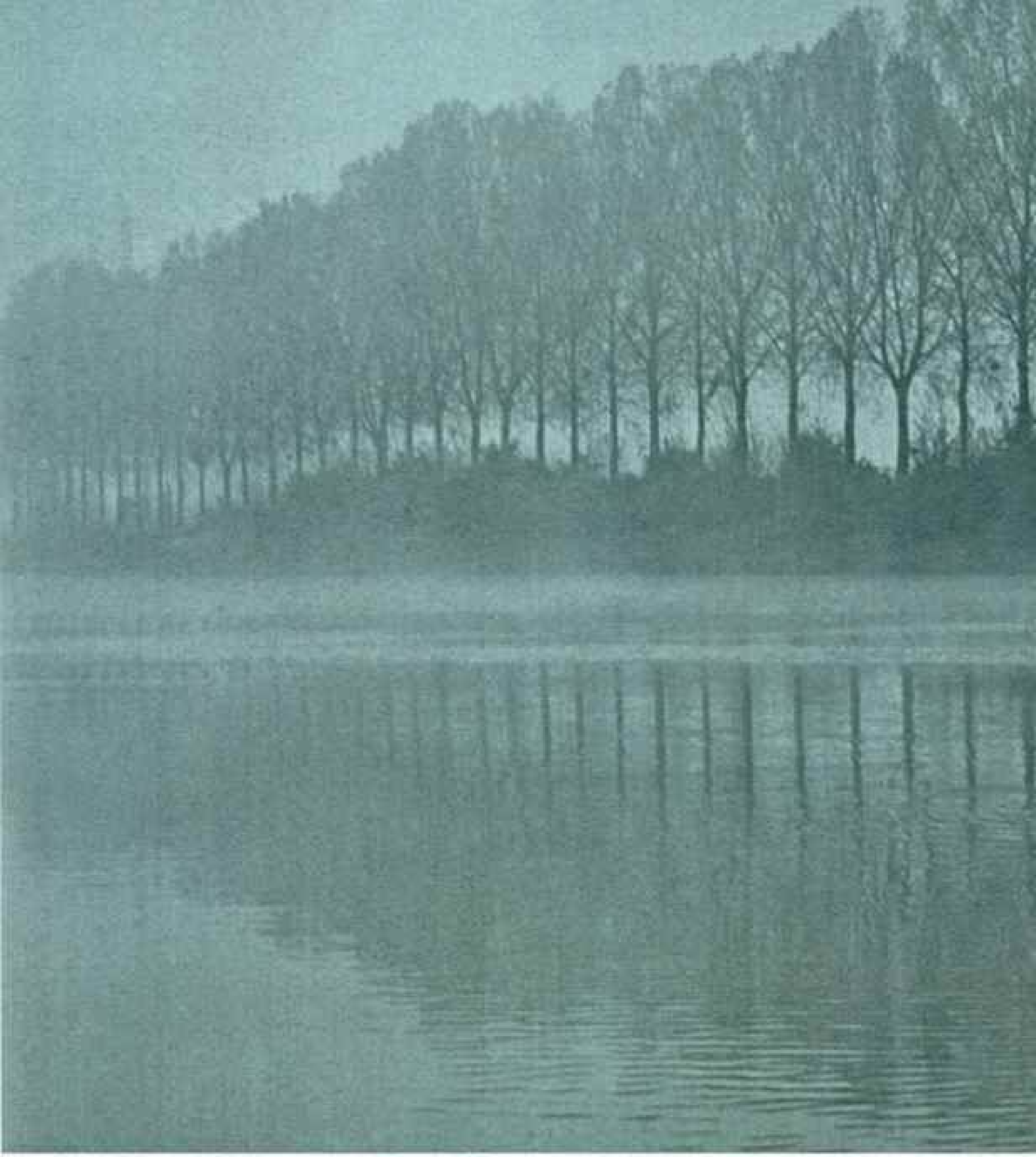
Abbé Denis Grivot, an expert on the history and art of Burgundy and director of the cathedral school at Autun, has strong views on St. Bernard. A big, earthy, no-nonsense Burgundian priest, who made me think of the good giants described by Professor Kleinclausz, the abbé told me: "Bernard was riddled with faults. When he visited châteaus, the owners hid their sons and daughters for fear Bernard would magnetize them into monasteries and convents. He even broke up a marriage to get one man in. A frail, charismatic, sickly ascetic, he wasn't very Burgundian, except by birth. Burgundians have always been bons vivants, generous and tolerant."

Despite St. Bernard's un-Burgundian penchant for mortifying the flesh, his Abbey of Fontenay is one of the most beautiful places in Burgundy. He chose this isolated spot in 1118 because of the purity of its water and its remoteness from the world. It was the water that saved the abbey during the French Revolution; its abundance made the place ideal for a paper mill. Now restored and open to the public, Fontenay is owned by M. Hubert Aynard, a descendant of the man who bought the mill from the state after the revolution.

"Fontenay has been in my family for five

*Mr. Davenport described "Provence, Empire of the Sun," in the May 1975 GEOGRAPHIC.

Fronting the centuries as they scuttle by, a heavily timbered medieval house in Clamecy crowds the street with an enclosed cylindrical stairwell. Plain, substantial, and convivial, the 500-year-old domestic architecture of Burgundy has enlisted a new generation of devotees among the restoration-minded.



generations," M. Aynard said, as we strolled through the beautifully manicured grounds, "and it's been a family mania to protect it. One of my great-great-grandfathers, Elie de Montgolfier—he was famous for his balloon experiments—bought this place in 1820."

We paused to admire a stone basin, brimming with water from a triple-tiered fountain and teeming with young trout.

In the 12th century, M. Aynard said, these largely vegetarian Cistercians began raising fish. "They channeled the stream into a *vivier*, a fish preserve. I'm continuing that. Today we have 200,000 trout at Fontenay, and we supply a lot of restaurants," he said.

"People thought I was an ecology freak when I insisted on cleaning up the valley and purifying the water six years ago, but now Fontenay is safe, not only for trout but for all

of us. It's classified a historic monument. Even I can't alter it."

M. Aynard led me through the dormitory where a hundred monks once slept on straw mattresses on the floor; St. Bernard's favorite pillow was a block of wood.

"Bernard was too austere," M. Aynard said, "but there is that side of the Burgundian. We fluctuate between the spiritual and the spirituous."

With mist as accomplice, a lone angler drifts on the Saône near Tournus. Perch and pike will be welcome on the hook. Even carp, scorned elsewhere as trash fish, are transfigured by Burgundian chefs.

River systems flowing north and south meet in Burgundy, making it a natural corridor. Monastic Christianity and tin from pagan Britain both traveled this route.

On the way to another famous abbey, at Cluny, I drove through the Morvan, a regional park of oak- and beech-covered mountains and lonely lakes, the unspoiled heart of Celtic Burgundy. A highlight is the plateau of Mont Beuvray, site of Bibracte, the once flourishing capital city of the Aedui, a powerful Celtic tribe, allies of Julius Caesar. A monument in this vast solitude bears an inscription from Caesar's *Gallic War:* "HE HIMSELF DECIDED TO SET UP WINTER QUARTERS AT BIBRACTE."

New Order Inhabits Ancient Site

At Cluny stand the ruins of what was once the greatest monastery and abbey church in Christendom. After the French Revolution it was wantonly destroyed by contractors who sold its venerable stones for building materials. A splendid single tower and part of the transept are all that remain of the vast, vanished church.

This spiritual corner of Burgundy is, however, now the scene of a new monastic community, dedicated not only to the ancient adherence to poverty, chastity, and obedience, but also to the modern ideal of ecumenism. In 1940, almost in sight of Cluny's tower, the stone village of Taizé attracted Roger Schutz, a Calvinist theological student from Lausanne, Switzerland (page 812). He found here the ideal, isolated place for an ecumenical community. Today he has been joined by 70 monks, some Catholic, some Protestant.

Brother Roger's charismatic spirit has attracted young people from every nation. In 1974 they formed the Council of Youth, which now has thousands of followers—dramatic support for Brother Roger's hope "in the capacity of the young to reinvent the world." What all these blue-jeaned young people have in common is a commitment to radical Christianity that calls for a redistribution of wealth (especially to aid the poverty-stricken Third World).

But the dream of ecumenism has yet to be realized. Brother Roger, an almost ethereal personality, told me that the Vatican had not yet consented to the Roman Catholic brothers of Taizé taking the Eucharist from him. Instead of insisting, Brother Roger has humbly renounced giving Holy Communion for the time being. "The unity of the

The unusual is usual in Burgundy cuisine. Cockscombs (**above**) and snails, Burgundy style (**below**), are specialties of the region. Snails, once abundant in the wild, are now farm raised to meet an unabating demand. Each year at Domaine d'Auvenay, near Beaune, a wine tasting and feast (**right**) has exacting guests—the great chefs of France.

Catholic Church is a precious thing," he said. "I do not want to disrupt it."

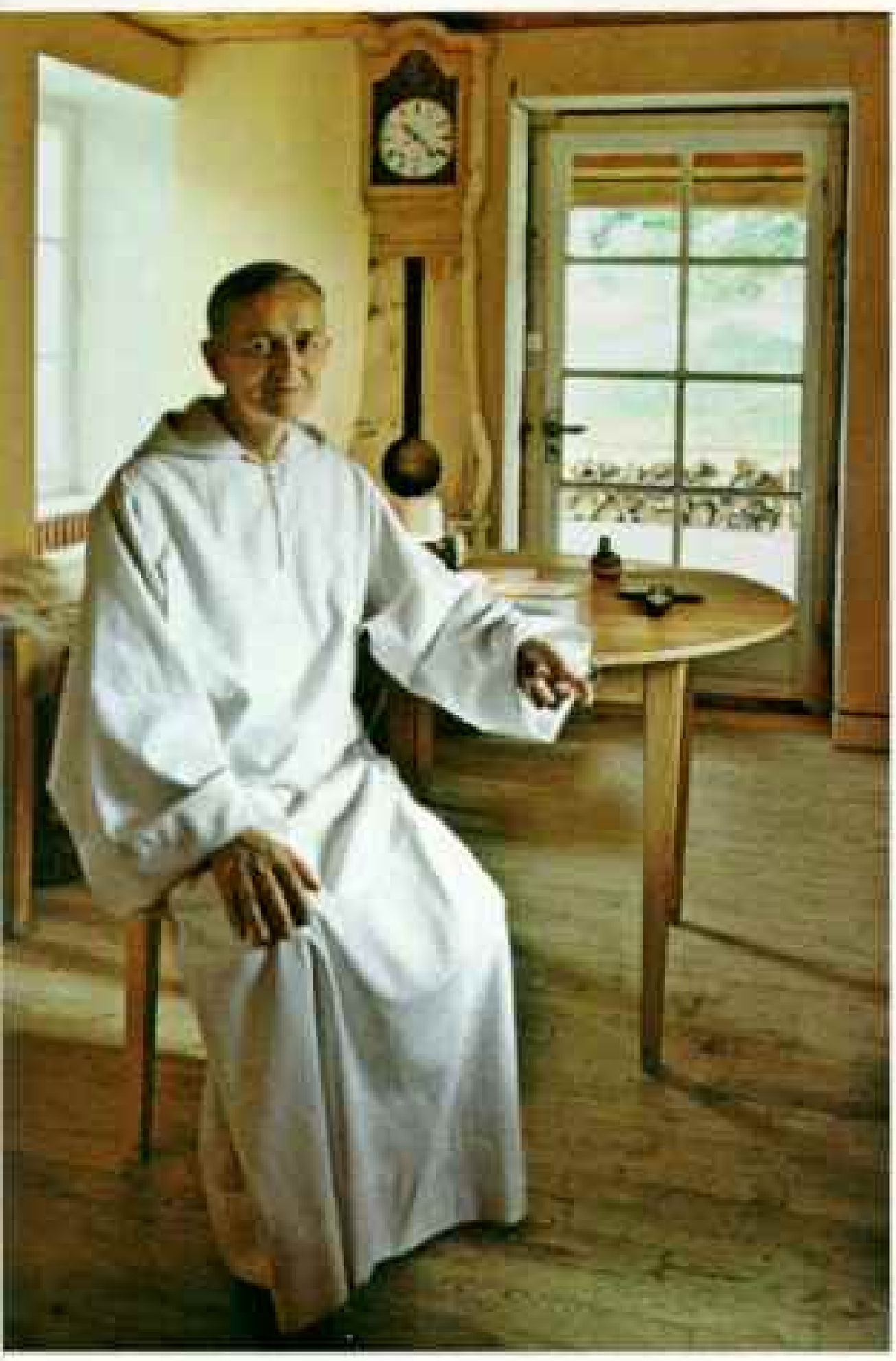
As I was leaving this exalted community, two visiting Burgundian priests brought me back to earth. Like most visitors they had been served a lunch of ham, lentils, and cold water outdoors, cafeteria style.

"There's no wine," one of them said disconsolately.

"That's where they're making their big mistake," his fellow priest quickly replied.

Wine is Burgundy's auxiliary religion. Crosses mark some vineyard boundaries in the wine-producing areas: the Côte de Nuits and Côte de Beaune (which together comprise the Côte d'Or), Chablis, Côte Chalonnaise, Mâconnais, and Beaujolais, a vast, sunny vineyard of southern Burgundy that last year produced 137,000,000 bottles of the most popular red wine in France.

The nearly 46,000 Burgundian wine-growers regard their profession as a sacred trust. Their business documents often manage to invoke "the grace of God and the patronage of the Blessed Virgin." Priests, blessing the annual *vendange*, the gathering of the grapes, invariably mention the first of Christ's miracles, when He turned water into wine at the wedding feast in Cana.



A world made new in the justice of love: That vision brought Prior Roger Schutz (**above**) and Roman Catholic and Protestant brothers to the community at Taizé. Thousands—youths especially—flock yearly to the Church of the Reconciliation to share and spread an ancient message: the brotherhood of man under God.

The more militant St. Bernard used the basilica at Vézelay (**facing page**) to foment the Second Crusade in 1146.

What a Difference a Day Makes

I tried my hand at the vendange one bright September morning at the Samotel in the middle of the Côte de Beaune. This great moment of the wine harvest is dictated, one of my fellow grape pickers told me, by *"le bon Dieu:* the good Lord." Only He knows when it will take place.

Generally it is 100 days after the blossoms appear on the vines, announcing the formation of the tiny Pinot Noir grapes beneath. But choosing the exact moment of full maturity, maximum sugar content, can be a dicey decision. One more day of sunshine may produce a great, as opposed to a mediocre, year, and one day of hard autumnal rain or hail can ruin a whole year's production.

Under the hot sun I worked and sweated side by side with a group of robust, red-faced Burgundians. I stripped a few thousand grapes from the vines and tossed them into the big harvest baskets. By the end of the morning I thought my back would break.

After the grueling work of picking was over, I looked forward to trampling the grapes with my bare feet. But I found that the maceration of the grapes was done by a machine called *un fouloir-égrappoir*. First, it crushed the grapes, liberating the juice; then it ejected the stalks after separating them from the skins and the liquid.

Jacques Chevignard, chamberlain of the famed wine-tasting society La Confrérie des Chevaliers du Tastevin, explained, "The

pressing must make the grapes burst without crushing the seeds and stalks."

I asked Jacques what made Burgundy wine different from that of the great rival region, Bordeaux. "The essential points of difference are in the grapes themselves and in the vinification process [converting juice into wine by fermentation]," he explained. "The mixture of grapes that goes into Bordeaux wines involves many complexities, so that it may take ten to twenty years for Bordeaux wines to become drinkable.

"Things are much simpler in Burgundy! Here our great red wines come exclusively from Pinot Noir grapes, our great whites from Chardonnay grapes, and our Beaujolais from Gamay grapes. We do not have as long a vinification time as in Bordeaux. It is possible to drink our less important wines when they are only three years old, and our great wines from the time they are five.

"Burgundy is more flattering to the wine neophyte because it has more perfume, more bouquet. A great Bordeaux requires a highly informed connoisseur to detect negligible nuances that escape ordinary mortals."

Spoken like a true Burgundian—*terre à terre*, down to earth.

Much Does Not Mean Better

One thing is certain: Burgundy is more exclusive than Bordeaux, which makes 33 percent of France's wine, as opposed to 15 percent made in Burgundy. Only 16 percent of that 15 is produced in the Côte d'Or. Yet the very names of its villages and vineyards—Pommard, Meursault, Volnay, Clos de Vougeot, Chambertin, Romanée-Conti, Montrachet—echo like a litany.

Romanée-Conti is one of the most famous

vineyards in Burgundy. It is also one of the smallest—just four acres, producing about 7,700 bottles a year. I was taken there by a high priestess of the vine, one of the owners, Lalou Bize-Leroy, and there I met a high priest, M. André Noblet, Master of the Cellar and of the Vines (page 796). Another good giant, Noblet is the incarnation of the Burgundian: big, fair, blue-eyed, red of skin, the color of wine.

He also has the soul of a poet. "Ah, that's a feminine wine," he told me, as we tasted a young Richebourg '73. "It has a lovely body, great elegance. Like a woman, it will become more interesting as it gets older." My wife was delighted with the analysis.

Wine Is Good Medicine for Hospital

The capital of the Burgundian wine industry is the walled city of Beaune, and its most famous monument is the 15th-century hospital known as the Hospices de Beaune or, more familiarly, the Hôtel-Dieu (God's House). The founders, Chancellor Nicolas Rolin and his wife, had the prescience to ward off five centuries of inflation by endowing their hospital with vineyards that increase in value every year. Others have since followed suit.

On the third Sunday of each November, a wine auction, "the greatest charity sale in the world," is held for the benefit of this venerable hospital, which still functions with 125 beds for geriatric patients and 300 beds for general patients in a modern annex outside the city.

The Burgundians have turned this auction into a three-day bacchanal, replete with private and public tastings, parades, folk dances, six-hour lunches, and candlelight

Rabelaisian feast with endless courses and dozens of wines (**left**) is but one of three to fete the yearly wine auction at Beaune. While gourmands gorge, retired vintners (**above**) decorated with silver tasting cups—*tastevins*—serenade. The proceeds benefit Beaune's hospital; as wine prices soar, medical facilities improve. Those who fully participate in the Three Glorious Days usually survive their charity.

banquets. The celebration is known as Les Trois Glorieuses, the Three Glorious Days.

The auction was held on the second day in the huge indoor wine market. It was packed to the rafters, a fire commissioner's nightmare, especially considering the picturesque medieval tradition that the auctioneer has three lighted candles, which he extinguishes one by one as he announces, "going, going, gone."

I sat in the press box with a colleague from the Burgundian newspaper *Le Bien Public*. "Watch this first lot," he told me. "There is a big rivalry between Patriarche, an old Burgundy wine firm, and a mass producer from Arbois, outside our region. Patriarche makes it a point of honor to buy the first lot. They've done it for ten years."

Bids Mount, and Tension Too

The first lot, or *pièce*, was 228 liters of 1977 Corton; a similar pièce had brought 12,500 francs the previous year. That figure was reached immediately as the rival buyers shouted their bids.

"Do I hear 12,600? Let's have 12,700," the auctioneer bellowed.

The bidding mounted like a fever amid buzzing excitement, but when it reached 20,000 francs, all but the two main rivals had retired, and a hush fell.

"The hall seems to be holding its breath," my colleague whispered. *"C'est de la folie pure*—It's pure madness."

When the bid reached 26,000 francs, the auctioneer crowed, "Not bad, not bad. Do I hear 26,100?" He did, and much more. The rival firms dueled on in deadly earnest.

After 40 minutes of rising tempers, the price had been driven up to 33,800 francs—an unheard-of sum, *Le Bien Public* told me.

"Premier feu—first flame," the auctioneer shouted, knocking out one candle. *"Deuxième feu*—second flame. Going once at 33,800, going twice, the third and final flame. . . ."

Then Patriarche thundered, "33,900!"

"Sold to Patriarche," the auctioneer cried. A great cheer went up as he blew out the final candle. Patriarche, the Burgundian, was obviously the local favorite. I thought the auctioneer blew out that final candle rather fast.

