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A QUARTER of a million people waited on the field as the weary man stepped slowly to the microphone. They knew what his first words would be. They were ready with the response.

"*Joi Bangla!*" he cried, meaning "Victory to Bengal!" and the answer was an echo that swelled to thunderous volume as it rolled back from the crowd. "*Joi Bangla!*"

They call the man Bangabandhu—Friend of Bengal. The shouted exchange with him was a litany of nationalism in the People's Republic of Bangladesh, a battered infant among the world's sovereign states. And then, as dark clouds ran like tumbleweed before a wind gusting out of the northwest, Bangabandhu posed a question.

"Are you willing not to demand anything from me for two, even three years?"

Yes, they shouted. Some were too weak from hunger and disease to shout. They nodded to signify their willingness.

Bangabandhu is Sheik Mujibur Rahman, Prime Minister and father of the country. It is to him that the 75 million people packed into the Wisconsin-size former eastern wing of Pakistan look for leadership and inspiration as they strive now for nothing more than mere survival. His appearance at a rally—like the one I watched in the town of Mymensingh—is a concert for charisma. Though famine stalks his followers, through him they seem to find nourishment in the sweetness of independence.

Earlier in the day I accompanied Sheik Mujib as he inspected widespread destruction a few miles south of Mymensingh, where a tornado had reduced half a dozen villages to

Delivered from horror, Bengalis restore their lives after the 1971 civil war that won them independence from Pakistan. This village girl harvests tobacco. Modestly shielding herself from strangers, she keeps her hands free by holding her shawl in clenched teeth.

Bangladesh: Hope Nourishes a New Nation

By WILLIAM S. ELLIS

SENIOR EDITORIAL STAFF

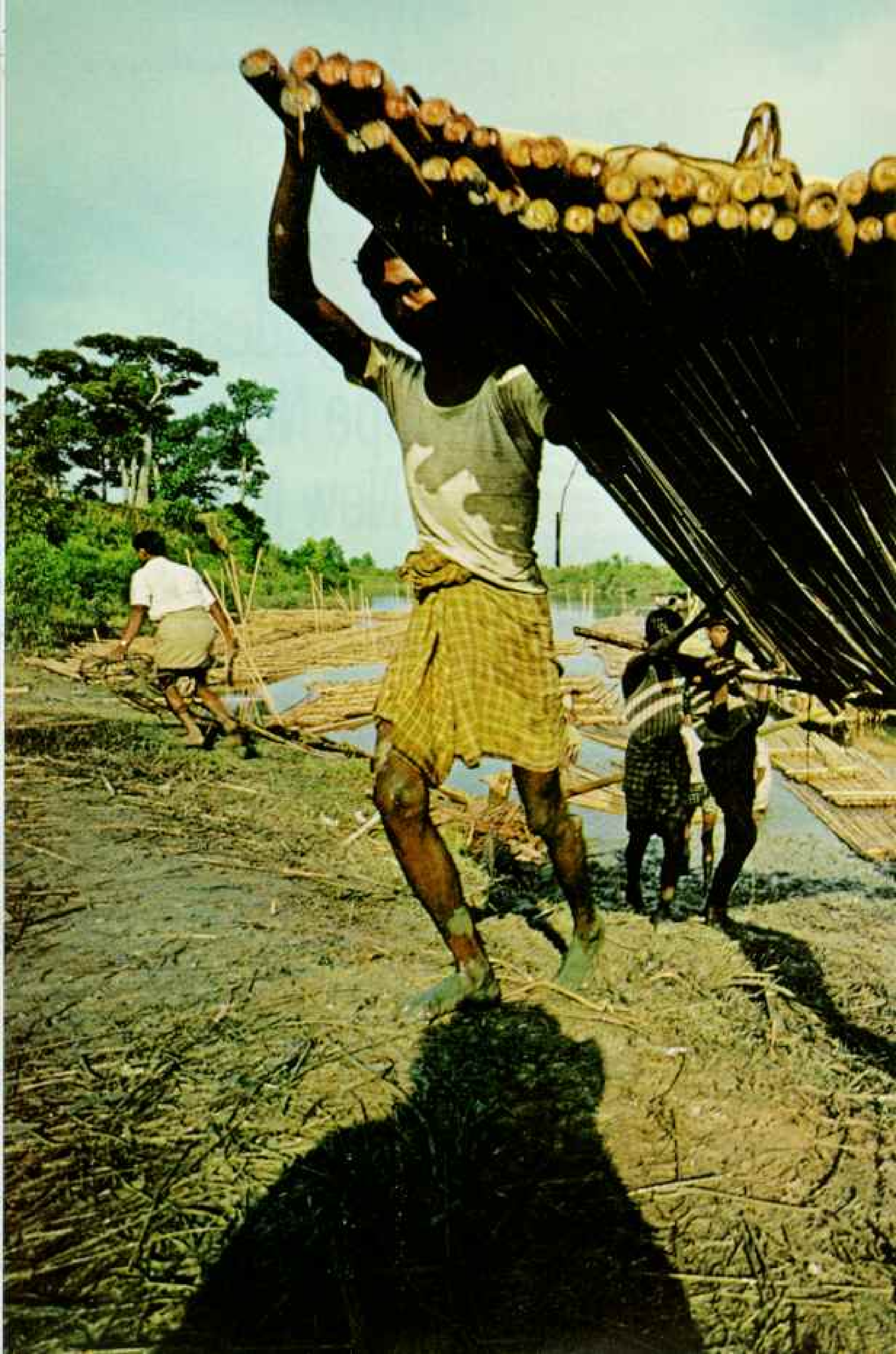
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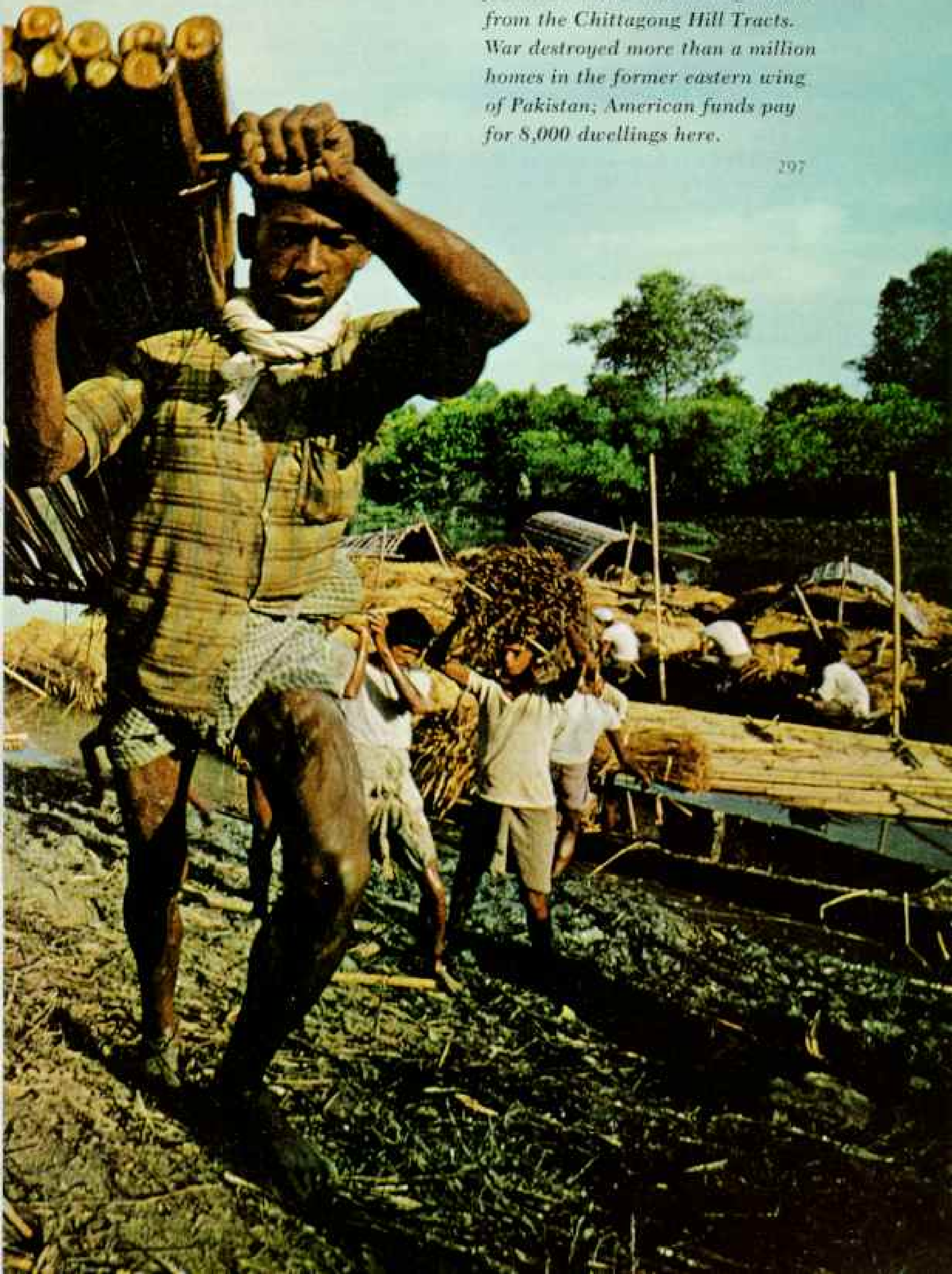


DICK DURRANCE



RAFTS OF BAMBOO, destined for house walls and beams, ride willing shoulders at Malumghat. The wood floated downstream in long trains from the Chittagong Hill Tracts. War destroyed more than a million homes in the former eastern wing of Pakistan; American funds pay for 8,000 dwellings here.

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rubble. Hundreds were left homeless, their bamboo-and-thatch shacks shredded by the 150-mile-an-hour wind. Fresh water was scarce, and there was a threat of cholera. Dead animals lay rotting in the April heat.

Sadness and the physical toll of 18-hour workdays showed in the Prime Minister's face as he walked through the debris. As word of his presence spread, the area came alive with thousands of villagers.

From a rise crowned with the stump of a mango tree, I looked out to see an incredible sweep of converging humanity: men in tattered skirtlike *lungis* who materialized from the emerald swatches of distant rice fields, women with babies freighted in arms and on hips, young boys and girls in stampedes of giggling exuberance.

The sudden appearance of such masses is common in Bangladesh. Here the population density—an average of 1,300 persons a square mile—is greater than it would be if every human being in the world were placed in the 48 contiguous United States.

Sheik Mujib had comforting words for those who were able to press in close enough to hear. But again, no promises. Not until the country could shake loose from the midwifery of horror and suffering that attended its birth. Meanwhile—*Joi Bangla!* And from a member of the Prime Minister's official party, upon seeing an old woman on her hands and knees pinching individual grains of wind-scattered rice from the hot earth, this: "May Allah give them strength."

After the Holocaust a Nation Rises

Slogans and petitions to deity may or may not have helped, but Bangladesh, the world's 147th independent nation, is getting to its feet. Survival seems likely and, considering what occurred here for nine months of 1971, that is indeed a miraculous accomplishment.

The aftereffects of that experience pervade nearly every aspect of life in Bangladesh. In the cities and throughout the countryside—everywhere—the strains of recovery are evident, and they are painful.

Sheik Mujib's government says that three million Bengalis died between March and December of 1971. The figure is probably inflated. But certainly the terrors and atrocities committed here—in Dacca and all across this gentle land of rivers and marshlands—came close to genocide.

When the fighting was over, there were

vultures almost too fat to fly, and Bangladesh was a land with few of the sinews of nationhood left unsevered. The government, by necessity, became a mendicant, and the rattle of its tin cup was heard around the world. Thus began the most massive disaster-relief effort ever undertaken.

Among the donations was a shipment of used ski clothing from well-meaning residents of a Scandinavian country. A relief worker in Dacca told me, "I guess that for many people Bangladesh is a place of shadow geography—one of those countries that you think is in the Himalayas, but on the other hand may be Thailand's neighbor to the south."

Rivers Crisscross a Fertile Plain

Driving east from Dacca, the capital city, I watched the geography of Bangladesh unfold in the toast and mustard shades of the Indian subcontinent. The land once comprised the bulk of the British-Indian province of Bengal. It is flat and fertile—55,000 square miles of mucky floodplain carved up by five major river systems (map, page 305).

I waited to board a ferry, my third since leaving Dacca. This one would take me across the Meghna, a river of strength and character that channels the merged flow of the Ganges and Brahmaputra into the Bay of Bengal.

There was activity along the banks. A woman stood in the shallows, splashing water on her skinny, naked baby to cool a wasting fever. Fishermen, chanting as they worked, struggled to get their nets in order. Led into the water, a bullock submitted calmly to a scrubbing of its lean and bony hindquarters.

More than anything else the Meghna, like most of Bangladesh's five thousand miles of waterways, is given over to boat traffic. Hundreds of barges and sampan-type boats moved on the river before me, their bamboo cabins golden in the morning light.

The ferry bumped into the dock, backed off, and then bumped it again. Passengers leaped ashore before the ramp could be lowered. Disembarking vehicles were held up when a truck driver stopped to buy a green coconut from a dockside vendor; ignoring the chorus of horns, he drained the milk in leisurely swallows. He then acknowledged the protests with a sweeping bow, climbed into his truck, and drove off.

I was the last to board, and by then the vessel was loaded far beyond safe capacity. There were no chocks left to secure my car,

but a deckhand assured me that they hadn't lost a vehicle in more than a year. So, with gunwales awash, we moved out under the smoky push of an ancient engine.

I noticed that some of the small boats on the river had as crew an old man and a young boy, the duty station of the former being the shade of an umbrella in the bow. Later I talked with one of these elderly rivermen.

"I'm too old to pole, too old to row, too old to handle sail," he told me. "But this boy, the son of my first son, who was killed by the Pak soldiers—he is strong, and one day the boat will be his. So he learns and I rest."

The average male Bengali is short, with dark skin stretched over a slight frame. But his tolerance for arduous manual labor is that of a giant. Nearly blinded by sweat, he pedals a pedicab with as many as four passengers in 104-degree heat. As a laborer he works 12 hours at a stretch, carrying bricks and other building materials on his head. He will pay with his hearing for having spent most of a lifetime in a jute mill where a thousand automatic looms clank forth a ceaseless din.

As a farmer, which most Bengalis are, he stoops all day in wet fields, managing to raise nearly enough to feed himself and his family.

Even in the best of times, life is hard for a Bengali. Per capita income is less than \$80 a year, and in recent years the country has been unable to feed itself. Of course, the situation is even worse now, but having separated itself from West Pakistan, Bangladesh is free to move in the only direction open—up.

Nation Bankrupt in the Wake of War

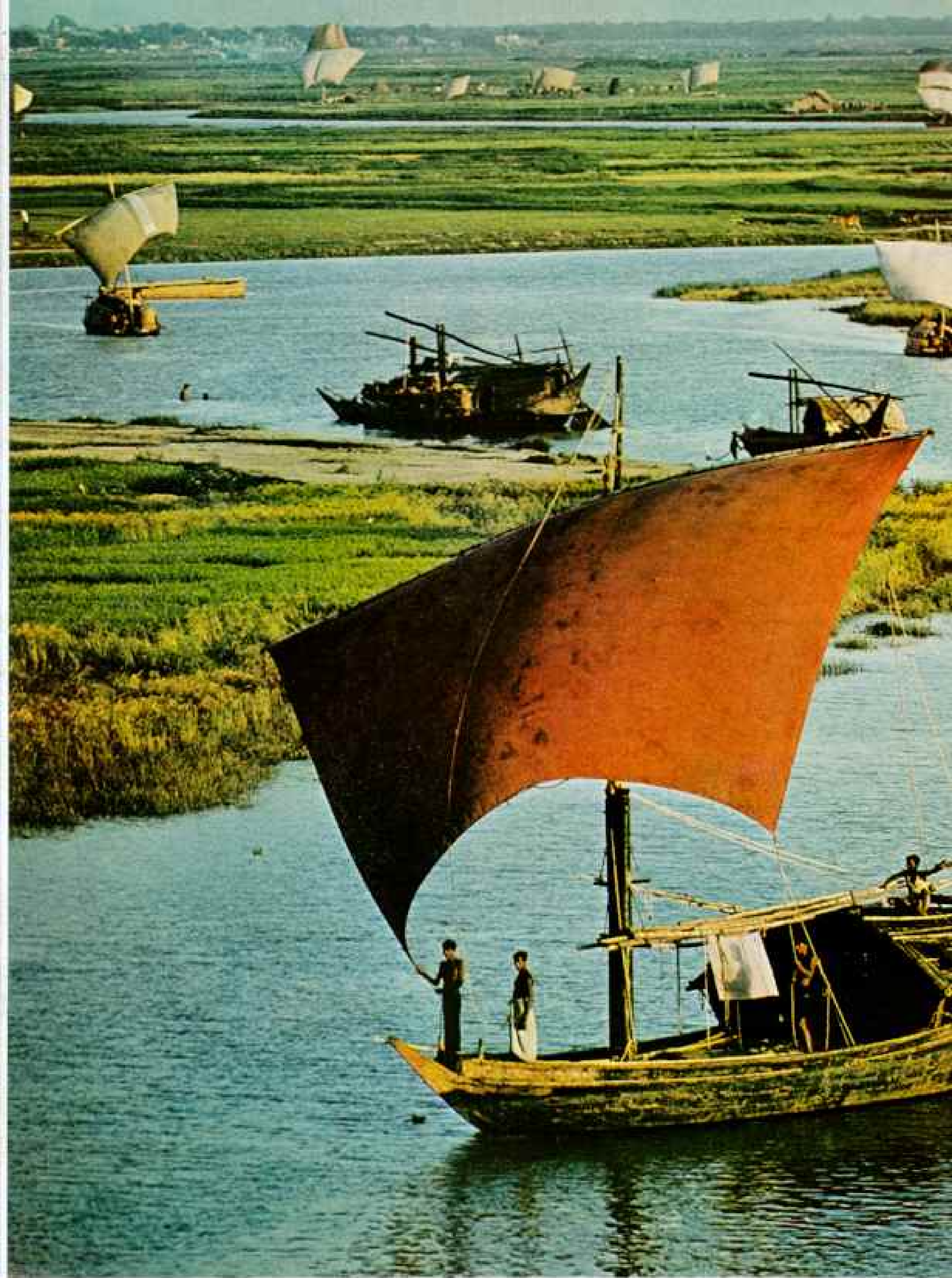
For the first months of its independence, Bangladesh was impaled on the shards of its war-shattered economy. Dozens of jute mills and other factories were heavily damaged. The plantations of Sylhet, which produced 68 million pounds of tea annually, were ruined.

The country came out of the war with less than \$500,000 in foreign exchange. Most of the major businesses were owned by West Pakistanis, who managed to get the bulk of their cash assets out of the country.

For many years before the troubles, the eastern wing felt that it was subjected to severe economic discrimination. Through the sale of its jute and other products, the East provided more than half the national export earnings for Pakistan. But though it had three-fifths of the people, its share of the national budget was less than 40 percent.



With loving hands, Bangladesh Prime Minister Mujibur Rahman touches the bowed head of a follower. Bengalis revere the 52-year-old politician as father of their nation. Sheik Mujib fought British rule in the 1940's, worked for the creation of Moslem Pakistan, and thenceforth championed Bengali rights within Pakistan. In 1970 his Awami League swept a majority of National Assembly seats and demanded greater autonomy for Bengalis. When negotiations failed, Pakistan's President Yahya Khan sent his army to subdue East Pakistan and jailed Rahman. Syed Nazrul Islam, left, presided over the government-in-exile during the holocaust that followed.



Graceful as butterflies, boats glide past rice fields on the meandering Turag River near



Dacca. Hundreds of watery highways interlace the low-lying heartland of Bangladesh.

"Certainly we won't enjoy a high standard of living in the near future," S. A. Karim said, "because, for one thing, the country is too small for the number of people we have. But there's no reason why we can't have a reasonable standard before too long."

Bangladesh hopes to reestablish traditionally profitable trade with India. And once the damaged factories are repaired, it will be able to increase its exports. Even now, the world's largest jute mill, in the town of Narayanganj, has resumed operations with 30,000 workers (pages 322-3). There the fiber of the tall, tough plant is processed into burlap, the most common jute product.

Austerity Limits Individual Salaries

Mr. Karim is Political Secretary for the Ministry of Foreign Affairs in the new government. Like all Bengalis, he can draw a salary of no more than 2,000 takas, or about \$275 a month. The entrance to his office is hung with a blanket-size piece of cloth. Inside, a ceiling fan turns, stirring a fine, hair-mussing breeze. (With a ceiling fan in almost every government office, nothing is more essential to the Bangladesh bureaucracy than the paperweight.) The office is dimly lit by the faint orange glow of a single electric bulb.

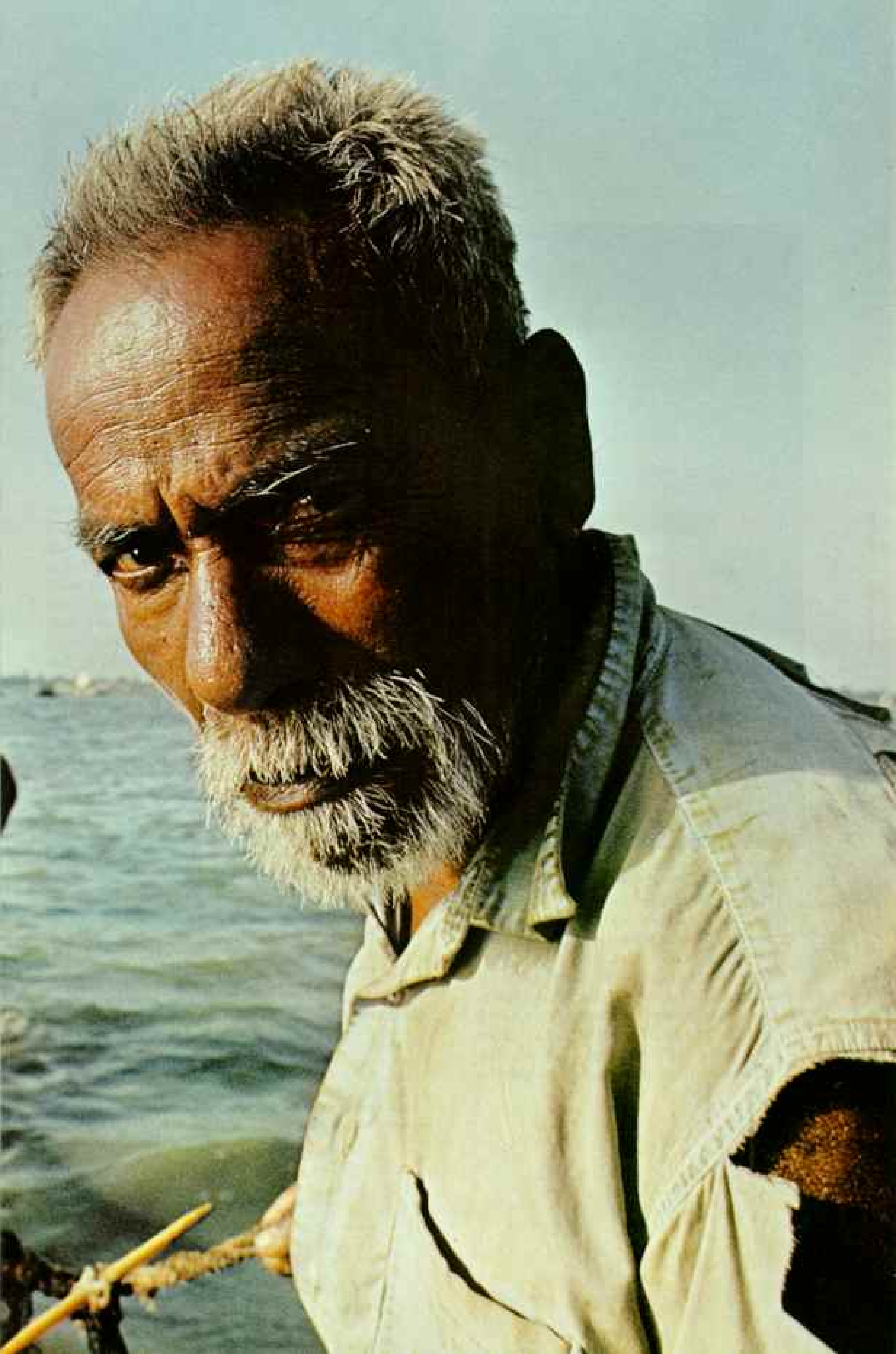
Before independence, Mr. Karim spent some time in Washington on the staff of the Pakistani Embassy. I mentioned that a friend of his in New York had asked me to deliver a gift. It was something for his young son who was born in Washington and who, since moving to Bangladesh, had yearned for something he had come to love.

He smiled and thanked me for the two jars of peanut butter. One crunchy, one smooth.

At Chittagong and Chalna, the country's two major ports, other gifts of food were arriving by the shipload. Grains and other foodstuff filled the silos and warehouses. Road traffic was heavy as trucks moved in to transfer the goods to distribution points. In all, nearly a million tons of staples were on hand in Bangladesh, and Toni Hagen was

Frontline troops in the war against hunger, fishermen haul a net from the Meghna River. In normal times, village markets display an abundance of fish, vegetables, and rice. But, because the war ravaged fields and displaced many farmers, the nation must now import additional food for its 75 million people.





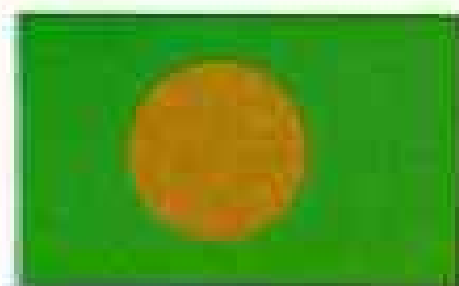


Lacy filigree of Chawkbazar Mosque adds a lighthearted touch to Chittagong, the nation's major port. Along this coast Arab seafarers traded for fine muslins as early as the ninth century. Later, Chinese sought pearls and precious stones. Hinduism and Buddhism flourished until Moslem Turkomans conquered Bengal in 1202. Many Hindus converted to Islam, but continued to share the culture of their non-Moslem neighbors.



ONLY SEVEN of the world's countries have more people than does Bangladesh (Bengal Nation), a delta land about the size of Wisconsin. Most of its citizens grow rice on fertile alluvial plains watered by five major river systems. During monsoon rains, the rivers overreach their banks, embracing the land in lifegiving floods. Each year these inundations enrich and transform the terrain that in only a few areas rises more than 30 feet above sea level.

Farmers have adopted dozens of rice varieties to meet local conditions. Some deep-water strains shoot up five inches a day for a week, keeping ahead of rising floodwaters; men harvest the grain from boats. New varieties of high-yield rice promise to double present output. Forests in the Sundarbans, a refuge of the Bengal tiger, produce timber. Elsewhere along the coast, miles of earth levees seal out water from polders—land reclaimed for agriculture.



AREA: 55,126 square miles. **POPULATION:** 75 million, with population density among the highest in the world. **LANGUAGE:** Bengali. **RELIGION:** 80 percent Moslem; 18 percent Hindu; Buddhist, Christian. **ECONOMY:** Agricultural; rice grown on almost all arable land; three annual harvests. Jute and tea exported. **MAJOR CITIES:** Dacca, capital and largest city (pop. 1,000,000); Chittagong (pop. 500,000), port. **CLIMATE:** Temperatures range from 40° F. in dry winters to more than 100° F. in wet summers. Monsoon rains contribute to a 100-inch average annual rainfall. **PRINCIPAL RIVERS:** Brahmaputra, Ganges, and Meghna. Many other navigable waterways.

Bangladesh





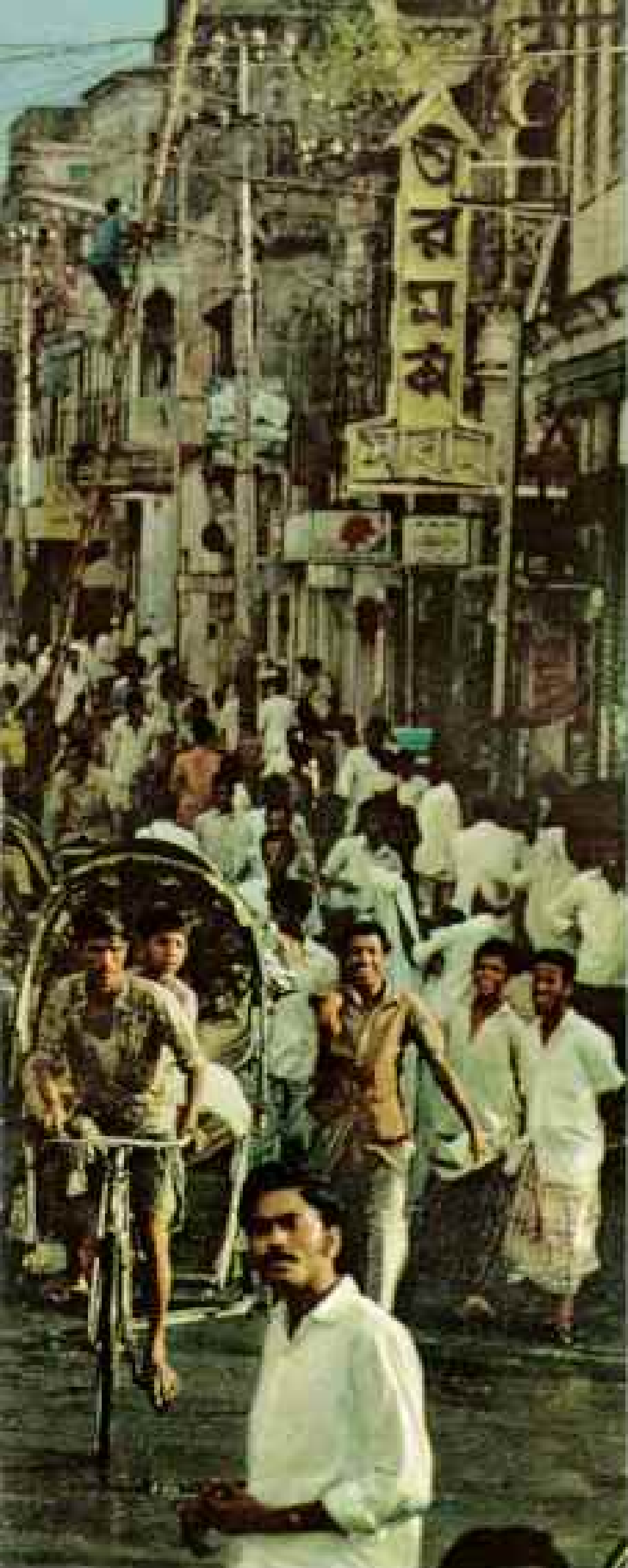
Cheerful din of pedicab bells and auto horns drowns out the whistle of a lone policeman on Nawabpur Road, the main shopping street of Dacca, capital of Bangladesh. His white uniform and the English-language signs recall 190 years of British rule. Little remains of the past quarter century of West Pakistani domination. Urdu, the language of Pakistani rulers and local Biharis, disappeared from schools and streets on December 16—Victory Day. Now Bengali language and script prevail.

With fuel in short supply, a porter (upper right) hurries a valuable load through the crowded city.

able to say that the immediate crisis was over.

Short and stocky and given to smoking the blackest of cheroots, Hagen headed the United Nations relief effort in Bangladesh until the spring of 1972. He is a blunt-spoken Swiss with a temper that rails at delays when it comes to feeding hungry people. Thus it was that in early March of this year, when there was less food available here than at any time in the past decade, he announced that the country was "headed for disaster."

The response was so immediate that, less than a month later, I sat in Hagen's Dacca office and heard him say: "We now have enough food in the pipeline to last for the next five or six months. If the country can get through this year, I think the long-range outlook will be good."



But Hagen emphasized that the mere transport of surplus food from rich nations will not solve the problem. "If we honestly want to try to help this new nation stand on its feet, then traditional ways of thinking in terms of charity have to be abandoned," he said. "The need is not so much for blankets and baby food as it is for cash, plain cash."

By that, of course, he means that destroyed bridges cannot be rebuilt with creamed spinach. Nor can a nation's currency be backed by a reserve of wool comforters. To raise Bangladesh to its prewar economic level will require, according to government estimates, between three and four billion dollars.

In addition to the United Nations, more than fifty volunteer agencies have been active in Bangladesh at one time or another this

year. Calcutta's famed Mother Theresa was here, and so was one L. E. Wallhagen, representing "Uncle Erik's Children's Help." Russians came with giant helicopters, while ruddy-faced New Zealanders in khaki shorts crewed a C-130 transport on loan from their government. Not to be outdone, the world's smallest political entity, the Rome-based Sovereign Military and Hospitaller Order of Malta, supplied one airplane.

CARE helps build new houses to replace some of the million or so destroyed during the troubles, and medical teams attached to the Red Cross minister to the ill. But it is the blue-and-white emblem of the United Nations that stands as the banner of hope. It appears on more than 600 trucks, and also on the two dozen "mini-bulker" vessels, each with a



ALL ILLUSTRATIONS BY JIGTI

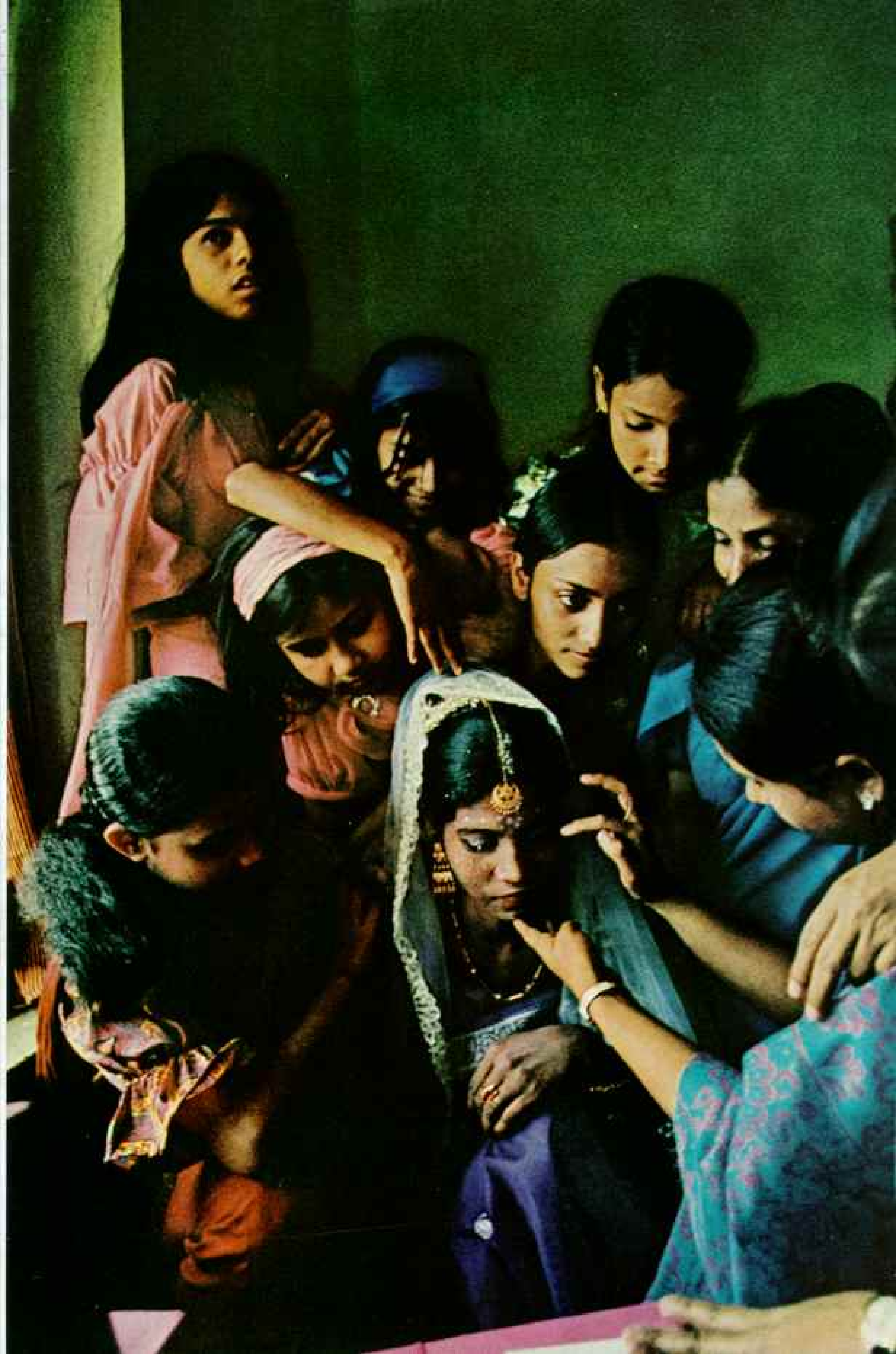


Atrocities of war live on in folk art painted on rickshas and pedicabs (above), and in the eyes of Bengali women. On March 25, 1971, the army of West Pakistan unleashed a ruthless campaign to suppress the rebellious Bengalis.

They struck hard at intellectuals, Awami League members, and Hindus, who were considered agents of India and instigators of the independence movement. In Dacca's Hindu colony of Shakharpatti, 8,000 out of 30,000 people died; this cautious survivor (left), dressed in plain widow's weeds, fetches water.

Untold thousands of women were raped, the ultimate dishonor in orthodox Moslem and Hindu societies. A 13-year-old girl (opposite) was kept for months in a military camp. After the war her father brought her to a women's relief organization that provides abortion and adoption services. Now she undergoes job training to give her economic independence in a society where woman's traditional place is the home.





capacity of 3,100 tons, that ply the waterways moving supplies.

It appears, too, on single-engine, short-takeoff aircraft, such as the one that passed low over the park one day in Dacca while musicians gathered to celebrate Pabeha Baishakh, the Bengali New Year.

