

VOL. 131, NO. 2

FEBRUARY, 1967

NATIONAL GEOGRAPHIC

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COVER: Eyes that have seen war look for peace in a new village for Viet Cong defectors (page 149).

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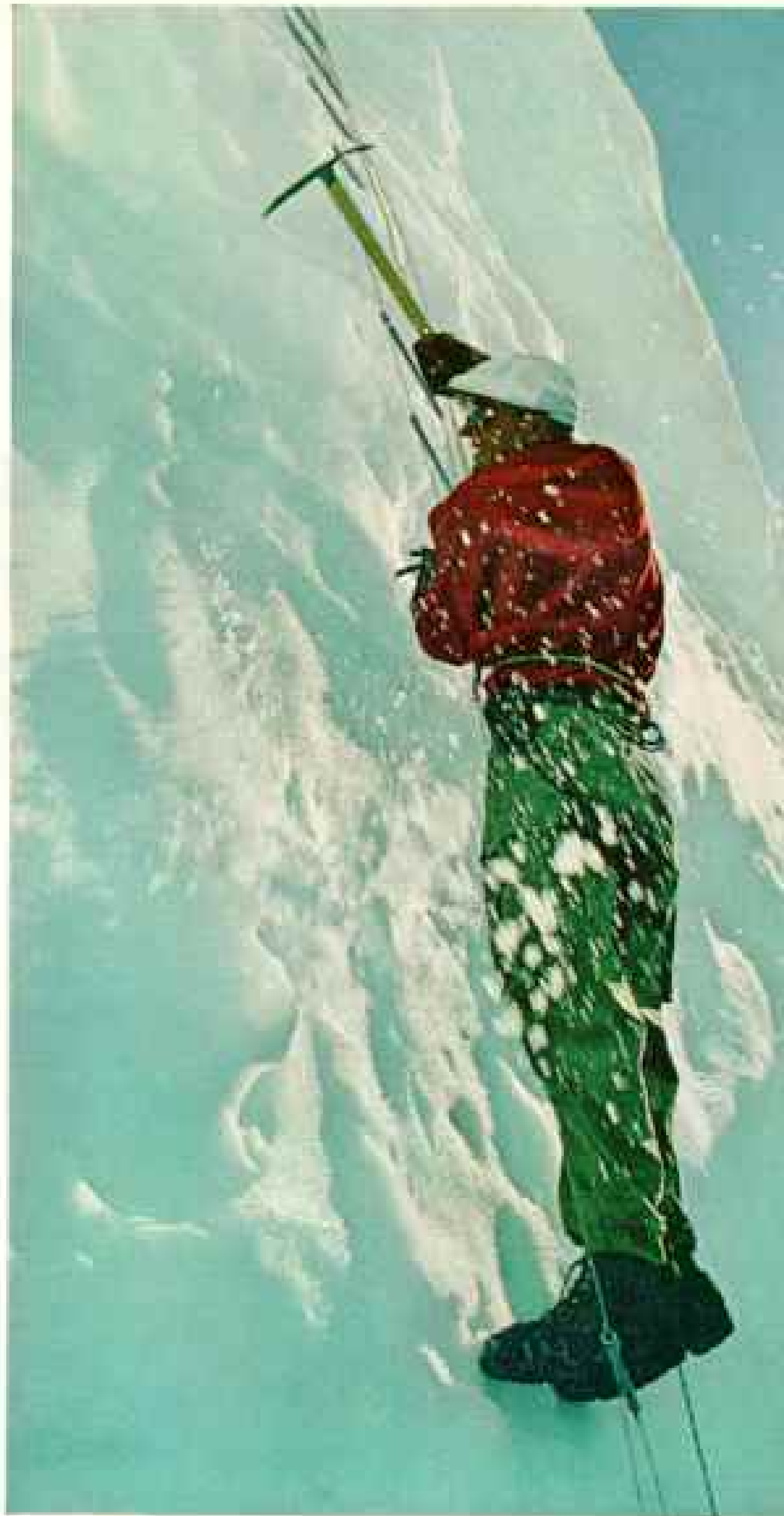
Icy layer cake yields weather secrets

CHIPPING INTO THE FROZEN PAST, Dr. Maynard M. Miller traces telltale bands of dust and pollen that separate annual snowfalls. He dangles on a crevasse wall in Alaska's glacierland to read weather history: Glaciers are among earth's most sensitive recorders of climate.

For the past six years, the National Geographic Society has supported Dr. Miller's studies. Professor of Geology at Michigan State University, he has probed ice rivers in Nepal as chief geologist of the American Mount Everest Expedition and in Canada's Yukon as glaciologist and field-party leader of the Mount Kennedy expedition.

The Society's Executive Vice President (above, center) and Mrs. Melvin M. Payne call on the scientist at his Alaska base camp, high on Taku Glacier. In this issue Dr. Miller gives exciting details of his research in southeastern Alaska's icefields—and what they may tell about tomorrow.

Others can share the privilege of making such explorations possible. Nominate your friends for membership on the form below.



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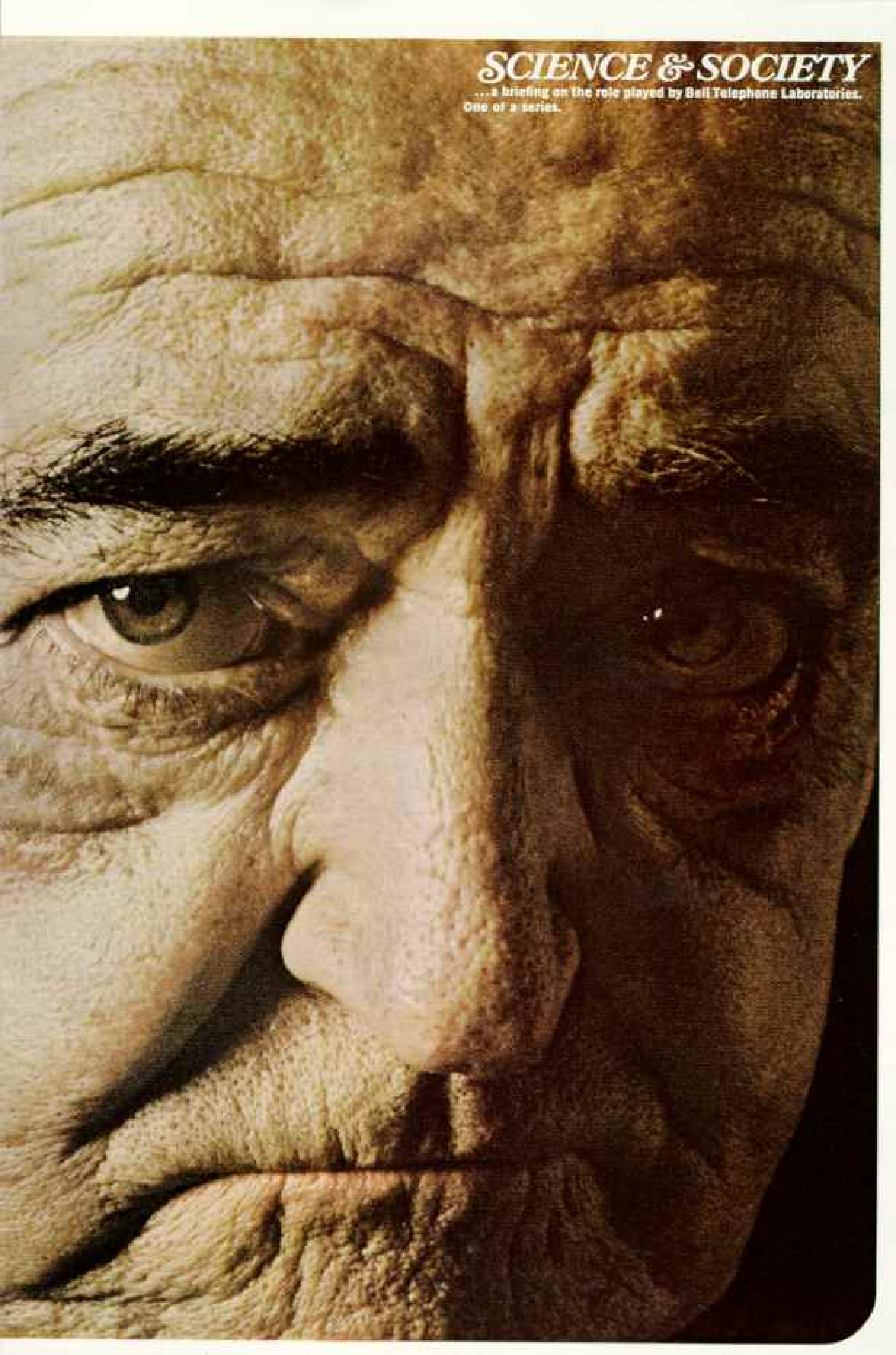
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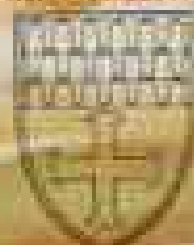
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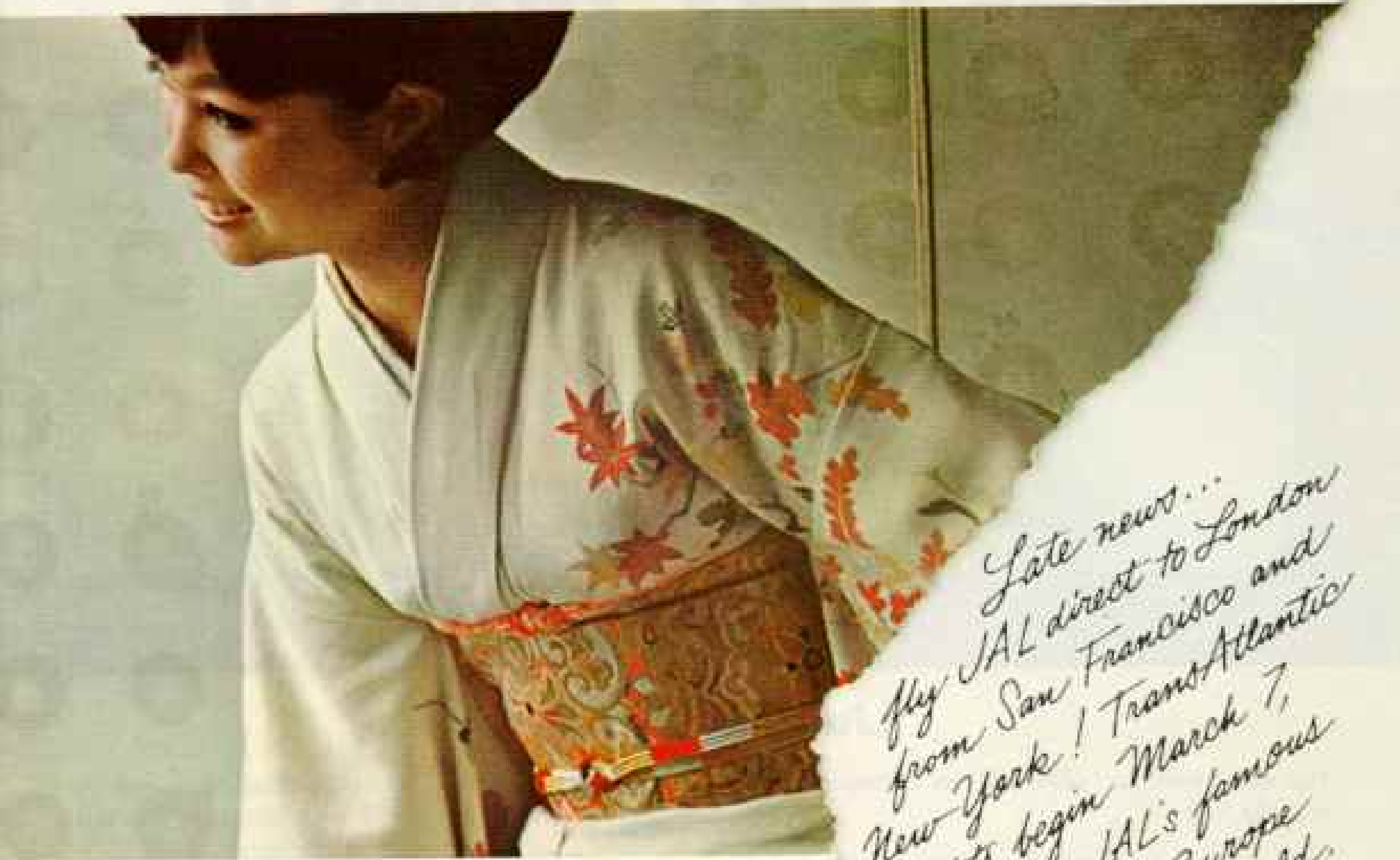
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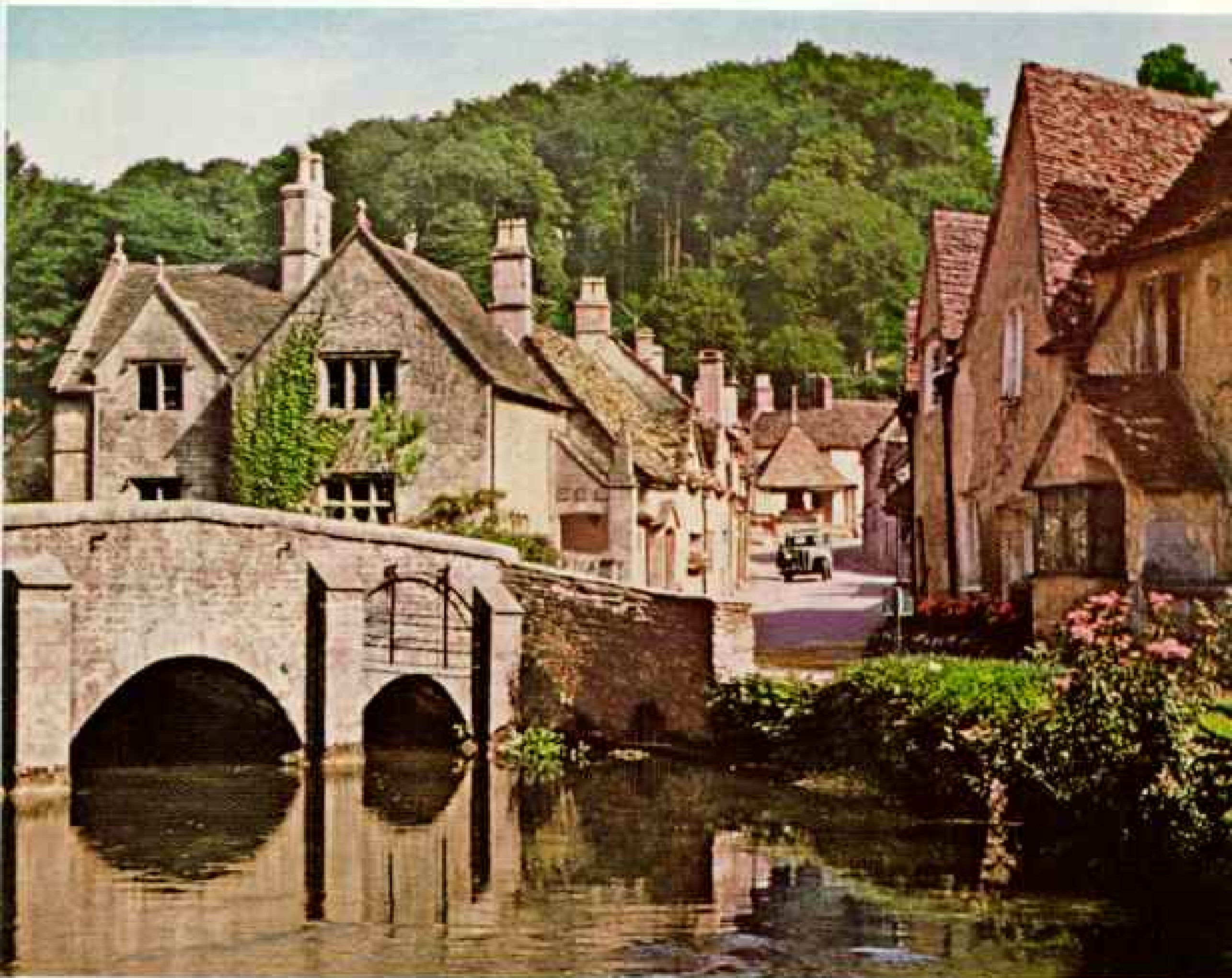
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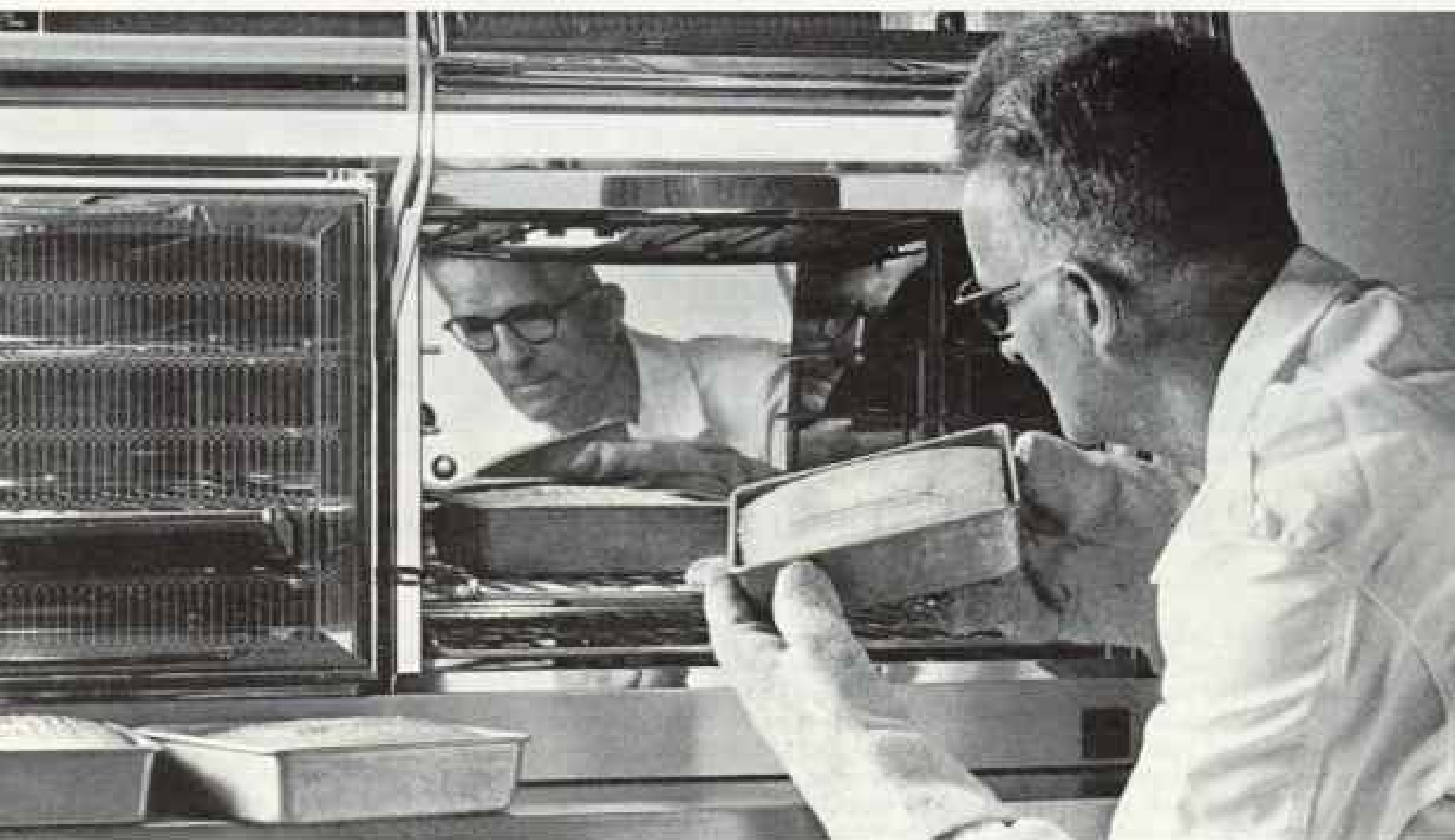


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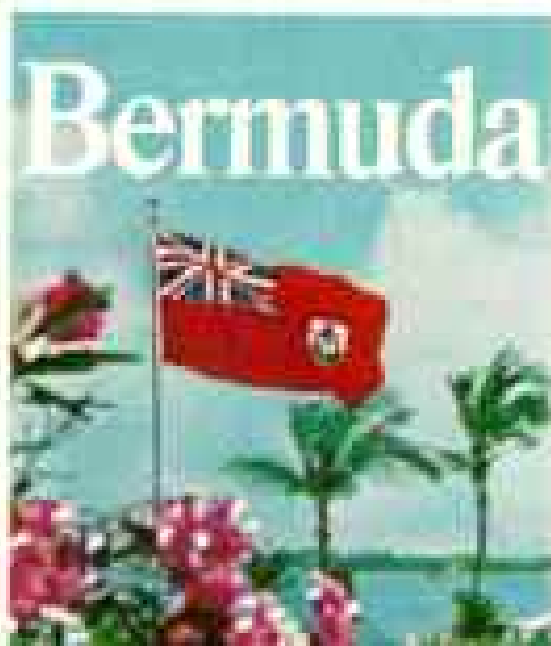
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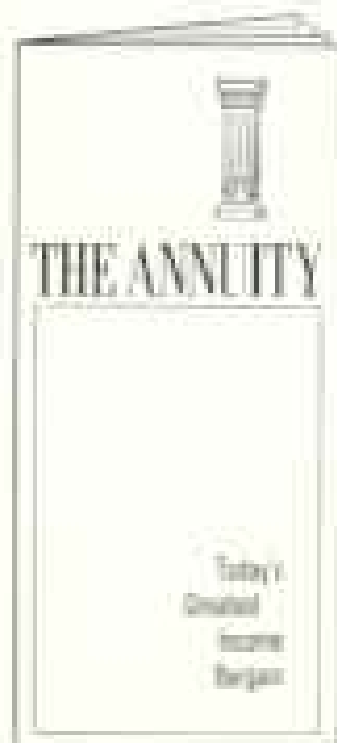
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February, 1967



NATIONAL GEOGRAPHIC

THE NATIONAL GEOGRAPHIC MAGAZINE, VOL. 136, NO. 2
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Behind the Headlines in Viet Nam

By PETER T. WHITE

Illustrations by
WINFIELD PARKS
Both National Geographic Staff

WHEN MY FRIEND THIEN, a Vietnamese editor, asked if he could speak quite frankly, I said yes, please do.

"Well," he said, "you Americans send many soldiers to fight for our country, and you spend much money here, but you really don't know very much about our people."

Quite frankly, I had to admit that he was not entirely wrong. It was the overpowering aspects of the Vietnamese scene—the unremitting warfare, the daily counting of its toll—that preoccupied Americans at home as they read their newspapers and

FLAME-TIPPED ROUGH
hangs above girls of
Hue wading in the
River of Perfumes.

ILLUSTRATIONS BY WINFIELD PARKS



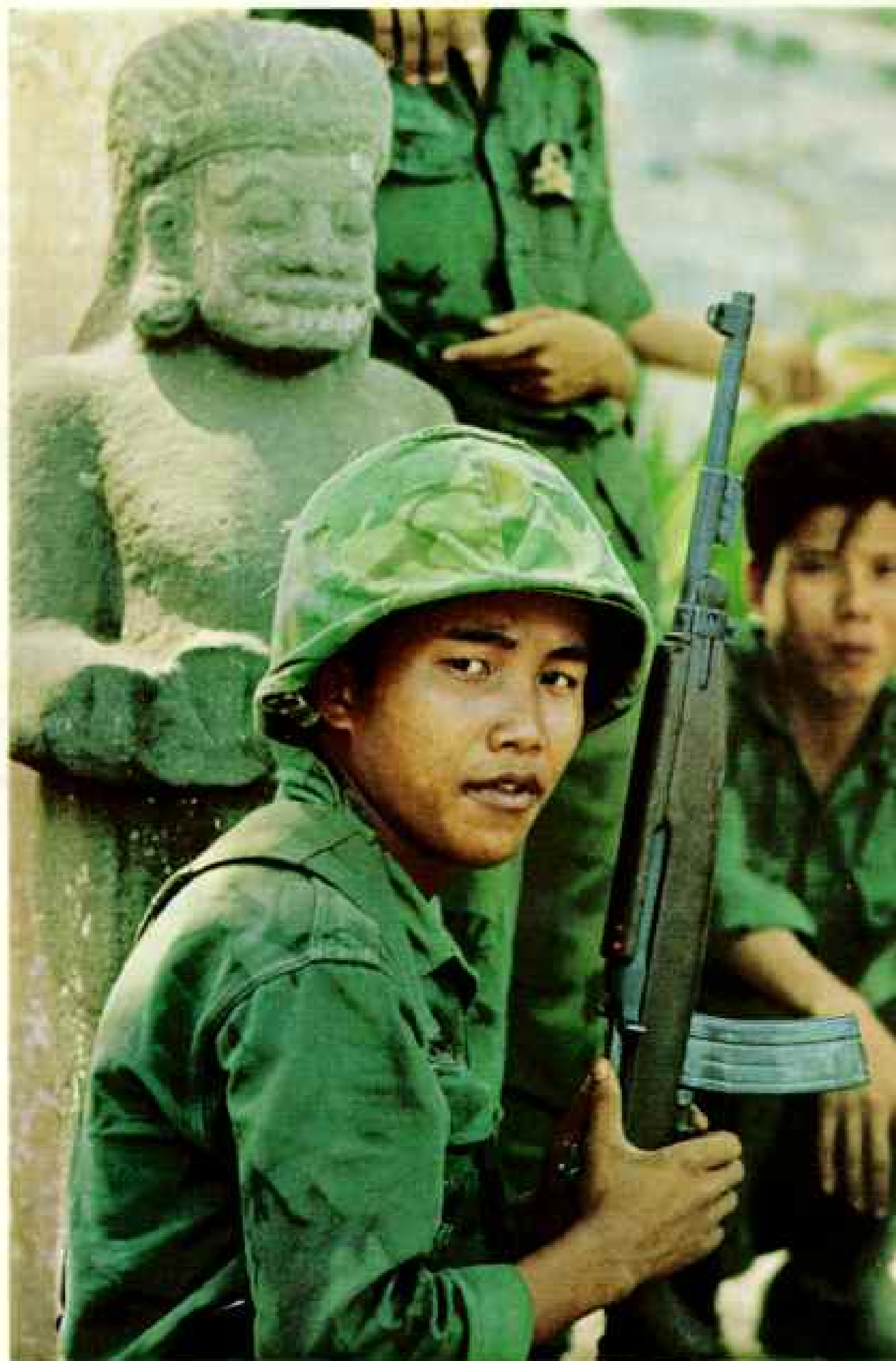
watched TV. The smoke of war hid the Vietnamese themselves—their beliefs, their history, their ways of doing things. That was why I had come to Hue (pronounced hway).

Why Hue? This city of 105,000 in the northeastern corner of South Viet Nam is, strictly speaking, now merely one among the country's 43 provincial capitals. But Hue, once the seat of emperors, remains in many Vietnamese eyes the spiritual and intellectual focus of all Viet Nam, both north and south of the 17th parallel (see the wall map supplement, *Viet Nam, Cambodia, Laos, and Thailand*).

Here survive many of the finest Vietnamese temples, palaces, and tombs. Hue is also a

center of learning, with more than 1,000 university students. And unlike Saigon—where foreigners swarm by the tens of thousands—Hue remains almost 100 percent Vietnamese. Elsewhere in Viet Nam, in the bustle of the nearby port city of Da Nang and in the quiet of its hospital wards, I was to see most strikingly how foreigners are affecting Vietnamese lives and attitudes. But what I was privileged to witness now, in Hue, was a manifestation of family piety as memorable as it was unchanging.

I stood in the old walled part of the city, in the temple called The Mieu, where ten altars gleamed in red and gold—each made to



STATIONERY (LEFT) AND BUSHCROW © N.G.S.

worship the spirit of a dead emperor of the Nguyen (pronounced new-yen) dynasty, the last to rule Viet Nam. This day was the 83d anniversary of the death of the Emperor Tu Duc.

"As we light the candles, we invite the emperor's spirit to come here," whispered a young man in a black turban and a wide-sleeved ceremonial robe of black silk. His name was Bao Toai, and he was a member of the imperial family. The last reigning descendant of Tu Duc had renounced the throne only 22 years before.

A dozen men—all robed like Bao Toai—went about quietly with lighted tapers, until the whole temple was softly aglow. Behind us, beyond the open gates, rain fell melodiously.

Oblivious of war that swirls to the city's edge, young women stroll in Hue's Citadel, seat of Viet Nam's last ruling dynasty. North and South value Hue as a repository of a cherished past. Here the author found a Viet Nam of serenity and beauty seldom reflected in daily headlines.

Proud Hue also exhibits an independent streak. Last year, Buddhist-led rioting sought to topple the Saigon government. The turmoil spread 50 miles to Da Nang—bustling seaport and major military base.

Vietnamese Marines (above), sent to restore order, bivouac beside an ancient statue at Da Nang's Cham Museum.



Nearly 100 percent Vietnamese despite the foreigners that war draws to South Viet Nam, Hue functions as a provincial capital and trading center only 50 miles from North Viet Nam. Its 105,000 residents dwell both within and outside the Citadel that walls off half of the city's six-square miles. The fortress also encloses the Imperial City where mandarins—scholarly bureaucrats of royal times—once governed. The ruling family lived in the innermost Forbidden City.

Hoping for a ride to the capital, Vietnamese soldiers and their families await the arrival of a military aircraft that flies daily between Saigon and Phu Bai, Hue's airport. Behind them a U.S. Marine repairs a helicopter.

The altar of the Emperor Tu Duc, and a table next to it, held sticks of incense, flowers of the flame tree, and plates of bananas, cinnamon, eggfruit, and sweets; cups of tea and glasses with rice alcohol; and 32 bowls with fish, meat, vegetables, and rice. "The emperor's 32 favorite dishes," said Bao Toai.

An old man entered—the Mandarin Duong Yem. He ranked as a baron and wore soft black boots and a floppy hat with blue embroidery. He prostrated himself, his forehead on the mat below the altar. Next to him a young man knelt, and from a tablet framed in red and gold he read of the life of Tu Duc. The young man left. The Mandarin Duong Yem prostrated himself thrice more, and with inaudible steps he backed away.

Sounds of War Shatter Temple's Peace

I backed away too, into a courtyard where bronze griffins glistened in the rain. Two helicopters of the United States Marines clattered overhead. Across the moats and ramparts of Hue wafted dull sounds of explosions—mortars and howitzers at work, the accompaniment of strife in some nearby village.

I had stepped back into the explosive reality of everyday life in the Republic of South Viet Nam.⁶ Yet the calm ceremony I had just observed was no less typical of South Vietnamese life today than those sounds of violence from across the walls. What I had seen in The Mieu temple could in fact be found across the country hundreds of times every day—in settings less grandiose, with fewer offerings, but with the same profound family meaning. My friend Thien had cautioned me to make no mistake about that.

"In the traditional Vietnamese house—that is to say, in seven out of ten homes—the most important spot is the altar of the family's ancestors," he had told me. "In many homes the altar is in the middle of what you would call the living room. You see, we believe that our ancestors continue to be present in the midst of the family. This is not simply a figure of speech or a poetic fancy. To us it is a reality. One's future, one's happiness, depends on keeping the spirits of one's ancestors happy."

Thien had earned a doctorate in political

⁶For other NATIONAL GEOGRAPHIC articles on war-torn Viet Nam, see the author's "Saigon: Eye of the Storm," June, 1965, and "South Viet Nam Fights the Red Tide," October, 1961; also, "Water War in Viet Nam," February, 1966, and "Helicopter War in South Viet Nam," November, 1962, both by the late Dickey Chapelle; "American Special Forces in Action in Viet Nam," January, 1965, and "Slow Train Through Viet Nam's War," September, 1964, both by Howard Sochurek.







PHOTOGRAPHY © N. G. L.

Hue paddles on water; pedals on land. Slim craft from 11 sampan villages cluster about Hue's market (left center). The large open-air enclosure fronts on the main commercial street that slices between the bank of the River of Perfumes and the green moat of the Citadel wall at right.

Bicycles of suspected draft-dodgers hang from the jeep of a policeman checking identification papers of military-age men. The city licenses 600 cars, 70,000 bikes.

Trussed porkers go to market in style, below.



science from the University of Geneva and had studied in England and the United States.

"I was trained in Europe and America," he said. "But I was *educated* within the bamboo hedges of my home in Hue, by my parents, brothers, sisters, and cousins, by our maids and nurses and cooks. They passed on the values that remain embedded in our Vietnamese minds and souls. No studies can erase these beliefs, no matter how long we may have stayed in foreign countries or how brilliant their cultures and civilizations may appear to us. Always remember, in many ways we do not feel as you do."

To me, as an American, the importance of Vietnamese feelings hardly needed stressing. Weren't these, after all, a key to peace in Viet Nam? And didn't we, as well as the Vietnamese, desire an honorable peace?

Already our soldiers killed here outnumbered the 4,050 who died in the American

Revolution. All indications were that soon the Vietnamese war might directly involve half a million armed Americans, and eat up nearly a fifth of our national budget—at a rate of two billion dollars a month.

Quiet Rhythm Pervades Life in Hue

In Hue, Thien had told me, a foreigner could most readily discern Vietnamese traditions, the things that moved people most deeply.

"I hope you'll like the place," he said. "No newspaper, no bank, no factories except for one cement plant. But Hue has our prettiest landscape and our prettiest girls. When the moon is full, you must spend the evening in a sampan on Huong Giang, the River of Perfumes" (page 154).

I arrived in the bloom time of the flame trees and the lotus, when day after day the river sparkled deep blue beneath a blazing sky and the thermometer stayed near 100



"Down with the Viet Cong; This is the way you liberate us?" asks a sign behind women bunching "eyes of the dragon," litchi fruit, for sale at Hue. Pupil-like dark seed and surrounding white flesh inspire the local name of this favorite Oriental delicacy. The women also vend grapefruit, a popular dessert.

Boats disgorge laden passengers at a landing near Hue's market. Anything that floats finds service ferrying people from outlying villages to market or to jobs in town. Market-bound women shoulder carrying poles with food baskets, one brimming with dried fish for soup.



STYLING BY LEOVA; AND KODACHROME BY WINFIELD PARKS © U.S.A.

until dusk. Then the humidity descended like a soggy towel, and mosquitoes floated by like tiny gray puffs. What surprised me was that a city should exude such calm.

All seemed still between noon and three in the afternoon. But during other daylight hours everything proceeded in a quiet rhythm: the bicycles, with men in open shirts and girls in silky trousers worn under the long, split dresses called *áo dài*, their jet-black hair down to the shoulders or even to the waist; men and women leaning forward on the long oars of the sampans; women in pajamas with carrying poles of bamboo over their shoulders, transporting baskets filled with fruit and watercress, ducklings and chickens, brooms and bricks, and a hundred other salable things.

All Hue seemed gently driven by a single mainspring—slowly, persistently, as if life here would surely keep going in this fashion forever, never speeding up, never slowing down.

"It's the same way in winter, when it rains day and night for three weeks at a time," said my friend Trang, a young lawyer who had come along as my interpreter. "Nothing can budge these people. In Viet Nam we say that in general the northerners, from Hanoi, are flexible. Southerners, from Saigon, get mad easily but they don't stay angry long. But these people from the center, from Hue? Stubborn! Bullheaded!"

Certainly the three regions did not speak quite the same language, and the difference wasn't simply a matter of accents. Trang, born in Hanoi and now living in Saigon, sometimes had to consult his dictionary.

"Take the simple word 'why,'" he said. "In Saigon, it's *co sao*. In Hanoi, *tai sao*. In Hue, *rang rua*. Many northerners have come to Saigon, so that both northern and southern words are pretty well understood there. But not here!"

All the same, Hue symbolized Vietnamese unity. Tu Duc's great-grandfather, the Emperor Gia Long—having consolidated the country after two centuries of civil wars and political division—made Hue his capital in 1802, and began building the Citadel that still stands so impressively today. Half of the town's six square miles are enclosed by the completely preserved walls of this gigantic fortress, whose moat and bastions form a rough square. Inside the great square nestles a smaller enclosure, with moat and walls measuring nearly 700 yards on each side, called Dai Noi, the Great Interior, or simply the Imperial City (pages 162-3 and map, page 152).

Poem Conveys At Least 64 Meanings

Like all Hue, the Imperial City was a sea of trees. Not flame trees only, but guava and breadfruit and litchi nut, papaw and mangosteen and pomegranate, coconut palms and frangipani, banyan trees and soft-needled pines. Past bronze cannon and stone mandarins, I came to a pavilion that was now a museum, to wander among precious objects of copper, lacquer, and porcelain, and court robes of yellow silk. On a wall hung a poem by Tu Duc's father, the Emperor Thieu Tri. The writing, arranged in a circle that radiated eight lines, was in Chinese characters of mother-of-pearl set in dark wood.

"One of the finest expressions of Oriental philosophy," said the curator, Mr. Ung Tuong. What did it say? Mr. Tuong smiled: "How can I tell you? It can be read in at least 64 ways."

I crossed the Bridge of the Golden Waters into a great courtyard, and then into the Palace of Perfect Peace. On a dais sparkled the red-and-gold throne, inlaid with mirrors. "The mirrors, you see, ward off bad spirits," said Trang.

The Citadel's innermost enclosure, the Forbidden City, had once been reserved for the emperor's immediate family. Formerly those who entered this enclosure without a mandarin's permission were put to death. Trang and I had a pass signed by Mr. Nguyen Van Diep, chief of the Hue Tourist Bureau.

Most of the buildings had been destroyed twenty years ago, in warfare against the French, and in the place of the emperor's private apartments now stretched a plowed field. A gardener was manuring it, to grow white lilies.

Back in the great courtyard the Imperial Ballet and Singers were ready. For this special performance I had obtained approval from the Imperial Family Council and from Lt. Col. Phan Van Khoa, the mayor of Hue. Colonel Khoa was also the province chief, representing the Saigon government, which supported this troupe for the sake of Vietnamese culture.

"We pick them for their voices, looks, and intelligence," said the instructress, Ho Thi Hue. "They start at 15 and stay several years. The boys are drafted into military service at 20, and the girls marry in their late teens."



FLOWING HAIR, DRAPED OVER SHOULDERS, and ao dai, gossamer gowns split to the waist and worn over trousers, identify Hue schoolgirls; one carries grapefruit. Besides claiming Viet Nam's handsomest palaces and tombs, the city boasts of having the prettiest girls.

ESPRESSO © P. S. S.



Five musicians robed in a shiny electric blue, known here as "Hue blue," played drums and a kind of oboe called *ken bau*; the conductor beat on a tiny brass gong, and 20 girls and 6 boys sang and danced. So heavily swathed were they in headdresses and silks that I couldn't tell the girls from the boys. They wound up in a triple pyramid, some standing on the shoulders of others.

Enchanting, but I could hardly see straight, such was the heat. How could anyone be so energetic in those hot clothes?

The instructress said: "You can get used to anything."

I stopped at the office of the Imperial Family Council to express my thanks. How many family members were alive now? "About a hundred thousand," said the Princess Luong Linh. Incredible, but true—the council had a book containing all the names. Many were distant relatives, of course. After all, one prince a century ago sired 72 children.

Lotus Means Purity—and Cash

The ponds and moats of the Citadel were choking with lotus, and I found lotus blossoms in vases, lotus leaves in tea, lotus seeds in rice. "A symbol of Hue, a symbol of purity," said Trang. "It grows from mud, yet smells so sweet; it means that a good man won't succumb to bad influence."