"That's $24 a bottle for a 1977 Burgundy," said *Le Bien Public*. "Utter madness!"

After the heat of the auction, we celebrated the Glorious Days finale at the Paulée de Meursault, a six-hour lunch to which every vintner brought six bottles of wine for the general enjoyment. The guest of honor, Burgundian author Henri Vincenot, told me that the people of Burgundy remain essentially Celtic, and he addressed this convivial company with Celtic eloquence. He called the assembled vintners "magnificent alchemists" who had solved the problem of solar energy by capturing, conserving, and distributing it in bottles. He praised their product as "a magic potion, which gives to our race that bantering and transcendent good humor, that ardent love of things . . . that spirited, shrewd, and eloquent joy, that reasonable madness and mad reason that are worthy of a real bon vivant."

For Tranquillity, Try Burgundy

The rest was anticlimax. The pharmacies of Beaune had run out of aspirin. I went to the Hôtel-Dieu and got some from one of the geriatricians. He was very pleased because this year's auction had brought an unprecedented sum to the hospital, 6,344,644 francs, more than $1,300,000, enough to start a special school to train nurses to care for senior citizens.

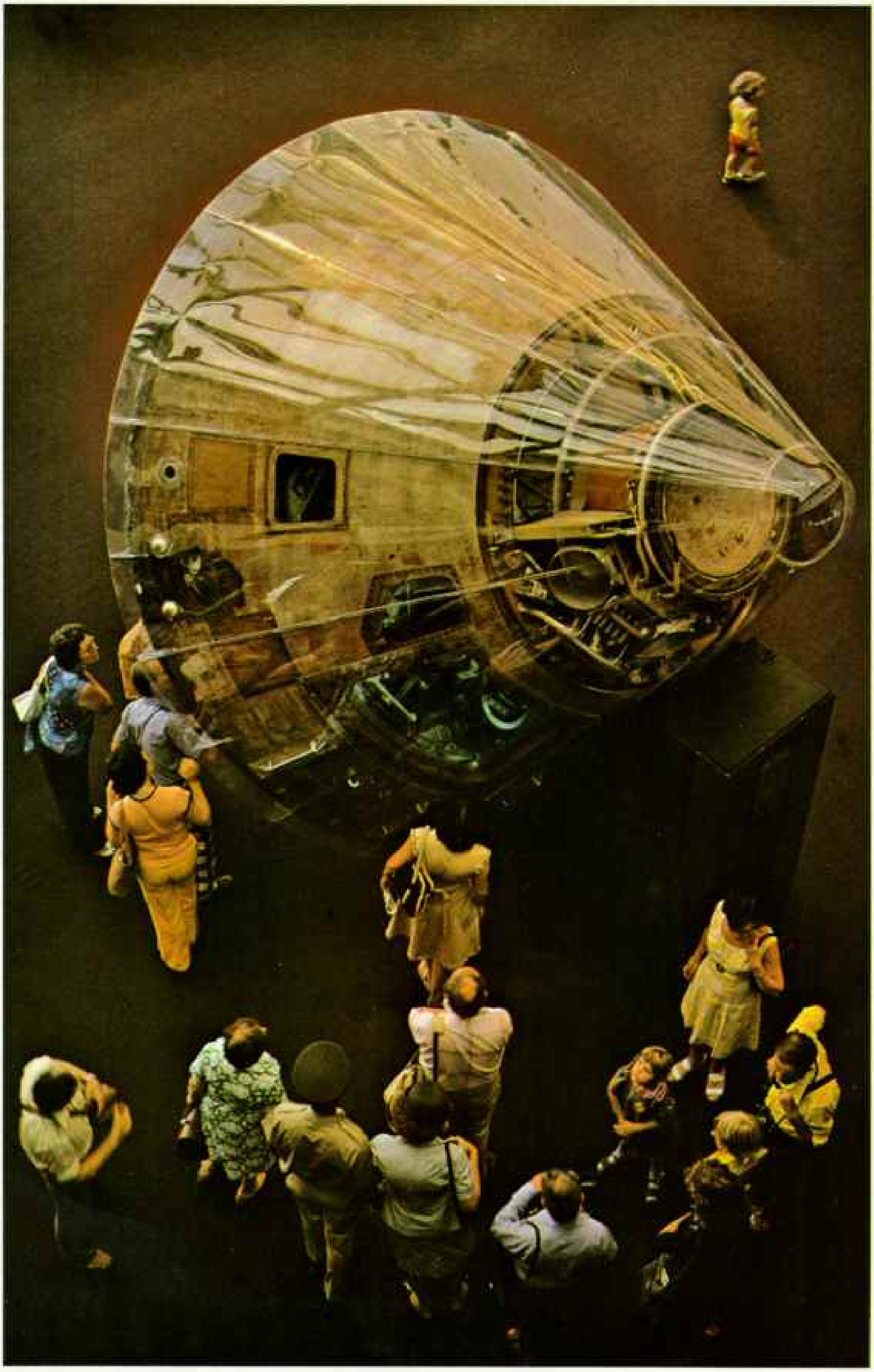
"Do your patients drink wine?" I asked.

"Of course," he said. "It's very therapeutic. Wine is the great ancestor of all tranquilizers."

I told him I had once been put on a diet of milk to treat an incipient ulcer.

"Good heavens," he replied. "That's enough to give you an ulcer. Next time try a little Burgundy. It heals everything." □

Bringing in the weeds, Mme Angèle Birotte of Arcenant cuts and collects wild grasses between her well-tended garden plot and the road. She feeds this marginal harvest, fresh daily, to caged rabbits until they make their debuts at table. Intensive use of small landholdings has long been a way of life in Burgundy, proving not only that small is beautiful, but nourishing and delicious as well.



OF AIR AND SPACE

By MICHAEL COLLINS

DIRECTOR, NATIONAL AIR AND SPACE MUSEUM

ON A WARM MAY DAY in 1896, a 13-foot-long dragonfly with silk-covered wings and a one-horsepower steam engine was catapulted into the air from a houseboat on the Potomac River. It circled round and round, rising to approximately a hundred feet.

When it settled gracefully on the water after a flight of 90 seconds, it had established an aviation milestone: More than seven years before the Wright brothers' Flyer carried a man aloft, this frail, unmanned, heavier-than-air craft—known as Aerodrome No. 5—had achieved stable powered flight.

Today Aerodrome No. 5 floats lazily in the Smithsonian Institution's new National Air and Space Museum in Washington, D. C. When I pass it, I give an appreciative nod and tip my hat to the genius behind it. The inventor was the third Secretary of the Smithsonian, Samuel Pierpont Langley. The Smithsonian's keen interest in flying machines really dates from his appointment more than ninety years ago.

Langley's successors were as perspicacious as he was in recognizing the emerging science of flight, and as tenacious in acquiring samples of its progress. Over the years, hundreds of artifacts filled Smithsonian warehouses, not only Aerodrome No. 5 but also the original Wright Flyer, World War I Spads, the first plane to fly around the world, and Charles Lindbergh's *Spirit of St. Louis*—all these and more. Unfortunately, only a fraction could be exhibited.

In 1946 legislation established a national air museum. Twenty years later, on July 19, 1966, new legislation broadened the museum's scope, creating the National Air *and* Space Museum. I would have paid more

JIM MENDENHALL (FACING PAGE); NATHAN BENN

High flier among Washington's tourist attractions, the Smithsonian Institution's National Air and Space Museum has counted some 18 million visitors since it opened in July 1976.

The author, a former astronaut, orbited the moon in the Apollo 11 command ship (**facing page**) while his mates landed. In the Milestones of Flight gallery (**above**) the X-15, world's fastest aircraft, flies above the Wright brothers' Flyer and Lindbergh's *Spirit of St. Louis*, at upper left.

Roaring out of yesteryear, a Ford Tri-Motor leads a formation of early

airmail and transport aircraft that includes the durable Douglas DC-3.

NATHAN BENN

"Ad Astra"—To the Stars—a sculpture by Richard Lippold, adorns the Mall entrance.

attention to this fact at the time, but I spent that day in orbit, circling the earth 16 times aboard Gemini 10.

It was not until November 20, 1972, however, that Chief Justice Warren E. Burger turned a ceremonial clod of earth and construction got under way. Architect Gyo Obata had designed a structure that would house the largest objects in the museum's collection, yet would merge pleasingly into Washington's spacious Mall.

Museum curators were ready with priority lists for displaying their artifacts. Historic aircraft were restored to mint condition by craftsmen at the museum's repair shop at Silver Hill, Maryland, with assistance from aviation enthusiasts and aircraft manufacturers. A team of exhibit designers was assembled to display these objects as educationally and interestingly as possible.

The National Air and Space Museum covers the entire spectrum of aerospace history, with exhibits ranging from 18th-century ballooning days to the future of space exploration. With such diverse subject matter, we decided to give each of the museum's 23 exhibit halls its own style.

During late 1975, when the building began filling up, we had some exciting moments. The gigantic Skylab orbital workshop, for instance, a 70,000-pound, 52-foot-tall cylinder (page 836), had to be shoehorned into the building. NASA obligingly separated it into four pieces, or it never would have fit through our largest door. Then we had to pile the parts back on top of each other—with only inches to clear the beams overhead.

Another close call involved the cluster of rockets in Space Hall. We cut a hole in the first floor to provide extra clearance. Even so, the 71-foot Jupiter C rocket rises from the basement almost to the skylight.

The largest aircraft inside the building is a Douglas DC-3, which now flies 35 feet above the floor, suspended from the overhead trusswork. It was being gingerly hoisted by block and tackle when a clamp slipped, sending the eight-ton craft hurtling to the floor. The crash was probably no

worse than many a hard landing the old workhorse had endured, and it was hoisted safely back up to its final resting place.

One of the most complicated installations was the intricate Zeiss Model VI planetarium instrument, a gift to the American people from the Federal Republic of Germany. This machine forms the heart of the Albert Einstein Spacearium, the most technically advanced sky theater in existence.

The paint was barely dry on July 1, 1976, when the new museum opened—three days ahead of schedule. The Air Force's precision flying team, the Thunderbirds, zoomed low overhead. President Gerald R. Ford called the museum "a perfect birthday present from the American people to themselves."

Then, with Smithsonian Secretary S. Dillon Ripley and Chief Justice Burger, the President watched while a signal from the Viking spacecraft approaching Mars, 200 million miles away, activated a mechanism that cut a red-white-and-blue ribbon—and the museum was officially open.

I am often asked how, in this age of skyrocketing prices, we ended up ahead of schedule and half a million dollars below budget. The heart of it is that we assembled a first-class team. It also helped to have a precise goal and schedule: a museum on the Mall by the Bicentennial, just as a few years earlier the goal had been to land a man on the moon by the end of the decade.

Public response to the new museum has been nothing short of phenomenal. The visitor count reached a million within 25 days, and 9.7 million in the first year. I believe it is, by a wide margin, the most heavily visited museum in the world.

People seem genuinely thrilled by their visits and eager to return. When asked to pick favorites, they give a wide variety of answers, but perhaps the most popular museum features are the motion picture *To Fly* and "Apollo to the Moon." The film, shown on a gigantic five-story screen, captures the soaring spirit of flight (pages 830-1). The Apollo exhibit, using astronaut equipment, spacecraft, and moon rocks, explains graphically how the lunar landings were achieved and what scientists learned.

Another crowd pleaser, of special interest to Geographic members, is the gondola of *Explorer II*, the National Geographic Society-U. S. Army Air Corps stratosphere balloon, which reached 72,395 feet in 1935, an altitude record unbroken for 16 years.

The World War I gallery re-creates an American airfield near Verdun just before the 1918 Armistice (pages 826-7). Against one gallery wall stands a hangar tent where the skeleton of a rotary-engine French Nieuport 83 biplane awaits repairs by three mannequin mechanics seated nearby.

"See that?" said one visitor to a friend. "In that war they had to build their own planes."

Such visitor misconceptions are as unpredictable as they are amusing. I remember another instance in which a boy said to his father, "Are those planes real?" The father replied, "Of course not, son. This is a museum. They couldn't afford them."

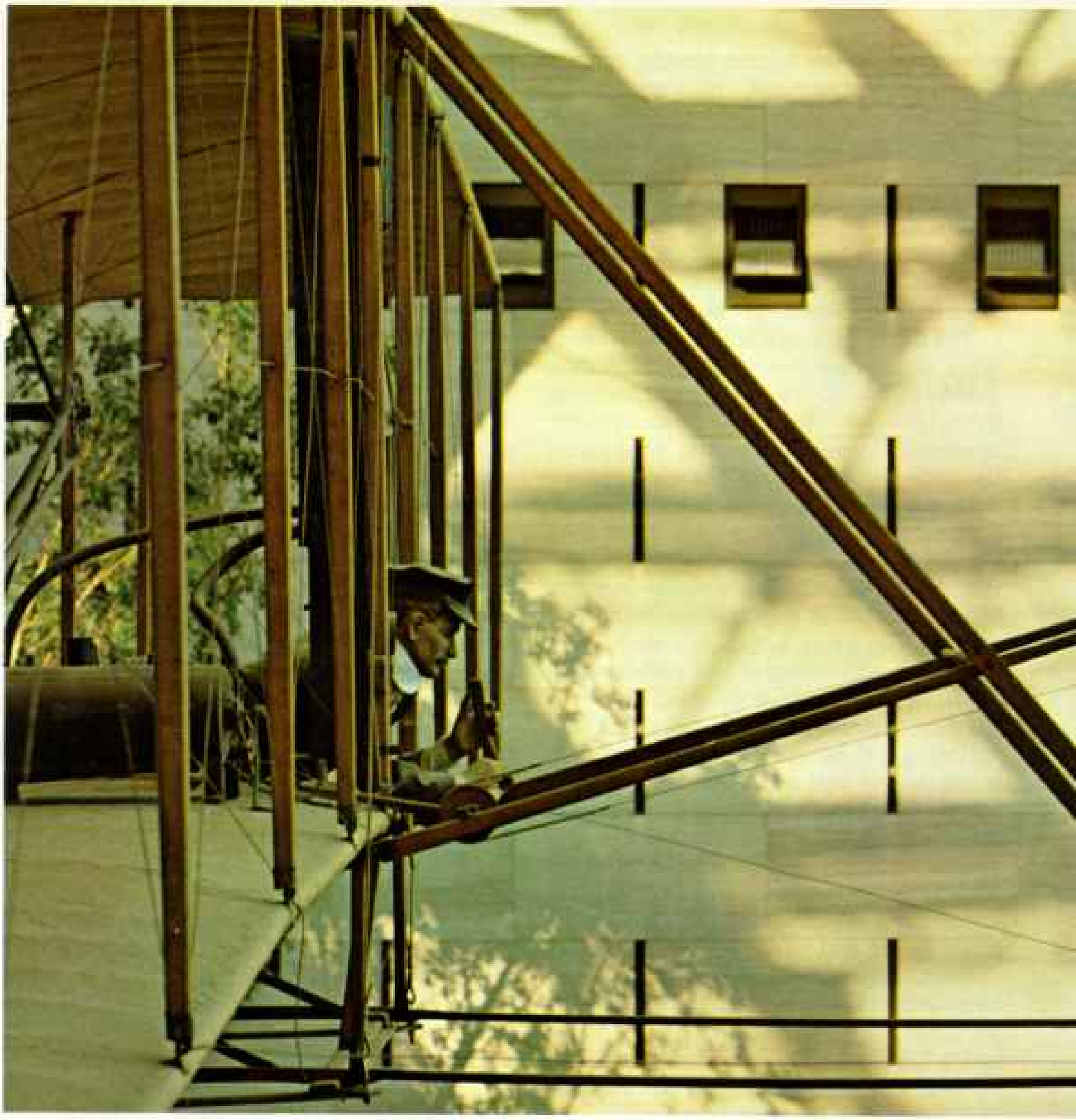
And there was the time when a forklift sputtered and died as we were repositioning a spacecraft. The workmen set ropes and stanchions around the disabled machine and left the gallery. Soon a couple stopped to admire the forklift tableau.

"Has that thing been to the moon?" she asked. "Yes, dear," her husband replied. "If it hadn't been, they wouldn't have it here."

PEOPLE clearly are intrigued by the new museum, but less obvious is exactly why. I think one reason is that the exploration of air and space has unfolded swiftly and dramatically, within the lifetimes of most of us.

Paul Garber, the museum's historian emeritus, remembers Orville Wright flying at Fort Myer, Virginia, in 1909. Millions of Americans remember where they were when Lindbergh reached Paris, or when Neil Armstrong set foot on the moon, and they have passed on this feeling of personal involvement to their children. The museum makes these events come alive and provides tangible evidence of the accelerating developments in air and space, and the part our pioneering nation has played in them.

This newest member of the Smithsonian family sits comfortably in its historic neighborhood, proud of the achievements it represents and looking eagerly to the future. If the museum were to borrow a motto, I would suggest that of the Air Force Flight Test Center in California: *Ad Inexplorata*—Toward the Unknown. * * *




New York June 17th, 1927
Bryant Park Bank
Pay to the Order of Charles A. Lindbergh
Twenty-five Thousand No/100 Dollars
Payable in funds current at New York Clearing House
$25,000. No/100
Raymond Orteig

NATHAN BENN (ABOVE); OTHERS BY ROBERT S. OAKES AND JOSEPH D. LAVENBURG

PATHFINDERS OF THE AIR

CRAFT THAT LAUNCHED the air age, the Wright brothers' Flyer (**left**) rose from a North Carolina beach December 17, 1903. Orville—here represented by a mannequin—and Wilbur each made two flights that day, the first sustained and controlled flights by man in a powered, heavier-than-air machine.

The spruce-and-muslin Flyer, which survived World War II bombs in a cave outside London while on loan to the city's Science Museum, joined the Smithsonian collection in 1948.

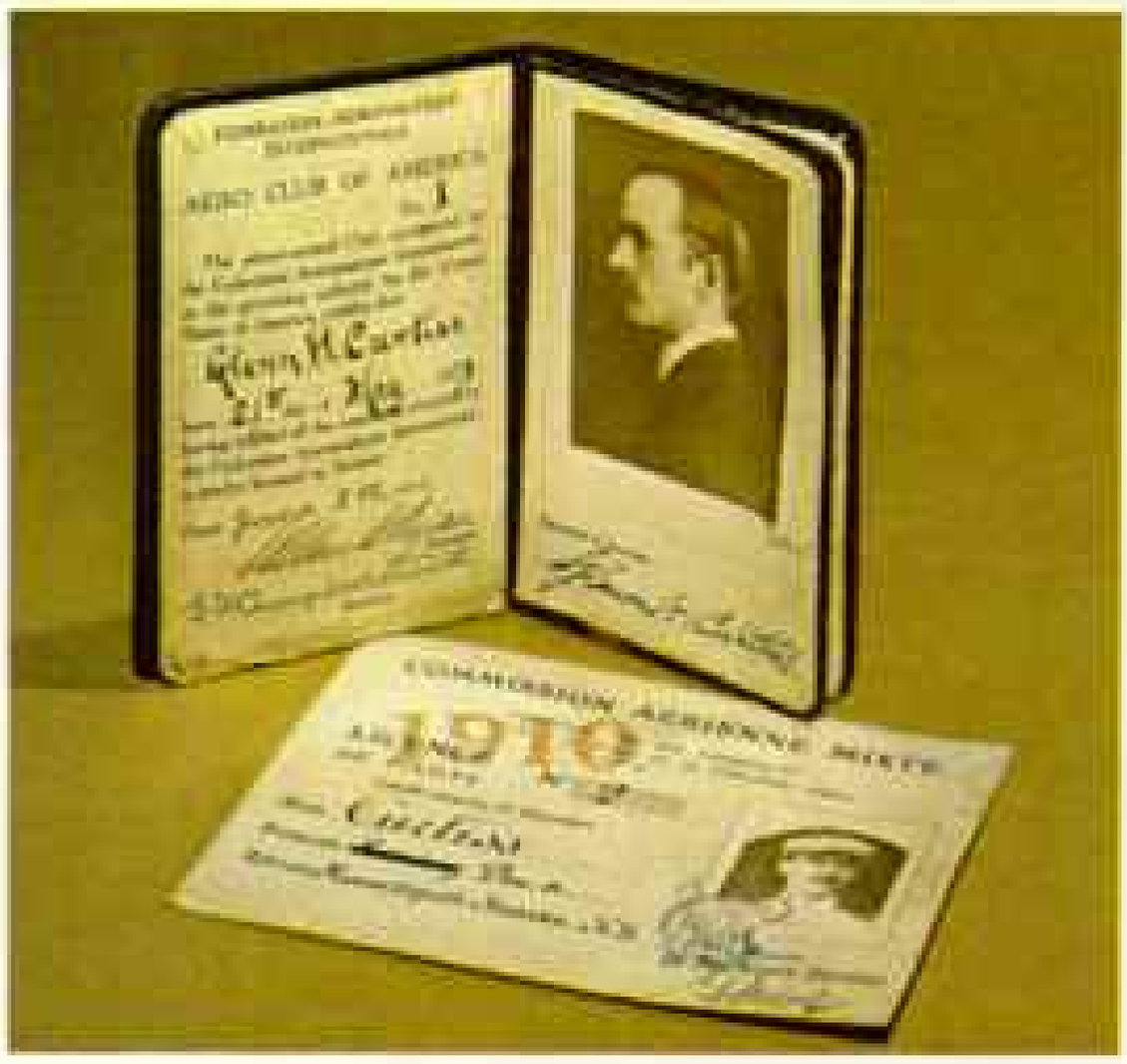
For the first nonstop solo flight across the Atlantic, in 1927, Charles A. Lindbergh won a $25,000 handsomely illuminated check (**below, left**) from Raymond Orteig, a New York hotelier.