The year 1,379 had arrived, according to the traditional Bengali calendar. To welcome it, a baritone sang of two enduring joys that neither war nor hunger could take away. He sang of rain and love: "The dark clouds of the monsoon are like your dark hair falling."

At all the musical festivities I attended that day, the voices, accompanied by breathy gasps of a harmonium, sang the praises of water—of the rivers and the rains and the floods that nourish the soil.

Monsoon rains transform much of Bangladesh into a vast lake, and when the floodwaters recede, the earth is renewed for another season of generosity. There are about 26 million acres under cultivation in the country, of which 22 million are given over to rice. The three yearly harvests produce a total of eleven million tons, about two million tons short of the requirements for a population of 75 million.

Children Ensure Care in Old Age

With the population growth such that the number of people will double every thirty years or so, this deficit is not likely to be overcome by anything short of a workable scheme for family planning. Today in Dacca there is much talk about birth control. But to the average Bengali—the illiterate farmer always on the edge of destitution—the idea of limiting his family is hard to accept.

"A man here wants children for economic reasons, or at least that's one important consideration," I was told by a United States Public Health Service epidemiologist who was on loan to the Cholera Research Laboratory in Dacca.

"He wants his sons to grow up and provide for him in his old age. But there is only a fifty

percent chance he will have a boy, and if he does, there is another fifty-fifty chance that the boy will not survive to adulthood. Therefore, to be reasonably sure of having two sons survive, he has to have about eight children."

End of a Task Prompts Hours of Song

Although more than 80 percent of the people of Bangladesh live in rural areas, more and more families are relocating in the major cities, especially Dacca.

Never a showcase of architectural excellence, Dacca today holds even less visual appeal with its new collar of shantytowns. Yet it is a city of hidden pleasures—pleasures that must be searched out, like perfect shells on a beach.

On Elephant Road, for example, I spent a full morning in the shop of a master craftsman, a maker of musical instruments. The air was heavy with the smells of glue and good wood. For two months he had been working on a two-stringed mandolin called a *dotara*, and now it was finished. He tested it for tone, and the results so pleased him that he played and sang of happy things for two hours.

And I went to Old Dacca where, on a street such as Islampur, the chaotic tangle of crowds and traffic grows tighter each day. I made the mistake, at first, of going down Islampur in a car. In less than a block, the vehicle was swallowed up in a vortex of pumping pedals. Pedicabs—a hundred of them, at least—quickly surrounded me, the tinkling of their bells like the laughter of Lilliputians frolicking on a pinned-down giant.

There are more than 30,000 pedicabs and rickshas in the city of Dacca. Among their drivers are young men who have expended more body-racking energy in their fifteen or so years than most men twice their age. They seldom laugh or smile, these boys, for their facial expressions are cast by the strain of their work.

Most of the vehicles are decorated with colorful paintings. The scenes vary from country

These well-to-do Moslems hid from the terror in an isolated village while their Dacca home was looted. Now back in the city, they welcome a new bride, gently fingering her wedding makeup and finery. Breaking with the tradition of arranged marriages, the groom met and wed the young woman during a visit to Calcutta, heart of Bengali life in India. Under British rule, the city was a part of the province of Bengal, which included Bangladesh.



life to cryptic expressions of fantasy, but the dominant theme is the price Bangladesh paid for its independence. A typical painting of this type depicts a sexual assault on a woman, and the bayoneting of a man, along with mass slaughter, the burning of a village, the bombing of civilians (page 308).

Such scenes are also common in calendar art. Newspapers continue to run daily stories on the atrocities, and a foreign dignitary visiting the country is almost certain to be taken to view one of the mass graves kept open for display (pages 318-19). Schools run contests for the best paintings by children depicting wartime butchery. Published poetry is loud with "anguished outcries." "Rivers of blood" flow through verse after verse.

Bangladesh refuses to shed the memories of its suffering. "Bengalis have had centuries of pain, so I think we're entitled to scream for a while," a Dacca University professor told me.

The historical roots of this new nation spring from ancient times—according to some historians, from a kingdom called Banga that is mentioned in Sanskrit literature. The early inhabitants are thought to have been a short, curly-haired people who mixed with

Mongoloids from the lower Himalayas and with Aryans who came from the northwest, following the course of the Ganges.

The thread of Bengali history can be picked up more firmly with the Moslem conquest of Bengal about A.D. 1200. From that time until the present day, it has been a history marked by turbulence and bloodshed. Just as strong men now weep for Bangladesh, so must they have wept many centuries ago when rebellious Bengalis were cast under the feet of elephants.

Hindus Favored During Britain's Rule

Near the middle of the 18th century, the British raj arrived, and with it 200 years of exploitation. With its own army and navy, the British East India Company committed such excesses in Bengal that Horace Walpole, the 18th-century English author, wrote:

"We have outdone the Spaniards in Peru! We have murdered, deposed, plundered, usurped. Nay, what think you of the famine in Bengal, in which three millions perished, being caused by a monopoly of provisions by the servants of the East India Company?"

Under British rule the Hindus became the

"We were small in number, but a determined force." Students recall the months they spent as Mukti Bahini—freedom fighters. At Dacca University, still scarred by bullet holes, they saw their professors murdered, their dormitories bombarded, their books burned. They fled to India, where they received military training, then returned to join guerrilla bands that mined bridges and power stations and ambushed soldiers. Now back in school to complete their studies, these youthful veterans face staggering competition for the few professional jobs available in a predominantly rural society.

Songbird at dawn, a student greets the Bengali New Year, April 15, with songs of Rabindranath Tagore, the Nobel Prize-winning poet.



managers and paymasters and government clerks, while the Moslems filled the lower level jobs. By 1947, when India gained its independence, it was obvious that the gulf between the two groups could never be bridged within the framework of a single nation. Thus, on August 15 of that year, the world's second and sixth most populous nations, India and Pakistan, came into being.

Because its boundaries were drawn to encompass the largest settlements of Moslems, Pakistan was divided into two wings more than 1,000 miles apart. More than distance stood between the units, however.

The people spoke different languages. The ruling West Pakistani was likely to be tall and fair-skinned, possibly a Punjabi. He was at ease with a swagger stick in his hand and had a hint of England's Sandhurst in his bearing.

The emotional Bengali of East Pakistan was in love with his own lyrical language. To him, the land was "Sonar Bangla—Golden Bengal," where the rivers and the rice fields and the rainwashed days heavy with the scent of jasmine replenished the soul.

West Pakistan was larger, but a greater

number of people lived in the eastern wing. Beginning in 1948 attempts were made to impose Urdu as the official language of all Pakistan, although fewer than 5 percent of the population of the divided nation spoke it.

Hope of Freedom Survives Prison

Among the Bengalis who were imprisoned for resisting this effort was Sheik Mujibur Rahman. He would spend 13 years in various prisons before the day in January 1972 when he was released from custody in the West and returned to Dacca. There, before a crowd of nearly a million people, he said:

"My lifelong desire is fulfilled . . . My Golden Bengal is today an independent and sovereign state. . . . Every second I awaited death in the prison cells . . . I was ready to die. But I had not an iota of doubt that the people of Bangladesh would be free."

The quest for this freedom intensified as the rule of West Pakistan grew more painful through the years. The capital was in the West, so were the supreme court and the headquarters of all the military services.

More than that, there was a disregard for the East's overpowering problems with





Dacca rides the rice plains like an island, lifting its buildings above the reach of monsoon floods. As Bangladesh grows by half a million people every three months, houses spread to acreage needed for agriculture.

Casualty of war, a ship lies in the shallows of Chittagong harbor. Mukti Bahini frogmen planted mines to disable the vessel, which was bringing supplies to Pakistani troops. Now, as part of massive relief operations, the Soviet Union clears the harbor and the American-owned tanker *Manhattan*, veteran of the epic voyage across the Northwest Passage, serves as a temporary grain-storage silo.

geography and nature. For example: On a Thursday night in November 1970, Bangladesh was the scene of the greatest natural disaster of modern times—a cyclone and tidal wave that claimed perhaps 600,000 lives. Seldom has the might of nature crashed down so heavily on a land and its people.

The lines of cause and effect in the movement for Bangladesh independence are sometimes hard to trace. But it was almost surely this disaster, and the seeming indifference on the part of the central government, that spurred the Bengalis into rebellious action.

Massive Trust Puts a Burden on Mujib

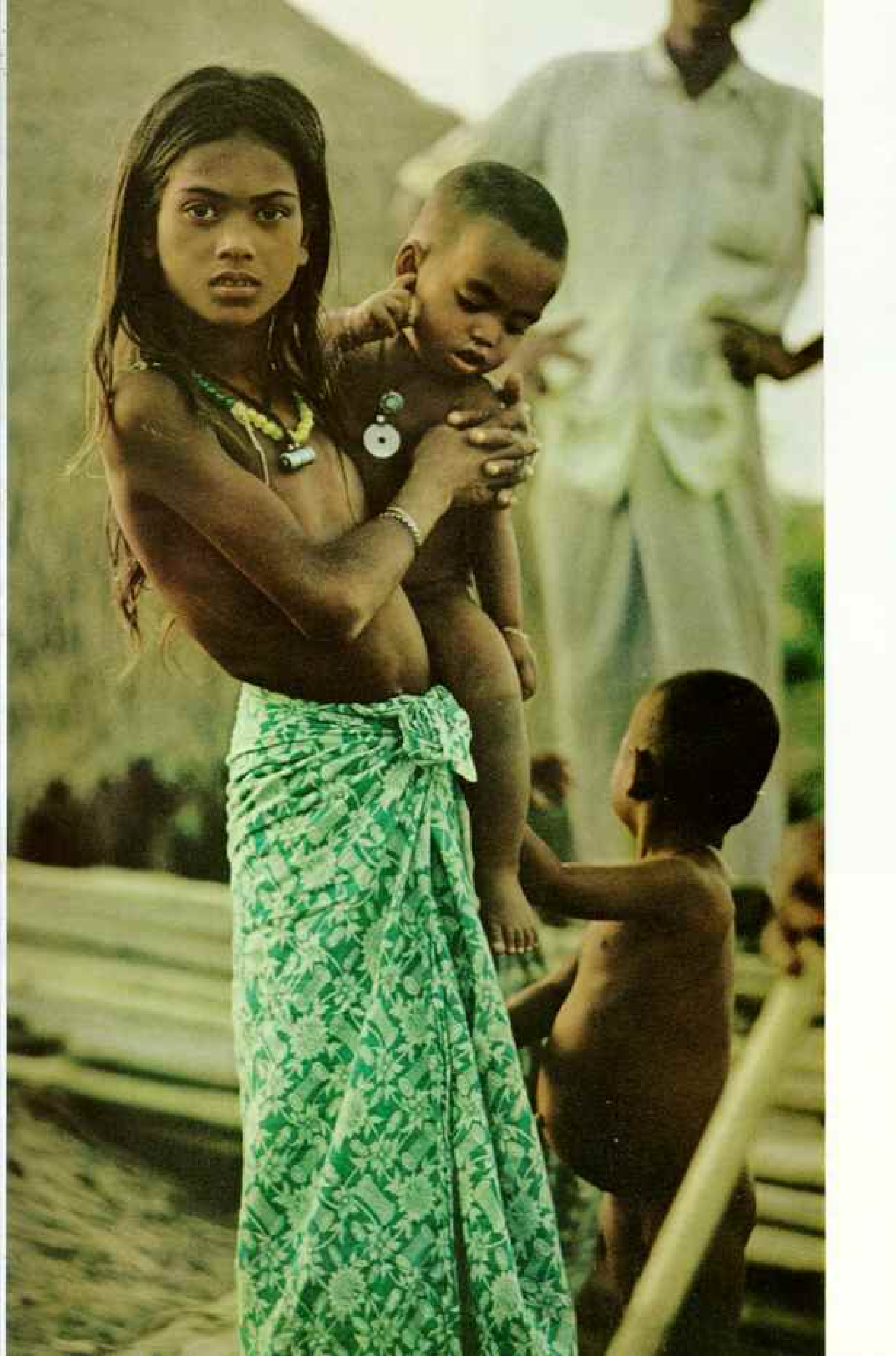
Sheik Mujib's voice was edged with anger as he recalled all of this for me in his office. "Everybody earned money by using us—the British, the West Pakistanis, everybody," he said. "They treated us as a colony and used us as a market. They exploited us, the British for 200 years and the West Pakistanis for 24, but they could not suppress us. We suffered—everyone in my country suffered—but we're now free, and I tell you that Bangladesh has a future. We will recover."

The Prime Minister drained the tea from his cup and slipped off his sandals. It was late evening, and he admitted that he was very tired, that his exhausting work schedule was "worse than being in prison." Then he asked me if I had attended the rally at Mymensingh and witnessed the massive expression of trust and hope placed in him. When I told him I had, he replied, "Then you must know how important it is for me to continue."

Martial law was imposed in all Pakistan in 1958, following a successful military coup. Only limited elections were held for 12 years. And when Pakistanis, East and West, went to the polls in 1970, they handed a clear-cut victory—167 out of 313 seats in the National Assembly—to Awami League candidates. The head of the Awami League is, of course, Sheik Mujibur Rahman.

The military government postponed convening the National Assembly. There were riots in East Pakistan. Mujib urged the people to "make every home a fortress." Eighteen days later, on March 25, 1971, the West Pakistani Army went into action, and for the next nine months, Bangladesh was ablaze.

"We took the first shell from a Pak Army tank," said Abidur Rahman, editor of *The People*, one of the three daily English-language newspapers published in Dacca. "That



was on that first night, on March 25. I had refused to obey an order to stop publishing news unfavorable to the army." He has made no effort to rebuild the partially destroyed newspaper plant. Rather, the heaps of rubble remain as they were on the morning after, when even the crowing of cocks seemed pitched to the shrill sound of fear.

From villages throughout the countryside, people set out for the closest border with India. In all, ten million Bengalis crossed over. Another ten million were displaced within Bangladesh.

There was another movement: Tens of thousands of young men went to secret training centers, and there they shed their gentle Bengali nature. They learned to handle firearms and explosives. They became expert at what some called "nights of the long knife"—dispatching an enemy with a flash of steel.

Indian Arms Aided Freedom Fighters

These were Mukti Bahini, Bengali freedom fighters whose jackhammer resistance chipped away at the Pakistani military effort until December, when India joined the battle as an ally of Bangladesh. After that it took only 13 days to rout the Pakistanis.

"Without the help of the Indian Army, it might have taken us another two or three years to do the job, but it would have been done." Mohammed Habibul Alam, a 21-year-old student at Dacca University, fussed with the moustache that hung from his lip like a black horseshoe. We were talking in a room on the fourth floor of Dacca's Inter-Continental Hotel—the same hotel in which Alam had set off 28 pounds of plastic explosives while fighting as a Mukti Bahini.

"Many Pak officers used to come here to drink and gather intelligence from informers," he said, rising and inviting me to accompany him as he reenacted the mission.

We left the hotel, entered again from the front and walked through the lobby. "People carry bags when they come into a hotel, so that's the way the explosives were brought in—in a bag," Alam said, returning a greeting from one of the desk clerks. Then I followed him into the men's toilet on the main floor, where he showed me how he had placed the package in a locker.

"It blew out all this," he said with a sweep of his arm as we walked through a hallway leading to the coffee shop. A porter rushed over to shake his hand. "The package was set

Her brothers' keeper, a village girl near Chiringa cares for smaller children while mother cooks and sews. Her necklace holds an amulet to ward off illness; it contains a verse from the Koran. In later years, brothers look after their sisters should they be widowed or divorced.

ILLUSTRATION (FACING PAGE)

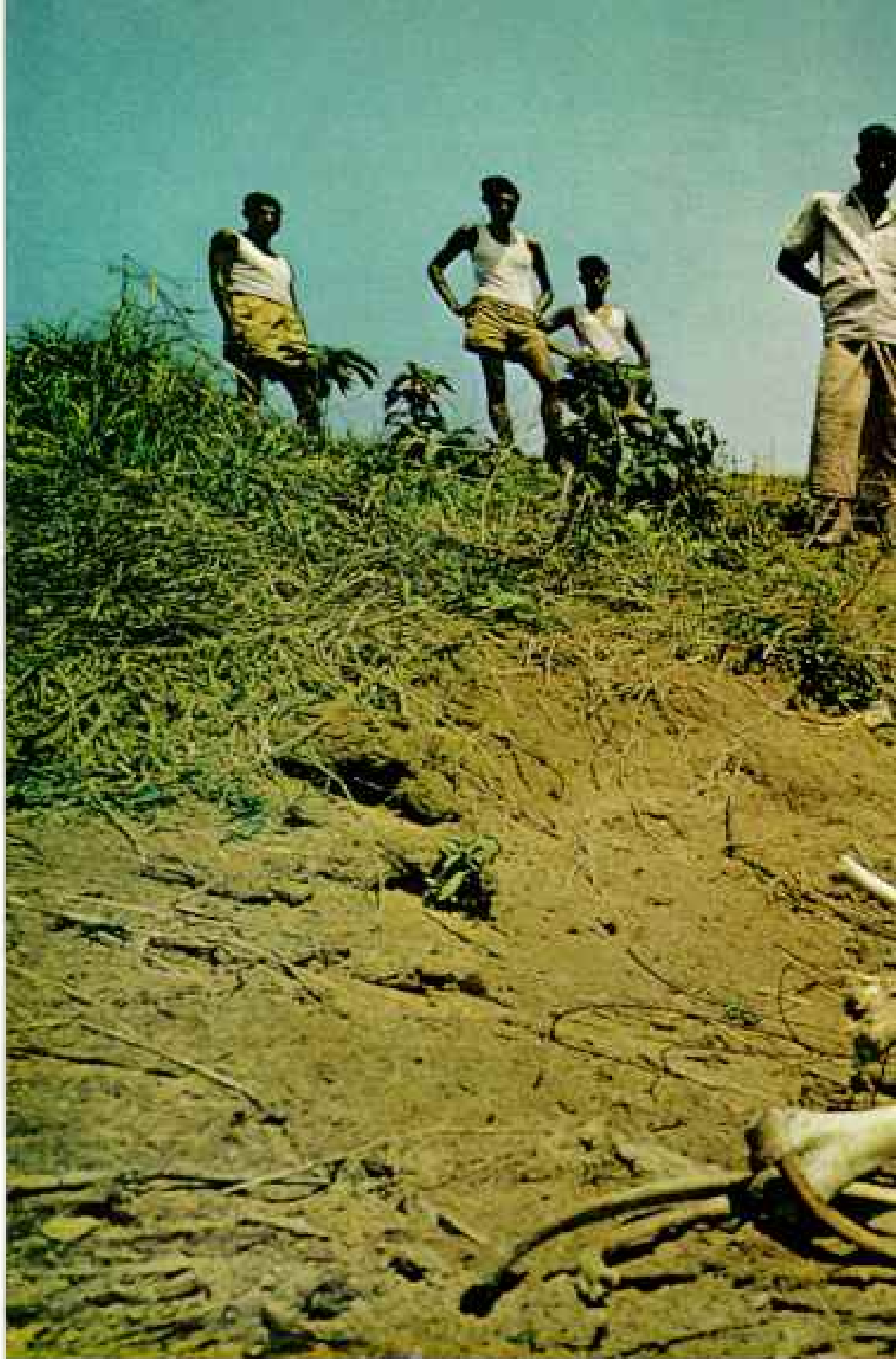


Patties of cow dung mixed with straw dry in the sun. They will fuel smoky, slow-burning fires under pots of rice, vegetables, and fish, the staples of Bangladesh. With a bamboo trap, this boy sets off to fish a channel near Boliarpur.

War's grisly reminders are purposely left on view. Here at Comilla Barracks, Pakistani troops and local collaborators—both Bengalis and Biharis—killed perhaps 100,000 civilians, burying the bodies in mass graves that still show as sunken areas in the brown soil.

On this hill members of the new Bangladesh Army pause during exercises, reflecting on lost friends and relatives. Some had served in the Pakistani Army, but when it attacked fellow countrymen, they switched to the Mukti Bahini.

As terror spread, ten million refugees—mostly Hindus—walked to India. The giant neighbor fed them for months. Then last December, India entered the war, which ended 13 days later in freedom for Bangladesh. Almost all the refugees have now returned.



to go off in 15 minutes, so I crossed the street and waited with my camera to get a picture of the explosion."

We had tea, and the waiter, recognizing Alam, said he would pay the check. "Why are they so friendly after you endangered their lives?" I asked. "Because," he replied, "they were all Mukti Bahini."

Rarely did I meet a young man who hadn't served Bangladesh as a freedom fighter. There was Abdul Ali, a shy boy of 16 who lost his left leg in the fighting. There was Ahmed Khan, a village schoolteacher who served as a Mukti Bahini commander with a thousand men under him.

"I encouraged my students to take direct action against the Pakistani Army," he told me. "After what they did to us—to our

parents, to our brothers, to our sisters, yes, especially our sisters—we had no choice but to raise our hands against them."

The sisters were raped. Many were confined in cantonments and subjected to repeated assaults over many months. Some were as young as 11 and 12. As with most government statistics having to do with the war, the number of alleged victims—200,000—may be exaggerated. Still, many thousands of Bengali women were abused.

By official proclamation, the raped women have been declared "war heroines," but that was little solace to the pregnant teen-ager who, disowned by her strict Moslem family, tried to strangle herself with her own hair.

"Very few of the girls wanted to keep their babies, so if they asked for an abortion, we



tried to help them get it," said Mrs. Sahera Ahmad, secretary of the Central Organization for Women's Rehabilitation. "There are also five or six international agencies working to place the children for adoption."

At one time Sheik Mujib issued a plea for young men to marry the women. There were more than 9,000 replies, but the scheme was judged a failure because of the almost equal number of demands for dowries. One applicant asked for a new car, another for enough money to pay for the publication of his poetry.

At times during my stay in Bangladesh, I felt the need to get away from the despair that frequently grips a visitor to the country. So it was to a range of low green hills, where tigers and leopards and wild elephants once

roamed in great numbers, that I escaped.

The Chittagong Hill Tracts lie in southeast Bangladesh, along borders shared with India and Burma (map, page 305). The 175-mile drive there from Dacca takes most of a day, because the road has but one lane, and much of that is taken up with pedestrians and livestock. It was at sunset, then, that I turned my back to the scarlet-splotted Bay of Bengal and moved eastward into the hills.

Teak trees rose high out of the thick tropical foliage that pressed in on both sides of the road. Banana and mango trees were heavy with fruit. In one clearing an old bull elephant followed the commands of its owner and pushed a load of logs toward a stream.

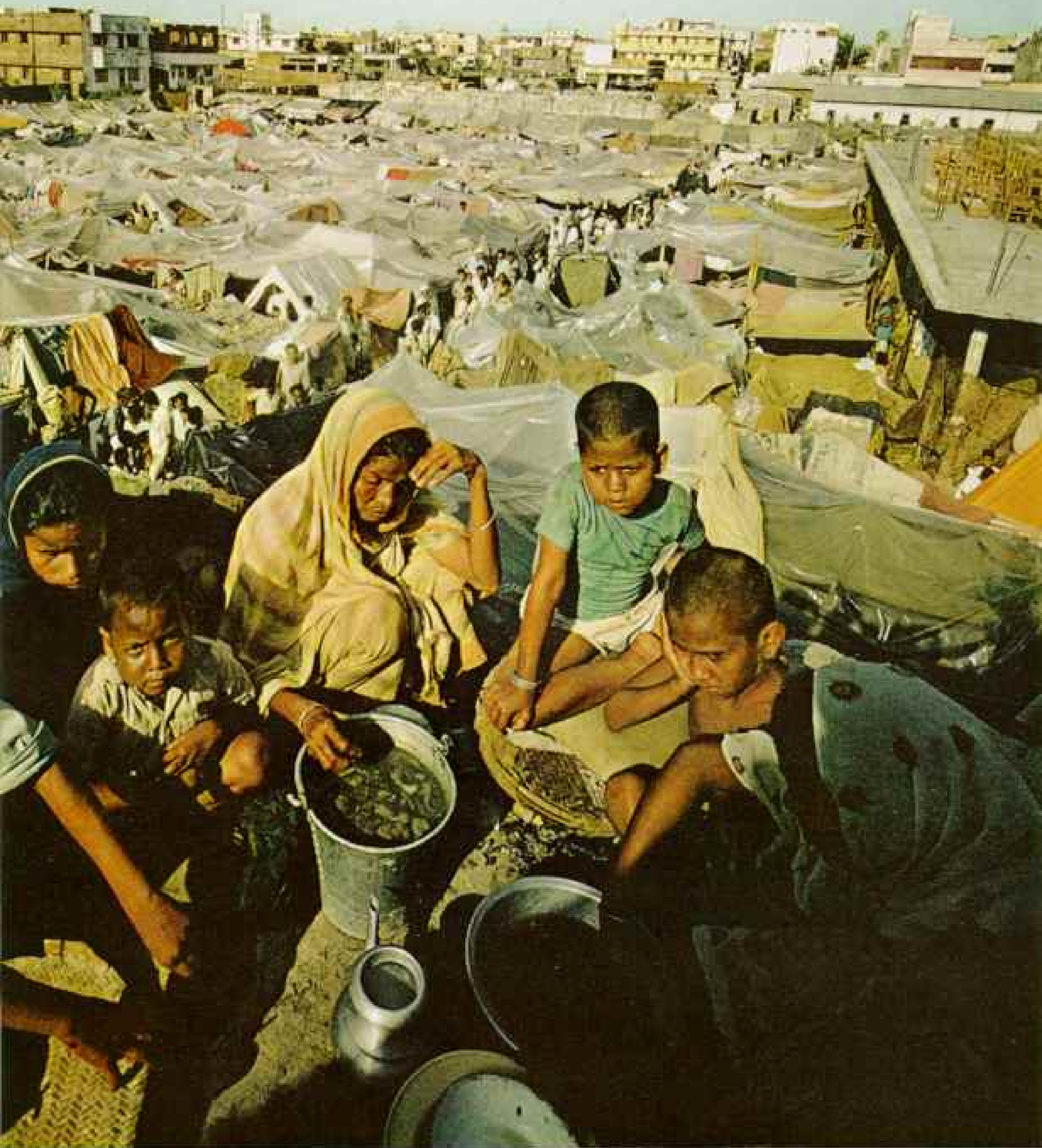
Kaptai Lake covers 250 square miles of the Hill Tracts. A reservoir formed by damming

Once-wealthy engineer lives in a Dacca refugee camp for Biharis, Urdu-speaking Moslems who cooperated with West Pakistan. Only slowly does their desperate situation begin to ease.



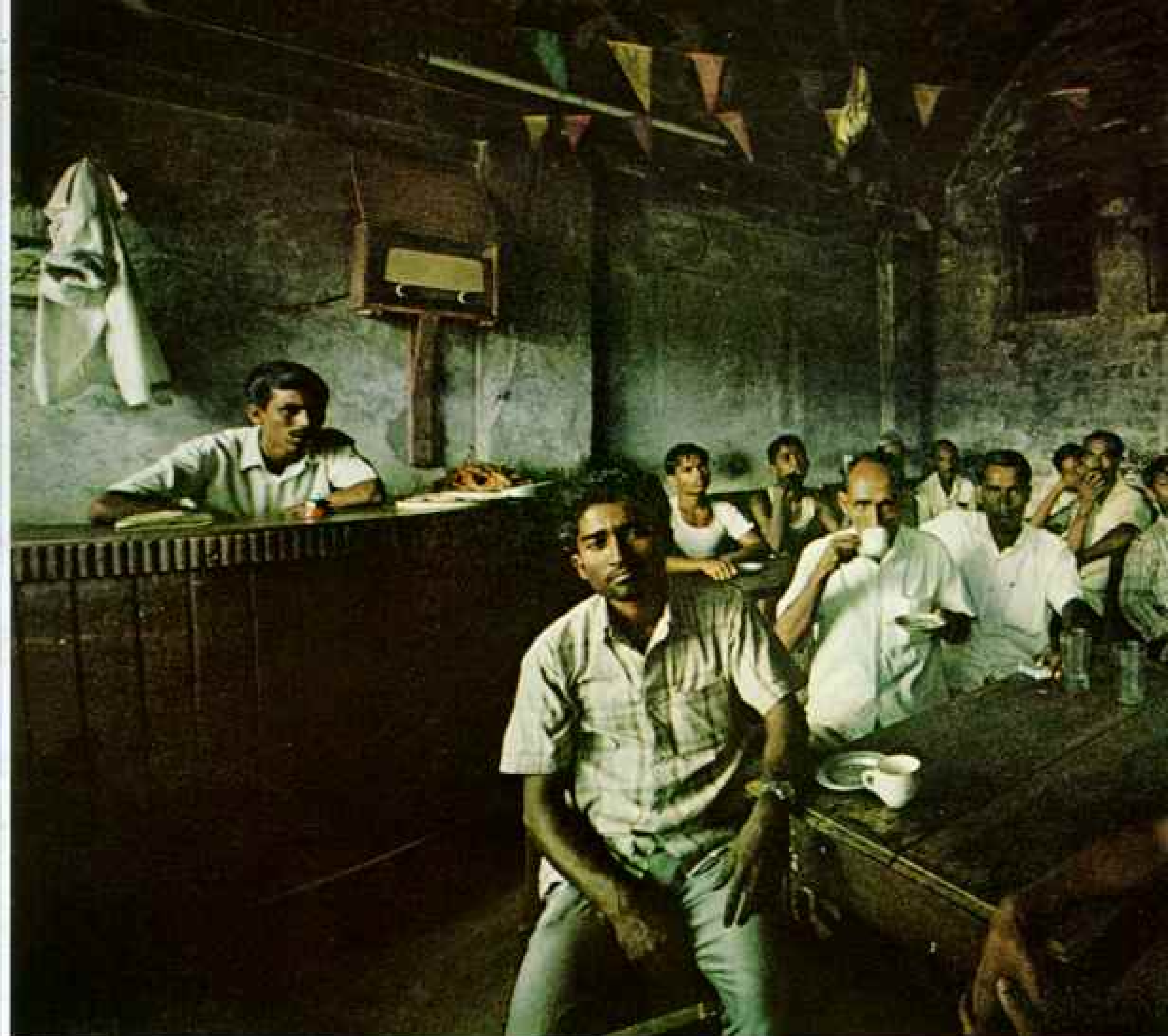
Cry of anguish rises above the tumult of the disease-ridden Bihari camp as a father weeps for three sons who died—perhaps from malnutrition—within moments of each other.

Life seems hopeless for 18,000 Biharis crowded in makeshift shelters in a two-acre schoolground in the Muhammadpur section of Dacca. They have little food, foul water, and



crude sanitation. No country wants them, and Bengalis have taken over their homes and jobs. The government has promised a return to normalcy for those Biharis who "accept

the sovereignty of Bangladesh." But deep-seated resentment persists and an uncertain fate awaits those whose hands are still deemed to be "stained with the blood of the Bengalis."



Idled by war, workers await the call to return to the Karnaphuli Rayon and Chemicals plant in Chandraghona. West Pakistanis, who owned most major factories, fled with cash reserves during the war. Prime Minister Rahman nationalized the industries, but they resume production only gradually, hampered by scarcity of capital and raw materials.

Roar of normalcy rises from 1,000 looms weaving burlap at the Adamjee Jute Mill, the world's largest. Grower of half the world's jute, Bangladesh relies on the industry as its major source of much-needed foreign exchange, though competition from synthetics threatens its future.





the Karnaphuli River, it is the principal source of hydroelectric power in the country. It is also a pleasant body of water on which to travel back in time, for some of the Hill Tracts tribes living along the shore maintain a lifestyle of primitive simplicity.

For example, the Murungs.

I arrived with a friend in a rented boat. Hearing the motor, two boys raced down a hillside. Each wore a breechcloth and the cautious half-smile of youthful curiosity.

They helped us dock the boat and then led us up the hill, along a path arched with tangled reaches of bamboo and other light and woody growths. It was easy to believe that this was once part of a great impenetrable jungle where the leopard lay in wait for the graceful sambar.

Murung Tobacco—a Smoke With Fire

We came to a clearing rimmed with huts of bamboo and thatch standing on stilts. A man who looked to be about 25 sat in the shade, smoking a pipe and spitting a lot. At his side was an elderly woman pounding whole-grain wheat with a thick pole. I shared the shade with the man and accepted a pipeful of the locally grown tobacco, a full-bodied (to say the least) leaf that burns with the fire of dragons.

The Murungs fish a little in the lake. They farm, too, using the ancient slash-and-burn method of agriculture, planting seeds in hillside soil enriched with the rain-soaked ash of burnt brush. Though they believe in spirits, they have no well-defined religion, maintaining that the scriptures they were meant to follow were written on banana leaves, and that the leaves were eaten by a cow.

Hriday Ramjeu Roaza, a handsome man of 45, identified himself as the tribal leader. He told me that during the troubles of last year, some of his people had fled from the Pakistanis and crossed the border into India. Roaza remained in the hills, he said, but in hiding. Now the others are back—those who survived—and life for the Murungs goes on much as it has for hundreds of years.

Of the handful of cities and more than 70,000 villages in Bangladesh, none enjoys a more serene setting than Chittagong. With the Hill Tracts at its back and the Bay of Bengal at its feet, this onetime fishing village in the ancient kingdom of Tippera has been described as "a sleeping beauty emerging from mists and water." By the 16th century,



Bringer of prosperity and ruin, the fickle Burhi Ganga River near Dacca skirts homes and fields, here plowed by bullock teams in the golden month of April. During monsoon rains, when as much as 100 inches may fall, the river bathes the fields, leaving a layer of silt. Homesteads rise above the deluge



on dirt mounds. For weeks much of Bangladesh becomes a lake, and lush crops of rice, vegetables, and jute spring to life. Sometimes nature turns savage, baring teeth of flood and famine. Bengalis were still reeling from the 1970 cyclone that killed nearly 600,000 when civil war engulfed them in new horror.



Portuguese sailors who came to trade were calling it Porto Grande.

Today Chittagong, with a population of about half a million, is the country's second largest city and busiest port. It is here that Bangladesh maintains its lifeline of relief from the outside world.

"We expect 300,000 tons of food grains to arrive here next month alone," Charles Kiser told me this spring. "Just recently we unloaded 18,000 tons of bagged cargo in nine days. I think that sets some kind of record."

Help Comes in Many Forms

Kiser is a United Nations port officer at Chittagong. When I talked with him, he and his staff were working seven days a week to handle the massive inflow of food and materials. "I've served in troubled areas before—the Dominican Republic, South Viet Nam—but I've never come up against a situation like this," he said.

Materials of all kinds were flowing in, including a shipment of 2,807 cartons of nylon yarn needed for fishermen's nets. But often the gifts were inappropriate—ski clothing

and electric blankets—or damaged. Some of the donated milk powder was unfit for human consumption.

Still, it was from this potpourri of offerings, electric blankets and all, that Bangladesh took its firmest grip on survival.

The Chittagong operation was handicapped by the condition of the harbor. Supplies had to be lightered, sometimes from several miles out, when masters dared not commit their vessels to a course littered with the hulks of ships sunk during the fighting. In all, nearly thirty ships had been sent to the bottom at Chittagong and Chalna.

The Bengali government had requested the United Nations to conduct salvage operations, but the U.N. did not have the six million dollars it would cost. Instead, in view of the urgency of the situation, the government accepted a Russian offer to clear the port. Now the Soviet naval presence casts its shadow on the Bay of Bengal.

The Russians are visible throughout Bangladesh. Their embassy in Dacca is heavily staffed, and it is not unusual to come across members of a Soviet cultural mission.



in a village, speaking to the people in fluent Bengali. Russian-made films dominate Dacca television, and newspapers run dispatches from Tass, the Soviet news agency.

Yet the average Bengali holds a deep and genuine affection for Americans. Frequently I was told, "Although your government did not take our side in the war, I know the American people were with us." Then, too, it is no secret that the United States has contributed cash and goods with a value of \$250,000,000, compared to the Soviet Union's \$94,000,000. India has given most of all, more than \$280,000,000.

Mujib has vowed that his government will follow a policy of nonalignment in international affairs, and that the new constitution, now being drafted, will reflect four basic principles: democracy, secularism, nationalism, and socialism. The parliamentary form of government will likely be patterned on that of India. Bangladesh has already been accepted into the Commonwealth.

By stressing secularism, as he often does, the Prime Minister means to assure the 18 percent of the population who are Hindus



PHOTO BY CLAUDE-DIETER BRAUER

"We wish to live in peace in our mountains, according to our customs." So say the Murungs of the sparsely populated Chittagong Hill Tracts. Twirling a spindle, a Murung girl winds newly spun cotton yarn.

At a rice hut, a tribesman steadies himself on a pole while flipping stalks with his feet to thresh the grain. Like many Southeast Asians, the hill people slash and burn the hillsides to prepare fields for rice, cotton, and vegetables. Pigs and hens, kept for sacrificial feasts, root and scratch under the high bamboo houses. A veneer of Buddhism lies lightly over the Murungs' belief in the spirit world. The mountain people fear the land-poor Bengalis, who have already built dams and settlements and cut down forests in the hills.



Handmade gravel: In a land with no stone and little natural fuel, Bengalis must import oil to bake bricks, which are then broken for use in road building. Laborers near Mirzapur, earning 40 cents a day, work beside a war-damaged bridge.

Peacetime army, commanded by an umbrella-shaded foreman, reroutes the dry bed of the Matamuhari River. Scraping away the near bank, they carry dirt to build up the opposite shore. By rechanneling some of their rivers, Bengalis reclaim acreage for rice and attempt to control flooding.





that they can share in the workings of the government (one cabinet post is now held by a Hindu). Of the three remaining principles, socialism raises the biggest question as to the future stability of the country.

Although Mujib plans continued large-scale nationalization of industry, his Awami League is basically middle class. Radical left-wing elements in the country, including many students, hold suspicions concerning the league's devotion to socialism.