"Lotus brings in one-twentieth of all the

city's revenue," said Mr. Nguyen Ro, deputy province chief for administration and finance. "Each bit of water is leased by the city to a concessionaire who sells the seeds, the flowers, and the fish that live among them."

Secretaries handed Mr. Ro folders with more figures. Hue was divided into three districts, 21 hamlets, and 11 sampan villages. There were 200 cows in town and about 600 cars, plus 70,000 bicycles. Artisans working at home with bamboo turned out 120,000 woven bags a year and 200,000 conical hats.

"The biggest output of hats in Viet Nam," said Mr. Ro, "hats of the highest quality. Hold one against the sun and you can read a



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Absorbed in melody, an oboist trills accompaniment for the Imperial Ballet and Singers (opposite). Robed in "Hue blue," he uses a five-tone scale that—like much of Viet Nam's culture—was borrowed centuries ago from China. The richly costumed youngsters, who live in the Imperial City, keep alive the arts of dynastic times.

Looks, voice, and intelligence won this beauty a place in the Hue ballet troupe. Children join at age 15. Girls continue until marriage; boys, until military service at 20.





French walls protect an Oriental city. Emperor Gia Long, builder of Hue, left the design of the Citadel's zigzagging ramparts to French military advisers who aided his climb to power in 1802. A canal paralleling the walls of the fortress feeds the moat. In the fore-



STRONGHOLD BY WYFIELD PARK © N.S.A.

ground, barracks and vegetable gardens now fill a ravelin, a strongpoint outside the main fortress (upper map, page 152). In this view to the southwest, the distant River of Perfumes flows from the Annam Cordillera, a spine dividing the lowlands of Viet Nam and Laos.

poem written on paper sandwiched between the hat's two layers of bamboo."

As plentiful as the lotus were the screens a few feet in front of nearly every door; screens of woven bamboo or of concrete, some decorated with lions made up of colored bits of broken porcelain. Some were hedges, neatly trimmed, or simply cloth hanging in the breeze. All had the same purpose—to keep out the bad spirits that travel in a straight line.

Trang said: "You see that square mountain all by itself, two miles away? Its name is Ngu Binh, the Screen of the Emperor. It keeps bad spirits out of the Imperial City."

On the slopes of Ngu Binh, and all around Hue, rose thousands of tombs scattered amid rice fields and in back yards, along roads, streams, and canals. Some were mere mounds; some, ornate constructions. Finding the right spot for one's tomb was as awesome a duty as

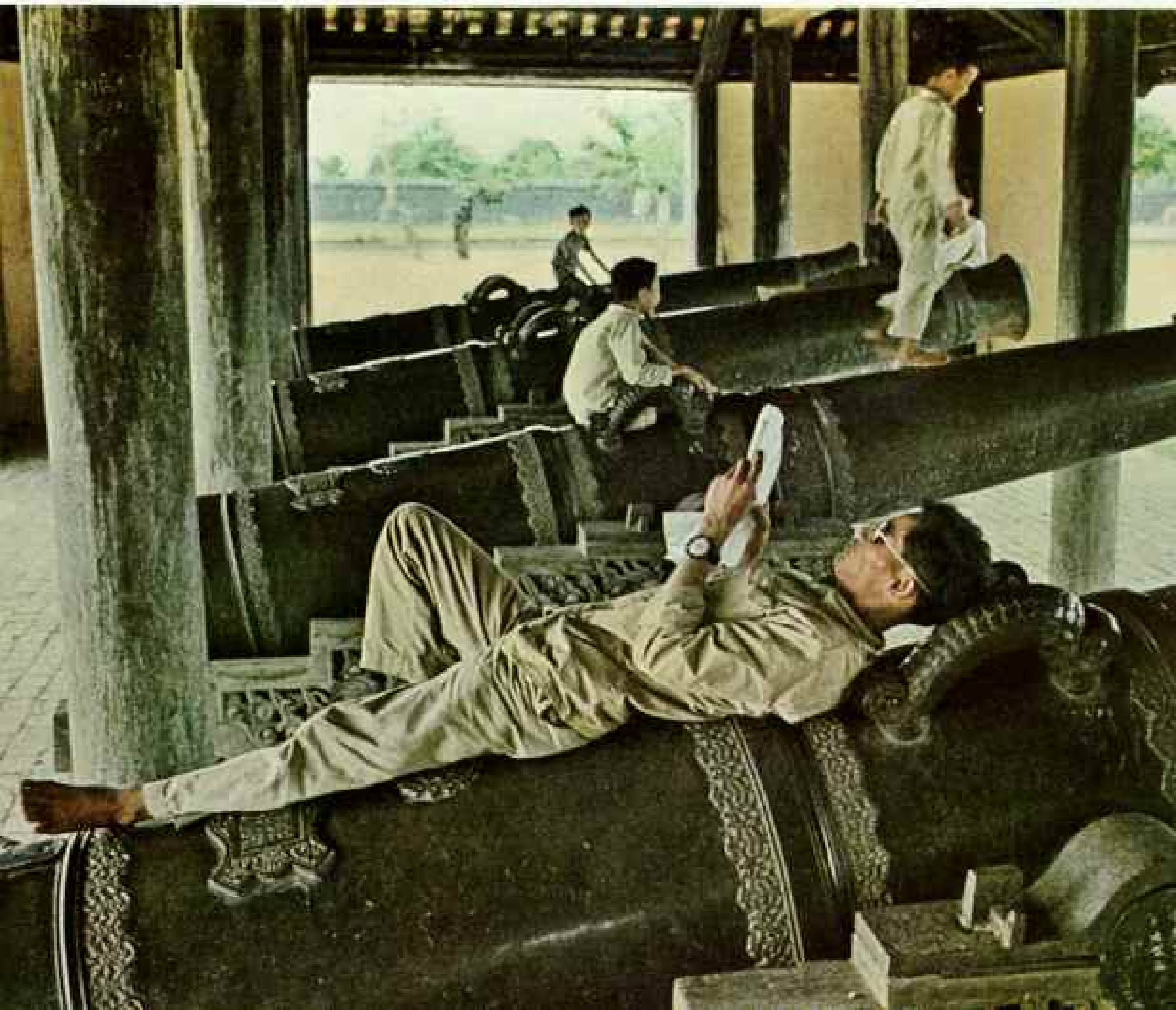
serving one's ancestors. For if a man's grave wasn't auspiciously positioned, his daughters' marriages couldn't prosper and his sons would surely be ruined. Many an unhappy family had moved the ancestral tombs to improve their fortunes.

Helping people pick good spots was the task of men like Mr. Nguyen Hanh. He was 73 and robed in Hue blue, and as we walked near Ngu Binh, he stopped at a tomb in a field of manioc. It was enclosed by a waist-high wall with stone lotuses on top.

"The Nguyen Khoas," said Mr. Hanh. "An excellent location. This couple's sons all reached high positions."

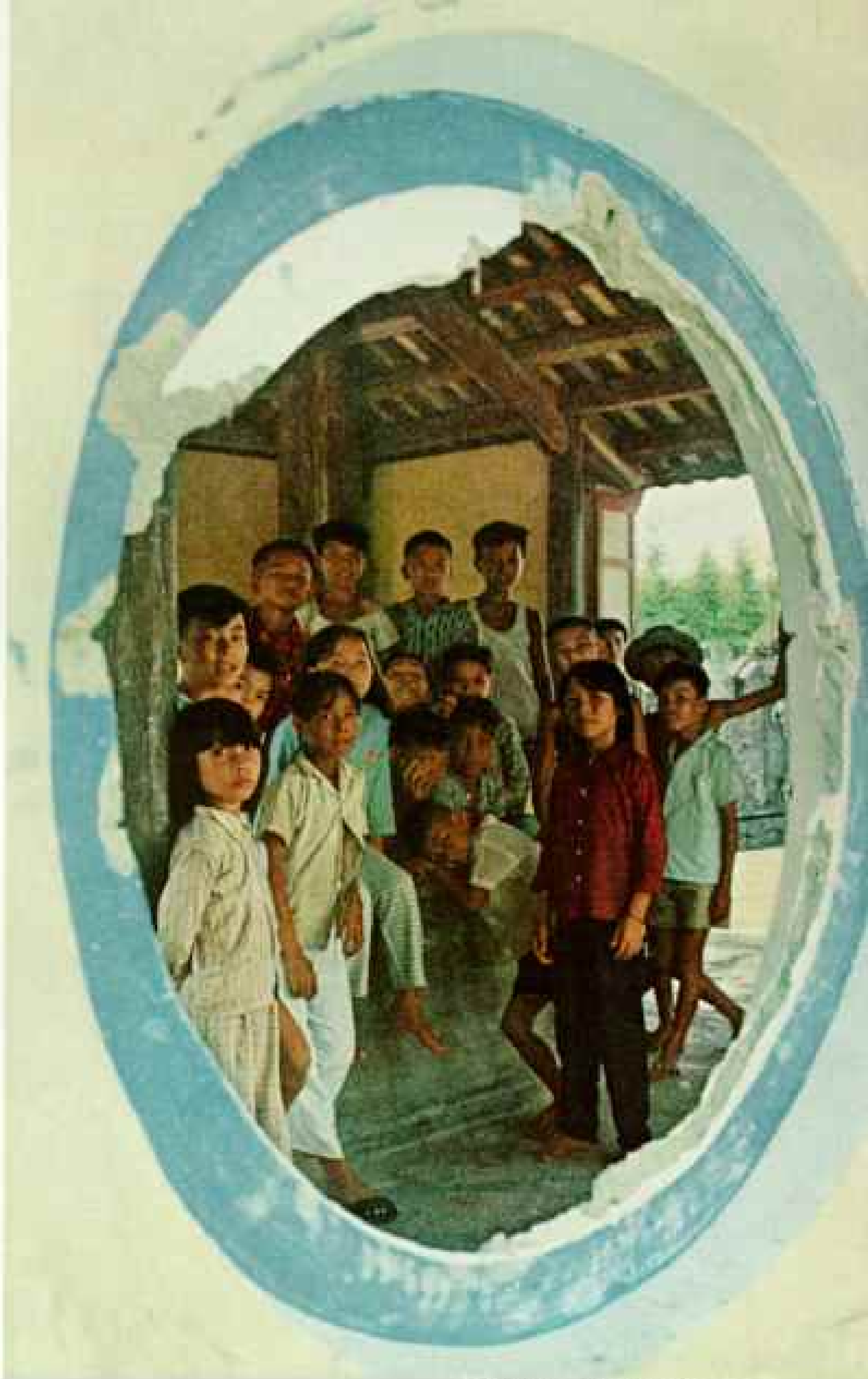
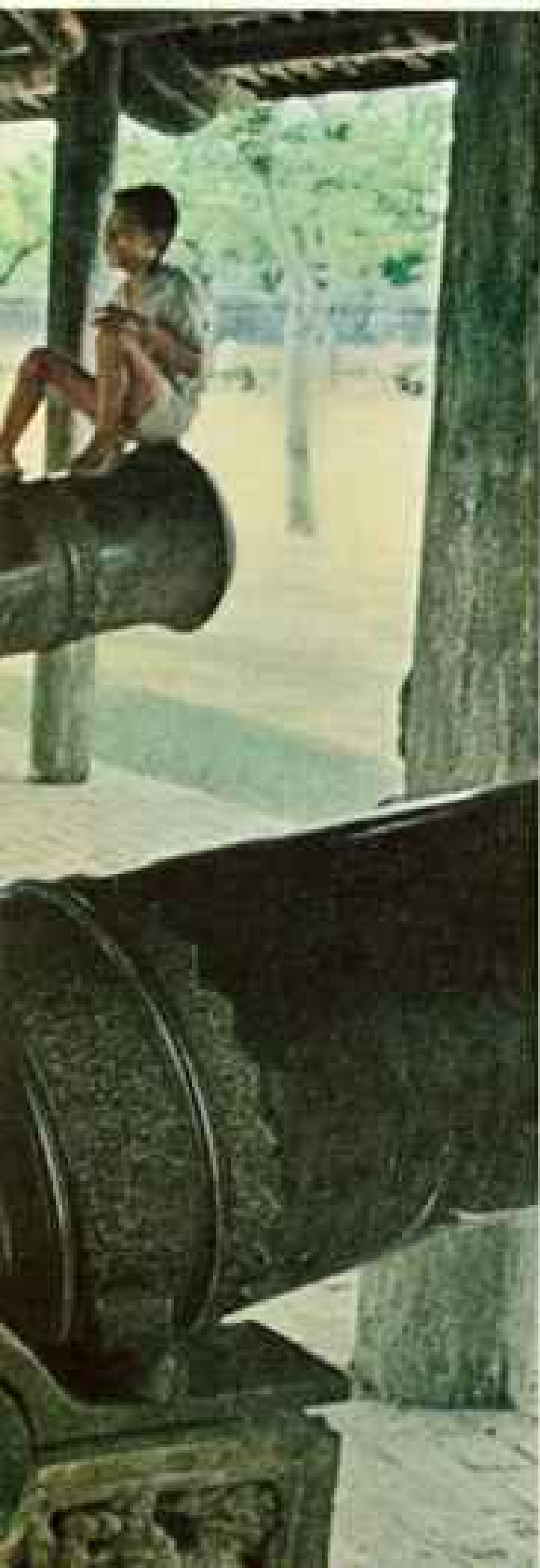
We passed a far more elaborate tomb flanked by stone phoenixes ten feet tall.

"Here lies a great mandarin," said Mr. Hanh. "All his children came to grief. That hill behind the tomb, very bad."



Hole in the wall reveals visitors to an emperor's tomb on the edge of Hue. Damaged by war, it honors ill-fated Duc Duc, who ruled but three days in 1883 and spent the rest of his life in jail. His remains repose in a mound outside.

Never fired, holy cannon affords symbolic protection for palace and kingdom. A university student and playful boys adapt the 17-foot-long pieces to other uses. A century and a half ago, Emperor Gia Long ordered nine of the ritual weapons cast of copper objects taken from rivals he had defeated in his struggle to unite the country.



EXTRAORDINARY BY WINFIELD PARKS © W.C.S.

Few of the tombs seemed well cared for. Many looked a mess. "That doesn't matter," said Mr. Hanh. "The location matters, harmony with the natural forces."

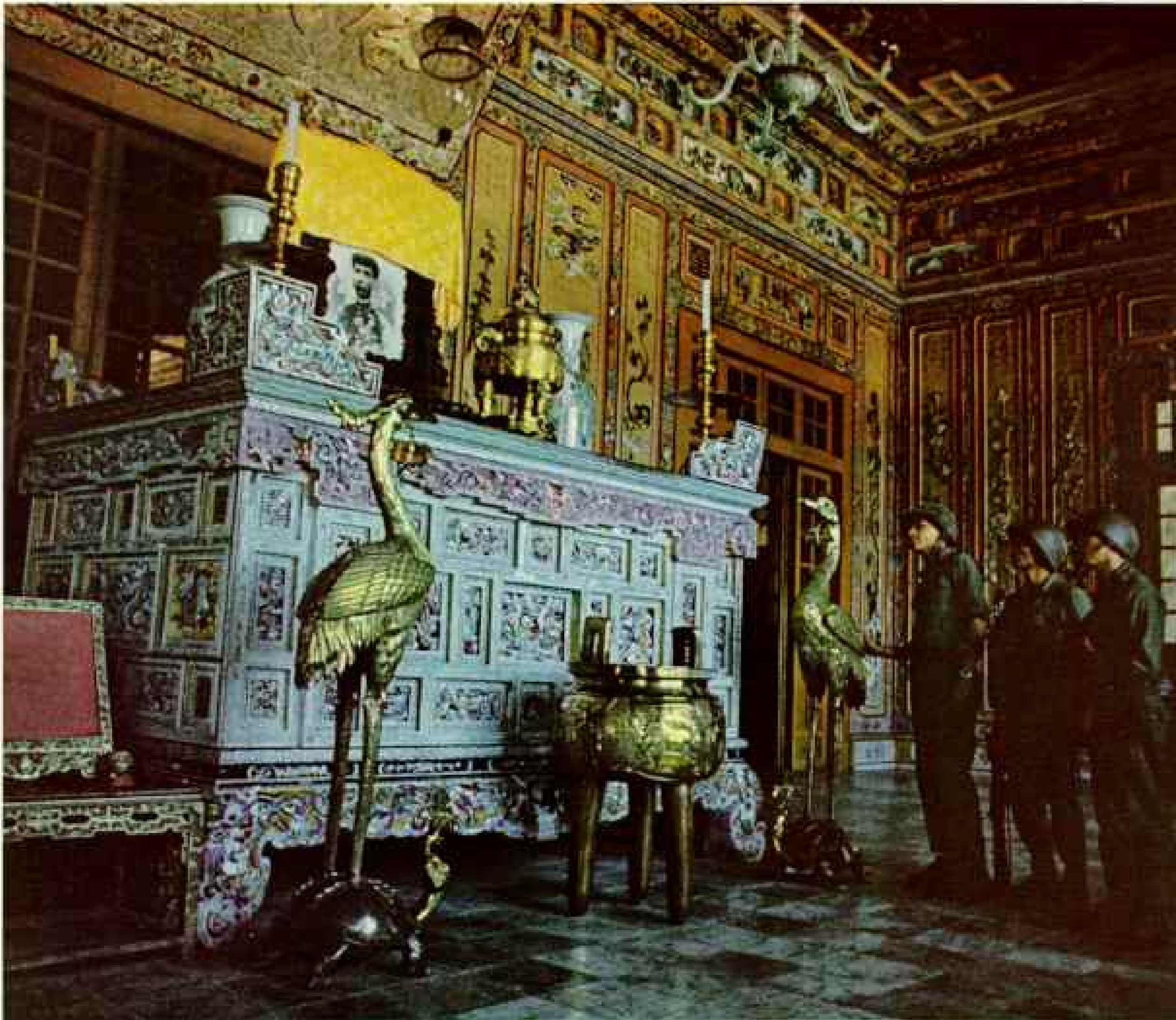
And he pointed to indications of these forces around us, to natural features he called a centipede, a snake coiled around an egg, a snake listening, a girl holding a flower. I couldn't see them.

"It requires much experience," said Trang, "much wisdom."

Mr. Hanh explained that different spots were best for different men. He asked my age and said: "Ah, born in the Year of the Buffalo. The monkey is good for you. Or the chicken. The buffalo is in good harmony with the monkey and the chicken."

Close to us, said Mr. Hanh, were manifestations of the deepest powers of all: the white tiger—the female principle, negative, threatening; and the blue dragon—the male principle, positive, benign. These forces met in harmonious balance in the Imperial City, exactly where the throne stood, two and a half miles away. That's why the throne had been put there.





Ornate altar awes soldiers in the tomb of Khai Dinh, who began building the massive monument near Hue five years before his death in 1925. Brass cranes standing on turtles signify longevity and hard work; the urn commemorates the emperor's reign.

Spanning a lake sequined by lotus blossoms, the majestic tomb of Emperor Minh Mang, completed in 1843, harmonizes the artistry of man and nature. Visitors to this and other tombs several miles from Hue risk bushwhacking by the Viet Cong.

I invited Mr. Hanh to my room, and he looked out the window at the river, the road, and the bridge.

"Not a good spot," he said. "But not bad enough for you to move. I suggest that you move your bed."

From his pocket he took a compass. Then he asked for a piece of string. With these he aligned the bed in a north-south direction, so that it pointed diagonally across the room.

"Your feet should point south, so you must switch your pillow from the head to the foot of the bed."

I thanked Mr. Hanh with the appropriate presents—a package of tea and, for his grand-

children, some money in a red envelope, because red symbolizes luck. That night I slept much better, evidently more in harmony with the natural forces. The moving of the bed out of the corner—and of my head into the middle of the room—gave me the full benefit of cross ventilation.

Everywhere in Hue I found myself surrounded by places of worship, by temples and pagodas and an occasional church, by the shrines in front of houses and inside practically all the homes and places of business.

What was the religion of the people? A venerable Vietnamese told me: "We have 30,000 Roman Catholics in Hue. And the rest,

the great majority, are they Buddhists? Ask them, and most will answer yes. But it's not that simple; it is a delicate matter."

Couldn't it be explained?

"The fact is that most Vietnamese, the best educated and the illiterate alike, believe exactly what the emperors believed. They believe in the morality propounded by Confucius. They are in awe of a vague Buddhism. Above all, they bow to the spirits—to the spirits of their ancestors and to many others; to the spirits of great men of the past; to spirits of the sky and of the fields, of trees and of animals; to spirits good and evil and changeably in between.

"In the most important matters of state, and in their personal lives, they consult mediums and sorcerers and astrologers—to learn what to do, when to do it, and when not to. All that, you see, is the Vietnamese way. If you like, call it the Vietnamese religion."

Beware the Inauspicious Days

Trang had mentioned that the 5th, the 14th, and the 23d of the lunar month were inauspicious, that these were days on which one had best lie low and do nothing out of the ordinary. On the 14th, sure enough, friends who had promised to take me to the beach at Thuan An begged off. I went anyway, driving past rice fields, walking a mile over a hot causeway to a ferry, and trudging another across a broiling sandspit to float at last in the lukewarm South China Sea.

At a refreshment stand I bit off a piece of dried cuttlefish, and for a long time it was more than I could chew. It kept expanding in my mouth, and when I finally got it down, it disagreed with me. I took another swim and was slapped down by a wave. I crawled out of the water and discovered that someone had made off with my watch and pocket-knife. That did it. Back in Hue, smarting with sunburn, I asked Trang to cancel the sampan ride set for that evening.

Spellbinding flame of burning incense licks the face of a medium. Family and friends of an ailing girl watch as the woman seeks to communicate with spirits she believes can prescribe a cure. Even Western-trained Vietnamese seldom make important decisions without consulting a medium, an astrologer, or a geomancer, who predicts fortunes from geometric figures. Three out of four Hue residents are Buddhists, others are Christian; but most also follow Confucius and bow to spirits of ancestors, national heroes, nature, and good and evil.

Trang demurred: "Be glad that these unimportant things happened. It means that you need fear nothing serious. Let's go."

Three musicians and three girl singers rode with us on the River of Perfumes. Along came a bumboat woman, and we all ate Chinese soup. Then it was dark. The musicians began to play and the girls sang, putting me in mind of the music described by Nguyen Du, the greatest poet ever to come to Hue. "One would think water was running, and clouds were traveling, through the flow of its notes."

These were melancholy songs. Of the pains



of love; of the beauty of the river and the full moon; of that familiar idol of central Viet Nam, the hero who fights in a good cause but fails. "How beautiful," sighed Trang, "like the song of a bird that has lost his way."

I became more melancholy by the minute until the moon—the famous full moon of Hue—squeezed through the clouds at last, pale and distant. My melancholy vanished. My sunburn cooled. It was a soothing ending of an inauspicious day.

Alas, the calm of Hue, as soothing as the breeze in the pines of the Citadel, how de-

ceptive it could be! In the wreckage of a great building of brick and concrete, I balanced on blackened rubble and jagged bits of glass. This had been the American Cultural Center. I was stunned, as if one of those pieces of glass had been driven into my stomach.

"We had 10,000 books," said Albert Ball of the United States Information Service. "Thousands of people borrowed them and came to our lectures and movies. We had the best medical journals...."

Ball picked up a smudged picture of President Kennedy.

DETACHMENT © NATIONAL GEOGRAPHIC SOCIETY





Long-lived lighter, a smoldering rope fires a hand-rolled cigarette of a tobacco-stall patron.



Elbowing into a bay of the South China Sea, Da Nang unloads nearly 200,000 freight tons monthly for the war against the Communists. Docks and warehouses line the Da Nang River by the old heart of the city (below). Trucks roar amid tents, oil tanks, and ammunition dumps. An airfield throbs to the ear-splitting whine of jets and the splutter of artillery-spotter planes. With nearly a quarter million South Vietnamese, Da Nang ranks second only to Saigon.



"We made a great effort in Hue because this is the mecca of Vietnamese civilization. We thought if we could help the university students we'd strengthen the leadership of the country—help it achieve a sense of direction, of pulling together. But Hue is also a place of intrigue, of plots and counterplots, and mutual distrust."

The center had fallen victim to the recent rebellion in central Viet Nam. Buddhist monks, proclaiming their own brand of Vietnamese nationalism, paraded in defiance of the government in Saigon. Vietnamese soldiers stood by while students with pistols and grenades demanded that the United States stop supporting that government. When President Johnson refused to intervene in this Vietnamese affair, the students sought to pressure the President by sacking the American Cultural Center.

"I don't blame this on the people of Hue," said Ball. "This was the work of a few. Some of them used to come to my house, but that's typically Vietnamese too. Personal relationships mean nothing to them when they are fighting for a principle."

Nor, to some, did their own lives. In a Buddhist pagoda inside the Citadel, on a small altar heaped with gifts of incense and

fruit, I saw the photograph of a high-school girl. Her name was Nguyen Thi Van, and in front of this pagoda, at the height of the rebellion, she had poured two gallons of gasoline over herself and set herself afire.

"Many wanted to do this but we stopped them," a monk said to me. "We tried to stop her too, but she died."

Outside, in the courtyard, lay a charred piece of her white robe.

No Safety in Fortified Headquarters

More and more, too, Hue lay in the shadow of the ruthless Viet Cong guerrillas.

"They mine the roads and blow up bridges," said an American official sent from Washington to analyze Viet Cong tactics. "They go after the fortified government headquarters, where the officials seek safety at night. They want to show the people that officials aren't safe anywhere, that the government cannot protect them."

The week before, 300 yards from the city limits, two score VC with submachine guns and plastic explosives had brushed past the guard of a hamlet at two in the morning. Now, in the sun, the debris sprawled in silent eloquence. There 12 civilians had died, among them the hamlet chief.





A little boy in a pith helmet kept his big brown eyes on me. This was Xi, the hamlet chief's son (page 176). He took me to his house. His mother and his sisters sat silently. His grandfather said, "Xi's father was my only son." The old man cried.

When I left, little Xi followed a while. I thought his big brown eyes would follow me the rest of my life.

In the wake of the rebellion in central Viet Nam, the authorities in Saigon imposed drastic changes. Lt. Gen. Nguyen Chanh Thi, the regional administrator and army commander who had shown sympathy for the disaffected Buddhist monks and students, was now in honorable exile in the United States. And numerous government offices moved away from Hue—50 miles southeast to Da Nang, long the region's major port. When I went there, I found a bustling center of commerce and an ever-expanding American military base (preceding pages).

Many officials had left Hue with mixed feelings, among them Mr. Le Khac Hy, an important judge. "Hue was better for the soul," he told me. "On a Sunday, when I would go to sit among the tombs, I felt like a superman, calm and wise and unworried. Da Nang is better for the body. A little cooler, better for my rheumatism."

Poetry Elusive in Chaotic Da Nang

I found Da Nang bad for my eardrums, lungs, and eyes.

Landing fields throbbed with jet fighters and propeller-driven dive bombers, with tiny artillery spotters and huge planes carrying enormous radar domes on their backs; with reconnaissance craft; with five varieties of helicopters and seven of transports. They made a lot of noise.

Tents, fuel dumps, and ammunition depots ranged far and wide. So did the jeeps, tank trucks, tractors, and wreckers, the power



ADDENDUM BY WINFIELD PARKS © U.S.A.

shovels, bulldozers, and 40-foot-long earth-movers with wheels seven feet high. All these vehicles raised an awful lot of dust.

In the background churned the U. S. Naval Support Activity, Da Nang. The port had few deepwater piers; hence many big freighters were met by LCM's and LST's—Landing Craft, Medium, and Landing Ships, Tank; by water barges, called YW's, and repair vessels, called YR's. Along the Da Nang River moved thousands of items from America—nearly 200,000 freight tons a month.

Was there no calm in Da Nang, no poetry? In a flare-dropping plane of the U. S. Air Force I circled out to sea and back again, through the night. We were ready, if an alarm should come, to hurry to any place in central Viet Nam, to illuminate any outpost under attack.

No alarm came. In the black of the sky I saw the Milky Way. Below, from hundreds of sampans fishing in the black waters off Da Nang, sparkled tiny white lights. Had I been

Awaiting airlift to battle, U. S. Marines stand by at Da Nang, headquarters for Marine forces in Viet Nam. They joined "Operation Hastings," pouncing on a North Vietnamese division that infiltrated the Demilitarized Zone between North and South. Each member of this mortar platoon packs 50 pounds of gear. Marine infantrymen lugging such burdens in tropical heat through swamps and forest-tangled mountains jokingly call themselves "grunts."

a poet, I would have said the Milky Way had dropped into the South China Sea.

The following day at the Sports Club, where businessmen of Da Nang played tennis with ferocity and grace, I heard a man denounce the high cost of sneakers. In the clubhouse the mayor, Lt. Col. Le Chi Cuong, said of course prices had to rise—the population had jumped from 160,000 to 240,000 in less than two years. More people would come, because here's where the jobs were—the jobs with the Americans.

Welcome Sight at "Busting-cap Time"

The mayor added that he was seeking to prevent people from destroying one of the marvelous Marble Mountains, the one with the famous pagoda inside, carved from the living rock.

The stone there brought good money from builders. They ground it and mixed it with cement. When dried and polished, this mixture made beautiful floors and walls that were easy to wash.

Afternoon was waning as we drove toward the Marble Mountains—NATIONAL GEOGRAPHIC photographer Winfield Parks and I, both eager to see the cave shrines, only six miles from the center of Da Nang (next pages).

At the last checkpoint a cheerful Marine said: "Five o'clock. Busting-cap time!" He meant fire from snipers. We drove on anyway, but then the road became a valley, wooded slopes rose high around us, and we had second thoughts. We started back briskly, and then our rented jeep stopped.

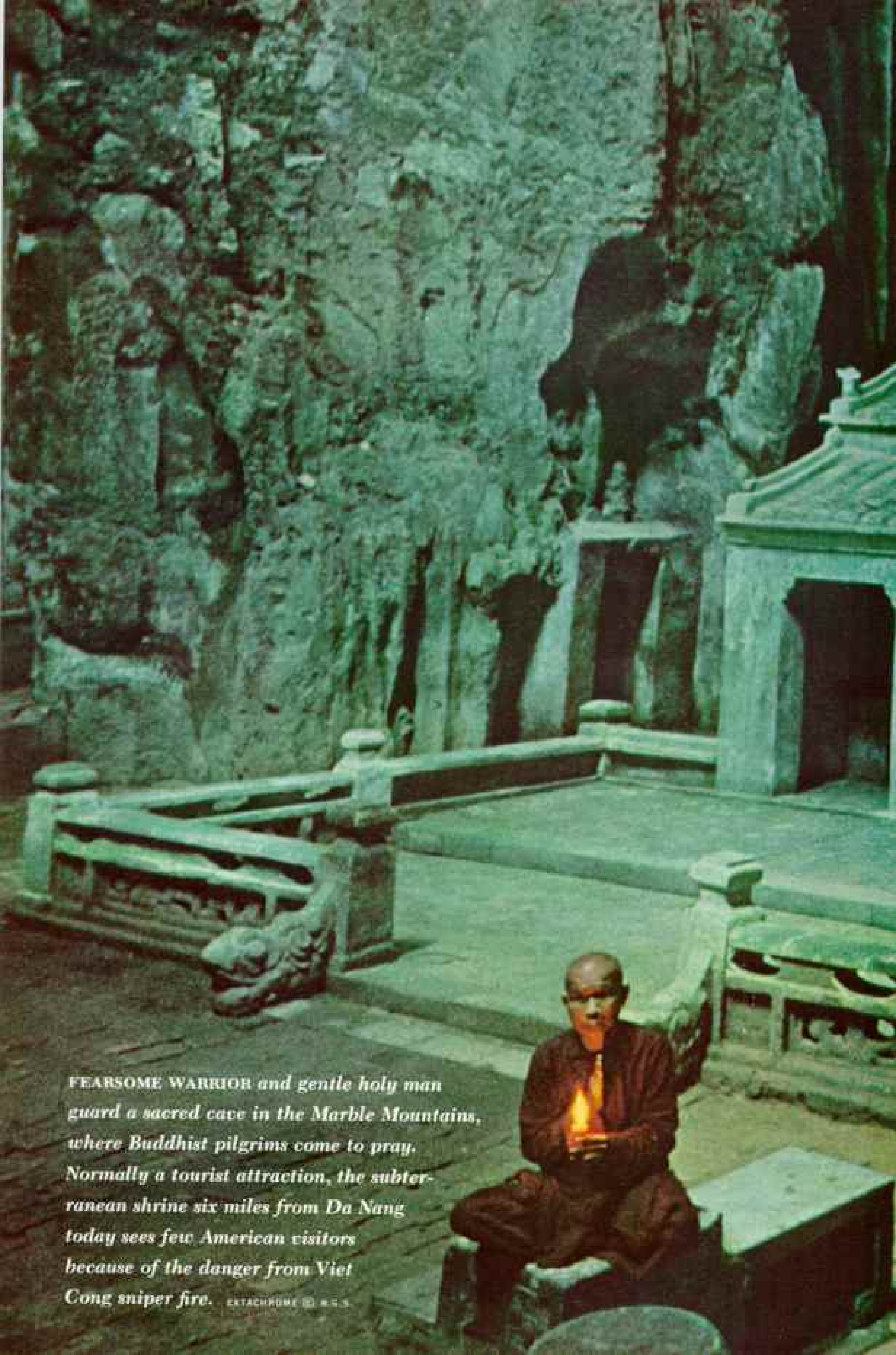
Out of gas.

I walked around the jeep, wondering which side was safest. Marine sharpshooters can pick off VC at 1,500 yards. Were the VC any less adept? Did Win have any suggestions?

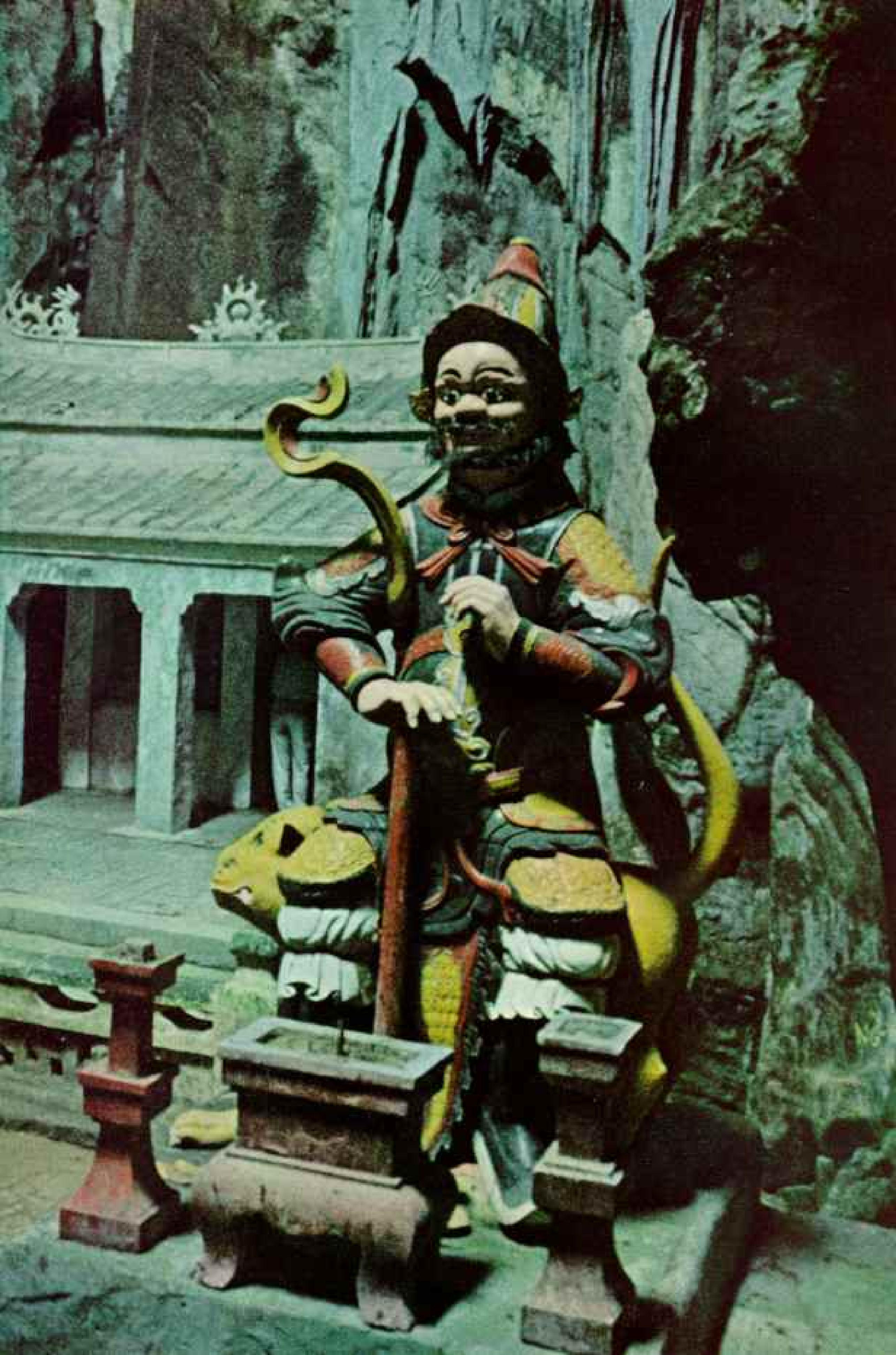
None.

And then, trailing a cloud of dust, came one of those enormous tank trucks. Glorious sight!

When we returned the next day, early, and stood before the great Buddha inside the



FEARSOME WARRIOR and gentle holy man guard a sacred cave in the Marble Mountains, where Buddhist pilgrims come to pray. Normally a tourist attraction, the subterranean shrine six miles from Da Nang today sees few American visitors because of the danger from Viet Cong sniper fire. ESTACHEPPE © R.S.





YODACHYOMF (ABOVE) AND YETACHYOMF © U.S.C.

In stunned silence, Xi sits in the rubble of a hamlet headquarters only 300 yards beyond the Hue city limits. His father, who was the hamlet chief, died with 11 others when VC raiders demolished the building with plastic explosives in a 2 a.m. attack.

Broken and bleeding victim of war clings to his sister as a nurse dresses foot and head wounds at Da Nang Civic Hospital. Doctors here struggle to save lives in a facility so crowded that two or three patients occupy every bed and others lie on pallets in the corridors. Shrapnel felled this terrified tot while Marines fought to expand their Da Nang enclave from 8 to 1,600 square miles.

Dispensing medicine and good will in daily clinics, Navy corpsmen care for ailing villagers near Phu Bai airport. A civic-action program also helps villagers build schools and improve farming methods.

mountain, I promised myself not to complain again about any truck, ever.

Like Hue, Da Nang had been in rebellion, and scores of men had died, but now the city was again ruled firmly from Saigon.

Strolling through the streets, my friend Trang and I stopped at the show window of a dentist. It displayed a tray of false teeth: gold, stainless steel, white, and jet black—the color of teeth painted with a special lacquer.

"In the old days," said Trang, "a girl who reached 18 with her teeth still white was not respectable. She could hardly find a husband."

We dropped in at a movie house, in the middle of a Chinese film from Hong Kong with a theme dear to Vietnamese hearts. Boy meets girl. Love blossoms. Then disaster. We stayed to the unhappy end, amid satisfied sighs.

Outdoors once more, I glanced into a large room open to the street. Four dozen men and women had come after working hours, to sit at typewriters and copy English texts.

"They'll be good typists," said the instructor. "Some know a lot of English. Even the ones who know none will earn much more than they do now. The Americans pay well."

Back at my billet I watched a movie starring John Wayne as a major—tough, two-



fisted, all Marine, commanding men who thought they were the toughest, most unbeatable bunch on earth. It dawned on me that the Marines I had met were very much like those on the screen, and I was proud of them. I wished I could have been a Marine myself.

At least I began to look like one. I too wore green fatigues. The sun and the sweat and the dust put on my forearms and face the same reddish-brown glaze, as if we had all been barbecued. And I learned to appraise Vietnamese villages with the eyes of the "grunts," as the Marine infantrymen call themselves.