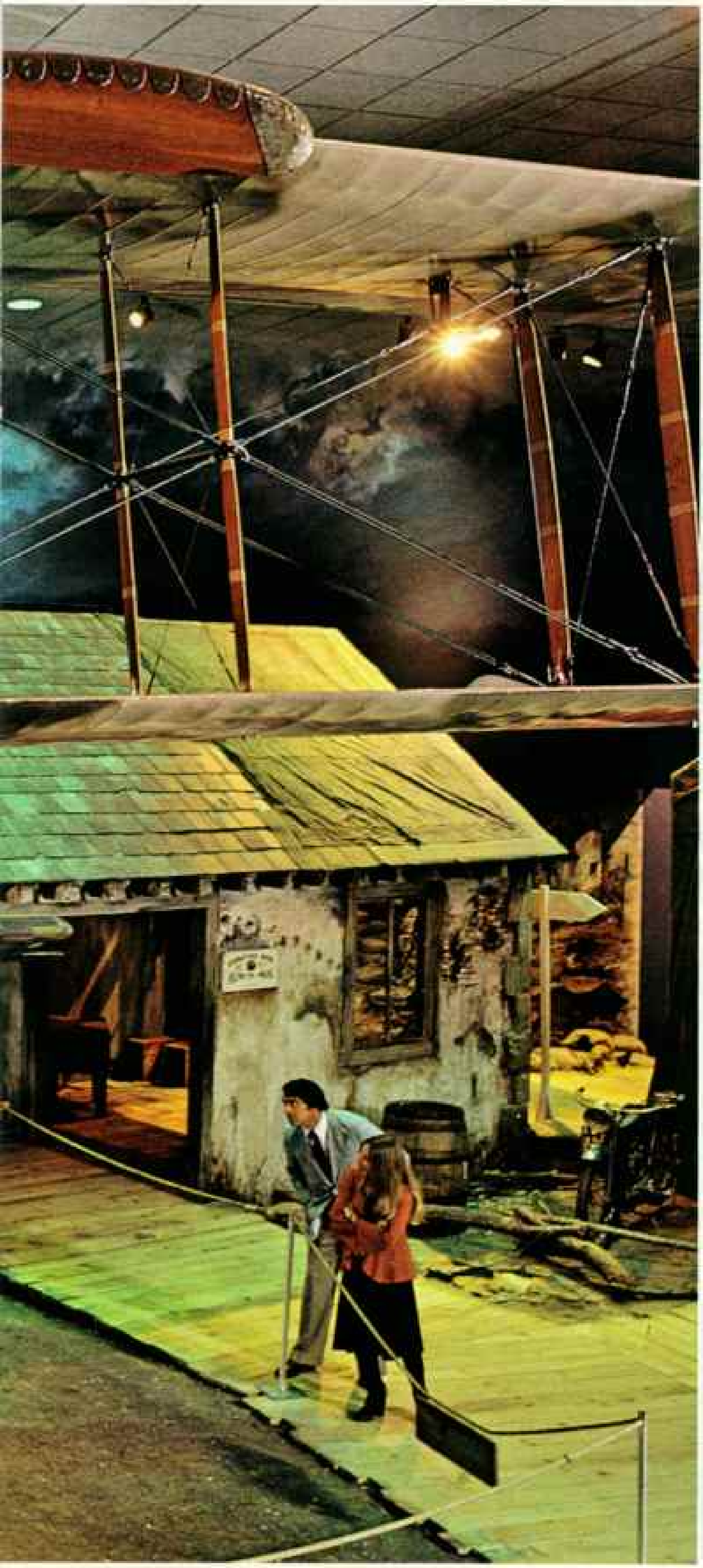
Pioneer of U. S. naval aviation, Glenn H. Curtiss designed the first aircraft to land on a ship. He also received the first pilot's license issued in the U. S., as well as the second issued in France (**below**).

Longer than two football fields, the Air and Space Museum contains more than sixty aircraft and numerous spacecraft and rockets. Is it possible to see everything in one day? That depends. A visiting museum curator, determined to read every descriptive label at every exhibit, spent five full days.

Photographs by
NATHAN BENN and
NATIONAL GEOGRAPHIC PHOTOGRAPHERS
ROBERT S. OAKES and
JOSEPH D. LAVENBURG

Text by MICHAEL E. LONG
NATIONAL GEOGRAPHIC STAFF





JUST 20 MILES FROM ENEMY LINES

AN AURA OF BATTLE pervades the World War I exhibit, representing an American airfield near Verdun, France, 20 miles from German lines.

Frozen in a victory roll that heralds an enemy kill, a Spad VII flies over a German fighter seized in 1918. Approaching through heavy rain, the fighter pilot landed his Fokker D.VII—D for *Doppeldecker*, or biplane—and was captured.

"Where am I?" the German lieutenant asked.

"Verdun," the Americans replied.

"I thought it was Metz," the German said.

In their quest for realism and authenticity, museum craftsmen restored the Fokker to its original condition. The Spad had been previously restored, down to the protective metal sheathing on its propeller.

The operations room of the American 95th Aero Squadron, painstakingly reconstructed from photographs, is pocked to simulate machine-gun fire. Craftsmen even knocked a hole in the building with sledges, then singed the edges with blowtorches, to depict the damage from an artillery shell.

NATHAN BENN AND LARRY D. KINNEY,
NATIONAL GEOGRAPHIC STAFF

MEMORABILIA OF THE PAST

ROBERT S. OAKES AND JOSEPH D. LAVERDURE

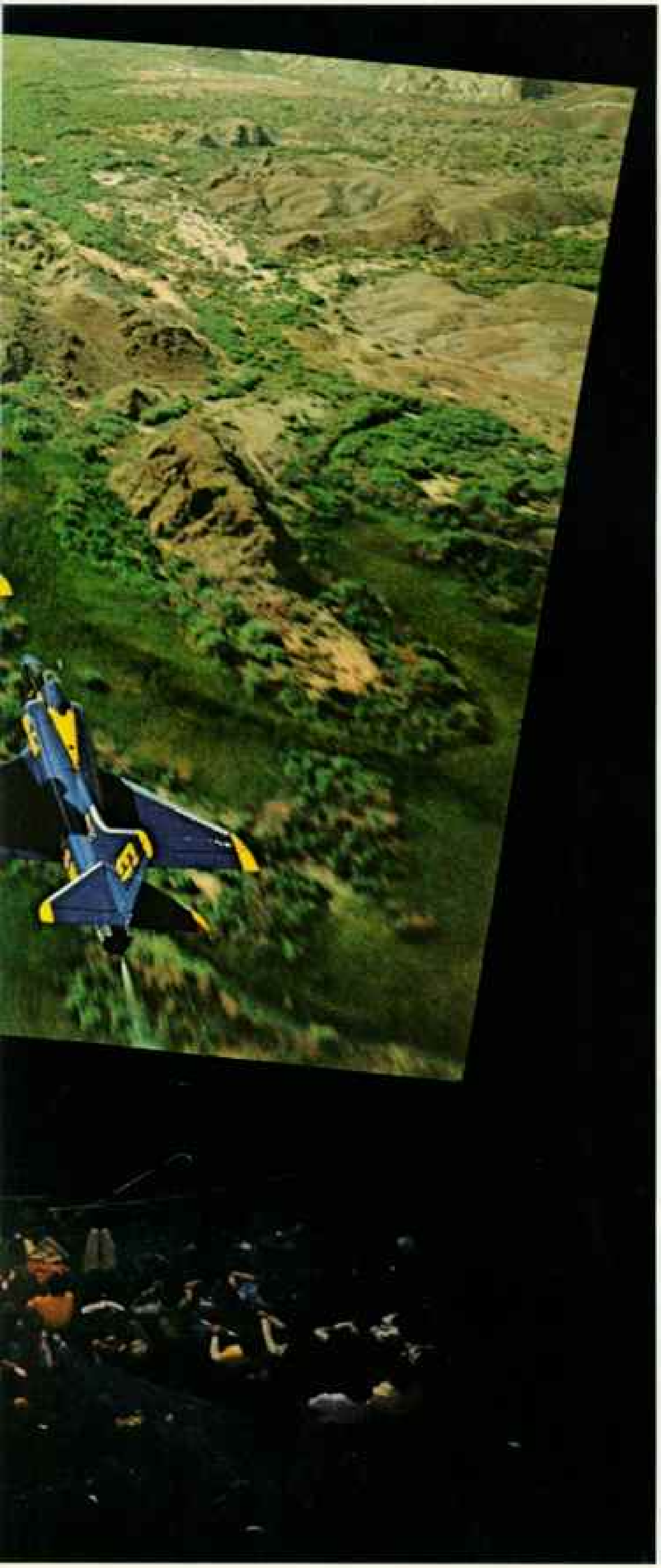
ON-THE-SHELF MEMENTOS in the archives provide rich browsing for researchers. A still life of World War I miscellany (**right**) features a leather helmet worn by Henry H. (Hap) Arnold as a young pilot. Arnold commanded U. S. Army Air Forces in World War II.

Clockwise from the helmet, which rests in front of an aviator's map, are: goggles, an aircraft clock, pilot's wings, two barometric altimeters, a shoulder patch, a boot hook, a combat flying helmet, and a flight logbook. The pencil-like steel dart, dropped in quantities, could pierce an enemy from head to foot.

Decorations, service ribbons, and a brigadier general's star grace the uniform (**left**) worn by World War I hero William (Billy) Mitchell. Farsighted advocate of air power and relentless critic of establishment policies, Mitchell lost his high rank and eventually was court-martialed for insubordination, but his prophecies prevailed.

Gloves worn by Neil Armstrong, first man to walk on the moon, carry a stitched-on checklist of tasks (**below**).


FRANCE
HAP ARNOLD
SECRE



TO FLY

OFF *YOU* GO into the wild blue yonder—at the spectacular movie *To Fly*. Projected on a screen five stories high, the movie practically puts the audience into the cockpits of the Blue Angels (**left**), the Navy's crack aerobatic team.

Viewers, photographed with RCA's new TV camera that "sees" in the dark, experience vertigo, exhilaration, and wide-eyed astonishment (**below**). Overheard from a child: "It's like I'm flying, Mom!"

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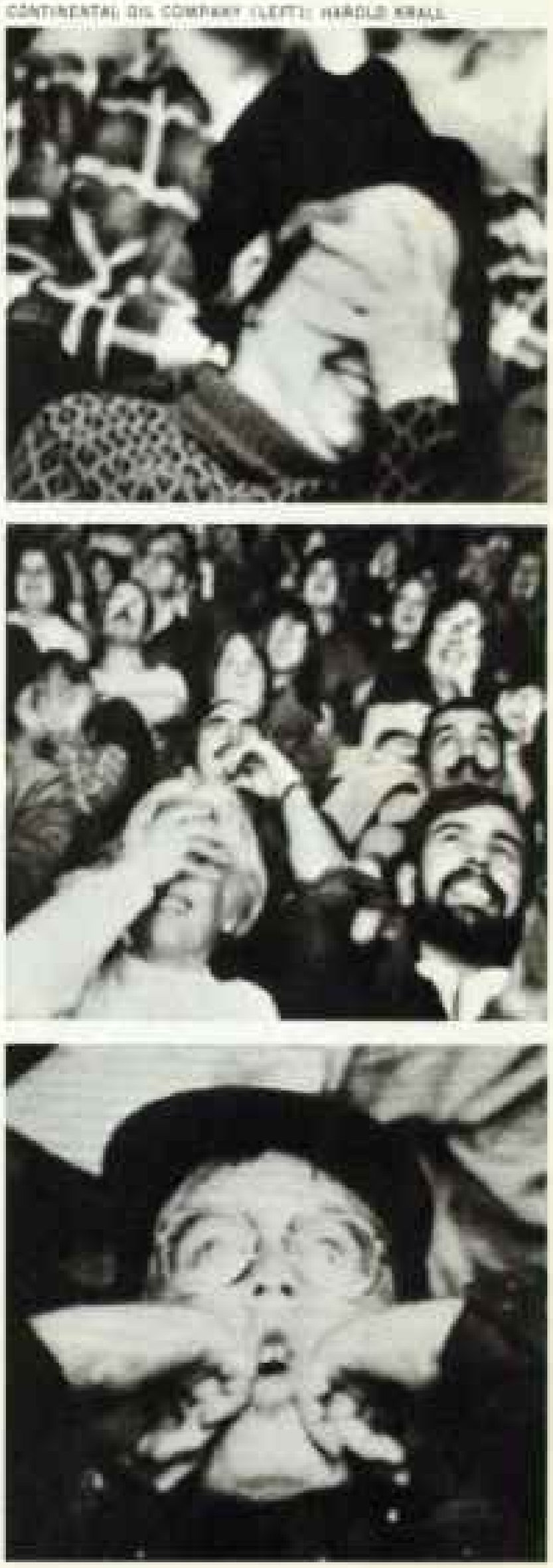
CONTINENTAL OIL COMPANY (LEFT); HAROLD KRALL

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NATHAN BENN (ABOVE); JOSEPH D. LAVERNIAS (LEFT); ROBERT S. OAKES AND JOSEPH D. LAVERNIAS

WAR IN THE AIR

HARASSED BY FLAK, B-17's head home after a raid on Germany in this mural in the World War II exhibit. An Italian Macchi C.202 Lightning fighter hangs above an American P-51 Mustang, a devastating performer against aerial and ground targets. At the Sea-Air Operations exhibit (**left**) visitors join the "captain" on the bridge of a carrier as fighter and patrol aircraft are launched. Museum archives include a 1923 prototype (**right**) of the famed Norden bombsight that permitted precision high-altitude attacks.

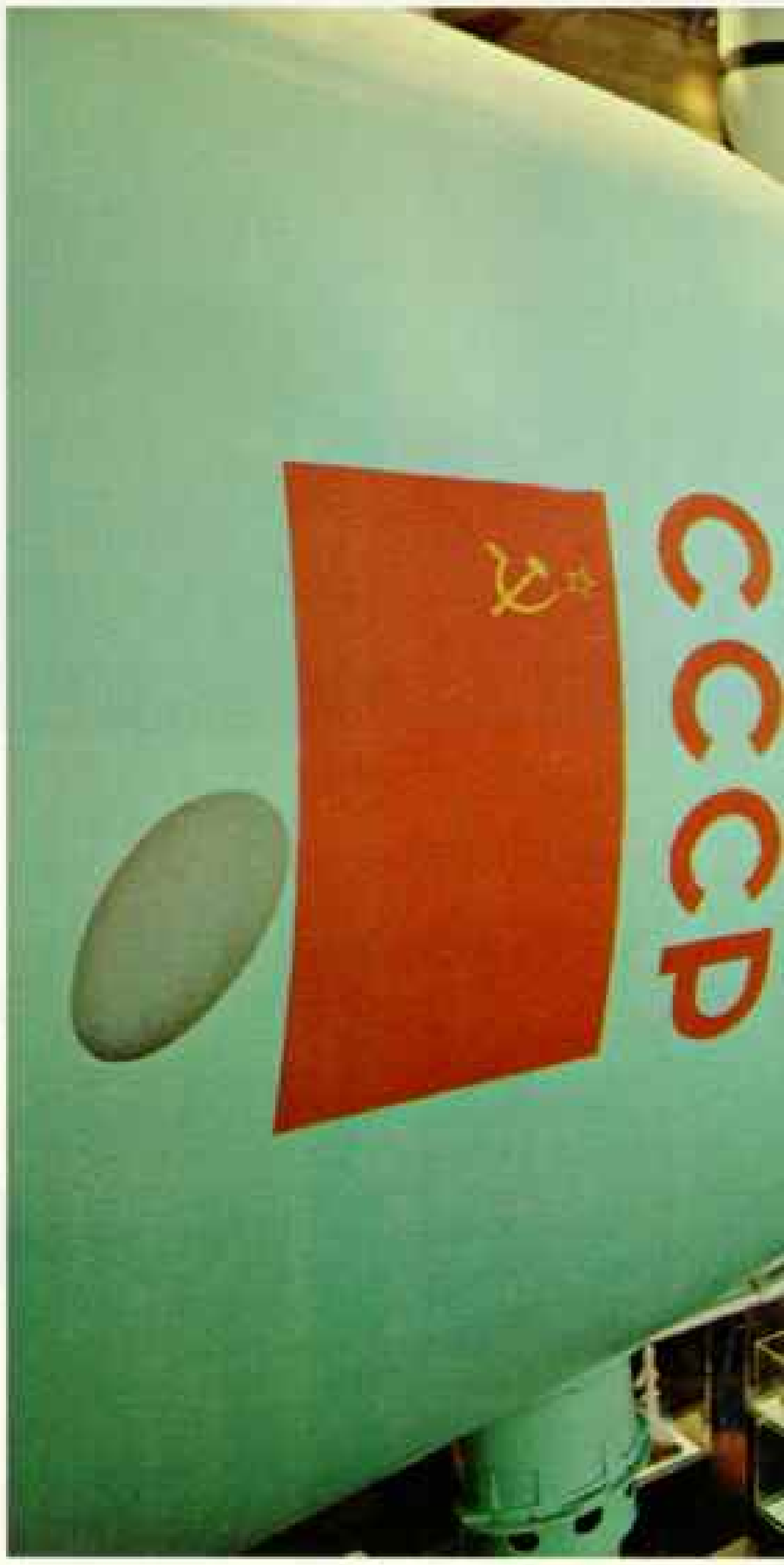
OF TRIUMPH—AND ESPIONAGE

TOGETHER ON THE GROUND, the beetle-shaped Soviet Soyuz is joined with a U. S. Apollo command and service module (**below, right**) in Space Hall. Similar craft rendezvoused above the earth in 1975.

The historic linkup took place 14 years after America's first manned space venture, the 15-minute suborbital flight by Alan B. Shepard, Jr., in *Freedom 7* (**right**). Beside the mannequin's right hand is a parachute, for use if the craft's main chute and a backup had failed to deploy.

Symbol of cold-war secrecy, Francis Gary Powers's pressure suit and helmet (**below, left**), not on display, carry only one mark of identification—the number 29 on the helmet.

Powers was wearing identical gear when his high-flying U-2 reconnaissance aircraft was shot down over the Soviet Union in 1960. Convicted of espionage after a trial in Moscow, Powers was later returned to the United States in exchange for Soviet spy Rudolf Abel. Powers died in a 1977 helicopter crash in California.