"The Awami League simply is not geared to the ideals of socialism," said Enayetullah Khan, editor and owner of the highly critical *Holiday*, an English-language weekly newspaper. "They have nationalized some industries, yes, but they have no long-range plans of how to run them."

All Watch the Government's Performance

Khan's paper hits hard at the government, but as we talked at the Dacca Press Club, he conceded that Mujib is probably the only man who can hold the country together at this crucial time. However, if the government fails to carry through with its promises for social reform, he said, Bangladesh will be in for a long spell of political turmoil.

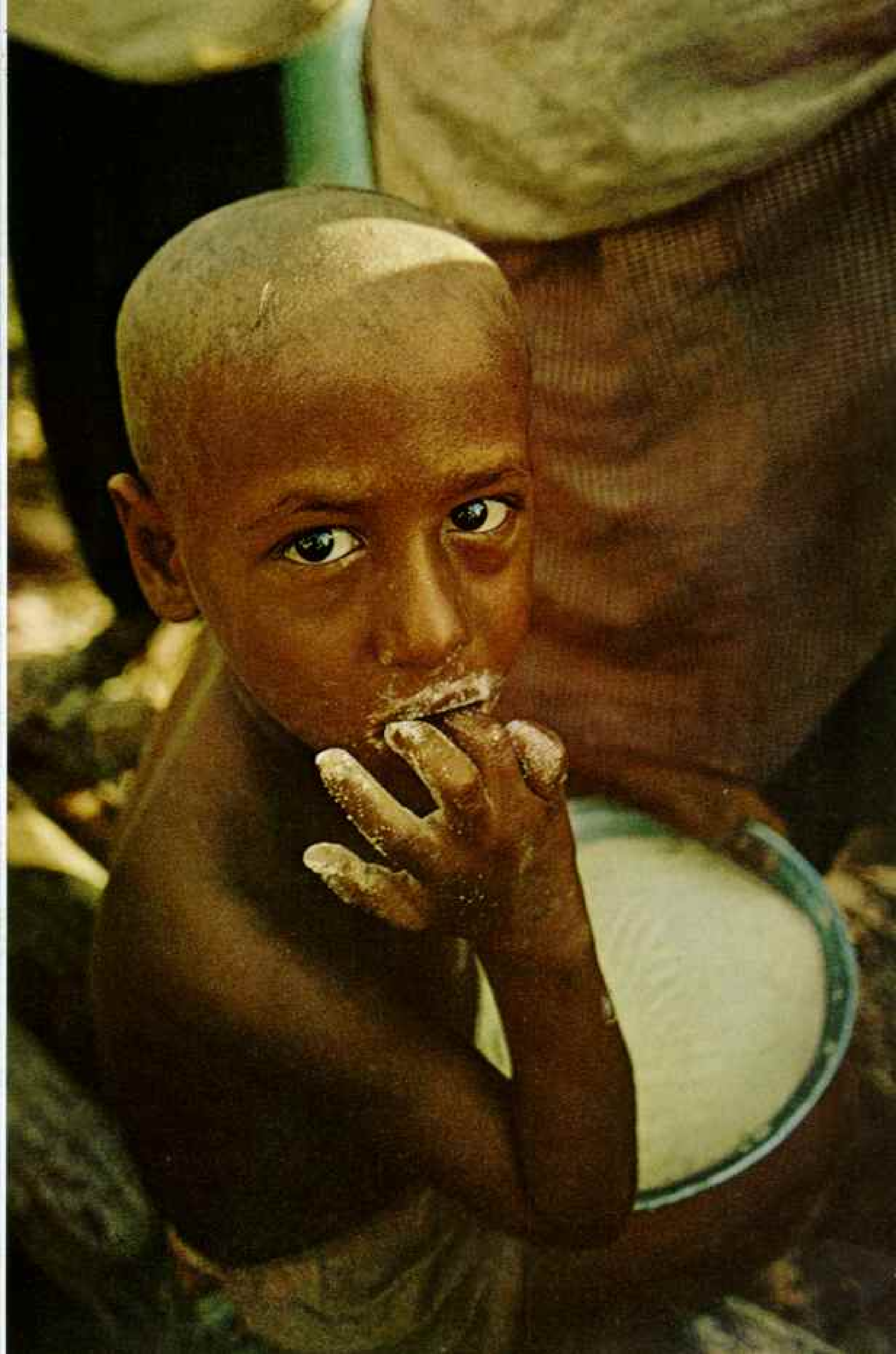
"The landless peasant is now aware of his rights," he told me, "and because he found his bravery in the war, he no longer will back down in the face of guns. Besides, he probably has a gun now himself."

Thousands of guns were given to Bengali freedom fighters during the struggle for independence. When the fighting ended, Mujib appealed for surrender of the weapons, but many remain out. Crime has become a significant problem, not so much in Dacca, but rather in the countryside.

"Until we can establish law and order, nothing can work here," said Mahbubullah, a 26-year-old former law student at Dacca University. "Our struggle has not ended."

Mahbubullah (the only name he uses) spoke at a student rally in February 1970 calling for an independent Bangladesh. "One month later I was arrested at the airport," he said. "I was tried in a military court and awarded one year in prison and 15 lashes."

He, too, said that no one is better suited to lead the country now than Sheik Mujib. Although no longer a student, Mahbubullah spends much of his time at Dacca University talking politics with his friends. There are few subjects more popular among the more



than 10,000 students enrolled there, of whom 3,000 are women.

In addition to medicine and law, the university offers a wide range of other studies, including a new School of Business Administration. A few people are skeptical:

"Some hard decisions are going to have to be made concerning education and employment here," I was told by an American who serves as an advisor to the government. "If you slip on a banana peel on a street in Dacca, two of the three people who help you to your feet may be unemployed economists. It's obvious that what the country needs is more street cleaners and fewer business-administration graduates."

Perhaps. Yet at the end of the war, few Bengalis were prepared by training and experience to take over management and other positions of responsibility. These were the jobs formerly held by West Pakistanis, or, in many cases, Biharis.

Reviled Biharis Barely Survive

The Biharis are Moslems, and when Pakistan was established in 1947, they moved from India into the eastern wing to escape Hindu domination. Urdu-speaking and often contemptuous of the Bengali's way of life, many of them collaborated with the Pakistan Army. Now most of the estimated million Biharis remaining in Bangladesh were being subjected to a cruel revenge. They were facing death from malnutrition and disease.

I went to the Dacca suburb of Muhammadpur, where there were five camps holding more than 30,000 Bihari refugees. One of the camps was a former school, and it covered an area of about two acres; 18,000 men, women, and children lived there in a nightmarish sinkhole of suffering (pages 320-21).

A lucky few had tents; 300 were supplied by the International Red Cross. For the others, there was a piece of plastic or burlap thrown over a few sticks pushed into the ground, or perhaps a lean-to of corrugated iron.

"We are ready to go anywhere, because nothing can be worse than this," Dr. Anwar Raza, a young Bihari physician, told me.

But no one had offered to take the Biharis—not even the Pakistanis. Sheik Mujib had said that the Biharis were free to assimilate themselves into Bengali society, but Dr. Raza only scoffed at that.

"How can we be safe out there when we're not even safe in here," he said. "Just this

Saved by strangers, a youngster at Khulna (facing page) dips into a dish of enriched corn-soya-milk powder sent by UNICEF, the United Nations Children's Fund. The protein-rich blend is usually mixed with water or cooked into bread.



Hungry clamor of children and nursing mothers surrounds missionaries Olive and Howard Hawkes, who distribute the UNICEF ration. This mother makes a carrying pouch with a corner of her sari. In the most massive disaster-relief effort ever mounted—estimated at 700 million dollars thus far—30 nations and more than 50 private organizations seek to alleviate the effects of cyclone, tidal wave, and war that have plagued the Bengalis during two years of sorrow.

morning they broke into the camp, kidnaped a young woman and beat her severely before sending her back. The kidnappings go on all the time. Of course I'd like to go back to my hospital, but I'm afraid."

So he attended to the sick in the camp with his meager medical supplies. It was not enough; the death rate was staggering. Daily food distribution amounted to less than 500 calories a person. There was not a single working toilet in the camp, and the only available water came from two pumps, neither of which offered more than a trickle.

A small army of children followed me as I walked through the camp, and nothing underscored the depths of the tragedy so much as did their eyes: the sleepy, glazed, staring eyes of the starving.

Spry Old "Criminal" Enlivens a Village

This time my escape from despair took me to the village of Boliarpur, about a 20-minute drive from Dacca. The 600 or so houses there, clustered and raised for protection against monsoon flooding, are surrounded by fields planted to vegetables and rice.

Almost every man in Boliarpur is a farmer, and on the morning I visited there most were tending their crops. Not Abdul Khalaq, though.

He's "between 82 and 85" now, and one eye gives him trouble, but he's still spry and well enough to work at making life enjoyable. His double fistful of rice each day is devoured with élan. He is a raconteur with a storehouse of unlikely anecdotes filled with brilliant exaggeration.

He boasted of his past: "A life of crime—ah, who knows how many were my victims—but one admired even by the police. Once they came to arrest me, but decorated me instead. Yes, a medal."

Wherever we went in the village, his presence set off a wave of lightheartedness. The woman making disks of unleavened bread smiled when she saw him. So did the young girls gathered before the village mosque for their daily two-hour session of Koran study.

Later that day, while flying to Jessore on a United Nations plane, I tried to single out Boliarpur from among the countless villages

sitting like hobnails on the flat sheet of land. But, of course, I couldn't.

From Jessore I went by jeep to Khulna, a drive of 40 miles along a road that comes to an end in the swampy expanse of the Sundarbans. The Bhairab River runs through Khulna, and at one place along its banks sits a white house with a well-tended lawn. There is also a large compound with a chapel and a school building.

For most of the past 20 years this has been the home of Howard and Olive Hawkes, missionaries of the Assemblies of God Church. Both speak Bengali—and speak it with some authority when boys climb the compound wall to see if the fruit on the mango trees is ripe for snitching.

At other times, thousands of children invade the grounds, and they are made welcome. Twice a week the Hawkeses pass out rations of instant corn-soya-milk powder, a sweetened, flavored, and vitamin-fortified mixture supplied by the United Nations Children's Fund. Nursing mothers, pregnant women, and children six months to 12 years of age receive the ration.

"They'll be here in the morning," Mrs. Hawkes told me. She and her husband had invited me to stay in their house for the one night that I would be in Khulna. "You'll hear them starting to gather out there before our rooster crows."

Rations Gone Before Sun Has Risen

At four o'clock the following morning there were nearly a thousand children pressing against the compound gate. Thirty minutes later the number had doubled. They came bearing pans and cans, paper cups and glasses—anything big enough to hold the ration (preceding pages).

They moved quickly past the distribution stations, and when the last one stepped up—a girl of four who accepted her ration in the bunched-up rag that was her skirt—it was still early.

But the rising sun seldom tarrys on the horizon in Bangladesh. The red-and-purple curtain of the first light was quickly burned off, and then it was there, full and fat and filling the sky with its white glare. □

His heritage and his future, the rich soil of Bangladesh responds to the care of a farmer near Boliarpur. Undeterred by staggering problems, Bengalis exude an incredible optimism fired by their newborn freedom.



Yesterday Lingers Along The Connecticut

By CHARLES McCARRY

Photographs by DAVID L. ARNOLD

NATIONAL GEOGRAPHIC STAFF

DEEP IN TIME, dinosaurs browsed where the river now flows, leaving tracks preserved in rock like hands on the clock of life. Hands that sweep forward through eons to Indian, explorer, and our own history. Scholars and witches, tycoons and evangelists, gunmakers and gentle poets have abounded in its valley—and, except for the witches, abound there still.

I speak of the Connecticut, "the long tidal river" that flows 410 miles from the Canadian border to Long Island Sound, forming the boundary between New Hampshire and Vermont, then winding across Massachusetts and Connecticut (map, page 338). In canoe and car and on foot, in every season, I have followed this river. I have traced it from above the lonely Connecticut Lakes of New Hampshire, where it trickles into the swampy Fourth Lake in a rivulet no larger than a child's wrist, to its majestic estuary, where salty Atlantic tides pulse out of

the Sound against the flow of the stream.

The North American Continent offers no lovelier journey—and none that more vividly expresses the grim conflict between God's work and man's.

The Way the World Should Be

In its northernmost reaches, the Connecticut flows through forest and meadows, filling lake after upland lake with sweet water. Shielded by steep wooded banks from mill and highway and hamburger stand, the modern voyager retains the illusion that he has stepped back into the wilderness. Like my 8-year-old son John, he can trail a hand over the side of a canoe, look upward at a cloud of migrating birds, and cry, "I wish the whole world was just like this."

On an evening in September, sitting on the shores of the Third Connecticut Lake with John and his brother Caleb, age 10, I could look back on a happy day.



A little after noon, as we trudged through woods that trembled on the verge of autumn, we had come upon a tall man dressed in the loose bib overalls and toil-stained fedora of the Yankee farmer. To a question from one of the boys he replied, "I'm trying to figure where the deer will be when the season opens." He poked a blunt finger into a cloven footprint, showing his spellbound young listeners how to tell it was a buck's track by the trailing mark made by the tip of the hoof.

"Venison's still the best eating there is," he'd said with a grin. "You come back when it's legal and I'll give you some—bet you'll think it tastes better than the beef your mamma cooks. Why? Because it tastes natural . . . not much of anything does anymore."

Earlier, the children had seen their first eagle, coasting downward in its hunt, and Caleb glimpsed a beaver that was too quick for my middle-aged eyes. Now, on the wind that blew down from Canada, we could smell

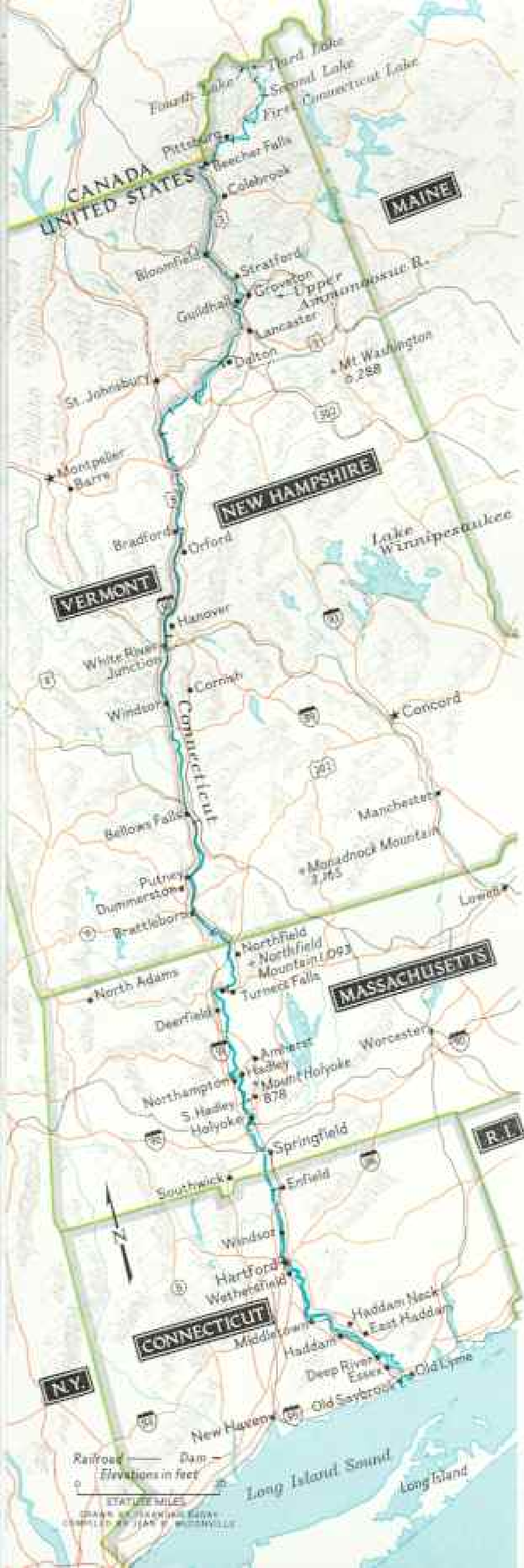
Stairstepping headwaters of the Connecticut River cascade out of a moss-covered bog in northern New Hampshire. From its birthplace less than a mile from Canada, the stream falls 2,650 feet as it winds some 400 miles southward to Long Island Sound.

With ample waterpower and inventive people, the valley spawned prosperous manufacturing cities. But industry brought growing pains, and the wastes of progress transformed a corridor of natural beauty into one of our first polluted rivers. Today, thanks to man's growing concern and the river's ability to purge itself, the Connecticut has begun its journey toward rejuvenation.



PEDALING THROUGH YESTERDAY, members of an antique bicycle club high-wheel into Hadley, Massachusetts, in 19th-century style. Magnet of their weekend visit: a local collection of old and unusual cycles.





the North—that hint of snow and tundra and wild flowers that stirs the blood of blond, blue-eyed types like us.

The pristine quality of the river's northern reaches does not last long. In its middle stretches, great mills suck up the water and give it back dyed green or copper—the color of money. Famous colleges shelter the restless young—Dartmouth in New Hampshire; Smith, Mount Holyoke, Amherst, and the University of Massachusetts (rising from the river plain like some Yankee Brasilia) in Massachusetts; Trinity and Wesleyan in Connecticut.

The lower reaches of the river are nearly as wild as the upper. Here its marshlands and salt flats hold the soup of life, where unnumbered species spawn and feed.* Here, even at the height of day, when the 20th-century American elsewhere hears the clangor of his changing country, there is no louder sound than birdsong or the wind. These were the harmonies heard by the first humans to know the Connecticut, and the Indians matched the poetry of nature when they called the river “the smile of God.”

Ladder of Dams, Dumpings of Man

Along much of the river today the racket of human industry threatens to drown the music of nature. Only miles from its source, the Connecticut is captured by the first of 17 dams; the dynamos within many of these structures make the electricity that helps to light New England. Soon afterward the farms, factories, and towns begin. Countless pipes and ditches discharge human ordure and the acrid wastes of industry into the water.

Sidney DuPont, a master at Becket Academy in Connecticut, who has led expeditions of his boys from the river's source to its mouth, put it well when he told me, “You drink the water from cupped hands—and then, a few miles downstream, curse the fool in your canoe who splashes you with his paddle.”

DuPont has his own rule of thumb for travel on the river: Where there are trout, you can drink; where there are smallmouth bass, you can swim; where there are carp, you can canoe. Where there are no fish, portage.

All the fish DuPont mentions live happily in the Connecticut, along with some forty other species. But the sturgeon has been

*The June 1972 *GEOGRAPHIC* featured a 38-page study of the Nation's endangered salt marshes.

gone since the late 18th century, and the salmon (so plentiful in colonial times that laws prohibited its being fed too often to indentured servants) no longer runs up the river. Its path to cold-water spawning grounds was blocked by dams as early as the 1790's, and with its homing instinct frustrated, the old salmon population soon died out.

Against the day when dams along the lower half of the river will provide swimways for migrating fish, many thousands of young salmon are introduced into its waters each year by the fish and game departments of its various states. Atlantic salmon go to sea and return to breed only at three to five years of age. If their brief experience in the Connecticut proves enough to trigger the mysterious memory process that causes them to return to their home stream to spawn, these noble fish may come back. Provided, of course, that they escape the commercial trawlers at sea.

Power Plant Changes Fish Habits

Besides the dams, man-made changes in water temperature are affecting riverine life. Heated water from the steam generators of the Connecticut Yankee nuclear-power station at Haddam Neck has been discharged into the river for five years, raising surface temperatures by ten degrees or more. The Essex Marine Laboratory is now completing a 1.5-million-dollar research project to determine the effects of this water on fish.

Barton C. Marcy, Jr., a fisheries biologist at the marine lab, is cautiously optimistic about scientific findings to date. "There's been no major disaster for the fish," he told me, "but we've noted some subtle long-term effects."

Thousands of white catfish and brown bullheads no longer winter in the bottom mud, as they have always done, but instead "lie like cordwood" in the unnaturally warm water. The fish feed more than they normally do, but show signs of emaciation; the effect on their spawning habits is still not known.

The most famous of the Connecticut fish, the American shad, still frequents the river. In colonial times it was salted and shipped in hogsheads to Europe as one of the Connecticut's major products. Commercial shad fishermen continue to operate in the estuary, and sport fishermen often pull five- and six-pounders out of the river.

Like salmon, shad live in the Atlantic but spawn in fresh water. Each spring hundreds of thousands enter the Connecticut. They



Yankee spirit unfurls in Deep River, Connecticut. Each year in July the town's Ancient Fife and Drum Muster draws dozens of competing corps. Parading in Revolutionary War dress with flags and muskets, the units are judged on the authenticity of their outfits. Musical tributes to the past fill the air, including "The World Turned Upside Down"—played at Cornwallis's surrender in 1781—and "Yankee Doodle." Thus does tradition dictate a way of life in many historic towns bordering New England's longest waterway.

start spawning about 30 miles upstream, but many swim onward, ascending the Enfield Dam by means of its sluiceway, and being lifted over Holyoke Dam by an elevator.

The thermal barrier at Haddam Neck, extending almost across the river, is a potential hazard for young shad headed downstream in late summer; the fish cannot survive temperatures above 90° F., now often exceeded.

"But all of them," Bart Marcy told me, with a hint of pride in the creatures he is studying, "find a cool corridor under or around the effluent." The immature shad by the thousands also pass right through the power turbines at Holyoke Dam on their way to the sea.

River Gains Some New Allies

Despite the dams and the pollution, the river is so hospitable to life, and so strong in its power to cleanse itself, that scores of species—fish and invertebrates and microorganisms—flourish in its depths. No complete inventory of riverine life has ever been made, so recent is man's interest in the life systems of his planet. But according to Bart Marcy, the lower reaches of the river sometimes are so glutted with alewife, blueback herring, and young menhaden that "a strong man can't lift a seine out of the water."

The river, long regarded primarily as a source of waterpower and a handy place to dump the wastes of progress, has lately won some human allies. In the early 1950's a group of Connecticut Valley businessmen and conservationists formed the Connecticut River Watershed Council. Their idea was to clean up the river, preserve its forests and wetlands, restore its wildlife. With a good deal of help—the federal and state governments together pay 80 percent or more of the cost of local sewage-treatment improvements—these men have seen the beginning of a new attitude toward the Connecticut.

Christopher Percy, the council's executive director, told me, "Between 1955 and 1965, more than 75 sewage-treatment plants were built in the valley. Some towns and mills still dump raw wastes into the Connecticut, but, what with new laws and new public concern, industry has made significant strides. The river is 30 percent cleaner in Connecticut today than it was six years ago."

By 1974, if all projects for the control of pollution are successful, much of the river from the northern border of Massachusetts to

(Continued on page 346)



Old-time America lives on in Lancaster, New Hampshire, where Wednesday night means a community concert. In a bandstand on the green, musicians of all ages play to an audience that usually listens from parked cars. Horns blare approval at the end of each selection.

Small and rural, Lancaster basks in an air of pastoral peace that easily spawns soda-counter storytelling—here between a policeman and a local youth. "The farther upriver you get, the more you find traditions and ethics typical of generations ago," says photographer David Arnold.



Color tells a deadly story at Groveton, New Hampshire, where brown, fish-killing wastes from a pulp and paper mill stain the Upper Ammonoosuc River, a Connecticut tributary. After dumping pollutants into the river for more than seventy years, the company is now installing a \$5,000,000 treatment system to make the stream swimmable again.

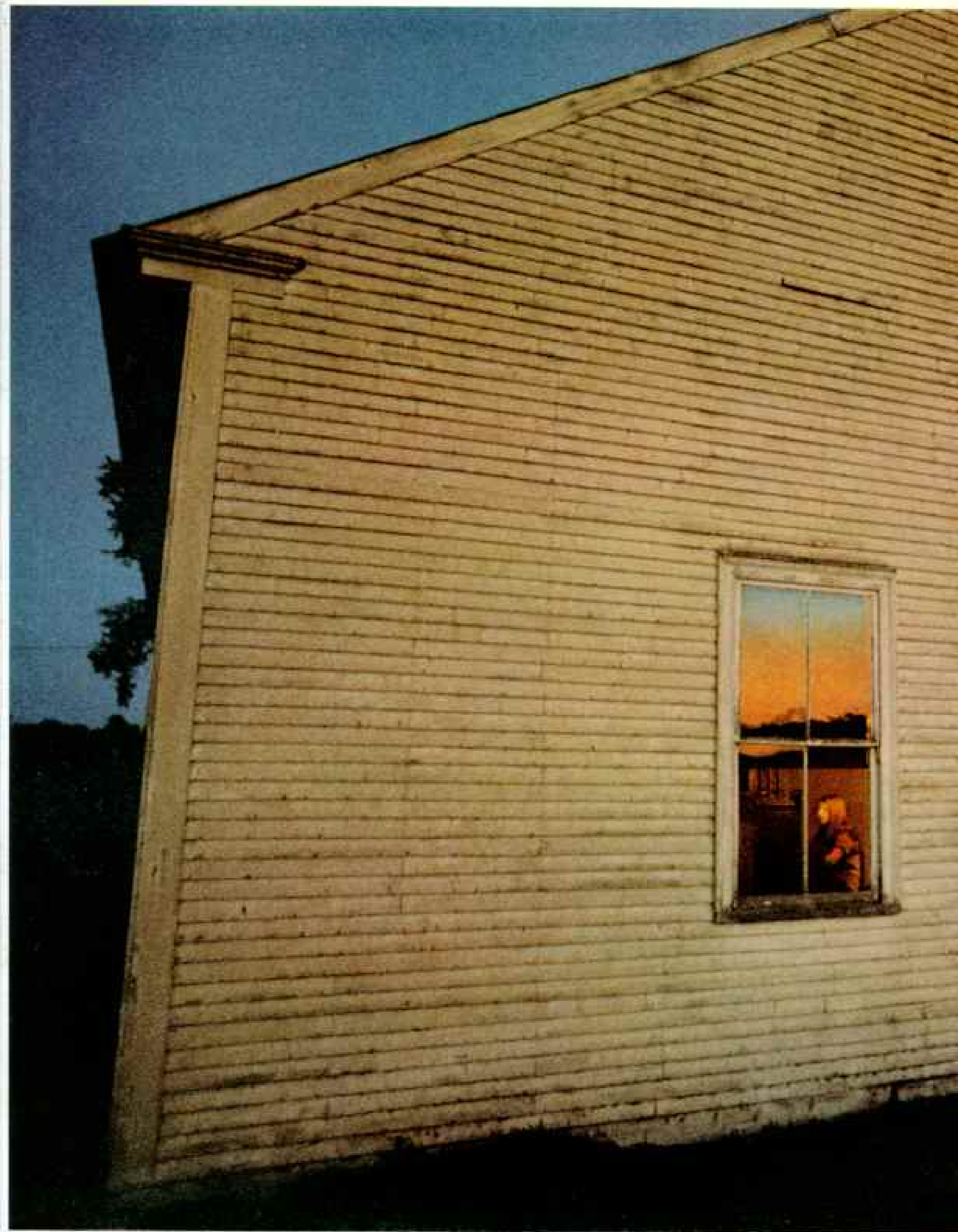


Spectrum of water samples taken last summer reflects the Connecticut's natural ability to cleanse itself. The cycle begins in the first jar at left, full of clear water from Second Connecticut Lake, then turns milky with a veneer company's discharge near Stratford, New Hampshire. Tea-colored water came from the Groveton mill outflow; the river is still discolored three miles downstream at Guildhall, Vermont (fourth sample). Raw sewage from many towns empties into the river throughout its length, badly clouding it at White River Junction (fifth jar). Red with fresh discharge from a paper mill at Bellows Falls, the fast-moving water regains clarity at Putney, where the final sample was taken.



Murky "spent liquor" oozes from a fistful of wood pulp at the Groveton mill. Washers flush the noxious waste fluid into the river, leaving cleaner pulp, shown at right, destined to become corrugated packaging. The mill's new equipment will end such pulp pollution by evaporating the liquor to a solid residue, which can be burned. Other effluents will be treated to meet state water-quality standards before they are piped into the river.





Window on the past frames Diane Brooks as she plays the pump organ in a 132-year-old church near Colebrook, New Hampshire. Vacated twenty years ago by a dwindling



congregation, the church is still maintained on the Brooks family farm. Kerosene lamps once used for regular Sunday services now glow during Diane's impromptu practice sessions.



"Imagine your wife in this!" hoots auctioneer Bill Abbott as he opens bidding on a tin bathtub at a Dalton, New Hampshire, sale. Typically, one visitor reaped an afternoon of fun and then went home with two mops—all for a quarter. Downriver in Bradford, Vermont, edge-of-the-seat tension draws a fairgoer (lower) to the horse-pulling event, where competing teams struggle to drag as much as 10,000 pounds.



the Sound will be clean enough for swimming—not only for people, but for all kinds of fish. In Vermont and New Hampshire, the target date is 1976.

In a sense, the pollution of the Connecticut has saved it from an even worse fate than the one it has suffered. Because the river is noisome in places (and because much of it has until recently been all but inaccessible by highway), its banks have kept much of their natural beauty. Little of the honky-tonk has marred their appearance.

Nature itself guaranteed the scenic future of the river. A great sandbar lying across its mouth prevented deep-draft ships from entering, and any large port city from growing up. On the peaceful banks of its lower reaches saltwater villages—Essex, Haddam, Old Lyme, Old Saybrook—recall in their graceful streets and boatyards the seafaring past of the region. Around them lie salt marshes and other wetlands, hatcheries of fish and refuges of birds and aquatic animals.

Connecticut's Senator Abraham Ribicoff,

former Secretary of Health, Education, and Welfare, has introduced legislation to preserve the valley. His bill to create the first part of a projected three-unit Connecticut Historic Riverway has twice passed the Senate, but has not been acted on in the House of Representatives. This initial legislation would halt further development of 23,500 acres of land on both banks of the river between Old Saybrook and East Haddam, Connecticut. The other units would be in the Mount Holyoke region of Massachusetts and in northern Vermont and New Hampshire, not far from the river's source.

"I want to clean up this great river and preserve its valley for the enjoyment of future generations," Senator Ribicoff told me. "I love the Connecticut, not only for what it is, but for what we learn about America from it. We must save what is beautiful while there is still time."

Pioneers Both Frugal and Hardy

Christopher Percy estimates that the clean-up of the Connecticut will cost as much as 300 million dollars more. Many think the result will be worth every penny.

This freehanded mood in the valley might puzzle the ghosts of the first settlers, who put down roots along the river almost 350 years ago. For one thing, those pioneer Puritans were a parsimonious lot; in Northampton, Massachusetts, they still like to tell of the 18th-century farmer who stopped his clock when he went into the fields, "so it would last longer." For another, the story of the early settlements is one of almost unrelieved struggle to subdue nature.

"Nature's pretty noticeable around here," said a Massachusetts farmer I chatted with one day. "It's Africa in the summer and the North Pole in the winter—and you've always got one eye on the river in springtime for fear it might wash you down to Long Island. But as long as things grow, we'll be here."

From the beginning, the settlers attacked nature with ingenuity and pious certitude. "God sifted a whole nation that He might send choice grain into the wilderness," thundered an early preacher in Hadley, Massachusetts. Considerable sifting had been accomplished long before the human race made its appearance.

Volcano and ice, rushing water, and the brilliant sun changed the landscape and the climate many times over the eons. The valley

has been a field of ice, a chain of lakes, and even earlier a hospitable swamp where dinosaurs grazed on water plants, leaving their huge three-toed tracks in wet muck that has since hardened into the stony shoulders of the river near Holyoke, Massachusetts.

Finally it became what it was when Europeans first saw it in the 1600's, and what it remains—one of the most productive farm valleys east of Iowa, and one of the likeliest places in the world to build a mill. From its source to its mouth, the Connecticut drops 2,650 feet, providing abundant waterpower.

The early settlers made their way from the coast through a dense forest that one young emigrant, fearful of Indians and wild beasts, called "a boundless contiguity of shade." They were dazzled by the broad meadows that lay along the river, waiting for the plow. The early comers dotted the land with houses and barns; their descendants have spread acres of suburbs around factory towns that make prodigal use of the river's waters.

Still, the land is kind. Its fertility is renewed now and again by the river's flooding. But a farmer has no guarantee that the land he tills will be planted by his grandson; where the river turns sharply in its great meanders, it transfers soil steadily from one bank to another, so that a cornfield that was in Hadley a hundred years ago may well be across the river in Northampton today.

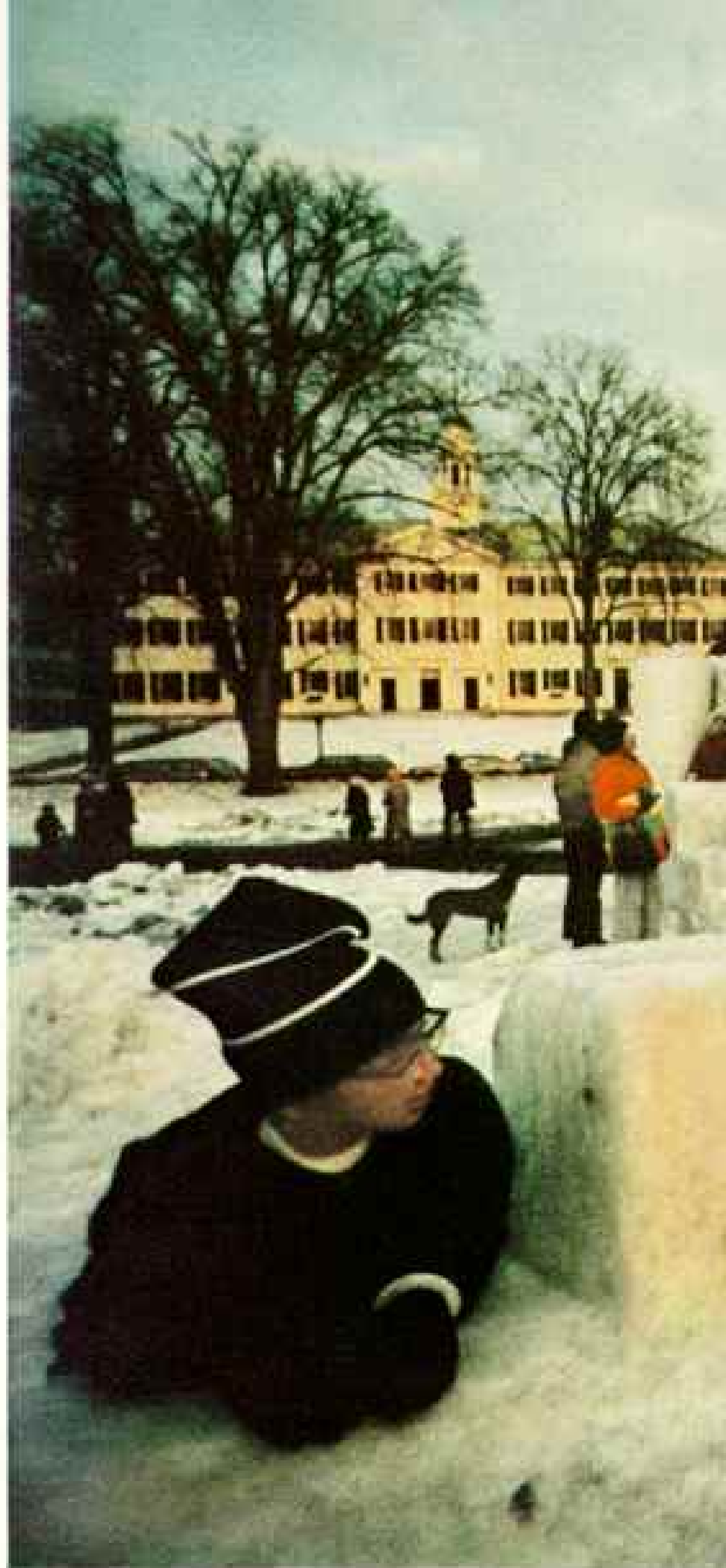
Machines Raise Output of Valley Farms

Despite another, more serious loss of land—to developers—the valley produces almost as much as it did in the heyday of agriculture. Walter Melnick, agricultural agent for Hampshire County in Massachusetts, told me: "The valley grows about 200 million pounds of potatoes annually. Thirty years ago, on nearly four times as much acreage, it produced 300 million pounds. The story is the same for all the other crops that earn millions of dollars each year for the valley's farmers—sweet corn and tomatoes, lettuce and onions, hay and asparagus."

One or two men with modern machinery can raise as much today as a battalion of brothers and cousins could coax from the soil in former times. The land and the machine, long twin features and often opposing forces in the valley, have happily married.

The crop that still depends almost wholly on the human hand is tobacco—the most important one in the valley and, ironically, the

Helmeted snowmobilers warm soggy gloves over a charcoal fire at Pittsburg, New Hampshire. Community spirit moved them and scores of others to stage a money-raising cook-out to help a neighbor whose house had burned down.





With or without snow, sleds roar at turnpike speeds near Lancaster, New Hampshire, where autumn drag races on a grass runway draw thousands of spectators. The machines have revolutionized long snowbound winters by opening remote lands to hunters and backcountry explorers. But conservationists say the snarling vehicles destroy nature's charm. New England's fastest-growing sport also generates one of its hottest controversies.

Winterland fantasy, a Wizard of Oz castle delights the young in Hanover, New Hampshire. Students at Dartmouth College built the snow sculpture for their 1972 Winter Carnival.

Begun 63 years ago as a modest winter-sports meet, Dartmouth's carnival has blossomed into a weekend festival of ski racing and jumping, plays and concerts, and parties for the predominantly male student body and their imported dates.

Casting through dawn mists, a youthful angler plumbs for bass near Windsor, Vermont. Above him looms the 460-foot Cornish-Windsor covered bridge, erected in 1866 and still in use. Its illiterate but inventive builder, James F. Tasker, earned the reputation of being able to span streams in a matter of days.