Cooking Pot May Hide a Tunnel

This ten-foot haystack? Could be hollow, with a vent on top and a passage below—a secret meeting place for a squad of five VC. The cooking pot in the corner of a hut might mask the entrance to tunnels, twisting for hundreds of yards, with chambers full of ammunition and rice. And full of booby traps to kill the Marine who entered.

"They hang snakes in there too," said a corporal. "Bamboo vipers and others. In the dark you won't know what bit you." If you didn't know, you couldn't get the right antivenin.

A Marine colonel gave me the "big picture."

Central Viet Nam, as administered by the Saigon government and its army, comprised the area of the First Corps, or I Corps. Americans call it Eye Corps: five provinces, totaling 10,000 square miles; 2,750,000 people, nine out of ten within 15 miles of the coast.

"When we came to Da Nang, we controlled eight square miles," he said. "Now it's 1,600. We've killed 2,000 VC around Da Nang alone. We're winning this war, decisively."

The key to success, the colonel said, was civic action, individual kindness. Giving the Vietnamese medical treatment and soap, helping them improve their agriculture and build schools. The trouble was a lack of manpower. "We can sweep anywhere, but the VC come in behind us and kill the people who cooperated with us." Now Marines trained the CAC, or Combined Action Companies—local Vietnamese units called Popular Forces, with a few Marines among them—to fill in behind the sweeps.

In the golden light of the morning, a helicopter gave me glimpses of the Da Nang tactical area, home to half a million Vietnamese and some 35,000 of the 60,000 Marines in Eye Corps. From mountains in every shade of green, rivers were winding to the sea in many





Badge of the fighting man, jungle boots seek a buyer on a Da Nang street. Rear-echelon troops and correspondents purchase the boots locally—either legitimate copies or black-market articles. Rot-resistant canvas sides outlast leather. Drain holes on the welt let water leak out. Nylon-mesh inner soles protect feet from crippling spikes the Viet Cong guerrillas plant in rice fields.

shades of blue and brown. A bridge hung into a river, blown up by the VC. Amid coconut palms, all that remained of a hamlet were charred foundations.

"We had to burn it," said the pilot. "But we resettled the people."

Tanks were fanning out on the roads, searching for mines. Near the Thu Bon River, 20 miles south of Da Nang, the pilot pulled us up to 2,200 feet: "They're still rather hostile down there." They probably had .50-caliber machine guns.

We soared over a 3,500-foot mountain, and I looked down on treetops packed as tight as bunches of broccoli. The pilot said this was a staging area of the VC.

"We can't see them but they can see us. In the clearings they work rice fields, believe it

or not. But only at night." On hidden trails—extensions of infiltration routes from Laos—they moved supplies on their backs, on bicycles, on elephants.

Black smoke shot up where a stream came out of a valley. "Air strike!" called the pilot. "Phantom jets. Something must have moved near the Special Forces camp."

Because of the noise of our rotor blades I heard no explosions. But my earphones brought an unfamiliar voice, a fighter pilot reporting to his base: "This is Condole 51-1, expended twenty D-3's... ten buildings destroyed, three KBA's suspected, enemy fire received." D-3's were 250-pound bombs. KBA's meant men killed by air.

Six Doctors Struggle to Save One "Grunt"

"Our main problem is booby traps and land mines," said Capt. William C. Adams of the U. S. Navy. He was in charge of surgery at the naval hospital in Da Nang, where men arrived without legs or arms, or full of shrapnel. "With luck, the choppers get them here twenty minutes after they're hit. We can do a lot for them. Have a look."

In a gown and mask I entered an air-conditioned quonset hut where a Marine lay on an operating table. Two doctors dug bone fragments out of his brain. Two more doctors worked on the lungs and intestines and removed a kidney damaged beyond repair. A fifth kept an eye on tubes supplying blood, dextrose, and anesthetic. Soon a sixth, an orthopedic surgeon, would attend to the legs. This grunt would pull through.

At another hospital, supported by the United States Agency for International Development, I visited civilians who had been wounded in the war around Da Nang. Their even voices told bitter histories.

Phan Cai, 70, from Hoa Ninh—picking tea leaves, machine gun shot him in the side. Tran Thi Tam, 60, from Loc An—gathering watercress, helicopter shot off her left hand. A woman in a neighboring bed spoke for Tran Hoai, 5, from Ky Lam. His parents had been killed by bombs from a plane. His legs were in a cast, his face was cut.

Was this really how these things happened?

"Nobody knows," said Dr. Jennings K. Owens, Jr. Dr. Owens left his practice in Bennettsville, South Carolina, to serve in Viet Nam for two months. "If anyone is hurt, it's always an 'American truck,' or an 'American mortar.' The other story we get—I mean, what we hear from our own people—is that our forces were shelling a VC column, and these were bearers for the VC. Or that a child was



PHOTOGRAPHS BY WINFIELD PEARS © NATIONAL GEOGRAPHIC SOCIETY

War bird's high-priced plumage goes on sale as junk at Hue. The Vietnamese hammer out kitchen pots from scrap like this sheet metal salvaged from a downed helicopter. The resourceful people devise uses for much of the debris of battle.

hurt by a VC grenade thrown into a school. . . .”

One morning word came that in the northernmost part of Eye Corps, just below the 17th parallel, Marines and South Vietnamese troops sought to flush out some 10,000 North Vietnamese regulars. It was the biggest Marine operation to date—and the Vietnamese Chief of State, Lt. Gen. Nguyen Van Thieu, and the Prime Minister, Air Vice Marshal Nguyen Cao Ky, flew north to inspect forward positions (opposite).

I went along. Marshal Ky flew the helicop-

ter from the copilot's seat. I sat behind him, next to Lt. Gen. Lewis W. Walt, commander of the Third Marine Amphibious Force and the ranking American in Eye Corps.

General Walt looked out at a slope turned blackish brown. Defoliation planes had done that. “Napalm too,” said the general. He also pointed out yellowish craters left by 1,000-pound bombs from B-52's. And he looked westward, toward Laos. “I'm from Colorado,” he said. “Aren't those mountains beautiful? A little like the Rockies.”



Lethal arsenal and two prisoners—spoils of Operation Hastings—go on display at Cam Lo, five miles from the Demilitarized Zone. Marines captured 254 weapons and 11 prisoners in this battle with North Viet Nam regulars.

In a firsthand look at the campaign, Prime Minister Nguyen Cao Ky, in sunglasses, and Chief of State Nguyen Van Thieu question barebacked prisoners. Newsmen squeeze in to listen.



We landed on a ridge, an outpost held by Vietnamese paratroops and their U. S. Army advisers. The generals inspected. I lay down on a poncho, listened to the whispering of the wind in the trees, and thought how peaceful this country could be.

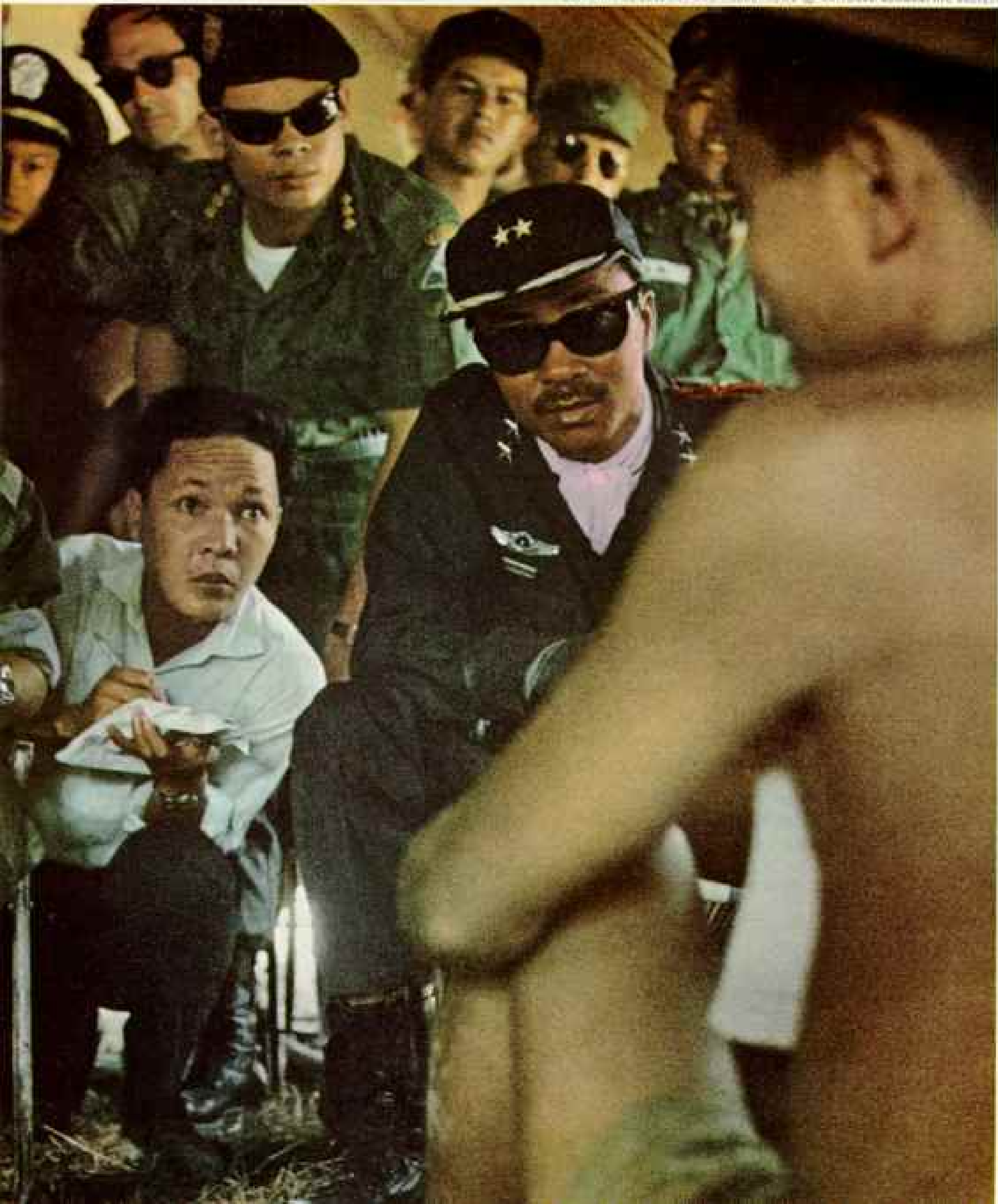
We stopped at the command post of a Marine battalion in waist-high elephant grass. I bent some down and rested on that. An old gunnery sergeant said the terrain was bad. "Like Guadalcanal. Or worse."

At the end of the day I hitched a ride south.

In the back of the plane, on stretchers and covered with ponchos, rode three dead Marines. The pity of it—that so beautiful a country had to be so deadly. I forced my mind away from gloom and asked to be let off at Hue.

From the old capital I toured the surrounding sights: the Terrace for the Sacrifice to Heaven and Earth, where once in three years the emperor reported on the state of his country to the highest spirit in the sky, and the 366-year-old Linh Mu pagoda, towering on a hill above the River of Perfumes. Here was

EXTRACTS FROM "THE BROTHERS" AND "HONORABLE" © NATIONAL GEOGRAPHIC SOCIETY





the seat of the senior Buddhist monk in central Viet Nam, but he was unavailable. For a time, at least, the ranking monks were hiding.

As I felt more at home in Hue, my friends felt more at home with me—and we talked much about elementary things that mattered deeply. About the power of the woman in the home. About the peasant's feeling for the buffalo. About everyone's awe of the spirits.

Golden Circles Bring Good Health

The voices of the girls of good family, pitched high and almost inaudible—weren't they the quintessence of docility?

"Dangerous!" said Trang. "These women of central Viet Nam—marry one and she turns into a tiger." Friends from Hue didn't deny that their women were in a much stronger position than might appear to foreigners. Thus the wife was now the family treasurer, the

keeper of the gold. The gold, of course, was the family's savings. If you needed a little cash, you sold a bit of gold—and only the wife knew where the gold was hidden.

To the people around Hue—the peasants on the great, flat ricelands—a buffalo was as valuable as gold and more endearing, because it had a soul. Not that any but a very few could afford one of these beasts. In Viet Nam a man was glad if he could find the money to rent a buffalo for the plowing.

That's why little Cho Em was so lucky. He wasn't tending some rich stranger's buffalo—this one, named Phao, meaning "Cannon," belonged to his father.

Cannon was a very good buffalo: nine years old, nearly eight feet from horns to tail. Best of all, on each side of his blackish hide curled a circle of golden hair. "This symmetry means good health," said Trang.



GREENHORN (C) H.A.R.

As a boy, Trang had ridden many a buffalo. "Why don't you ride this one," he said. "He's friendly. Two out of ten are mean, but we eat those. A mean one wouldn't get that big."

Cannon stuck his big blue-and-white tongue into his left nostril, then into his right. He gave me a look. He looked mean to me.

How I got up on him I don't want to think about. But once up there, I felt surprisingly at ease. When I slid down, I landed in a batch of clover. "In America," I said, "a four-leaf clover means good luck."

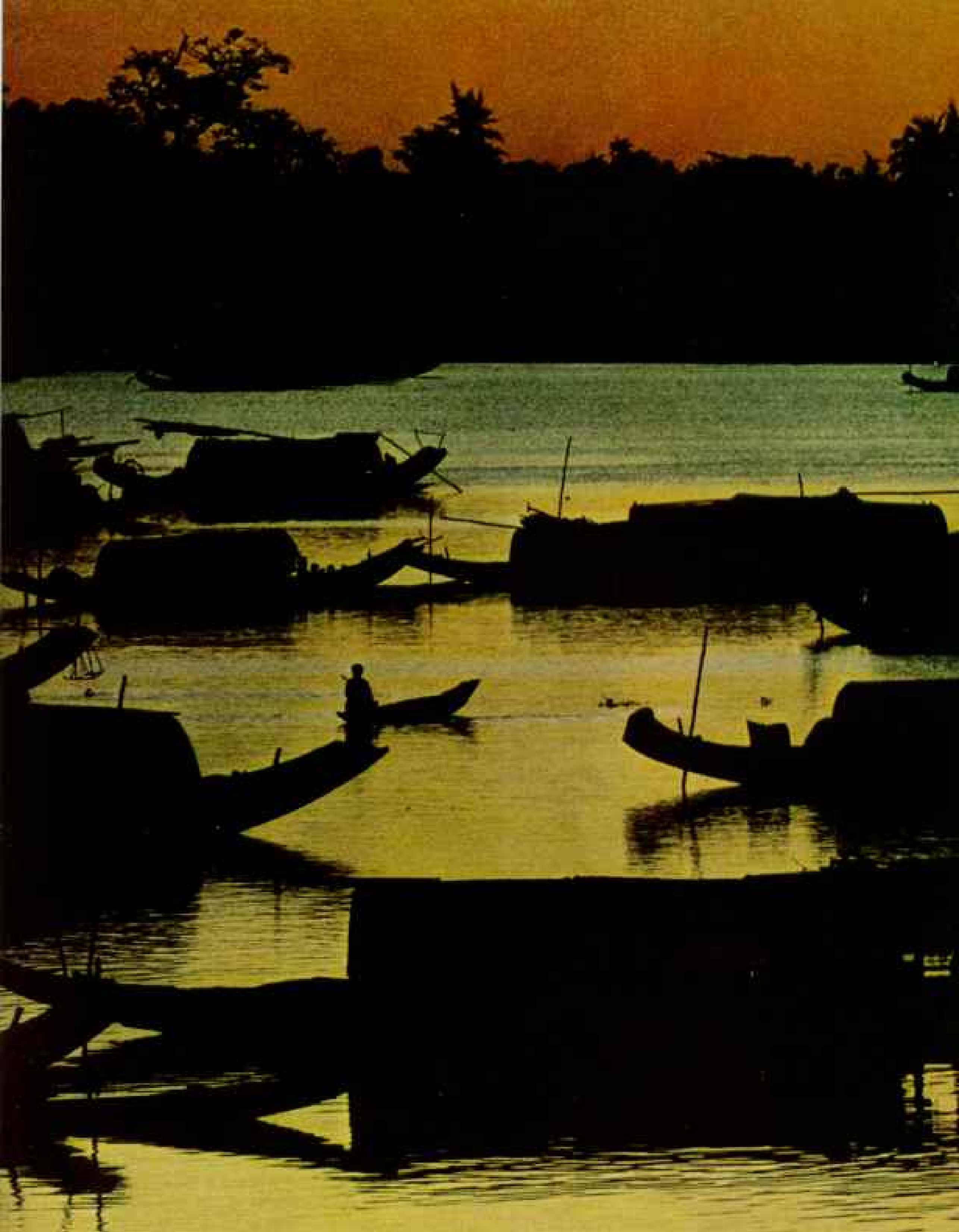
Trang said, "It doesn't mean a thing to us."

The University of Hue, closed during the recent troubles, was opening again. "Before, there were more than 2,000 students in all," said Professor Doctor Hans-Guenther Krahnick, a West German pediatrician and the senior adviser to the Faculty of Medicine.

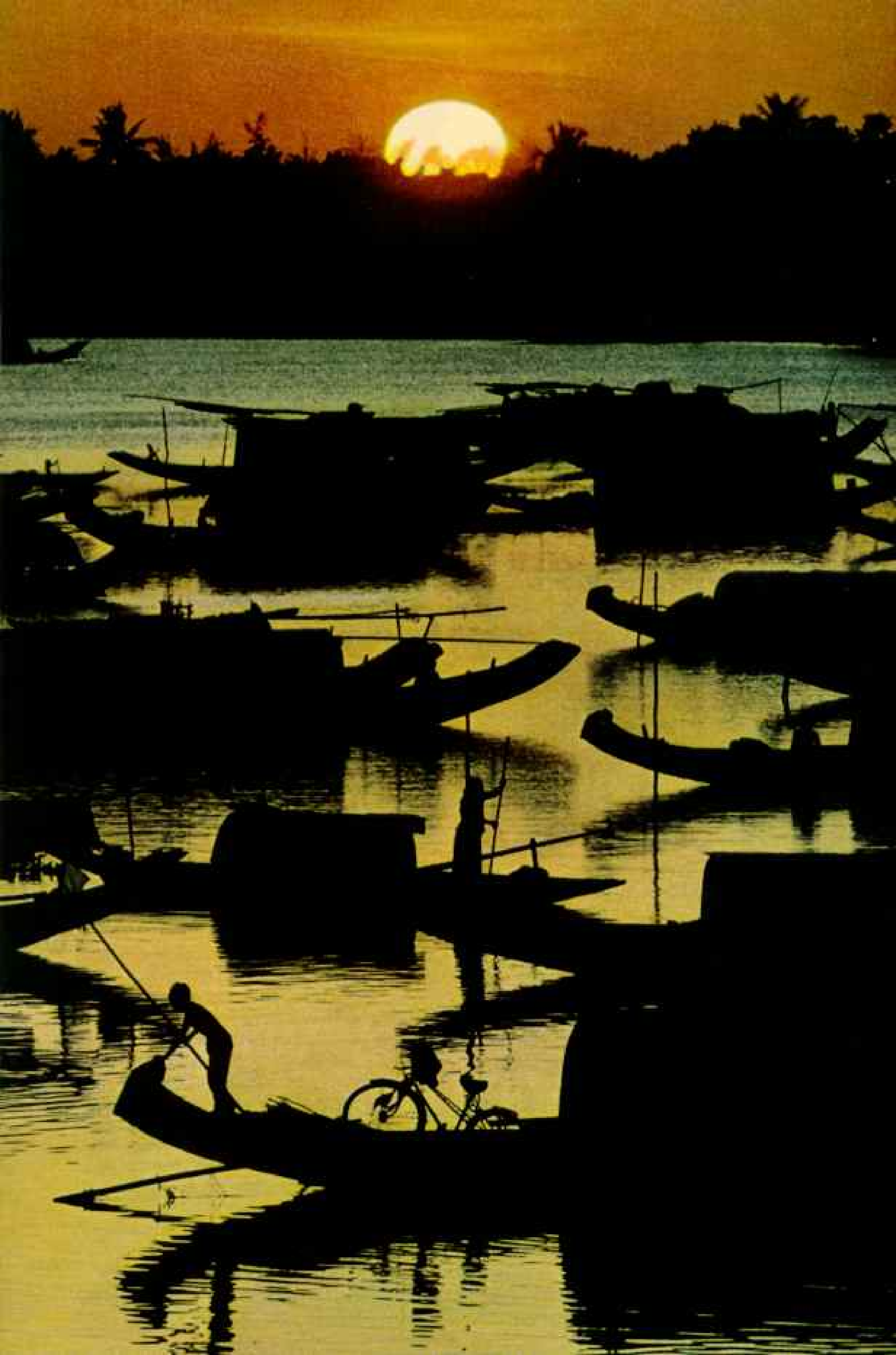
Some students who had taken a leading

Pumping life into paddy—the Asian word for rice—two farm boys operate a foot-powered irrigator. Trying the treadmill, the author discovered that it "requires little exertion, is efficient, and is easily made and repaired." Still, electric pumps would produce more than the present two rice crops a year; fertilizer would triple the yield.

Village women in Sunday best ride the running boards of a truck rattling toward Da Nang. A soldier, also unable to find space in the canopied rear, perches atop bundles of broomstraw. A Marine pulls his vehicle aside to make way on the narrow road.



DAY BEGINS FOR HUE AFLOAT. Entire families spend their lives in this sampan community. Besides fishing and hauling, owners offer moonlight cruises aboard their craft—many with handsome teak interiors—to dry-land residents of Hue.



Starting life anew, a former Viet Cong soldier cleans up the yard of a house given him by the government. Like his neighbors, he has fenced the yard with saplings; when they leaf out, they will screen the home from evil spirits. Adopting a program from the Philippines, South Viet Nam woos Communist defectors with money, houses, and garden plots in Chieu Hoi, or "Call Back," villages.

Hardened one-time guerrillas, like the man below, welcome the chance to be with families. But they live in fear of VC retribution in the poorly protected villages.



part in the uprising were under arrest, and some were hiding. A few had joined the VC.

Yet things seemed nearly back to normal. Exams were in the offing, and students studied all over the place—in pagodas, on top of the sacred cannons in the Citadel (page 164). On the island in the Lake of Contemplation, a young man with a book on biology said to me: "Could you study at home with eight brothers and sisters in your hair?"

Exams were already under way at Dong Khanh High School, the most famous school for girls in Viet Nam. Riot police with carbines and submachine guns guarded the pink stucco buildings. Nevertheless, a Viet Cong plastic charge had wrecked a classroom during the night. Another had been disarmed that morning. Yet the girls exuded calm as they pondered questions in philosophy:

Does psychology require experimentation? Can reason function without regard to intui-

tion? Are one's feelings an obstacle or a help for the moral life?

Professor Buu Ke—poet, novelist, and librarian of the university—received me amid his books under the great ceiling fans.

"You often hear that we are a young country, that we must build our nation," he said one day. "In a sense that's true, but in another it can be misleading. A Vietnamese nation existed along the South China Sea 2,000 years ago in the days of Julius Caesar, and even before that, for some 2,000 years of more or less legendary times. Please skim through this."

He handed me a fat book, in French, and I counted eight Vietnamese dynasties, one with 27 sovereigns. Even during 1,050 years of Chinese domination the Vietnamese never ceased to rebel until they had chased their overlords back to China, 1,028 years ago.

Professor Buu Ke continued: "Viet Nam did not always hold all the territory now



ENTRANCE (OPPOSITE) AND FISHING BY WINFIELD HARRIS © NATIONAL GEOGRAPHIC SOCIETY

divided into North and South Viet Nam. We expanded gradually, from north to south. About the time the first Europeans landed in North America and began to take the land away from the American Indians, some of our Vietnamese forefathers turned southward and took the area around Hue away from the Chams, a people of Indo-Polynesian origin."

Old Culture Nourishes a Young Nation

By the 18th century, the Vietnamese had pressed still farther south, at the expense of the Cambodians, to where South Viet Nam's borders lie today. "After that," said Professor Buu Ke, "we fell victim to the French."

He sat silent for a while. Then he said: "South Viet Nam is a young country, certainly, created after the French left 13 years ago. But as a civilization, we are not young. On the contrary, perhaps we have remained in the past for too long."

I saw reminders of the Vietnamese passion for independence in the very names of the streets: from Tran Hung Dao, in memory of the general who in the 13th century threw out the invading Mongols, to Phan Boi Chau, honoring a scholar who died in Hue in 1940 after struggling against the French for fifty years.

What would happen to Viet Nam now? Could the wounds ever heal?

I asked the father of the girl who had burned herself to death. He poured me another cup of tea and looked quietly around his shop—a repair station for motorcycles. He said: "At first my wife and I were very sad. But our daughter died for a cause, and so we were proud also. Now we are forgetting. Not her, but the sadness."

In the Citadel, at the weekly meeting of the Confucius Club, the members plotted a moral renaissance. First, newly vigorous teaching of Chinese, so that the five Chinese classics—the

books compiled or edited by Confucius and his followers—might offset the influence of the new books with no morality in them. For those who couldn't manage to learn Chinese there would be translations.

The Vietnamese call Confucius "Khong Tu." What did he prescribe for the troublesome present?

The president of the club, the Mandarin Phan Ngoc Hoan, replied that it was still man's primary duty to perfect himself morally. "Khong Tu said that he who perfects himself morally will direct his family well; if one's family is well ruled, one will run the country wisely; and if one runs one's country wisely, one will bring peace to the world."

Not that all Vietnamese agreed. Certainly not Mr. Hoang Kinh, the director general of the Nong Son Coal Mine and the An Hoa Industrial Complex, one of the largest government-owned enterprises in South Viet Nam.

Better a Good Son Than a Good Engineer

When I had visited him, 25 miles south of Da Nang, Mr. Kinh had sketched a dynamic, industrialized future for this region, based on his billion-ton coal reserve: plants making glass, cement, and dry ice; wood pulp, plastics, and fertilizer; and enough electric power for lighting, for small industries, for the pumping of water from the rivers into the paddies, a task now done by men on treadmills (page 183). Electric irrigation would mean more than two crops a year, and the fertilizer would triple the yield of each paddy.

VC harassment had frozen these plans. With the railroad ruined, and traffic by road or river extremely hazardous, An Hoa depended on an airstrip defended by U.S. Marines. As we raced from the mine toward the airstrip—in a speedboat on the Thu Bon River, surrounded by boats with company guards and machine guns—Mr. Kinh said that the hold of the family must be reduced.

"Don't misunderstand," he said. "In many ways I support the family. When one of our guards is killed, I give his wife three years' wages. I give her a decent job so she can raise the children, and when they're old enough, we train them to be skilled workers. That's why our guards are loyal."

But why weaken the family?

"Because in Viet Nam the family means too much. It's everything. It paralyzes us. I send a boy to Germany to become an engineer—five years! Twenty thousand dollars! He returns and his father says: 'I rent four houses to Americans for plenty of money; come and live with us in Saigon.' The boy goes. He tells me, 'It's more important to be a good son than to be a good engineer.' That's what we must change, and we haven't much time."

My own time in Hue was running out, and I hadn't yet visited the most important imperial tombs. Then word came from the province chief. He still couldn't spare enough troops to permit an excursion to the tomb of the Emperor Gia Long, six and a half miles away, or five miles to the tomb of Gia Long's son, Minh Mang (page 166). But 12 men with one machine gun and two grenade launchers would do for the tomb of the Emperor Tu Duc.

It stood in a walled town of its own, with many kinds of trees and five times the area of the Forbidden City where the emperor had spent most of his lifetime. Behind the great wall rose a temple, buildings for attendants, statues, and inscribed stones. Enclosed by yet another wall, and surrounded by pines, stood the simple tomb. The emperor had designed it all himself, and often he sat here, in an airy pavilion on a lake of lotus, writing poems about the impermanence of all things.

Tu Duc was a dreamer; during his reign the French came and took his country. In his extremity, Tu Duc sent the Mandarin Bui Vien to Washington, to ask help from President Ulysses S. Grant. Nothing came of it. The French forced those who came after Tu Duc either to rebel and be exiled, or to rule as puppets over central Viet Nam alone.

A gray bird rose from a frangipani tree. Dragonflies hovered over the lotus like tiny helicopters—some blue, some red, some yellow—and I thought of my friend Thien.

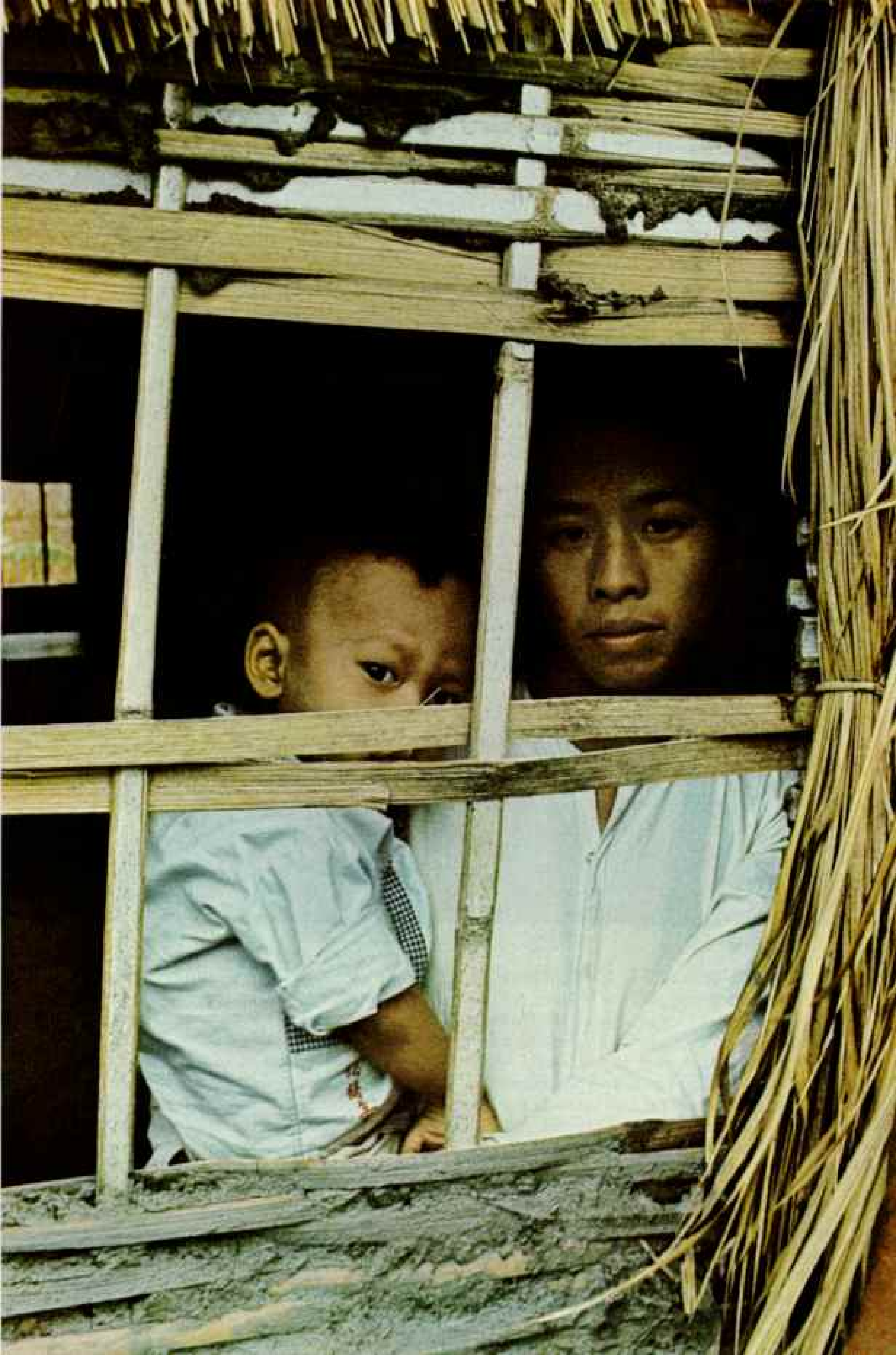
"Viet Nam," he had told me, "like many other countries, is a dream, and to make dreams come true, one needs people who believe in dreams. I have been told by Americans, whose science and wisdom I respect, that America also is a dream, a dream as beautiful as a spring flower. . . ."

And I prayed that both dreams might long endure.

THE END

"Pain and fear were read on the faces of the miserable ones." The words of Nguyen Du, the Shakespeare of Viet Nam, describe a family fallen upon misfortune in earlier days. But they still ring true for this mother and child peering uneasily from their unfinished home in a Chieu Hoi village. Riven by conquest and civil war through most of their long history, the Vietnamese still look hopefully to tomorrow.

CONTINUE © K.L.C.





WITH THE SPOTLIGHT of world attention and concern beamed on Viet Nam and its neighbors, the National Geographic Society this month presents a new wall map of that part of the world—**Viet Nam, Cambodia, Laos, and Thailand.**

As graphic, accurate, and up to date as the Society's skilled cartographers can make it, the new map will enable members to follow the march of events in strife-torn Southeast Asia. More than 5½ million copies have been produced for distribution as a special supplement to the February *GEOGRAPHIC* and to meet the subsequent needs of members and Government agencies.*

Peter T. White's article, "Behind the Head-

lines in Viet Nam" (page 149), explores that unhappy country's cultural heritage; as a companion piece, your Society's map makers have created a comprehensive guide to the region's unfamiliar geography, in record time and on the large scale of 30 miles to the inch.

The Demilitarized Zone between North and South Viet Nam, averaging only six miles across, appears not as a line but as a swath a fifth of an inch wide. And 9,669 place names pinpoint both cities and obscure hamlets that

*Additional copies of the map and a booklet-form index to its thousands of place names, with a special key to provinces and other administrative divisions, may be obtained by writing to Dept. 373, National Geographic Society, Washington, D. C. 20036. Maps, \$1 each on paper, or \$2 on fabric; index, 50 cents; postage prepaid.



EXTRACTED FROM U. S. MARINE CORPS (LEFT) AND U. S. ARMY



Men of two worlds cross paths in Viet Nam. The farmer, seining his paddy field for an extra crop—fish—exchanges glances with passing U. S. Marines who hunt guerrillas. Moving warily into the unknown, a soldier fords a chest-deep river near the village of Long Thanh, 20 miles east of Saigon.

NEW GEOGRAPHIC WALL MAP SPOTLIGHTS Strife-torn Viet Nam and Its Neighbors

may be the source of next week's headlines.

The name "Central Highlands," so often in the news, takes on clearer meaning when one looks at the rugged mountains of Viet Nam. The new map portrays them with remarkable clarity. Cartographers chose the light thrown by late-afternoon sun on northwestern slopes to achieve a striking relief effect.

Among hundreds of point elevations on the map, dozens in Viet Nam soar to a mile or more—"steer-clear" warnings to low-flying pilots. Ocean soundings appear in fathoms; boxed figures beside harbor names indicate controlling channel depths in feet.

An angled blue pattern, signifying paddy fields, identifies at a glance the strategically

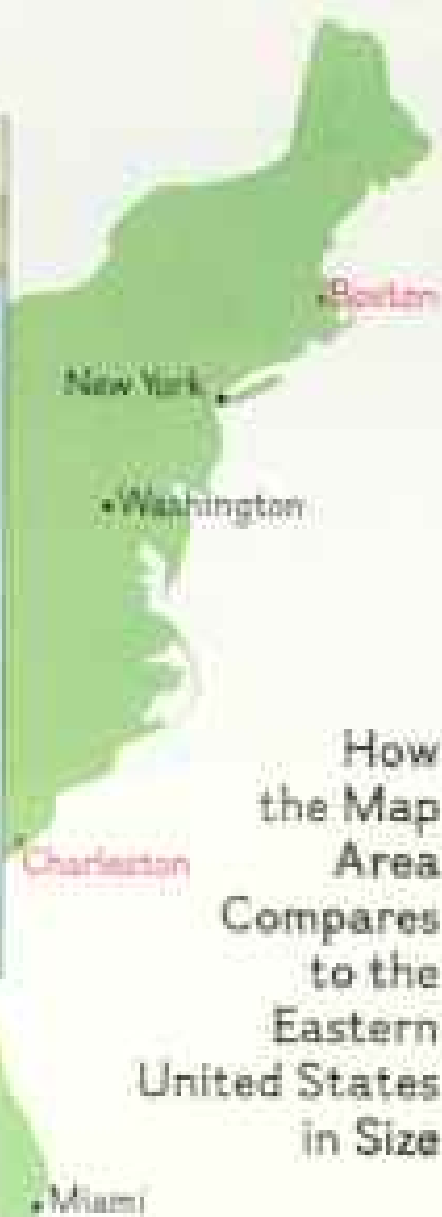
vital rice-producing areas on which all of Southeast Asia depends for its staple food.

Scarlet airplane symbols indicate airstrips. Planes operating from bases such as Da Nang, Quang Tri, Tra Bong, and Quang Ngai have provided our troops in the south with powerful air support, while teaming with carrier-based Navy planes to reduce the enemy's fighting capability with bombings in the north.

Among the top targets of these attacks have been the two rail lines leading from Hanoi northeast and northwest toward China's Kwangsi and Yunnan Provinces. A large Communist Chinese contingent in North Viet Nam has been kept busy repairing and defending these major supply links.

Hidden under their own dust, U. S. tanks rumble past a hamlet ten miles from Da Nang. Tracks at center, left by turning vehicles, mark a skirmish with the enemy by another patrol. Most of the 35,000,000 Vietnamese—North and South—live on such velvet-green terrain. Their rice fields quilt deltas and alluvial plains near the curving coastline.

Maps below show that Viet Nam's northern and southern capitals—Hanoi and Saigon—lie almost as far apart as Boston, Massachusetts, and Charleston, South Carolina.



How the Map Area Compares to the Eastern United States in Size

One inset indicates the vast distance flown by Guam-based B-52 bombers to attack military targets in Viet Nam. A second completes the "tail" of Thailand. This teeming country, whose very name means "Free Nation," struggles to remain independent in the face of stiffening Communist pressure.

Neighboring Laos has been wracked for years with intermittent fighting on the Plain of Jars. Farther south in Laos, Sepone (about 25 miles southwest of the Viet Nam Demilitarized Zone) serves as a major base for Pathet Lao Communist forces and the Viet Cong. Increasingly, the Soviet Union has used the Sepone airstrip to land Viet Cong supplies, thus circumventing traffic tie-ups in the Soviet's uncooperative neighbor, China.

"Neutral" Cambodia, wedged amid Thailand, Laos, and Viet Nam, also finds herself embroiled in the war. Communist supplies filter across her borders over the "Ho Chi Minh Trail"—a network of tracks from North Viet Nam and Laos into South Viet Nam.

The map reflects changes wrought by feverish construction. At Cam Ranh Bay, 185 miles northeast of Saigon, thousands of Amer-



icans have labored night and day to convert a fishing village into Viet Nam's largest port. Outside Saigon, a once-sleepy airport roars with activity; as the pace of conflict accelerates, the runways at Tan Son Nhut echo the thunder of more take-offs and landings than those of any other airport in the world!

Far to the west, in Thailand, Americans have created a new deepwater port at Sattahip, on the Gulf of Siam. Nearby, at U Taphao, one of the world's largest airbases hurtles toward completion; as the 11,500-foot runway



KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER WIMFIELD PARKS © N.G.S.

took shape, construction crews each day poured enough concrete to make a strip 4,000 feet long, 25 feet wide, and 18 inches thick.

The Society's photographic laboratory employed the latest technology to prepare this map for publication. A four-ton, 22-foot-long camera reduced original drawings to wall-map size (31½ by 39 inches). Thirty films were combined to make the final color plates.