ROBERT S. OAKES AND JOSEPH S. LAVENBURG (OPPOSITE AND TOP); NATHAN BENN

JIM WENDENHALL (ABOVE); ROBERT S. OAKES AND JOSEPH D. LAYENBURG (LEFT); NATHAN BENN

THE MOON... AND BEYOND

TOO TALL for the museum doors, the 52-foot-high Skylab orbital workshop (**above**) was separated into four pieces and reassembled inside. It is identical to the unit launched in 1973, which provided astronaut living quarters and work stations for Skylab experiments.

Simulating the first manned moon landing, mannequins of Neil Armstrong and Edwin E. (Buzz) Aldrin, Jr., exit the lunar module (**right**), twin to the one they used.

Less than a foot high, a vernier engine (**left**) is identical to those aboard Surveyor spacecraft during lunar probes in the 1960's. Used for braking during final moments of descent, the tiny engine's thrust of 104 pounds is a mere whiff compared with the 1.5 million pounds generated by the Saturn F-1 engine, also on display at the nation's treasure-house of air and space. □

Dragons of the Deep

PICTURE STORY BY PAUL A. ZAHL, *Ph.D.*

PHYCODURUS EQUES

ANIMAL OR VEGETABLE? Fish or fantasy? Looking like a tangle of seaweed, the leafy sea dragon—kin of the sea horse—gallops in dreamy motion through pastures of marine algae. The 30-centimeter (12-in) creature, a true fish, sprouts leaflike appendages that mimic vegetation in its habitat.

Seen with uncamouflaged clarity in an aquarium, these dragons were taken off the south coast of Australia in chilly water 15 meters deep. The animal's bony exterior helps ward off attack by predators that aren't fooled by its camouflage. Swimming slowly about, it sucks up marine microorganisms and small worms with its tubelike snout. Because its weedy habitat repulses nets and its snout eschews fishermen's hooks, the sea dragon is rarely seen except when tossed ashore by storms.

"*PREGNANT*" *FATHER*, a male weedy, or common, sea dragon bears a mass of eggs under his tail (**below**). In a turnabout of usual sexual roles, the male of the species carries the young through the hatching period. The female deposits 100 to 250 eggs on the underside of her mate's tail, where they are fertilized and protected in cuplike supports (close-up, **left**). Within each egg the embryo appears as a reddish mass. After three to five weeks, the half-inch-long hatchlings are released into the sea.

Transparent fins flutter almost invisibly as they propel the stiff-bodied creature slowly through tangled beds of kelp. The weedy sea dragon, more common than the leafy variety and as much as 15 centimeters (6 in) longer, favors shallower depths near the low-tide line. The two species are seldom found together.

PHYLLOPTERYX TAENIOLATUS 25 CM (10 IN)

PAS DE DEUX *for mother and child: A 30-centimeter (12-in) adult female weedy sea dragon and a youngster ride along with a slow, graceful, bucking motion reminiscent of a kangaroo's.*

Rudie H. Kuiter

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HIPPOCAMPUS BREVICEPS (LEFT); SOLENOSTOMUS PARADOXUS (ABOVE)

ODD FISH, ALL—the sea dragon and its relatives, the sea horse and the pipefish, belong to the suborder Syngnathoidei. All have bodies encased in a bony armor, and most have longish snouts. While sea dragons are apparently limited to the offshore waters of Australia, several kinds of sea horses and pipefish are scattered throughout tropical and temperate waters, including the Gulf of Mexico and the Caribbean.

Clasping a stalk of alga with his prehensile tail (**left**), an Australian male sea horse displays a markedly swollen brood pouch. Whereas the male sea dragon carries the eggs on the underside of the tail itself, the male sea horse carries them concealed in a pouch under the tail and ejects the newly hatched brood in multiple spasms after an incubation period of about ten days. This ten-centimeter (4-in) specimen shares the same general habitat as the sea dragon.

More streamlined than either the sea horse or sea dragon, a brightly colored ghost pipefish (**above**), about eight centimeters long, darts about more swiftly than its slow-moving relatives. Photographed in Sydney's harbor at a depth of about ten meters, this ornate specimen looks like so much dancing sunlight when seen in its usual environment among billowing fields of multicolored seaweed.

Australian ichthyologist Alison Reynolds (**below**), who made numerous dives to collect some of the specimens for this article, surfaces following a descent south of Melbourne. After gingerly combing with bare fingers through dense beds of kelp, she emerges with three *Phyllopteryx*—a pregnant male nearly thirty centimeters long, center, an adult female, and a youngster—bizarre dragons of the sea that St. George himself would have marveled at. □

The Proud Armenians

By ROBERT PAUL JORDAN
ASSISTANT EDITOR

Photographs by
HARRY N. NALTCHAYAN

MOST ARMENIANS fled Turkey long ago, but some of the villages they abandoned still stand on the lonely reaches of the Anatolian highland. This one was typical—a cluster of flat-roofed stone huts stepping up a mountainside, dominated by the forlorn shell of a Christian church. Muslim families were tilling the steep plots and praying to Allah at the appointed hour.

I had come here on a spring afternoon in the company of an Armenian priest from Istanbul, a quiet man of middle age. For him it was an act of faith, and a sadness. His people had been gone six decades.

We watched Kurdish children playing in the dirt road. Other people, he said, had taken over many Armenian villages—Kurds here, Turks elsewhere. His face was impassive: Land is to be used, people must live.

Leaving the stricken church, he touched hand to heart. Such churches were common

Loving welcome by relatives greets a visitor from the United States (**right**) at the airport in Yerevan, capital of Soviet Armenia. A scattered people who have survived oppression and a brutal diaspora, Armenians now come from all over the world to visit this remnant of their once vast ancestral homeland. Reminder of the Christian faith that unites them, a 15th-century church calendar secreted in a flasklike leather container (**below**) probably served an Armenian who feared persecution.

in Turkey, he murmured, prey to the elements and vandals, ruins of a civilization. There were two in the nearby city of Malatya. We would soon be going to Malatya.

Another sorrow lay deep. I felt it though I am an *odar*—foreigner, in the Armenian language. The priest gripped my arm.

"Armenians are still being driven from remote villages," he said grimly. "It is the old hatred. Sometimes a young girl is abducted, or a husband killed. They cannot bear to stay on their land after that. They make their way to the patriarchate in Istanbul. We give them shelter and find them homes."

I looked out to the distant Euphrates, not wanting to hear of such agony. The river was a glinting ribbon on its timeless run to Mesopotamia. The priest spoke again.

"Once Armenians were heavily concentrated in eastern Turkey. Only a few remain. In all the interior, only three churches are working. Malatya has none. But some of my flock are there, and much time has passed since my last visit. Tonight we will meet in a house." He smiled for the first time. "You shall see the joy of Armenians renewing their faith."

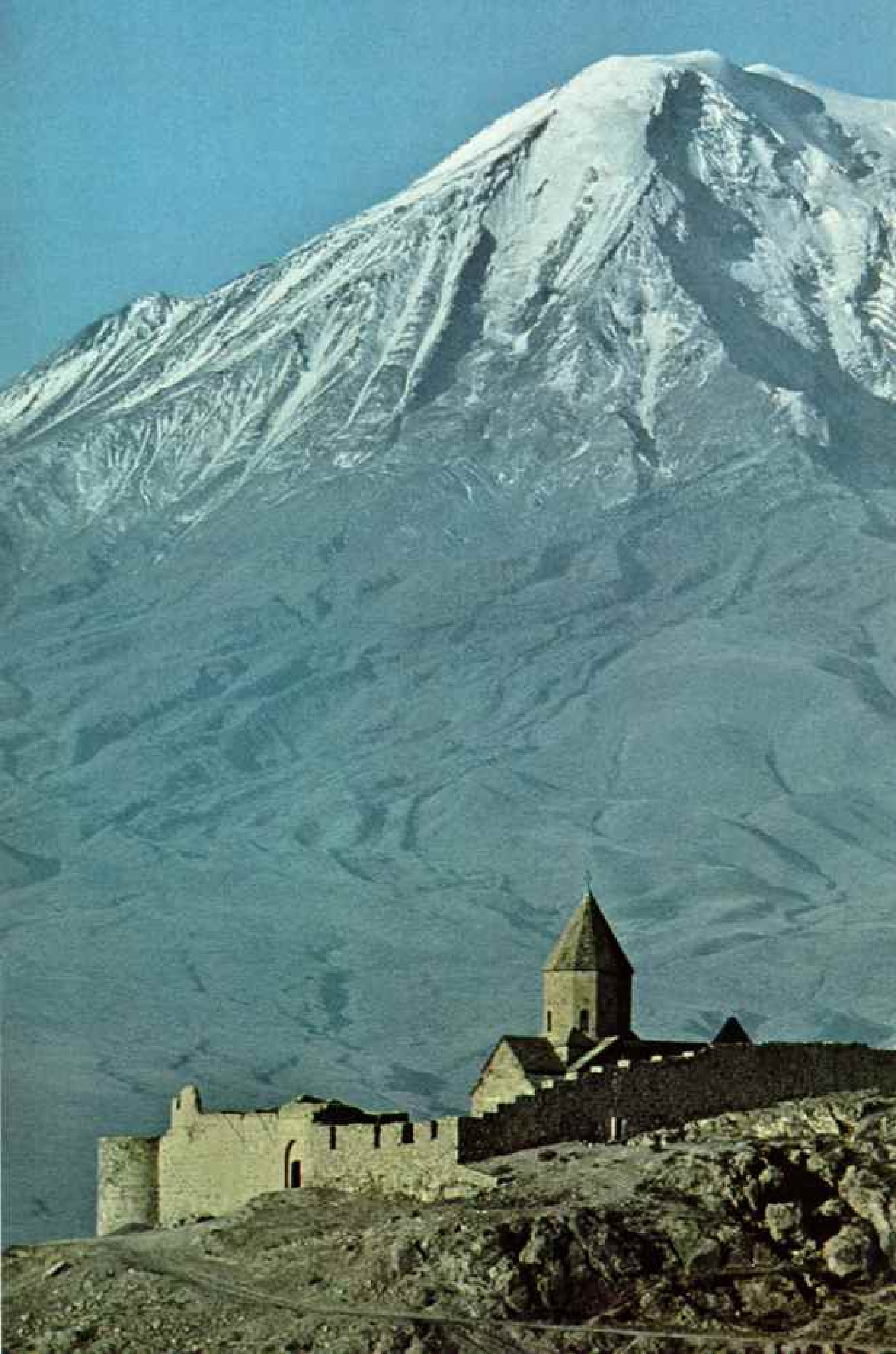
A few hours later, after darkness fell, the city's few Armenian families filled a small living room to overflowing. The priest and his deacon, richly robed, led them in prayer and song in the dim glow of a ceiling light, while incense smoldered.

It was, I thought, as if a band of early Christians had gathered furtively in a cave to worship. Children were baptized, Communion given. One aged, failing woman, scarf on head, knelt with tears of happiness falling. Earlier she had despaired.

I sat with her afterward. "We are sheep without the shepherd," she said. "At last the shepherd came—and he forgave me."

Forgave?

She had broken the pre-Communion fast.



FROM THE COLLECTION OF HAROUTUNE P. HAZARIAN

Snowy beacon through dark centuries of Armenia's often tragic history, the rumpled presence of Mount Ararat (**left**) looms as the symbolic heart of the ancient nation. Clearly visible from Soviet Armenia, the mountain rises within Turkey, where only a few Armenians still dwell. In 1915 the Ottoman Empire, allied with the Central Powers, embarked on a mass deportation of its Armenian minority, some of whom were collaborating with the enemy, Russia. Starvation and mass executions killed two-thirds of the empire's Armenians.

Khor Virap church, inside the Soviet border, marks the spot where Christian evangelist Gregory the Illuminator was imprisoned by Armenia's pagan King Tiridates III for several years prior to 301. At that time, legend tells, demons turned the king into a pig, until, in a moment depicted on an illuminated manuscript from 1679 (**above**), Gregory cast out the demons at the bidding of the king's sister, who kneels at Gregory's left. Converted by his cure, Tiridates established Armenia as the first Christian kingdom.

Faint with hunger, she had eaten a handful of raisins. In torment she had approached the priest, confessed, and been absolved. I saw no greater joy that night.

The old fear was present too. As we left, a girl stopped me. "Do not forget us," she pleaded softly. "We are alone here. We are always afraid that something will happen to cause trouble."

MANY TIMES as I traced the journey of Armenia, I was to wonder if worse trouble had ever afflicted any other people, or whether any other people persecuted down the centuries had persevered more nobly. Armenians have gone forth into the world and multiplied. Peaceful, hardworking, intelligent, religious, family oriented, they have become a great, though little-known, success story.

But not in the land of their origin. Archbishop Shnorhk Kaloustian, Armenian Patriarch of Istanbul, struggles daily with the realities of survival in Turkey. I called on him at his island home in the Sea of Marmara. A white-bearded, Biblical figure, he seemed frail and weary, but resolute.

In the early 1900's, he began, more than two million Armenians were living in the Ottoman Empire, mostly in the east where their ancestors had dwelt for nearly three millennia. Then came a series of massacres and deportations—his own father, brothers, and uncles were killed, his sister taken—by government forces.

By 1920 or so, he went on, only about 150,000 remained. Today they have dwindled to perhaps 45,000 in Istanbul, 15,000 in the interior. The exodus continues.

"If I were to tell you that we do not have problems," the Patriarch said, "I would be lying. We are free to practice our religion. And Armenians do well in their businesses. They are diligent and clever. But there are bureaucratic discriminations. I have presented these difficulties to our government."

I asked him to explain. "We cannot build new churches or repair old ones," he replied. "But Turks can build new mosques." His eyes swept the horizon, where minarets of Islam pierced the city's skyline. "Our church properties are unfairly taxed. Our schools have Turkish co-directors, whose power grows. Even to enroll our children meets with bureaucratic obstacles. We are second-class citizens."

The Patriarch sipped a cup of tea. "So far we have managed, somehow, to take care of our churches, schools, and orphanages. We receive help from Armenians overseas, especially in America. But we do not have the means to resettle our refugees from the interior. They are real heroes."

I could suggest others. Only hours before Armenian Christmas services were to be held last January 6, bombs heavily damaged the patriarchate and cathedral. The services went on as scheduled, communicants picking their way through the debris.

The bombing was believed to be in retaliation for similar incidents in Europe against Turkish property. Tragically, since 1973 six Turkish diplomats have been assassinated by terrorists claiming to be Armenians.

ONE ASKS the why of it all. At base, I have concluded, rest three historical factors: geographic situation, racial characteristics, and religious differences. To oversimplify: Turkey is for the Turks, and Armenians persist in their right to be Armenians.

Ancient Armenia spread over eastern Turkey into Iran, Iraq, and the Soviet Union (map, following page). Armenians were occupying this land bridge between Europe and Asia—their Armen ancestors were Indo-Europeans—in the days of the Assyrians, Medes, and Parthians. The blood of the Hittites is one of their strains.

The Armenian people have always clung to their culture, traditions, language, and ideals—sustained by the religion that they embraced around 300 as the first Christian state. In the fifth century, when the Holy Scriptures were translated into their language, a historian wrote that God became an Armenian-speaking God.

Sleep, little children. An Armenian family shelters in an Istanbul church while awaiting resettlement in the city. Even though Turkish law proscribes persecution, Armenians claim that ancient animosities still exist in remote areas.

They looked on their rugged and beautiful land as an earthly paradise. The Garden of Eden had graced their soil, so they believed. To this day they salute, and mourn, the great mountain called Ararat, on which, it is said, Noah's Ark came to rest.

I know firsthand that it pains Soviet Armenians to view, with each sunrise, Ararat's snowy peak looming just across the forbidden border with Turkey (pages 848-9).*

Once I stood with a local journalist, Loris Gukasyan, before a great monument that salutes the martyred Armenians. Loris held out his fist and clenched it. "That is my heart," he said. The sacred mountain rose majestically beyond us.

The land so loved by the Armenians had a fatal flaw. The ancient invasion routes from east and west traversed it. As a result, five different Armenian kingdoms have existed, for a thousand of the last 2,500 years.

Centuries before Christ, the Persians came as conquerors; a little later, Alexander the Great and the Seleucids. Parthians and Romans used the Armenians as a buffer. Persia and the Byzantine Empire divided the land. Arabs conquered it.

As the 11th century ended, the Seljuk Turks swept through from central Asia. Another triumphant invader, the Ottoman Turks, followed. From 1375 until World War I the land of the Armenians was carved up among Turkey, Persia, and Russia.

Most of the old Armenia came under the rule of the expanding Ottoman Empire in 1514. Its religion was Muslim. Centuries of intermittent persecution ensued, exacerbated by the imbued Armenian longing for nationhood. In the late 1800's some 200,000 Armenians were massacred, a portent.

In World War I, when the empire sided with the Central Powers, it decided to settle the Armenian question. The Armenians, seen as a dangerous element fighting beside the enemy, Russia, and cooperating with the other Allies, would be eliminated.

The result: Massacres and deportations —forced marches into the Syrian Desert

*See "Turkey, Cross Fire at an Ancient Crossroads," by the author, in the July 1977 GEOGRAPHIC.

High noon of Armenian history saw Tigran the Great in 70 B.C. ruling an empire that far exceeded the traditional homeland. Intermittent independence and subjugation followed until the last Armenian kingdom fell in 1375. A short-lived republic born after World War I was crushed by Turkey and Russia in 1920.

—took place beginning in 1915. In all an estimated million and a half men, women, and children died.

And a tragic phrase echoed around the world: "The starving Armenians. . . ." You hear it even in this day, a remonstrance to children who pick at their food.

I discussed all this with many Turks. Younger ones generally knew nothing of the Armenian holocaust; it is not taught in their schools. In eastern Turkey old men recalled to me how Armenian forces had overrun their villages. "The Armenians were seeking to establish their own nation," one said.

To the Turks, Armenians had betrayed their country in wartime, causing civil conflict (in which Turks, too, were massacred), thus justifying countermeasures. Also, they dispute the number of Armenians killed.

What of more recent events? I made it a point to talk with informed Turks. One deplored the terrorist assassinations and bombings of the past few years. "The world is full of hatred," he said.

"There could be some bureaucratic problems for Armenians, like everyone else, today in Turkey," he continued. "You have problems with your own bureaucracy in the United States. But Armenians as Turkish citizens have the same rights and protection under the constitution as all others. The courts are there."

THE EXODUS led to Russia, Iran, Iraq, Syria, Lebanon, Europe, and more distant lands. (A classic account of conditions in the refugee towns of what is now Soviet Armenia appeared in the November 1919 GEOGRAPHIC—"The Land of the Stalking Death," by Melville Chater.) The United States opened its gates wide; Armenians are still arriving, most from Soviet Armenia and war-devastated Beirut.

Upwards of half a million live in the U. S., concentrated in Greater Boston, New York and northern New Jersey, Philadelphia, Detroit, Chicago, and California, home to as many as 150,000. They are successful merchants and businessmen, educators and engineers. Increasingly they go into medicine, law, and journalism. Politics attracts them.

I traveled extensively in California and found that its Armenian-Americans stand as good exemplars. One of the first I talked with was the late George M. Mardikian.

As a boy of 15 he had fought in Turkey and was imprisoned; he escaped and at 18 sailed in steerage to America. He took a job washing dishes in a San Francisco speakeasy. Eventually he bought it and built it into the famed restaurant called Omar Khayyam's. He became the friend of Presidents and won the Medal of Freedom, the country's highest civilian award.

As Mr. Mardikian said, he heard "the song America sings." I spent an evening with him last year at Omar Khayyam's, not long before he died. "I was born on November 7," he told me. "But I celebrate my birthday on July 24. That's the day I began to live, the day I saw the Statue of Liberty."

I HAVE NEVER MET an Armenian-American who did not look on the U.S. with gratitude. Like George Mardikian, many have grown wealthy. One day a quiet-spoken multimillionaire named Haig Berberian philosophized about money.

"Armenians," he mused, "indeed know the value of money. Some people think we're on the tight side. We call it conservative.