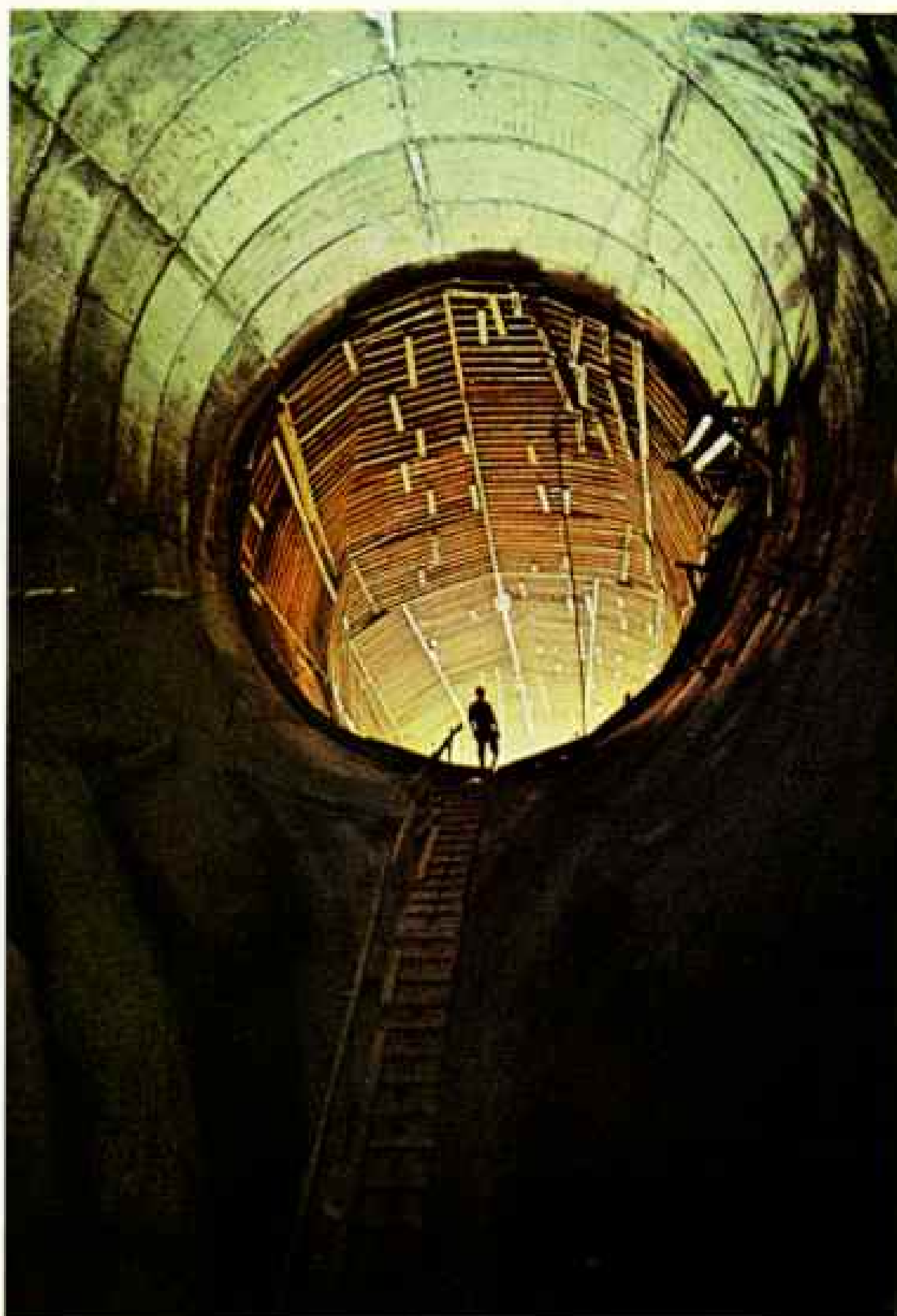
one that supports many a factory. The heart of New England seems an odd place for this southern plant to flourish, but many of America's famous cigars are wrapped in prime shade-grown Connecticut Valley tobacco leaf.

Tobacco has been grown in the valley since Indian days. Today it is the premier cash crop, producing \$24,000,000 a year in Connecticut alone. It earns more money per acre than any other crop grown in the U. S.

From mid-Connecticut to northern Massachusetts, huge fields of tobacco grow under

gauzy tents that shield the delicate leaves from the sun (page 353). In the late 19th century the Dutch all but drove American wrapper leaf off the market with imports from Sumatra, where the hot sun, filtered through a constantly cloudy sky, produced a stretchy, aromatic leaf of exceptional quality. Ingenious Yankees reasoned that tobacco grown under tents to shield it from the valley's fierce summer sun might be just as good as that grown in the Dutch East Indies. The experiment was first tried in 1900. After

Yankee ingenuity flourishes today in the construction of a power station at Northfield Mountain, Massachusetts. A cavernous intake-outflow conduit (below) will funnel water downhill from a man-made lake to drive million-kilowatt hydroelectric turbines. In periods of low power demand, the same turbines will pump river water back up the shaft to replenish the reservoir.



several years of false starts, it succeeded with Cuban seed. The valley has been marketing quality cigar wrappers ever since.

Tobacco is a romantic crop, but a difficult one. Lorenzo D. Lambson, whose family has been growing it near Sodom Mountain in Southwick, Massachusetts, for more than a hundred years, told me the secret of the valley's fine tobacco: "Our soil is pure—eight to ten inches of loam on top of a thin layer of subsoil, and below that sand and gravel. A lot of places have tried to grow shade tobacco,

but most can't do it—we've got the soil."

On Lambson's 33 acres in tobacco, every plant is set in the ground, hoed, tied, twisted, and finally picked by human hands—up to a hundred pairs at harvesttime.

Lambson showed me a well-cured hand of tobacco—a bunch of uniform-size leaves tied together. He stretched a leaf, setting off its fine vein structure and flawless brown skin.

"That's what a leaf should be," he said. "You can only get that kind of leaf by using your hands—all the way."

I had to confess (though I am allergic to tobacco and immediately had a paroxysm of sneezing) that I had never seen, or smelled, a more beautiful product of the soil.

Lambson's handiwork pays off. He produces 1,600 pounds of tobacco per acre, and he sells it for 50 cents to \$7.50 a pound.

Lorenzo Lambson is one of the few independent tobacco farmers in the valley; much of the growing has been taken over by the big tobacco companies. About 80 percent of Connecticut leaf goes for sorting and grading to Puerto Rico and the Dominican Republic, where labor costs are much lower. Cigar makers also draw wrappers from other, cheaper sources. This and other factors have reduced tobacco acreage in the valley from 28,000 in the late 1940's to 6,300 today.

"Tobacco will survive in the valley, but not at anything like historic levels," Dr. Gordon S. Taylor told me. He heads the Connecticut Agricultural Experiment Station at Windsor, and is widely regarded as knowing more about valley tobacco than anyone else.

All their research, he confesses, has not disclosed why dead cigars and old cigar smoke smell so bad. "I sort of hoped at one point that we could please the ladies by eliminating smelly draperies and stinking ashtrays," he smiled. "But we never did find out why a cigar, which is so satisfying to a man, has to be so annoying to his wife."

Dutch Tell English of Connecticut

Long before Connecticut matched the Dutch in growing tobacco, the first explorer arrived in the person of Dutch mariner Adriaen Block (Rhode Island's Block Island is named for him). In 1614 he sailed his 50-foot ship *Onrust* (in English, *Unrest* or *Restless*) over the great sandbar and upriver to the Enfield Rapids, about 60 miles from the Sound. He traded with the Sequin and Nawaa Indians, and then hoisted sail for home to give news of his discovery to the Amsterdam Trading Company.

What the Dutch thereafter called New Netherlands was already on English maps as



Southern crop in northern fields: Wrapper tobacco for the finest domestic cigars flourishes in the river's sandy valley, drawing Puerto Ricans who tend, harvest, and hang it to cure (above). Dominoes help pass off-hours (right). Gauzy shrouds (far right) temper the sun, simulating the cloud-veiled skies of Cuba and Sumatra.



New England. Capt. John Smith, at about the same time, had sailed along Cape Cod, and in the name of James I laid claim to what he guessed must lie beyond it.

The Dutch were mainly interested in trade, the English in colonization. With commendable generosity, the Dutch told the English at Plymouth Colony of the fertile lands to the west. The Puritan fathers dourly responded that Dutchmen had better trespass with caution, if at all, on lands that belonged to the English Crown.

The Indians, long established on the Connecticut, not unnaturally regarded the valley as their own. There were many tribes along the river, living uneasily with one another. Among them were some very naive diplomats. In the early 1630's, several bands of valley Indians—Podunks and perhaps Mahicans, whom James Fenimore Cooper apostrophized as the noblest of red men, the Mohicans—visited the Massachusetts colonies and invited the land-hungry settlers to help them expel the ferocious Pequots.

At first the English declined these offers of alliance, but their curiosity about the Connecticut lands was further stirred. On September 26, 1633, a small ship carrying a band of settlers from the Massachusetts colonies sailed upriver past a sign claiming the Connecticut for the Netherlands, as well as a Dutch fort that hailed the intruding ship but failed to fire its two cannon. The colonists went ashore at a spot that is now Windsor, Connecticut, where they built a palisade.

The English, of course, outlasted everyone. They soon founded two more colonies, at Hartford and Wethersfield. After the harsh climate and the rocky soil of the Massachusetts coast, they rightly believed that they had come to a comparative paradise. To their Puritanical souls, paradise was obviously a theocracy, and this they established, under the leadership of the Reverend Thomas Hooker, in 1639. They described their purpose as "to maintain and preserve the liberty and purity of the Gospel . . . and also of the churches."

Valley theocrats later promulgated laws





Mirroring her grandmother's portrait, a young mother reflects the tranquility that is the birthright of many who dwell in the Connecticut Valley. Gentle landscapes and simple, rural ways increasingly lure today's youth, much as they drew Puritan settlers more than three centuries ago. This homemaker and her family belong to the Brotherhood of the Spirit, a 250-member community



near Northfield, Massachusetts. Ranging from infants to the middle-aged, members shun drugs and alcohol and have won respect for their peaceful ways. Working the land or holding town jobs, they pool all fruits of their labors.

specifying the death penalty for 15 separate offenses. One provided for execution of disobedient sons who were "stubborn and rebellious and will not obey their [parents'] voice and chastisement."

In the 1680's the witch-hunting divine, Cotton Mather, accused Mary Webster of Hadley of murder by sorcery. Witch Webster was hanged unsuccessfully by "brisk lads" of the town, then left in the snow to freeze. She nevertheless survived 11 years to a natural death. Her "victim," a farmer named Philip Smith, had died from what Mather described as being made "very valetudinarian."

Indians Massacred Valley Newcomers

The cross and the rifle played equal parts in the settlement of the valley. The Massachusetts farms and towns, particularly, were subject to sudden and violent Indian attacks for more than a century. Not only resentful local tribes contested the settlers, but also hostile bands from upriver and Canada. In the three bloody years of King Philip's War (1675-78), 230 persons were killed and nearly 200 houses and barns burned.

Gunpowder was often stored in the garrets of fortified meetinghouses, which also did duty as churches. This foiled the Indians but sent the faithful scampering when a thunderstorm broke out during services.

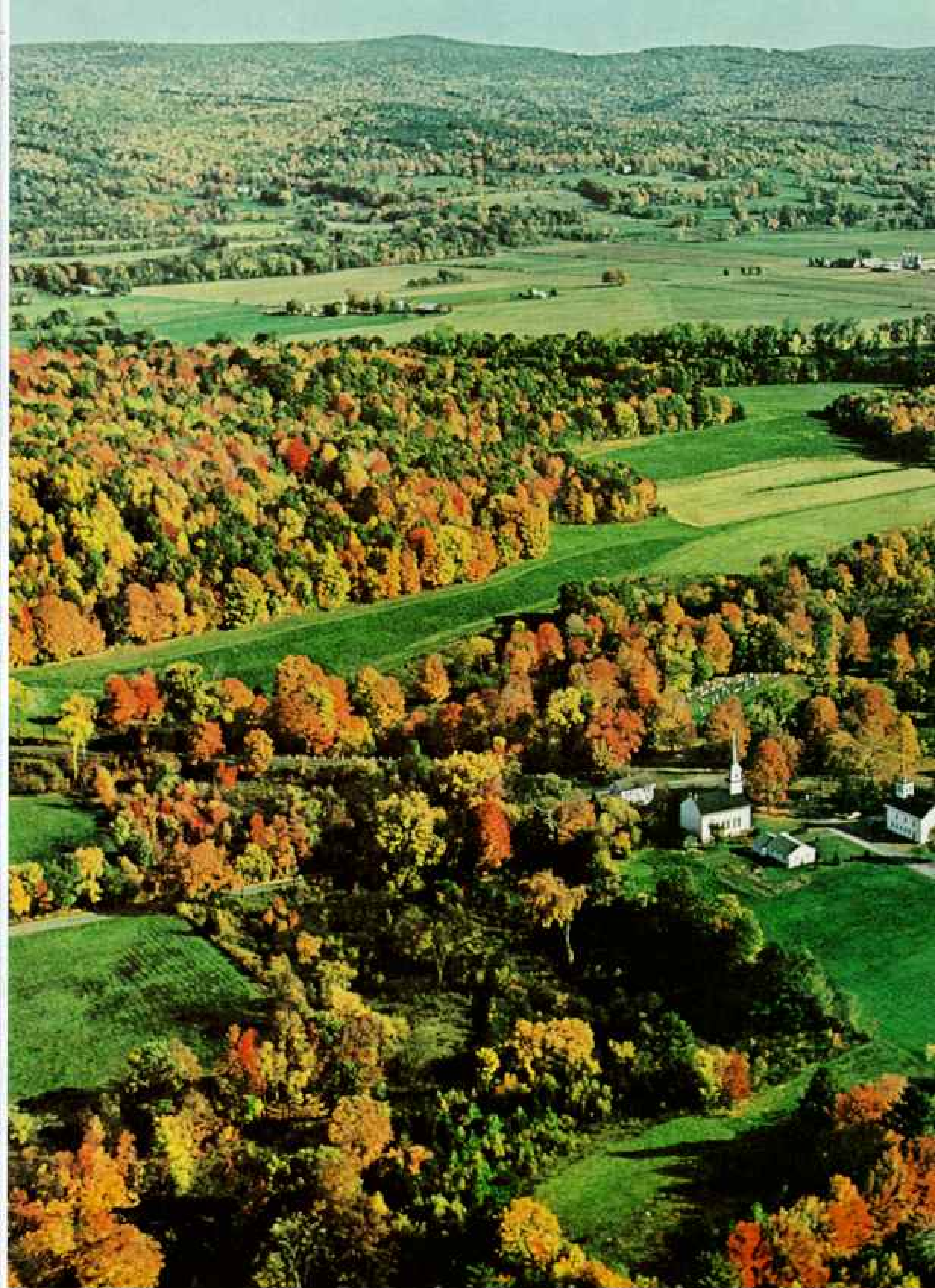
On February 29, 1704, Deerfield suffered one of the most celebrated Indian attacks in New England's history. A French officer, Hertel de Rouville, with a force of 340 Indians and French soldiers from Canada, attacked before daybreak, put the snow-covered town to the torch, killed 49 men, women, and children, and carried off 109 captives.*

Just before sunup on February 29, 1972, I parked my car outside Deerfield. It was a windless day, and the town dogs did not catch my scent any more than their ancestors had smelled de Rouville's irregulars.

Deerfield has been preserved by its wise town fathers pretty much as it was in the 17th and 18th centuries. The graceful old houses, looming in winter mist, looked enough like the ones de Rouville burned to suit my purpose. It was my idea to walk along the river as the captives had done—many of them still in their nightclothes, their feet bare or bound hastily in rags.

I floundered through the snow, and not

* "Deerfield Keeps a Truce With Time," appeared in the NATIONAL GEOGRAPHIC for June 1969.

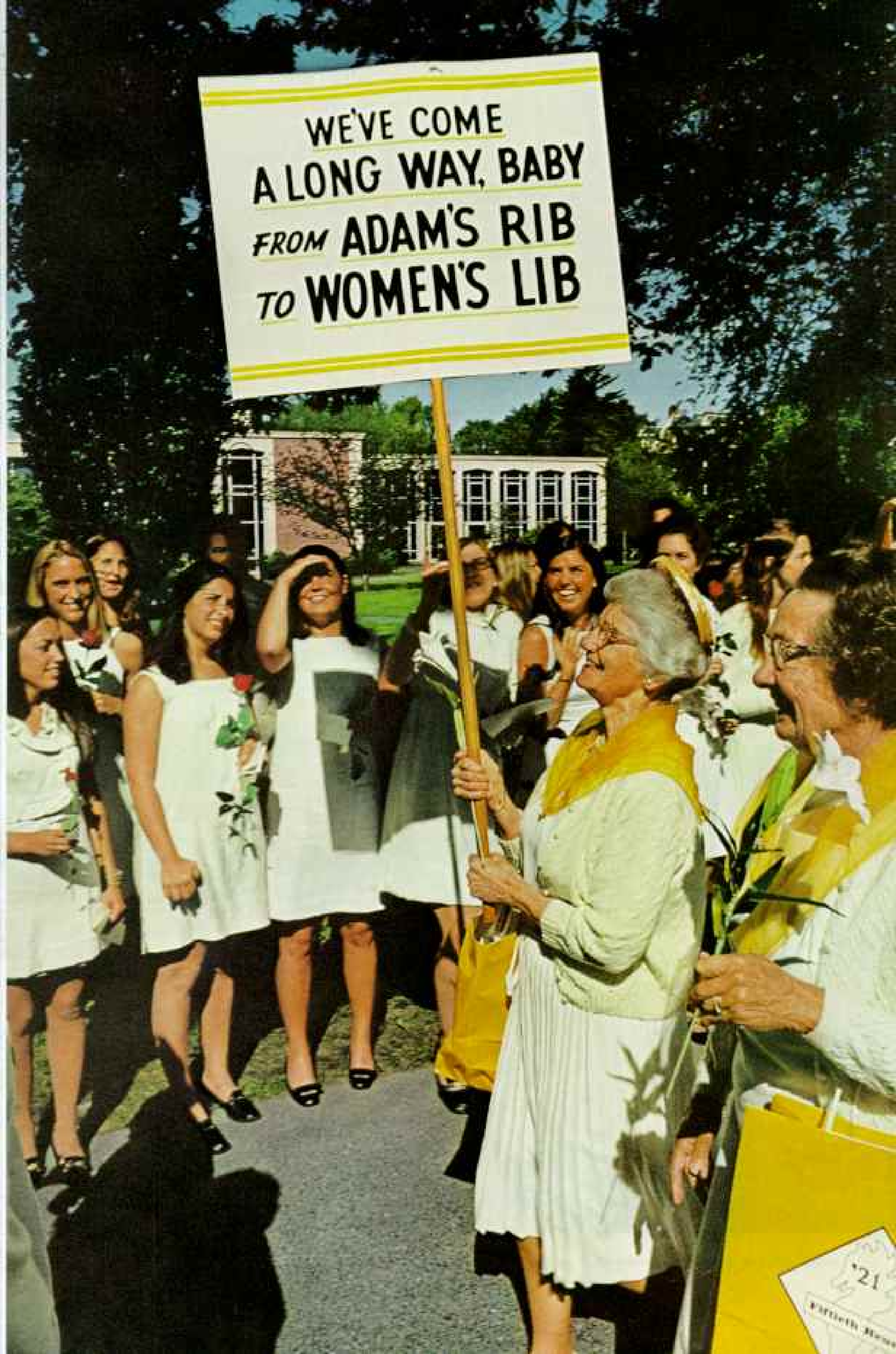


Autumn's palette colors the Massachusetts floodplain as the tree-lined



Connecticut elbows its way past prim churches and productive farms.

**WE'VE COME
A LONG WAY, BABY
FROM ADAM'S RIB
TO WOMEN'S LIB**



'21
PARTICIPATION - 2000

Sprightly Class of '21 entertains the graduating Class of '71 during commencement and reunion rites at Smith College in Northampton, Massachusetts. This final ceremony marked the end of a peaceful school year, in contrast to loud political demonstrations the preceding year.

Student power starts with voter registration at the University of Massachusetts in Amherst (right), home also of Amherst College. The new 18-year-old voting age, plus Massachusetts registration laws, could bring student rule to the town, where collegians far outnumber "townies."



even woolen socks inside stout boots or the goosedown jacket my wife had given me for Christmas could keep the cold from my bones. Longing for warmth, I rounded a bend in the river and saw a small fire blinking. Crouched beside it, over a hole in the ice, was a fisherman in red plaid.

He introduced himself as Roger Coe, "from right around here," and brought out a Thermos. He handed me a cup of coffee laced with something more warming. I told him what I was about, and asked if he could believe that the captives of Deerfield could have survived their savage ordeal on a morning worse than this.

Roger Coe looked at the rising sun, then at me. "They had to," he said. "But why anyone else would go for a walk on the ice at 6:30 on a February morning unless he was tied up by an Indian, I can't answer you!"

Floods May Be Vital to the River

The Connecticut no longer figures greatly in the conscious daily life of valley people. As a New Hampshireman remarked to me, "There's not much reason to pay it any mind, like there used to be when it ran the mills or carried the barn away."

The river has often been a cruel companion. Close to twenty major floods have been recorded since the settlers came, and some have been truly devastating. With the Connecticut now controlled by dams and dikes, there's little likelihood that a flood like the big one in 1936, which did some 65 million dollars in damage, will come again.

Professor Lincoln Brower, a biologist at Amherst College who has a special feeling

for rivers, thinks this may not be altogether a good thing. "The only reason flooding is bad," he told me, "is that man has been foolish enough to build on the floodplain. I see flooding as God's gift. Refertilization of land is responsible for civilization in the first place—ancient Egypt being a prime example."

An ecological activist, Professor Brower is opposed to dams. In his view, they return a great deal less than they take. According to a preliminary study at Amherst College, the action of the dam at Turners Falls, Massachusetts, reduces by tenfold the number of invertebrates, such as insect larvae and snails, for several miles downstream.

This plunder of life, which takes place when the dam stops the flow and dries out parts of the stream bed, probably also affects the river's capacity to cleanse itself. It is the life in the river, much of it microscopic, that breaks down sewage and waste, purifying the water. "If man were enlightened," Professor Brower declares, "he would deindustrialize many areas of the Connecticut Valley."

To industrialists, such ideas seem extreme. "Man deserves as much consideration as the shad or the aquatic snail," says John Hickey of the Holyoke Water Power Company in Massachusetts. "The new pumped-storage facility we're building here at Northfield Mountain will help prevent brownouts by delivering power when the demand is greatest. And it will be practically invisible."

Built inside the mountain, the facility will pump 2½ billion gallons of river water up to a reservoir in an 8-hour period, using "borrowed" power when overall demand is low. Then, at peak demand, the water will flow

Industry and art flourish along the river. A china closet on its way to be antiqued and waxed rolls down the Ethan Allen assembly line in Beecher Falls, Vermont.

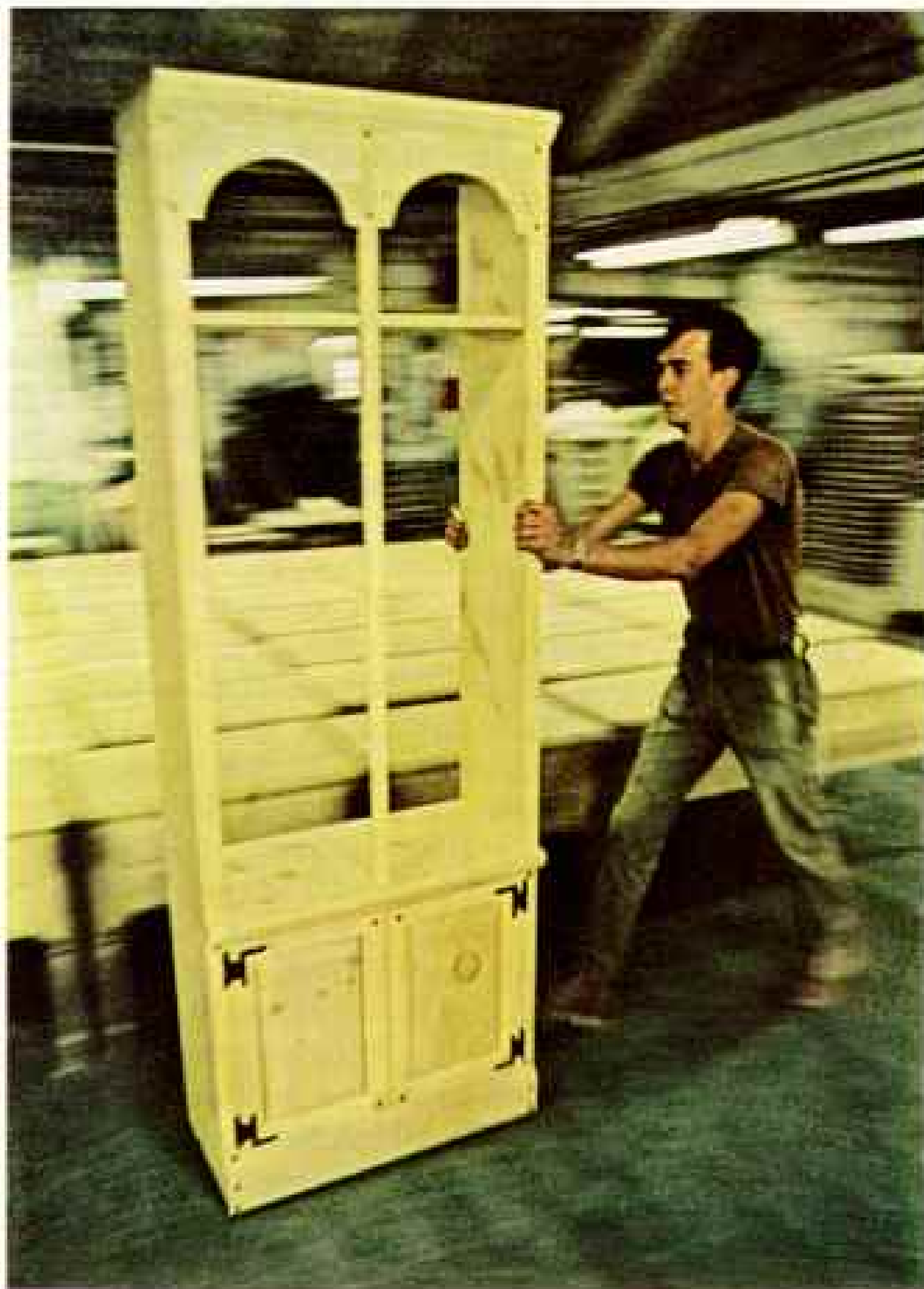
Artist James Hendricks follows abstract themes in his "Tondo" series—huge disks covered with a plaster-thick acrylic base that fissures when baked, forming a three-dimensional surface that is then painted. A University of Massachusetts faculty member, Mr. Hendricks rotates each disk when completed to determine the best way to hang and view it.

back down, turning generators to supply a million kilowatts.

In Professor Brower's view, this facility will hardly be "invisible." Part of the flow of the river will actually be reversed for two miles in July and August while the pumps lift water at the awesome rate of 5.4 million gallons a minute.

It's impossible to judge for certain whether men like Brower or men like Hickey are the realists with regard to proper use of the river. One thing is certain: They will hear from each other for years to come, for the construction of 200 new dams on the Connecticut's tributaries has been projected for the next 50 years.

Those who tinker with the flow of the river would delight their predecessors in the valley. As much as any place on earth, it has been the home of mechanical genius. I called on one such genius in Springfield, Massachusetts. He is John C. Garand, who invented the M-1 rifle (page 363). As Garand explained,



and as every GI of World War II and Korea was told, this rifle is "a gas-operated, clip-fed, semiautomatic infantry weapon—the best in the world."

Inventor Got an Early Start

Garand emigrated from Canada as a child. By the age of 12 he was a millworker, and the inventor of a device to paint bobbins in the cotton mill where he was employed. In 1933, as an obscure worker in the Springfield Armory, he developed the prototype of the M-1, then called, as many think it should always have been, "the Garand rifle." Garand made the drawings, designed machines to make complicated parts, worked up formulas for the manufacture of special kinds of steel.

How, I asked, did a man with so little formal education know how to do such things?

"Oh, I just *knew*," Garand responded.

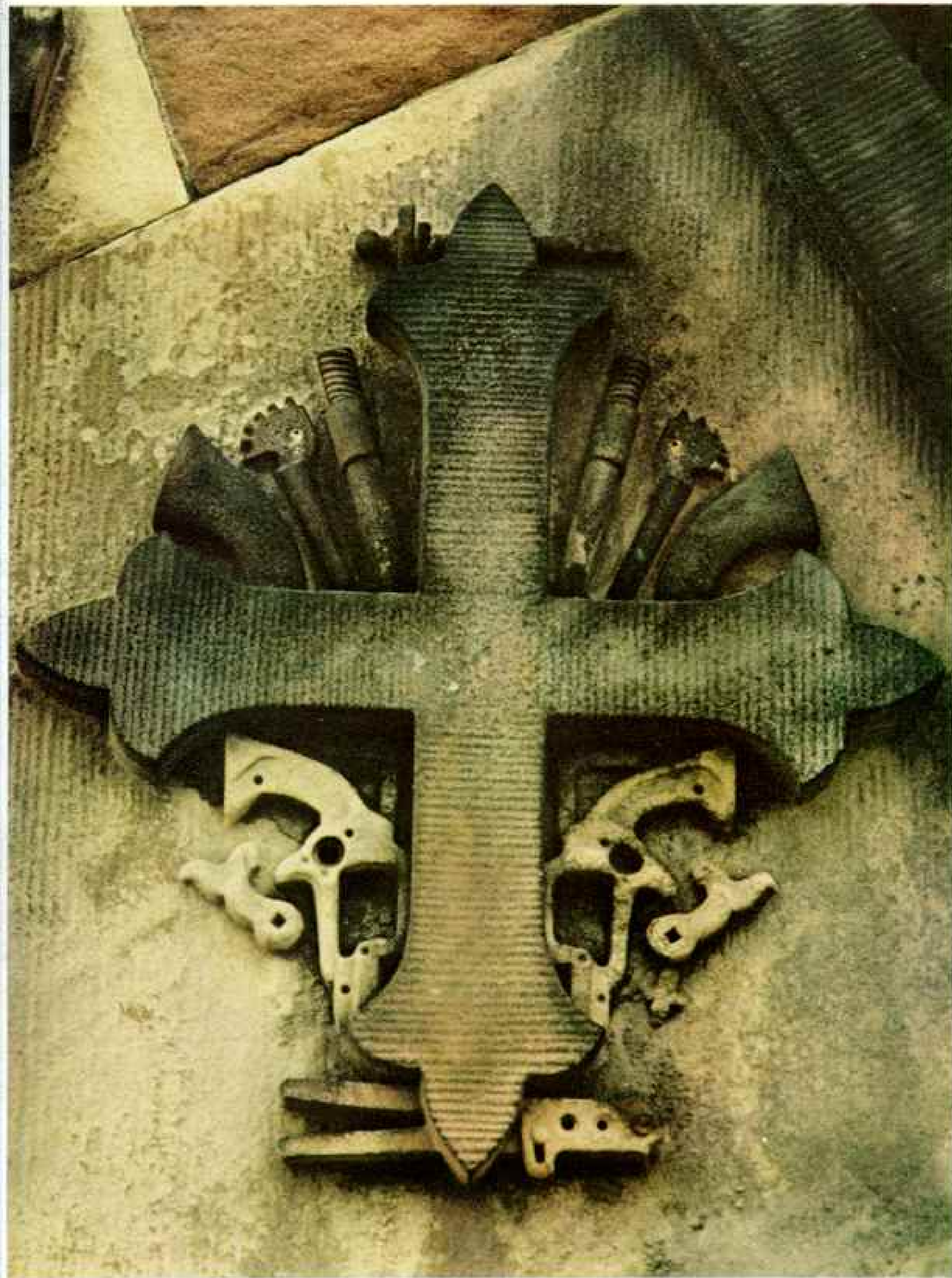
His rifle was carried into battle by millions of Americans—not a few of whom wrote to him to thank him for saving their lives. For

his labors, Garand received a pension and the one-millionth M-1 manufactured at the Springfield Armory. Altogether, more than six million were produced.

He bears no bitterness that he never shared in the huge profits earned by his invention. And, on occasion, he has had some reward. Not long ago Garand and his wife were invited to the White House for a Sunday service. "As we went through the reception line, I saw that President Nixon was very tired," Garand recalls. "A man told him my name, but it didn't mean a thing to him. Then I said, 'I'm the M-1 rifle.' He woke right up, smiled, and gave me a real handshake."

Americans won the West, and all their past wars, with the help of firearms manufactured in the Connecticut Valley. Samuel Colt's factory in Hartford still turns out all sorts of six-shooters, and provides most of the M-16 rifles used in Viet Nam. Upriver, in Springfield, Smith & Wesson continues to make handguns.





Holstered in stone, carved gun parts and a bullet mold at bottom embellish the cross of a Hartford church dedicated to arms-maker Samuel Colt, inventor of the six-shooter that still symbolizes the old West. Colt's factory was one of the earliest to produce standard, interchangeable parts for firearms, and so became an industrial milestone along America's road to universal mass production.

Long linked with precision machinery, the valley still harbors many gunmakers. Here at Springfield, Massachusetts, a Smith & Wesson worker (right) assembles a handgun. The city is also home of the famous Springfield Armory, which equipped U.S. fighting men from the Revolutionary War to Viet Nam.



Father of the M-1, John Garand holds his semiautomatic rifle, the standard weapon of millions of Americans in World War II and Korea. Garand perfected it while working in the Springfield Armory. Until 1968 the armory employed an unsurpassed work force of expert gunsmiths and machinists; today it houses a museum and a technical college.

The Springfield rifle, in its various forms, may well have been the most famous of all American arms. As early as 1777, the Springfield Armory—on a hilltop site above the river—made ammunition, and from 1795 to 1968 it turned out millions of muskets, carbines, and rifles. Its products spoke on battlefields from Saratoga to Bull Run to the Little Big Horn to Normandy to Viet Nam.

No longer does the armory produce these instruments of valor and suffering. Except for a museum, its regimental square of brick buildings has been turned over to a community college. I reflected, as I watched boys of military age and girls old enough to be widows sauntering across the handsome broad quadrangle, that many would think they had found a better use for the armory than their forebears had done.

Fulton No Hero in New Hampshire

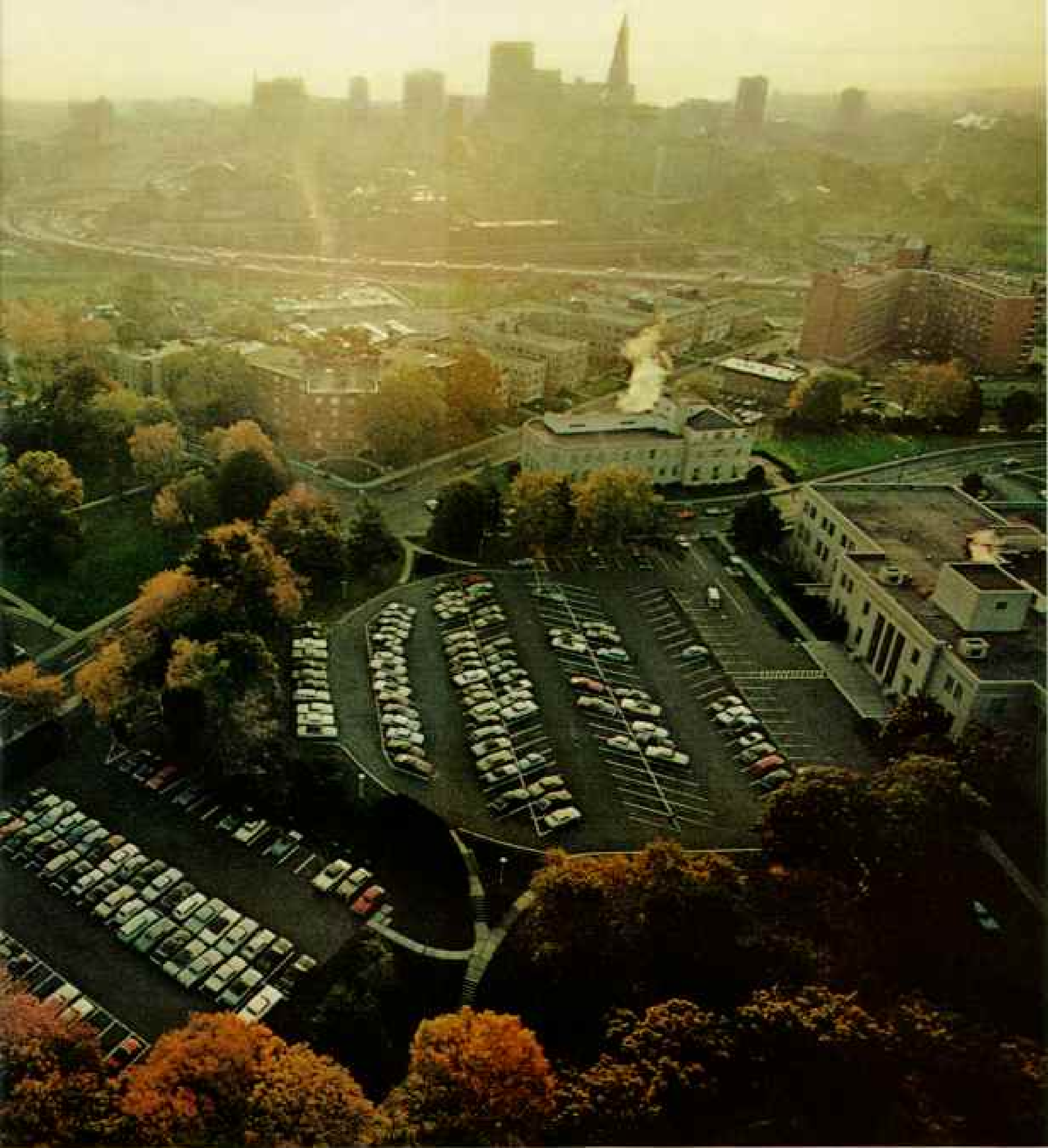
Valley people have, of course, been as ingenious in the mechanics of peace as in those of war. In 1793 Samuel Morey, a farsighted tinkerer of Orford, New Hampshire, launched a skiff in the Connecticut. The small boat carried Sam and an invention he had worked up that winter in the Orford blacksmith shop—a steam engine that drove a paddle wheel and moved the skiff upriver at a steady five miles an hour.