A computer calculated camera settings for precise focusing and scale. One of the world's largest halftone screens broke up relief draw-

ings into millions of tiny dots, achieving a dramatic play of light and shadow that brings out mountain regions in a remarkable three-dimensional effect.

Here, then, is a detailed and timely map that ranges from the South China Sea to the pagodas of Moulmein, from inside mainland China to Malaysia's jungled frontier. Within the map's borders crowd an estimated 150,000,000 people; in their future the hopes and fears of the whole world come to focus.

THE END

Science finds new clues to



By MAYNARD M. MILLER, Ph.D.

our climate in **Alaska's mighty
rivers of ice**

Photographs by CHRISTOPHER G. KNIGHT

195



I LOOKED IN DREAD at Hubbard Glacier, a scant mile away across Alaska's Disenchantment Bay. Crackling like an artillery barrage, a pinnacled cliff of ice 250 feet high and five times wider calved from the glacier's face. The berg vanished under its own cloud of spray and reared up into the air seconds later. Toppling forward, it shoved a giant wave toward us at 50 miles an hour.

"Hang on," I yelled pointlessly to Barry Prather, my No. 1 assistant. The low, barren reef from which we had been triangulating the glacier's position offered no security, and shore lay too far for our skiff to reach in time. We would stand and wait.

Unwisely, we had chosen to occupy this reef, an old survey control station, at close to high tide. The only safe time would have been at low tide, when land would absorb the effect of a sudden wave. Now we had been caught.

Skiff Crumples as Wave Surges Past

Explosions of other calving bergs boomed across the fiord as the wall of foaming water and ice bore down on us. Its angry flank washed over the rock, sucking our skiff into a jagged cleft and crumpling it. The water swelled above our knees. . . .

Then the crest swept past. Had the wave been a few inches higher, we could not have withstood its pull. But we were safe. Other members of the expedition maneuvered a boat through the churning tide to our side.

It was reminder enough, though, that man has long felt this beautiful land's cruelty. Once, I had read, a wall of water caught a hundred Indians at their summer sealing grounds here, drowning them all. Now I could visualize how such a disaster could happen.

My companions and I were taking a series of bearings on Hubbard Glacier's advancing five-mile-wide terminus, establishing its latest position. Our survey was part of the National Geographic Society's Alaskan Glacier Commemorative Project, a five-year field study begun in 1964.

The project salutes the work, back in the early 1900's, of Professors Ralph S. Tarr and Lawrence Martin. Sponsored by the Society, these pioneering glaciologists described the

fluctuations of numerous ice rivers—including the Hubbard—in the Yakutat Bay, lower Copper River, and Prince William Sound regions (map, page 207). Their expeditions resulted in a monumental volume, *Alaskan Glacier Studies*. Published by the National Geographic Society in 1914 and long out of print, this 500-page book has helped guide glaciological research ever since.

Icy Record May Foretell the Future

Today we have moved well beyond such studies of limited areas. Our own research project encompasses a vast sweep of Alaska's magnificent, hostile coast from Wrangell almost to Anchorage, and the lonely, ice-armored ranges soaring above and far behind it. Only thus can we obtain a comprehensive picture of these glaciers' complex and paradoxical behavior. Except for Antarctica, Greenland, and Ellesmere Island, this remote country contains the largest fields of ice anywhere in the world.

"Why?" people sometimes ask us. "Why do you risk your necks year after year roaming such a wilderness?"

I have an answer. Glaciers are among the most delicate recorders of climatic change, and Alaska's coast-and-mountain landscape is one of earth's most climatologically sensitive. I am sure that glaciers eventually will help man to plot climate centuries ahead.

Why do I think so? Primarily because our records point to a remarkable regularity of climatic cycles over more than two centuries. These records show that Alaska's ice masses advance and retreat in direct correlation with cyclic changes in sunspot numbers. Sunspots coincide with strong electrical energy discharges from the sun.

At risk of reviving a theory long out of vogue, our findings persuade me that these cyclic solar storms affect glaciers' temperatures and nourishment—snow—causing growth and decay in similar cycles. We detect an intercontinental similarity in the glaciers' regular thickening and thinning.

Our records thus reinforce the concept that world-wide climate is influenced by cyclic solar activity. If the pattern continues, such

◀ Spray erupts as high as a 26-story skyscraper when Hubbard Glacier calves massive bergs into Disenchantment Bay. Alaska's immense glaciers, living reminders of the Ice Age, give scientists new insights into past and present climate—and hints about the future.

◀ Wedged in a crevasse 35 feet down, glaciologist Tylor Kittredge drills holes for marker pegs; their movements will reveal internal shifts of Vaughan Lewis Glacier. Belaying rope and crampons hold him above flowing melt. Summer runoff fluted the sheer walls.





Campus on ice: Field headquarters of Michigan State University's Summer Institute of Glaciological and Arctic Sciences clings to a *nunatak*, or island of rock, at Camp 10, nearly 400 feet above Taku Glacier, a river of ice rimmed by the jagged Taku Range.

Each summer some sixty teachers and students study Alaska's vast fields of ice. Their survey, directed by the author, includes the five-year Alaskan Glacier Commemorative Project, sponsored by the National Geographic Society to continue research begun 58 years ago by glaciologists Ralph S. Tarr and Lawrence Martin.

Hivelike shelters holding sensitive equipment yield temperature and humidity readings to a student making rounds in subarctic twilight.

Northern lights silhouette a *nunatak* behind a 1,000-volume field library.



ESTACADERAS LEASHE AND OPPOSITE LOWER BY CHRISTOPHER C. KNIGHT; APPACHORNE BY ROBERT W. FULLER © 1966

activity will diminish for the next 40 to 45 years—and the weather over large areas of the earth will be colder and wetter.

Ice once overspread 30 percent of the earth's land surface, with the southern edges of North America's frozen shroud reaching into Kentucky. This mighty invasion marked one of the four great ice ages of the Pleistocene, an epoch lasting one to two million years, according to present scientific thought. The last great glacial age, called the Wisconsin, made its final advance almost 12,000 years ago.

Lesser glacial periods have occurred since then as climate periodically grew harsher. Alaska's mountains began reglaciating about 500 B.C. A new Little Ice Age was in progress as early as six centuries ago and continues here today. Ice now covers about 10 percent of the earth's land area.

Some people speculate that increasing smog will cause our atmosphere to capture and retain more solar heat, gradually melting the world's icecaps. But I believe smog and other factors, such as changing carbon dioxide content and volcanic dust, will prove only marginal in their effects on our climatic future.

I have been investigating glaciers since 1940, with time out for World War II, and

since 1946 I have directed the Juneau Icefield Research Program. I am writing this in the fall of 1966 from the heart of the vast Juneau Icefield, a mere 25 air miles from the narrow strip of coastal rain forest flanking Alaska's capital. The contrast is so sharp that this icy highland might easily be Antarctica.

Camp 10, our headquarters, perches on a windswept *nunatak*—the Greenland Eskimo word for an island of rock in a sea of ice—nearly 400 feet above crevasse-riven Taku Glacier (above). In some years well over 100 feet of snow falls on the level glacier surface.

The bitter gales keep our ten aluminum-clad, insulated wooden buildings free of snow's crushing winter weight. Steel cables bolted deep in the rock run over the roofs and tie the buildings down.

Visitors Arrive From "Banana Belt"

We are surrounded by 1,500 square miles of ice and snow. Our 4,000-foot elevation gives us the climate of Point Barrow, Alaska, 335 miles north of the Arctic Circle. When we head up-glacier 20 miles to 7,200-foot Camp 8, we encounter astonishingly harsher weather, comparable to the North Pole's.

Over-snow vehicles transport us whenever 199



WOODCHROME (HONEY) AND SKYSCRAPER BY CHRISTOPHER G. BRIGHT © N.A.S.

Taku becomes a busy cargo terminal as an Alaska Air National Guard plane brings supplies for remote outposts. Ski planes, helicopters, and airdrops sustain the summer institute's 24 stations dotting the 1,500-square-mile Juneau Icefield (map, page 207).

Foundered in the grim lips of a crevasse, a motorized sled stalls a field party. Equipped with skis in front and cleated tracks behind, such snow vehicles sometimes broke down on rough ice; next summer the author may also use a dog team.

Self-made blizzard engulfs a student chopping ice from the windmill generator for Camp 8, perched near the source of Taku.



possible. But we demand too much of them on the rough ice, and they break down. I am considering adding a dog team next year.

Bound for Camp 8, we slog ahead in biting rain—which presently turns to snow—and 70-mile-an-hour gusts. Jumping one crevasse after another, I wonder why I didn't pursue a less rigorous line of work.

Finally we reach Camp 8, where in winter our thermometers twice have gone down to -87°F . Rime wreathes our beards, and spicules of ice grow from our parkas. Our people there greet us unsympathetically:

"How are things down in the banana belt?"

Institute Works in Vast Outdoor Lab

Long treks like this remind me that I am running one of the world's most spacious classroom-laboratories. This year some sixty graduate students (three of them women), research affiliates, and senior scientists are taking part in Michigan State University's

Sixth Summer Institute of Glaciological and Arctic Sciences, supported by the Foundation for Glacier Research in Seattle, of which I am director, and the National Science Foundation.

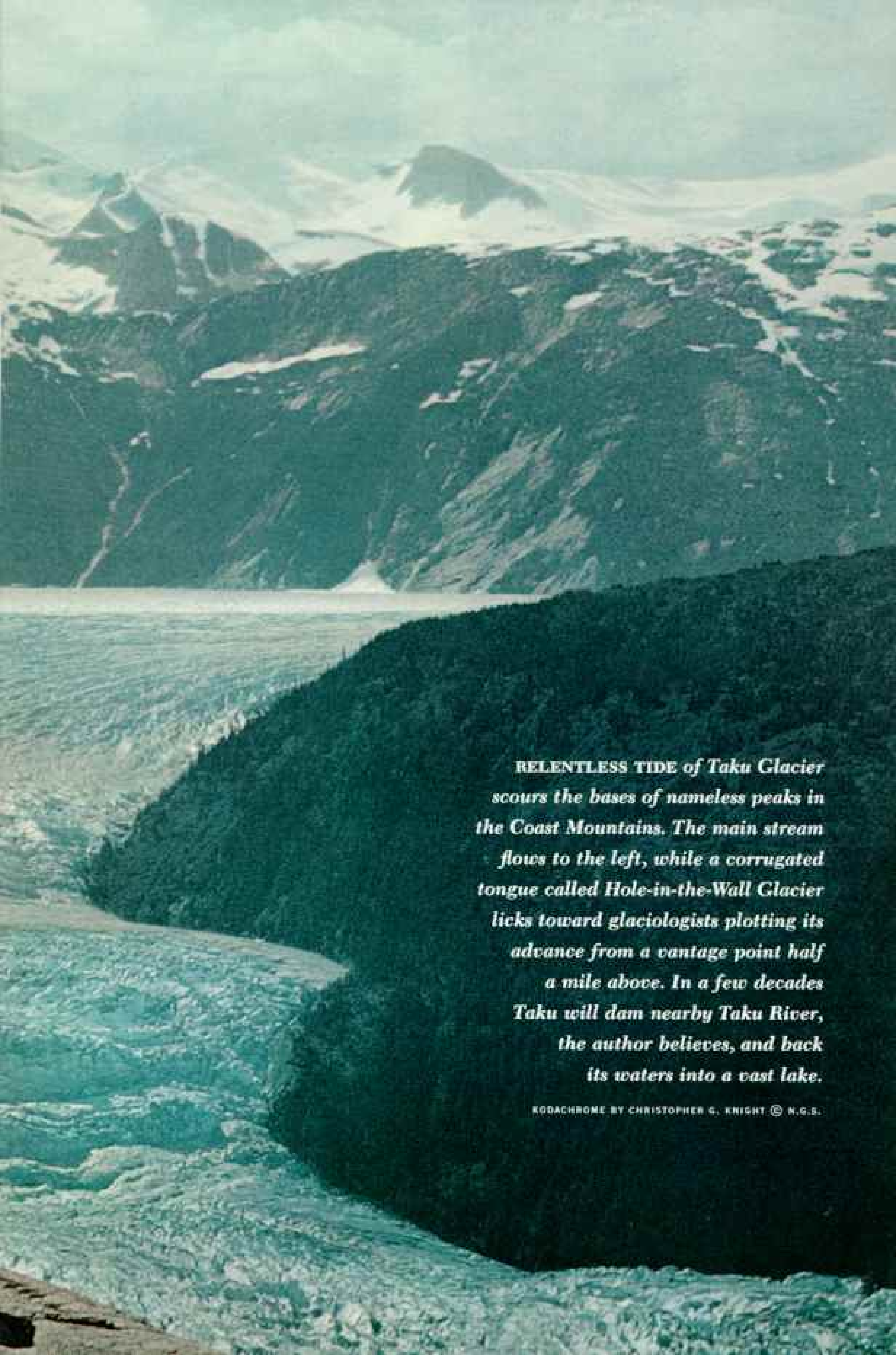
Working out of Camps 10 and 8, and 22 lesser stations and facilities scattered over about 1,000 square miles, we see the over-all pattern of the region's glaciers. The Juneau Icefield provides an ideal sampling. Of its many large glaciers, we are making detailed studies of 16 whose termini are in various phases of advance and retreat.

Additionally, in early spring and late fall, and occasionally in the height of winter, our scientist-mountaineers make surveys all along the coast and deep into rugged ranges behind it. Here we find 90 percent of Alaska's glaciers.

Taking the pulse of more than 200 ice rivers, we are discovering great changes since the days of Tarr and Martin. An example is the shrinking of ice in Glacier Bay and Icy Bay—about 15 miles of retreat in each.







RELENTLESS TIDE of Taku Glacier scours the bases of nameless peaks in the Coast Mountains. The main stream flows to the left, while a corrugated tongue called Hole-in-the-Wall Glacier licks toward glaciologists plotting its advance from a vantage point half a mile above. In a few decades Taku will dam nearby Taku River, the author believes, and back its waters into a vast lake.

KODACHROME BY CHRISTOPHER G. KNIGHT © N.G.S.



CHRISTOPHER G. KNIGHT (LEFT) AND BELLINI © N.A.S.



Saxifrages thrive among more than 70 wildflowers on the Juneau Icefield.

Picture window on a sea of ice: Dr. Miller (at right, gesturing) briefs staff and students in the U. S. Forest Service's Mendenhall Glacier Visitor Center near Juneau. Director of the summer institute, the author took part in the American Mount Everest Expedition and the mapping of Canada's Mount Kennedy (see *GEOGRAPHICS* of October, 1963, and July, 1965).

Tenacious lichens, surviving on nunataks a thousand years and longer, reveal by their age when ice receded and the plants took root. Geobotanist James Anderson studies them.

Scooped from glacial ice, algae fill a jar for study. Red pigment shields their chlorophyll from the sun's glare. Clusters of the minute plants, absorbing solar heat, melt round, red "sun cups" deep enough to capsize vehicles.





DETAILS BY CHRISTOPHER D. KNIGHT © N.G.S.

We can meet the challenge of the ice, and gain new insights thereby, because we have advantages that early glacier explorers lacked. Ski planes and helicopters supply our staging areas and then lift us beyond to the glaciers' sources of nourishment in the mountains, where no one had penetrated until a few decades ago and where no large scientific expedition can exist today without such air support.

Superior equipment—gravity meters, radiation instruments, powerful ice augers—lets us probe glacial mysteries from every angle. The windows of numerous scientific disciplines—geology, ice physics, botany, arctic meteorology, glaciology, photogrammetry—provide startling new perspectives.

Survival Comes Before Science

One consideration governs every move we make: survival. Danger and glaciers are partners. To stay alive requires continual forethought, alertness, and work. Eating properly, getting enough rest, maintaining morale, keeping clothes dry and equipment operative, and staying in radio contact with the outside world consume as much as 60 percent of our effort.

Not long ago Dr. Thomas C. Poulter, renowned geophysicist and inventor of a seismic exploration method that we are using here, and Robert P. Jordan, of the NATIONAL

GEOGRAPHIC staff, took a plunge into the bone-chilling water at Mendenhall Glacier's terminus. Their rowboat capsized as they tried to board it from a precarious ledge of rock.

"We clung to the boat," Dr. Poulter told me later, "and somehow managed to right it. Then we hauled ourselves aboard. I took off my rubber boots and we bailed the boat out. By then we had drifted far from land. Shivering in our sodden clothes, we had to paddle a mile through ice floes to get back."

A strapping 225-pounder, still a field man at 69 years of age, Dr. Poulter has been a senior researcher in our icefield program for three summers. He also has accompanied three expeditions to the Antarctic, serving as Rear Adm. Richard E. Byrd's second in command and senior scientist at Little America from 1933 to 1935. The National Geographic Society awarded Dr. Poulter its Special Gold Medal for his accomplishments there.

What, I asked, were he and Bob Jordan doing at Mendenhall's forbidding face?

"We intended to insert a microphone in the ice and tape-record the sounds of the glacier as it crept forward," Dr. Poulter replied.

He is continuing this work at Camps 10 and 8. It represents a new scientific approach, one that may tell us more about the sliding of glaciers on their beds.

Arctic and alpine geobotany are the special

"Home of the Spirits," Indians called this white vastness with its awesome, rumbling glaciers. Peaks of the Spirit Range, naked and jagged, tower above a helicopter bringing food and mail to Camp 8, hard by the Canadian border. Here tributaries of Taku Glacier start a 30-mile march to the sea; not until a century and a half passes will these snows slide at last into Taku Inlet. Nourished by snowfall that often exceeds 100 feet a year, Taku ranks as one of Alaska's largest and most active ice rivers.



fields of Dr. Roland E. Beschel of Queen's University, Kingston, Ontario. Far up the flanks of these glacier-carved massifs, where only the eerie fugue of wind and waterfall breaks the stillness, he pauses to "graze" on the heaths and flower gardens he finds there.

Low-growing heather, sedges, rushes, willows—these and many other plants struggle for life in the thin, scattered patches of recent soil. Some willows spread four feet wide, yet stand but three inches tall. Ring counts show them to be as much as a hundred years old.

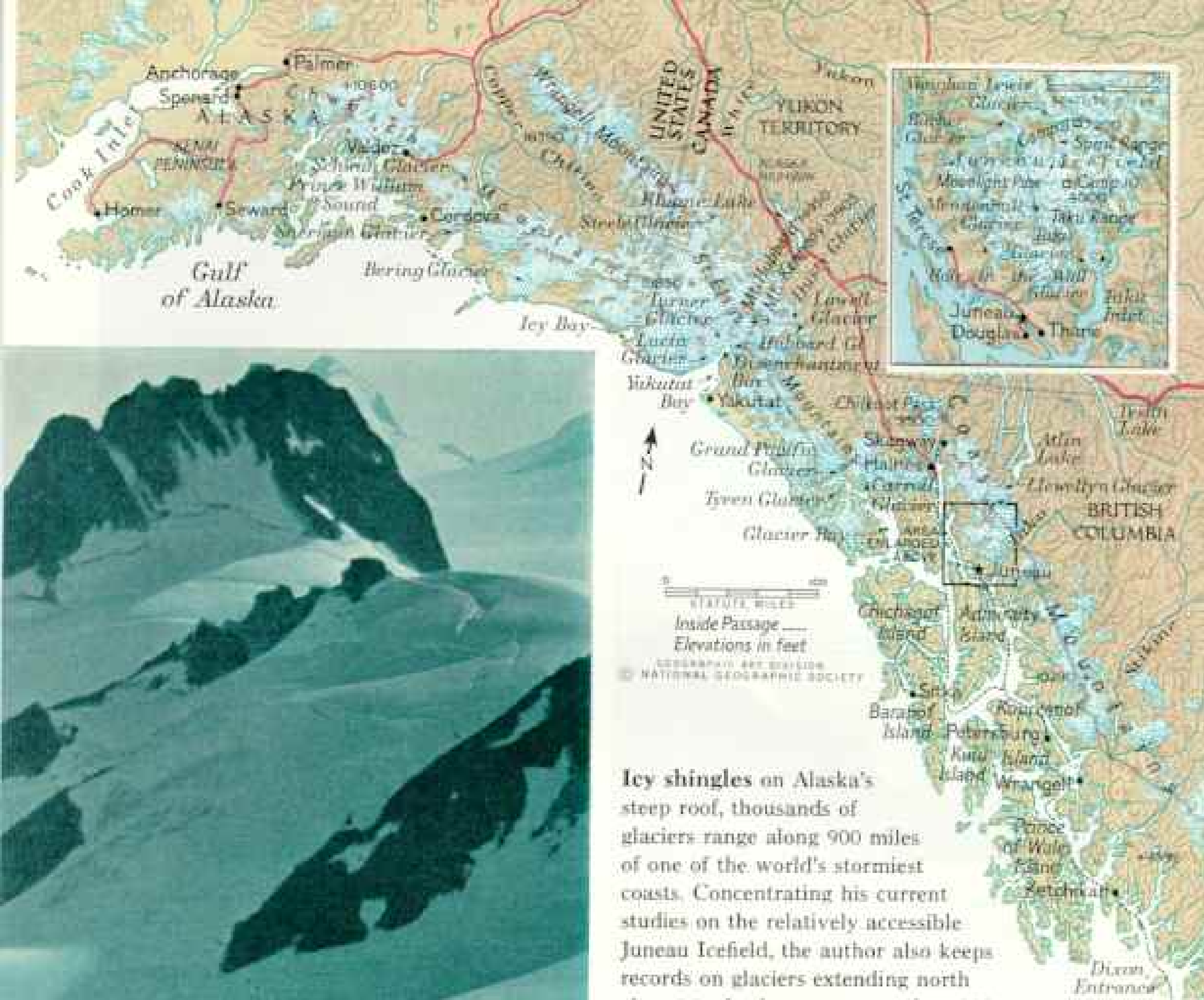
Numerous flowering plants find root: willow herb, blueberries, crowberries, saxifrages (page 204). Some are rare. Dr. Beschel came down one night from Moonlight Pass, a few miles north of base camp, proudly exhibiting a tiny primrose (*Primula cuneifolia*), its fragrant pink rosette the size of a fingertip.

Patricia Kay Armstrong, a peppery young biology teacher who is seeking an advanced

degree in botany at the University of Chicago, found an even rarer specimen. On a cliff overhanging the Vaughan Lewis Glacier's spectacular icefall, Pat came upon a dandelion. In her lawn at home it would have annoyed her; here, she was elated.

The kinds, size, and extent of plants afford glaciobotanists an idea of how long a nunatak has been glacier-free. To calculate centuries-old ice movements, Dr. Beschel combines dendrochronology—counts of growth rings in trees and dwarf shrubs—and the new science of lichenometry, in which he is the world's foremost authority.

The growth rates of lichens—among earth's longest-lived, slowest-growing plants—vary according to the climate in which they live. Lichenometry measures the diameters of the largest lichens and relates them to a growth rate established for the area. The result: an estimate of when the ice receded, baring



PHOTOGRAPH BY W. E. GARRETT, NATIONAL GEOGRAPHIC SOCIETY © N.G.S.

the rock for the growth of plants (page 204).

Ring counts of trees that have grown up after the passage of glacial ice may show an age of up to four centuries, while some lichens grow for more than a thousand years here.

Dr. Beschel's findings give us valuable bits of evidence as we try to plot the comings and goings of Alaska's glaciers. By using dendrochronology and lichenometry on Bucher Glacier, for example, he has shown that the Little Ice Age reached its peak in some parts of this area in the late 16th century, instead of in the 18th as we had previously supposed.

Football Star Turns to Arctic Research

The challenge of new scientific information like this excites all of us. Larry Onesti, who hikes with Dr. Beschel on many of his field trips, has forsaken a successful athletic career to study here. You may remember Larry from his football days at Northwestern University,

where he won All-America recognition. Perhaps you've seen him on television playing middle linebacker and defensive halfback for the Houston Oilers. This is Larry's first season out of football. One evening I asked if he regretted it. "I miss it," he replied, "but I don't regret it. I'm a geographer by education, and I'm becoming one by experience here in Alaska. I'm doing what I should be doing." Then this husky, friendly ex-football star resumed washing dishes. We all take turns cooking and logging meteorological readings, and everyone pitches in on the other chores. There are no slackers on this team. Housekeeping can be backbreaking work. Sooner or later, we must handle—lift, carry, push, pull, put up, take down, repair—everything we need to live here. Most of these items have been brought in by ski-plane crews of Brig. Gen. William S. Elmore's Alaska Air

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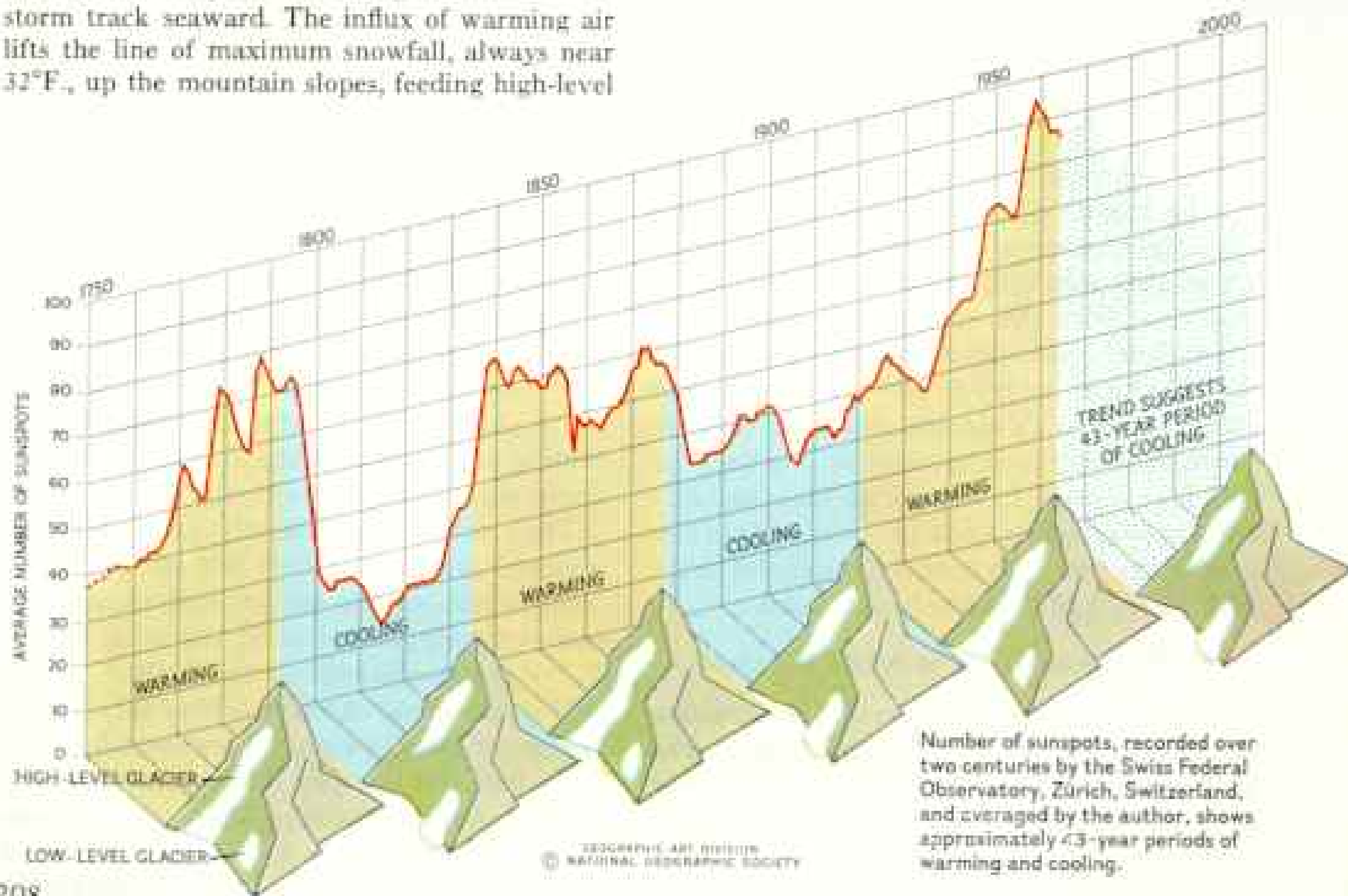
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Glaciers wax and wane with solar activity, the author believes. When the convulsions that cause sunspots wrack the sun, electrically charged particles stream earthward, converging over the magnetic poles. In North America, these particles increase the energy of the continental air mass, causing it to expand and nudge Alaska's usual storm track seaward. The influx of warming air lifts the line of maximum snowfall, always near 32°F., up the mountain slopes, feeding high-level

glaciers and starving those below. When the sun calms and the cooling continental air pulls back, the line of maximum snowfall descends to nourish lower glaciers. Diagram below shows the parallel between recorded sunspot averages and coastal glacier fluctuation during the past two centuries.





PHOTOGRAPH BY CHRISTOPHER C. BRINT © N.E.A.

Frozen halo arcs between members of a field team traversing upper Llewellyn Glacier. Crystals of fresh-fallen snow, each a delicate prism, refract the evening sun's slanting rays to cause this extraordinary phenomenon. Glare in the camera lens creates the rayed star and pink spots. Motorized sled and skiers scoot along at 15 miles an hour. Like a frozen sea, this crestal snowfield, called a *névé*, stretches six miles to rumpled peaks of the Coast Mountains, boundary between the 49th state and British Columbia.

National Guard (page 200), by Arlo Livingston's two helicopters, or by bush pilot air-drops from Juneau. Climbing as much as 1,000 vertical feet up a nunatak from the glacier below with an 80-pound load on your back is all in a day's work.

This season the various camps are receiving some 24 tons of supplies—building materials, scientific instruments, dynamite, gasoline (for generators, snow vehicles, stoves, lanterns, and heaters), canned and packaged foods, personal equipment, and mail.

I need not rush to mail call. My wife Joan and our younger son Lance are living in Juneau while 12-year-old Ross and I are camping on the ice. This is the sixth expedition for Ross, my No. 2 assistant. Joan and I frequently chat by radio. She passes along a message from 5-year-old Lance every time we talk. "I'm going to start spending summers up on the ice with you next year," he informs me.

We couldn't do without Joan. She is our official greeter, front office, purchasing agent, secretary-administrator, diplomatic liaison

with the Air National Guard and the Governor's office, and a host of other things.

She sees to it, for instance, that we get ample bread, meat, carrots, onions, and occasionally fresh celery and lettuce. Pilot Ken Loken even air-drops eggs to us.

All you have to do is wrap each egg carefully in a pile of crumpled newspaper so that it has a cushion around it. You place a couple of dozen eggs in a cardboard box, tie it tightly, and toss it from the plane. Not a single egg will so much as crack.

Schedules Bow to "Contingency Options"

This raw land conditions man; man doesn't condition it. Ice overrode the rock island I am sitting on about the time the Declaration of Independence was signed. This fractured shoulder of granodiorite may be overridden again in another century or two.

We start each day with a definite schedule. Certain things are routine: reveille, the 7 a.m. meteorological reading, breakfast. Camp details come next: sweeping down all spaces,

NATURE'S BULLDOZER. *Taku topples two-century-old spruce and hemlock. Expedition member measures summer shrinkage of the scarred glacier edge two miles above its terminus. When winter halts the thaw, the monster will resume its onslaught; booming ice, splintering trees, and growl of boulder crushing against boulder will orchestrate the devastation. Taku's rampaging advance recently caused highway officials to relocate a proposed road.*





lugging melt and rainwater from catchments, policing the area.

Franz Gabl, our ski and safety director, summons us at 9 a.m. with a stentorian blast on a foghorn, and we attend lectures until noon in the 46-foot-long institute building. Authorities like Dr. Robert F. Black of the University of Wisconsin, a leading arctic geologist, may discuss permafrost phenomena; Dr. Marcel de Quervain, director of the Swiss Federal Institute for Snow and Avalanche Research, may offer a lecture on snow physics. Dr. Otto T. Trott, Dr. Theodore Lathrop, and Dr. Wayne M. Smith, Pacific Northwest physicians and mountain-rescue experts, conduct survival indoctrination.

After lunch, snow-test equipment may be demonstrated. Then we move out, lurching over the ice on vehicles, sometimes hiking or skiing, to take numerous field measurements.

Dinner awaits when we return—hamburgers, spaghetti, stew, or a similar hearty entree, with plenty of vegetables and canned fruit.

Afterward, until 11 p.m., we hold seminars and watch movies such as the one on the U. S. Navy's Project Ski Jump on an ice island near the North Pole or one of my expedition films on Himalayan or Patagonian glaciers.

Now I must make a confession. Schedules like this often just don't work out. We are forced to live by the rule of contingency options. Perpetually in contention with the weather, we adapt to its whims. We are philosophic, more or less, when the weather turns from 80-degree sunshine to near-freezing murk and high winds in half an hour, even though it drives us indoors for a week.

In storms this year, a tent camp was flattened, an aluminum igloo blew down a cliff, meteorological equipment shelters were splintered, roofs sailed away from two main buildings, and doors were ripped loose from four buildings, including an outhouse.

Rescue Attempt, Then Back to Work

A few days ago this relentless land showed a far more terrible side. An airplane carrying nine persons from Skagway to Juneau went down in the jagged wilderness. A rescue helicopter flew here from Juneau and the pilot said, "Let's go." We flew up winding canyons in swirling mists, landing on a 20-foot ledge at 5,000 feet—the lip of a crevasse in which the aircraft had crashed and burned. There were no survivors.

That night in camp I again chalked a sched-

ule on the blackboard. Tomorrow we would spend on the ice—weather permitting. Then I crawled into my sleeping bag and tossed most of the night, pondering man's tenuous hold on life.

Day arrived in sparkling dress. At seven stations throughout the icefield we continued our scientific observations. We took measurements of retained winter accumulation, of summer melting and runoff, of changing temperatures within the glaciers, of strain rates on the surface and below, of erosional features and soil evolution on bedrock exposures.

We deduced from movement stakes how far a glacier had traveled since the poles were placed, and whether it was moving as a whole or slipping or shearing in separate units.

Seismic devices and gravity recorders gave us the depth of glaciers—600 to 1,700 feet—and the shape of their bottoms. We probed subsurface conditions by boring deep with heavy mechanical and electrothermic drills.

Crevasse Bares Glacier's Inner Works

Still another of our exploratory operations offers a good, quick way to check on a glacier's internal working: Climb down a crevasse.

"But crevasses are bottomless," our rare visitors volunteer thoughtfully.

"No, they're not," I reply. "Just because you can't see bottom doesn't mean it isn't there."

The fact is that crevasses in this region seldom reach deeper than 125 feet. At that depth the glacier's plastic flow heals the wound, which is what these yawning cuts amount to. Pressure causes them, much as a sheet of glass fractures if you place a pencil under it and press down on the glass.

Before entering a crevasse we take great pains to clear away its cornice of snow, lest it fall in on us. Then, with safety rope tied to the waist, we climb carefully down a cable ladder, digging crampons into the perpendicular ice wall at each step. One of our companions belays us. On the way down we learn several things about the glacier.

Layers of dust and pollen, often scalloped with surface irregularities produced by wind and sun, separate one yearly snowfall from another. Compression reduces these dirty layers to faint lines a few feet apart. On Taku, near Camp 8, they reveal that the snowfall of the winter of 1948-49 lies 90 feet down.

Sometimes we detect in the carapace of old snow, called firn, a network of icy structures. These form a sort of skeleton, like a

skyscraper's steel framework—with columns, walls, and floors of dense, granular ice. They are created when spring's melt water percolates into the glacier's depths and refreezes. Once the glacier warms to the melting point, however, surface water no longer refreezes but drains deep into the interior and runs off in subterranean tunnels, carrying erosional "rock flour" with it. Hence the milky streams that often flow from a glacier's snout.

Why are some glaciers advancing, others maintaining near-equilibrium, and still others wasting away?

A glacier, I tell our students, can be analyzed as a problem in economics. It's like a

own, and 7 percent advancing. Since 1958, however, the number of advancing glaciers has increased to about 10 percent.

But the really surprising thing is that the few showing long-term advances are not only the largest and longest; their total ice adds up to more than all the other glaciers combined.

Why do they push forward while others beside them retreat? A convincing answer emerges from our measurements on the Juneau Icefield and throughout south coastal Alaska.

We have found that in recent years much more snow has fallen high in these mountains than formerly. Because the huge, advancing glaciers all feed at quite high elevations, they

Remnant of forest overridden by ice, the trunk of an Alaska yellow cedar emerges from the terminus of Taku to tantalize the author. Radiocarbon dating later revealed that the tree grew a thousand years ago, establishing that timber, not ice, then covered the valley. During this same warm interval, Vikings crossed the Atlantic and settled in Greenland and Newfoundland.



ILLUSTRATION BY ROBERT F. JOHNSON, NATIONAL GEOGRAPHIC STAFF © N.G.S.

savings account. When you make big deposits (large amounts of snowfall), you put more money aside for later years (in time the glacier will thicken and advance). When you deposit less (little or no snowfall), yet continue to withdraw funds, the savings account dwindles (the glacier thins and retreats).

I oversimplify. But it is an apt analogy because glaciers do run—I should say flow—on a budget. The cash in the account is measured in water equivalent, and the amount of solid ice adds up to the total budget at year's end. Our annual check on this bank account tells us the glacier's state of health.

Earlier I said that we are keeping tab on more than 200 glaciers. It may surprise you to learn that over the past 25 years 63 percent have been retreating, 30 percent holding their

have been dining well. The retreating glaciers, on the other hand, are all fed at lower levels, where in recent years there has been less snowfall. They are undernourished.

Half a century ago the reverse was true. Heavy snows fattened low-lying ice tongues and pushed them forward; high-source glaciers, lacking snow, grew thin and pulled back.

We sought a clue to explain this turnabout, and found it in weather records of 64 coastal stations embracing all the areas we are studying. Juneau's records are representative.

Between 1917 and 1950, the capital city's January temperature average rose nearly 8° F. Consequently, the weather became too warm for the glaciers on the lower slopes. For several decades, they received more rain and less snow, abetting shrinking.



The warming of the 1920's, '30's, and '40's, however, proved a boon to the high-level glaciers. Temperatures here rose during the snowiest months to around 32° F. The heaviest snowfalls occur near the freezing point, so these glaciers became exceedingly healthy.

Sunspots Linked to Glacier's Health

Glaciers thus periodically experience increases and decreases of net accumulation, and so they advance, linger, and retreat as precipitation and temperature trends change. The question is: What causes these cycles?

Evidence developed by Dr. Hurd C. Willett, Professor of Meteorology at Massachusetts Institute of Technology, suggests the

answer. Dr. Willett, one of our staff affiliates this year, has shown us how cyclic changes in the climate closely parallel the cyclic changes in sunspot activity—the manifestations of powerful electrical energy discharges from the sun.*

We now feel confident that our investigations here back up the solar-climate theory of weather cycles. Sunspots have been diligently recorded for well over 200 years. We find that glacier fluctuations over these past two centuries show a tantalizing correlation, taking into account the glaciers' flow lag, with sun storms and temperature trends.

*Dr. Herbert Friedman wrote a fascinating biography of "The Sun" for the November, 1965, *GEOGRAPHIC*.

Dr. Willett reports that sunspots go through cycles of roughly 80 to 90 years, waxing for 40 to 45 years, then waning. (In addition, as scientists have known for some time, sunspots show lesser cycles of 11 and 22 years.)

Our research detects major glacier changes of the same frequency—periods of about 90 years, with smaller fluctuations of two decades or less.

Since 1915, such solar activity has risen to very high levels, and the climate in the United States has been generally warmer and drier. The waxing phase of this cycle, longer than usual, has apparently ended. The low phase, I expect, will bring lower temperatures and heavier snowfall to northern states, with

High road of the snow gods, Dusty Glacier curves down the St. Elias Mountains. Dark moraines—deposits of rock and soil—zigzag from the impact of mysterious surges in the ice, perhaps related to quake-triggered avalanches or a speed-up of tributaries. Intrigued by these surges, Dr. Miller's research team has intensified its study of such "galloping glaciers." Scour line of Dusty's high tide fifty years ago stripes the valley edge.