"You can't buy happiness with money. Pleasure, yes. Happiness is: You enjoy your work, you enjoy your family. When you start something and build it on your own, that is happiness. All this and one thing more: the Church. The Armenian Church and Armenians cannot be separated. In the old country, my father and brother were killed. My father could have been saved if he had said, 'Yes, I will become a Muslim.'"

Haig Berberian began processing walnuts in Modesto, California, in 1947. Ten years later he was the "Walnut King," the world's largest individual walnut handler. Now retired, a philanthropist, he invests in land, plants orchards, develops shopping centers. He does not know how to quit.

The simple fact is that Armenians like to work, preferably for themselves. For many it is their play. In Beverly Hills I visited grocer Archie Dickranian. For forty years he has been operating his Premier Market there—"a village store," in his words. He keeps the front open, even in winter: "I say to the boys, if you're cold, work a little faster. You'll stay warmer that way." His son-in-law and *(Continued on page 858)*

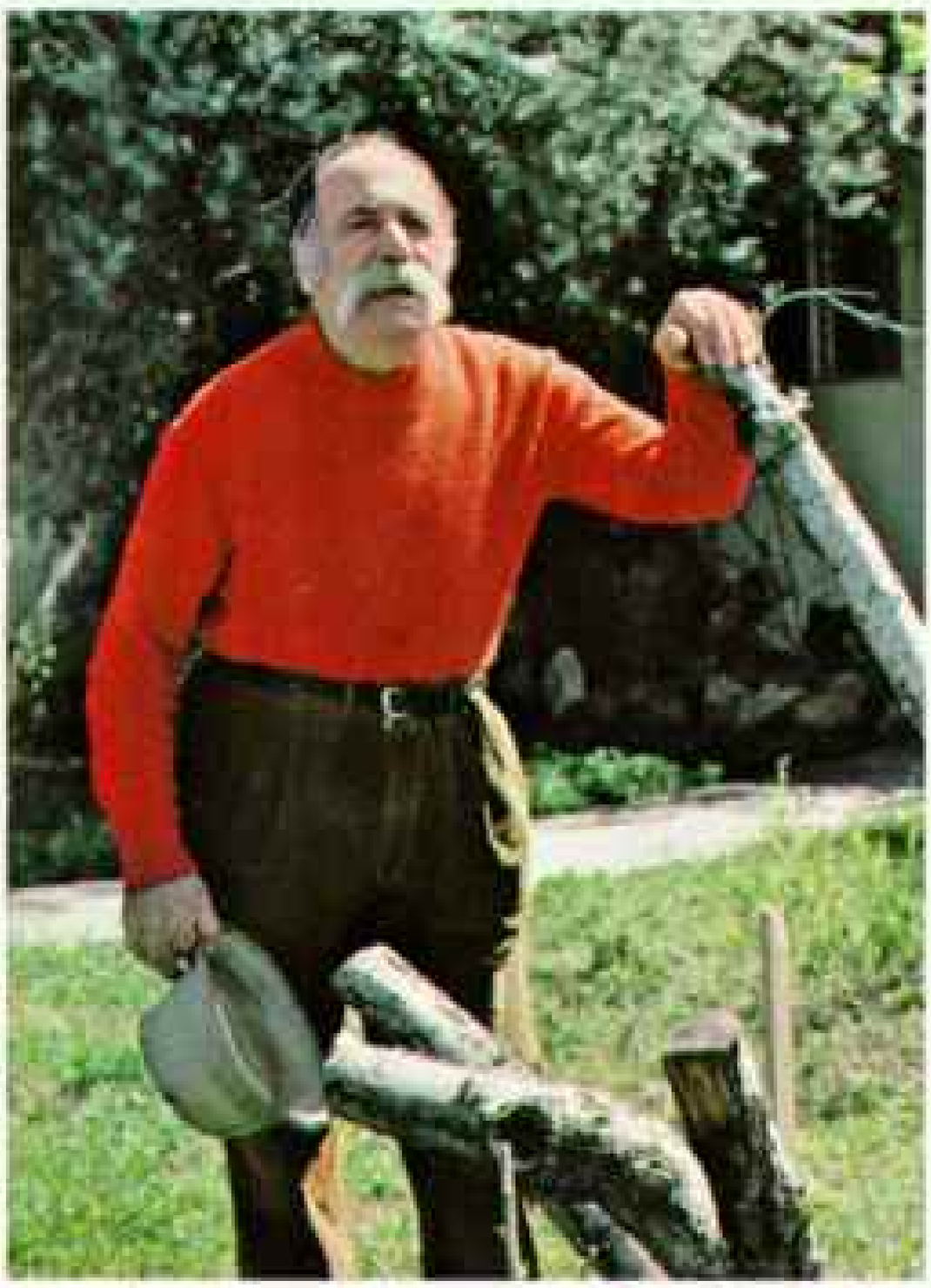
United States

Open-armed message proclaims the pride of New Jersey-born Vivian Hovsepian (**right**). She speaks for many of the half a million Armenians in the United States when she says: "I'm kind of clannish about Armenians. Most of my friends are Armenians. And so I look for Armenian things."

A shared background joins young people in a folk dance (**above**) at a church picnic outside Boston. The August festival celebrates the vineyard harvest in Armenia. The smell of shish kebab and the strains of Armenian music fill the air as more than 4,000 celebrators munch hundreds of pounds of grapes blessed by Armenian clergymen.

The snowy profile of Mount Ararat adorns a shoulder patch worn by Sossi Dayian (**left**), member of an Armenian Girl Guide troop in Montreal attending a regional olympics in New Jersey. While the New York-New Jersey area once boasted the largest Armenian population in the U. S., California now holds the title. The most obvious sign of ethnic identity lies in the "-ian" or "-yan" endings of family names—suffixes that mean "of" or "from."

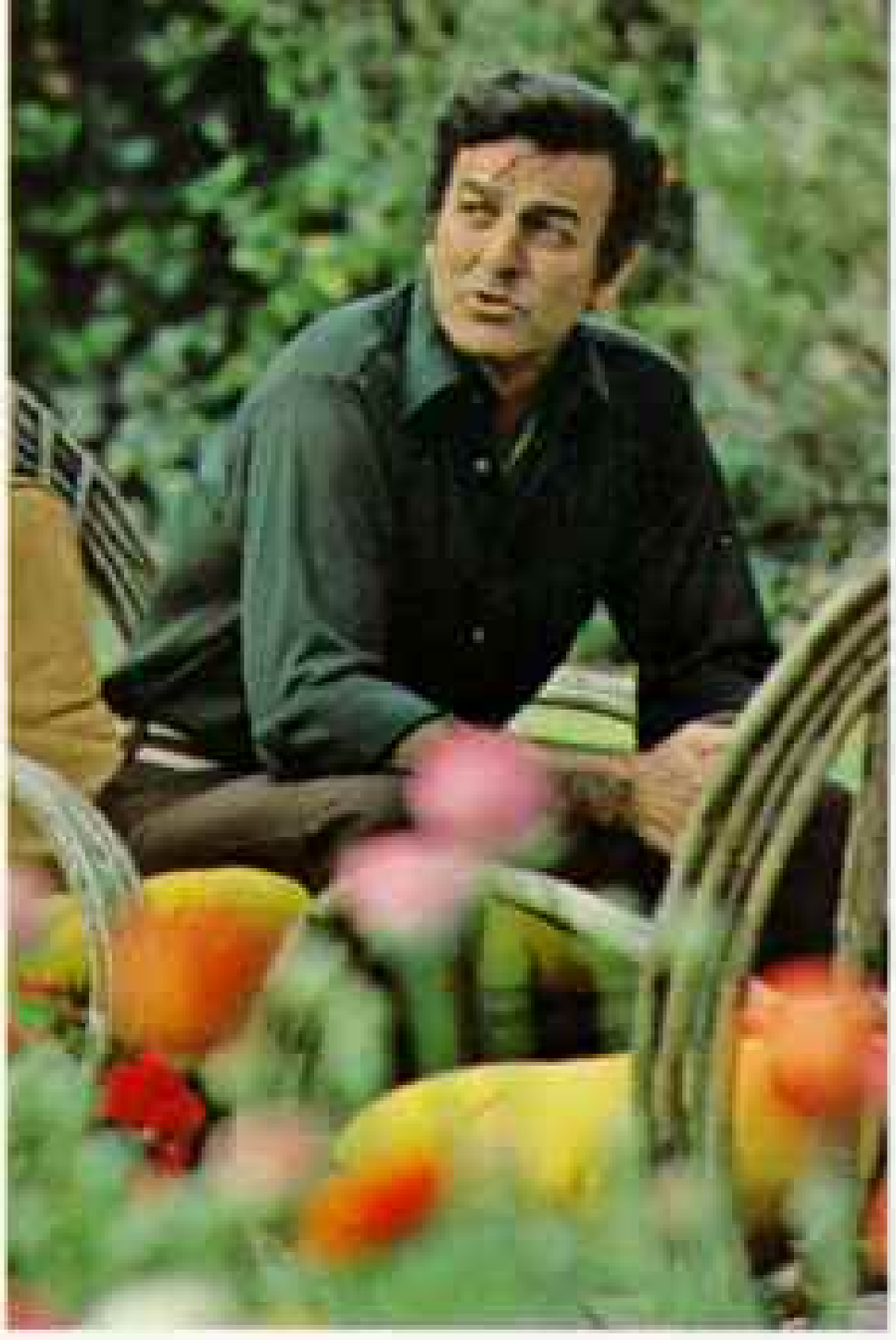

KISS ME
I AM
ARMENIAN



"**We live as one nation**—as Armenians. Outside of that, we are an asset to every nation." A galaxy of leading Armenian-Americans (clockwise from **top, left**) bears out the words of Alex Manoogian. The Turkish-born industrialist earned the honorific title "world's leading Armenian" with charitable contributions of more than 13 million dollars to both Armenian and non-Armenian institutions.

America's most familiar Armenian is Krikor Ohanian, better known as actor Mike Connors, and best known to many as the television detective Mannix. Tim Agajanian reaped a fortune through combined garbage disposal and landfill operations after emigrating from Russia.

A street institution in San Francisco, flower vendor Al Nalbandian also collects art and organizes tours to Soviet Armenia.



New York opera singer Lucine Amara included classic Armenian songs when she performed in Yerevan. Kirk Kerkorian performs financial wonders as the head of an empire that includes MGM Studios. Pulitzer Prize-winning author William Saroyan has portrayed his native Armenian community in Fresno, California, with a warmth reflected in his assertion, "I am biased. I do like my family."

(Continued from page 853) nephew work with him, fast.

In an upstairs room, six telephone stations take orders from Hollywood's stars. Movie and television actors on location abroad cable him for delicacies. Ordinary folk receive equal welcome.

Archie Dickranian stocks only highest-quality items, and his customers have made him rich. "I came to this country with nothing but faith and hope," he told me. "I had been hungry as a child. I went into the food business so I could eat all I wanted. America has been a feast to me."

Mr. Dickranian, a leader in community affairs as well as national Armenian matters, speaks proudly of his heritage. And he is gravely concerned for its future. Many Armenian-Americans believe as he does that assimilation is inevitable.

I PUT IN A PLEASANT HOUR with Mike Connors (born Krikor Ohanian), the television and movie actor (preceding page). "I grew up in Fresno," he said, "as an Armenian. But my children—they're half Armenian—are almost unaware except for what I tell them. I'm afraid it's only a matter of time before Armenians will be just like everybody else."

I hope not, for one obvious reason: This country needs its creative minorities. And indeed you can find many young people who may well retain their Armenian-ness all their days.

I think especially of hundreds of them happily yelling and milling about outside the Rose and Alex Pilibos Armenian School in Los Angeles, waiting for 8:30 and the opening bell. They were dark haired and dark eyed, wore blue sweaters, and ranged from kindergartners through ninth graders.

After the bell, they recited the Lord's Prayer in Armenian, gave the Pledge of Allegiance in English, and filed into school.

In the U. S. and abroad the Armenian General Benevolent Union has 6,000 children in its own schools. Life president of the AGBU is the distinguished Detroit industrialist Alex Manoogian, the leading patron and benefactor of Armenian causes and an international Armenian leader (page 856).

"For many years," he told me, "our chief concern was to aid refugees. We still help the

Venice

Quiet hours of study lead toward the priesthood for students (**above**) at San Lazzaro, an Armenian ecclesiastical enclave. Since their arrival in the Italian city in 1717, the fathers of the Mekhitarist Order have built not only a church and a seminary, but also a library containing more than four thousand invaluable Armenian manuscripts located on what Lord Byron, who often visited, described as "a small island situated in the midst of a tranquil lake" (**right**). A long-established printing press, the order's most vital contribution to Armenian culture, publishes works in the unique Armenian alphabet.

Soviet Armenia

Fruits of free enterprise abound at the covered market in Yerevan (**above**), where growers sell produce from small plots of their own, unrestricted by government control. On Yerevan's outskirts the churches of Echmiadzin—the spiritual hearth of Armenia—host a constant stream of weddings. Wine and cognac brighten a preceremony party at the bride's home (**left**). Armenians have given the Soviet Union some of its most gifted artists, musicians, scientists, and educators.

needy, but education and cultural activities are our focus now. I love my people. We want to preserve our traditions."

One sunny day I headed into California's San Joaquin Valley, which has lured Armenians down the years. The strong mountains that rim it, the bountiful earth, the sweet dry air remind them of their lost homeland. Many have become farmers, processors, and packers. They ship fruit and vegetables throughout the United States and overseas.

I DROVE along the valley, bound for Fresno. En route, a town called Yettem—Garden of Eden—intrigued me. There I discovered a grape grower named Robert Setrakian operating a flourishing winery. That was Eden enough for me; I forgot to inquire about apple trees.

Fresno has long been a kind of capital for Armenians, though they have moved from the old downtown core, erecting beautiful churches farther out. But the old Holy Trinity Church is still well attended. Nearby, the Valley Bakery, built in 1924, is still owned by Saghatelians and busier than ever.

Janet Saghatelian and her brother, Sam, master baker, make endless round slabs of *lahvosh*, a large, thin cracker bread, and loaves of plump *peda* bread. Both are tasty old-country legacies. Mail and phone orders for lahvosh come in from all over the United States. Peda bread, being perishable, can't travel as far.

Sam began learning to bake at age 6 from his father, more than half a century ago. Janet started in the bakery when she was 10. "My 9-year-old daughter will be joining me here soon," she said, smiling, as we halted before the glowing oven. The parade of lahvosh mesmerized me—row after row of crackers blistering and bubbling as they advanced, browning on top.

"Our breads hark back to Biblical times," Janet said, "part of our tradition. Wherever we go, we produce and prosper. Armenians are individualistic—we don't always work well together. But put us anywhere in the world and we'll do good. You can never drown the fire in the Armenian spirit."

I agreed wholeheartedly with her a bit later, caught in a whirlwind of words swirling from William Saroyan. I had presumed on the Pulitzer Prize-winning playwright at his

modest home in Fresno, and he hadn't wanted to talk—too busy writing (page 856). But the subject snagged him: What did this Armenian think about Armenians? He fixed me with piercing eyes. The torrent began:

"I am biased. I do like my family. I have great respect for them. . . . The human experience is basically tragic. We have suffered. We shall never forfeit the feeling of suffering, remembering our martyrs. . . . The Turk has been named villain. I don't believe in villains. What we hated was the government that deceived and betrayed us and behaved in an inhuman way with us. . . .

"In the end"—he summoned even greater force—"there must be a diminution of hatred in favor of understanding. And so, what the Armenians ask, and rightly, is an acknowledgment by the present Turkish Government of a crime against humanity, and appropriate behavior to supplement that acknowledgment."

William Saroyan walked me to my car. "*Ertak parov,*" he boomed—"Go in peace." I told him that I soon would make my sixth trip to the Soviet Union for NATIONAL GEOGRAPHIC, my first to Soviet Armenia. He had recently visited there. "You will often be surprised at what you find. Astonished."

AS I PROBED deeper into the Armenian story, I was increasingly astonished that these people had even survived the ordeal of sixty years ago. Who had ordered it? And why?

One of the leading instigators was Talaat Pasha, Turkish Minister of the Interior. Once, while the Armenians were being eliminated from Turkey, Talaat outlined his government's position to Henry Morgenthau, then the U. S. Ambassador.

"In the first place," Mr. Morgenthau quotes Talaat, "they have enriched themselves at the expense of the Turks. In the second place, they are determined to domineer over us and to establish a separate state. In the third place . . . they have assisted the Russians in the Caucasus. . . ."

The American envoy tried to argue with Talaat. "Suppose a few Armenians did betray you," the ambassador said at one point. "Is that a reason for destroying a whole race? Is that an excuse for making innocent women and children suffer?"

"Those things are inevitable," he replied.

After World War I the victorious Allies dictated a peace treaty in which Armenia was recognized as a free and independent state. The treaty condemned the massacres; Ottoman Turkey would deliver to the Allies those held responsible. Then the empire collapsed, and the new government rejected the treaty.

THE INFANT Armenian Republic fell under Turkish attack and Soviet pressure soon after it was born. Today the only remaining part of the republic lies in the Soviet Union. Armenians have long demanded that Turkey accept the blame, and some call for restitution of land and for reparations. The Turks feel that the history of what occurred has been grossly misrepresented, and that the Armenian claims are invalid.

Talaat Pasha was listed as a war criminal and condemned to death. He had already fled Turkey, taking refuge in Berlin under an assumed name. In 1921 an Armenian walked up to him in the street and put a bullet through his head.

Armenians do not forget. I know one in particular, a gentle and graying piano teacher, for whom this deed is starkly poignant. I met him in Belgrade, Yugoslavia, aware only that he was one of the few Armenians there. We talked in the small, drab room where he instructs his pupils. He was 52, he told me, a native of the city.

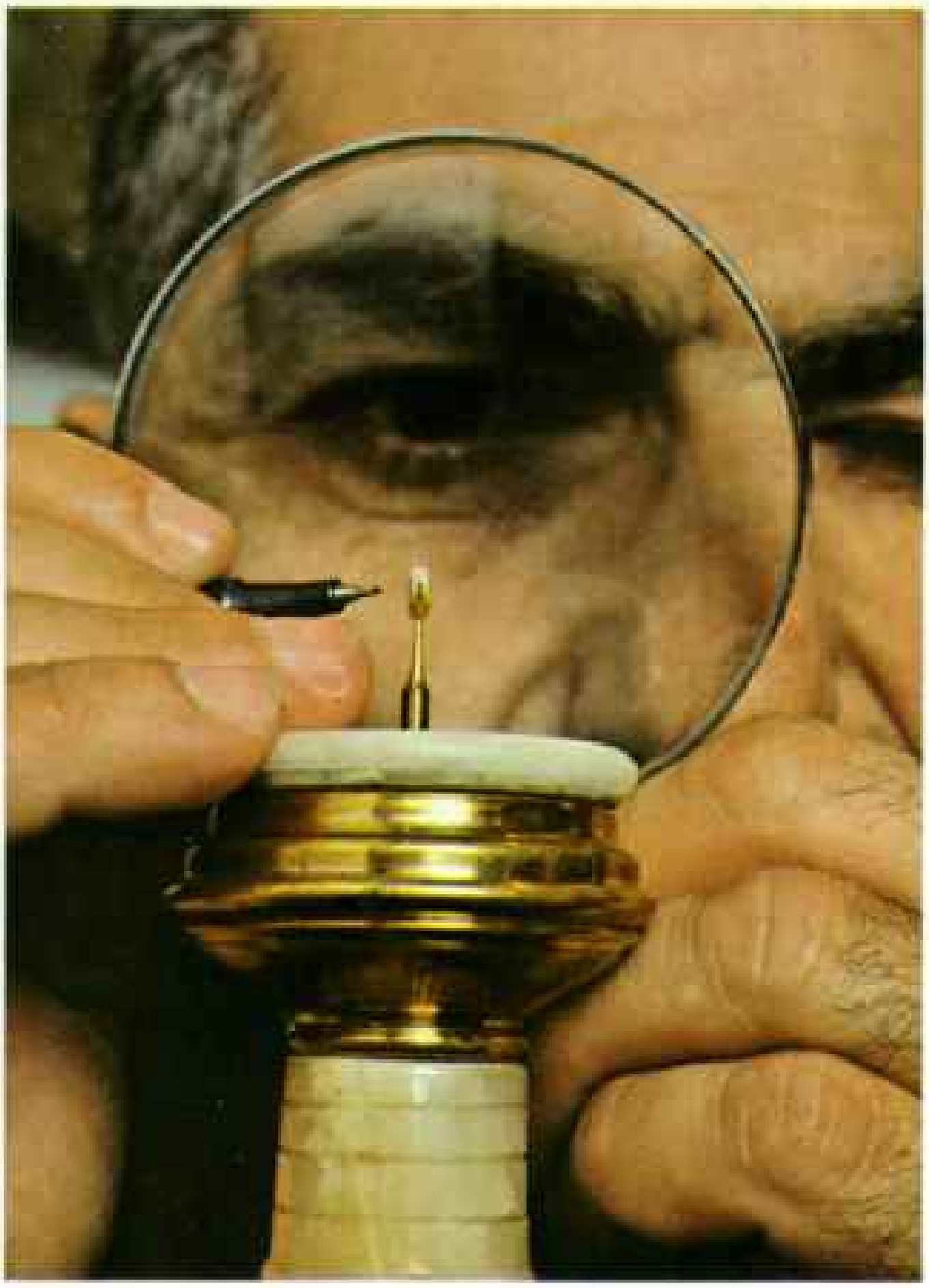
"There used to be a large number of us, a community," he said. "Our fathers all were friends. But most people left after World War II. Those who stayed on—we don't associate. We're all married to local girls. Our wives and children don't speak Armenian.