A few years later, in another, larger boat, Sam Morey steamed from Hartford to Manhattan. Robert Fulton visited Orford, talked to Sam Morey, and used some of Sam's devices in his own more famous steamboat. In New Hampshire at least, Robert Fulton still wears a villain's black moustache—for no one there believes that anyone except Sam Morey invented the steamboat, whatever the history books may say.

The steamboat had a brief but glorious day on the Connecticut. In 1826 the *Barnet* negotiated the Enfield Rapids, helped by a crew of polemen, and docked in Springfield. Later, when a canal had been dug around the rapids, steamer service between New York and Springfield became commonplace.

A visitor named Charles Dickens was less impressed by these rivercraft than the locals were. Of a ride between Springfield and Hartford on a February day in 1842, he wrote: "Mr. Paap, the celebrated dwarf, might have lived and died happily in the cabin. . . . I think [the engine] might have been half a pony power."





Tale of two cities: Home of prosperous insurance companies (above), Hartford also sprawls with tattered ghettos sheltering the poor—mostly blacks and Puerto Ricans (right). But numerous community groups are working to better the city. Concerned citizens have formed the Greater Hartford Process, which seeks to coordinate urban planning. The city-supported Everywhere School (left) interests neighborhood children in learning through visual aids and experimental, unstructured methods of teaching.



Inspired by Mississippi riverboats, Mark Twain's home in Hartford features running balconies, turrets, and broad porches, whimsical reminders of a steamer's pilothouse and decks. Here the humorist spent his most productive years, writing *The Adventures of Tom Sawyer*, *The Prince and the Pauper*, *Life on the Mississippi*, *The Adventures of Huckleberry Finn*, and *A Connecticut Yankee in King Arthur's Court*. Here his children grew up, and one daughter died. Today the house is a museum of Twain memorabilia. Inside at sundown, a bronze bust of the author shadows an oil painting that illustrated an 1899 edition of *Tom Sawyer*.



By the time of the Civil War, the railroad had whistled the death knell of these picturesque craft. The last vestiges of commercial traffic on the river are barges that carry several million tons of cargo, mostly oil and gasoline, to Hartford each year. Coast Guard icebreakers keep the channel open most of the winter. North of Hartford a pleasure boat is a rare sight, but off the Haddams and Old Saybrook, Connecticut, on any summer day the river is filled with sails.

Connecticut Pioneered the Assembly Line

If Sam Morey's steamboat ceased to be useful in the valley, other inventions born there have literally changed the world. It was the armories along the Connecticut that developed the system of interchangeable parts which gave birth to the machine tool—and so to the techniques of mass production that turned America into the complex and staggeringly rich society it is today.

As early as 1799 Eli Whitney proposed setting up a plant near New Haven "to make

the same parts of different guns... as much like each other as the successive impressions of copper plate engraving." Forty-nine years later Samuel Colt's factory at Hartford was mass-producing guns. From then onward men, but not the things they manufactured, could properly be called "one of a kind."

The valley has had its share of the men and women who were one of a kind. Jonathan Edwards, only boy in a family of 11 (all his sisters were six feet tall or more, so that his father joked he had sired "sixty feet of daughters"), preached in Northampton for 21 years, beginning in 1727. He made that town the center of an evangelical movement called the "Great Awakening."

Noah Webster compiled part of his dictionary while living in the valley, and helped found Amherst College. That fey spinster, Emily Dickinson, wrote some of the finest poetry in English in Amherst. Augustus Saint-Gaudens sculptured his standing Lincoln and much else at Cornish, New Hampshire; his home is preserved as a national historic



site. Rudyard Kipling married a girl from Brattleboro, Vermont, built a house shaped like a ship in nearby Dummerston, and there, gazing upon snowy Monadnock across the river, wrote *The Jungle Books*.

In the 20 years he lived at Hartford, Samuel Langhorne Clemens wrote those classics—*Life on the Mississippi*, *Tom Sawyer*, *Huckleberry Finn*—that made the Mississippi the very symbol of American life. Mark Twain's house, its kitchen in front "so the servants can see the circus go by," is open to a public still enthralled by his works.

Hard Question for a Ghostly Companion

Mark Twain is my favorite human being of all time. When I set out upon the Connecticut, knowing that he had spent much of his life on its banks (dreaming of another river), I should have liked to invite him along.

I should have liked to stand with him on Mount Sugarloaf above Hadley early in the day, watching the sun burn away the ground mist, hearing the tractors in the fields beneath the mist even before it lifted. Or float down the estuary with him in a boat. Or show him what has become of the river near the factory towns, where it is browner than his muddy Mississippi ever was.

My journey up and down the valley—through the clash of natural beauty and arrogant despoliation, through the history of a righteous people who furnished the world with guns and tobacco—filled my mind with questions. They are an American's questions, and what better ghost to put them to than that of Mark Twain, the quintessential American?

On all the little questions I would have held my tongue: Why should a room full of old guns in Springfield stir in me the truest love of my country? How can men live in one of the most perfect landscapes on the planet, and seem not to notice it? How can the river have been forgotten by the people and the towns to whom it has given wealth and pleasure for fifteen generations?

Instead of all these small questions, I would have asked the big one: "Mr. Twain, why is it that man spoils whatever he touches, and endears himself to me for having done it?"

Mark Twain, I suspect, would have answered me as he did another inquisitor in *Life on the Mississippi*. "I was gratified to be able to answer promptly, and I did," Twain wrote. "I said I didn't know." □



Mariner's dilemma, the Connecticut ends in salt marsh and shifting sandbars that have hampered ships and sparked dredging schemes for centuries. The 1773 broadside advertises a fund-raising lottery to enable "safe and easy" navigation in and out of the river. But the river always won out, and even today only shallow-draft vessels ply the stream.

Near the river's mouth, wetlands shelter waterfowl, crabs, and other wildlife, attracting naturalist Roger Tory Peterson of Old Lyme and his son Lee. Thus, after fueling bustling cities and mill towns, after nourishing miles of farmland, the river ends as it began, amid settings where man is only a visitor.



Human Treasures of Japan

By WILLIAM GRAVES

Photographs by
JAMES L. STANFIELD

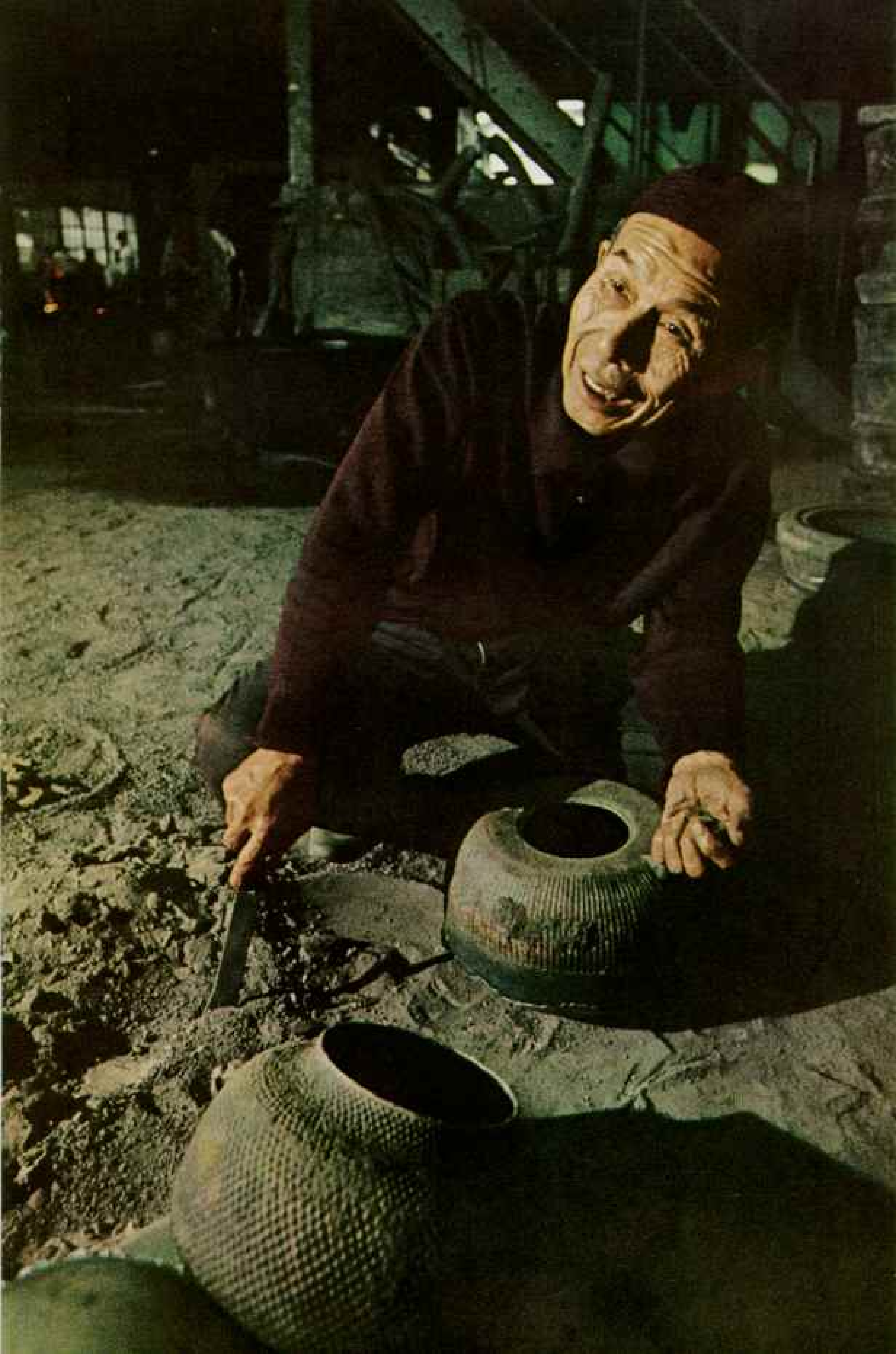
BOTH NATIONAL GEOGRAPHIC STAFF

OFFICIALLY THEY ARE KNOWN as "Holders of Important Intangible Cultural Properties," but in reality they are Japan's living national treasures. Designated by law and subsidized by the government, some seventy individuals and twelve groups today hold the coveted title for their mastery of such ancient but now endangered skills as weaving, pottery making, swordsmithing, dyeing, lacquerwork, puppetry, and even pantomime. All are encouraged to pass on their priceless gifts to future generations of artists.

Curiously, the idea of recognizing people as national treasures originated not with a Japanese but with an American—General of the Army Douglas MacArthur, commander of the Allied occupation forces in Japan after World War II. Appalled by the wartime destruction of priceless works of art, he persuaded the Japanese to safeguard those who carried on the creative tradition.

Here at his studio in northern Honshu, Tesshi Nagano (right) cleans newly cast ceremonial tea-kettles, his specialty. The iron molder's completed work gleams below.







DEAN of living treasures, lacquer artist Gonroku Matsuda presides over the official selection committee. One of the original artists to be chosen, he declares that skill alone is not enough. "Spirit is the essential quality behind great art—a spirit that demands an endless search for perfection. And that spirit must be developed, layer on layer, like fine lacquerwork."

Revered by his fellow artists, he works quietly at his studio in Tokyo, creating masterpieces such as this *susuribako*, or Japanese writing box (left, almost actual size).

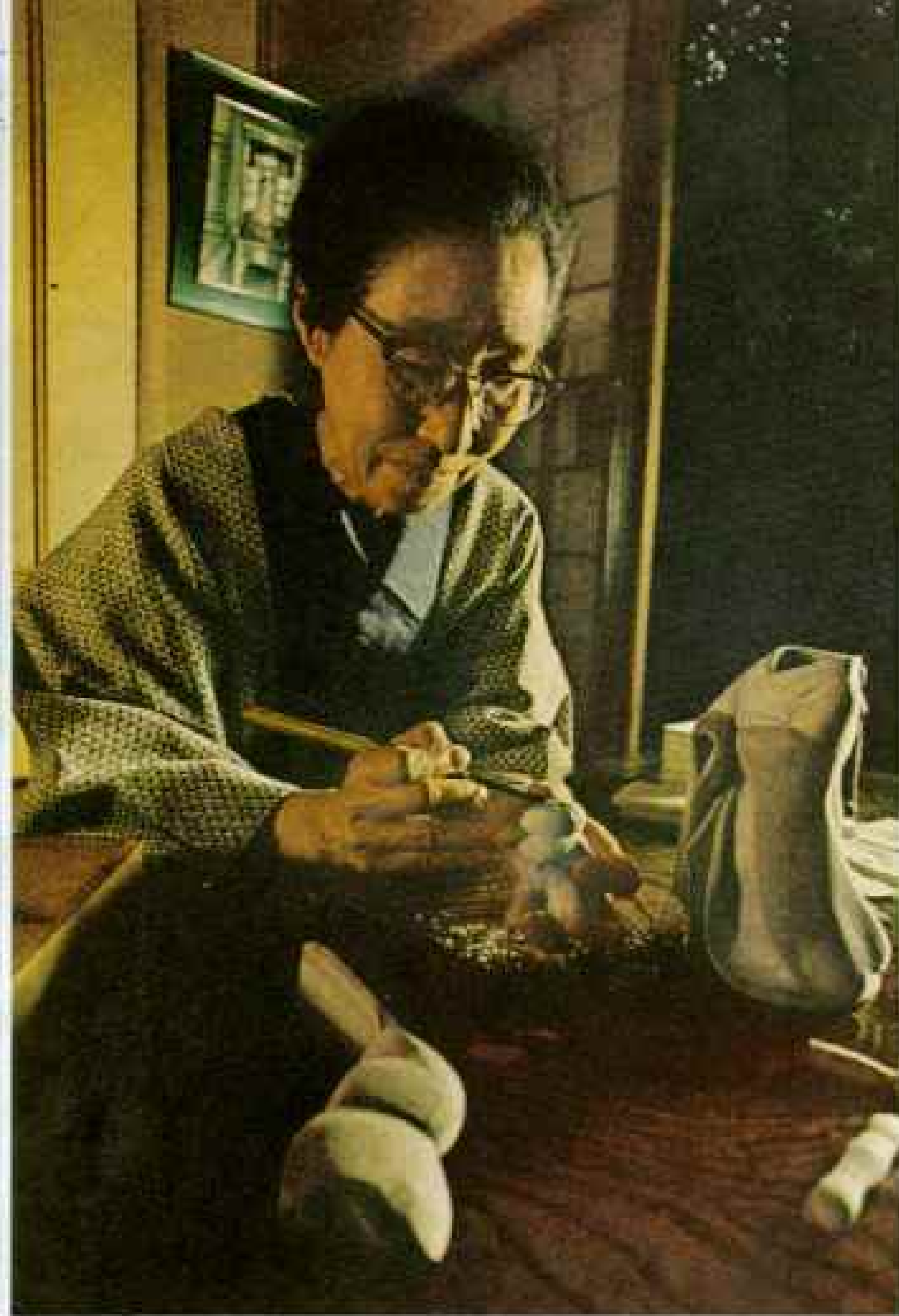
To achieve a precise shade of white for the lacquered image of the *tsuru*, or Japanese crane, Mr. Matsuda used an ancient formula consisting largely of powdered shells of quail eggs.

"I needed two dozen shells," he told the author, "but unfortunately quail eggs are not all the same color. I bought 2,400 of them before I found 24 that matched perfectly." Shaking his head slowly, he added, "I do not believe that Mrs. Matsuda and I will ever eat quail eggs again."

Here he shaves sections of conch shell to transparent thinness for decoration on a lacquered tray.

Like many of Japan's arts, lacquerwork is a borrowed technique. It arrived centuries ago by way of China and Korea and was subsequently refined by Japanese masters.





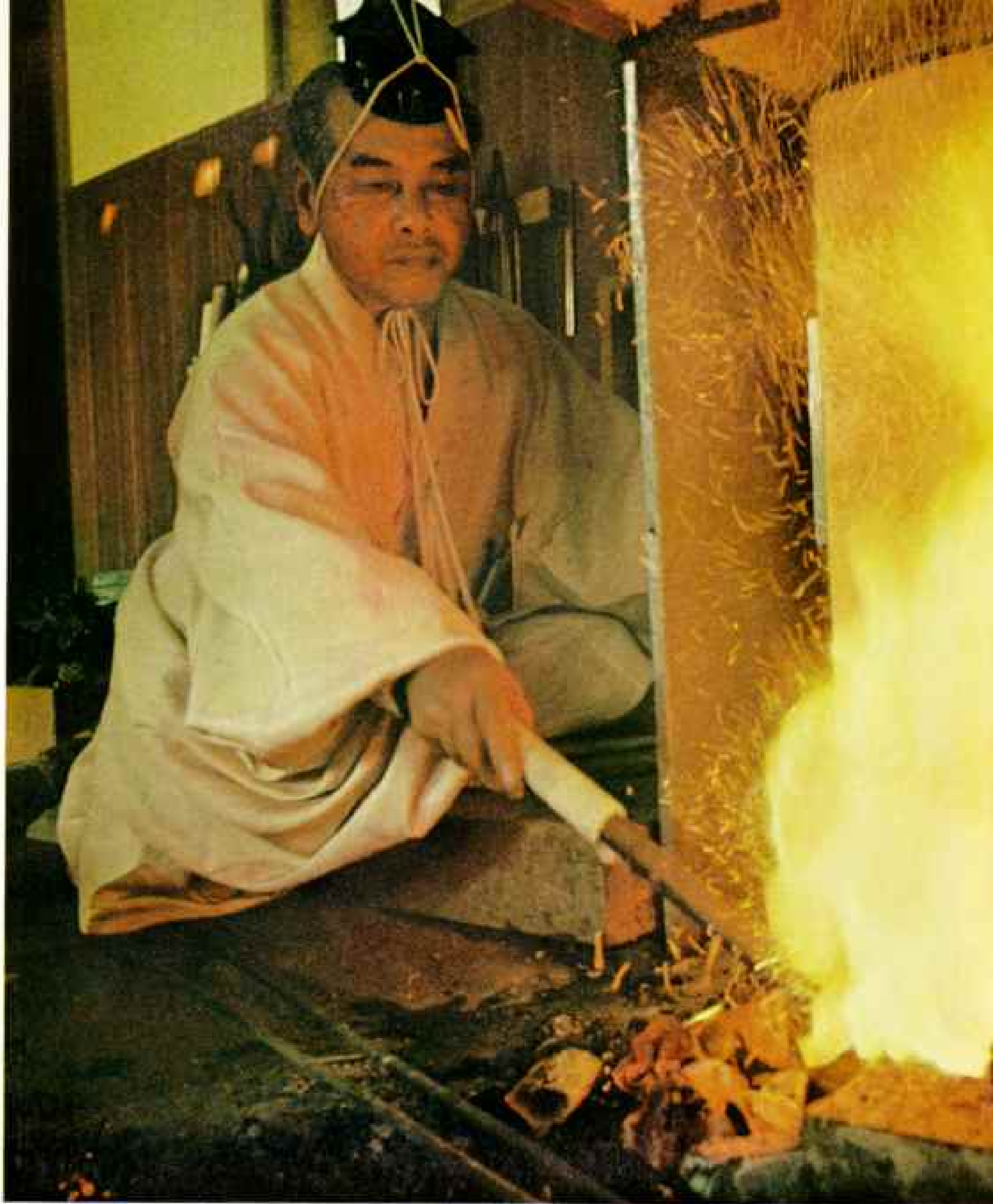
A MASTERPIECE takes shape in the hands of doll-maker Ryujo Hori, one of seven women designated as living treasures. Her minutely detailed figures, sometimes ten years in the making, represent legendary characters, often drawn from ancient Oriental literature.

At 75 Miss Hori still goes into the forests to select the best *kiri*, or Paulownia wood. After carving each doll as though fully clothed, she adds an elaborate costume of fabrics that she weaves and dyes herself. Dolls' faces always resemble that of Buddha, chosen for an air of eternal contemplation.

Here at her Tokyo studio Miss Hori shapes the head of a townswoman of Japan's feudal Tokugawa period. A finished doll (right) symbolizes a young Chinese girl of the first century B.C., holding a legendary peach known as "Banto." Requiring 3,000 years to ripen, the peach bestows health and everlasting life on anyone fortunate enough to taste it.







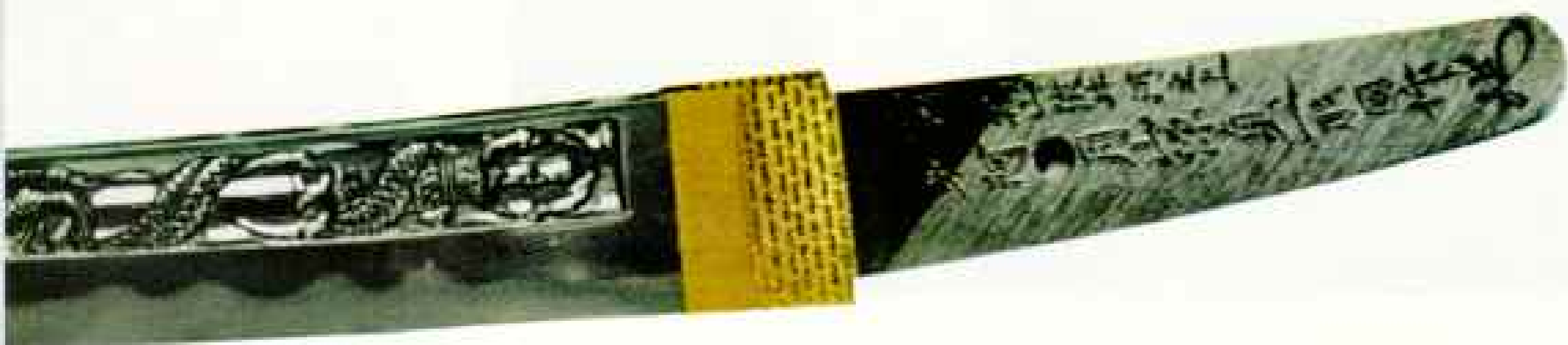


VULCAN OF THE ARTS, swordsmith Sadaichi Tsukiyama fashions a *tachi*, or samurai blade, at his forge near the city of Nara. Dressed in the master swordsmith's loose white robe and classic *eboshi*, or black-lacquered hat, he heats a small block of steel in his charcoal-fired forge to more than 2,000° F. Judging the temperature of the block by its glowing color, he withdraws it from time to time and lays it on an anvil, where his assistants flatten it with blows of their heavy sledges.

"When the blade is sufficiently flat," he explains, "it is folded lengthwise back upon itself and then flattened again. The process must be repeated many times. The thousands of fused layers give it necessary strength and flexibility."

Once the symbol of Japanese chivalry and later of militarism, the *tachi* is revered today as a work of art. Fewer than a score of craftsmen now preserve the techniques borrowed from Chinese swordsmiths nearly two millenniums ago and gradually adapted to Japanese tastes.

Descended from four generations of swordmakers who used the professional title *Gassan*, Sadaichi Tsukiyama also goes by that title; it is the name of both a sacred mountain in northern Honshu and the style of blade his forebears developed there. Three Japanese emperors—including the present one, Hirohito—have owned *Gassan* swords. The ornamented blade below is a *wakizashi*, a shorter sword traditionally carried with the longer *tachi*.



MAN IN MAIDEN'S GUISE charms theater-goers in the classical drama known as Kabuki. Greatest of today's *onnagata*, or male players of female roles, Utaemon Nakamura has spent a lifetime developing the charm and grace of a leading lady. His profession dates from the 17th century, when Japanese authorities banned women from the stage because of unseemly duels among admirers.

Connoisseurs of Kabuki value the performer for his stylized concept of womanhood rather than for mere mimicry of an individual. Pictured backstage (opposite), Utaemon wears the chalk-white makeup and elaborate headdress of a geisha in an 18th-century romance. On stage (below), he routs a would-be assassin with the legendary strength accorded all Kabuki heroines.

In private life, Utaemon pursues such masculine interests as photographic safaris in remote areas of Africa and an occasional gambling expedition to Las Vegas, Nevada, where he is an honorary citizen. The father of two grown sons, also Kabuki actors, he is the sixth generation of his family to bear the illustrious stage name Utaemon. □





New Links

New Tricks Outwit Our Insect Enemies

By HAL HIGDON

Photographs by ROBERT F. SISSON
and EMORY KRISTOF

NATIONAL GEOGRAPHIC PHOTOGRAPHERS

LIKE TINY ICE TONGS, the pincers of an aphid lion snap shut on a jumping plant louse (right). The hunter injects a paralyzing venom, then begins drawing out its prey's body fluids. Soon the louse, a voracious enemy of feathery acacia trees, will become another trophy on the aphid lion's back. A walking mortuary, the six-legged predator wears the grisly raiment as camouflage, living up to a more descriptive name given it by scientists, "trash-carrying green lacewing larva."

The acacia tree was brought to this country from Australia. Somehow, the plant louse got here later and threatened its survival. A search for the louse's enemies on the southern continent turned up eight natural foes—among them, the lacewing.

In the outcome of this lopsided bout between lion and louse may lie one answer to man's never-ending competition with hungry insects. As concern mounts over the effect of chemicals on our environment, attention turns increasingly to biological control—the suppression of pests by the introduction and encouragement of their natural enemies.

As I watched the aphid lion destroy the





FAMILY CORYMBIDAE, 3/8 INCH LONG; FAMILY PHOSPHIDAE, 1/16 INCH LONG; ROBERT F. BROWN

louse in a California laboratory, I could not help feeling delighted with the outcome. Had the encounter occurred on a lawn or city park, another insect pest would have been eliminated without more potentially harmful chemicals being poured into nature's already tainted ecological systems.

Among some hundred thousand insect species identified in the United States, only about 200 are serious pests. Like the plant louse, many are aliens, unwanted hitchhikers on imports, which found in this country a haven free of the enemies that controlled their numbers in their homeland. In the reproductive explosions that have followed, they munch through billions of dollars each year in trees, shrubs, and food crops.

Rosy Prediction Comes to Naught

The story of man's struggle against bugs is as old as the history of agriculture. But in 1939 the discovery of DDT fostered a belief that the battle's balance had shifted in man's favor.

"DDT misled everybody connected with pest control," I was told by Dr. Robert van den Bosch, entomologist at the University of California. "The feeling was, you get this miracle insecticide, throw it into the fields and gardens, and we all go fishing. Well, it didn't work that way."

Dr. van den Bosch and his associate, Dr. Kenneth S. Hagen, recall a colleague who in the early 1950's warned them to begin making collections of mosquitoes, codling moths, and boll weevils because they would soon be extinct! But man underestimated the resiliency of his insect enemies.

Chemicals caused massive kills, but enough individuals always survived—usually the strongest—to continue their species. Insects then began to develop resistance to insecticides. The doubling and quadrupling of dosages and the synthesizing of new chemicals brought only temporary protection, while killing off friend and foe alike. In the devastating wake of DDT lay not only pests, but also bugs that ate pests, and friendly pollinators such as bees and butterflies.

As early as 1949, DDT residues were discovered in milk. When fish and wildlife deaths were linked to spray programs, scientists began to realize that in the battle to save food from swarms of insects the protection had become the poison.

In the wake of the government's ban on

most uses of DDT, scheduled to take effect in 1973, the search for safe weapons focuses on the "three P's" of biological control: predators, parasites, and pathogens. Predators such as the lacewing larva and the back swimmer (facing page) kill and eat their insect prey. Parasites feed on their still-living victims. Pathogens are disease organisms.

In a tour of research laboratories across the Nation, I watched these weapons being tested. In Tifton, Georgia, I saw assassin bugs with venomous stingers spearing corn earworms—pests that cause 200 million dollars a year in damage.

In a Niles, Michigan, laboratory a parasitic wasp stung a wormlike larva and laid an egg in its body. The growing wasp embryo would consume its host before the larva could develop into a cereal leaf beetle, an enemy of Midwest grain farmers.

I descended into an underwater tank at Riverside, California, to watch guppies devouring mosquito larvae. In Libertyville, Illinois, I visited an agricultural laboratory where scientists are perfecting a bacterial spray that causes the cabbage looper to starve from loss of appetite. Today more than half the budget for insect research in the United States Department of Agriculture is devoted to the search for biological and other non-chemical controls, compared with only 16 percent for research in conventional insecticides.

Sprays Alter Insects' Natural Cycles

Along with the three P's, scientists are gathering an arsenal of "dirty tricks." By spraying hormones on pests, they change insects' natural growth patterns, causing them to hatch too soon or too late to feed and breed normally. Synthetic female scents lure males away from prospective mates, and the release of sterilized insects prevents offspring.

No absolute alternative to the use of chemicals has been found. Predators and parasites, often fragile in comparison to their prey, are not easily raised and shipped. Production of synthetic pathogens moves slowly. Sterilized male pests must outnumber fertile males before release programs become effective.

At present, science is aiming at the integrated use of both biological and chemical weapons. Such a program could greatly lower the distribution of potent insecticides, and perhaps move our sullied environment one step closer to a balance acceptable to all earth's inhabitants.

Native ally hunts underwater

HANGING UPSIDE DOWN, a back swimmer (right) rows with its hind legs toward a mosquito larva. Grasping the defenseless wiggler with its front legs, the hunter draws nourishment with a beaklike mouth (center), then discards the carcass (bottom).

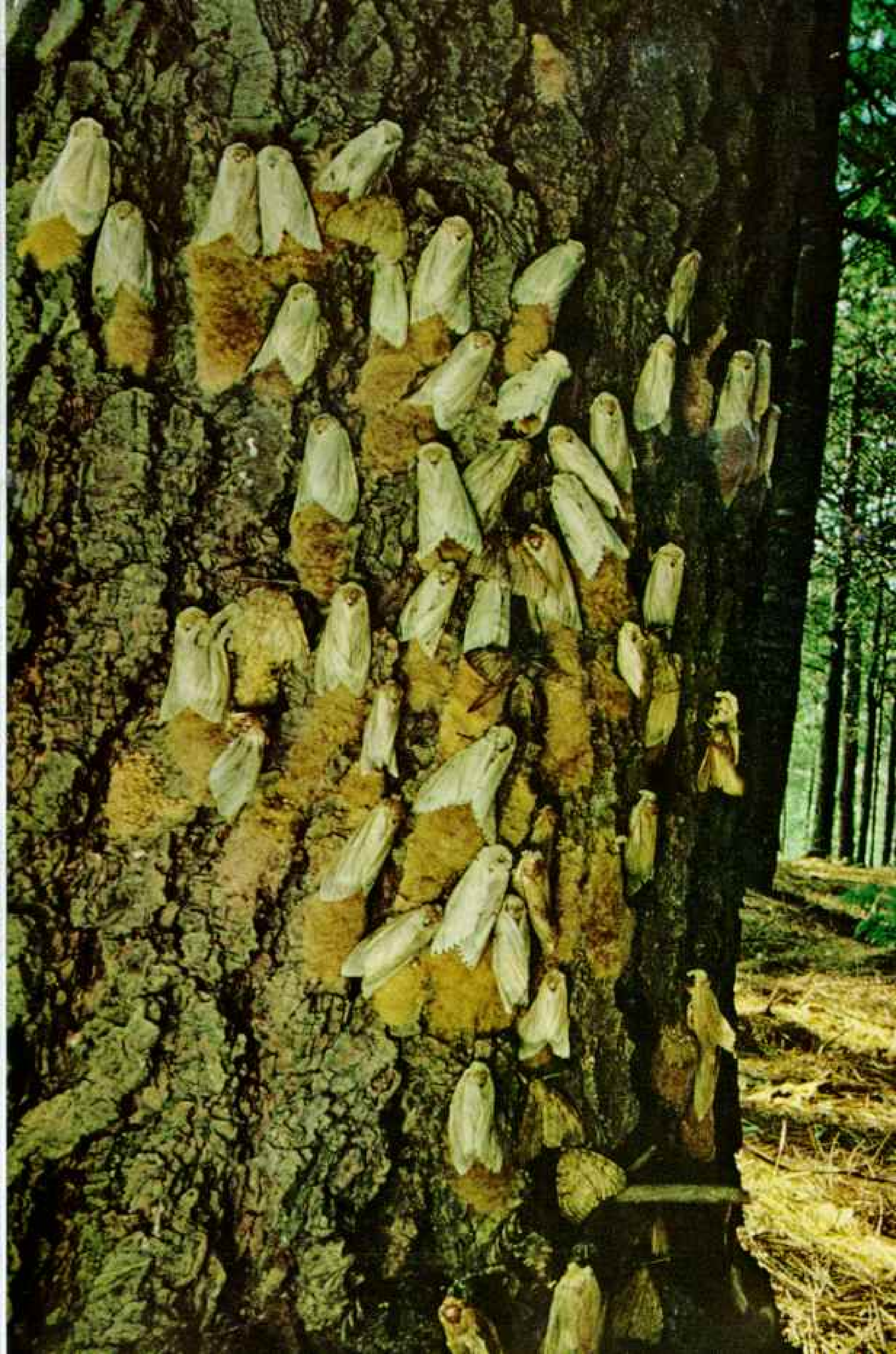
Unlike such imports as the aphid



lion, the back swimmer is a native species that might be encouraged to help control the mosquito, which has developed a high resistance to insecticides. However, scientists who study the predator temper their optimism with a cautionary note: In their search for mosquitoes, proliferating back swimmers could invade swimming pools and inflict painful bites on bathers.



AETHINA THERSITES, 1/2 INCH LONG; *CULEX TARSALEIS*, 1/8 INCH LONG; ROBERT S. DIBBON





Vagabond pest

SGOWING A CROP of vandals, female gypsy moths lay clusters of eggs on a white pine in Massachusetts (left). Gnawing through an oak leaf (center), larvae show the devastating appetite that may defoliate more than two million acres of Northeastern forests before this year ends.

A Medford, Massachusetts, naturalist imported gypsy moths from France in 1869, hoping to cross them with the American silk moth and create a hardy thread-making caterpillar. Not only did the experiment fail, but disaster also resulted when some of the newcomers escaped and their descendants fanned out (map).

Carried aloft by a sail of spun silk and body hairs, larvae are dispersed by breezes, which sometimes carry them 20 miles or more. Their unusual mobility accounts for their name.

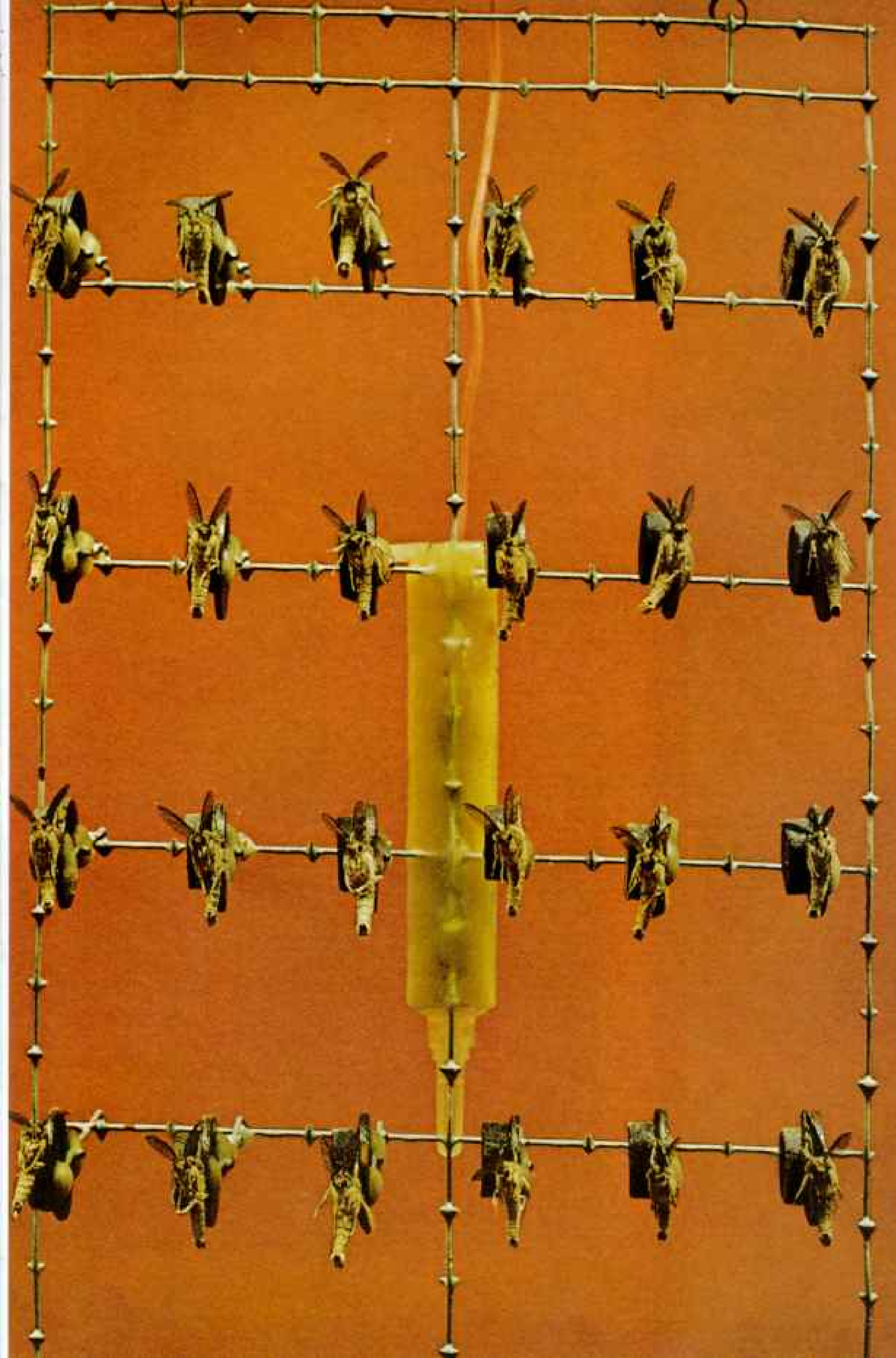
Branches bared by an infestation web the summer sky in Cape Cod's Nickerson State Park (below).