TEAR OUT THE ATTACHED PAGE
as your reminder to share in an exciting television tour of our biggest state



FOODACHROME BY CHRISTOPHER G. WRIGHT © A.S.A.

Geographic family explores Alaska's rugged splendors in its centennial year.

FIRST THERE ARE the forests, great expanses of spruce and hemlock. The Inside Passage winds ever northward, and many islands press in. Now mountains and icefields soar, and glaciers chill the straits with melt.

You are traveling the new "marine highway" ferry route to Alaska with Bill Garrett, of the NATIONAL GEOGRAPHIC staff, and his family. The journey unfolds

on Tuesday, February 7, with presentation of "Alaska!"—your Society's third television documentary of the 1966-67 season. Sponsored by Encyclopaedia Britannica, Inc., and Aetna Life & Casualty, it is produced in association with David L. Wolper. The Columbia Broadcasting System will televise the hour-long program in color.

The Garretts—there are five of them

including Brandy, a mournful mountain of a St. Bernard—travel by camper-bus, ferryboat, bush plane, and snowshoes. At times they seek out routes forged only for the hardy. They climb windswept Chilkoot Pass, tortuous trail of gold hunters who stampeded to the Klondike in '98. At the crest they discover dozens of portable canvas boats, mysteriously abandoned. Apparently some enterpris-

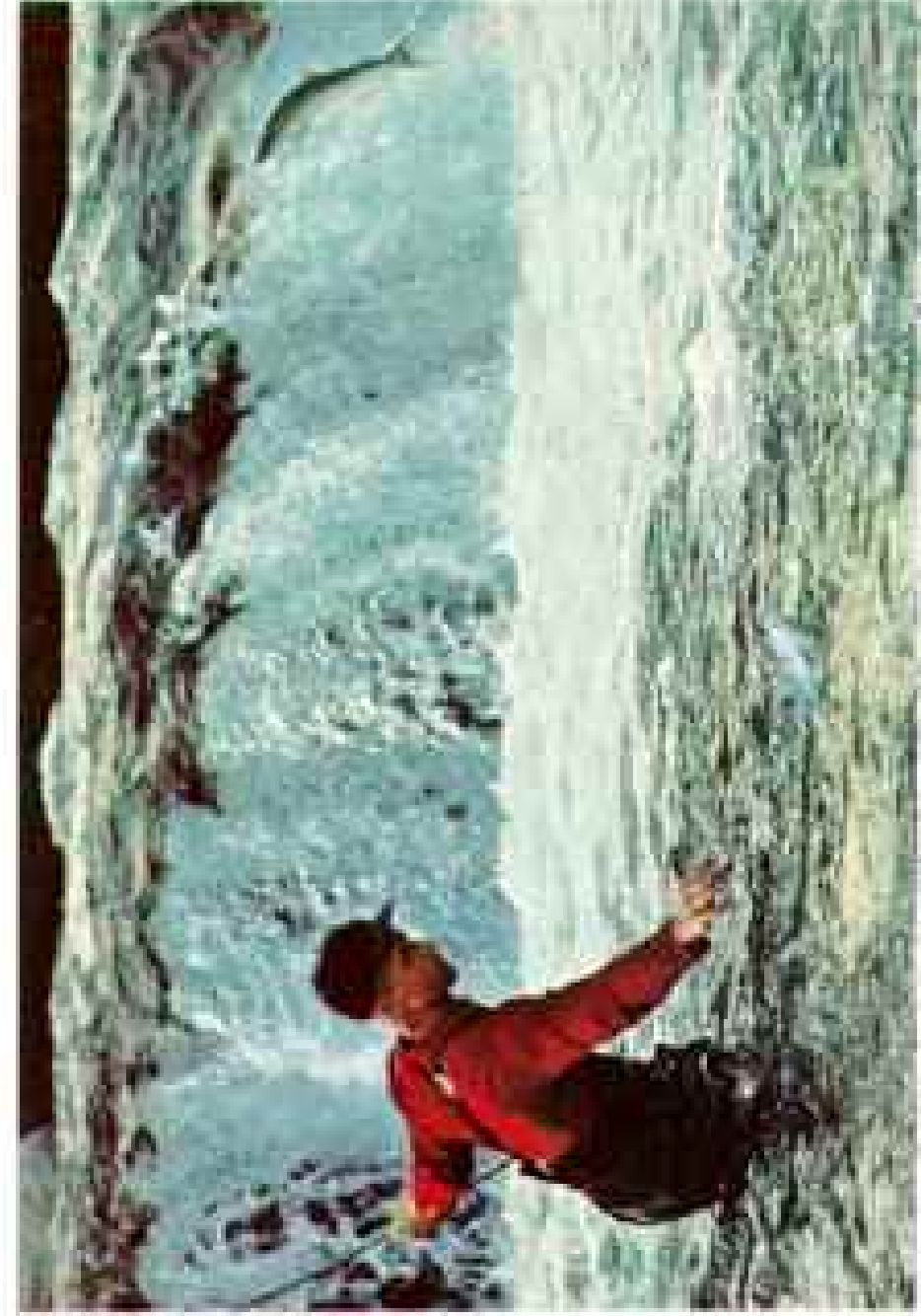
ing soul planned to transport them to the Yukon River in hope of obtaining fabulous prices from miners eager to reach gold country.

Recovery from earthquake, offshore oil wells, glacier flying, salmon fishing, wildlife adventure—all these play parts in the drama of "Alaska!"—the remote land purchased by the United States a century ago for two cents an acre.



OVERLEAF: BRITANNICA BY WALTER M. PYLE

Last frontier beckons the adventurous to Alaska. A hike in the wilds may afford a glimpse of the largest carnivore that walks the earth—an Alaska brown bear with her cubs. Salmon vault Brooks Falls in Katmai National Monument, at 4,215 square miles the biggest preserve in the federal park system. Northernmost U. S. citizens find excitement in blanket tossing. Sitka-to-Juneau ferry threads a quicksilver highway amid forested isles. Anchorage prospers anew in the wake of a devastating earthquake in 1964. Overleaf. In 3 a.m. summer sunshine, Michael Garrett, 14, and dog Brandy explore Ruth Glacier beneath 20,820-foot Mount McKinley, the continent's highest peak.



STANDSTILL: THOMAS J. ARCHERMAN



FRONTIERLAND: CARL LEVY AND ARBYL; SAND BUSHSHOES: AT. S. C. GARRETT © A.S.A.





ASCENDING BY CHRISTOPHER S. SWIFT © N.C.S.

helicoptered to the Steele's source. He reported that the surface had fallen away, leaving remnant ice cliffs 200 feet high clinging to the valley wall. We found the Steele's source area to be high and steep, for it feeds from the upper snowfields of 16,000-foot peaks. The cause here, too, may relate to a dynamic instability within the ice, though I suspect the trigger has been a combination of warming ice, snowfall changes over the past 40 years, and massive slides set off by the strong quake of 1958, as well as by the one of 1964.

Although such surges are often spectacular, they are the exception and not the rule. The long-term behavior of Alaska's rivers of ice,

I am convinced, relates to climatic changes.

The very name of the glacier beneath our base camp serves as a reminder of change, for the Indians say Taku originally meant "the place where the geese sit down." Today no flocks pause to rest, but geese did once land here. In times long past, most recently around 1750, the glacier crept across the head of its fiord, creating a 36-mile-long lake in the deep valley to the east. One sees the telltale lines of the old lake on the valley's sides.

Today Taku advances anew. In a few decades it probably will close off its fiord once more, and again this will be in truth the place where the geese sit down. THE END



Potpourri of pleasures served up by the Bahamas: Skindiver skims the clutching hand of a staghorn coral as he explores an iridescent realm near Grand Bahama Island that swarms with tropical fish and harbors sunken treasure. A

More of Sea Than of Land:

By CARLETON MITCHELL

Photographs

IN THE MOONLIGHT ASTERN, Gulf Stream seas loomed as rolling silver hillocks. Ahead, a beacon glimmered every ten seconds above a low silhouette of rock. Nearer, through the whine of wind in the rigging and the slap of crests against *Finisterre's* hull, sounded the boom of surf.

My three-man crew crouched on deck. Tom Fletcher was forward with a flashlight. Fred LaDrew stood by the main sheet. Dawson Pinder, our cook, watched anxiously as the tender towing behind us threatened to toboggan down a wave into our cockpit.

The circle of light played on jagged limestone not much more than two boat lengths ahead. "Now!" I shouted to Tom. Grinding the wheel hard over, I jibed to parallel the coast. I had to keep within a few yards, for close offshore lay a sunken coral reef. Coming to a jutting point, we jibed again.

Miraculously the sea smoothed. By passing through Gun Cay Cut, we had crossed from the Gulf Stream to the Great Bahama Bank, a vast sandy plateau, much of it less than 12 feet below the surface. Many such cuts exist; entering them requires local knowledge and,



Battling bonefish, taken off Andros Island, challenges sportsmen as salt water's "fightingest" fish, pound for pound.



working sloop, her sails filled by trade winds, skirts a jagged point during a race in the Out Island Regatta in the Exumas. Lakeside Cafe Martinique on Paradise Island, off Nassau, serves a candlelight supper of stone crabs and champagne.

THE BAHAMAS

by JAMES L. STANFIELD, *Black Star*

normally, sunshine to show the water's color.

Gun Cay Cut, piercing the line of islets and rocks between Bimini and Cat Cay 55 miles east of Miami, Florida, is one of the easiest passages, despite its S-turn and scary proximity to shore. I had chanced it by night only because I had sailed it often by day. Even so, it was a dramatic entry to the Bahamas.

"My heart didn't leave my throat until we got to Nassau," Dawson said later.

Low Taxes Bring Airborne Change

In a sense, I was coming home. Almost twenty years before, a local newspaper referred to me as "at least half Bahamian." I had made my first landfall on Bimini more than ten years before that, a sea- and island-struck dreamer who had left school to answer an advertisement for "hands to man a ketch West Indies bound."*

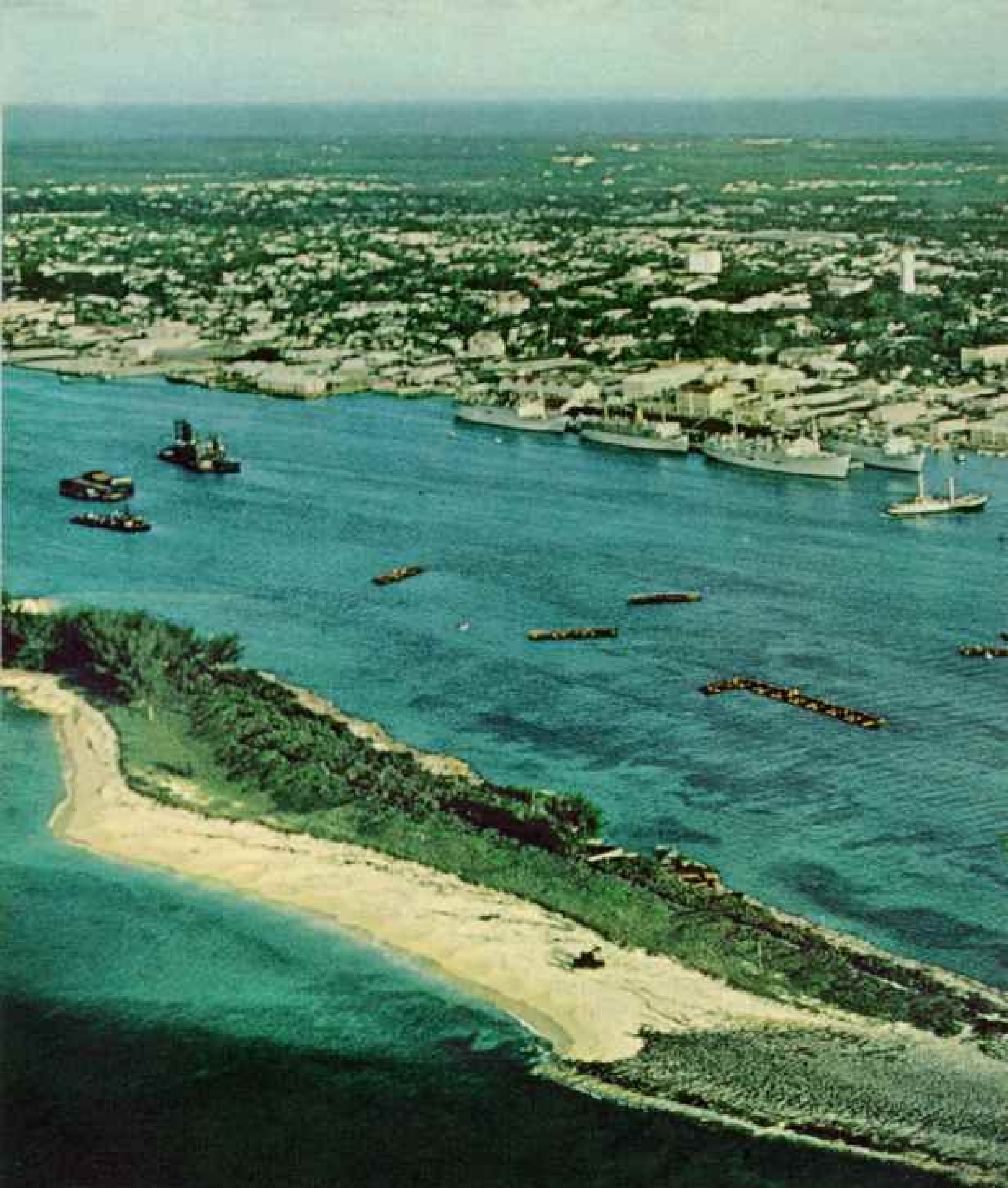
On that trip, head winds and a leaking hull kept us from getting beyond the Bahamas, so I came to know the archipelago in its simpler days. Nassau was then a sleepy British colonial capital, a true outpost of empire. Most of the Out Islands lay deserted, except for scat-

tered settlements where the natives lived by fishing and scratching small garden plots behind their huts. The Bahamas consist of almost 3,000 such outcroppings, large and small, scattered over a sea base of 100,000 square miles (map, pages 224-5).

Now I knew I approached sweeping changes. Air transport, a new concept of leisure, international finance, and one of the world's most lenient tax systems had brought a post-war flood of visitors and settlers. "You won't recognize Nassau," I had been told. "And even the Out Islands are being built up."

Yet the timeless things would remain. The transparent water, taking its hue from the depth or character of the bottom, could never be changed; nor could the climate, a blend of tropic and temperate zones, with flowers, fruit, and vegetables common to both. The Out Islands? I didn't believe progress could

*Author Mitchell's first NATIONAL GEOGRAPHIC contribution was "Carib Cruises the West Indies," in January, 1948. In recent articles he recounted a voyage through the Windward Islands (December, 1965) and Leeward Islands (October, 1966). These led to the latest of the Society's Special Publications, the book-length *Isles of the Caribbees*, published last November.



ONETIME HAUNT OF PIRATES, Nassau on New Providence Island now welcomes a steady stream of cruise ships. Even bigger liners will dock here when dredgers finish deepening the harbor. A lighthouse crowns the western tip of Paradise Island. Its Atlantic beaches will be alive with sun-seekers after three hotels, a motel, and a casino open on its broader eastern part, linked to the city by a new high-rise bridge.





spoil them, at least not in my lifetime.

From the wheel of *Finisterre*, after Gun Cay Light faded astern, I was treated to another sight that will not change: the miracle of dawn on a small boat. The wind was from the west, an "out wind" to local sailors; normally, easterly breezes blow, for the Bahamas lie on the fringe of the trade-wind system. When cold waves sweep across North America, they sometimes end as fronts crossing the Gulf Stream. Then temperatures fall in the Baha-

mas, although frosts are all but unknown. Now such a "norther" bore us eastward.

Nassau, on the island called New Providence, peeped over the horizon that afternoon. As we neared, I could see houses clustering along the beach and fanning over the hillsides far beyond the city boundaries of ten years before. New hotels altered the skyline.

Yet, as flying fish skittered from under the bow, I became aware of many things virtually unchanged from my first visit in 1933. Soon I



EXTRACT FROM BY FLIP SCHULKE, BLACK STAR © N.Y.S.

could see the lighthouse marking the tip of Hog Island (page 221). The name stems from earlier days when pigs were kept there to supply Nassau with fresh meat. In 1962 it was officially renamed, more alluringly, Paradise Island. But the whitewashed stone tower still stood, greeting me as an old friend.

So it remained as I became reacquainted during a Bahamian sojourn of nearly five months. Behind new façades on teeming Bay Street, I found byways I could have sketched

Joy explodes in the New Year's Day Junk-anoo at Nassau. Beginning at 4 a.m., care-free revelers prance back and forth on Bay Street, their homemade crepe-paper costumes making garish splashes of color. Beep-beeping on horns, pounding drums, and tooting whistles, they greet the dawn and usher in the year ahead.



BOATCOURSE BY JAMES C. STANTFIELD, BLACK STAR © N.C.S.

The author: New Orleans-born Carleton Mitchell raised his first jib on Lake Pontchartrain at the age of eight. Today he is a champion ocean racer and chronicler of the sailing life.

"He writes as he sails—intensely, with great ardor and flair," declares an offtime shipmate, *GEOGRAPHIC* Editor Melville Grosvenor. "We would cruise all night, Mitch navigating, standing his watch, and skippering to boot. Then at dawn he would go ashore to spend the day interviewing people, collecting notes."

Here at the helm of *Finisterre*, the 38-foot yawl he called "my dream boat," Mr. Mitchell looks ahead to his next port of call in the Bahamas.

from memory. Along the waterfront, native sloops still brought produce to market. I recalled the days when I had strolled here to buy "beef steak or green-turtle steak, boss, take your choice: a shilling a pound." Fishermen, skinning grouper or breaking out conchs, might have been the same. So might the women selling straw hats and bags in Rawson Square. Yet progress had been phenomenal.

"Up until 1951, hotels closed in the summer, putting people out of work, and Nassau lay dead until the next year," said Sir Stafford Sands, one of my old friends. Knighted since I first knew him, Sir Stafford holds the twin portfolios of Minister for Tourism and Minister for Finance under a new constitution that took effect in 1964. The Bahamas, though still a British colony, now have full control of their own internal affairs.

"Ours was basically an economic problem," he said. "We had no rich soil to till, no minerals to exploit—only climate. So first we went about building tourist trade. In January, 1966, more people visited Nassau alone than came to all the Bahamas in 1950. Now we're almost as crowded in summer as in winter.

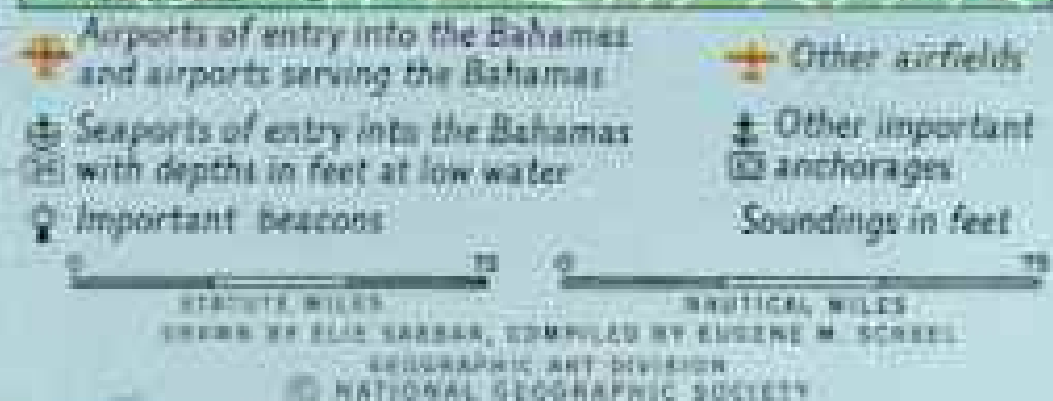
"Perhaps more important, the Bahamas

BAHAMA ISLANDS

THREE THOUSAND islands, cays, and rocks, scattered over an ocean area slightly larger than Great Britain, make up the Bahamas. Coral-capped peaks of submarine mountains, they rise 70 miles off Palm Beach, Florida, and run southeast for 600 miles.

Lair of freebooters—including the infamous Blackbeard—and later of Civil War blockade dodgers and Prohibition rumrunners, the Bahamas now boom with new industrial and vacation developments. Each year more than half a million sun seekers throng to Nassau and the Out Islands, as Bahamians call everything beyond New Providence.

GOVERNMENT: British colony, self-governing since 1964. **LAND AREA:** 4,400 square miles. **POPULATION:** 138,100 (est. January 1, 1966), concentrated on New Providence (85,000) and Grand Bahama (21,000). **ECONOMY:** Once based on sea-island cotton, sponge fishing, and shipwreck salvage, now on tourism, duty-free trade, ship bunkering, produce farming, forest and fishery products. **MAJOR CITIES:** Nassau, capital, Freeport. **CLIMATE:** Tropical to subtropical. Temperatures average 70° F. in winter, 80° to 90° in summer.



have kept the 18th-century viewpoint that government should not interfere with business, except for building codes and other regulations to protect the public. Customs duties on imports pay most of the costs of government. There is no income, corporate, capital-gains, sales, or unimproved-land tax in the Bahamas. We have no 'death duties' on real or personal property. Over the past 16 years this freedom from taxes and regulations has attracted foreign capital investment in excess of half a billion dollars."

Freeport: Boom Town on the Sea

What had this huge investment wrought? I flew northwest from Nassau toward the Out Island of Grand Bahama to have a look for myself at its most dramatic accomplishment: the miracle of Freeport (pages 238-41).

When I had been here nine years before, bouncing along rutted trails in a jeep, Freeport existed as a small hole in the ground, with a dredge gnawing at the edges.* The island of Grand Bahama itself looked like a slice of barren scrub-pine-and-palmetto land torn adrift from Florida.

Now I found Freeport an extensive harbor

rimmed with ships. On one side towered the silos of a plant built by United States Steel to make cement from limestone dredged in creating the harbor. On the other clustered huge oil-storage tanks filled with fuel for passing ships. Ocean-spanning vessels didn't even have to waste time docking to refuel. They simply queued at buoys and filled up from underwater pipelines from shore.

To help launch this ambitious, privately financed scheme, the government of the Bahamas suspended even the customs duties for new businesses—hence the name, Freeport.

Standing astride several busy trade routes, this has become one of the largest bunkering installations in the Western Hemisphere. In 1965, Freeport's quick-lunch counter served 1,610 vessels approximately 9,000,000 barrels of fuel—against none in 1955.

From Freeport, paved highways lead toward Lucaya, the residential area. Beyond a cluster of office buildings and stores lie homes, golf courses, hotels and tall apartments, a casino,

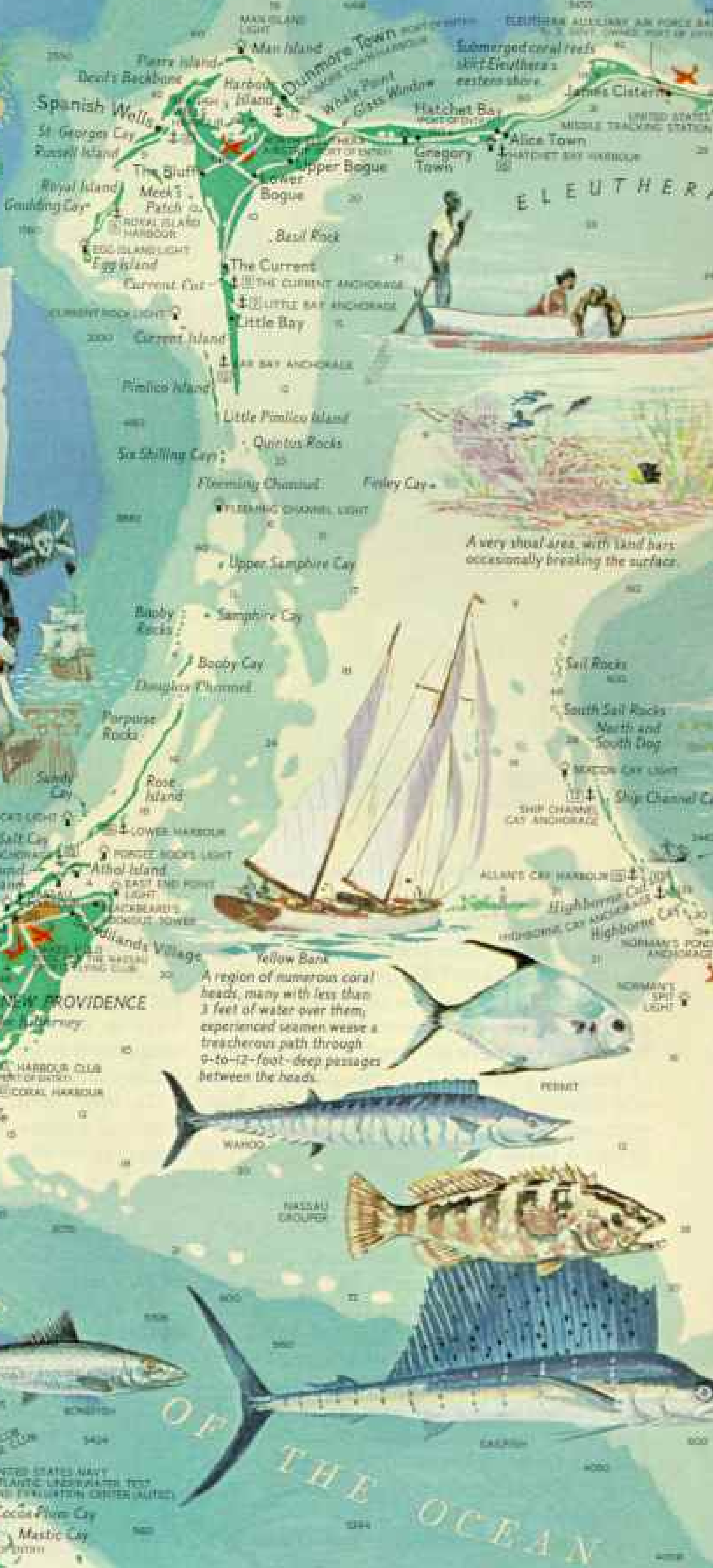
(Continued on page 231)

*The author described this 1957 visit in "The Bahamas, Isles of the Blue-green Sea," NATIONAL GEOGRAPHIC, February, 1958.



The
**EXUMA
CAYS**
BAHAMA ISLANDS

Beacon
Major anchorages and harbors with depths in feet at low water
Airfields shown in red
Elevations and soundings in feet



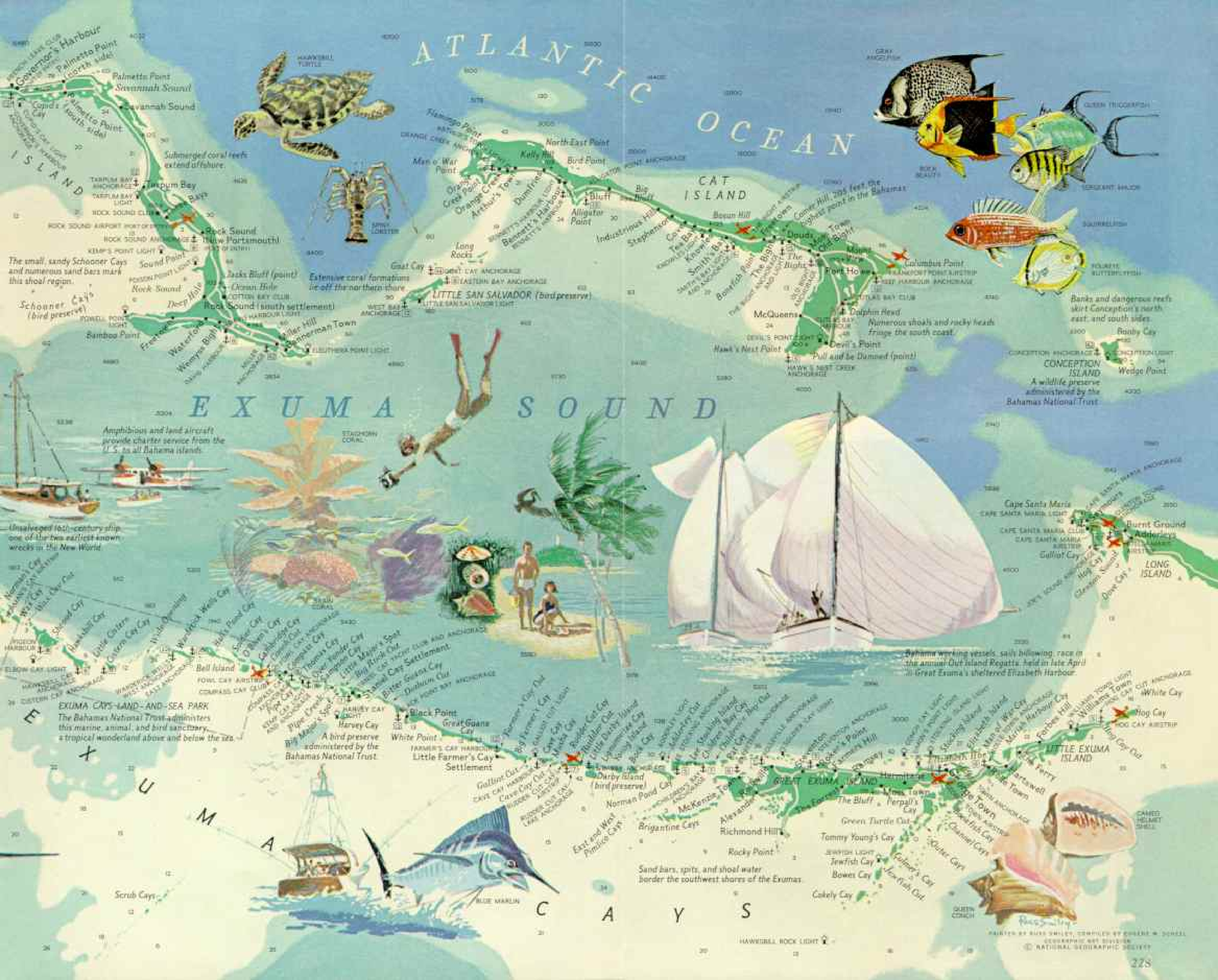
A very shoal area, with sand bars occasionally breaking the surface.



A region of numerous coral heads, many with less than 3 feet of water over them; experienced seamen weave a treacherous path through 9-to-12-foot-deep passages between the heads.



OF
THE OCEAN



ATLANTIC OCEAN

EXUMA SOUND



Sydney working vessels, sails billowing, race in the annual Out Island Regatta, held in late April in Great Exuma's sheltered Elizabeth Harbour.

The small, sandy Schooner Cays and numerous sand bars mark this shoal region.

Schooner (bird preserve)

Amphibious and land aircraft provide charter service from the U.S. to all Bahama islands.

Unsalvaged 16th-century ship, one of the two earliest known wrecks in the New World

EXUMA CAYS-LAND-AND-SEA PARK
The Bahamas National Trust administers this marine, animal, and bird sanctuary, a tropical wonderland above and below the sea.

A bird preserve administered by the Bahamas National Trust.

Sand bars, spits, and shoal water border the southwest shores of the Exumas.

Banks and dangerous reefs skirt Conception's north, east, and south sides.

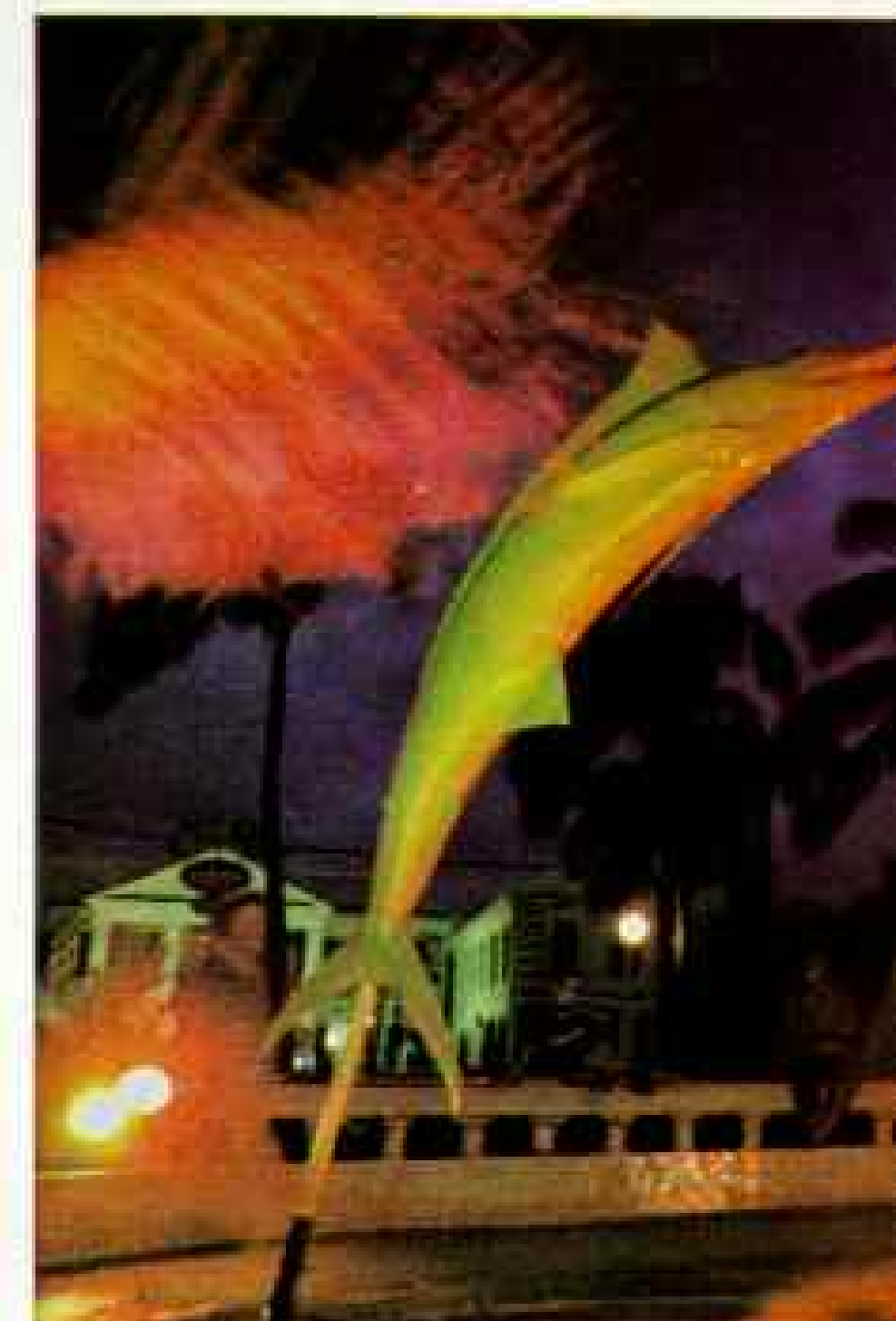
CONCEPTION ISLAND
A wildlife preserve administered by the Bahamas National Trust.

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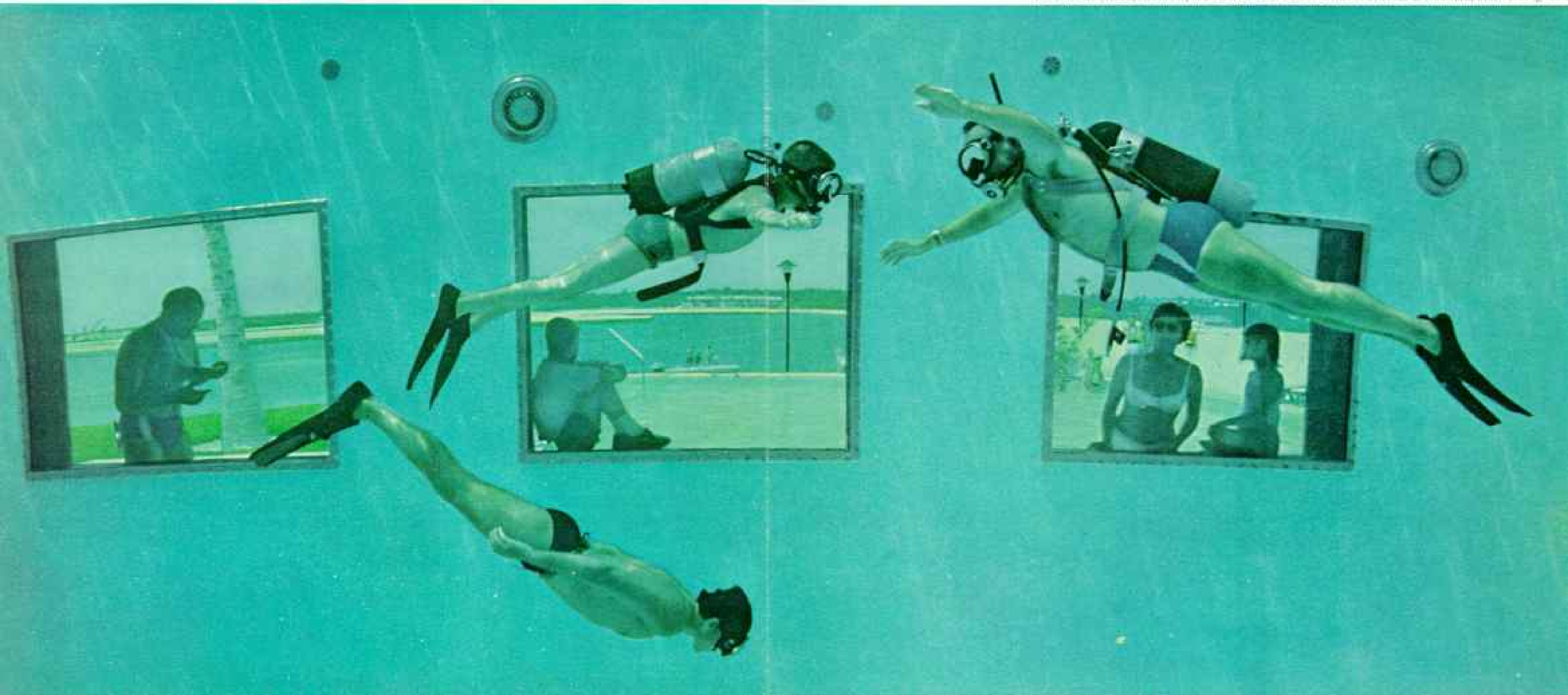


Eye on the action, a chic vacationer from Maryland, Robbi Robinson, graces a poolside at Bimini.

Taking aim on a world's-record dive without breathing apparatus, 39-year-old French swimmer Jacques Mayol trains in the Underwater Explorers Club pool at Freeport, Grand Bahama. His companions wear scuba gear. The practice paid off: Last June, Mayol descended 198 feet into the Atlantic.



DESIGNED BY CAVLER, FAR RIGHT, AND LOWER RIGHT; AND ILLUSTRATED BY JAMES L. STANFIELD, BLACK STAR © N.S.A.





When Nassau swings: Marlin ringing the fountain in Rawson Square seem to tail-walk to music of collegians holding a hootenanny during Easter holidays. Or the fish might be dancing to the rhythms of Berkley "Peanuts" Taylor as he beats Congo drums and belts out goombay calypso—a Bahamian specialty—in a nightclub appropriately named the Drumbeat.

Applause of backers brings a happy grin to a winning jockey, 12-year-old Danny Ramsey, at Hobby Horse Hall race track.



and yachts moored in man-made lagoons.

Airplanes shuttle almost ceaselessly across the Gulf Stream. Many visitors hop over from Florida for dinner and dancing, plus a whirl at roulette, and go back the same night. In the casino I saw a sign: "Last plane for Miami leaves at 5 a.m."