"But I speak it!" he declared, thumping the piano bench. "It is unexplainable about us Armenians. It is something deep inside." He looked at me, and spoke urgently: "Now I will tell you something. My father killed Talaat Pasha. He was arrested, and freed, and he is buried in your country."

I did not know what to say. Finally I asked what he thought about it.

"I am proud," he answered.

I flew on to Moscow. The Novosti Press Agency, which handles Western correspondents, assigned a journalist as my guide and



ALL BY ALBERT WOLDEAY

If angels danced on the head of a pin, Edward Kazarian could sculpt their wings. The Soviet Armenian maestro of miniatures does his most delicate work between heartbeats, using microscopes and diamond-tipped tools to create a steel Charlie Chaplin in a needle's eye (**below**), elephants marching along a human hair inserted inside another hair (**above**), and the Kremlin etched on one side of a grain of rice (**left**).

intermediary—it is the system. An Aeroflot jet carried us to Yerevan, capital of Soviet Armenia. In the following weeks I would be astonished many times, as William Saroyan had predicted.

Exploring Yerevan, I discovered a handsome and stylish city, its new high rises living nicely with traditional architecture. Many buildings were gaily dressed in varicolored facades of stone, lending a soft resplendence to the place—predominantly pink, so I decided. Broad avenues and tree-vaulted parks graced the city; along one promenade exactly 2,760 slender fountains were splashing, I was told—a fountain for each year of Yerevan's existence.

Little of the rawness here, then, and little of the monotony of some new Soviet cities I had seen. Tumult, yes.

In a country where perhaps one person in a hundred owns a car, traffic was thick and aggressive; now and then drivers argued with policemen, who eventually—themselves temperamental Armenians—lost patience. Strollers munching ice-cream cones thronged sidewalks. Lines waited at movie houses. Cafés were crowded. In my hotel a band propelled earsplitting rock music far beyond the bounding dancers. How they danced! *(Continued on page 867)*

The path of faith leads a Soviet Armenian family on a pilgrimage of thanksgiving to the ninth-century church of St. John the Baptist at Lake Sevan. To fulfill a vow taken when she lay seriously ill, Sanam Arevian and her family herd sheep seven times around the building (**right**). The sheep's ears are then nicked (**above**), and Sanam's husband marks her forehead with the sheep's blood in the sign of the Cross (**below**). The animals are later slaughtered and given to the poor.

This sanctuary is one of scores scattered throughout Soviet Armenia that are in various stages of disrepair. The state has renovated some as historic monuments. Yet church authorities estimate that well over half of all Soviet Armenian infants are still baptized, and the republic's 35 working churches are crowded with believers.

Half a century ago Yerevan had been a large town. These people had come from Turkey, other parts of the U.S.S.R., and the outside world, and multiplied. Now close to a million Armenians were overcrowding it. And Soviet Armenia itself had altered vastly—from a mountainous, boulder-strewn desert into a modern industrial state with nearly three million citizens.

Government officials boasted that in material well-being, and in educational, technological, and scientific achievement, Armenia ranked high among the U.S.S.R.'s 15 republics, of which it is the smallest.

"You must devote two-thirds of your article to Soviet Armenia," one declared. "What other Armenia is there? And look what we have accomplished."

ONE OF THE GREATEST accomplishments is—stone. Armenia is the mother lode of rocks, almost all kinds known on the globe. The story goes that God had nothing left but rocks when the Armenians applied to Him for land. The storyteller smiles slyly. All is well. He puts his hand on your arm. "Stone is our bread."

It is. The enterprising Armenians have found hundreds of uses for their limitless endowment of rocks, especially with volcanic tufa and perlite.

I spent an afternoon at the Research Institute of Stone and Silicates. Director Geber M. Kaniezian, a man of seriousness, led me around the exhibit room. I stared at bottles, boards, industrial cloth, filter powder, insulation, soil conditioner, crystal ware, many other items—rock, every last one of them. Yerevan's distinctive appearance, said my guide, the glowing pinks, yellows, browns, came from tufa quarried in the Caucasus.

"We've replaced brick with building blocks of perlite," Mr. Kaniezian continued. "We'll replace steel with an even stronger construction material made of tufa and perlite." He fingered the lapel of his gray wool suit. "Someday the cloth on our backs will be spun from stone." As I left, he said firmly, "There are six hundred of us here. We're working on it."

I moved on to the hydroponics institute and walked among plots of vegetables, grapevines, and herbs prospering in slag and gravel. "All plants can be grown without soil," said Professor Gagik S. Davtyan, head of the institute, "faster, and with a much greater yield—in Armenia, from two to ten times more. By the year 2000 we may be growing 20 percent of our plants hydroponically. You know, stone is our bread."

Armenians earn their bread in the same fashion as other Soviet citizens. I talked with them in cradle-to-grave factories—mothers drudging on the production line, their toddlers in the nursery. Six hundred families toiled at a collective farm I visited, hoeing weeds in vineyards and orchards, cultivating vegetables. It was a career.

"**Touch not mine anointed,** and do my prophets no harm," reads the canon, as Vazken I, Supreme Patriarch of the Armenian Apostolic Church, replenishes the holy chrism (**facing page**). The sacred baptismal oil is restored every seven years in Echmiadzin, where the Patriarch keeps a Vatican-like residency. There, too, stands St. Gregory the Illuminator Cathedral, where Armenian faithful pray, light candles, and release live pigeons (**above**) as a symbol, in one worshiper's words, "of freedom."

Half of the republic's income derives from industry, I was informed by Fadei T. Sarkisyan, Armenia's premier and himself a computer expert. He spoke familiarly of electrotechnology, machine tools, metallurgy, and chemicals. Seven or eight telephones occupied his desk; sometimes a couple rang simultaneously. The majority of young people, he said, were satisfied with their jobs.

It was something I pondered often—whether the individualistic Armenian soul shriveled in this communal way of life. It depends on the individual, I have come to believe. I know ranking Armenian Communists who profess to have absolute faith in the system, and in themselves. I know non-Communist Armenians who intensely dislike the system, and the card carriers. There was the man I sat with at a small clubroom in Los Angeles. He had arrived days earlier from Armenia, where he had worked as a mechanic for many years. He absently told his string of beads, watching other elderly men play cards. "I waited ten years to get out," he said.

It is difficult for a Western journalist in the U.S.S.R. to achieve a balance. Interviews are always arranged, eliminating options; you get what you are given, and what you get invariably uplifts Communism. In Yerevan, when I asked to meet an American repatriate, my escorts complied.

Martik M. Martentz, his attractive wife, Rebecca, and their daughter, Martha, welcomed me to their flat. It could have been a comfortable middle-class apartment in the United States: upright piano, overstuffed chairs, rugs, a wall of books. Mrs. Martentz graciously offered coffee, her voice carrying the accent of her native Massachusetts. Martha, 23, slim and lovely, served it; she was newly an M.D., doing her internship.

Martik Martentz related their story. They

Lebanon

Settlers in an ancient land, survivors of the bloody battle of Musa Dagh fought their way out of Turkey in 1915 and later founded the town of Anjar in eastern Lebanon amid marshes and bleak wastes. Today more than 100,000 apple trees grow in orderly, well-irrigated rows beside the excavated remains of an 8th-century Arab city.

Caught in the middle of civil war, Lebanon's Armenian community walked a narrow path of neutrality but suffered losses in both property and spirit. Gutted buildings along the Rue Allenby in Beirut (**above**) housed many Armenian shops and businesses. A student at the city's Mekhitarist Order boarding school displays an artillery shell (**right**) that crashed through a wall on the school's top floor and bounded down three flights without exploding. "It came in like a lion and went out like a lamb," says Father Talatinian (**left**), pointing to shell-hole repairs. "God protected us." But some Armenians are once again on the move in search of greater security and economic opportunity.

had left the United States when Martha was 10, he said. "It was my lifelong dream to come here. I wanted to work for this new society, this Armenia delivered from the massacres. I didn't want to make money in my life. I'm not the consumer-society man."

Born in Constantinople (now Istanbul), he had sailed to the U. S. at 17 or 18, worked his way through a private school in Massachusetts, become a translator, cook, laborer, seaman, printer, journalist.

"I edited the *Armenian Herald* in New York for 22 years," Mr. Martentz recalled, "and other Armenian papers in California." He was 75, but looked 65. He talked continuously.

"I told my wife and daughter, 'It's a new country. It's going forward.' And so we moved to Armenia." He opened his hands, palms up.

"It's a country that is building a new life, whether the outside world likes it or not. The American and the Soviet people can be very good friends. The Soviet Union always emphasizes friendship, peace, mutual understanding, trade, cultural relations. . . ."

THE SOVIET UNION, officially atheist, does *not* emphasize religion. Quite the contrary. But God finds a better reception in Armenia, from my experience, than anywhere else in that vast land. The symbols of faith do not here lie beaten in the dust. The reason seems plain. Armenians and their Church are inseparable.

On a Sunday morning when Mount Ararat's white glory shone against a distant and alien sky, I walked from my hotel in Yerevan to nearby St. Sarkis. At this church the Supreme Patriarch of all Armenians—the Catholicos—today would come to sing the Lord's song. Outside, clergy were blessing lambs destined for sacrifice. A woman penitent approached the church on her knees.

I entered St. Sarkis, to be engulfed in

Whence cometh my deliverance? On a mountainside near Beirut, a lonely sculpture reaches skyward in supplication. Monuments to the past stand outside many of the world's scattered Armenian communities, and in the hearts and memories of Armenians everywhere.

humanity. The faithful were hushed, expectant. Hundreds of tapers were flickering. Then His Holiness Vazken I appeared, central in his retinue, and the multitude parted before him. A triumphant hosanna rent the basilica, and all the days of Christendom were as one.

THERE ARE NUMEROUS working churches in Armenia. The government maintains many others as historic monuments. One working church is preeminent, the oldest Christian church in use on earth. Built in 303 by St. Gregory the Illuminator, who brought the faith to Armenia, it stands in the small town of Echmiadzin, not far from Yerevan. It is an austere and commanding work of man.

The cathedral presides over a walled enclave that also contains the palace of the Catholicos and a seminary. Whatever their religious differences, the world's Armenians look to this citadel as their spiritual center.

His Holiness Vazken I granted me an audience. He spoke of Armenia's cultural renaissance, and of Echmiadzin's international ties. The Catholicos was hopeful for his immediate flock. "In a year," he said, "Armenia gives birth to 60,000 children. We baptize two out of three."

Before leaving Echmiadzin, I lingered in the venerable cathedral. One of my government escorts, a party member, bought a couple of candles. He lighted both, handed the first to me, kept the other.

I was puzzled. "You do not believe in God," I said, "but you light a candle."

"No," he whispered, "I am not a believer." He thrust the candle's base into a sandbox glowing with other tapers. "I light it in the feeling of respect for the Church."

My work was complete in the U.S.S.R., but I had a last stop to make on the trail of the wandering Armenians. I went to Beirut, Lebanon, to see how they fared in that devastated city. Once more they had been caught up in strife not of their making.

The Lebanese war had ended a few months earlier. Now, an Armenian member of the country's parliament told me, the waiting game was on. Before the billions needed to rebuild the stricken city would flow in, there must be political settlements for both the Middle East and Lebanon. Some 220,000 Armenians, a little less than a tenth of Lebanon's population, were marking time with the rest. Thousands had fled, many to the United States.

Beirut: financial capital and playground of the Middle East, until the war. Armed soldiers of the Arab peacekeeping force were manning roadblocks at key points. They scrutinized everyone's passport, sometimes searched for weapons. You ventured forth at night at your own risk in the ruined downtown section.

By day, with the brilliant Mediterranean sun flooding this ghastly urban sarcophagus, you could stumble through rubble-strewn streets, past the blackened sockets that once were shops—Armenian shops, a lot of them. Perhaps a fourth of the business district had been Armenian (page 870).

Bulldozers had begun clearing away the debris at last, reconstruction of the port was under way, and a few merchants were starting over. I talked with them. "There is no business so far," said Berge Aprahamian, a 31-year-old optimist. "I still have my $200,000 loss."

It might be a while before business picked up for him, it struck me. He was displaying evening bags, chic gloves, and the like. But he was *there*. The stand where his father, Aram, had served the public for forty years was open again.

ON THE EVENING before I left Beirut, I rode in the bullet-riddled taxi of Vartan Naltchayan, a young husband who was soon to be a parent. His doctor, he said, had just removed the last of 17 shell fragments from his body.

We drove past the cathedral of the Armenian Catholicosate of Cilicia and zigzagged high into the hills above the city. There we parked, and walked to the heroic statue of a woman at prayer, Mother Armenia (facing page). Twilight stole across the valley, turning Beirut into a diadem of glittering gems. At its center lay darkness, the darkness of man's destruction.

Vartan spoke. "We were neutral through it all. We carried the wounded—Christian, Muslim, Palestinian—to the hospitals. Why does trouble always follow us? Why"—he spaced his words—"is it dark out there?"

"God knows," I said. □

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SO MUCH TO GO FOR.

Tracking giant otters in Surinam

TEMPTING TARGETS that may reach seven feet in length, South America's endangered giant Brazilian river otters (**below, right**) have all but succumbed to pelt hunters and poachers throughout most of their former range in the Amazon River Basin. To study their behavior in Surinam's uninhabited backwater country, zoologist and author Nicole Duplaix (**right**) swims in for a closer look while wearing a rubber otter mask (**below**). Aided by the National Geographic Society, the World Wildlife Fund, and the New York Zoological Society, Ms. Duplaix has spent nearly two years collecting data that conservationists will need to save these gregarious, fiercely territorial creatures from extinction. Share the satisfaction of supporting such efforts by nominating a friend for membership.

ALL BY NICOLE DUPLAIX

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CITY, STATE, ZIP CODE

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The Honda Civic. The car we

designed around a shopping bag.

It's true. We had supermarket shopping bags flown to our factory when we designed the Honda Civic® Hatchbacks. Measuring the bags helped us determine the size of the rear cargo area.

This may seem like a lot of fuss over a small detail. But at Honda we do everything that way. For all its simplicity, the Honda Civic has been planned with meticulous care.

So you see? It's not by accident that four full-sized shopping bags fit inside our hatch.

Of course, four also happens to be the number of full-sized people that fit inside our Civic's passenger compartment. And if we went to all that trouble to make a shopping bag comfortable, just imagine what we must have done to make you comfortable.

HONDA

We make it simple.

"We must make our forests more productive."

Beautiful. Productive. That's our forest! Prompting one person to say, "Protect them", while others want greater use. Who's right? Maybe both.

Forests are magnificent. Peaceful, sweet smelling, beautiful. A retreat to experience nature on her own terms. Refuge for wildlife. Protection for critical watersheds. No wonder many demand our forest be preserved—untouched.

The other side, however, explains that trees are too important not to be used. For wood. For homes and furniture. For paper. For newspapers, books, letters and checks. Demand for forest products grows. Will double in the U.S. in 50 years. More trees, not fewer, must be cut. On more land, not less.

Woodlands are wondrous and wood is essential. So what to do? The answer lies in the character of the forests themselves. They can give us recreation, wildlife, watershed protection and timber all at the same time. Because trees are uniquely renewable. Once harvested they can come back to provide outdoor pleasure and wildlife cover as they grow.

But it takes responsible management to get the most from our forests. Restocking idle scrublands, planting genetically superior trees, co-ordinating harvest with other needs. Measures like these can double wood production and maintain aesthetic values for centuries to come.

We at Caterpillar build machinery that works in woods and millyards. Beyond that interest, we are concerned that our forest resources be managed to meet the needs of tomorrow's generations.

There are no simple solutions. Only intelligent choices.

CATERPILLAR

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

"Forest lands should be protected."

Myth:
It takes a lot of fuel to move a heavy load.

Fact:
On today's railroads, one gallon of fuel moves a ton of freight 280 miles.

Most automobiles made in Detroit can go about 100 miles to the gallon—if they move by railroad. The same goes for most other goods that move by rail. Today, railroads use less than one-third as much fuel as trucks, on the average, to move big loads.

And railroads are working to save even more fuel in the future—with entire trains of grain or coal that require less energy than either barges or pipelines, with new space-age technology, with improved operating practices.

Piggybacking—the movement of truck trailers and containers on railroad flatcars—is the fastest growing part of the railroad business. It not only saves fuel, it reduces traffic congestion and improves highway safety by taking more than 2 million truckloads off the roads each year.

The Department of Transportation expects the nation's freight load to double by the year 2000 and the railroads' share to grow even faster. One important reason for this is that the existing rail system already has the capacity to handle many more trains. Another is the railroads' proven fuel efficiency.

Last year the railroads spent a record $9 billion for track and equipment improvements that will allow them to handle more freight with greater efficiency than ever before—saving both fuel and money.

Association of American Railroads, American Railroads Building, Washington, D.C. 20036.

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For more information write Dept. ME, PENTAX CORPORATION, P.O. Box 2677, Littleton, Colorado 80161

The most remarkable collection of world coins ever assembled

Coins of all Nations

A complete and comprehensive collection containing a fascinating mint-fresh coin from every coin-issuing country in the world

Coins of all Nations

Each coin will be individually sealed in a stamped and date-canceled cachet that has been officially postmarked in the country of issue

Limit: One collection per person
Subscription deadline: June 30, 1978

You have the unprecedented opportunity to acquire a collection of world coins unlike any that has ever been issued before. A collection that includes official monetary coins from the coin-issuing nations of the world—with each coin sealed in its own individual cachet, postmarked in the country of issue.

This extraordinary collection will provide every member of your family with a fascinating way to learn about nations and peoples in every part of the world—*through their unique coinages*. It will be a thoroughly pleasurable experience as well as an educational adventure. And in years to come, this distinctive coin collection will become a prized family possession.

By arrangement with government officials throughout the world

To assemble the *Coins of All Nations* collection, The Franklin Mint is making special arrangements with the central banks or monetary authorities of more than 150 coin-issuing nations—and with the postal authority of each of those nations as well. Every nation that regularly mints and issues coins

will be represented in this collection, except where government regulations prohibit. The result will be a comprehensive collection of uncirculated mint-fresh coins that otherwise could only be assembled if one were to actually travel to every coin-issuing country in the world.