2 INCHES LONG, EMORY BRIDGMAN



PRINIBETRIA DISPAR (LEFT), 1/2 INCHES LONG, THOMAS WEISBERG; JAROVETI EMORY BRIDGMAN



SHACKLED FOR SCIENCE, male gypsy moths reveal the effectiveness of experimental sex attractants. A delicate seismograph connected to a wire grid (left) records their reactions when a synthetic odor duplicating that emitted by females permeates the Department of Agriculture laboratory at Otis Air Force Base on Cape Cod. Before release of the lure, a placid male dangles quietly (right). He writhes when exposed to the odor (lower right).

When seeking mates, male moths zigzag in seemingly aimless patterns to pick up the scent released by the virtually flightless females. Spraying an infested forest with the synthetic lure might make it impossible for the confused males to track a mate. Attractants might also draw male moths to futile rendezvous with pieces of scented cork, or to sticky deathtraps.

Should the gypsy moth continue to reproduce unchecked, it could spread destruction from the Northeast into the rest of the country. In an effort to hold the line, a broad program of integrated control, relying on natural enemies, scientific stratagems, and chemicals, is underway.

Many species of birds, the white-footed deer mouse, and the imported calosoma beetle feed on the insect; several wasps and flies parasitize its larvae, pupae, and eggs. Assisting these small warriors, pathogenic sprays spread disease among caterpillars, and sex lures and sterilized males curb reproduction.



U.S. DEPARTMENT OF AGRICULTURE

Watchdog of West Coast orchards

LAYING EGGS atop her lunch, a vedalia ladybug deposits the dark red ovules on a cottony cushion scale, a citrus parasite. California growers were the first to defeat an insect pest by importing a natural enemy when they brought the vedalia beetle from Australia in 1888.

The scale, actually an insect encased in a tough wax shell within a gummy white



sheath, lies immobile on a tree branch as it sucks out plant juices. When dining on the pest, ladybugs sometimes eat their own eggs while chewing through sheath and shell.

Mass infestation by scales threatened to destroy the burgeoning California citrus groves in the late 19th century. Orchard owners achieved complete control of the scale insect within two years after vedalia

ladybugs were imported. The operation cost less than \$5,000 and saved millions of dollars annually. When DDT spray programs eliminated the ladybugs in the late 1940's, scales reappeared in force. Reintroduction of the beetle and tempering of chemical applications again saved the industry, after many growers suffered serious losses.

Vedalia ladybugs now help control scales in more than 60 countries, and the success story has launched searches for other insect allies. The technique is not new, however. The ancient Chinese unleashed predatory ants to attack insects feeding on the leaves of their citrus trees.

Scientists from the Department of Agriculture's European Parasite Laboratory near Paris scour the European countryside for enemies of the greenbug, alfalfa weevil, and the cattle-plaguing face fly—all alien pests now established in the United States. At the Pakistan branch of the Commonwealth Institute of Biological Control, technicians nurture a predator called *Platymerus laevicollis* for shipment to Venezuela and the Indian Ocean islands of Mauritius and the Seychelles to fight the huge rhinoceros beetle. A grant to the institute's branch in Switzerland will be used in a search for insects that eat the opium poppy and *Cannabis sativa*, the marijuana plant.

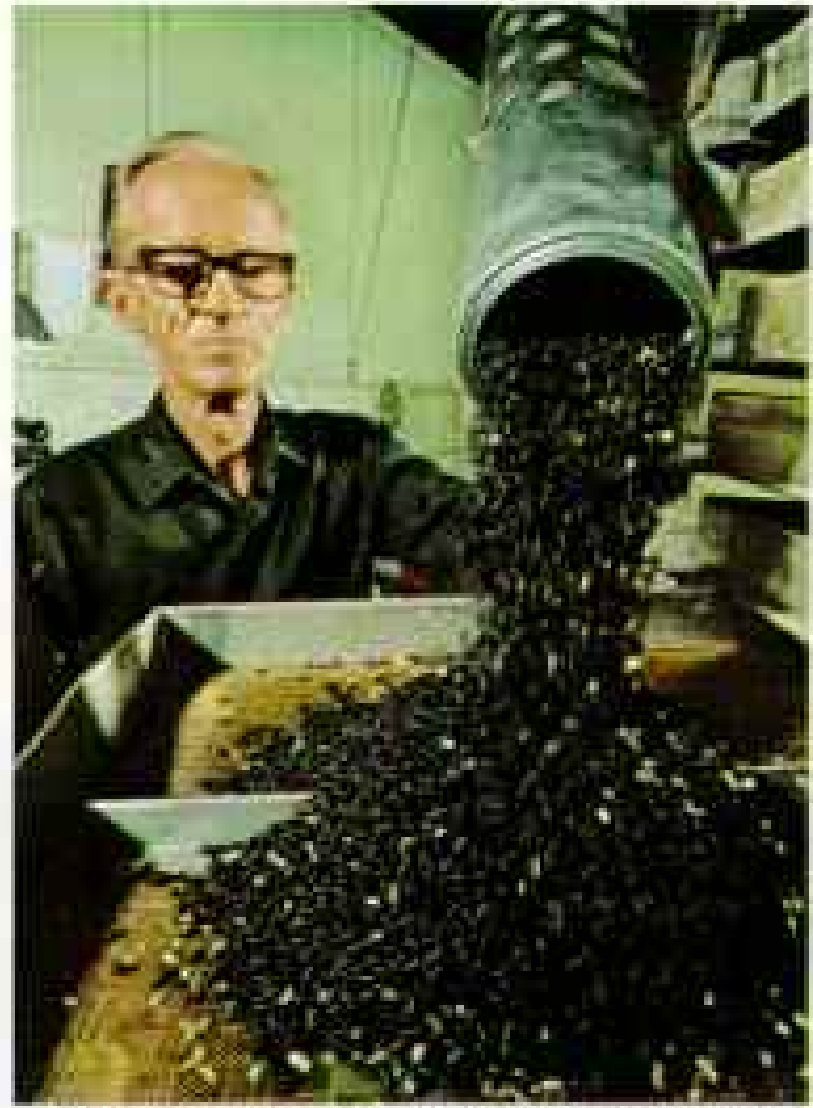
Today public awareness marches nearly in stride with scientific progress.

"Farmers are sensitive to the dangers of chemicals," says Don Goodenough, a California orange and lemon grower. "We live in the middle of our groves. We're concerned with our health and the health of our children."

The economy of biological control also beckons. In the Santa Clara Valley northwest of Los Angeles, Goodenough and other growers scattered laboratory-raised parasitic wasps in their orchards in 1971 to combat red and black scales. The treatment cost them only \$8 an acre, compared with \$25 to \$100 an acre spent by chemical users.



RODOLFO CARBONELL, 1/8 INCH LENS; JERRY PURKAS, 1/4 INCH LENS; ROBERT F. SUTTON



EDDILLIOMYA HOBWINDHAB, 2/2 INCH LONG, EMERGENT BRISTOP

Sterilization stymies the screwworm fly

A CARDBOARD BOMB—ripped open by the slipstream—spews screwworm flies from the rear of an airplane over southern Texas. When they reach the earth the sterilized males will couple with female flies, which mate only once, dooming reproduction. Native to warm climates, the flies lay eggs in open wounds of livestock and wildlife. Flesh-eating larvae can eventually kill their hosts.

In a Department of Agriculture insectary at Mission, Texas, where 190 million screwworms are produced weekly, bombardment with radiation from cobalt 60 (**upper left**) leaves male pupae sterile. After being poured into trays (**upper middle**), they are boxed in groups of 2,000 just before emerging as adult flies. During the airdrop, many escape to speckle the inside of the DC-3 and members of the release crew (**upper right**).

Massive releases along the United States-Mexico border effectively halt the northward movement of screwworm flies each spring. Sterilization also quashed a Florida outbreak in 1959.





Hornworm succumbs to a deadly disease

GLUTTONY SPELLS doom for a tobacco hornworm on a tomato plant (upper) that has been sprayed with a bacterial spore called BT. *Bacillus thuringiensis* affects only certain pests without killing their predators or parasites. Within 20 minutes after ingesting spray residue with its meal, the paralyzed hornworm hangs limp as BT toxin breaks down its tissues (right). Three days later, darkened in death, it still hangs from the perch by its hind claws (far right).

Scientists have also identified more than 300 viruses capable of bringing fatal diseases to insects. The organisms are believed to be entirely different from those that cause disease in humans, and are thus harmless to man. To insects, however, such viruses bring epidemics. Each cabbage looper that dies of the highly contagious polyhedral virus leaves germs that infect more of its kind.

The milky spore disease successfully used against the grubs of Japanese beetles also packs a long-lasting punch. This bacillus can be scattered on the ground to infect future generations of the ravenous pest.



MARCOLOTTA (2); (3) JAMES LONG; ROBERT F. SPENCER





1 LARVA OF SPINTELES MEDICAGINIS, 1/2 (INCH LONG) ALYSSUM CATERPILLAR, SILVER
 2 SPINTELES MEDICAGINIS, 1/2 (INCH LONG)



TRICHOGRAMMA MINUTUM, 1/32 INCH LONG, ROBERT F. EIDEN

Parasite wasps kill at leisure

MINUSCULE FRIEND on the bug battlefields, a tiny parasitic wasp called *Trichogramma*—about the size of the period at the end of this sentence—deposits its own eggs in the egg of a tobacco hornworm. In this extraordinary photograph of the parasite at work, the wasp's egg can be seen as a small darkish bulge beneath its body, about halfway down its egg-laying organ. The wasp's larvae will eat the hornworm embryo and depart from the eggshell as adults—happy substitutes for the four-inch-long vegetable-eating caterpillar. Laboratories in several countries cultivate *Trichogramma* to combat insect pests.

EMERGING from its victim, the well-fed larva of another parasitic wasp leaves the body of an alfalfa caterpillar (1). Devouring blood and fat within the caterpillar, the parasite carefully avoided vital organs so that its food source would remain alive. Once outside, the wasp larva spins its cocoon as the dying host flounders nearby (2). Four or five days in a silken blanket (3) transform the pupa into an adult (4), that will seek out another caterpillar in which to deposit its single egg.



ADULT SPINULES

New weapons challenge the cotton thieves

WHERE COTTON IS KING, its enemies are legion. Most devastating among them: the boll weevil of song and story (**lower right**) and the less familiar bollworm, here staring from a cut-open cotton boll.

Gathering boll weevils in a cotton field, Dr. D. D. Hardee of the Department of Agriculture's laboratory at State College, Mississippi, collects specimens from a conical trap.

Bright hues and chemical sex lures draw the weevils to the cone, used in southern Mississippi in a multiweapon campaign against the destructive pests. Moving instinctively upward, the bugs crawl under the wire mesh and emerge from a hole at its tip (**middle**). But an execution chamber awaits; a clear-plastic box caps the cone (**drawing**). Unable to find the way out, the weevils die.

A spray program last year destroyed 90 to 95 percent of the weevils in the test area.

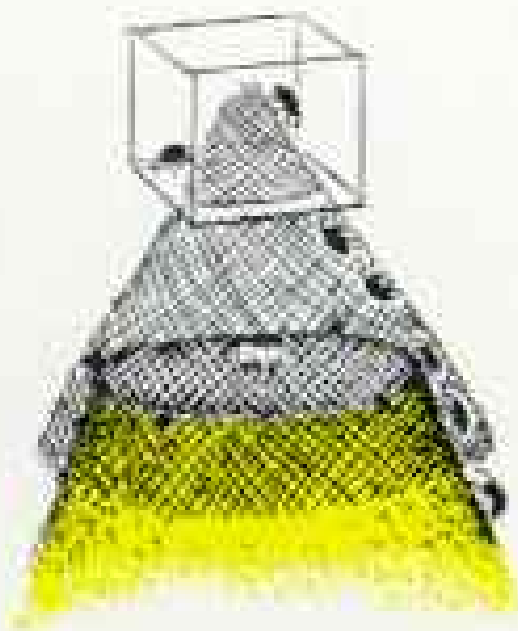
Winter kill further thinned their ranks, and traps collected more in the spring. Release of sterilized males should ensure a weevil-free crop next season.

If primary reliance in the war on cotton pests can be shifted to biological controls, the release of harmful chemicals into the environment would be greatly curtailed. Spray programs against the boll weevil account for a third of the insecticides currently employed in the United States.

Besides polluting the environment, sprays have also prompted plagues of bollworms, by killing the predators and parasites that once controlled the pests. "If spraying for boll weevils could be replaced with other methods of control, the bollworm would cease to be a serious problem," said Dr. M. J. Lukefahr of the Department of Agriculture laboratory at Brownsville, Texas.

BOLLWORM, *HELIOTHIS ZEA*; 2 INCHES LONG; BOLL WEEVIL





THOMAS BRANTZ, 1/1 (BY LINDA ROBERT T. BROWN (BELOW), EMORY KRISTOF)



Hormone sprays cause bizarre growth patterns

RINGED by healthy mealworm beetles feeding on corn (left), several half-formed insects flounder helplessly at the Department of Agriculture laboratory in Beltsville, Maryland. Sprayed with a synthetic juvenile hormone, their development was halted at mid-metamorphosis, leaving freaks that can neither digest food nor reproduce. Close-up (below) tells the



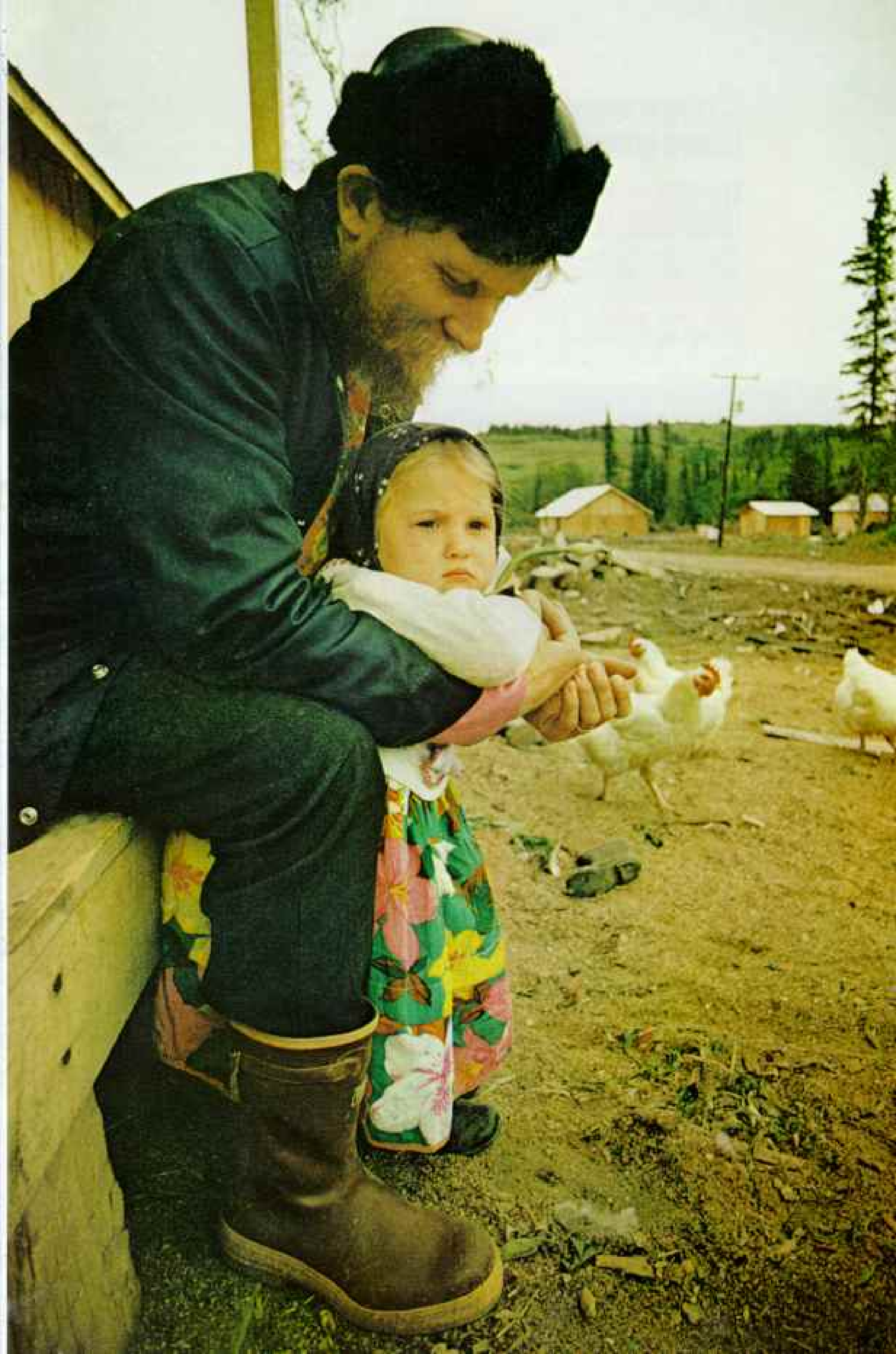
tale: Hormone-treated mealworm, center, grew partial wings and the head of a normal adult beetle, right, while retaining the soft lower body of the pupa, left.

New hope for controlling pests lies in such synthetic hormones that trigger insect development at the wrong time. They could cause dormant pupae to emerge at mid-winter, for instance, to face a quick death. Sprayed milkweed bugs (bottom) vary dramatically from the untreated nymph at bottom and the normal adult at top. One nymph became a "supernymph," far right, that will quickly die. Half-adults at center and lower left grew mature features but failed to shed their nymph skin.

Most important, to a public grown wary of chemical sprays, the insect hormones have shown no toxicity to man or animals. Some helpful insects are now affected, but further research seeks to restrict damage to the target insect alone. □



INSECT MOUNTS (LEFT) 1/4 INCHES LONG; UNDEVELOPED PUPA (CENTER) 1/4 INCHES LONG; NORMAL ADULT (RIGHT) 1/4 INCHES LONG



NIKOLAEVSK

A Bit of Old Russia Takes Root in Alaska

By JIM REARDEN

Photographs by CHARLES O'REAR

Family joys, a safe haven, and the companionship of like-minded friends spell contentment for Kondraty Fefelov and 200 other Old Believers. Still holding out against reforms made 300 years ago in Russia's Orthodox Christian ritual, these gentle dissenters feel that on Alaska's Kenai Peninsula they have reached the end of an elusive rainbow that led their band most of the way around the world.

THE SONG WAS LIKE THE ECHO of an ancient wind, carrying my mind to strange shores, great forests, and a troubled land.

"Devil music," said a church elder who sat next to me.

The true, clear voices of the peasant-costumed men and women resounded in the low-ceilinged cabin. The women wore long colorful skirts, and the bearded men wore *rubashki*, the hand-embroidered blouses of old Russia. In the plaintive strains they voiced, I sensed the fierce passions of simple people, and dreams as old as time.

The elder shook his head. "This music is the work of the *braga*. They will have to make many prayers in church for it." But he was smiling.

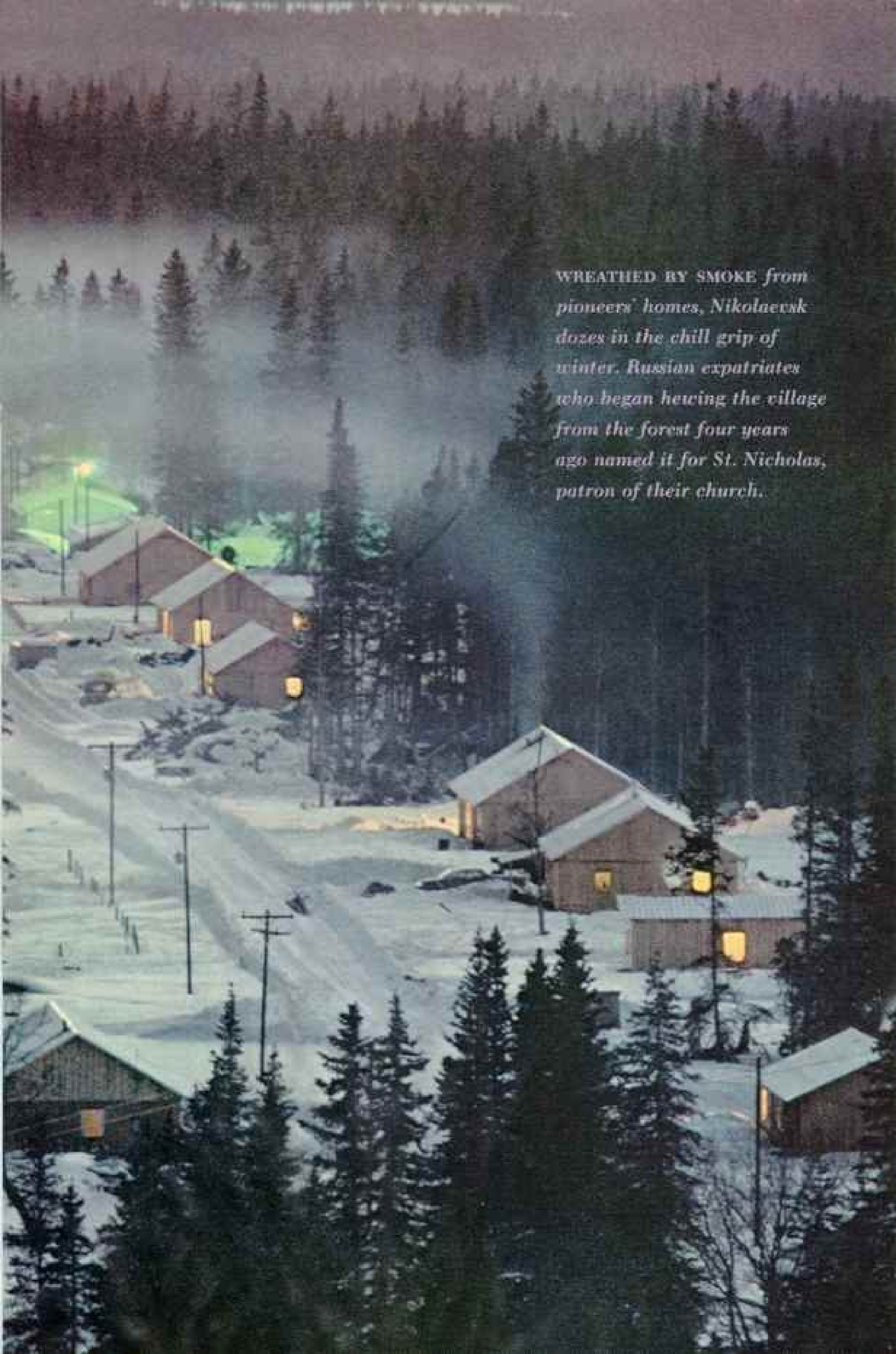
The *braga*, an amber, mildly alcoholic drink made from raisins, yeast, sugar, and berries, had been flowing freely, but I could attribute to it only a small part of my eerie feeling of displacement in time and space. This room—indeed the entire village around me—had surely dropped out of 17th-century Russia.

I was actually in Alaska, on the sparsely settled Kenai Peninsula, where my hosts had newly created the village of Nikolaevsk amid rolling foothills garbed with spruce and birch. This remote hamlet was the latest stop in an exodus that had taken them from their homes in the Soviet Union to Manchuria, to Hong Kong, to Brazil, to Oregon.

Their quest for religious freedom began in the 1920's, after Communism came to Russia, but in a broader sense it had begun more than 300 years ago, when their ancestors refused to accept the reform of the rites of the Russian Orthodox Church and were excommunicated. These dissenters became known as the Old Believers—sometimes the Old Ritualists—and many of them paid for their beliefs with their lives.

The Alaskan settlement is a tiny splinter of the defiant



A photograph of a snowy village at dusk or dawn. The scene is dominated by a dense forest of evergreen trees, their branches heavily laden with snow. In the foreground and middle ground, several wooden houses with gabled roofs are visible, their windows glowing with a warm, yellow light. A thick plume of white smoke or steam rises from the houses, drifting across the sky. The overall atmosphere is cold and quiet, with a soft, hazy light suggesting the time is either early morning or late evening. The snow covers the ground and rooftops, creating a textured, white landscape. The background shows a continuation of the forest, fading into a pale, overcast sky.

WREATHED BY SMOKE from
pioneers' homes, Nikolaevsk
dozes in the chill grip of
winter. Russian expatriates
who began hewing the village
from the forest four years
ago named it for St. Nicholas,
patron of their church.



Linked arm in arm, village girls exchange news on the settlement's only road. Like their mothers, they wear colorful homemade dresses, and never venture out in public without covering their long tresses with scarves.

group, which does not form a single church or communion but consists of isolated communities, each with its own church. There may be as many as three million Old Believers in the Soviet Union. Small colonies exist in Brazil, Argentina, Australia, New Zealand, Oregon, New Jersey, New York, and elsewhere.

The Russian-speaking Old Believers of Nikolaevsk are making a new life, pioneering in a spectacular land. Their village lies 12 miles north of clear Kachemak Bay, where the glacier-hung Kenai Mountains and deep lovely fiords ring the southern shore. Salmon, halibut, king crab, shrimp, and clams abound in the bay, and stately bald eagles wheel above the small boats that fish its cold waters.

If one climbs the slopes above the village, steaming Iliamna Volcano can be seen through the clean Alaskan air, 50 miles to the west, across Cook Inlet. If one strolls just a short way outside Nikolaevsk, the neighbors he meets will be the huge Kenai moose and the fat, shiny black bears that browse the open hillsides.

IN 1967 four full-bearded Russian expatriates arrived on the Kenai, seeking land for their people and information on Alaskan living. They had come from an Old Believer colony in Oregon, looking for a way to escape the temptations and distractions of modern America, which had begun to impinge on their lives there. The four inspected and bought a square mile of wilderness from the state.

"They walked every foot of that section," a farmer who accompanied them told me. "They found the springs, the best places to build, and located the best timber."

The first four houses were built in 1968—lonely, raw cabins in a vast spruce forest. Electricity was brought in by the local cooperative, and more families arrived.

I live in Homer, on the north shore of Kachemak Bay, only 25 miles by road from Nikolaevsk, and I flew over the village in small planes many times during its first years. I could always tell when a family had arrived from Oregon—there would be a pile of household goods on the ground, and nearby, another cabin under construction.

I had serious doubts that the settlement would succeed; in the 16 years I have lived on the Kenai two earlier attempts at colonization by other groups had failed. But time has proved the Old Believers knew how to tame a wilderness. Their village is now home to some 200.

The men work in nearby communities, and some have become commercial fishermen. The villagers do not farm for profit in the short Alaskan summers, but some families have greenhouses where they grow their own vegetables (pages 410-11), and a few have outside gardens. Each man builds his home and supports his family, but, in true pioneering and Christian spirit, all work together, too.

"We help each other by trading work," Kiril Martushev, one of the first to arrive, told me.

"And we all built the church together," Kondraty Fefelov, a church elder, said. "But there weren't many of us at Nikolaevsk then. Now we must make it bigger. Maybe we'll

Half-century search for a homeland

FIRM IN THEIR FAITH for more than three centuries, Old Believers have paid for their fidelity with martyrdom and exile. Adherents to the Old Faith first became targets of persecution in the 1650's, when they refused to accept the rites adopted by the Russian Patriarch Nikon. In the next several decades thousands committed suicide rather than follow the new order. Russian Communism's suppression further thinned their ranks—once an estimated 15 million. Today no more than three million survive there.

Elders of the Alaska group fled from the Soviet Union to Manchuria in the 1920's and 1930's and lived by hunting and trapping. Seven young men born

near Harbin posed there for a group photograph in 1958 (below); four of them now share a new life in Nikolaevsk (bottom).

Fear of Chinese Communism caused many Old Believers to migrate to Brazil, via Hong Kong. Unable to make a living there as farmers, some of the group left South America to start again in Oregon. In 1967, to shield their children from what they felt were corrupting influences—television, tobacco, and drugs—Old Believers purchased land in the Alaskan wilderness for a new village.



FROM THE SCRAPBOOK OF FEDOR BEKASOV



Agile fingers of Anisia Yakunin (facing page) fashion a *pozar*, a belt of vibrant hues. Cards prevent tangling of the threads. Her husband tutors their son and niece in Bible reading.

finish it after fishing season—if we have a good season.”

Villagers must earn money, to complete not only the church but also their own homes. Winter jobs are scarce, so the money earned during the short Alaskan summer must stretch through the long winter.

Salmon fishing has brought little money. Alaska's salmon fisheries are crowded, and competition is keen at nearby Cook Inlet, where only two fishing days a week are allowed during a one-month season. Halibut fishing has been better.

“We made between \$400 and \$500 every four or five days one June,” Ivan Fefelov told me, jubilantly. He and his son-in-law, Vladimir Martushev, fish the boat *Baikal*, which they built together.

Of the 12 top-quality commercial fishing boats now owned by Old Believers, villagers built ten themselves. Eighteen of the men had worked in a furniture factory in Oregon and are experts with wood. Two years after their arrival in Nikolaevsk, several of the men spent the winter building a 32-foot diesel-powered commercial fishing boat in the local sawmill of the Polushkin brothers. Others, like Victor Yakunin and Feodor Basargin, sharpened their skills working in a boat shop 12 miles from Nikolaevsk.

Last winter 15 Old Believers formed the Russian Marine Company, built a shop in Nikolaevsk where five men work, and prepared to produce for sale fiberglass boats of 12-, 16-, and 34-foot lengths. By early spring two 34-foot hulls had come from their largest mold, and one of these was within weeks of launching as a commercial fishing boat to be used by Prohor Martushev. The other hull will be similarly outfitted for Larion Polushkin.

WHEN THE MEN can find time, they pitch in on civic construction. The second year, in my flights over the village, I saw that three springs had been combined and a pipeline dug from the hillside reservoir into Nikolaevsk. Now all homes have running water.

At first the biggest problem facing the Russian settlers was the road that gave access to their village from the nearest road maintained by the state. It was an abandoned oil-company seismic-exploration trail that had not been graded. During rains or when winter-frozen ground thawed, it became an impassable three-mile morass, and in winter it was usually blocked with snow.

One snowy March day I watched 15 men and boys of Nikolaevsk attack snowdrifts on this road with shovels—just three days after the community had paid \$300 to have a bulldozer plow it. In half a day the villagers had cleared it enough to drive again. Now at last, federal and state money has financed construction of a permanent road.

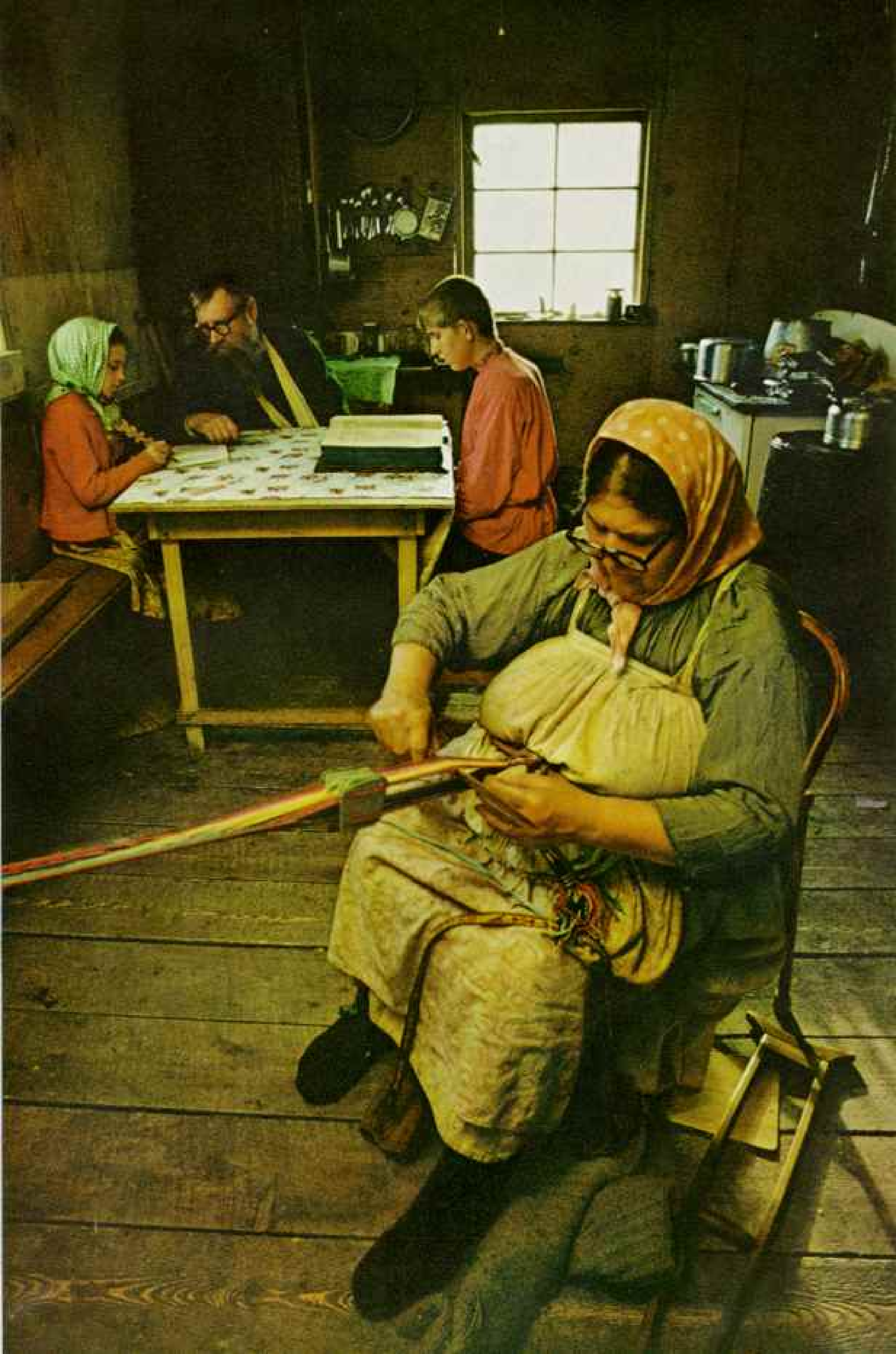
What with wrestling with such problems—problems all Alaskans face—the Old Believers have in a sense become part of our community. In another sense, our Old Believer neighbors remain as remote as 17th-century Russia, for it is the style and tempo of that time and place that they struggle to preserve. In dedication to that ideal, they decided to leave Oregon, where about 4,000 Old Believers

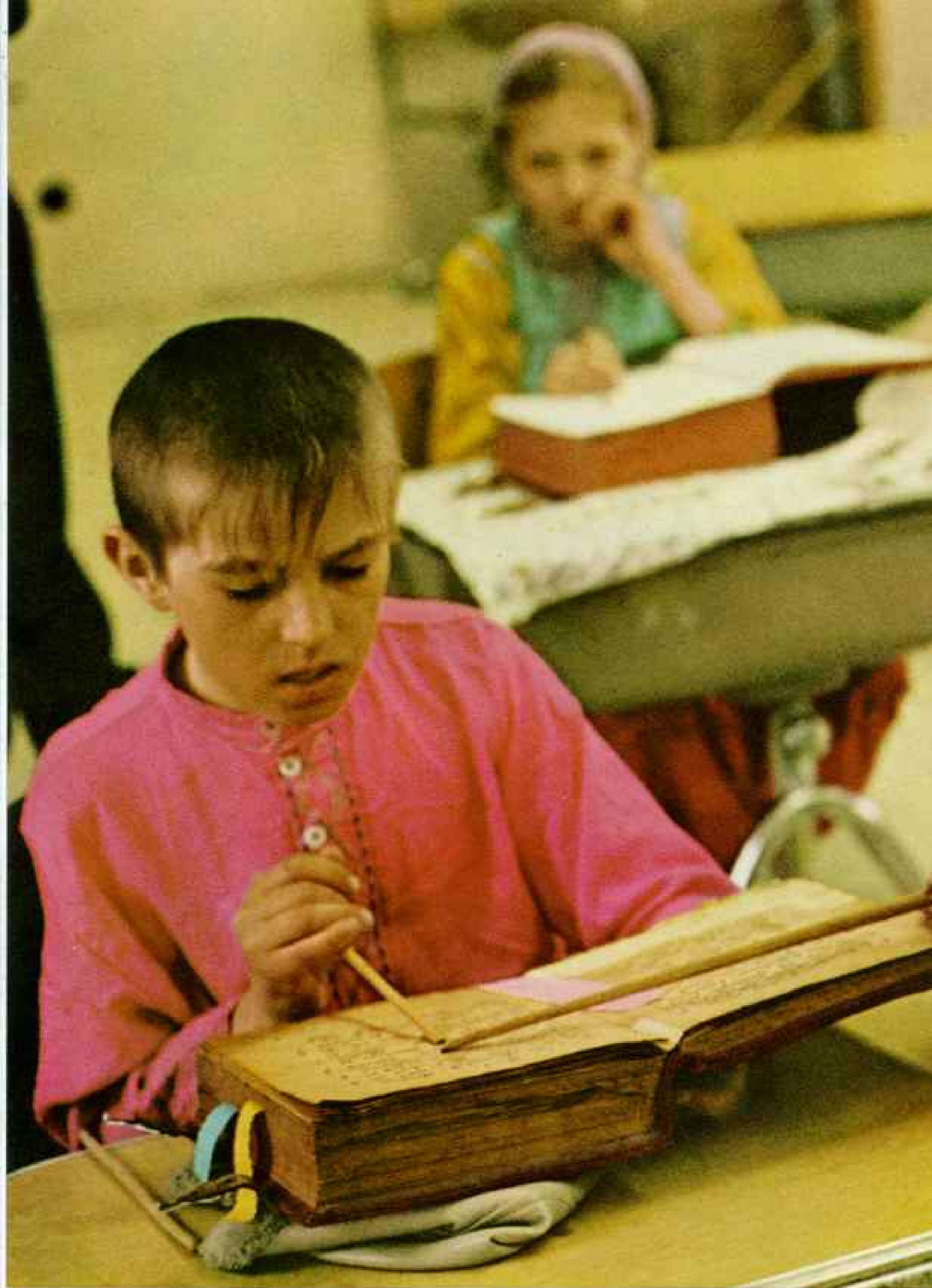


JIM HEARDEN (OPPOSITE)

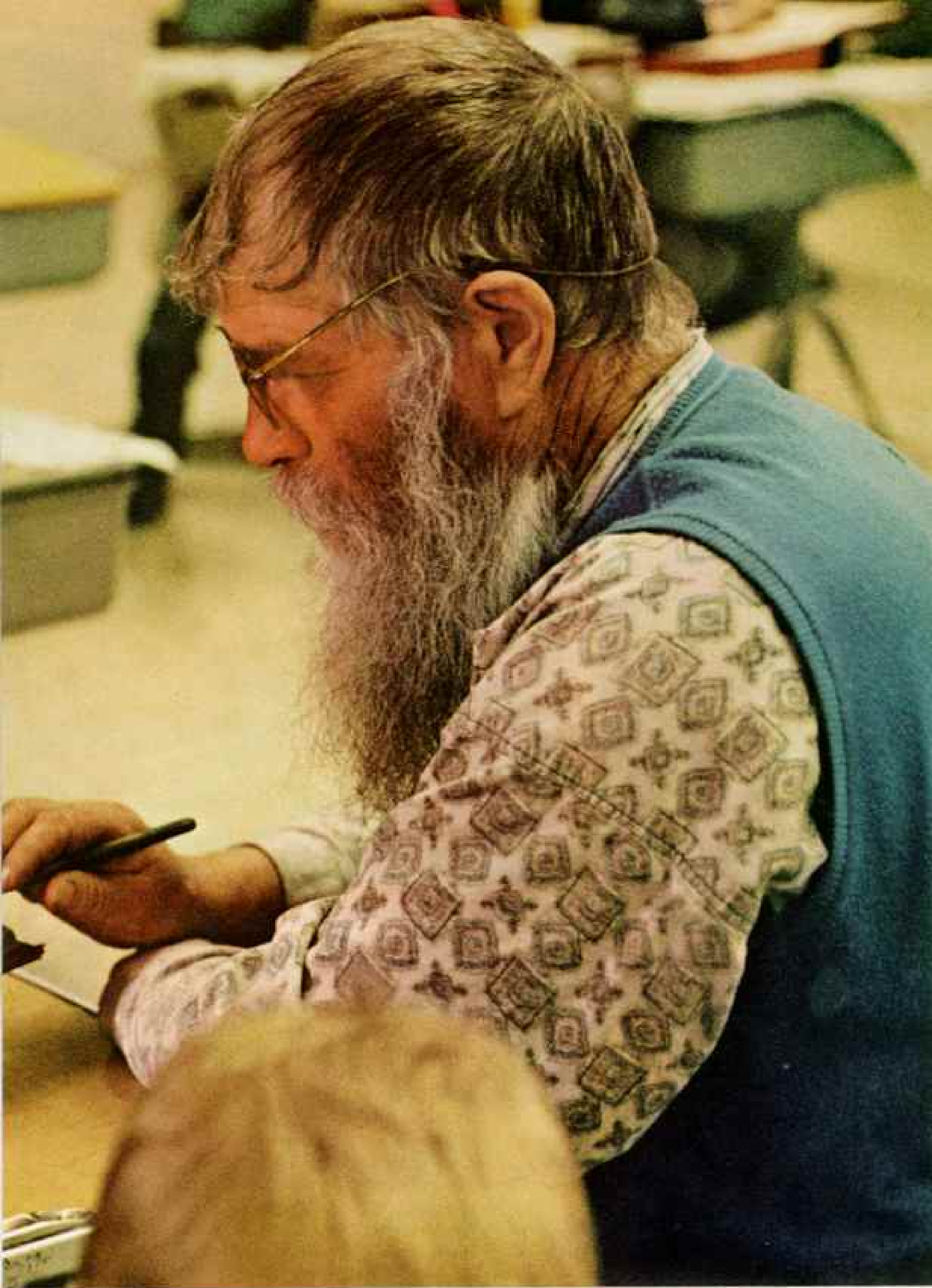


Splashy bouquet serves as a necktie on Fadey Basargin's *rubashka*, the traditional Russian blouse. Each embroidered garment takes a woman about 25 hours to make.