Wallace Groves, the American who conceived this development, smiled when I congratulated him. "Last time you were here," he said, "Freeport-Lucaya had zero population and no automobiles; now we have a traffic problem, and almost a quarter as many people as New Providence.

"Our formula is simple: We attract industry by making life pleasant for people working here—and for visitors as well. Without tourists we could not afford a jet airport, golf courses, theaters—all the things that make a community. These bring more industry."

First Royal Visit to the Bahamas

On my return to Nassau, I stepped back into the colonial era. The entire island eagerly awaited the arrival of Queen Elizabeth and Prince Philip aboard their yacht *Britannia*.

On the quay, I became part of the ancient pomp and ceremony of empire. Sir Ralph Grey, G.C.M.G., K.C.V.O., O.B.E., Governor of the Bahamas, stood in full uniform at the foot of a red carpet. With him waited the Premier, Sir Roland Symonette, and their wives. Across from us stood leopardskin-draped drummers of the Bahamas Police Force Band, polished



BUTTONHOOK OF LAND known as Norman's Cay basks in the sun. Its sheltered lagoon offers snug harborage to cruising yachts like the author's yawl Finistère, here carrying its famed "redhead" spinnaker.





tunic buttons and badges glinting in the sun, scarlet ribbons tied around white sun helmets.

Yachts that had escorted *Britannia* into the harbor anchored nearby as floating grandstands. Spectators packed every window and rooftop overlooking Bay Street; Queen Elizabeth II was the first reigning British monarch ever to visit the Bahamas.

After descending the gangplank, she walked through lanes of school children to a raised platform for the official welcome. I had a moment of worry when the Premier's son, Robert Hallam Symonette, Speaker of the House of Assembly (page 237), had to back down the steps after presenting a parchment scroll to the Queen. But even in silver-buckled pumps, gold-trimmed cape, and full-bottomed wig, my longtime shipmate "Bobby" lost none of the sure footing he had displayed as a member of *Finisterre's* ocean-racing crew.

Despite the colonial aura of the royal visit, Bahamians largely control their own government. "In internal affairs I am bound by the advice of my ministers," Sir Ralph Grey told me later. "I can advise or warn against decisions with which I'm not in accord, but if they insist, I must go along."

\$3 Bill Created to Match Pound Sterling

Since May 25, 1966, the Bahamas have taken another step away from the mother country by replacing the pound sterling with the dollar. Each new coin bears the profile of Queen Elizabeth on one side, but the other depicts a local subject—a native sloop on the quarter, a leaping marlin on the half dollar, a conch shell on the silver dollar. Paper money follows the same dual motif—including the curious \$3.00 bill, nearest equivalent to the \$2.80 English pound.



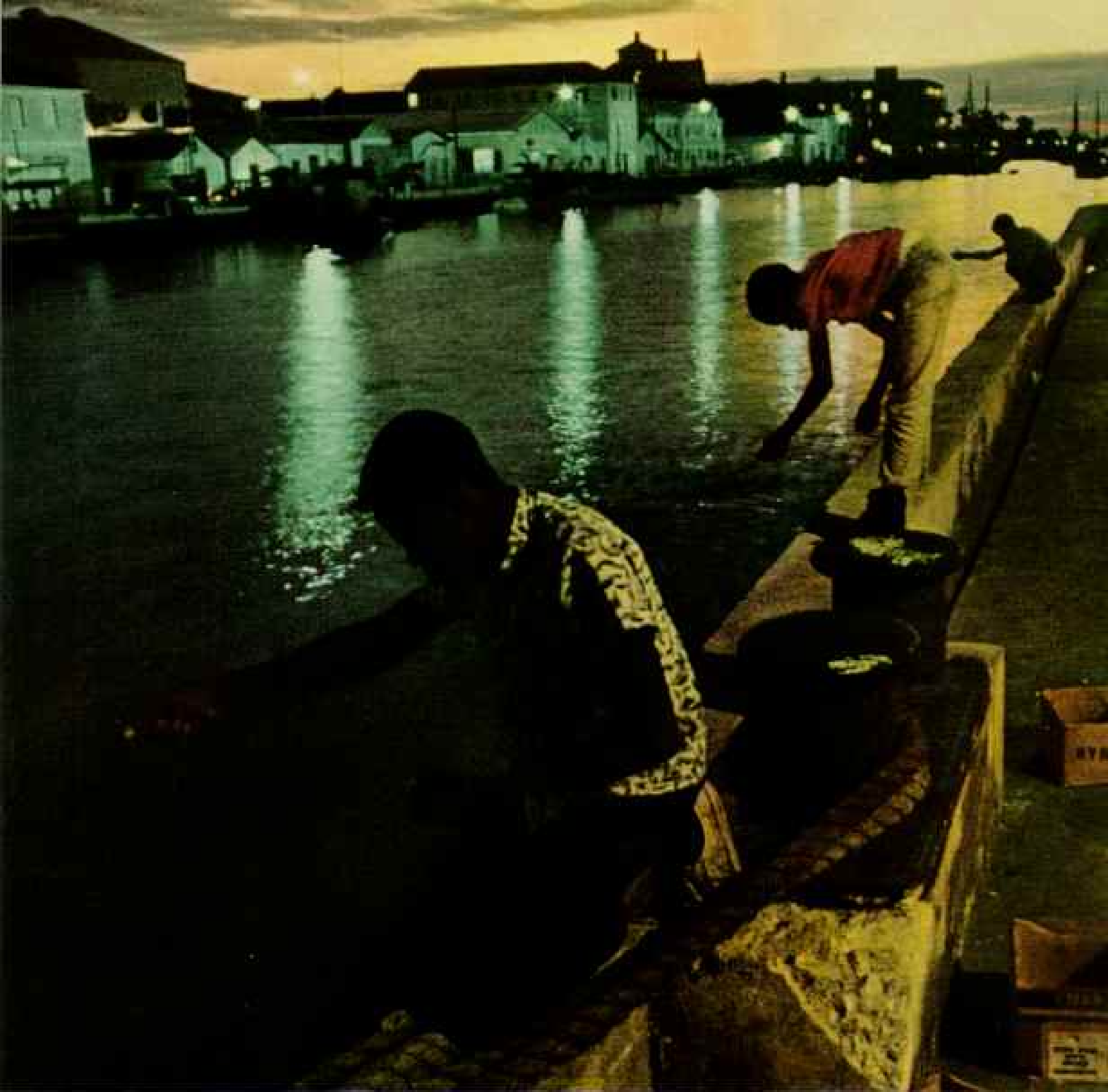
His Queen stands behind him as Sir Ralph Grey, Governor of the sun-burnished Bahamas, administers the colony's affairs. Great Britain's Queen Elizabeth II appointed him to the office in 1964, the same year the island attained self-government in internal matters.

Leopardskins draping their uniforms, drummers of the Bahamas Police Force Band beat the retreat at the Out Island Regatta in George Town on Great Exuma. In Nassau, the troop performs every other Saturday for the Changing of the Guard at Government House. The constables constitute the only armed force in the Bahamas.

Ten thousand Bahamians jam Rawson Square and hundreds more perch on rooftops to welcome Queen Elizabeth and Prince Philip during their five-week West Indies tour last winter. To celebrate its first royal visit, Nassau declared a holiday, closed all schools and shops, and turned its downtown into a forest of flags.

EXTREMUM (LEFT) AND ADDACHROM (ABOVE) BY JAMES L. STANFIELD, BLACK STAR; RODACHROM BY FRED WARD, BLACK STAR © N.C.S.





In my revisiting of remembered places, I did not omit Ardastra Gardens, where dozens of flamingos still perform precision drills to the commands of trainer Hedley Edwards. To my amazement, the flock even stopped on command to pose for photographs.*

"When you were last here, they wouldn't allow anyone but me to approach," said Mr. Edwards. "Now they let little girls near them. They will tolerate boys and adults if I insist, but they're partial to little girls."

At one time the flamingo—national bird of the Bahamas—faced extinction here. To save the species, conservation-minded citizens formed the Society for the Protection of the Flamingo, now part of the Bahamas National Trust. Through its president, Oris Russell, I met Alexander Sprunt IV, research director

of the National Audubon Society and adviser to the trust. Together we arranged a visit to the flamingo colony on Great Inagua.

At Matthew Town, photographer Jim Stanfield and I piled into a jeep with our guides, Sam and James Nixon, brothers who had worked together as wardens for 15 years. Soon we turned onto a stone dike to cross a lake. At the far side the road vanished. We drove across an area of baked mud, cracked like the scales of a huge prehistoric monster. Limestone outcroppings and dead, twisted trees pushed through the mud in meaningless patterns. I began to gag on the clouds of corrosive salt dust.

*In "Ballerinas in Pink," NATIONAL GEOGRAPHIC, October, 1957, Mr. Mitchell described this extraordinary flock of performing flamingos in Nassau.



REPRODUCED BY JAMES L. STEPHENS, BLACK STAR © N.E.A.

Jigging for fish off Prince George Wharf in Nassau, twilight anglers pull in pilchards.

Legislator and sailor, Robert Hallam Symonette presides over the House of Assembly. He has crewed aboard *Finis-terre* in many ocean races, and in 1964 competed in the Olympics at Tokyo.

As Speaker, Mr. Symonette wears the wig and robe that signify his high office. House Clerks, in foreground, wear shorter wigs. Ceremonial mace, imported from England in 1799, adorns the Speaker's bench. The hourglass times members' speeches.



"Now you know why this is called 'the Devil's Garden,'" said Sam Nixon. He drove confidently over the trackless terrain. Finally we pulled up before Arthur Vernay Camp, named for the founder of the Society for the Protection of the Flamingo. A small boxlike cabin of plywood stood on a spit of land. Raised shutters revealed four cots inside.

"Mr. Vernay and three friends tried to sleep here in a tent," said Sam. "Then one night our dogs chased a wild donkey right through it. All four men went rolling onto the ground yelling, with the donkey braying and the dogs barking. After that we built the cabin."

Flamingos Find Sanctuary in Briny Wilderness

We left our gear and returned to the jeep. Now we traversed a part of the Devil's Garden where ponds were bordered by mangroves, hardy trees able to survive tropic heat and salt water by throwing out myriad roots as breathers. When even a jeep could go no farther, we trudged from sun-dried mud into warm, knee-deep brine, so salty it stung every tiny abrasion on my legs. A bottom like taffy tried to pull off my sneakers at each step.

Suddenly Sam signaled and dropped to his knees. I could hear a sound like wild geese gabbling. We traversed the last hundred yards crouching and crawling from one bit of cover to another.

Finally, hidden in brush, I looked out on a lake—and instantly forgot my discomfort. Before me were hundreds, perhaps thousands, of flamingos. In the late-afternoon sun each pink-feathered body glowed almost like flame.

The flamingo's scientific name, *Phoenicopterus*, comes from Greek words meaning "crimson-feathered." Early Christians took the bird to be the legendary phoenix of Arabia, which mythology said lived for 500 years, then lit a funeral pyre with the fanning of its wings, and arose reborn from its own ashes.

As I watched spellbound, I found the birds as graceful as they were beautiful. Some balanced on one leg, heads tucked under wings, dozing. Others preened feathers, twisting sinuous necks with the fluid motion of an Oriental dancer's arms.

Jimmy Nixon broke into my reverie with a nudge as he

Boom town of the Bahamas, Freeport today claims almost as many hotel rooms as Nassau. Since 1956, land values on Grand Bahama Island have multiplied many times, and the population of the once-sleepy isle has skyrocketed from 4,000 to 21,000. Lucayan Beach Hotel, with its golf course and marina, flanks the channel leading out to the Atlantic. A new Holiday Inn, largest in the chain, fronts the ocean at left.

Windfall from the deep, pieces of eight sank with a Spanish galleon that foundered off Grand Bahama more than two centuries ago. Part of a multimillion-dollar treasure, the silver coins lay buried only a thousand yards offshore from the Lucayan Beach Hotel (right). Four Miami divers who worked at the hotel discovered the drowned riches in 1964. Coral-encrusted anchor (bottom) provided the first clue to the cache.



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BOGACHROWE (LEFT CENTER) AND ESTABLISHED BY JAMES G. STARFIELD, BLACK STAR © R.S.L.

handed me a pair of binoculars. "Look at that group," he whispered. "They're going into their courting display." About a hundred birds had gathered into a compact mass. In Jimmy's words, they were "standing proud," bodies and necks fully outstretched, the males taller than the females (pages 242-3).

At some inaudible signal, all began marching in one direction with high knee action. They stopped suddenly; heads swiveled and wings snapped open like giant fans to show jet-black flight feathers.

"Soon they'll pair off," explained Jimmy. "Then they'll establish a new colony and begin building nests."

As sunset approached, newcomers arrived to join the flock, while others left for distant ponds. To take off, a flamingo attains speed by running in giant steps. This is one reason they must not be disturbed when nesting; in a panic they may trample eggs and young. Airborne, they looked like flaming javelins.

Sandy Sprunt had told me he estimated the number of flamingos on the 267-square-mile sanctuary of Great Inagua at 20,000. Sam Nixon felt certain the number was higher. The colony has increased through protection from poachers, wild hogs seeking eggs, even overzealous bird-watchers and photographers. Worst of all are low-flying aircraft that may panic the birds. Bahamian law now prohibits planes from flying at less than 2,000 feet over the flamingos' nesting grounds.

Baby Turtles Fly to the Bahamas

The Nixon brothers also serve as the guardians of Union Creek, part of a reserve of the Bahamas National Trust. At Union Creek, scientists are studying the ways of another species nearing extinction in the Bahamas—the green turtle, valued all through the West Indies as food.

After the desolation of the Devil's Garden, it was pleasant to drive along sandy beaches



Once-barren Grand Bahama now supports a multimillion-dollar industrial complex built by United States Steel Corporation. Pipelike rotating kilns stretch almost 200 yards in length in a plant

that produces cement from dredged-up limestone. Cruise ships moored in Freeport Harbour (below) brought in many of the record quarter of a million visitors that the island welcomed last year.





Dozens of airline flights a day connect it with Nassau and Florida, and a new jet strip puts New York within two hours' flying time.

EXTACHROME (BELOW) AND SODACHROME © N.E.S.



shaded by palms waving in the cool trade wind. This time we took face masks and swim fins to stalk our quarry.

Rock fences at both ends of a tidal creek formed an underwater corral. Each season for four years a United States Navy plane, as part of the scientists' Operation Green Turtle, has flown in a thousand baby turtles from Costa Rica. They have been tended by Sam and Jimmy Nixon at Union Creek until able to fend for themselves.

When I dived below the surface, at first I could see everything but turtles. Parrotfish and snappers watched me from a tangle of mangrove roots. Several barracuda hung lazily, as if suspended from invisible wires, and a small ray flapped off before me.

Then, as Jimmy Nixon splashed through shallows in a roundup drive, turtles began to zip by like miniature flying saucers. It was a case of now-you-see-'em-now-you-don't: I never knew turtles could move so fast! Finally Jimmy made a diving leap and seized one by its flippers. It had reached a length of ten inches, about a third the size of an average adult.

Green turtles once bred prolifically in the Bahamas, but were virtually wiped out by hunters. Today only one tiny nesting colony survives there. By their efforts on Great Inagua, the scientists hope to re-establish wider breeding grounds of these handsome and valuable food animals.

How Much Salt in a Gallon of Sea?

On my first visit to Great Inagua, aboard *Carib* in 1946, I had met the Erickson family of Boston, who were reviving the century-old salt industry. Mud-and-stone dikes, some dating from the early 1800's, formed shallow pans. Sea water was admitted, the liquid burned away by the sun, and the crystals hand-raked. The Ericksons introduced machinery but continued to use the old pans even as they built new ones. Some of their first customers were fishermen from the Grand Banks off Newfoundland.

Now I found that the Ericksons had turned over their salt holdings to Morton International Limited, and the operation had been expanded and modernized.

"Most of our output goes to the chemical industry," I was told by resident manager Chester W. Jenkins. "But some is used in de-icing northern streets and highways. Fishermen still buy some 5,000 tons a year, but that's only a grain in the shaker against our present production."

I followed the whole process by starting at the inlet, where pumps lift 75,000 gallons of sea water a minute, day and night. I ended where piles of salt rose like snow mountains in the tropic sun. Then I asked Chester a question: "How much salt do you get from each gallon of water?"

He looked startled. "I never figured it out," he confessed.

I did not see Chester again until late afternoon, when he triumphantly handed me a small paper packet. "Here it is!" he exclaimed. "Four level tablespoons!"

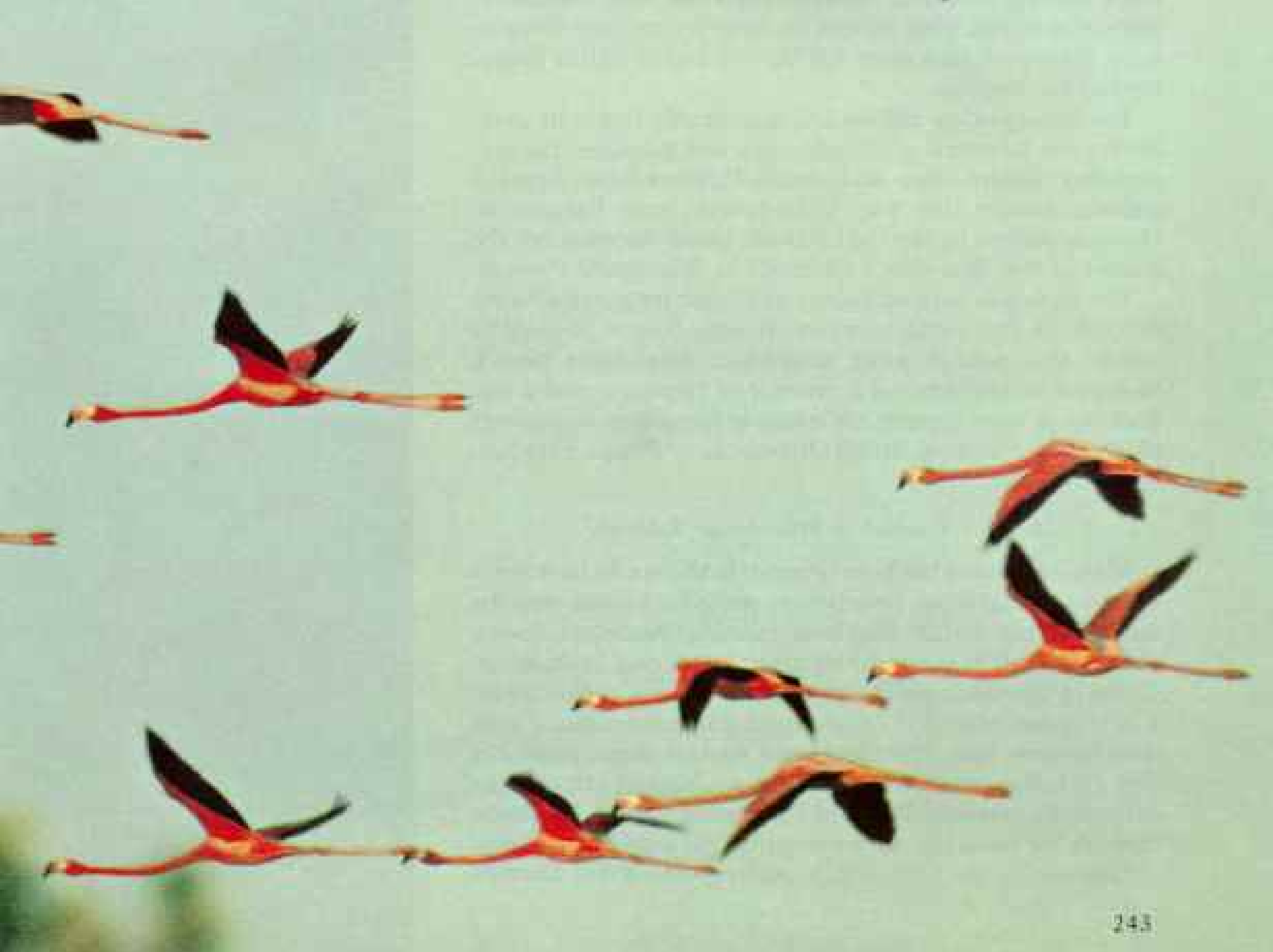
After each expedition to an Out Island by plane or boat, I returned to Nassau, for it remains the center of the Bahamian world. There were visits to Hobby Horse Hall, where young jockeys in flapping shirttails ride locally bred ponies. I ate picnic lunches on *Finisterre*, anchored off





DANCE OF LOVE: *Flamingos perform a courtship ritual on a salt-pond stage. Heads held high, they stride across shallows on Great Inagua, the males pausing to display ebony flight feathers in the hope of attracting mates. The flamingo is the national bird of the Bahamas; more than 20,000 of them find sanctuary in a 267-square-mile reserve on Great Inagua. World War II training planes, and poachers later, drove flocks from Andros Island breeding grounds.*

Trailing delicate legs in flight (below), necks craning and broad wings beating like metronomes, the salmon-red birds set the skies aflame.





Gift-bearing Arawaks greet Christopher Columbus at Hispaniola in 1492 on a stop-over after his historic first landing on San Salvador Island. Columbus, in turn, presented the Indians' chief with shirts, hats, knives, and mirrors. He had not found the Grand Khan of Cathay he sought, but he had shown the way to the greatest treasure of all, the New World.

Lonely stone cross (below), one of three San Salvador monuments to the Genoese seafarer, juts above children playing roll the tire. Lowering noonday sky heralds an approaching squall.

palm-girt Sandy Cay or the gleaming beaches of Rose Island, and took shopping tours along Bay Street, choosing from the same merchandise that can be found in London's Bond Street. Yet after a few days of maitres d'hôtel bowing from the waist and a taste of Nassau's night life "over the hill"—the native section lying beyond the ridge crowned by Government House—I once more felt the irresistible pull of places beyond the horizon.

The history of the Bahamas is inextricably tied to its geography: the lacework of islands, cays, and passages; the surrounding waters, deep and shoal. Treasure-laden Spanish galleons passed this way home-bound from Panama or Havana, pushed by the Gulf Stream. Other shipping ran the gantlet of the Providence Channels or Windward Passage.

The Bahamas became known as a "nest for pirates," until in 1718 the first royal governor, Woodes Rogers, arrived to handle the swashbuckling gentlemen. After more than a thousand surrendered on a promise of clemency, and a few backsliders were hanged, the motto of the colony was adopted: *Expulsis Piratis Restituta Commercia*—"Pirates Expelled, Commerce Restored."

Missiles Tracked in Mile-deep "Bathtub"

Always this land has been oriented to the sea. In later years came wrecking, when vessels were sometimes lured onto the rocks by false lights. Blockade running flourished during the U. S. Civil War; so did rumrunning during Prohibition.

One of the oddities of the group is the Tongue of the Ocean, a submarine dead-end canyon plunging more than a mile deep between New Providence and Andros (maps, pages 224 and 226). Here the U. S. Navy has established AUTEC—the Atlantic Underwater Test and Evaluation Center. We drove through the base, still under construction near Fresh Creek.

"Tongue of the Ocean is a perfect site—a big bathtub





Dentist comes to patient: Dr. Norman Cove of Nassau treats a youngster in the village of Victoria Hill on isolated San Salvador. Several times a year he and a physician visit this Out Island.

with no steamer traffic to interfere with our listening devices," Lt. Comdr. Russell R. Gill, USN, explained during my tour.

"We've planted hydrophones beyond the barrier reef and built radar and optical towers above, all tied together by cables and computers. Thus, for example, we can track a rocket missile fired from a submarine until it breaks the surface, then follow it through the air and back into the water, all the way to a submerged target."

Andros, half the size of Puerto Rico, is not only the largest island of the archipelago but was until recently the most primitive. Yet on flying into the interior, I found roaring rock plows shaving off the top layer of limestone and pulverizing it into surprisingly rich soil.

With wells drilled 160 feet apart, a giant sprinkler system is turning the wasteland into a vast garden. "Those rows of cucumbers are more than a mile long," farmer William F. Parker, Jr., said casually as we passed. 245

RESEARCHERS BY JAMES L. STANTFIELD, BLACK STAR © R.C.C.



a field that seemed to run over the horizon.

Only a few years ago the interior of Andros was virtually unknown. Now warehouses bulge with strawberries awaiting airlift to London, and refrigerated ships sail daily to Florida. Andros farming has become big business, especially when frost in Florida sends the price of winter vegetables soaring.

"During the height of our season, from December 15 to March 15, Andros ships up to \$50,000 worth of produce a day," Bill told me.

While Andros Island faces only the narrow Tongue of the Ocean, my next stop, San Salvador, is washed by the vast Atlantic. Here, 475 years ago, Columbus stepped ashore and named his discovery for the Saviour who had guided him across the trackless sea.

No fewer than three monuments mark spots where Columbus is supposed to have landed. I made the rounds in a jeep driven by Roy Solomon, who represents San Salvador in the House of Assembly. The oldest marker stood

behind a tangle of reefs and breaking surf no sailor would ever attempt. The others faced a sand beach on the leeward side, a long gentle curve like outstretched arms waiting to embrace tired seamen.

Visiting San Salvador when I was there were Dr. Paul Poad, a Nassau physician, and Dr. Norman Cove, a dentist (preceding page), both holding daily clinics. "A crowd gathers whenever I pull a tooth," Dr. Cove told me with a smile. "If the patient doesn't make too much fuss, I generally get other volunteers, but if he shows pain, the crowd melts away."

I went with Paul Poad on an emergency call, relayed through the island's one party line of only 16 telephones. On receiving a message that a girl was "taken bad sick," we drove to the tiny settlement of Victoria Hill.

A small bundle of misery huddled in an iron bedstead. While Paul made his examination, I was struck by the neatness of the home, so small that the bed took up half the space. The

Slam, bang, a trickle down the neck, salt-rimmed lips: Skipper Mitchell wrestles the wheel on



patient's infection called for antibiotics and rest. After Paul closed his bag, the girl managed a wan smile.

As we walked down the hill, Paul paused to shake the hands of the elderly, pat babies, and talk with their mothers. Once he came to San Salvador strictly as a volunteer, but now the government sponsors his visits, part of an expanding Out Island medical-care program dubbed the "Flying Doctor Service." A private organization, Community Welfare, also sponsors visits by a Nassau physician, Dr. Stevan George, to islands accessible only by amphibious plane or native sailboat.

Houses Match Hues of Sea and Flowers

For my next Out Island trip I took a postman's holiday by joining John Schutt, a Miami printing executive, and his wife Louise aboard *Conch Pearl*, their husky diesel cruiser. On our run across Great Bahama Bank, I enjoyed the unfamiliar luxury of basking in the

sun with a book as the miles flowed astern.

Stopping for a night at Spanish Wells on St. Georges Cay, I found the settlement little changed since my last visit, nearly ten years before. The clapboard houses were still painted fanciful colors matching the flowers in the yards or the hues in the sea beyond. Flaxen-haired children smiled shyly at strangers; the islanders are proud of their Anglo-Saxon lineage. Their ancestors were early American colonists who chose to remain loyal subjects of King George III following the Declaration of Independence. After the Revolution they were allowed to leave the mainland for the Bahamas.

Although the masts have been chopped out of once-picturesque schooners to make way for engines, the islanders have not given up their seafaring ways. They remain the finest fishermen in the Bahamas, carrying catches to market in Nassau. And they cling to their Puritan heritage. "We hold prayer meetings

gathering seas on "a most un-tropic day." A hard southeasterly drives *Finisterre* to George Town.

WOODCHERRY BY JAMES L. STANFIELD, BLACK STAR © N.Y.C.





Splintering glass-clear seas, *Finistère* reaches across Great Bahama Bank near the Exumas under curving mizzen, main, and genoa jib. "A fair breeze, smooth water, hot sun on your shoulders—what more could a sailor want?" asks the author. Photographer Stanfield, swinging.



ENTRANCE BY JAMES L. STARFIELD, BLACK STAR © NATIONAL GEOGRAPHIC SOCIETY

precariously atop the mast, casts his shadow on deck. *Finisterre* sailed for days on such shoals, only 10 to 15 feet deep but so transparent that with a bow lookout, as above, she piloted the banks by color—purple-brown of coral heads, yellow of sand, cobalt blue of deeper waters.

four nights a week," said "Cap'n Punch," an old acquaintance, who at 75 had retired to his birthplace after operating a glass-bottomed sightseeing boat in Nassau.

From Spanish Wells, *Conch Pearl* drove her way across the rough Northeast Providence Channel toward Great Abaco Island with its necklace of tiny cays. The red-and-white-striped lighthouse at Hope Town wore a fresh coat of paint; it had been sandblasted by "hurricane" Betsy, one resident told me.

Boats Built of Horseflesh and Madeira

On the Abaco Cays you can still hear phrases that arrived with British colonists in bygone days: A bar is "in a rage" when heavy seas break across, and a boat "hasn't fetched yet" if she is overdue.

A colony of American yachtsmen has settled on nearby Man of War Cay, where craftsmen continue to turn out trim vessels using naturally curved frames of native woods

called horseflesh and madeira. The wooden gutters and rainspouts of many houses are caulked like a ship's planking.

When *Conch Pearl* swung close to Snake Cay, I rubbed my eyes at the sight of a side-wheel steamer seemingly floating on dry land. Intrigued, I rowed in for a closer look. Thomas A. Thompson explained it all in an air-conditioned office on the upper deck.

"This is the S. S. *Robert Fulton*," he told me, "built in 1909 for the Hudson River Day Line between Albany and Manhattan."

The boat now houses employees of an American company, Owens-Illinois, engaged in cutting and shipping pulpwood from Abaco's pine forests (opposite).

"The *Fulton* was brought to Abaco in 1959," continued Mr. Thompson, operations manager of the enterprise. "We kept her afloat at first. But the next year we had some bad nor'easters, and a few of our secretaries got seasick at their desks. So we pumped sand



Snarl of chain saws echoes across Great Abaco as loggers fell groves of Caribbean pine for Owens-Illinois of the Bahamas, Limited. Many are Haitians, who earn more in a month than they might make in a year on their home island.

The pulpwood, cut into eight-foot lengths, rides barges to Jacksonville, Florida, where a mill converts it into containerboard for corrugated boxes.

Trees left standing will reseed Great Abaco's forestland for another cutting 25 to 30 years hence. Meanwhile, the company hopes that sugar cane will provide steady employment for the labor force.

High-spirited foursome of boys, dog, and donkey romp on the palm-dappled sands of Andros, largest and least tamed of the Bahamas.

DETACHROME (RIGHT) AND KODACHROME (© R.S.L.)



around the hull. High tides rise in the bilge, and last year the hurricane shook us a bit. She hasn't forgotten she's a ship."

From the beginning of my Bahamas stay, I had been looking forward to the Out Island Regatta. Each spring, island sloops pause in their task of fishing or transporting cargo to converge on George Town, Great Exuma, some 120 nautical miles southeast of Nassau.

Regatta participants enjoy music on the village green, the ceremony of tattoo, lights and bunting, a chance to see the Governor—and above all, the opportunity to settle arguments about who has the fastest boat. For visiting yachtsmen, it is a pageant of vessels out of the past, an exciting competition, and a good excuse to sail among the most enchanting cays in a cruiser's paradise.

I had long laid plans. Jim Stanfield would be there with his cameras. Jim Hoffman, with whom I had sailed in Japan, had arranged his law practice and vacation to fly from Tokyo to join *Finiaterra* for the passage from

NASSAU. GEOGRAPHIC Editor Mel Grosvenor, who had cruised the Leewards with me the year before, had promised to join the crew at George Town. We would explore offbeat channels and anchorages on the way back.

The morning we headed eastward for Hatchet Bay on Eleuthera, the water of the Great Bahama Bank lay calm. Despite a windy winter, it looked as though the scattered fleet of yachts and competing "smack-boats" was going to be blessed with fine weather for the regatta.

After an overnight stop at Hatchet Bay, *Finisterre* reached lazily toward Governor's Harbour, a resort settlement centered on Cupid's Cay. If the breeze is easterly, all is serene. But if it swings into the north or south, a prudent skipper shifts his anchorage to the lee side of Cupid's Cay.

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Many historians believe this was the landing place of the Eleutherian Adventurers, the first settlers in the Bahamas. They left Bermuda in 1648 under the leadership of one William Sayle to carry on the "independent way of worship" of Puritan friends in New England. They named their new home from the Greek *eleutheria*, meaning "freedom."

Crewman Stays On Despite Broken Arm

Unfortunately, I recalled, the expedition was shipwrecked on arrival. I looked uneasily over my shoulder to the north at gathering clouds as we anchored. Going ashore, I grew increasingly concerned and decided to move *Finisterre*. Jim Hoffman volunteered to help.

All went well until we came back ashore in the tender, when Jim stepped on slippery coral and fell. We drove him to Rock Sound,



where X-rays disclosed a broken right arm.

Next morning Jim Stanfield and I put him aboard a plane for Nassau. Scudding southward before a heavy wind, I reflected on the irony of fate. *Finisterre* had crossed the Atlantic without my having to issue more than a Band-Aid from the medicine chest. Now we had lost a shipmate who had come from the other side of the world for a short passage!

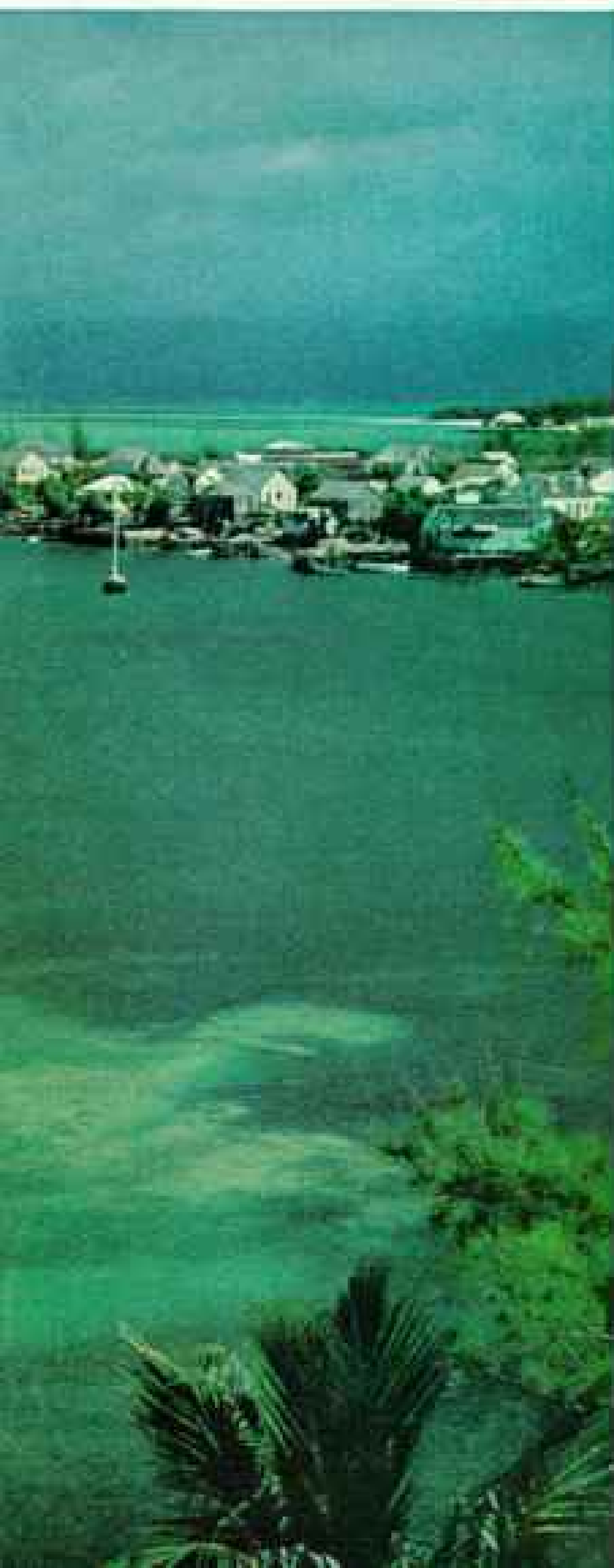
My spirits matched the leaden skies as we neared Rock Sound. When we dropped sails, I thought there was something familiar about the man standing on the dock. Then I saw the cast and sling. The doctor who had set Jim's arm felt he might as well be in *Finisterre's* bunk as a hospital cot! He had even driven him to the airport to fly back from Nassau.

Twenty-four hours later I had some doubts. Eleuthera lay astern. Carrying mainsail,

Her wake a snowy crescent, an outboard planes across Hope Town Harbour (left). Bracketed by landmarks that smack of pirate tales—Parrot Cays, Lubber's Quarters, and Eagle Rock—Hope Town nestles in the Abacos, the northernmost Bahamas. It offers haven to sailors in hurricane season, pure peace in good weather.

Like actors in a thriller, author Mitchell and guide Joseph Hoche pursue Mrs. Robert Symonette through depths of an underwater cave at Staniel Cay. A location for the movie *Thunderball*, the cave lies in the sea like a hollow iceberg, partly above water, mostly below. Sunshine spilling through an opening spotlights Mrs. Symonette.

DETROIT (BELOW) AND HOCHBERG © A.S.S.



mizzen, and a small jib, *Finisterre* plunged into the rising swells of Exuma Sound. Spray flew aft to drench us in the cockpit. Steadily the wind freshened. Soon seas were battering against our topsides, while the bow wave blew to leeward as salty smoke.

At sunset I knew we were carrying far too much sail, but I was faced with a rare dilemma as skipper: what to do? One Jim crippled, the other inexperienced, and Dawson Pinder a cook who had trouble getting around on deck! Finally putting the Jim with one good arm at the helm, we lowered the mainsail and muzzled it for the night. A wild night it turned out to be, with the seas growing larger and steeper as the wind blew ever harder.

Daylight revealed a seascape of tumbling gray to windward, streaked by sullen gray-caps, while to leeward stretched a jagged line of low cays. Finally the entrance to George Town opened over the bow.

Threading through shallows behind Stocking Island, we dropped anchor off a small hotel named Peace and Plenty. Alas! *Finisterre* found no peace, but plenty of steep rolling waves: Elizabeth Harbour is wide, and the unseasonal wind howled unabated.

Splinters Fly as Race Begins

More than thirty yachts and an uncounted number of native craft had put in to snug harbors along the way and never arrived at



"Surrey ride, folks?" Albert Curry finds plenty of customers in Dunmore Town: He drives the only carriage in the only settlement on Harbour Island, a dot of land off the northeast tip of Eleuthera. Many of the islanders commute to Eleuthera daily in dinghies for work in citrus groves and truck gardens.

On Princes Street (below) the 72-year-old Curry stops for a fenceside chat with the wife of a retired doctor from Connecticut. Petrea vines climb her picturebook-neat home on an island whose pace of yesteryear accents its charm.



PHOTOGRAPHS BY JAMES L. STARFIELD, BLACK STAR © N.Y.C.

George Town. But the spirit of the regatta was unquenched.

At the beginning of the first race, splinters flew. Island boats start with anchors down and sails furled. When the cannon fires, the crews begin a mad scramble.

"There are no right-of-way rules until later," said regatta-committee chairman Bobby Symonette, "so we don't recognize fouls. Afterward, the main requirement is that if two boats meet and neither can cross ahead of the other, both must tack. Also, they must finish with the same number of men they start with. Otherwise, in light airs, the skipper might make the crew dive off the stern one at a time to kick the boat ahead—and some can't swim!"

Standing beside Mel Grosvenor, who had flown in shortly after *Finisterre* arrived, I found us both shouting. Spectators and crews alike filled the air with challenges, insults, and wagers. As the sloops have no lead ballast on the keel, they depend for stability on boulders in the bilge—and big crews when racing in heavy wind (following pages). On the deck of *Tida Wave*, 29 feet long, I counted 19 crewmen. Each carried a sack filled with sand!