The essential facts about the collection are these:

- A single, mint-fresh coin from each of the nations in the world that issues coins will be included in this collection.
- Each coin will be sealed in its own individual cachet, which has been designed and produced especially for the collection.
- Each cachet will be officially stamped, date-canceled and postmarked in the country that issued the coin—and in the *city* where its treasury is located.
- The entire collection will be issued in a single, limited edition—available by direct subscription only.

This historic collection will not be made available through any dealers, retail stores or even from national banks here or abroad. It may be acquired *only* from The Franklin Mint and *only* until the world-wide deadline of June 30, 1978.

Fascinating coins from distant lands

Each coin will be both attractive and interesting in itself. The *50 Centavos piece of Mexico*, bearing the portrait of the heroic Cuauhtemoc, last of the Aztec rulers. The *5 Paisa coin of Pakistan*, an unusual four-sided coin with the star and crescent of the Moslem faith. The *Papua New Guinea 1 Kina coin*, depicting the rare sea crocodiles native only to this lush Pacific land. The *2 Dollar coin of Hong Kong*, featuring the famous coinage portrait of Queen Elizabeth II by Arnold Machin. The *50 Ore coin of Sweden*, designed around the crowned monogram of King Gustaf VI Adolf. And the *5 Drachmai coin of Greece*, bearing the image of the Greek philosopher Aristotle. More than 150 coins in all, each one telling a fascinating story.

These monetary coins from all over the world will form a remarkable collection. They will include coins of many shapes—round, square, triangular, octagonal, even one with twelve sides. And coins minted in a wide variety of metals—as many as ten different coin metals including silver, bronze, copper and brass.

Custom-designed albums provided

To enable each subscriber to protect and display his collection, a set of hardbound library albums will be included. In addition, authoritative reference information will accompany each cachet, describing the coin carried in that cachet and providing background data about the country that issued it.

As a subscriber, you will receive your collection at the convenient rate of three cachets per month—sent to you in a protective mailing package. The price for each will be just $5.50. This includes the mint-fresh coin, the cachet, the stamp, special foreign postmarking and all customs charges. There is no added charge for the collector's albums.

Assured rarity for your collection

The *Coins of All Nations* collection will be permanently limited to the number of valid orders postmarked by the world-wide deadline of June 30, 1978. After that date, this collection will never be offered again—anywhere in the world.

Owning this extraordinary collection of world coins will provide endless hours of pleasure for you and every member of your family. Furthermore, the collecting of these coins, in their individually postmarked cachets, will be *an educational experience as well. For each* coin has a story to tell. And *each* stamp and postmark will be a collector's item in itself.

To subscribe, you must mail the application below to The Franklin Mint, Franklin Center, Pennsylvania, no later than June 30th.

NOTE: *Cachets from all of the countries shown will be included in the collection. However, since Governments on rare occasions authorize revisions on short notice, some of these issues may be subject to change.*

SUBSCRIPTION APPLICATION

Coins of all Nations

Valid only if postmarked by June 30, 1978
Limit: One collection per person

The Franklin Mint
Franklin Center, Pennsylvania 19091

Enter my subscription for *Coins of All Nations*, consisting of a mint-fresh coin from every country in the world that regularly mints and issues coins except where government regulations prohibit. Each coin will be issued in a stamped and date-canceled cachet, postmarked in the nation of issue. The cachets will be sent to me at the rate of three per month, and the issue price for each cachet is $5.50.* I will also receive a set of deluxe hardbound albums at no added charge.

I understand that I need send no money now. I will be billed $16.50* for each set of *three* coin cachets in advance of shipment.

** Plus my state sales tax and 50¢ per cachet for shipping and handling*

Signature_____

ALL APPLICATIONS ARE SUBJECT TO ACCEPTANCE.

Mr.
Mrs.
Miss_____

PLEASE PRINT CLEARLY

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City_____

State_____ Zip_____

Also available in Canada, at $6. per cachet. Mail application to The Franklin Mint Canada Ltd., 70 Galaxy Boulevard, Rexdale, Ontario M9W 4Y7.

Coins shown actual size.

The *Coins of All Nations* collection includes a wide variety of fascinating monetary coins from all over the world. Each coin is sealed in its own cachet, postmarked in the country of issue.

Why are so many manufacturers putting this much information on their labels?

Under Food and Drug Administration regulations, the labels of food products for which nutritional claims are made must contain lists of important nutrients including vitamins, minerals, protein, carbohydrates and fats, as well as calories. Vitamins, minerals and protein are expressed as percentages of the U.S. Recommended Daily Allowance (U.S. RDA)– the daily amounts established by the Food and Drug Administration as essential for maintaining good nutrition.

Even when a listing is not required, many food manufacturers voluntarily provide this information. They realize how this kind of information lets shoppers like you compare ingredients and buy the most nutritious foods.

Good nutrition. More important than ever.

Even though our country enjoys one of the highest standards of living and is the largest producer of food products in the world, there are serious gaps in our national diet, most frequently because of poor eating habits. These deficiencies are not limited to low income groups, but cut across all economic and social levels.

According to the most recent information, twenty to fifty percent of Americans run some risk of not meeting the U.S. RDA for at least one or more of the vitamins C, A, B_1 (thiamine), B_2 (riboflavin), and folic acid. Minerals such as iron and calcium are also likely to be insufficient.

Other ways you may be robbing your body of vitamins.

Recent studies show that blood plasma levels of vitamin C in heavy smokers were as much as 30% lower than in non-smokers.

Chronic heavy consumption of alcohol, including beer and wine, may interfere with the body's utilization of vitamins B_1, B_6 and folic acid. In addition, excessive drinking is frequently accompanied by poor eating habits, which compounds the problem by reducing vitamin intake. If you're dieting or skipping meals, you may be eliminating foods that contain many vitamins, including C, E and B-complex.

Sickness, including fevers and colds, may very well lower the level of vitamins in your blood. And women who take birth control pills could need extra vitamins B_1, B_2, B_{12}, folic acid and from two to ten times the normal amount of vitamin B_6. These increased nutritional needs have been demonstrated in several studies, but your own physician should be consulted.

How to get the extra vitamins you may need.

When shopping for foods, be sure to read the nutritional panels on the side or back labels of the package. Select those that give you and your family a well-balanced diet, and will add up to a daily intake of at least 100% of the U.S. RDA for vitamins, minerals and the required amount of protein. Just to be sure, you can also take vitamin supplements daily. There are a number of different formulations including multiple as well as individual vitamins.

Vitamin Information Service,
Hoffmann-La Roche Inc., Nutley, N.J. 07110.

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(PLEASE PRINT) FIRST NAME | MIDDLE INITIAL | LAST NAME | AGE

ADDRESS | CITY | STATE | ZIP | HOW LONG

☐ OWN ☐ BOARD ☐ RENT | MONTHLY RENT OR MORTGAGE PAYMENTS | SOCIAL SECURITY NUMBER | PHONE NUMBER | NUMBER OF DEPENDENTS

FORMER ADDRESS (IF LESS THAN 2 YEARS AT PRESENT ADDRESS) | HOW LONG | OCCUPATION | NET EARNINGS | ☐ MONTHLY ☐ WEEKLY

EMPLOYER | ADDRESS | CITY | STATE | ZIP | HOW LONG

FORMER EMPLOYER (IF LESS THAN 1 YEAR WITH PRESENT EMPLOYER) | HOW LONG

OTHER INCOME IF ANY: AMOUNT $ | **Alimony, child support, or separate maintenance income need not be revealed if you do not wish to have it considered as a basis for paying this obligation.** | SOURCE OF OTHER INCOME

NAME AND ADDRESS OF BANK | ☐ SAVINGS # _____ ☐ CHECKING # _____ | ☐ LOAN # _____

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NOTE: ADDITIONAL INFORMATION MAY BE REQUIRED BY SEARS TO PROCESS THIS APPLICATION. YOU WILL BE PROVIDED A COPY OF THE SEARS CREDIT ACCOUNT AGREEMENT TO KEEP UPON APPROVAL.

BA

National Geographic

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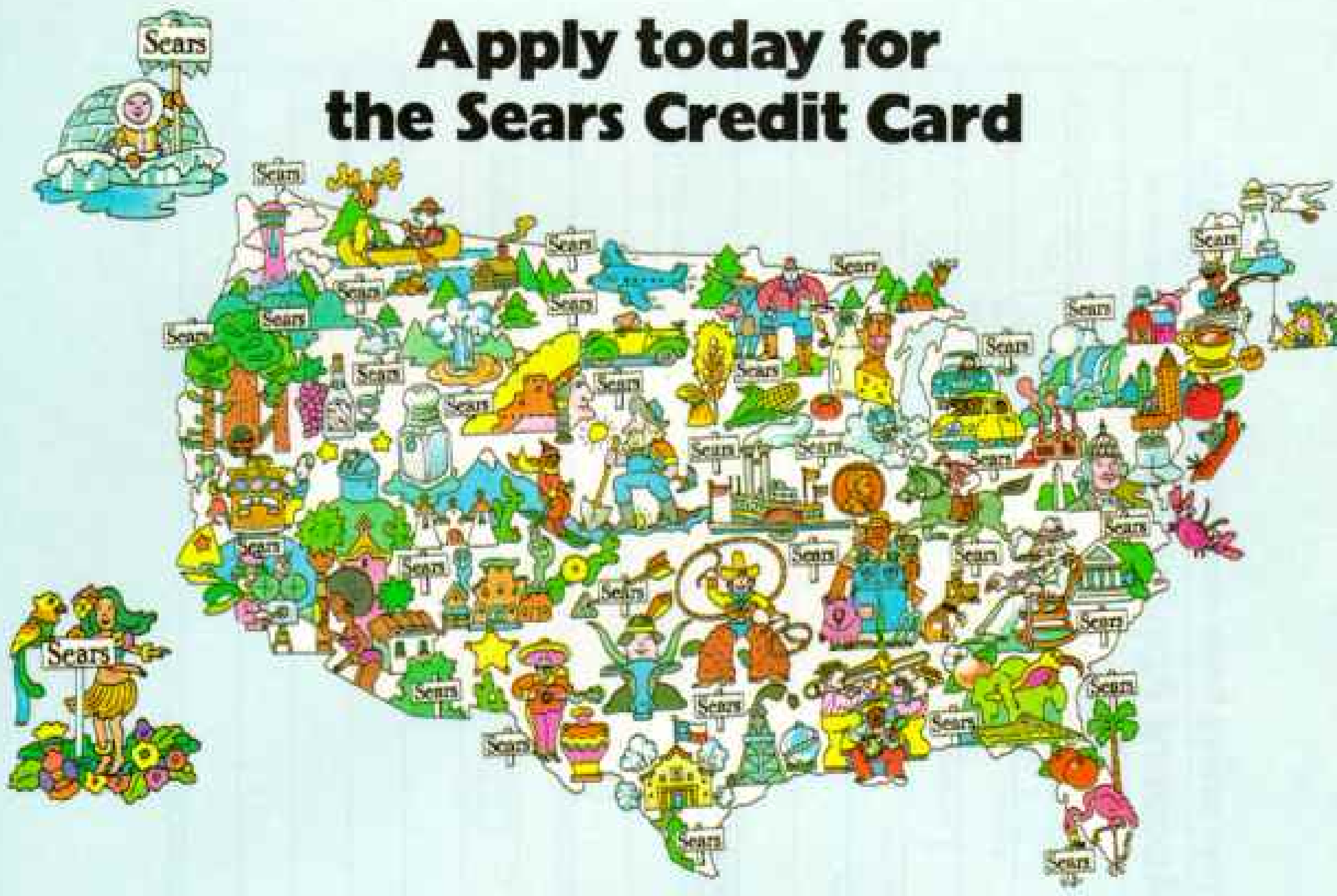

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It's a great escape."

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"We visited the old print shop on Featherbed Alley in St. George's. It's a town that gives you a feeling of history. Of things past."

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Why in the world should anyone know that you're wearing bifocals, except you?
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AO American Optical
Ultravue® Lenses
The Invisible Bifocals

In a city famous for its pretty girls, she's most beloved of all

Copenhagen's lovely Little Mermaid, perched gracefully on her rock at the harbor shore, was created in bronze by sculptor Edvard Eriksen. The fairy-tale heroine sent all of Copenhagen into mourning and nearly created an international furor when she was decapitated by vandals in 1964. Not until a new head was skillfully cast from the original 1913 mold and fitted to her slim figure was the city restored to its normal good appetite and spirits.

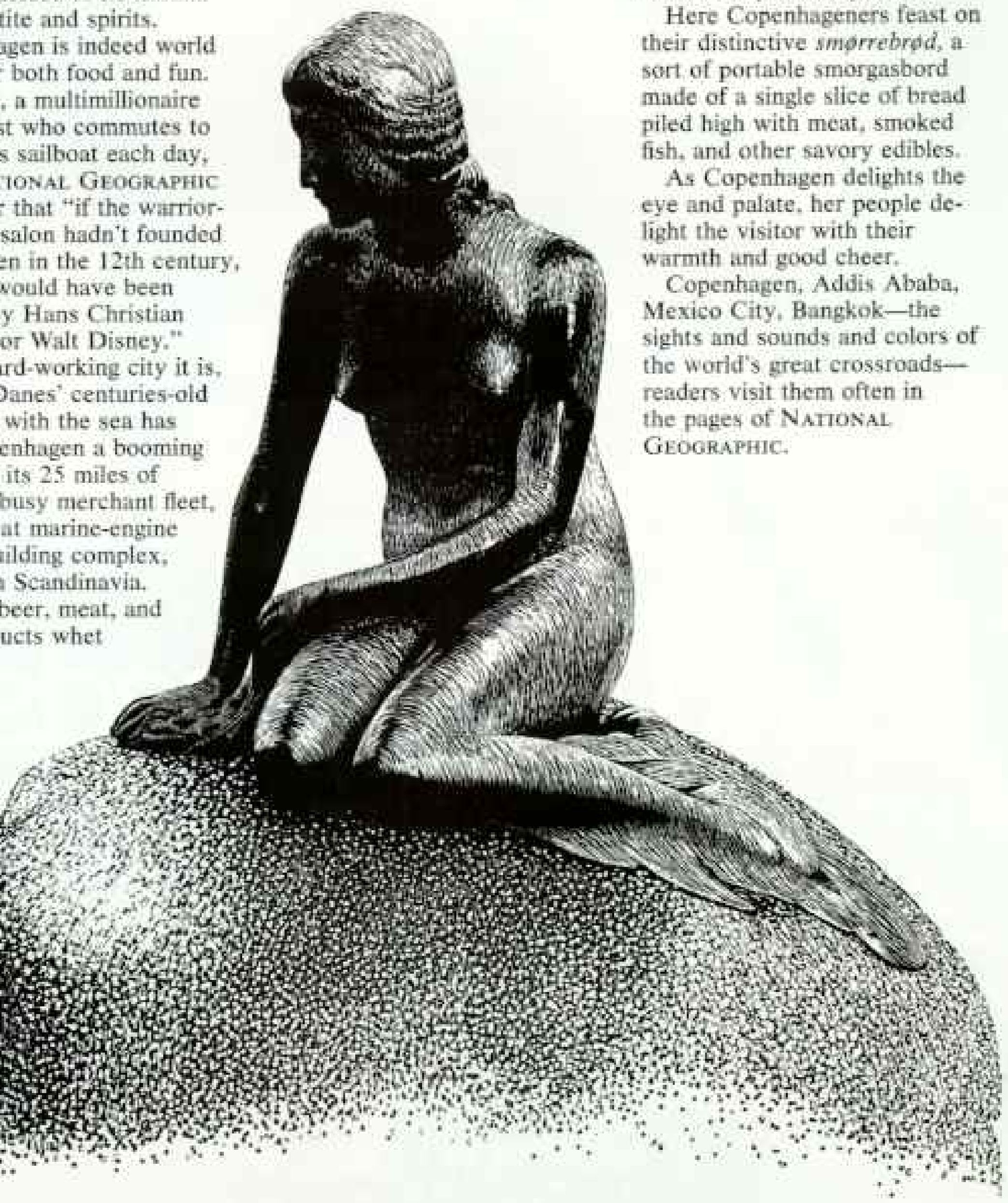
Copenhagen is indeed world famous for both food and fun. One Dane, a multimillionaire industrialist who commutes to work in his sailboat each day, told a NATIONAL GEOGRAPHIC staff writer that "if the warrior-bishop Absalon hadn't founded Copenhagen in the 12th century, the place would have been invented by Hans Christian Andersen or Walt Disney."

But a hard-working city it is, too. The Danes' centuries-old love affair with the sea has made Copenhagen a booming port. With its 25 miles of quays, its busy merchant fleet, and its great marine-engine and shipbuilding complex, it is first in Scandinavia.

Danish beer, meat, and dairy products whet jaded appetites throughout the civilized world.

Danish craftsmen and designers, working in precious metals and rich teakwood, have become silversmiths and cabinet-makers to the world. Their clean, bold lines typify the best of 20th-century design.

But over all of this industry hover the lighthearted spirits of Hans Christian Andersen, immortal storyteller, and of good King Christian IV, 17th-century master-builder. From King Christian's vision came much of central Copenhagen's rich beauty—classic structures with graceful arched doorways, elegant towers and spires soaring above wide plazas, and the Stock Exchange, with its fanciful tower formed by the entwined tails of four copper dragons.



Tivoli, best known and very possibly best of Europe's amusement parks, is certainly in the spirit of the great king.

A glittering 20-acre fairyland of light, Tivoli is a mid-city magnet for gourmets and concert-goers, young or old, king or commoner. Its restaurants, theaters, concert halls, playgrounds, fun house, and fireworks displays have enchanted more than 150 million people in a century and a quarter.

Here Copenhageners feast on their distinctive *smørrebrød*, a sort of portable smorgasbord made of a single slice of bread piled high with meat, smoked fish, and other savory edibles.

As Copenhagen delights the eye and palate, her people delight the visitor with their warmth and good cheer.

Copenhagen, Addis Ababa, Mexico City, Bangkok—the sights and sounds and colors of the world's great crossroads—readers visit them often in the pages of NATIONAL GEOGRAPHIC.

High-prowed Viking ships adorn coins of a realm that dominated most of the known world a thousand years ago. Warriors' shields rim a longship (upper), scourge of the seas. The stockier *knarr* carried cargo. Lusting for gold and glory, Norsemen went *viking*—plundering—from Ireland to Asia Minor. The Rus, Swedish merchant-colonists, left their name on a vast land—Russia. Vikings led by Eric the Red sailed westward, to Greenland. Eric's son Leif discovered "choice" land beyond and called it Vinland. On the present-day Island of Newfoundland, Norsemen stepped ashore five centuries before Columbus.

When their settlement was unearthed, a saga unfolded. Readers shared the thrill of discovery—as they often do—in the pages of NATIONAL GEOGRAPHIC.

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Newest in the PPG line, Solarcool cuts way down on ultraviolet light, too, which is a major cause of fading. Its beautiful mirrored face provides comparative privacy, and by reducing glare makes it a lot nicer to look out on a summer's day.

Up north, PPG Twindow® insulating glass uses two sealed panes to bring breathtaking winter scenes indoors while you breathe in comfort. Since it reduces heat loss through the glass more than 40 percent, it obviously saves energy. It cuts messy condensation. And if you want to save even more, add storm windows for triple glazing.