With kindly patience, age passes its religious heritage to youth. Each day



after school, 70-year-old Epifan Reutov instructs a class in Bible studies.



Halibut wrestler Pavel Fefelov heaves a 60-pounder onto a rack at a fishery in Kodiak. Old Believer men not employed on one of the 12 fishing boats owned by villagers take summer jobs throughout the Kenai Peninsula. Impressed by these nearly tireless workers, employers tolerate their frequent absences for religious holidays—an average of three a month.



still live in the Woodburn area, a verdant farming region some 30 miles south of Portland. The ancestors of one group there left Russia about 300 years ago to live in Turkey, and came to the United States in 1963 through the personal intervention of Attorney General Robert F. Kennedy.

But Oregon was not the answer for all the Old Believers in the colony. Some wanted to create a small community of their own, and in Oregon this proved to be impossible. For the young there were the temptations of television, movies, tobacco, strong drink—all unacceptable to their religious code. There were also young men and women outside the faith to whom youthful Old Believers were attracted. A number of the girls even married non-Old Believers.

One small group decided to seek the old way of life in Alaska. "Trees are better than stores for kids," Anisim Kalugin said when I asked him why he had left Oregon.

Advised by the Tolstoy Foundation of New York, they wrote to the Kenai Peninsula Borough: "We want to return



Heated gardens add months to Alaska's brief growing period (left). This plastic greenhouse fills with women at radish-tasting time.



to a community life of our own, to own land and homes, to live in harmony with our neighbors, to protect the integrity of our faith, and to raise our children with a minimum risk of contamination from modern temptations. . . ."

And so they came to the Kenai. Behind them lay an ordeal of dislocation that had stretched through half a century. Eighty-three-year-old Grigory Martushev invited me to his home to hear the story. I walked two miles of snowy trail to reach Nikolaevsk, for the access road was snowed shut. Passing the modest houses that line the main dirt street of the village, the log barns, and the fences with onion-shaped picket tops, I came to Grigory's cabin. It was made of raw yellow spruce from the Polushkin mill.

The old man speaks no English, so his 27-year-old grandson Kiril translated. "In 1930, the Communists came into my home, accused me of hoarding flour, and took everything but the clothing we wore," he said. "I was thrown into jail, then released, but the threat of jail remained. With my

When winter nears and jobs grow scarce, Irina Fefelov's family will not want for food—thanks to summer canning. A July afternoon finds her at a make-do outdoor kitchen, putting up fresh cherries flown to Alaska from warmer climes. Sealed jars of homegrown onions, cucumbers, tomatoes, and zucchini will also line her pantry shelves before the first snows fall.



brother Yosif and his wife and four children, my wife and I with our two children fled from our village, which was about 200 miles from Vladivostok." Kiril translating, added his own comment: "Rabbits don't even live that far out."

"We rowed across the Sungacha River into Manchuria. The current was swift, and the boat was swept into a whirlpool where it overturned," Grigory said wearily, as if he had repeated the story many times. "One of Yosif's children drowned. In 1931 we started a village in the wilderness near Harbin, and it grew to 22 log houses as more Old Believers arrived from Russia."

Until Communism came, life in Manchuria was rewarding. "We were rich because we were happy," Kiril said. The government in Manchuria accepted the Old Believers. Though it gave no financial assistance, it allowed them to settle and then left them alone, not even trying to tax them.

Pimen Yakunin, who became a great hunter in Manchuria, once entertained me in his tiny cabin and recounted his exploits.

"There were wild boars, deer, bears, and tigers," he said, rolling up his sleeve to show me vivid scars left by the claws of a young tiger he captured. "My dogs cornered it, and I was clawed while pinning its head down with a big forked stick. After the capture I sold the animal to a zoo. I caught or killed about 40 tigers, altogether. Once a tiger stalked me; I turned and shot him just as he leaped at me."

Pimen explained that the market for dead tigers was good; their whiskers, claws, skin, and even meat were important ingredients in Chinese medicine. So were the antlers of a large deer, which the Old Believers sold to Chinese to be ground into a highly prized aphrodisiac.

The only enemies of the Old Believers were the public enemies that roamed Manchuria. Once their village was invaded by a band of more than a hundred brigands. Before dawn a score of Old Believer hunters, with rifles, slipped out of the village and surrounded it. Women and children went into the woods, or hid in cellars. At daylight the hunters attacked, and in a day of fighting killed 30 of the outlaws and routed the rest, without loss to themselves.

"Bandits left us alone after that," Kiril said.

AFTER 26 YEARS of good living I had to leave Manchuria," Grigory said. "Our people knew about Communists." The Old Believers were not harassed by the Chinese Communists, but they were taking no chances on the future. They went to Hong Kong and encountered other groups of Old Believer refugees who had fled from the Soviet Union through China. The British in Hong Kong fed and housed them while arrangements were being made for emigration. Then in 1958, Old Believers from these groups were transported to Brazil by the Intergovernmental Committee for European Migration. There the World Council of Churches provided 6,000 acres of land at Curitiba, about 200 miles southwest of São Paulo.

The Old Believers struggled in Brazil, but adjustment to the land was difficult, and several crops failed. When they

Playing it cool, a youngster plunges into a hideaway swimming hole (facing page) in the icy North Fork. In this secluded pool not far from the village, the boys spotted the summer's first large spawning salmon—good news for fishermen fathers who had been told the catch would be meager that season.

Aimed at a pest, a squirt from a can hits a friend. Blotched by bites from voracious Alaskan mosquitoes, village youths spatter each other with aerosol insecticide.





Simple pleasures fill leisure hours for children denied television, radio, and musical instruments. A mail-order catalog (top) substitutes for TV commercials.

When they aren't shooting marbles or jumping rope, the youngsters lurch about on handmade stilts or—in winter—zip down hills on homemade sleds. One lad (above) finds pleasure in a Russian-made camera.

Easter feast ends Lenten fasting. Religious beliefs prohibit outsiders from joining this festive table (opposite). Old Believers rarely use knives or forks, and eat from common plates.

got good crops, oversupply plummeted prices. To the Old Believers, the Brazilian Government appeared to be turning leftward. So during the 1960's, with the help of the Tolstoy Foundation, many settled in Oregon. There, with modern America all around them, the Manchurian Old Believers found their cherished convictions under assault, especially among the young.

"We don't smoke, don't shave, don't drink hard liquor. We don't use marijuana or birth control," Kiril said.

They also shun tea and coffee. They eschew shellfish, and so exclude the abundant crabs, shrimp, and clams of the Pacific from their diet. Every Wednesday and Friday they forswear meat, eggs, and milk.

The people of Nikolaevsk expect that more Old Believers from Oregon will finally join them—especially some who earlier tried life in the village and went back discouraged, and those who contributed to the purchase of the land but decided to wait in Oregon till they thought the Alaskan experiment would succeed.

Nikolaevsk's Old Believers have no doubt of their success. Prohor Martushev, Kiril's father, told me, "We work hard, and we play hard. You visit us at Easter, and you will see that we are happy."

EASTER SUNDAY and the six days following are Nikolaevsk's most important holidays, but I found I would have to march to a different tune if I was to attend at the proper time. The Old Believers determine the dates of holy days not by the Gregorian but by the Julian calendar. December 25, for instance, falls on what is January 7 to all but a few Americans.

The day before Old Believer Easter, I visited the home of 25-year-old Feodor Basargin. He is "Fred" to his *Amerikansky* neighbors, and he is venturing into the construction contracting business. (Shortly after Easter, Fred was elected *starosta*, or mayor, of Nikolaevsk for a one-year term. The ballot was secret, and only the men voted.)

Feodor's married sister Agripena and her husband, Anany Kozhin, were there, as was Victor Yakunin. The three Basargin children, Ulita, Grigory, and Varsanofy, and the two Kozhin children, Alexey and Tatiana, were playing inside the house. The men visited and watched the children, while the women boiled and dyed Easter eggs in the kitchen.

"They're hurrying to get done before church," Feodor explained. The service was to start at four that afternoon.

Between boiling and dyeing eggs, Irina, Feodor's wife, removed rising dough from a wooden tub, punched it down, rolled it, and plunked it into pans to rise on a nearby table.

Not wanting to make the women late for church, I decided to get out of their way, and so walked to the home of Anisim Kalugin. He was one of the four-man advance party that bought the land for Nikolaevsk. During summers he works in a salmon cannery, 45 miles away at Kasilof, and the rest of the year he picks up odd jobs elsewhere. The Kalugin house is one of the largest in Nikolaevsk, with three bedrooms, a big living room, and kitchen. Like the majority



Rustic noodle factory: For Anna Kalugin and her mother, Solomia, a barbed-wire fence becomes a drying rack for freshly cut noodles (below), a staple in the Old Believers' hearty diet. They curb their appetites on Wednesdays, Fridays, and during four annual fasting periods, when eggs, milk, and meat are forbidden.



of homes, it is heated by firewood; the village has only a few oil stoves. The house was sparkling clean and bright with freshly embroidered cloths on the walls. The eggs were all dyed, and the seven Kalugin children were preparing to go outside to the wood-heated *banya*, or steam bath.

Anisim's wife, Solomia, came through the living room with her hair falling in a great cloud to her waist. The women never cut their hair, and in public they keep it in braids and covered with a *platok*, or head scarf. An unmarried girl wears one braid, but when she marries, which may be as young as 15, her hair is plaited into two braids at the wedding ceremony and worn that way thenceforth.

I chatted with Anisim, and then moved on. As I left, Solomia came out of the *banya*, wading through the snow and holding 10-month-old towel-wrapped Karnily on her hip. Only his bare feet and head were visible, and they were glowing red from the steam bath.

Until Saturday midnight, Easter services were informal, with elders reading passages from the Bible. The formal



Dairy cattle feed on wild hay cut from fields overlooking the village (upper right). Women do the haying while their men are at sea fishing. Here Maria Reutov (lower right) teaches her daughter how to swing a scythe. Old Believers also use tractor-drawn mowers.



services started at midnight, with hallowed rituals that continued until seven in the morning. These rites date back in some respects to those of imperial Byzantium in the eighth century A.D.

For their right to worship as I saw them doing, the Old Believers have been nonconforming since the 1650's. In those years the Russian Patriarch Nikon attempted to reform the rites of the Russian Church to accord with the Greek usages in the Orthodox Church, from which Russian Christianity originated in 988. In the seven centuries that had passed, Greek and Russian rites had diverged.

The Old Believers' long-ago defiance of the Patriarch Nikon is, to them, as immediate as if it had occurred last week. "We refused to accept the changes Nikon wanted," youthful Kiril Martushev told me, "and so we were persecuted and exiled." The disagreement between Nikon and the Old Believers extended to such fine points as how to make the sign of the Cross. The Old Believers used two fingers; Nikon cried heresy and insisted on three.



Scrambling for eggs, village children charge through drifts (facing page) in search of the Easter symbols—a favorite game for even the tiniest tykes. Age rarely bars children from games of any sort. Old Believers—boys and girls alike—display concern and affection for younger brothers and sisters.



Live jack-in-the-box, Feodor Basargin delights year-old Varsanofy—and wife Irina, too—by popping out of his home's storage bin with eggs to be boiled and dyed for Easter.

To the Old Believers, such details are important. In their lives almost everything has religious significance—even the clothes they wear. Church elder Kondraty Fefelov told me that a child is baptized and given a cross to wear around his neck when he is 8 days old. From then on he may wear the rubashka and the *poiyas*, a handwoven belt. Just as sacred manuscripts were illuminated by monks in the Middle Ages, the rubashki are embroidered today by the women of Nikolaevsk, using patterns handed down from generation to generation (pages 406-407).

The art of manuscript illumination is also kept alive. Prohor Martushev showed me a hand-lettered book he had prepared while living in Hong Kong and waiting to move to Brazil (page 424). Illuminated in vivid gold, silver, red, and blue, it was a collection of chants, set in a musical notation created in Russia about a thousand years ago and known as *znamenny*. At the Easter services I heard *znamenny*—it sounded faintly Oriental, in a minor key. While the congregation chanted—and indeed through the whole hours-long Easter service—everyone remained standing except the ill and elderly, who were permitted to use benches.

ON EASTER MONDAY the brilliant colors of the girls' *sarafany*, or long dresses, as they played in the snow near the home of Efim Bagdanoff, showed me where the adults had gathered. Neighbors had helped Efim build his house, and this holy day was his chance to show appreciation by having a party. I ducked snowballs thrown by the children as I ran into the crowded house. It was screaming with joyful hues, for many wore new finery—the brightest, most beautifully embroidered clothing I had seen, all made by the women of Nikolaevsk.

Prohor Martushev motioned me to a seat on the bench beside him. "Welcome, Jeem. You like some braga?" He placed a brimming paper cup in my hand.

Efim proffered a platter of colored hard-boiled Easter eggs with a ceremonial, "*Christos voskrese*—Christ is risen," and Prohor taught me to reply, "*Voistinu voskrese*—Indeed He has risen."

Men crowded the benches around the edge of the living room. Some wore black *kaftany*, or cassocks, from their church attendance of the previous night. Laughter and happy shouts filled the house.

Chattering women set a table in the kitchen, and a group of adults, after giving thanks to God, sat down to eat their first meal in seven weeks without Lenten restrictions. I was not asked to join them. Just as Old Believers will never pray with other Christians, they will not eat with them unless forced to, as in restaurants or when traveling. Most Old Believers keep special dishes in their homes for the sole use of guests, and I ate from these in the living room. "It is a custom that started long, long ago," my host explained, almost apologetically.

After the meal, the diners stood and, in unison, faced the icons in the corner of the kitchen. They made the sign of the Cross and gave thanks for the food again. Then braga





flowed freely, and the party became merrier. Once some of the men went outside and had a snowball fight.

Prohor smiled and pointed to the many brightly dressed children swirling about the house, excitement shining in their eyes. "Lots of fine kids—they are our future," he said.

THE OLD BELIEVERS cherish that future. I visited the two one-room schoolhouses they persuaded the Kenai Peninsula Borough to build and support. There the youngsters of Nikolaevsk are educated in English. In one room George Wolansky teaches kindergarten and first and second grades. He is a graduate of Western Washington State College, with degrees in Russian and education, and this is his first assignment in Alaska. He lives nine miles away, at Anchor Point, with his wife and 5-year-old son. With the other teacher, Robert Moore, he usually walks two miles from the main road to the school.

Tatiana Martushev, 21, who has four children of her own, works as Wolansky's aide. Using a life-size diagram of a woman in an apron and ankle-length skirt, and with labels in English, she points, and the sweet high voices chant, "Stomach, knee, apron, eyes..." When a child doesn't understand an English word, Tatiana or Wolansky explains in Russian. By third grade most of the children speak English, but not without a Russian accent, since English is spoken only in the classroom.

In the other schoolroom, Robert Moore, who also lives at Anchor Point with his wife and two young daughters, teaches grades three through eight. He had taught for a year at another Kenai Peninsula school. Educated in Tennessee, he claims, facetiously, that he is infusing the Nikolaevsk children with a Southern accent. He does not speak Russian, but he has help from aide Glikeria Kuzmin (page 423).

"I am trying to prepare these children to be productive in an English-speaking society," Moore told me. "The children sometimes struggle with language arts, but they are amazing in mathematics. One 6-year-old can easily add five-digit numbers, five deep, and a seventh-grader does high-school-senior math."

Braving no-man's-land, Artemy Polushkin is offered a baby's bottle, to the amusement of women gathered for chitchat after a festive Easter meal. Scarves conceal plaited hair: one braid for single girls, two for wives.

A close-knit, gregarious folk, villagers never knock before entering neighbors' homes. Parties often include visits to as many as half a dozen houses, each replete with food and *braga*—a homemade, mildly alcoholic brew.

Stuffed and happy after the holiday dinner, the men relax on a couch against a backdrop of tapestries as vivid as their rubashki. The followers of the Old Faith feel shaving would be an insult to the wisdom of God, who gave man a beard—however thin and light it may be.

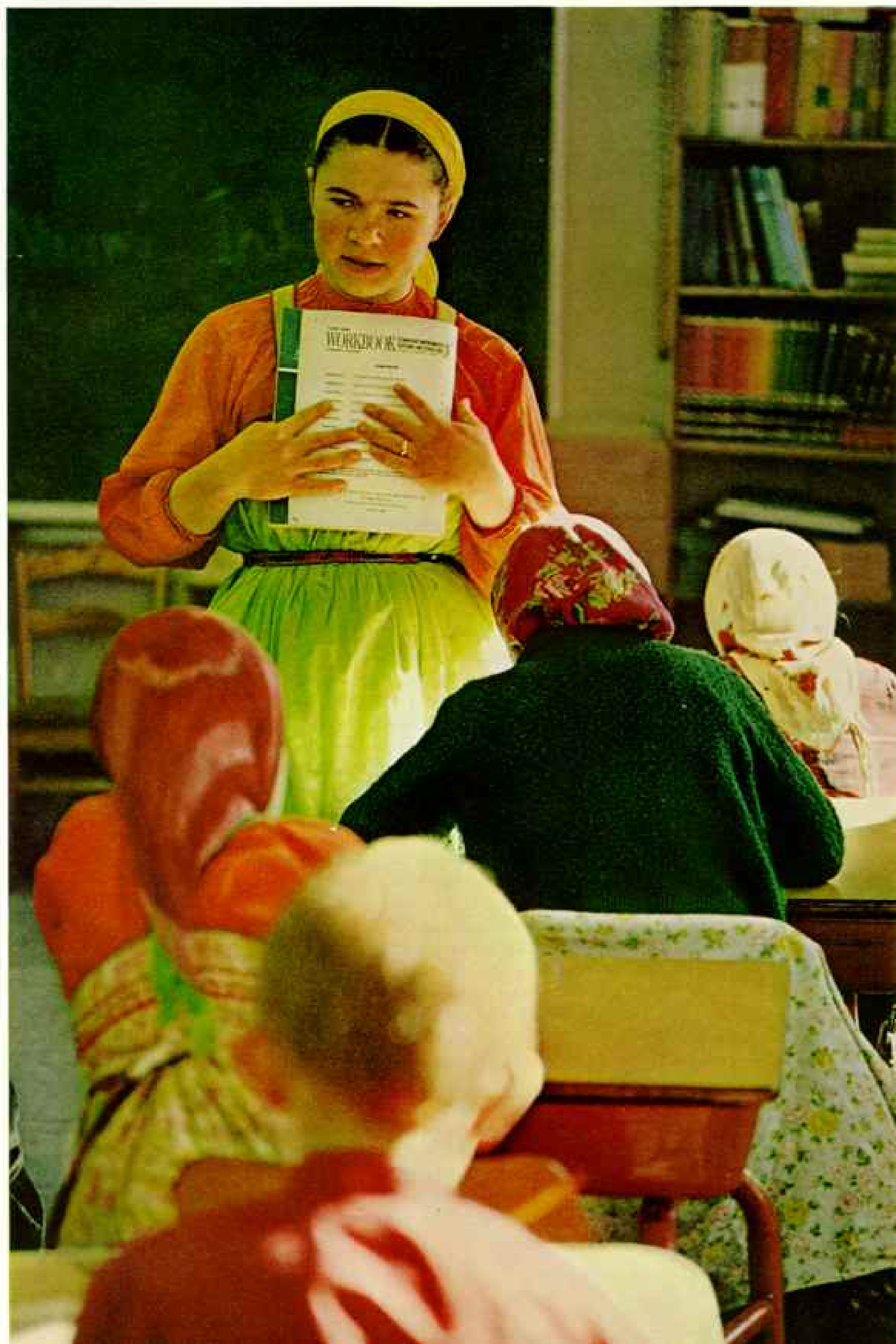




Grim grin signals success for 6-year-old Glikeria Fefelov (top left) as she chalks English-alphabet letters on the school's new blackboard. Well-disciplined village youngsters show healthy respect for the punishment strap (top right) that a parent left with a substitute teacher to enforce order.

Though fluent in the Russian they

hear at home, the children do their lessons in English. Bilingual classroom aide Glikeria Kuzmin (right)—a mother herself at 17—helps students bridge the language gap. Pupils eager to play outside press toward the door (above) at day's end. Old Believers normally quit school for jobs or marriage after the eighth grade.



Bowed in prayer, a reverent child (facing page) fulfills the Old Believers' purpose in moving to the Alaskan wilds—perpetuation of a faith that has buoyed them through centuries of hardship and change.

I asked Moore if there were conflicts between the religion and his curriculum, which includes a citizenship course and study of the Constitution.

"Not really," he answered, "although some of the fathers asked me to tape shut the human reproduction section in our encyclopedia. Now I teach reproduction using sponges, fish, and plants as examples."

Moore has shown the children NASA-produced films, and discussed the moon landings, but the children will not believe that man has landed on the moon. The Bible says that God made the moon for light, and, therefore, the children argue, it is a ball of fire like the sun, and impossible to walk upon.

The pupils' concentration on their studies is mightily aided by several Old Believer taboos. Nikolaevsk does without television, radios, and musical instruments. "We don't believe they are necessary," Kondraty Fefelov said.

FOR RELAXATION, the children are encouraged to stay at school after hours in the long dark winters for Bible studies. They have swings and homemade sleds and enjoy such traditional sport as the Russian game of rabbit, in which players in a circle vigorously throw a small ball at the rabbit (one of the players) inside. Boys fish for Dolly Varden trout in the quiet waters of the North Fork, their rubashki making vivid splashes amid the somber green of towering spruces. Bevvies of brightly dressed little girls scamper through a Christmas-card landscape in their version of hide-and-seek.

I watched a group of them one day when the snow lay deep and wind moaned through the tops of the surrounding forest. Jabbering in Russian, the girls took turns hiding and searching for a dozen dyed Easter eggs. A cow bawled in a nearby barn, chickens scratched in the snow, and a rooster crowed.

Nine-year-old freckle-faced Ulita Kalugin dashed by, shouting excitedly. She tucked a red egg under a woodpile, then said to me in English, "No one will see this one," and rushed off to hide another.

The life of the children of Nikolaevsk is, of course, not always so idyllic. Three lonely graves of children who have died in the village stand in a clearing on the outskirts. Medical care is not easily come by. Since the elders feel it would be too expensive to install telephones in Nikolaevsk, a mother cannot call a doctor for advice, but must wait for the periodic clinic calls made by Dr. Paul Eneboe of Homer. Local doctors encourage Old Believers to visit the modern hospital at Homer, but they are generally reluctant to do so. The women of Nikolaevsk bear their children at home, attended by a midwife.

In spite of such drawbacks, the Old Believers of Nikolaevsk have accomplished what they set out to do. After a turbulent past, they have seen their dream of a new life in the old way come true. For old Grigory Martushev that is a crowning achievement. "I have been running for 40 years," he said. "At Nikolaevsk I stop." □

Devotion to creed inspired Prohor Martushev's exquisitely illuminated collection of *anamenny* chants sung by Old Believers in their services. Handcrafted by him over many months, the two-inch-thick book reflects the elegant religious artistry of 17th-century Russia.





Shouldering down to the Irish Sea, gable-to-gable guesthouses line the promenade

The Manx and Their Isle of Man

By VERONICA THOMAS
Photographs by TED H. FUNK

“**Y**OU’LL BE PUTTING a sight on the Fairy Bridge soon now,” says Garth the taxi driver, a good-looking young man with dark curly hair. “We’re nearly there.”

The road we follow leads from Ronaldsway Airport to Douglas, the capital of the Isle of Man. It’s not a wide road and it twists a bit, but it’s the leafiest, greenest one I have ever seen. Tall trees with great curved trunks arch from either side, like a luxuriant tunnel.



in Douglas, port of call for the waves of tourists that surge each summer to the Isle of Man.

“Is this your first time in the island?” Garth inquires. When I say it is, he asks what I know about Man.

In fact, I know only what I have read: The Isle of Man, a largely self-governing community within the Commonwealth, lies in the Irish Sea, roughly equidistant from England, Scotland, Wales, and Northern Ireland (map, following page). From the top of Snaefell, its highest mountain at 2,036 feet, you can see the “six kingdoms”: England, Scotland, Wales, Ireland, Man—and Heaven. The island, 32 miles long by 13 wide, has 56,000 people,

mountains, glens, rugged coastal cliffs, and a climate mild enough for palm trees. The Manx people are said to be . . .

“Fairly superstitious, we are,” says Garth, as if reading my thoughts. “Especially Manx fishermen. If one of them put a sight on you now—you being a woman and red-haired as well—he’d likely go straight home again and not go fishing at all.”

He slows the taxi and announces, “There’s the Fairy Bridge now. Don’t forget what I told you—nice and *loud!*”

A stream trickles beneath the little bridge



Bantam beau in Prince Albert elegance joins in the annual Laxey Fair. Manxland's flavorful ways, inviting beaches, and bustling casino lure half a million visitors a year to this home of 56,000. Most come by ferry from neighboring England and Scotland, which lie near enough to be visible on clear days.



MAP BY ALFRED C. STEARNS
 COURTESY BY GEORGE W. DEANEY

and passes into a meadow of shoulder-high grass and white hogweed.

"Good afternoon, fairies," we say. Garth shakes his head, "Louder, or they won't hear you—and you forgot to wave." I comply. "There now," he says, and we drive on.

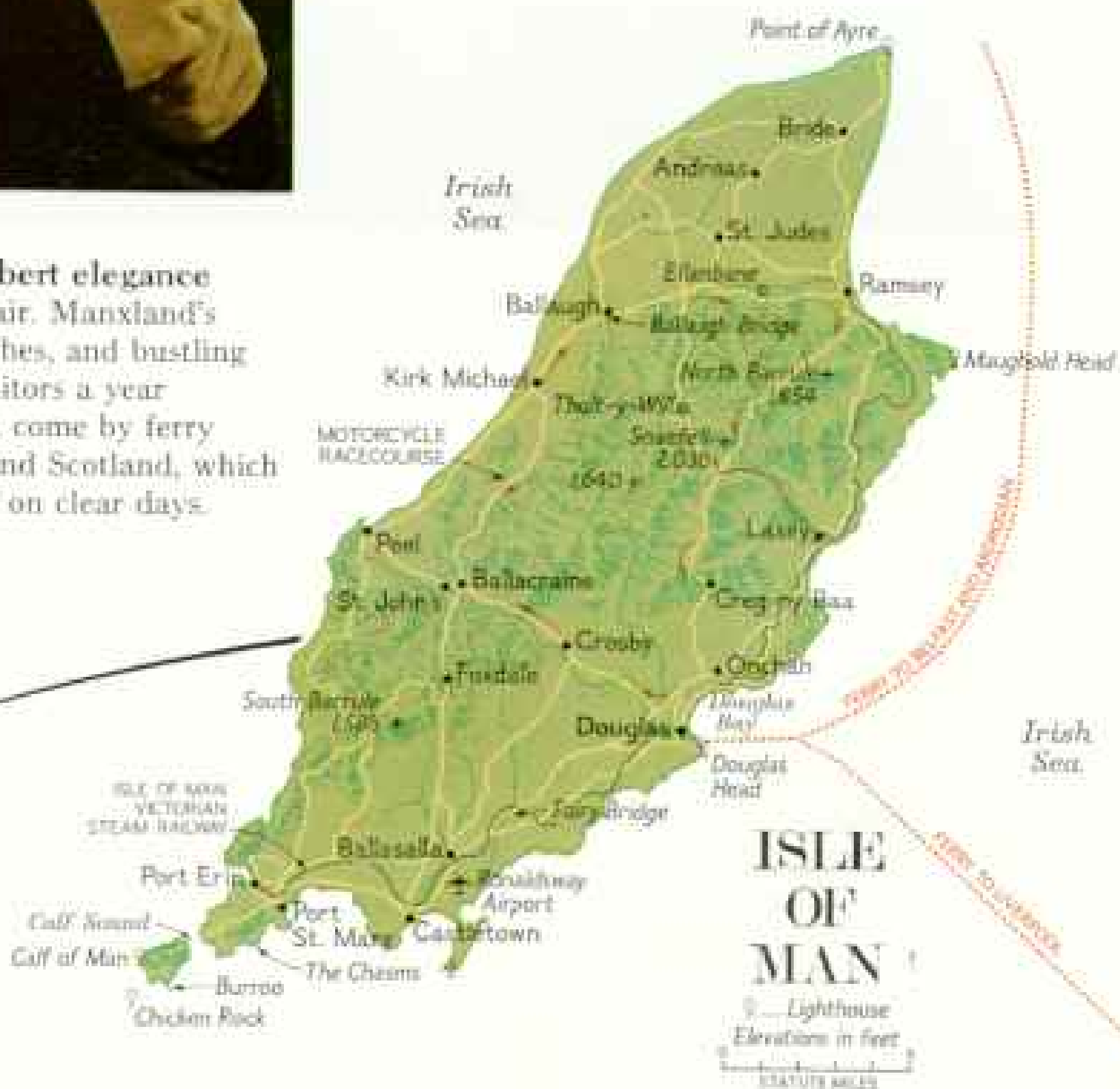
"It doesn't do to offend the fairies," Garth explains. "Not long ago I took a visitor in from the airport. From London he was. He just laughed. Refused to salute the fairies at the bridge, he did. He wasn't laughing five minutes later when his pen leaked ink all over his front!"

Beyond Douglas Head and its white lighthouse off to our right, we enter the seaside town of Douglas. Built upon trade with British ports such as Liverpool, Douglas grew from a small fishing village into a thriving commercial and tourist center of 20,000 permanent residents, with facilities for 30,000 visitors. Many outsiders are lured by the gambling casino in the capital.

In downtown Douglas, a jumble of narrow, winding thoroughfares enfolds Strand Street, the main shopping area. Display windows overflow with postcards and souvenirs.

Small cafés do a brisk business in hot meat pies, sausages on sticks, kippers, and chips, chips, chips—familiar to Americans as French fries.

Garth deposits me at the door of a pleasant-looking seaside hotel. We shake hands and I



thank him for introducing me to the island.

"One thing is certain," he assures me, smiling. "You're in with the fairies now."

In the weeks that follow, Garth's prophecy is amply fulfilled, whether by the good fairies or by the islanders' warmth. Wherever I turn in their hospitable domain, I am welcomed not as a stranger but as a member of a large family.

Gift Bought Back Because of Smuggling

For a small island, Man has had a varied and sometimes turbulent history. The Celts who arrived from mainland Europe via the British Isles about 500 B.C. evolved Manx Gaelic, a lilting tongue that has all but died out in favor of English. Then came a Viking raid in A.D. 798, the first of several incursions that led to Norse settlement. Stability arrived in 1405, when England's Henry IV gave the Isle of Man to the Stanley family, later known as the Earls of Derby, who ruled for more than three centuries.

In 1765 the British Crown bought the Lordship of Man back, in an effort to prevent the Manx from smuggling contraband into England. Since then, the King or Queen of Great Britain has held the title "Lord of Man," although the island is not actually part of the United Kingdom.

One of the first islanders I met is a "come-over"—the Manx term for someone born elsewhere who immigrated to Man. John Drummond of Megginch, fifteenth Baron Strange, is a come-over with a difference. A few years ago, at 65, he left his castle in Scotland and settled on Man, where members of his family had lived for 560 years. He and his wife, Violet, invited me to lunch one day at their charming house, set amid wild flowers and waterfalls; its name, Tholt-y-Will, means "Will's Barn" in Manx Gaelic.

The Stranges have converted part of the property into a comfortable inn and small restaurant. Over a delicious meal of grilled fresh trout and strawberry mousse, Lord Strange spoke of island legends.

"Our king," he said, smiling, "is actually a Celtic god, Manannan Mac Lir, lord of the sea. In fact, the island's name, Man, is just a short way of saying Manannan."

Manannan Mac Lir is not only a king, but also a sorcerer. When a mist cloaks the isle, people here call it "Manannan's Mantle."

Queen Victoria and Prince Albert stopped at the island in 1847, and Manannan—no

respector of fellow royalty—shrouded Douglas harbor in a mist that forced their party to land up north, at Ramsey. The same thing happened to George V. Indeed, so many kings and queens put in there that people took to calling it "Royal Ramsey."

Time was when a good many islanders welcomed Manannan's Mantle. It provided superb cover for the lucrative smuggling that centered around Douglas. Brandy and silk from France, rum from Jamaica . . . It wasn't illegal to bring those items into the Isle of Man, for the island was not subject to British duty. But the Manx sailors ran the goods "across the water," as islanders refer to the British mainland. Many a Manx family built their fortune in those daring times. They never used the word "smuggling," preferring to refer to it as trade.

Today the inhabitants rely on less adventurous ways to make a living: tourism, light industry, building construction, fishing, agriculture. And, incidentally, the farmers produce sufficient meat, milk, and potatoes to meet the needs of Man.

Islanders receive modest wages, but enjoy a low tax rate. A government secretary may earn 25 pounds (about \$65) a week, and a starting schoolteacher slightly less. Fishermen average around \$60 a week.