When sails filled, boats heeled sharply. Only a few skipper got away without mishap. Bowsprits poked into topsides, main booms raked competitors' decks, rigging tangled. Sails were torn, spars sprung, paint rubbed off. The gallery screamed as crews fought to clear themselves.

After three days of rugged competition, *Thunderbird* of Mangrove Cay, Andros, emerged as champion (pages 258-9).

Wind-triggered free-for-all: With a burst of frenzied hauling, crewmen raise anchors and loose-footed mainsails when a cannon booms the start of the annual Out Island Regatta in breeze-frosted Elizabeth Harbour (right). Masts snap, sails rip, rivals ram, and skippers roar insults at one another as the chunky Bahamian workboats scramble for the lead (below). Aboard No. 12, a sailor has reefed the mainsail, Bahamian fashion, by wrapping a line around the boom; he now frantically trims the jib as his craft gets under way.

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PHOTOGRAPHS BY MELVILLE BELL SARGENTON © NATIONAL GEOGRAPHIC SOCIETY



"She stands up to her cloth good," I was told by the proud owner, the Reverend Dr. Wilfred Gentry McPhee, pastor of the Mount Calvary Baptist Church in Nassau. "We built her to be the fastest boat in the Bahamas, but she's a real working smack—nine months of the year she's in the water, going conching, sponge fishing, turtling, and crawfishing."

Asked why a man of the church owned a boat, Dr. McPhee replied poetically: "It was always my cherished desire. I'm an Andros man, from Mangrove Cay. I grew up by the sea, my people live on the sea, and the good Lord provides for us from the sea."

When *Finisterre* sailed from George Town after the last prize had been awarded, Bobby Symonette came along to show us some favorite places. His constituency in the House

of Assembly runs "from Hog Cay to Ship Channel Cay, including the Islands of Great and Little Exuma, and all Islands, Cays, or Rocks, within 3 leagues thereof," in the words of an 1802 electoral document.

In the Exumas it is easy to understand the Bahamian's affinity for the liquid world that surrounds the mosaic of land. Offshore, ocean seas still crested, but now the wind was astern, and we were amply crewed. With Mel at the wheel, Bobby and I set one of our "secret-weapon" sails from racing days—a reaching jib cut high for heavy weather—and scudded down the faces of purple-blue swells.

Turning in at Rudder Cut, *Finisterre* passed through a smother of white breakers before finding the calmer water of the bank. Before long, however, it became apparent that the



water was spread thin. Mel Grosvenor looked at our wake and exclaimed, "The keel is stirring up sand like dust behind an automobile!"

While Bobby stood on the bow to conn us clear of even shallower bars by the paleness of the water, I was thankful for the fresh breeze that heeled us over. Upright, *Finisterre* might have drawn too much to get through until the tide turned.

Skipper Gets a Sudden Dunking

We spent the night sheltered by a crescent of sand, and sailed next day into the teacup harbor of Little Farmer's Cay, where some of Bobby's constituents welcomed us ashore.

On our return, Mel Grosvenor decided to take the Boston Whaler, our outboard-powered tender, for a spin. Unfamiliar with an

engine control combining gearshift and throttle, he pushed the lever forward while I stood holding *Finisterre's* rail. As the Whaler shot ahead, I stretched for a moment like a bridge between the boats. Then a very surprised skipper splashed into the sea, while a very embarrassed editor roared away.

After I had dried out, we stopped at Black Point on Great Guana Cay, where Governor Grey dedicated a clinic and radiotelephone station. Afterward, His Excellency came aboard *Finisterre* for the sail to Staniel Cay.

Slack tide next morning found us in an underwater cave where scenes from the James Bond movie *Thunderball* had been filmed. A rock cleft barely shoulder-wide led into a cavern (page 253). Sun shafted from above like a spotlight on fish swimming over a coral garden.

GROSVENOR (RIGHT) AND JAMES L. STARFIELD, BLACK STAR © N.E.S.



Parasols offer as much show as shade — and advertise a political campaign. Islanders wear their Sunday best at the opening of a clinic and radiotelephone building at Black Point in the Exumas.

Shifting human ballast balances straining sails and gives winning *Thunderbird* greater speed in the Out Island Regatta. Lacking lead keels, Bahamian boats carry rocks as ballast; for added weight in races, many vessels have crews big enough to man a full-rigged windjammer.

Through an opening like a huge submerged picture window we could look out on lurking barracuda and receding planes of color as the water deepened.

After showing us Pipe Creek, a lacy pattern of cays and shallow channels, Bobby Symonette left to preside over a session of the House. Then we were three. Dawson Pinder, thrown by a heavy sea on the way to George Town, had injured his leg, and had to be flown to Nassau. I was tempted to declare *Finisterre* a disaster area, but the next few days became the happiest memory of the winter.

The wind remained fresh but fair, cool in the shade of the mainsail, warm in the sunshine of the cockpit. Everything sparkled. Mel Grosvenor, Jim Stanfield, and I sailed over a sea of incredible colors, blue and green and once even amber as we crossed the Yellow Bank, which takes its hue from sand and coral on the bottom.

We snorkeled and fished for the pot, and my shipmates allowed *Finisterre* to retain her cordon bleu rating after I took over as chef. Our pièce de résistance remained casserole of steamed conch—the mollusk marinated in lime juice, then simmered in a sauce of onions, tomatoes, crushed red peppers, and sprigs of thyme (opposite).

Perhaps the dish tasted so good because earlier in the day we had watched the conchs being gathered. Anchored near us at Bell Island was the sloop *Laura Mae*. Her two-man crew slept in a tiny cabin but otherwise lived on deck in all weather. They cooked their meals over burning driftwood in a firebox lined with stones.

Recipe for tropic tonic: Blend a hideaway cove in the Exumas with sunshine, stir with tempering breezes, add turquoise seas, garnish with palm-fringed beaches. *Finisterre's* crew drops anchor at Little Farmer's Cay to savor at leisure.



Out of the depths off Bell Island comes a feast: the author spears a two-pound spiny lobster. A huge barracuda watched the action from the blue infinity of deeper water.



Side dish of laughter spices a dinner of steamed conch and yellow grits aboard *Finisterre*. Cook Dawson Pinder serves Robert Symonette, Carleton Mitchell, and Melville Bell Grosvenor (left).

PHOTOGRAPHS BY JAMES L. STORFIELD, BLEND STAR © U.S.S.





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For Triton's horn — the flavorful conch—men of the Bahamas scan blue-green waters through glass-bottomed buckets called "water glasses." Emblem of the sea god, *Strombus gigas* crawls the sea floor foraging for algae. Spying a conch on the bottom, a fisherman guides a pronged shaft under it



and lifts it into the skiff (left). To keep the catch alive for Nassau markets, the men tie the conchs in clusters (above) and pile them in shallow water, where they tug futilely in opposite directions and so stay together. For the voyage to Nassau, the conchs ride in a water-filled well amidships of a sloop like the one at right.

A heritage from the golden age of sail, such workboats haul fruit, vegetables, and poultry, as well as fish, from one isle to another. With almost constant fresh winds, the Bahamas remain one of the world's few spots where sails play a vital role in a nation's economy.

"We expect to take two weeks to 'hook' a cargo for Nassau," her captain told us, then took us in the dinghy to show us how. While his helper sculled with a long oar, he peered into the water through a glass-bottomed bucket. When he spotted a conch, he lifted it into the boat with a hook-tipped pole.

The fishermen keep their catch alive for market by punching holes in the shells and tying five conchs together. Left in the shallows, the mollusks try to wander off. But since they invariably take different directions, they only succeed in staging an aimless tug of war with one another, so they stay in place.

Exhausted "Corpse" Relives a Sea Adventure

From *Laura Mae* we gained an insight into the hard life of native sailors, but before the cruise was over we had a more dramatic example. As we prepared to leave Norman's Cay, Nassau radio station ZNS announced that a sloop had capsized during a squall near Rose Island the previous evening. The captain had been picked up, but the crewman was lost; anyone sighting the body was requested to notify the Bahamas Air-Sea Rescue Auxiliary. It was not a cheerful prospect, as Rose Island was our destination, and I thought of it when we sailed into Lower Harbour late in the afternoon to anchor.

I was below when I heard Mel and Jim speak to the occupants of an approaching dinghy. I heard a phrase about "de mon lost from de boat" and expected the worst. Suddenly Mel stuck his head down the companionway. "Come up, skipper," he exclaimed with a grin. "*Finisterre* is being boarded by a ghost!"

Sitting in the cockpit with the islanders who had rowed him out, we heard the story from the "lost" crewman. He wanted us to report by radiotelephone that he was alive, though dilated eyes and disjointed speech showed he was still in shock. I wrote down just what he told us:

"I see a squall comin', and I yell, 'Get down de mains',"



REDACHROME (UPPER) BY MELVILLE HILL BRADYENOR,
ESTACHROME (LOWER) BY JAMES L. STANFIELD, BLACK STAR © N.A.S.





but de next mon didn't do nuttin'. I say, 'Tie loose de dinghy,' but it too late. De wind hit and de smack turn over, and de dinghy sink, too. I take off all my clothes and I swim mor'n two hours. I ain't see no shark, so I lucky. I stay on de beach all night, cold, an' today I walk till I find a house. De people dere give me some clothes, and here I is."

Back in Nassau, Bahamian yachtsman Kenneth Albury came aboard to replace Mel Grosvenor, whose duties awaited in Washington. After a month of fresh easterly winds, I expected a downhill slide to Bimini. But the breeze swung west, giving us a slow passage across the Great Bahama Bank back to Gun Cay Cut, our point of entry.

Bimini is a place wholly dedicated to fish and fishing. Tides rich in food swirl through passages between adjoining rocky cays. On one side of the narrow chain of islets, the

Yanked from his chair by 360 pounds of hooked fury, Dr. Curtis Mendelson battles a bluefin during the International Tuna Match off Bimini last May. Fisheye-lens view from the stern of the Bahamian team's boat reveals at left an even larger bluefin—609 pounds—taken earlier by Robert Symonette, at right on bridge deck. Acrobatic dolphin (below) stands on its head in a valiant battle to throw a hook. In life the fish blazes with iridescent color. When decked, it fades quickly to the blues and grays of death.



ENTRICHROME (ABOVE) AND AQUACHROME BY JAMES L. STANTFIELD, BLACK STAR © N.S.S.



Call of the sea sings a siren song to swimmers and sailors in the Bahamas. On a lonely Bimini beach, a water sprite skips to rippling surf. Tangerine sunset transfixes

Gulf Stream forms a highway for giant pelagic predators; on the other, sandy flats and mangrove thickets shelter smaller varieties.

Since my first visit in 1932, marinas have grown along the single waterfront street. We found them crowded with boats built for the single purpose of pursuing salt-water game fish. Elaborate aluminum towers, equipped with steering wheels and engine controls, give skippers almost a gull's-eye view of surrounding waters. Even taller outriggers skitter bait along the surface like flying fish.

Bimini rewards the angler. Of 59 world's records set in the Bahamas, the 1966 International Game Fish Association chart listed 35 taken off Bimini and nearby Cat Cay.

"To Florida fishermen, we're a suburb of Miami," a marina operator told me. "It's only 50 miles across. A fast boat can make it on a calm day in a couple of hours."

This sport-fisherman's mecca also offers ideal conditions for scientific research. There is never a shortage of specimens, and the clear water permits direct observation. Between

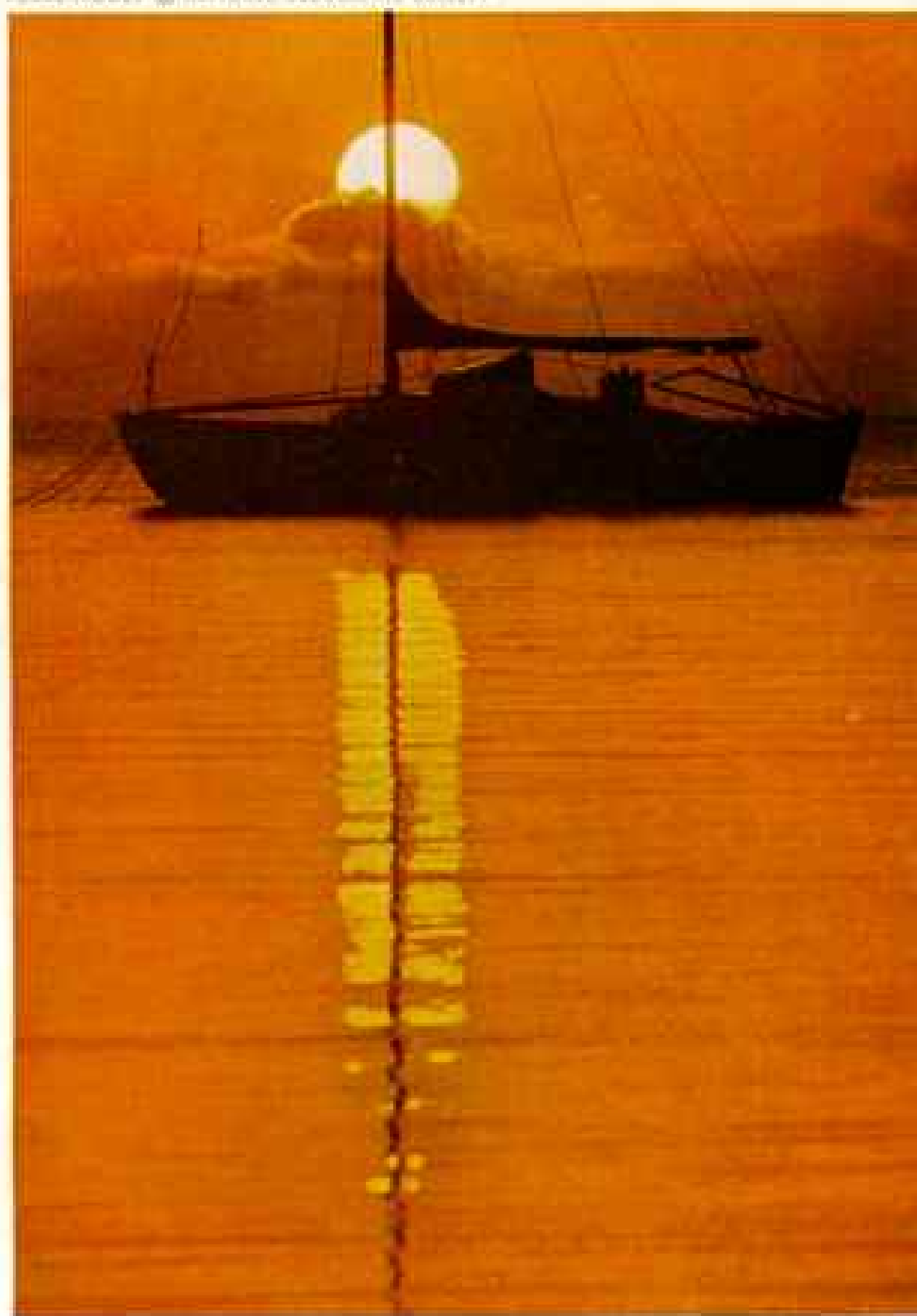
docks crowded with yachts and charter boats, wire pens hold a colorful array of local species, from triggerfish to porpoises and sharks.

After watching the morning ritual of feeding, I sought out Robert F. Mathewson, resident director of the Lerner Marine Laboratory, a field station of the American Museum of Natural History. At the time, the scientists were paying particular attention to sharks.

No More Shark Wrestling for Cordell

Recently scientists at the laboratory had taken the first shark electroencephalograms ever attempted. They embedded electrodes in the lobes of the brain to study its reaction to outside stimuli, such as food, light, and sound.

Asked how sharks were captured, Dr. Mathewson replied, "Mostly by hook and line, but occasionally Wild West rodeo style, by 'bulldogging.' If some native fishermen spot a shark cruising the shallows, they chase it with an outboard and jump on its back. Then they wrestle it into the boat." He paused and looked across his office at a man who was waiting to



a slumbering sailboat on the reflection of its mast. Despite man's encroachments, trade winds, sea, and sun preserve the islands' tranquillity and timeless pace.

be paid for sharks he had delivered. "That right, Cordell?"

"Yes, suh! But I ain't sure I'm going to do it no more! Last one I jumped, I missed his fins and grabbed his tail, and he turned around and bit me, right here!" Cordell Rolle grasped his right thigh.

Dr. Mathewson reassured me. "Fortunately, it was a small nurse shark, a bottom-feeding type with small teeth."

Laboratory experiments included electrocardiograms of other species of fish brought up from depths of 200 feet or more to study damage to heart muscles caused by gas bubbles in the blood, corresponding to the bends or caisson disease in humans. Thus the findings might benefit not only tunnel builders but men beginning the conquest of the depths from underwater villages.

The laboratory uses other Space Age techniques as well. These include a TV camera, enabling scientists to scan the sea bottom without leaving the laboratory, and a water tunnel, similar to a wind tunnel but permit-

ting them to study subjects in moving water.

Not to neglect the lighter side, I enjoyed lazy hours poolside at the Bimini Big Game Fishing Club, putting a final burnish on the tan I had acquired during the winter. Late afternoons, tall glass in hand, I sat on the veranda of the Compleat Angler. Surrounded by fading photographs of fishermen standing beside giant trophies, I relived earlier years with long-time residents who had seen the whole cycle of change on the island.

When *Finisterre* finally crossed the bar to re-enter the Gulf Stream, I remembered Ponce de León's quest for the Fountain of Youth. He had passed through the Bahamas in 1513 without finding the fabled island called Bimini, where, he believed, flowed the waters which would turn back time for the aging.

As the real Bimini dropped below the horizon, I decided that the Spanish navigator had simply misunderstood the legend. The Fountain of Youth lies everywhere in the Bahamas. It is the clear, sparkling, eternal sea itself.

THE END

Japan's "Sky People," the Vanishing Ainu

By SISTER MARY INEZ HILGER

Photographs by EIJI MIYAZAWA, Black Star

COOLNESS AND QUIET enfolded me as I walked into the room. Shadows half hid household objects alien to a Minnesota nun. Others were familiar indeed.

A wire basket full of smoked fish hung beside a television set. Prayer sticks with their curled white shavings were thrust into the floor of the stove pit. An electric light bulb dangled overhead. Prints of black-haired Oriental beauties flanked a sink where a glass tumbler held the family toothbrushes.

To the elderly couple who received me, Tsurukichi Seki and his wife Riyo, I surely looked as strange as they did to me. Fresh from the rice fields, he wore loose diaperlike pants and a shapeless brown shirt. Her slight figure was hidden in a Japanese blouse, embroidered apron, baggy bloomers, and bright rolled scarf.

My attire was that of a Benedictine nun—the white of pleated coif and band, the black of veil, the gray of woolen scapular and belted habit.

I had come here because my hosts were Ainu (pronounced eye-noo). A research grant from the National Geographic Society had made a long-time dream come true. For eight months I would study these "white" aborigines of northern Japan, a people for whom—as a distinctive culture—the fires were going out.

"Please! Sit here by the stove. It gives a good warmth—just as you, American sister, are doing as you come among our Ainu people. Our house is honored by your being here."

With these hospitable words the Sekis welcomed me to their home near Mukawa, a village on the south coast of Hokkaidō, northernmost island of the Japanese Archipelago (map, page 273).

I made myself comfortable on a pile of pillows with my stockinged feet pulled up under my habit. I could see my shoes where I had left them at the door. Simmering kettles whispered that soon there would be tea.

My host had briefly excused himself to change into neat white pants and T-shirt. He took the place proper

Time's long shadow creeps over an Ainu grandmother who sees the distinctive life of her people—aboriginal inhabitants of Japan's Hokkaidō island—drawing to a close. Lip tattooing in her youth, a custom now obsolete, helped her attract a husband. These mysterious people have long been an enigma. Whence came the Ainu—and when? Scholars have viewed their round eyes and wavy, abundant hair as evidence of Caucasoid ancestry.

Strangely, others argued for a link with Australia's aborigines.

Today, many anthropologists believe the Ainu may actually be a separate race; recent archeological discoveries suggest that they are the last survivors of a population that has lived on Hokkaidō for at least 7,000 years. Now the Ainu, who stood apart for millenniums, face complete absorption by the Japanese.

EXTACHROME © R. S. S.





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EXTONHONEY AND ASOACHROME (OPPOSITE) BY EJI MIYAZAWA, BLACK STAR © NATIONAL GEOGRAPHIC SOCIETY



Tribute to a water spirit: Rare algae native to Hokkaidō's Lake Akan receive a salute from the Ainu each October. Bearded elder in ceremonial robe displays the velvety balls, called *marimo*, before a Shinto priest, in deference to one of the principal religions of Japan. Then, in a dugout, he returns the plants to Lake Akan.

Older Ainu believe spirits live in plants, mountains, animals, fire, and water. In their rites they seek to please the good spirits and prevent evil ones from causing sickness and misfortune. They encourage public performances, such as the *marimo* festival, to perpetuate Ainu culture.

Dance of the Bow: Zenjiro Ishikawa mimics a brave bear hunter beside Lake Akan. Only "men grown strong in wisdom," as the Ainu say, wear beards and crowns. Outsiders once called them "Hairy Ainu" because they have more body hair than the Japanese.



for the man of the house, sitting cross-legged facing the door of the stove, its fire revered as sacred by the Ainu.

Hardly had we settled down when the door opened again to admit other guests. Into the sunlight flooding through the windows stepped two fine old Ainu women. Tsurukichi introduced them to me—Katanto Kaneko and Mine Honda.

Broad blue tattoos spread across their mouths like mustaches. The marks were evidence, I realized, of a passing generation. These women were full-blooded Ainu. Technically, tattooing has been illegal in Japan since the 17th century, but until about fifty years ago such laws were often ignored by people of pure Ainu strain (pages 269 and 295).

The women came forward to greet me in the accepted Ainu manner. Kneeling before me, they bowed so low their heads touched the floor. They kept uttering muted sounds—half cry, half whine—the old Ainu way of expressing heartfelt welcome.

They rose, and each stroked my face, whimpering with joy, then tested with both hands the muscles in my forearms. How old was I? Seventy-three.

"Unbelievable!" they chorused. "Why, you have the strength of a much younger woman."

We sat down around the central stove, and Riyo Seki passed cups of steaming tea.

"Oh, we are very glad you have come, Holy Woman, to put it all down on paper—to record the way we Ainu used to do things!"

Looking across the teacups at these new friends, I saw in the steady, dark eyes and wrinkled faces heights of pride and depths of sadness. Beneath the dignity I caught the message that had brought me here: A human tide soon would engulf these gentle, warm-hearted people, whose very presence in Japan presents a paradox.

In appearance and physical traits, in religion, and in many customs, the Ainu differ sharply from the Japanese who so overwhelmingly outnumber them. That the Ainu are not of Mongoloid origin is strongly indicated by a look at a full-blooded Ainu. He has round, dark-brown eyes, curling lashes, prominent eyebrows, rather long earlobes, and an abundant head of hair, often with a slight wave. His complexion is quite fair. Men have heavy beards, usually very dark; old men wear full beards and mustaches.

The Ainu language, too, is a puzzle. The oldest Ainu speak it among themselves. They also use it in prayer and when they recite the Yukar, an epic, and the Uwepekere, a group of traditional folk ballads. But younger Ainu no longer speak it, and it has no written form except as its sounds have been expressed phonetically in Japanese.

Ainu Grandparents Hold Key to Past

My special aim was to study child life, to learn how Ainu youngsters were trained one, two, or three generations ago, before "Japanization" sharply altered the pattern of their upbringing.

While recording the environment in which the children grew up, I hoped to learn much about the whole fabric of Ainu life. I would tap the knowledge and wisdom of the older generations, who in their waning years see much of their culture vanishing. I wanted to anticipate the staggering loss to ethnology that the passing of the present generation of Ainu grandparents will represent.

Japan's "Hairy Ainu" are concentrated on Hokkaidō, their traditional homeland, an island about the size of South Carolina. In addition, there were groups that lived a generation ago on Sakhalin and the Kuril Islands, now part of the Soviet Union; most of them have migrated to Hokkaidō.

The most generous estimates of the number who remain identifiable as Ainu give a total of 15,000, and of these the full-blooded Ainu are counted at 300 at most. But even some of the 300, almost all of them over 60, show Mongoloid traces, an inheritance from centuries of contact with the Japanese.

Tranquil Coast Shelters Vanishing Race

Along the south shore of Hokkaidō the pearl-gray sea murmurs softly against the pale sands. Fishermen, many of them Ainu, net salmon, sea trout, and herring here.

Most of the Ainu settlements I visited lie scattered along an arc of coast between Muroran and Cape Erimo and inland to distances of 20 or 30 miles. Today many of these aboriginal communities have shrunk to mere subdivisions of larger Japanese towns. And while some of the Ainu men work as independent farmers and fishermen, many of them seek employment under the Japanese—in town government, as cab drivers, or as factory workers.

At Tomakomai, a newsprint-making town, I set up headquarters in a business building that had one floor of hotel rooms. I needed a convenient and comfortable place to plan my visits among the Ainu, to work on notes, and to review each day's findings.

Two capable Japanese women, fluent in English, joined me as assistants and interpreters. Chiye Sano is Associate Professor of Anthropology at Nanzan University in Nagoya and holds a doctoral degree from the Catholic University of America in Washington, D. C. Midori Yamaha recently earned her master's degree in sociology from Loyola University in Chicago. Without the help of this dedicated pair, my work among the Ainu could never have been achieved.

Twenty-five miles southwest of Tomakomai lies the seaside resort town of Noboribetsu, whose hot springs attract Japanese by the thousands each summer. Here, Ainu from Nibutani, 50 miles away on the lovely Saru River, gather to demonstrate their customs and culture to visitors.

In Noboribetsu I met 40-year-old Shigeru Kayano, one of the younger full-blooded Ainu (page 278). He is a dynamic leader in the effort to salvage all the best of Ainu culture, though if you passed him on a Chicago street, you might take him for an American.

Some old Ainu resent any commercializing of their heritage. But Noboribetsu's *chisei*, a

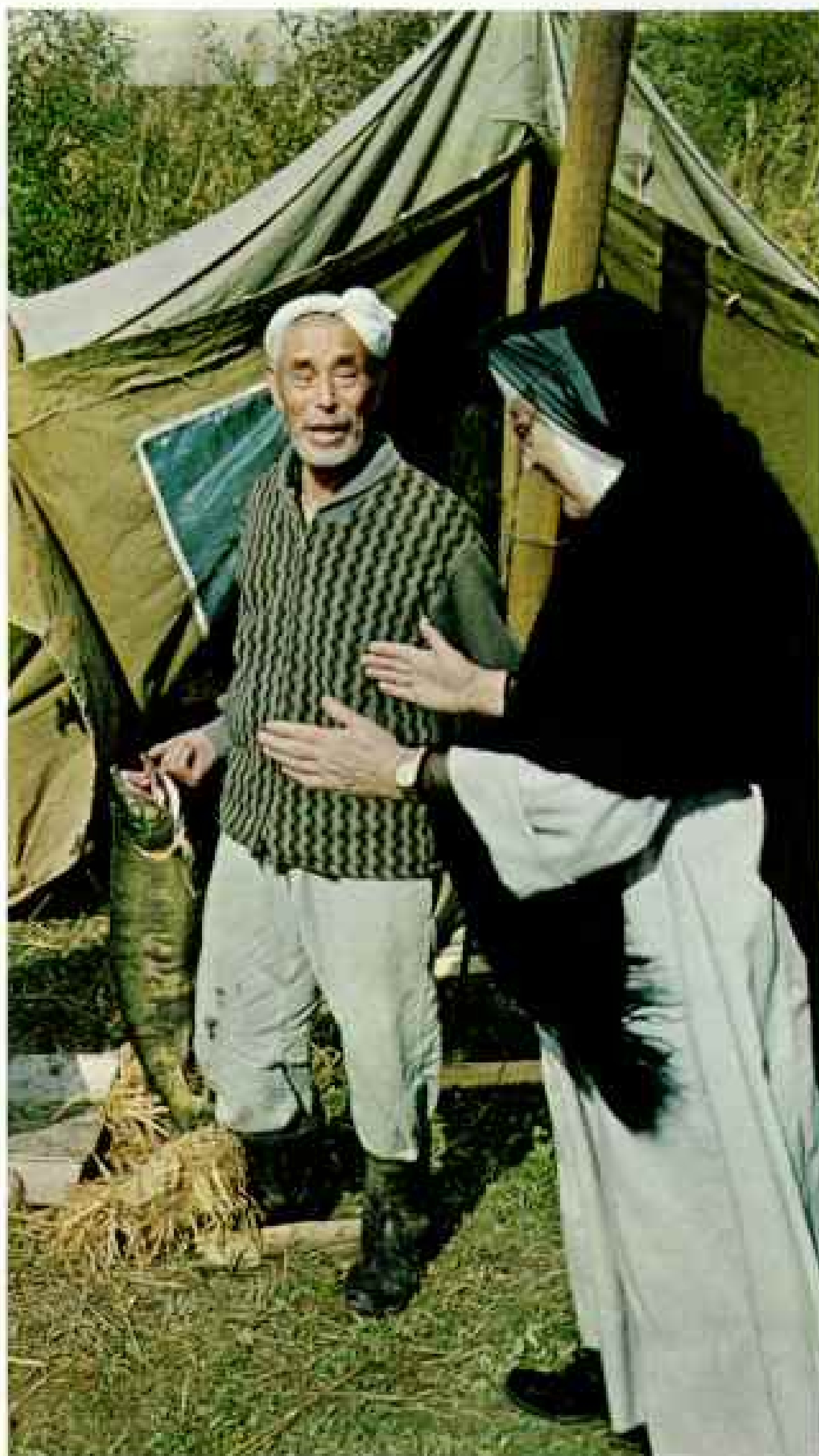


Refuge of a remnant race, Hokkaidō shelters fewer than three hundred full-blooded Ainu scattered among some five million other inhabitants. A handful of Ainu may live in Soviet-held Sakhalin and the Kuril Islands.

The Japanese spread over the archipelago centuries ago, but they shunned the cold, uncivilized north. Not until the 17th century did their traders establish themselves in Hokkaidō. In the 19th century settlers followed, and Ainu land became part of Japan. Visiting the island in 1854, members of Commodore Matthew C. Perry's expedition noted that the "Ainos... well proportioned and with intelligent features" were mainly fishermen. Today Hokkaidō's Ainu follow many lines of work.

"So big!" Distinguished ethnologist Sister Mary Inez Hilger admires an 11-pound salmon netted by 71-year-old Tsurukichi Seki. Aided by a National Geographic Society research grant, the 73-year-old Benedictine nun from St. Joseph, Minnesota, spent eight months collecting information about Ainu ways. "I sought the older people," she says, "for they still speak the Ainu tongue and live with tradition."

Learning of her project on Japanese television, the Ainu greeted her as "Learned Woman"; she holds a doctorate from the Catholic University of America in Washington, D. C., and is a Research Associate of the Smithsonian Institution. Her studies of Indian tribes of the Americas have resulted in six books; she is now at work on a seventh, about the Ainu.



PHOTOGRAPH BY ELLI WITKOPSKA, BLACK STAR © N.G.S.



traditional Ainu house, has authenticity and helps perpetuate the Ainu world that was. There one may see the old dances, and exhibitions of wood carving, rush basketry, and the weaving of *attush*, a cloth made from the inner bark of the elm.

"We try to give visitors a little knowledge of what is best and most truly characteristic about the old Ainu life," Kayano said as he showed me the *chisei*. It consists of a framework of wood covered by grass, bulrush, or bark, with an entry shed, low doorway, sacred window facing east, and single family room with packed dirt floor and open fire pit.

The *chisei* as a tourist attraction has had this beneficial effect: Ainu art is being newly appreciated. Even in Tōkyō's exclusive shops we saw Ainu designs on sofa pillows, bed-

spreads, curtains, and jewelry cases. These designs are printed on wrapping paper, on shopping bags, even on wallpaper. Native crafts provide income and revive self-expression among the Ainu, just as they do among our American Indians.

"Certain of our rites and ceremonies are too personal and sacred to be performed in public," Kayano observed. "For you, though, as a scholar," he added graciously, "we shall of course be glad to conduct them."

I place Kayano and his young friends among what I call the ardent Ainu, those dedicated few who strive to keep alive the customs and crafts of their forebears. Kayano himself is a skilled carver specializing in exquisite wood trays.

Through him I made the acquaintance of

"Wicked spirits cause illness. We must drive them away," old Ainu believe. To treat a crippled man of Nibutani, praying women tie his limbs with bulrush stems and cloth and gently beat him with branches. Then they cut away the bindings with sickles and throw them into the Saru River, shouting and scolding; thus the "evil ones" flee.

In a similar exorcism, a woman with a facial tic (below at center) receives treatment beside a good deity, a tree "well shaped and leaning to the east." An elder offers *saki*—rice wine. Friends gesture and stamp to drive out the spirit of sickness.

Contentment, a gift of old ways: The wife of Ichitaro Nitani broils fish over a sunken hearth. Her husband, whittling a skewer, told the author: "We never forget to toss a little of our food and drink on the coals for the dead and the spirits—especially the goddess of fire. Our hearth is sacred, and the duty of the wife is to see that the fire never goes out." Revered white stick, the *inau*—made of a peeled willow branch with shaved curls attached—blesses the fireplace. The elder treats it as "a messenger to the deities." Antique trade goods, heavy necklaces, and other *inau* decorate the wall.





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three charming Ainu women, Misao, 65, Ume, 76, and Toroshina, 75. The last name of all three was Kaizawa, although they were not directly related.

A fine tattoo adorned Toroshina's mouth, and I asked her about this custom.

"The Japanese thought our tattooing a cruel practice, so they forbade it," Toroshina explained. "Maybe it was, but tattooed lips meant we were marriageable. I was tattooed against my will at 17, but now I'm glad it was done. I found a husband right away."

Ume had a few words to add: "When I was the right age, I watched another girl being tattooed. It was an awful sight. Some women held her down while another made incisions around her lips. Blood was dripping down her face, and she was in agony. I hid and never was tattooed. But I got a husband anyway."

The young Ainu girl underwent tattooing,

often in three stages, between the ages of 11 and 21. First the lips were washed with a well-boiled solution of birch bark and clear water. Then grandmothers or maternal aunts began the painful pricking with a razor-sharp sliver of a knife. They wiped blood away with a cloth saturated with the hot bark broth, and into the cuts they rubbed birchwood soot from the bottom of the cooking kettle. This gave the tattoo its blue color and, coming from the sacred fire, protected the wearer from evil entering the mouth or nose.

Days of Power Now Only a Memory

For thousands of years the Ainu were powerful in Hokkaidō, and some six centuries ago their settlements extended into Sakhalin and the Kuril Islands. By then the Japanese were edging northward from Honshū.

By the 1600's trade flourished between the



Singing as they work, women lift and drop heavy pestles, pounding rice for cakes. They demonstrate the age-old technique in front of an Ainu grass house, or *chisei*, and a storehouse on stilts at Nibutani, an Ainu stronghold.

Shigeru Kayano tells the author how such re-creations awaken interest in Ainu culture. He gave her invaluable help in locating his people; Japanese census figures and records do not specify race.

Remembering ancestors, Ainu bring gifts of candy, biscuits, and saki to graves near Nibutani. Needle-eye carving marks a woman's grave; spear-shaped post a man's. Gable-roofed pole indicates Buddhist influence. When burying a relative, women tie bits of charcoal to grave poles for light, so the departed soul can see the way as it seeks relatives in another world. There, Ainu believe, the dead live much as they did on earth.



Ainu and people in the southern islands of Japan as well as with those living on Sakhalin and the mainland of Asia (map, page 273). The Ainu bartered their furs for brocades and beads from the mainland. From the Japanese they obtained the rice wine called saki and lacquered storage boxes. We saw these boxes in many Ainu homes, where they are still cherished (page 286).

Trade that began as exchange ended in outright exploitation of the Ainu. They became vassals to the feudal landlords of the Japanese Matsumae clan. Finally the Japanese Government asserted its authority over Hokkaidō in the 19th century, breaking the power of the Matsumaes.

In 1899 Japan's new Hokkaidō Natives Protection law provided the Ainu with land and tools for farming. It also assured all Ainu children an education, but they remained

segregated from Japanese students until 1937.

At summer's close we followed our Noboribetsu friends to their homes in Nibutani. Its friendly houses provided a natural focal point for our work.

Of 101 families in the Nibutani area, 80 are of Ainu blood. A little wistfully, Shigeru Kayano explained that today not one Ainu family lives in a traditional Ainu house. But the Ainu fare much better in modern houses than in cold, grass-walled huts. Virtually every Ainu community I saw looked much like any Japanese town.

Houses are durably built of wood, usually unpainted. Corrugated tin or asbestos shingle covers the roofs. Most homes have radios, TV sets, and running water (pages 284-5). Many dwellings contain small Shinto shrines, reflecting the readiness of younger Ainu to adopt Japanese ways.

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The Ainu are a deeply religious people, and the universal sacred object is the *inau* (pronounced ee-now), or prayer stick. Sometimes prayers seem to be directed to the inau itself; at other times it apparently is a "messenger" between suppliant and deity.

Only men make the inau. One day at Nibutani I sat down to watch Kashiko Kaizawa fashion one. From a stem of willow he removed the outer bark with his thumbnail. Then with a small knife he expertly shaved surface layers of the wood so that they came up in curls; he left the paper-thin, spiral streamers attached to the stick. This inau was about two feet long; some are longer and some shorter. Sometimes the carver cuts two or even three rings of shavings.

The inau that Kashiko whittled that morning was a special one to honor the goddess of fire. He made a transverse cut in the middle of the stick to indicate a mouth, then a vertical slash in the same spot, into which—to represent the heart—he wedged a piece of charcoal from the fire.

While old Matsuji Kaizawa recited prayers, Kashiko reverently stuck the inau into the earth floor of the fire pit.

Cherished pet, a bear cub models for wood carver Toyoji Teshi at the Ainu village, or *kotan*, by Lake Akan. Traditional sources of food and clothing—and intermediaries to the spirit world—bears are a favorite subject for carvings.

Japanese sign identifies the stand as "Liaison Office, Ainu Association." Mr. Teshi organized fellow tribesmen to improve their livelihood. They moved to Akan to sell handicrafts and entertain the thousands of visitors flocking each summer to Akan National Park.

Dress alike don't make look alike. Japanese girl at right dons the Ainu's ceremonial robe, headband, and necklace, but her face shows racial characteristics different from those of her companion, a girl of Ainu blood. Carvings by Indians of northwestern North America inspired the totem pole.

I found the inau in almost every home, evidently as meaningful a symbol to the Ainu as the cross is to the Christian. Favored places for inau, apart from positions near stoves and fire pits (page 276), were in the corners on each side of the entrance.

Sacrifice of Bear Expressed Gratitude

Like other primitive religions, the Ainu's is locked in conservatism, and its rituals are largely petitions for favors or for placation of natural forces. Many of its tenets are colored by superstition. The old Ainu saw spiritual beings called *kamui* in many things: fire, water, plains, mountains, trees, seas, and animals.

With a festival known as *iomande*, the Ainu honored the *kamui*, or spirit, of the bear. When the animals awoke from their winter's sleep, the men went to the forest and captured a cub. Taken to the village, the captive

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was cared for by the women until it was two years old.

Then the bear was ready to be sacrificed at a festival, which included prayer, dancing, and feasting. Archers first excited the bear by bombarding him with blunt arrows; then they slew him with a special arrow or knife. Finally the men throttled the dead beast between two logs.

By sending the bear's spirit back to its ancestors, the Ainu showed their appreciation for the creature. They believed the gods provided the bear expressly to feed and clothe them (opposite). The Japanese Government considered the ceremony a cruel one and

many years ago made such killings unlawful.

Mainstay of the Ainu diet in ages past, the bear is still prized for meat and for the supposed medicinal value of the dried liver and gall bladder. Fewer than 3,000 remain in Hokkaidō, but a bear farm beside the Ainu village near Noboribetsu held 46 captive bears at the time of my visit. Once 16 escaped and several had to be shot—producing an unexpected feast for Kayano and his dancers!