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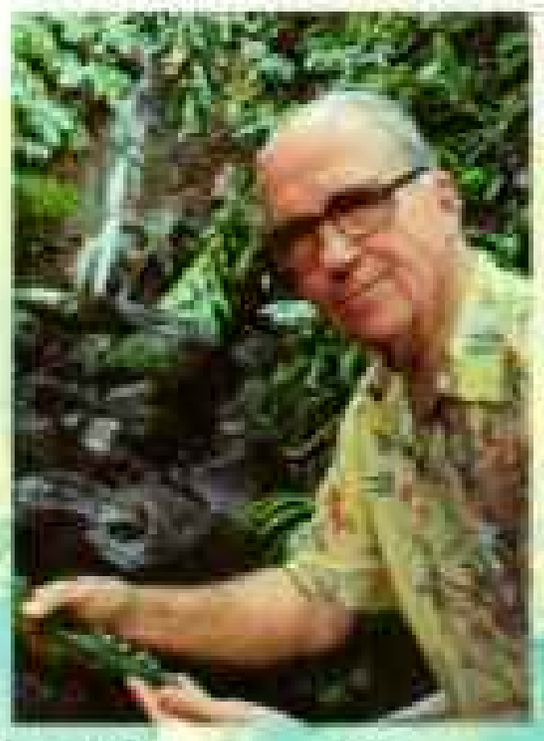

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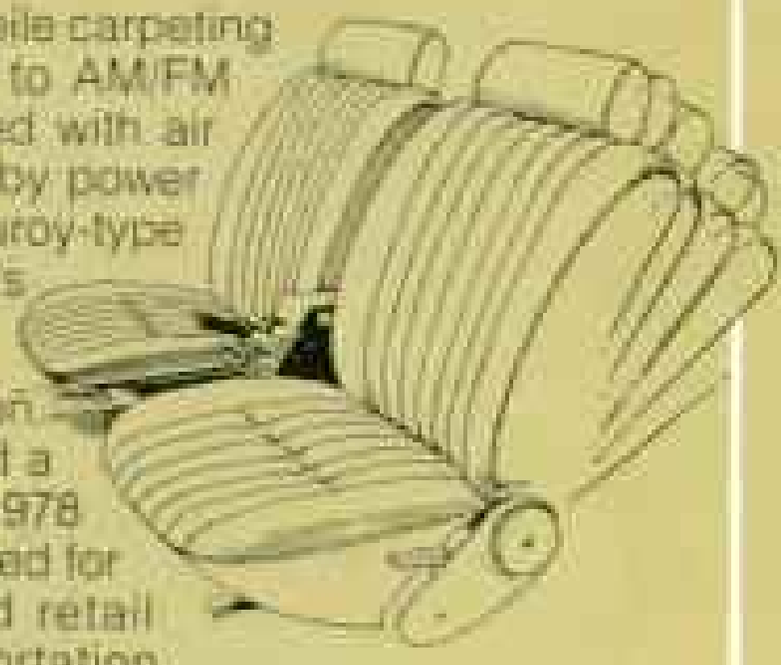

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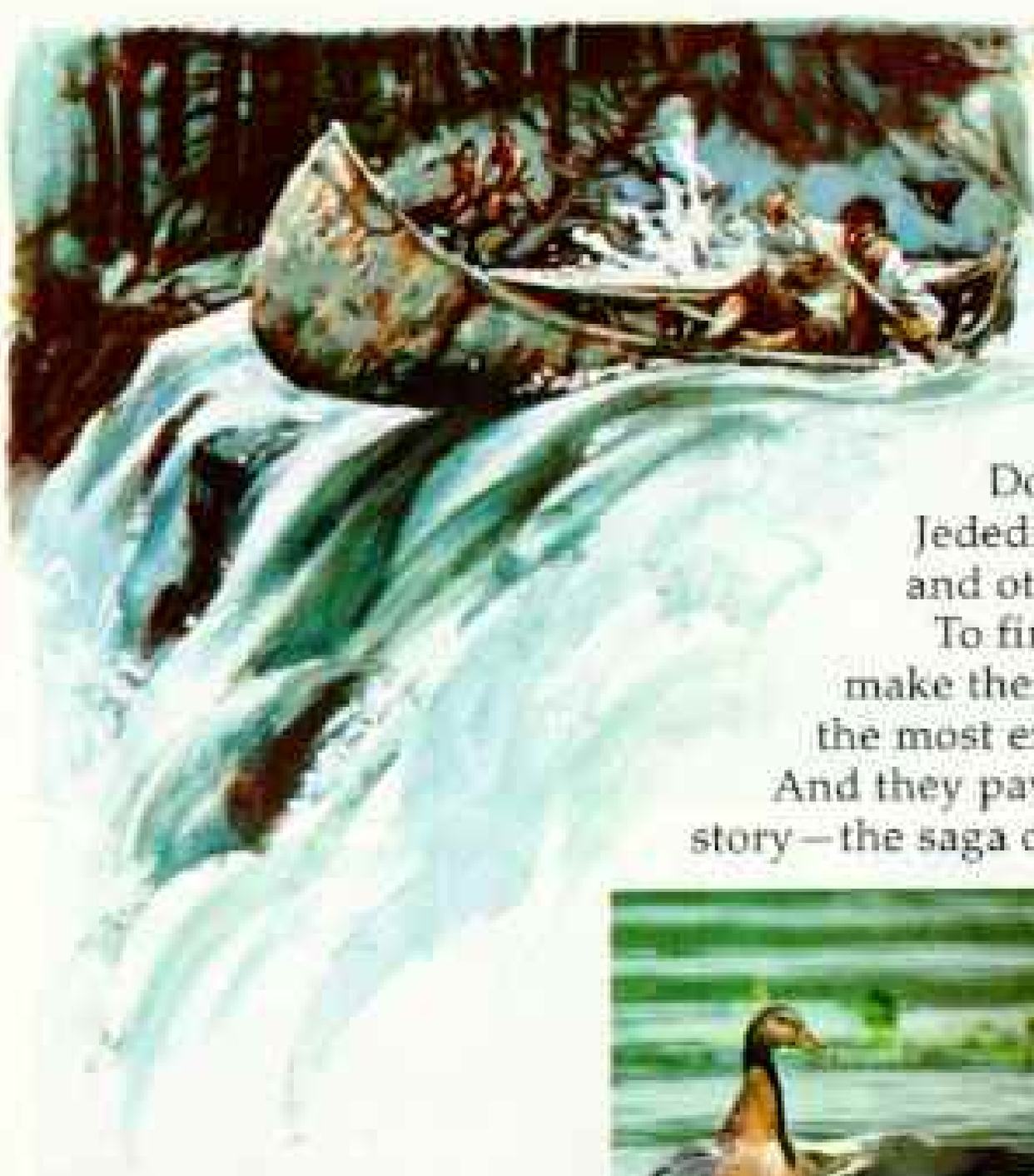

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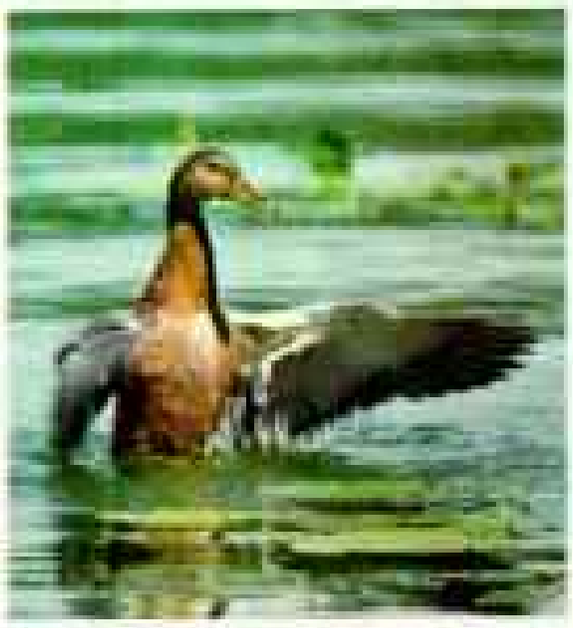

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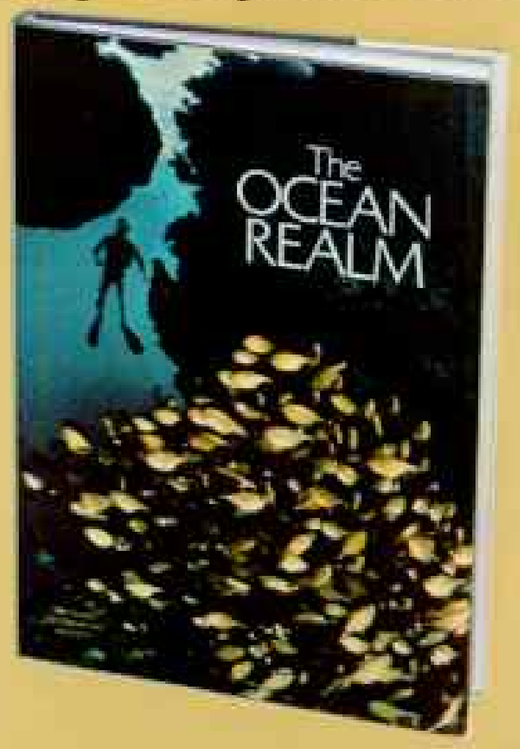

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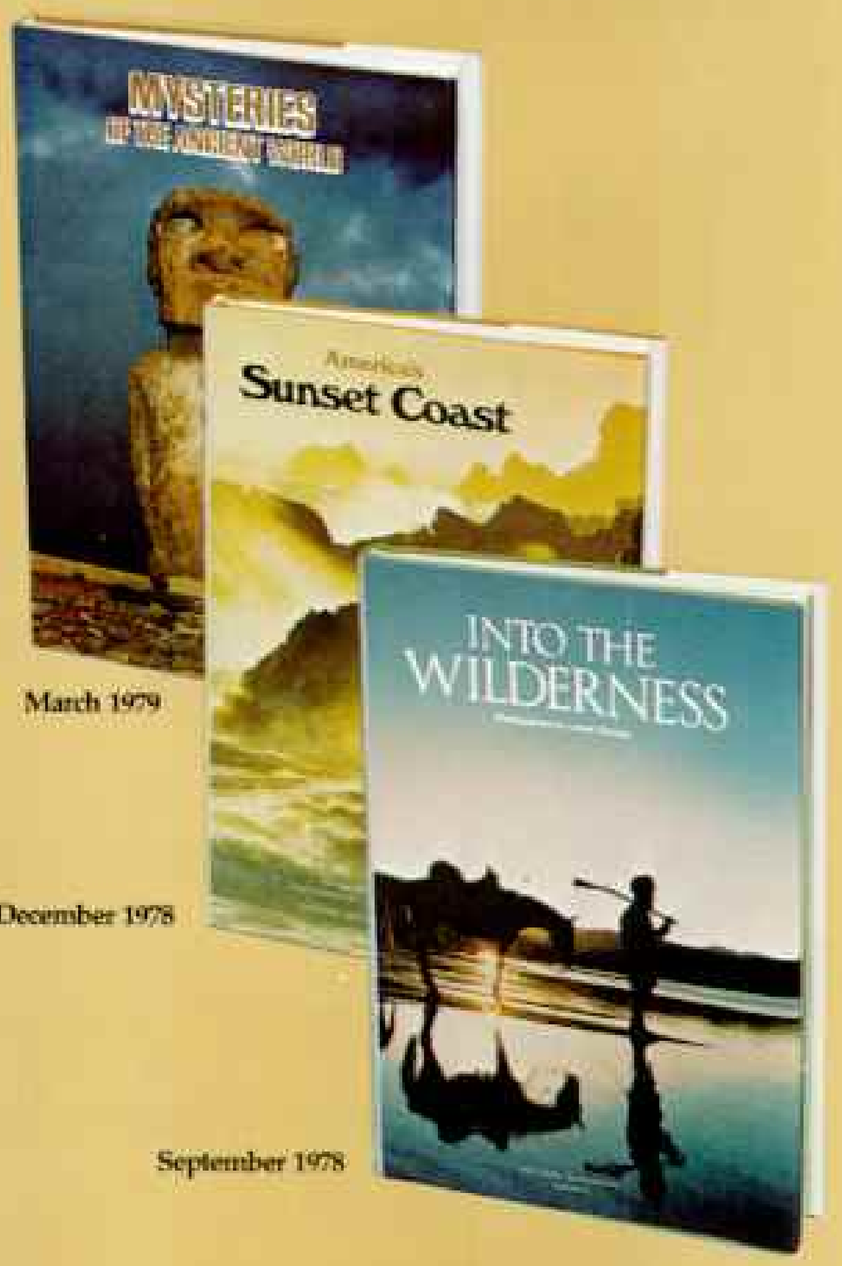

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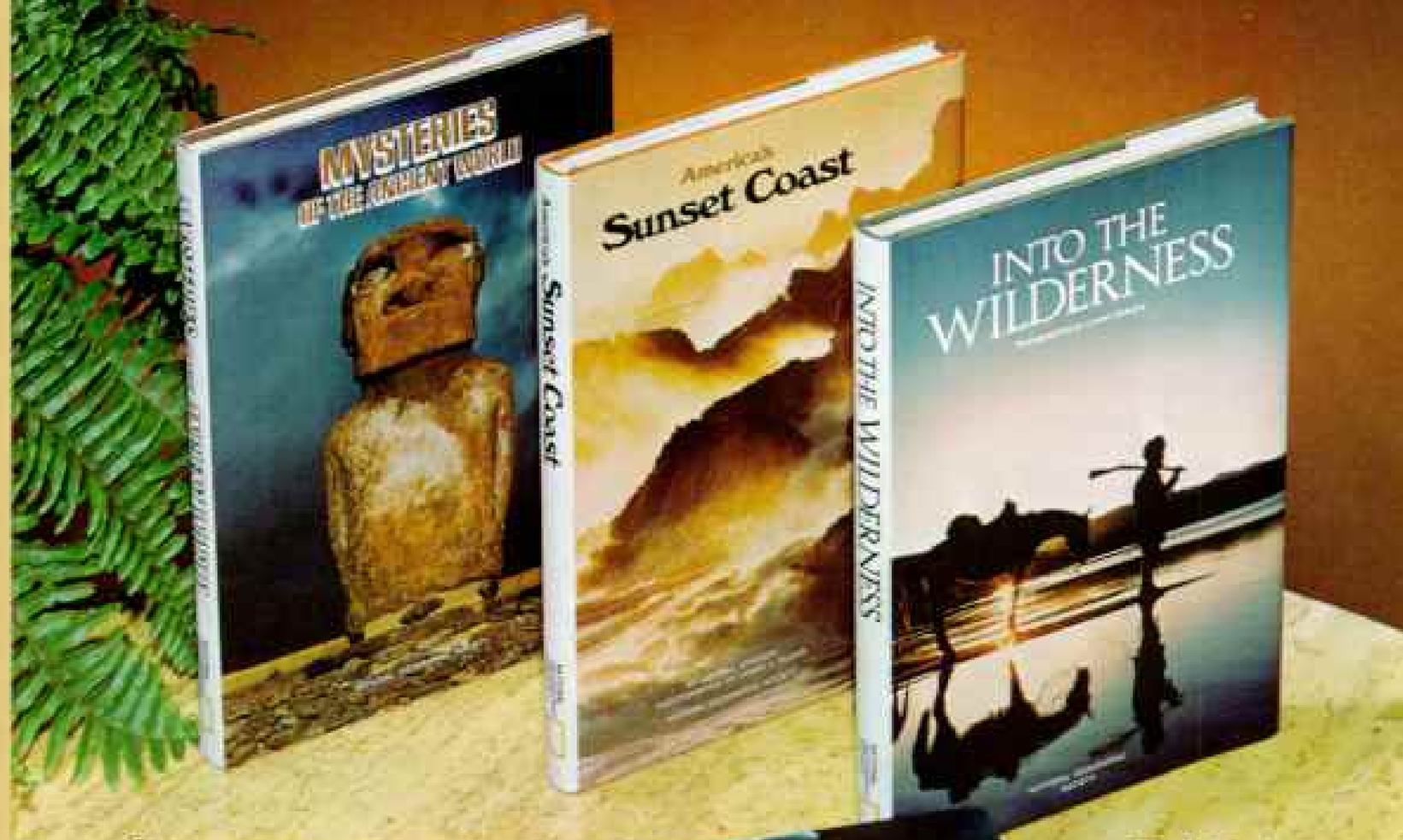

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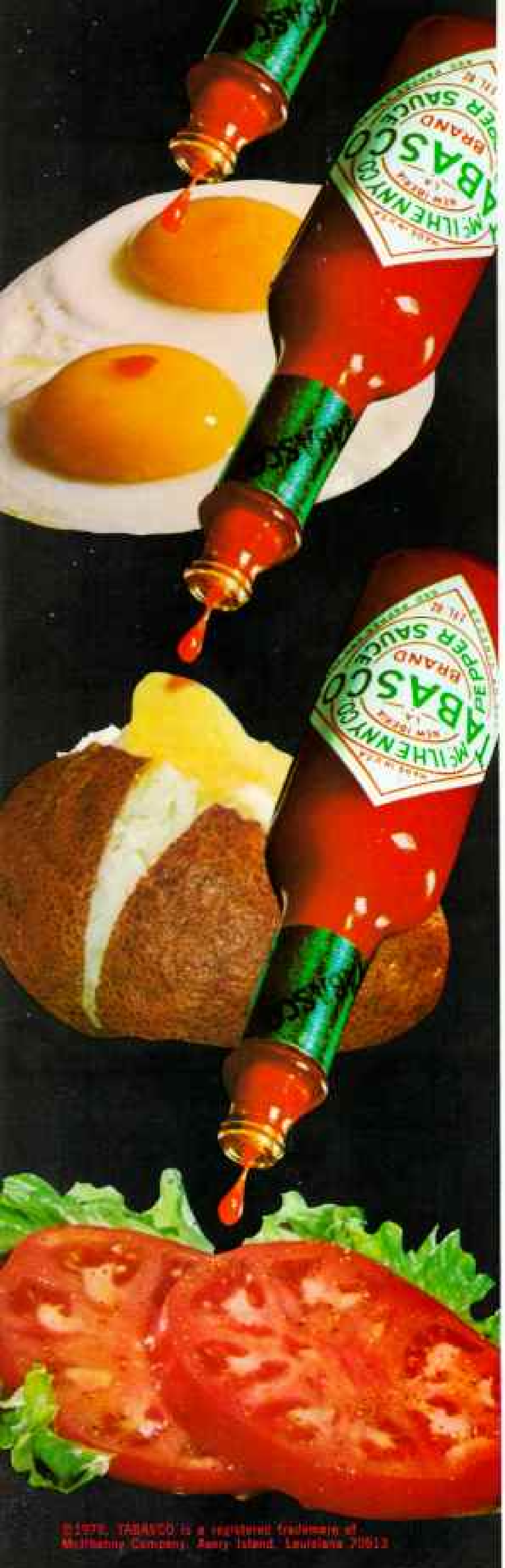

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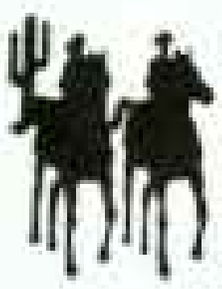

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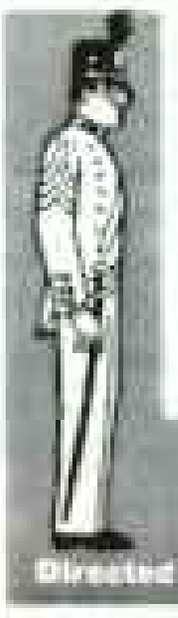

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Is time running out for the mighty condor?

Profile from the past, the Andean condor has changed little since prehistoric times. Beady red eyes, hooked beak, and white ruff mark the female. The paler-eyed male wears a crinkled crest. Giants among birds that fly, condors soar on wings spanning as much as ten feet. Leaping from cliffs, condors ride updrafts to three-mile altitudes, attaining speeds of 35 miles an hour. Wings flap sparingly, mainly for takeoffs and landings. Andean condors haunt coasts and mountains from Colombia to Tierra del Fuego, feeding mostly on carrion. Once plentiful, their numbers decrease as humans encroach on their wild domain.

Hunters bag them for trophies. Guardians, hired to protect guano birds on Peru's offshore islands, wantonly slaughter condors on the mainland. One village ceremony also takes a grisly toll. A captive bird is swung from arched poles, and Cashapampa's fist-swinging horsemen pummel it to death. A man bites its tongue out, then others tear the creature apart for talismans. The rite, now meaningless, apparently began with the Spanish, who symbolized destruction of the Inca's pagan culture by killing condors. Their cousins, the few surviving California condors, cling to dwindling mountain retreats. Readers keep tabs on these and other endangered species by regularly turning to the pages of NATIONAL GEOGRAPHIC.

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