Bligh of the *Bounty* Married Here

Man's ties with the sea include the mutiny aboard the *Bounty* in 1789. Lt. William Bligh, commander of the *Bounty*, was married in 1781 at Kirk Onchan, just north of Douglas, to Elizabeth Betham, daughter of the first British customs officer on Man. The Blighs lived in Douglas for several years before moving to London. Fletcher Christian, Bligh's shipmate and leader of the mutiny, came from an old Manx family.

But the Isle of Man is better known to the world for its tailless cats (page 431) than for its maritime associations. Not long after reaching the island, I heard a venerable rhyme by an unknown author:

*Be bo bend it,
My tail ended,
But I'll go to Man
And get copper nails
And mend it!*

Of course the last thing they want at the government-run cattery in Douglas is a cat with a tail. "We produce between 30 and 40





Emerald as Ireland, hedgerowed as England, Man wears a pattern of lush pasture. Through intensive farming, the island yields an abundance of meat, vegetables, and dairy products. The warm Gulf Stream brings a gentle climate.



Tailless trademark, the Manx cat (above) had become so scarce eight years ago that officials set up a cattery to propagate the breed. Now 30 to 40 pure Manx kittens a year purr off the reproduction line.



Island oddities, Loughran sheep graze on the Calf of Man (left). One ram sports four horns; occasionally the breed produces a six-horned animal. Only last-minute efforts saved the sheep from extinction.



With pageantry born of pride, the Manx proclaim their laws. Each July 5 the island parliament gathers at the village of St. John's. After prayers in the church, the dignitaries proceed between resplendent honor guardsmen to Tynwald Hill—an artificial mound. The open-air assembly traces its origins to the island's Viking past. Two judges known as Deemsters recite the measures passed that year (left), the first reading in Manx Gaelic and the second in English. Only then can the acts be signed into law.



pure Manx kittens a year," Mrs. Violet Holroyd told me one morning when I visited the cattery. "Unfortunately, not all of them are born tailless; in a litter of six kittens from two tailless parents, as many as five may be born with tails.

"On the other hand," she added, "you can take a long-tail from here on the island, breed it with another long-tail, and you may get a perfect Manx."

Tourists Ride in Open "Toast Racks"

Not far from the cattery, the Douglas seafront, with its sunken flower gardens and two-mile-long promenade, borders the bay in a colorful crescent. Behind the promenade, like a gaily painted seawall, stand rows of houses and hotels in pastel shades of lemon, pink, green, and blue (pages 426-7).

To me, the promenade is a Victorian watercolor come to life. Scarlet-and-white horse trams clop up and down the boulevard. Passengers tour in the open carriages known as "toast racks" because of their bench seating.

"I always put me old mother on the tram," a vacationist from Manchester told me on the promenade. "Let her go up and down from half past ten to lunchtime. Oh, she luv's it, up and down the prom! Sees all kinds of people, gets the air, and it doesn't tire her."

Twice a year the tranquillity of Douglas,

and much of the island, is shattered by a different sort of vehicle: the racing motorcycle. In June several hundred contestants come from abroad to enter the "T.T."—the International Tourist Trophy Races—over a grueling course that tests men, machines, and sometimes the patience of the islanders (pages 434-7). A second, smaller race takes place in September, the Manx Grand Prix.

"Two weeks of crowds," my hotel receptionist sighed, as the first of the cyclists and their machines arrived by ferry from England for the T.T. The invasion swelled to 40,000, including wives, children, and racing fans.

The entire island seemed swept up in a frenzy of speed. Motorcyclists careened, skidded, and maneuvered over the course at speeds as high as 150 miles an hour. After a fortnight the results were reviewed: trophy winners in eight separate races; several major injuries; uncounted minor mishaps; and two drivers killed—one of them a garage mechanic and part-time racer named Brian Finch, aged 24, with a wife and baby.

I happened to witness Brian's leave-taking from some of his friends just before the accident. I had joined a group of motorcyclists for lunch at a refreshment tent in the grandstand area when it came time for Brian to start his race. Donning his crash helmet, he stood up at a nearby table. "Be careful,



now," one of his companions said, half joking.

Brian laughed and made a thumbs-up sign.

Twelve minutes afterward he failed to negotiate the curve at the Ballacraigne Hotel and slammed into the pub's stone steps.

Despite such grim events, the T.T. has a festive air, and moments of gallantry mixed with humor. They tell the story of a woman who lived in the village of Ballaugh, along the racing route. Every morning during the practice runs she stood at her window in a white dress watching the riders pass. One day a rider sent a bouquet of flowers addressed simply to: "The White Lady, Third Gear Change Past Ballaugh Bridge."

Strange Sheep Survive on the Calf

I turned from the T.T. to a quieter side of island life, a tiny bird sanctuary and nature reserve on the Calf of Man. The islet's name comes from the old Norse word for calf, *kalfr*, which also means an islet located next to a larger island. The 616-acre islet lies southwest of Man across half a mile of treacherous tidal rip called Calf Sound. The Calf has a resident population of three lighthouse keepers and—from March to November—the sanctuary warden and his assistant. There are no roads and, besides the lighthouse, only the warden's stone farmhouse.

After crossing Calf Sound by hired motor

launch, I hiked to the farmhouse. There in the small garden I found a bearded man standing amid freakishly tall purple foxgloves. Without a hint of surprise he said, "Welcome to the Calf. I'm the warden, Malcolm Wright."

From that moment on I was Malcolm's welcome guest. We entered his house, above whose front window I noted a sign in Latin, *Parva Domus Magna Quies*—Small House, Great Peace. Malcolm explained that the house had belonged to a wealthy Manx family who built it in the 19th century.

"Now there's just my assistant, Bob Smith, and myself," he added. "You'll meet him later. First, let's have a spot of lunch. Where are your provisions?"

Provisions?

Malcolm sighed. "Didn't they tell you over on Man that you're supposed to bring your own food?" He grinned. "Never mind. Let's see what we can find in the pantry."

We shared some baked beans and tomato soup and then set off around the Calf, across rolling fields of wind-streaked grass, onto a ledge overlooking the sea. Tucked along the rock were dozens of birds' nests. Malcolm reached into one and handed me a herring gull chick, a fluffy ball of speckled gray as light as a powder puff.

Almost instantly the mother gull swooped
(Continued on page 438)





Glory and bedlam descend on Manx each summer when snorting motorcycles invade the island. Simultaneously come swarms of racing fans, who perch along normally peaceful roads to watch riders jockey their shrieking steeds. At peak season thousands of cycles thunder over the island, briefly dividing the Manx into those who favor tourism and those who prefer tranquillity.

Most frenetic is the "T.T."—the International Tourist Trophy Races—when normal traffic is officially banned from a 37 $\frac{1}{2}$ -mile course (map, page 428). While a helicopter ambulance stands by, groups of two and three throbbing machines rocket out of Douglas, reaching speeds as high as 150 miles an hour in races that go as many as six laps.

Death sometimes draws the finish line for drivers, and injuries stop others. Biting a towel to blunt the pain of a broken leg, a race casualty rides a stretcher toward help (lower left). But next year he and the other contestants probably will be back, pulled like moths to the flame of cycling's fame and danger.



Once a champ and still a fervent fan, Englishwoman Marjorie Cottle won motorcycling fame in the 1920's and '30's. Here she enters the Vintage Rally on Man, where cycle buffs show off vehicles of yesteryear.

Pampered hybrid between car and cycle, a 1927 English Morgan three-wheeler parades at St. John's in the Vintage Rally. Such automobiles enjoyed some 40 years of popularity because they were taxed less than conventional cars.





Emotions spent watching the T.T., a weary couple laden with camping gear await a ferry to Liverpool. Their fashionable "leathers" protect against the elements and skin-scraping spills. Only spectators arrive and leave on their motorcycles; race drivers carefully transport their charges in vans.

Nostalgic veterans parade in the Vintage Rally, riding a 1930 sidecar model.



Tackling a tricky curve, a driver and his passenger lean to the inside for balance during a T.T. sidecar race. Spectators crowd this turn at Creg-ny-Baa, where hurtling cyclists must brake from speeds of 125 miles an hour to 30. To minimize accidents, the course is closed to traffic during practice periods so that racers can test the run's many hazards.

low over me, making frantic, scolding cries like mirthless laughter. Malcolm returned the chick safely to its nest. We scrambled farther down the cliff toward a detached rock called the Burroo, Gaelic for "round hill."

"Look! There's a seal!" Malcolm exclaimed, pointing to smaller rocks offshore. "And two more," he added, passing me his binoculars. I trained them on the rocks, and saw three gray seals, their mournful eyes staring up at me. We left the seals to their rocky lounge and walked toward the lighthouse. I had a sudden inspiration and asked if I could stay overnight. "Yes, if you'd like. We can give you supper and a room," Malcolm said. "The lightkeepers have a radiotelephone, and you could call your motor-launch captain on Man and ask him to come for you tomorrow."

Within minutes it was arranged. We left the lighthouse and followed a trail through fertile meadows. Suddenly we came upon a little flock of Loaghtan, rare Manx sheep with coarse brown wool. A ram looked straight at me, his four beautifully curved horns reminding me of a Viking's battle helmet (page 430). Apart from these sheep, Malcolm commented, the Calf has no domestic animals—no dogs, cats, horses, or cows.

"In 1969 a few Loaghtan were moved over here, where they wouldn't interbreed with other types of sheep. Like the Manx cat, the pure Loaghtan was dying out on Man. The idea was to help preserve the strain. We have a dozen pure Loaghtan now."

I asked about the origin of the extra horns.

"Nobody really knows," Malcolm said. Possibly the Vikings brought the Loaghtan sheep from Iceland, where some rams also have more than one pair of horns.

Isle's Peace Appeals to a Londoner

We started back toward the farm. It was that lovely time of day when the sun mellows to honey and the shadows stretch long and inky on the grass. Only the occasional scurrying of a rabbit broke the stillness.

Bob Smith, a young Londoner doing his first tour of duty on the Calf, greeted us at the farmhouse. I asked how he liked the islet, and he answered, "It's good here—peaceful. Mind you, it's a far cry from London."

That night in bed I listened to the distant sea. I thought about the wild birds, the seals, and the Manx sheep—all of them safe and free to be themselves.

The next day my motor launch picked me

up at the Calf and took me to Port Erin on Man's southwestern coast. From there I traveled to Douglas on the picturesque 19th-century Isle of Man Victorian Steam Railway. Turning northward, I set off for "Royal Ramsey," the charming port town where British kings and queens have detoured to avoid the Douglas mist.

Manx Bride Arrived on the *Mayflower*

There are better reasons than fog for visiting Ramsey, and one is George Quayle. At 76, a good-natured wiry man with scarcely a line in his face, he boasts an inexhaustible knowledge of island customs and history. His reputation is such that he receives letters from abroad addressed simply: "Keeper of Folklore, Isle of Man." And he is the only person I have ever known who grows blue, not scarlet, pimpurnels in his garden.

Mr. Quayle lives alone in a small cottage a few miles from Ramsey. He used to live up the road at Ellanbane, which island tradition identifies as the house where Myles Standish met his first wife, Rose. She sailed with him on the *Mayflower*, but died childless the first winter in Plymouth. Some Manx believe that Myles's second wife, Barbara, whom he married in 1623, was either a sister or a cousin of Rose. If so, the couple's six children were the first of Manx blood to be born in the new colony.

When I called on Mr. Quayle one afternoon, he sat me down beside a hedge of wild white roses. Beyond the hedge the hills blended into a haze of violet.

I mentioned my encounter with the four-horned ram on the Calf. Mr. Quayle shook his head sadly. "We used to have a number of animals that were special to the Isle of Man," he said. "There were ponies called Manx garrons, very surefooted on the mountains. And there were Manx cattle, too, with down-swept horns." He lit his pipe. "There are still some hens without tails—'rumpy hens' we call them. But the ponies and cattle have all died out."

Fortunately, some Manx traditions survive, such as "tying up the bride."

"It was a sort of ransom affair," explained Mr. Quayle. "When a bride was on her way to the church, neighborhood children would stretch a rope across a road. Custom demanded that the carriage stop, and the bride's father or her escort would throw coins to the 'highwaymen.' Sometimes a bride would run

into two or three roadblocks, and the children would collect quite a haul!"

In country areas the custom lingers; later I saw a young bride in the northern parish of Andreas being "held to ransom."

Other Manx traditions related to marriage were less joyful.

"We were a rock-ribbed people. The church took a hard view of illegitimacy," said Mr. Quayle. "Back in 1713 there was the case of poor Katherine Kinrade. She came from a nearby parish. Kath was a simple-minded country girl who bore three illegitimate children. As punishment, the bishop ordered her dragged through the sea behind a fishing boat. She survived, mind you, but it was cruel for a young girl who was only simple, not evil."

In the old days nearly every islander believed in witchcraft. "Our church records are full of the accounts of trials," Mr. Quayle said. "But there is only one record of a witch being put to death. Punishments were generally mild, and the most common one involved

standing before the church on Sunday morning dressed in a white sheet for all to see."

Monique Wilson doesn't wear a white sheet, but she is avowedly a witch. She and her husband, Campbell, are high priestess and high priest of a coven, or assemblage of witches, in Castletown, on the southeast coast of the island. I visited them at the Witches' Mill, their home that adjoins a 16th-century barn containing a museum of witchcraft.

Witches Dance for Their Neighbors' Good

Monique, a pale, intense woman of French origin, has penetrating luminous eyes and a fondness for witches' jewelry—heavy silver bracelets and a wide silver necklace shaped like a collar (below). Her collection of horned masks, swords, amulets, and other charms fascinated me. I noted a skull, a broken crucifix, a doll with its lips pinned together, and a silver hand encrusted with turquoise, agate, and moonstone.

"We practice white witchcraft, never black.



The isle's good witch, Monique Wilson reigns as the high priestess of a 13-member coven that includes her husband. The coven uses its purported supernatural power for white magic instead of black, healing the sick and performing other good works. The Wilsons' curio-crowded home is attached to a converted 16th-century barn that houses a museum of witchcraft and magic—one of Man's many tourist attractions.



Luminous as the soft Manx sun, heather and yellow gorse paint a 200-foot

magic," Monique said. "It's all a matter of purpose. When the 13 members of our coven dance naked in the witches' circle, we concentrate on a single constructive idea, such as helping a sick person get well."

Fishermen Take a Red-haired Risk

One day skipper John Swindlehurst, a deep-voiced bear of a man, agreed to take me fishing. Manx hospitality had won out over superstition; he and his three-man crew were willing to risk having a red-haired woman aboard their 47-foot boat *Tonn Vane*—Manx Gaelic for "White Wave." As John put it, grinning, "We'll see if you're lucky."

John fishes for "queenies," shellfish similar to our deep-sea scallops. We left Douglas harbor at sunrise, bound for a spot six miles out in the Irish Sea.

The Swindlehurst family has produced

generations of Manx fishermen, and the sea is John's great love. "It's good to be up this time of day to see it!" he exclaimed, as we steered eastward on a calm sea. Ahead, the new sky was streaked with pale gold.

"We'll be shooting the gear soon," he told me. "Once we start, there won't be time to eat, so we'd best have breakfast now." Turning the wheel over to Peter Griffiths, the youngest crew member, John soon had bacon, sliced potatoes, and eggs frying on a small stove. I wandered aft where an older man, also named Peter, knelt on deck mending a net with a white plastic needle. Ian, the third crew member, dispensed mugs of strong tea, and we had breakfast.

Soon it was time to prepare for the first haul. John stopped the engines, while the two Peters and Ian lifted the heavy dredge nets over the rail. John got underway again, and



headland. Yawning fissures called the Chasms cleave the bluff beyond the cottage.

the cables rushed out as the dredges sank to the sea floor, 100 feet down.

A long hour would pass before the dredge nets were to be hauled. Then I would learn whether I was lucky or had jinxed their catch. John laughed at my impatience. "*Traa-dy-liaaar*," he remarked—"There's time enough."

At last John stopped the engines and with a clatter of chains raised the nets. As the catch spilled out, I sighed in relief: Several thousand glistening queenies, streaked with yellow, pink, red, purple, and orange markings, poured onto the deck.

"Not too bad," said John, turning to me. "These will come to about five bags. Last year we averaged double that to a haul, but the queenies are getting fished out."

In late afternoon, after several more hauls, we steered for Douglas with some 30 bags of queenies worth about \$156.

Earning a living from fishing is not easy. "It's often a 14- to 16-hour day," young Peter told me as we entered the harbor, "but there are worse ways to spend your life."

While queenie fishing supports many families, the real Manx king of the sea is the *sked-dan*, or herring, which islanders process into world-famous kippers. In the town of Peel, on the west coast of Man, I watched a herring fleet glide into the harbor with their catch.

About 20 boats—mostly Scottish and Irish—lined up three and four abreast beside the quay. Sea gulls screamed and swooped close as wicker baskets brimming with silvery fish were winched up and deposited on the pier.

After an auction the catch goes by truck to kipper houses near Peel harbor. A driver gave me a ride to one of these, where I saw the herring split, cleaned, and soaked in brine. Then they were strung on long rows of hooks,

to be smoked over smouldering hardwood chips in 25-foot-high brick kilns.

Percy Moore, the owner, spoke with me inside his 85-year-old smokehouse. We were surrounded by sacks of hardwood chips that spilled out on the floor, palely golden like breakfast cereal.

"Manx kippered herring is the most natural food you can get," Mr. Moore said. "All natural. They use red vegetable dye across the water. Over here it's the slow smoking process that turns them that red color. Nothing has been added." He smiled proudly.

Joyful Fete Reenacts an Old Disaster

The sea was not always so bountiful to Peel; once upon a time it brought death and destruction to the small village in the form of a Viking raid in A.D. 798. Peel commemorates this raid every summer with a stirring Viking festival featuring a reenactment of the battle.

For the occasion the beach at Peel becomes a stage, complete with an early Celtic village consisting of a log stockade, tiny chapel, and clusters of thatch-roofed huts.

When I arrived shortly before sunset, a large crowd of spectators was beginning to fill the viewing stand overlooking the beach.

"You can't go on the beach like *that*," a Viking official exclaimed, shaking his horns at my short-skirted cotton dress. Fortunately, one of the festival-committee ladies took me in hand. Soon I was the image of a Celtic woman, in a long saffron cloak and sandals.

I joined the cast members, copying their actions. We knelt as three black-robed priests intoned prayers. I was still kneeling after the others stood up—I'd lost my pen in the sand.

Suddenly a large signal fire blazed near the water's edge, and the cry went up: "The Vikings are coming!" In actual fact the Vikings were already there. For some time I'd seen the four longships with dragonhead prows rowing not far out in the sea. The battle began, swords clanged, and horned helmets flew. The women and children fled shrieking to the stockade; I hid behind a large pile of kindling. Victorious Vikings were storming the stockade, which fell with a splintering crash. Soon nearly every Viking had a kicking Celtic woman over his shoulder.

I was thinking the spectators were certainly getting their money's worth, when a Viking pounced on me from behind.

"I'm going to carrrey ye away!" he announced, in a decidedly Scottish accent. It



History and high jinks mark a spirited reenactment of a Viking raid on Man. Each summer the town of Peel, where the Norsemen struck, erects a log village and stockade on the beach. During the festival townfolk mill around on the waterfront, impersonating the Celts. Suddenly horn-helmeted Vikings in longships charge ashore. The defenders slay the Norse chief, but the Vikings storm the stockade—which collapses—and swoop up laughing Celtic maidens (right). Then, escorted by torchbearing Valkyries, they carry the body of their leader to a longship (above).





Giving hard-earned pennies a last pinch, tourists challenge an automated card game at Summerland, an entertainment center in Douglas. With charming versatility, the Isle of Man draws legions of elderly pensioners with low-budget pleasures, while simultaneously offering zestier night life to their juniors.

was then I remembered the Viking ranks had been supplemented by volunteers from the 71st Scottish Engineer Regiment, conducting summer maneuvers on the Isle of Man.

"Let me go, I'm working!" I shouted indignantly. My captor was determined. In the struggle, one of my sandals fell off. He put me down to retrieve it. Suddenly we were caught up in the funeral of the Viking chief, who had been killed in battle. A boat bearing his effigy was pushed out to sea and set afire, while white-robed young girls sang a lament in the flare of torches.

Finally the festival ended, and my beaming captor shook my hand. "Cowboys and Indians, eh?" he said, removing his horned

helmet and wiping his brow. "Good show all round."

Before leaving the island soon afterward, I commemorated my visit. For one British pound, visitors to the Isle of Man may have a tree of their choice planted, with a small inscribed plaque. On Peel Hill stands a sycamore with a plaque: "Owen James Gordon Thomas. New York City. Summer 1971."

Owen is my 4-year-old son. It is my hope that one day, when both he and the tree are grown, Owen will visit the spot and see his sycamore. I could have chosen another type of tree, but I'm keeping in with the fairies. You see, sycamores grow especially well by the Fairy Bridge. □

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COVER: Daring cyclist pilots an antique high-wheeler near Hadley, Massachusetts (pages 336-7). **DAVID ARNOLD**

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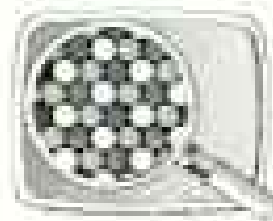
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WILSON WHEATCROFT (UPPER AND LOWER LEFT) AND PEGGY WHEATCROFT

Jungle gardeners of New Guinea

CASSOWARY QUILLS pierce the nostrils of a Tifalmin elder wetting a leaf for his hand-rolled cigar. Anthropologist Wilson Wheatcroft and his wife, Peggy, lived two years with the Tifalmin, a mountain tribe of central New Guinea. The young American couple, supported by a grant from the National Geographic Society, compiled a cultural study—the first ever made—that focuses on complex rituals initiating boys into manhood, Taro growers, the people maintain village shrines filled with sacred

pig bones to ensure fertility of their gardens. They also trade tobacco with other tribes for stone tools and palm-wood bows used for hunting small game (upper left).

Wheatcroft showed the Tifalmin how to fashion figures from local clay (lower left), but tribesmen refused to touch them, fearing they might be inhabited by spirits.

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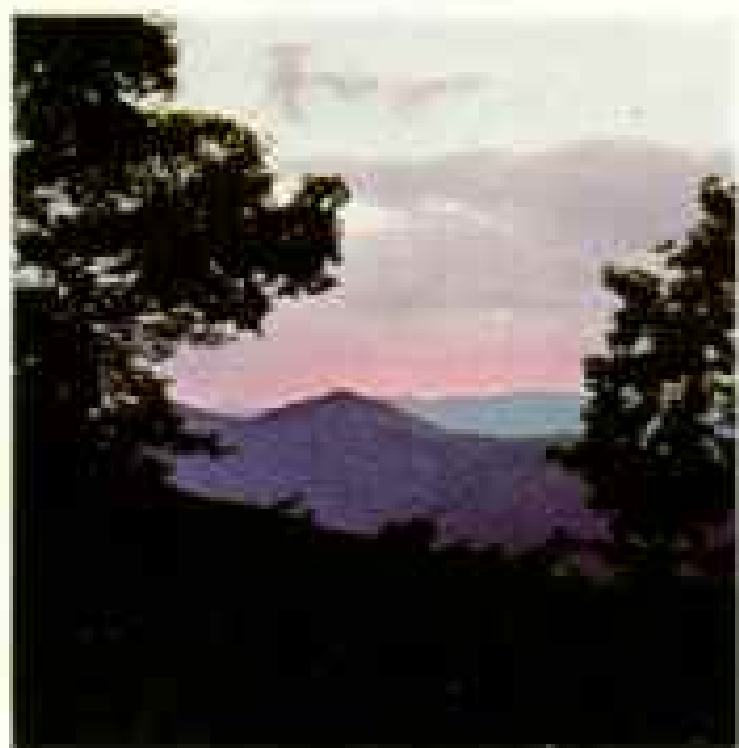
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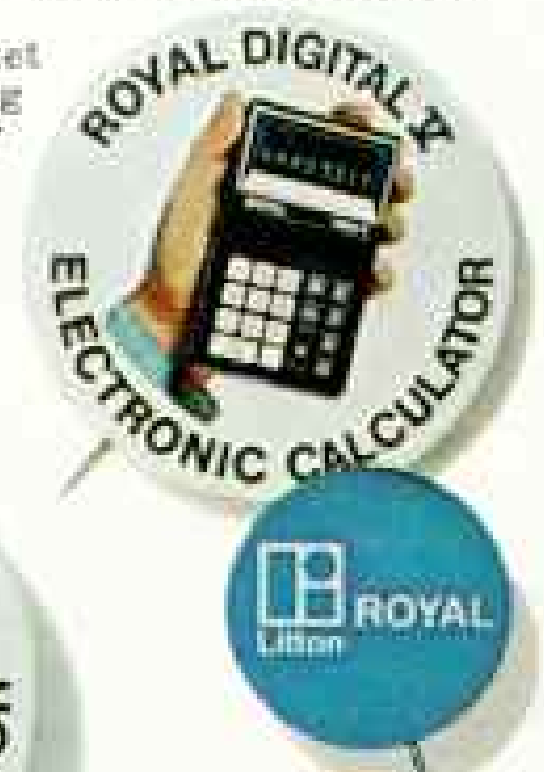
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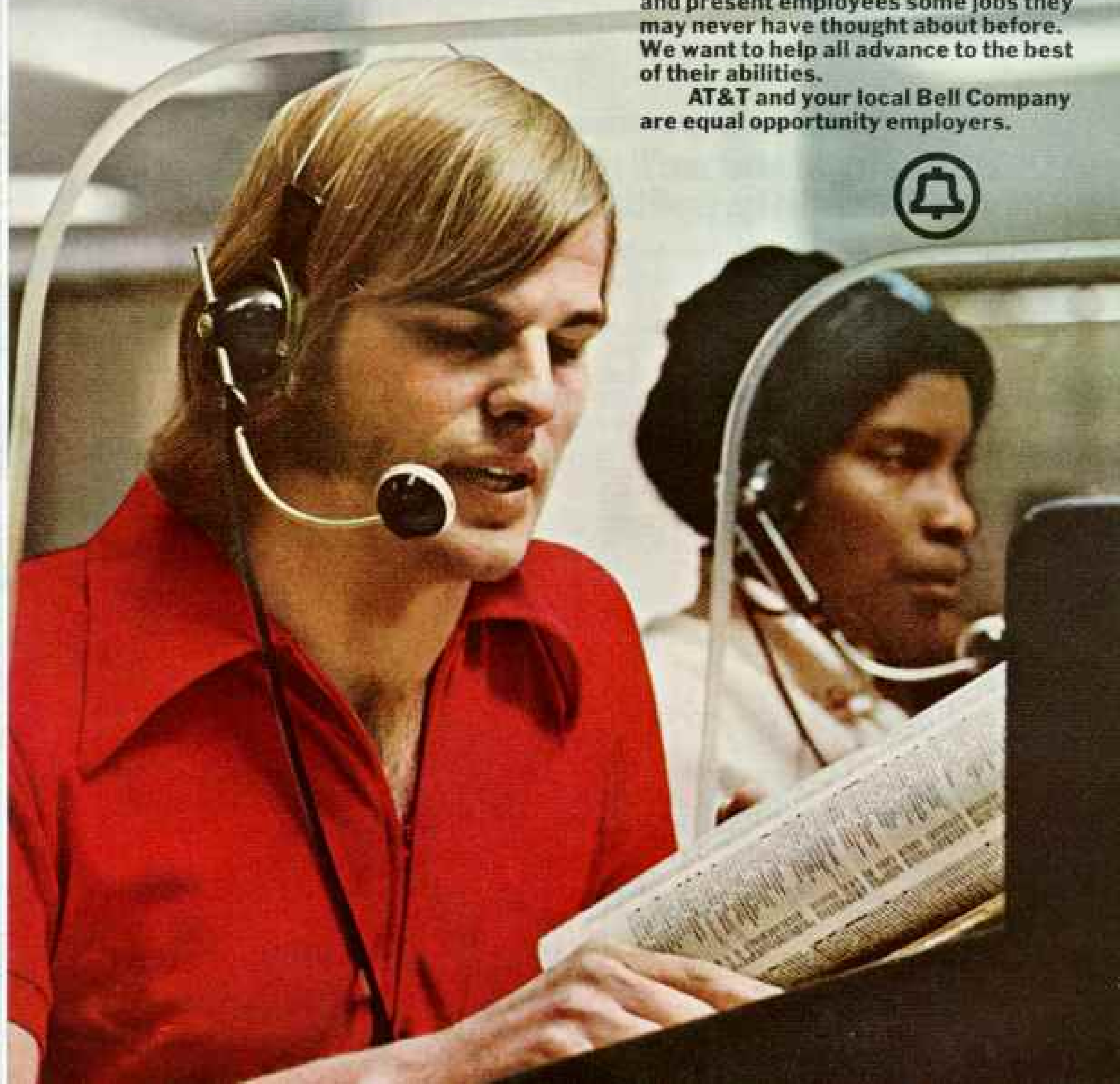
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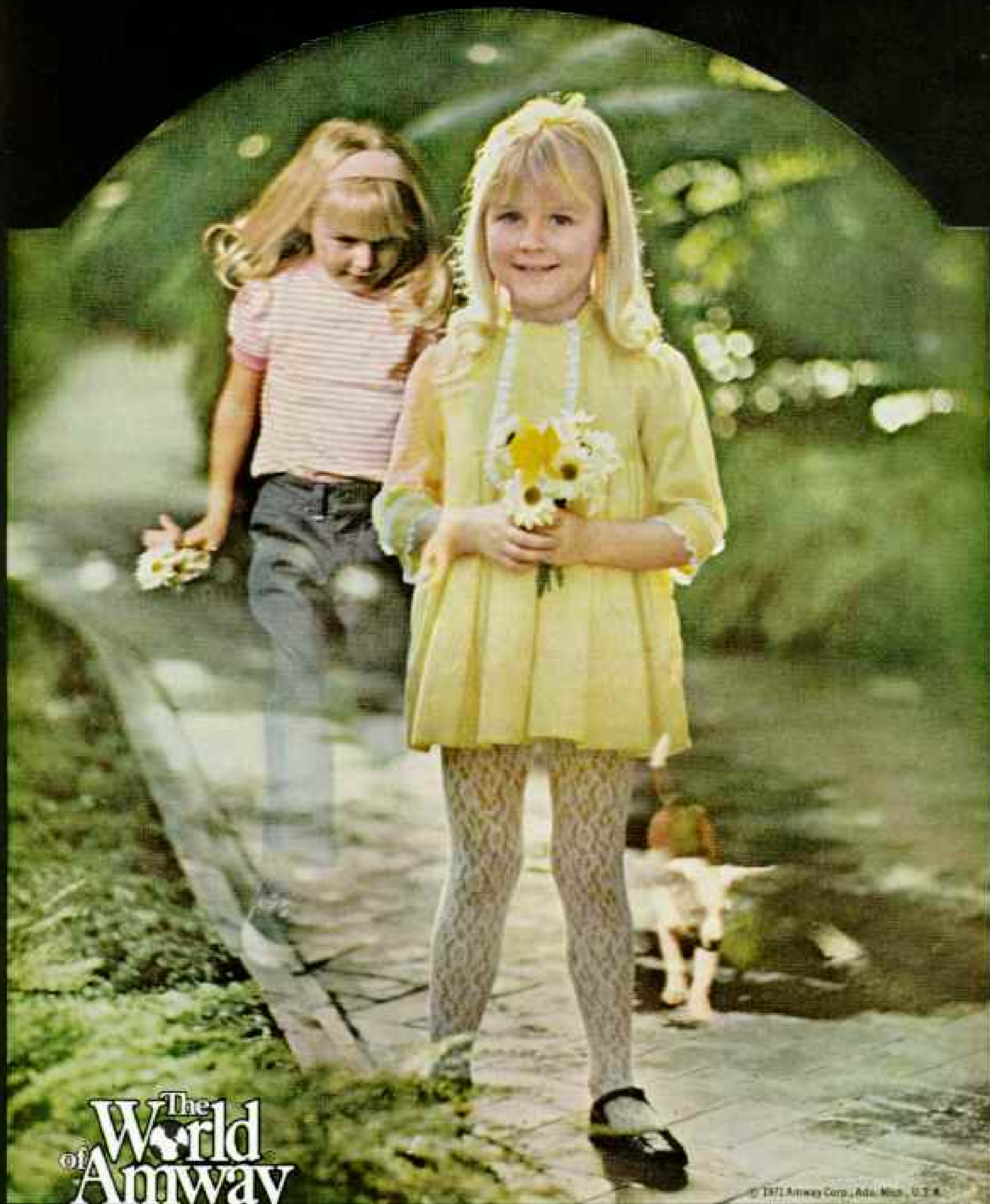
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1/4 cup Mazola Corn Oil	1 teaspoon paprika
1/4 cup wine vinegar	1 teaspoon dry mustard
1 clove garlic, split	1/2 teaspoon tarragon
1 1/2 tablespoons sugar	1/2 teaspoon thyme
1 teaspoon salt	1/2 teaspoon oregano
	1/4 teaspoon pepper

Measure all ingredients into jar. Cover tightly; shake well. Chill; remove garlic. Makes 1 cup. Serve on fresh, crisp salad of greens, carrot curls, cherry tomatoes, sliced radishes, scallions and cucumber.



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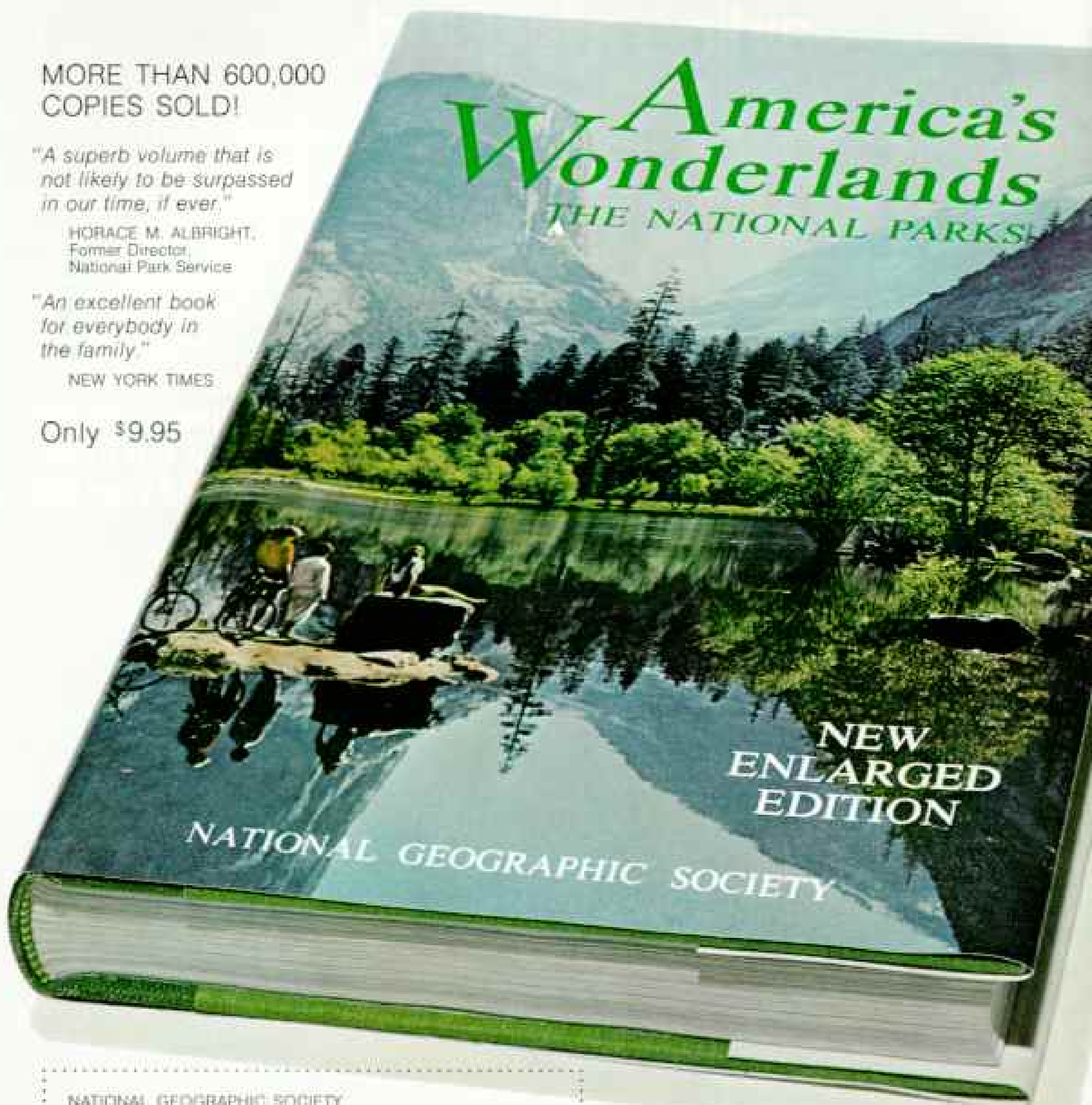
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When you put up a wall, who are you really shutting out?

A barrier makes prisoners of the people on both sides of it.

If it keeps someone else out, it also keeps you in.

And some of the most impenetrable walls in existence are built out of the most insubstantial things: words.

Words become rules and regulations, procedures and attitudes. And because words come easy, walls spring up far faster than they can be torn down.

A simple statement like "We don't want those people competing in our area" is the bricks and mortar of a wall.

This barrier can exist between two people or two departments or two nations. The result is always the same. It stops the flow of communications and ideas.

This is something we are very concerned about, because 3M

is closely identified with innovation, and much of that innovation stems from the creativity that is possible when individuals are not hampered by artificial barriers.

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The temptation to erect a wall is always strong. In the beginning, the idea behind it is that it will protect somebody from something and make him strong.

But in the end, it only makes him weak by making him dependent upon the wall.

Because a wall cannot prevent someone on the other side from having a good idea. And it will not protect an inferior product from a good one.

But the worst thing about a wall is that it takes away the incentive to work constructively with your neighbors. And this ultimately prevents you from getting the best possible products or services.

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