Ainu God Forgets His Chopsticks

"The true Ainu looks upon no single god as ruler of the world," Kayano told me. "Some people confuse Kotan-kara-kamui as such a being. But Kotan-kara-kamui represents the total world as it is viewed by the Ainu. His spiritual embodiment came down to Hokkaidō from the skies, established the land of the Ainu, and then went back to the heavens.

"On the return trip," Kayano continued, "he looked back and noticed that he had left his chopsticks behind. This would never do—they would rot! So he changed them into willow trees, and the Ainu have preferred willows for their inau ever since."

We often joined with Ainu families or with groups of neighbors at their prayers, which are suited to the occasion and often quite impromptu. No longer are prayer gatherings as formalized as they used to be, when the head of the house assigned a particular god to each guest. One would pray to the bear, another to fire, others to the house and mountains, and so on. A predominant plea was, and still is, for the health of children.

On one occasion at Ni-butani I observed that the presiding elder, old Matsuji Kaizawa, still kept

(Continued on page 287)





Most Honorable Bear

SINCE OLDEN DAYS, AINU have respected the bear above all other animals. In their legends, the spirits of bears are credited with rescuing the race by taking physical form to provide food during a devastating famine. The AINU formerly gave thanks in a sacred ceremony called *iomande*.

Leading villagers paraded a bear raised from a cub, praying for good health and good hunting. Then they harried the animal with blunt arrows and finally sacrificed it. The body rested in state between swords and sacred inau as elders presented a bowl of cakes and cups of saki, dispatching the bear's spirit to its homeland. A Japanese artist, depicting the hairy bodies of the AINU, painted the ceremony as it was practiced in the 19th century. Authorities now forbid it because of its cruelty.

Ainu still hunt the bear, eating its meat, drying its gall bladder and liver for medicine, and selling its skin. Farmer Suekichi Torao (opposite) bagged five bears in one year. And belief in bear spirits lingers. The fearsome skull at right, stuffed with shavings and held in a forked stick, forms part of a simple altar in Nibutani.



Television and pinups, chopsticks and clotheslines: Home of a younger-generation Ainu family near Mukawa resembles that of any Japanese farmer. For the evening meal, the widowed mother (center) washed fish at the tile sink, cooked it on the wood-burning stove, and now serves it with grated radish, steaming soup, rice, and tea. Tattoos on



the grandmother's hands and face follow Ainu tradition; her parents ignored Japanese laws prohibiting the practice. This family's teen-agers left the room rather than be associated with the study of the Ainu. One grandmother commented, "We old people try to carry on as before, without getting in the way of our children and grandchildren."

EXPLORING BY THE WYAZAMA, ELDER STAR © NATIONAL GEOGRAPHIC SOCIETY





Bear carving on his crown, an elder welcomes the author to Nibutani in a formal ceremony, Matsuji Kaizawa dips the tip of his carved stick into the saki cup and offers a few drops to the inau before him. Placing the stick across the cup, he drinks and prays. "We perform this ceremony in good faith. We do not slight the spirits. Our old customs die, so we are happy to have the Learned Woman with us to record them." Saki stick keeps whiskers out of the drink, so Japanese called it a mustache lifter. Everywhere she traveled, Sister Inez found the AINU "warmhearted and uninhibited."

Mother-of-pearl inlay decorates a three-layered bowl that came to AINU country in trade with the Japanese generations ago.



Bowing low—even as they do today in greeting and farewell—two bearded AINU approach a Japanese overlord surrounded by retainers. A woodblock print records the palace reception near Hakodate in 1751. The AINU, bringing gifts of furs and salmon, will dine on fish, sweet cakes, and saki. Although the AINU then held all of Hokkaidō, a powerful Japanese clan, the Matsumae, controlled fishing and trading, and exacted high tribute.



pretty tight control of the group, although each person chose words to his liking. At intervals, Matsuji stroked his beard, waved his open hands heavenward, rubbed them together, raised a bowl of saki, dipped his wooden mustache lifter into the bowl, and sprinkled the fireplace inau with the wine. Then he took a sip. His lifter, or libation stick, elegantly carved in a shape like an oversize letter opener, kept the ends of his sweeping mustache from drooping into the saki as he drank (opposite).

Three times the elder sprinkled a few drops in the fire and lifted the bowl high to drink of it. The bowl passed around to permit each person to drink.

Prayers played an important part in Ainu life. One morning, as I strolled with 78-year-old Yoso Kimura beside the Saru River, I asked her to tell me about them. She said a prayer to the river god would go something like this: "Human life could not exist without the river. So we thank you, river, for your favors, and beg of you that this year the salmon will run thick in the streams."

For the bear festival, Yoso said, the supplication might follow this pattern: "Oh, bear! You are good to humans. You give your fur for our bedding and our coats. You give us meat to eat. We shall perform some dances in your honor. Then we shall send you back to your own country in the sky with many gifts for your fellow bears."

From fields and forests, the early Ainu derived potions and antidotes for almost every ailment. Many remain in use today.

In Noboribetsu, I watched Misao Kaizawa drying herbs hung on a line above her stove.

"To cure our children of stomach-ache, we blend two plants: sweet flag and celandine. It works so well we call it 'doctor killer.'

"To check a cold early, eat soup made of deer and bear bones. But if the cold has set in, it's best to inhale the steam from boiled mint."

Malignant spirits caused sickness, accidents, broken limbs, house burnings, drownings. When a man drowned at sea, all Ainu men in his village marched in single file along the beach with swords in their hands.

"Ya, ho! Ya, ho!" they cried. Thrusting with swords and shouting vehemently, they menaced the evil spirit that had drowned the man.

Elaborate rituals have long been used to exorcise the evil spirits that cause neuralgia, rheumatism, facial tics, and convulsions. In some places these ceremonies, attractive simply as costumed pageantry, have been abandoned for fear of ridicule.

Animal Skulls Enshrined at Altar

In Nibutani a woman with a facial tic was to receive treatment. Kayano encouraged us to record this exorcism, since it was one of those considered so sacred that it would never be performed for outsiders. In a generation or two it might be forgotten.

An *ekashi*, or elder, always leads, and at this ritual Matsuji Kaizawa presided in handsome robes. He wore a crown of woven strips of bark with a small carved bear head at the front. His long white beard accentuated his great dignity of bearing and gesture.

Four attendant women and another man helped Matsuji. First there were prayers before the outdoor altar near Matsuji's house. A row of forked poles formed the altar, and from the forks stared out vacantly the enshrined skulls of bear, deer, fox, squirrel; their departed spirits are much honored by the Ainu as messengers to the other world.

The little procession then walked solemnly





to a shapely nara tree. I watched the old man unsheath his long sword and stomp six times around the tree, thrusting and slashing toward it as if he were cutting down the invisible being who had caused the tic. All except the sick woman prayed constantly and moved their feet in unison to the slow, rhythmic sound of unintelligible mumblings (page 275).

Matsuji placed short crotched sticks in the corners of the woman's mouth. With deft knife strokes the female assistants sliced through bands of bark placed previously around the subject's neck. Then they beat her gently with leafy branches to drive out the wicked spirit.

Whether this colorful ceremony effected a cure, I do not know: I did not see the patient again. When I asked Kayano if the ardent Ainu—and only these would undergo such a treatment—regularly patronize the trained town doctors, he said that they did.

"Do they try their own ritual cures before or after visits to the doctor?"

"Both. If one fails, they try the other."

One day I strolled in a seaside Ainu village—or *kotan*—near Shiraoi, between Tomakomai and Noboribetsu. As I passed a shop, I was greeted by its owner, Takeichi Moritake, a kindly elder of the old school. He had



ENTACHEUREY BY ELO WILHELM, BLACK STAR © N.S.

Twang of a *mukkuri* gives the beat as 78-year-old Kisa Shitakawara plays an Ainu instrument similar to a jew's-harp. Thread blurs as her hand jerks it to vibrate the bamboo reed. Her tune recalls hunters stalking a bear. With no written language, Ainu transmit their history and teachings in song and story. The author recorded epic poems, chants, lullabies, and tongue twisters. Sometimes the good-natured performers broke into laughter during a demonstration. Scroll-and-bracket designs, embroidered in chain stitch, decorate many Ainu ceremonial robes.

recognized me from the publicity that preceded my visit. The old gentleman had published a book of poems in Japanese, and now he wrote a special one for me:

*An aftermath of typhoon—clouds moving fast.
A cool breeze across the big lake
Gives one a chill toward the evening
When a religious woman visits me.
Her card says Benedictine Sister.
She's here to inquire
Into the ways and customs
Of old among the Ainu. . . .*

Moritake has a profound knowledge of things Ainu, and I asked him to tell me about his people's belief in life after death.

"All Ainu go to another world where they live much as they did here on earth," he replied. "The world after death is a world of souls. The body of the deceased is an empty shell, so we Ainu say, 'Toss it away!'"

"When we old Ainu eat or drink, we always share a little with the dead. We say, 'This is for them,' and then we throw it into the fire. After that we eat the remainder. When we drink saki, we throw a few drops toward the stove, saying, 'This is for the dead.'"

Ainu never mention their dead by name. Instead, a mother speaks of a deceased child as "my youngest," "my oldest," "my second born."

On the death of a married woman, her house and all its contents were formerly burned to the ground. The Ainu reasoned that in the other world she would need a home. Nowadays a very small house is built and burned.

The Ainu have come to revere their old cemeteries. Kayano took us one day to visit the one near Nibutani where his father and others of his family lie buried.

"But we cannot go there empty-handed," said Kayano. "We must offer food and saki to the dead."

So we stopped at a country store to buy sweet cakes, candies, and a bottle of saki.

From the road a hillside path led through scrub bamboo and tall grass high above the Saru River. Tree branches obstructed our view. I lost my footing and started sliding. One of my assistants helped me back up to the slippery path.

Soon we reached the grave markers—slabs or posts of weather-beaten wood. Those for men had spearlike tops, while the women's were pierced with an eye, like that of a needle (page 279).

Kayano strewed candy and biscuits on the graves of his relatives, and poured saki over the markers. He asked us to do the same. Then he scattered the rest of the sweets and liquor at random across the cemetery for all the others buried there.

Turning back to the world of the living, we took a two-hour train ride to Shizunai, which the Ainu once called Shimbu-Chari or "a place where people fish early in the morning." Father Donald J. Vittengl, an American Maryknoll missionary, met us at the station, and we piled into his truck to jolt along to the seashore.



Daydreams grow like dandelions on a summer day for the 13-year-old son of Shigeru Kayano. Like other teen-agers in Japan, he wants to reach 16 quickly so he can qualify for a motor-bike license.

Little boat sailing a sea of air lulls a baby to sleep. Interested in child training, the author asked this elder what Ainu attribute he would most like the youngster to have. He answered, "Faith in the Ainu way."

We found Ainu women and a few men out in the shallow sea filling sacks with sea urchins. Families scattered along the shore cracked open these spiny little creatures with stone or hammer and with forefingers scooped out a jellylike orange substance which they popped into their mouths.

Another day on the same beach, other Ainu harvested tangles, a well-named ropy seaweed used to flavor soups and make relish. The green-black strands, six to eight feet long, were pulled from the sea early in the morning and laid out to dry on the pebble-strewn beach or on straw mats. When dried, they were cut into three-foot lengths and sorted for quality before being sold.

The Ainu must exploit every source of food, for Hokkaidō, its protected wilds notwithstanding, no longer abounds in game.

One fine old Ainu man, who showed me a calling card identifying him as a "former chief," told us how he longed for past plenty.

"Life was so easy in those days," he said. "There was always so much to eat. If I was hungry, I went up into those hills over there and shot a deer or rabbit or raccoon. Then there was meat for everyone, all we could eat.

"Now the Japanese are everywhere, and our animals are gone. Our young people leave us for city jobs. Not enough hands are left to work our fields. It can happen that we go hungry. In days past we were never hungry."

Back in Tomakomai for a few days, I received an intriguing telephone call.

"Are you Hilger-San—the holy lady from America here to learn about the Ainu?"

The voice was that of a Japanese man. I asked if I might help him.





EXTRACHROME LABOVET AND ROUBCHROMEL © NATIONAL GEOGRAPHIC SOCIETY

"Ah, no," he replied. "But I can help *you*. I know where the Ainu came from!"

This was extraordinary news, for to my knowledge, nobody knows exactly where the Ainu came from—or when. Their striking but superficial resemblance to Europeans—round eyes, wavy hair, and fair skin—have suggested to many a Caucasoid origin, and anthropologists in the past have speculated that the ancestors of the Ainu came to Japan from the northwest, through Siberia. Other scientists have tried to relate the Ainu to Australia's aborigines, suggesting that Ainu forebears migrated from the south.

There is another possibility that challenges scholars: Were the Ainu descendants of the prehistoric people of northeastern Hokkaidō who over thousands of years left archeological remains distinctly different from those in

the rest of Japan? Perhaps my Ainu friends are the last of a separate race who have made Hokkaidō their home for 7,000 years.

There are so many theories; yet the mystery of the Ainu remains veiled in the mists of time. But here on the telephone was a man with the answer. I invited him to tea, and soon a genial young Japanese was sitting beside me.

Flying Saucers No Puzzle to Guest

"You have come just in time," said my guest. "The end of the Ainu is at hand. But I can tell you of their beginning.

"They came from the skies," Tsutomu Kuwada declared. "Yes, from the skies! Their ancestors were space people—the same who still live in the clouds and send those flying saucers to earth."

In the course of my fieldwork I was to learn

that many an Ainu elder believes in this legend of the Ainu's origin in space. On a hill in the Saru River valley, in fact, a monument marks the spot where the first Ainu are supposed to have come to earth.

Crane's Flight Inspires a Dance

One of our jaunts farthest afield took us to scenic Akan National Park in the wilds of eastern Hokkaidō. An Ainu kotan stands beside Lake Akan, a glorious sheet of blue water framed by mountains, one of them a volcano puffing peacefully like a reclining giant.

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Close to the beach here, Toyoji Teshi, the Ainu leader of the kotan, staged for us the colorful dances that draw travelers to Akan from afar. In the Crane Dance the handsomely costumed girls flapped bright capes lifted over heads and arms to imitate flying birds. For the Trembling Pine Tree Dance, the girls violently flung their hair backward and forward. In the Bow Dance, bearded Zenjiro Ishikawa strutted through a stylized hunting pantomime (page 271).

Reticence on the part of parents hampered me a little in certain areas of my child study.



Still, I learned a great deal about Ainu traditions of child raising from the grandparents. The new generation are not really Ainu children at all.

I observed that Ainu children, mixing with Japanese at school and play, betray no awareness that they are any different. It embarrasses them to talk about the customs of former times or to participate in Ainu ceremonies. The elderly folk perforce acquiesce and try to carry on as their hearts dictate "without getting in the way of the younger generation," as I heard it stated.

In a small place called Higashi-Shizunai I met an outstanding Ainu, Taro Sasaki, who breeds race horses on his Sasaki Horse Pastures (following pages). A full-blooded Ainu 62 years old, he proved to be one of our most helpful informants. He voiced staunch pride in his ancestry and the customs of his people.

"This little boy," and he pointed to his two-year-old grandson, "is the tenth generation of Ainu in this valley."

As we sat around the stove in Sasaki's home, our host started talking about children, for he had read in the newspaper of my research.



KODACHROME © N.S.S.

Farm boy forsakes his chores to try out homemade stilts and make himself tall as a man. White radishes, some two feet long, dry in the sun. Pickled and stored until winter, they take the place of fresh vegetables.

Neighbors share the work at harvesttime near Shizunai. Side by side, Ainu and Japanese thresh rice in a farmyard. Tattooed Ainu feeds sheaves into the threshing machine while a man at right holds a bag filling with grain. Only quick-maturing, frost-resistant rice grows during Hokkaido's short season.

"Ainu child training has always been based on preparing for a useful adulthood," Sasaki said. "Now, as in former times, quick movement, alertness, and promptitude are the most important attributes for an Ainu boy. If he possesses these, he will be a good hunter and fisherman.

Games Give Training for Grown-up Tasks

"In general, play life for the Ainu child helps teach adult skills. I used small bows and arrows and spears when I was only three years old and soon handled full-size ones effectively. Fathers hunting or fishing kept their boys close to them so they could learn by watching and imitating.

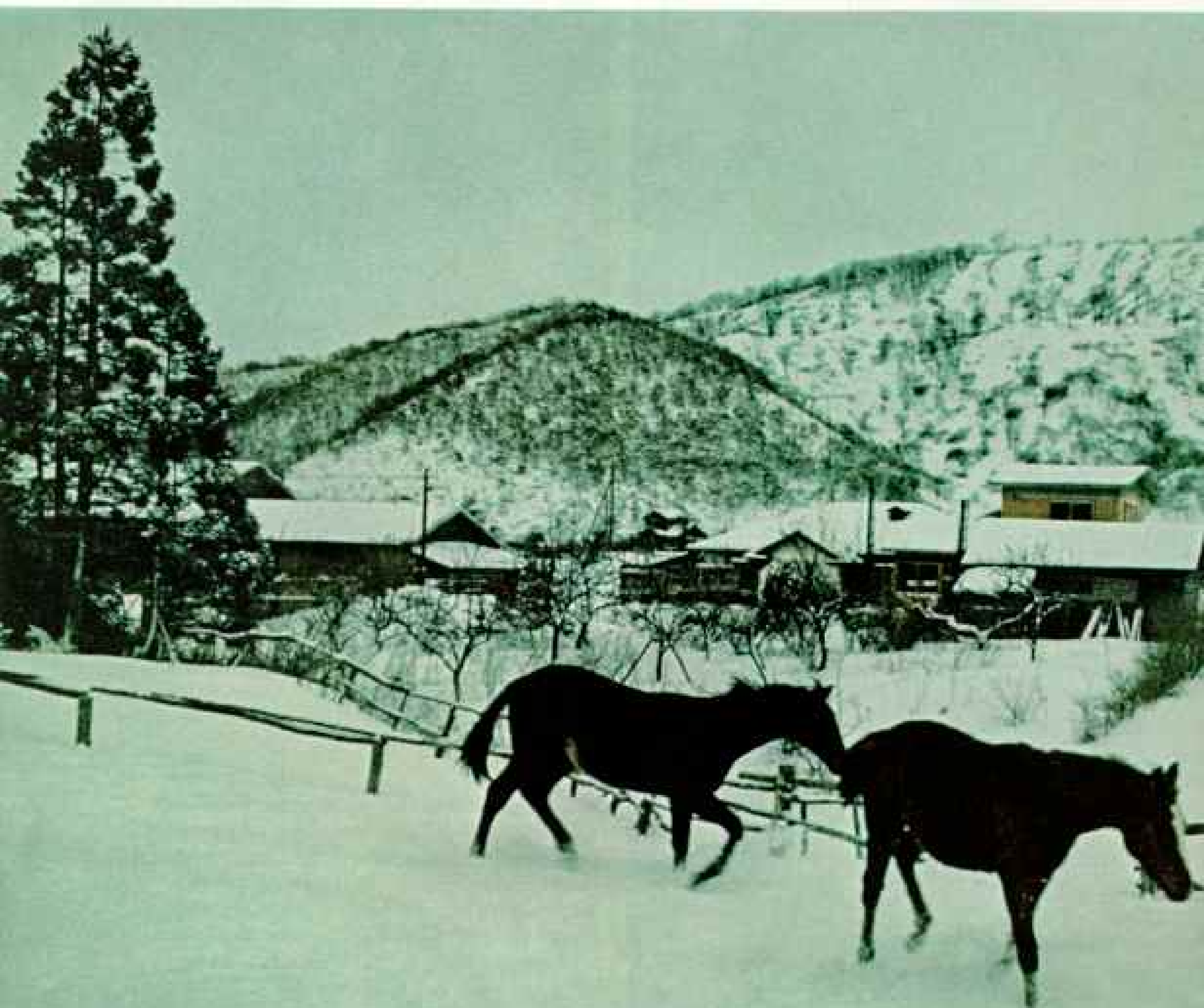
"A child must be disciplined but he needs affection, too," Sasaki continued. "But a boy or girl should never be kissed by a bad person, for badness like sickness can be contagious."

As with boys, the training of young Ainu girls emphasizes both craftsmanship and character. The Ainu mother and grandmother take very seriously their duty of teaching girls weaving, sewing, embroidery, and cooking.

Early training is reflected in the superb needlework of older Ainu women. We saw ample evidence of this in the handsome apparel they stitch for themselves and their men (page 288).

Gulf between generations widens as more Ainu marry Japanese. A full-blooded Ainu grandmother watches over the two-year-old daughter of an Ainu and his Japanese wife. The old woman likes her tattoo—the only one in her valley—but is glad girls no longer need endure painful tattooing operations.

Running free, thoroughbreds ruffle new snow at the Sasaki Horse Pastures in Higashi-Shizunai. Frisky collie guards them. Prosperous Ainu rancher Taro Sasaki raises sleek race horses for Japanese tracks. Frame buildings, common in rural Hokkaidō, suggest a Dakota spread. Deep snow and sudden windstorms make winter life precarious but beautiful.





Ainu robes, trousers, coats, and aprons are richly embroidered and decorated with appliqué work. Patterns are bold, colors striking.

"But in our day more than use of hands was taught," my dear friend Mine Honda had once told me. "Those who were to be future wives and mothers were shown the way to being kind of heart."

Before leaving Hokkaidō, we paid a final visit to Mukawa to bid our old friends there farewell. Tsurukichi Seki prompted his wife Riyo to recite some of the Yukar, the Ainu epic in lyric form that is both poetry and song.

The Yukar—its name means "to imitate"—draws its themes from the mystical interplay between the Ainu and the natural world about him. It tells of the human frailties and foibles of birds and animals as they played the parts of manlike gods.

"No one knows all of the Yukar," Riyo said. "It doesn't seem likely, in fact, that anyone ever could have known it all."

We moved closer to the fire, and Riyo recited in Ainu a good forty minutes of the Yukar. I was fascinated, watching the fluidity of her expressions as the mood of the poem changed. She sang certain portions and played other parts in dialogue.

Some passages she spoke angrily, some she whispered, some had a joyous lilt, and others were delivered in subdued singsong. She closed her eyes, looked skyward, then gazed off into imagined distances. At the end Riyo explained to us that she had rendered the Kamui Yukar, a legend about the god of the bears who was sent to this earth.

"The Yukar is recited only by those who know it well and who have the voice for it," Riyo added. "Evening is the best time, with the children a part of the family group."

The Ainu child, I found, is molded con-

siderably in his home life by Ainu tradition. But in his community life he is Japanese.

Responsive and outgoing, the Ainu are a joy to work with. Their faces light up and their expressions switch quickly with their moods. Comfortable in their loose clothes, sipping tea and saki, they relax among themselves or with friends, talking freely.

When I left Japan, I took home with me a small mountain of material—hundreds of pages of notes, for one thing, recording every available detail of Ainu life that I observed.

I am now in the throes of interpreting hours of tape recordings of songs, folk tales, legends, the minutiae of rituals and recollections, much of it in three languages—the original Ainu and the Japanese and English translations.

Our able photographic collaborators, Eiji Miyazawa, who has illustrated this article so superbly, and movie cameraman Goro Tsuda, produced an extraordinary film documentation of Ainu personalities and folkways.

When the time came to take leave of our first

hosts, the Sekis, several of their friends appeared—Katanto Kaneko, Mine Honda, and Ume Abe, two of them with their husbands.

"We must bid you farewell in the Ainu way," said Riyo.

The men raised and lowered their hands and bowed. The women uttered mournful whining sounds.

Riyo crossed her forearms, taking each of my hands with the corresponding one of hers. She shook my hands gently and lovingly, her eyes moist.

"Thank you for your visits with us," she said. "We shall never meet again, but we shall never forget you."

Each of us bowed to all the others.



Bright face to the future, a fifth-grader practices Japanese calligraphy at Nibutani. Unlike most children of this vanishing people, she has learned from her family to feel special pride in her Ainu heritage.



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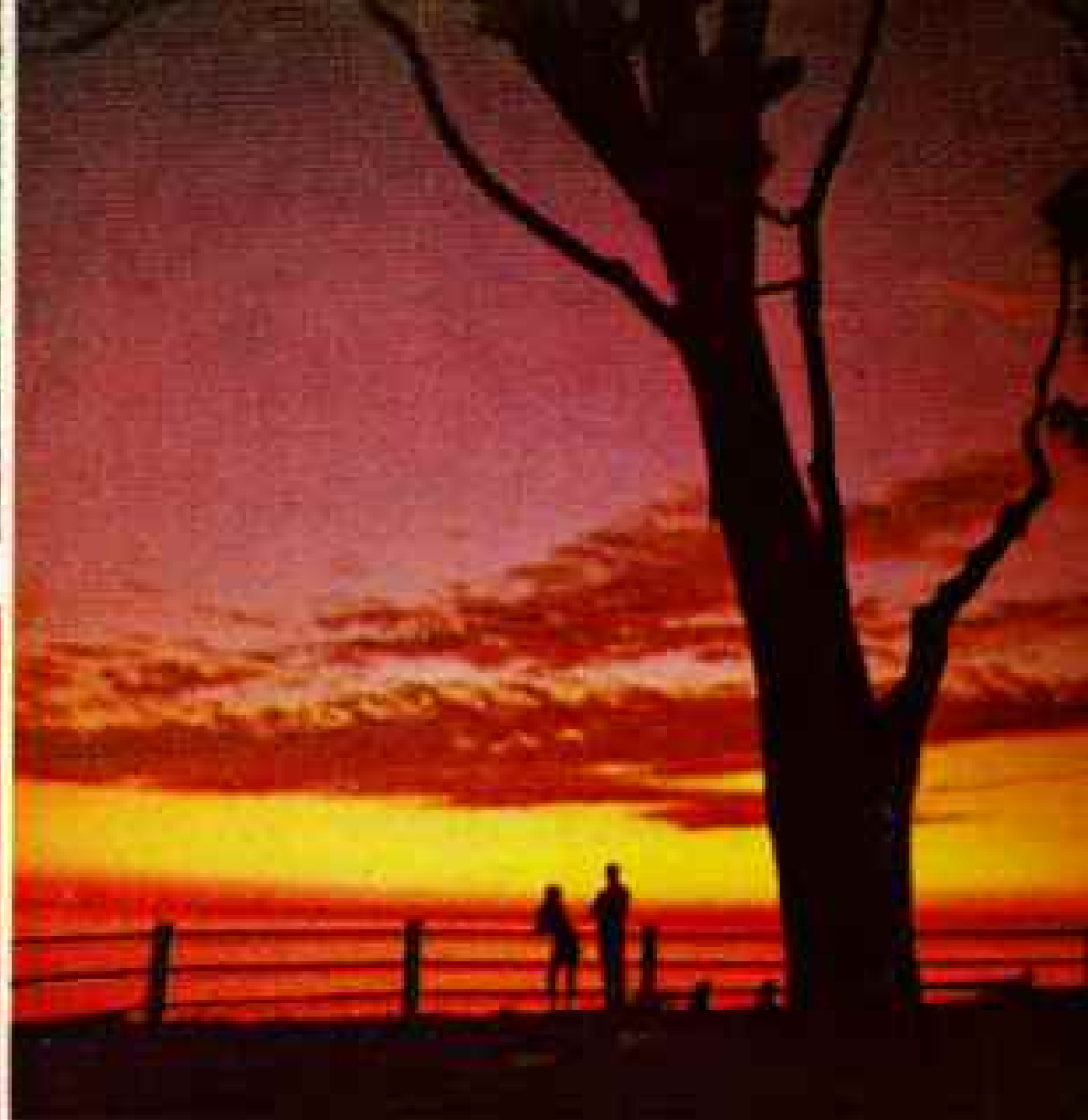
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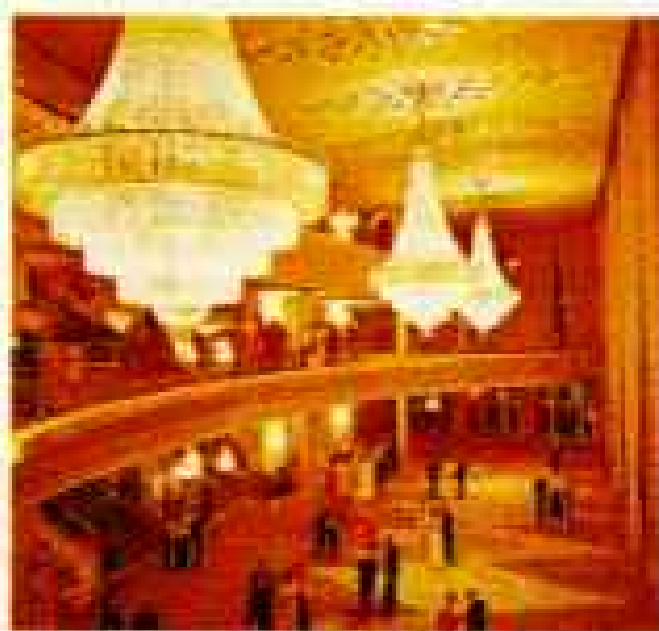
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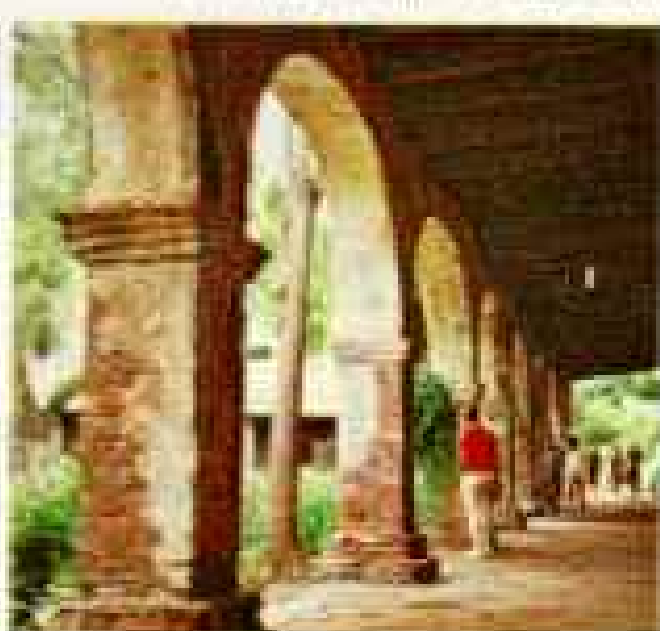
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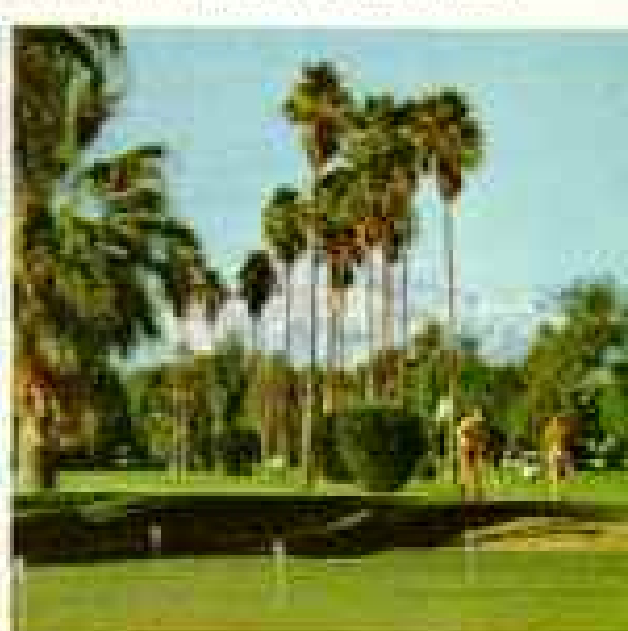
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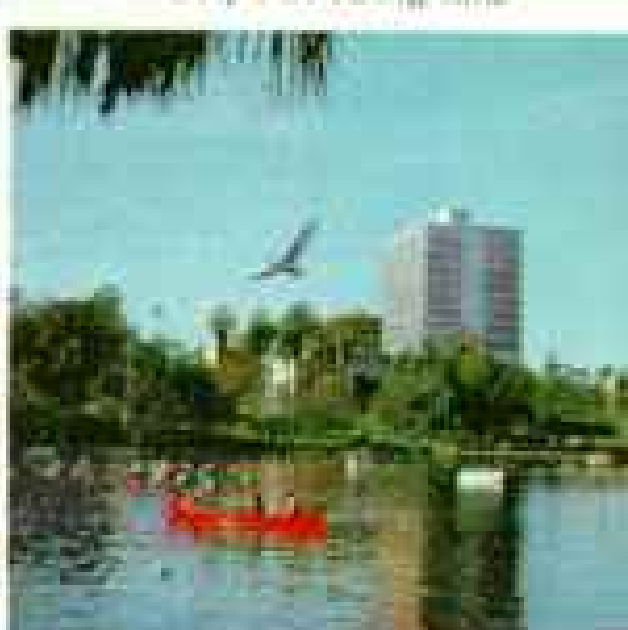
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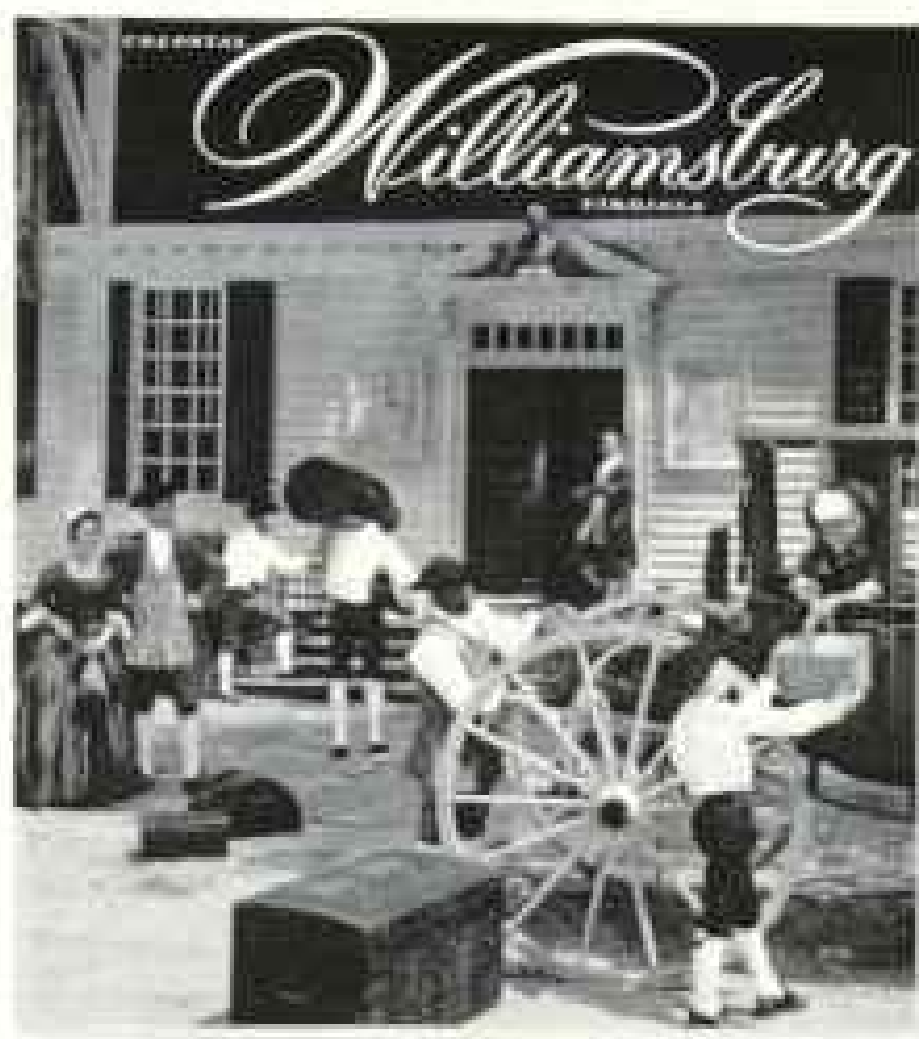
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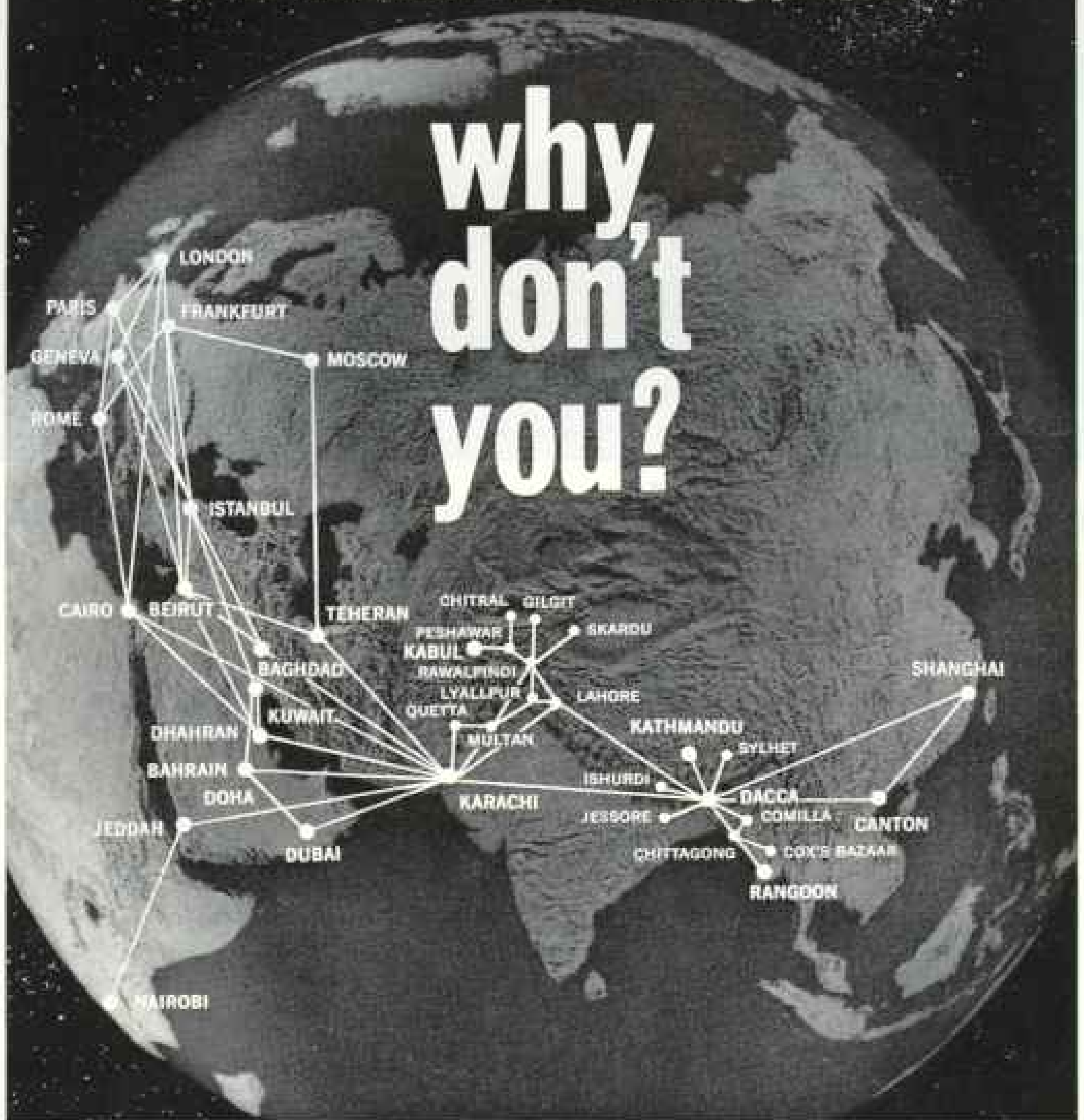
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