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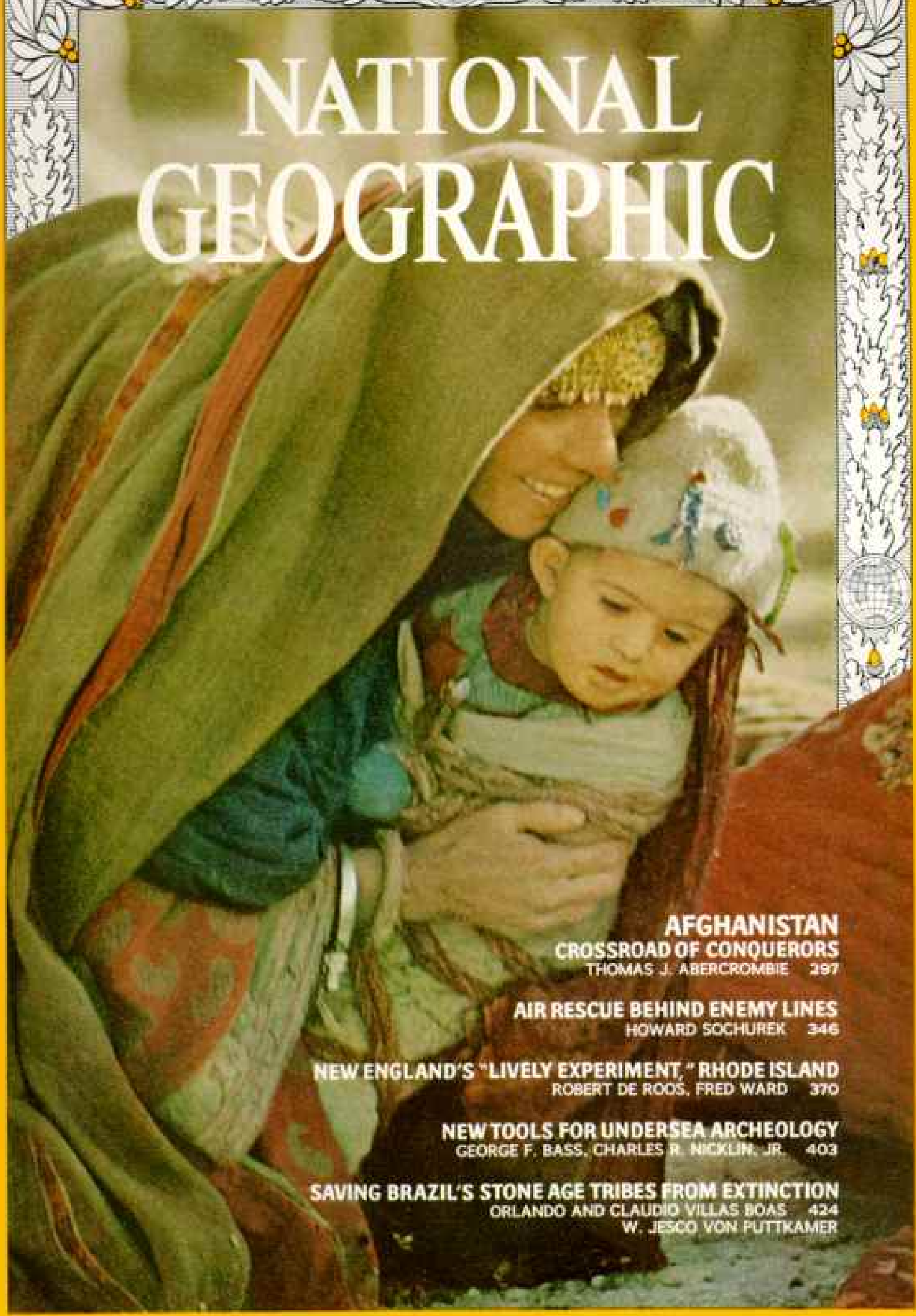

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Afghanistan

CROSSROAD OF CONQUERORS

Article and photographs by THOMAS J. ABERCROMBIE
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A DOZEN BOLD AFGHAN STALLIONS, lashed to frenzy, collided in combat around the headless goat sprawled in the dust. These were fighting horses, giants 17 hands high, trained to kick and bite. Sweating and shouting, their turbaned riders hacked away with short whips at men and beasts alike. I plunged my horse into the battle.

"Wardar! Wardar!" screamed the crowd. "Pick it up!"

Through the billowing dust I saw my friend Mohammed Ali Hussein swoop down. Hanging from one stirrup amid the flying hoofs, he snatched the prize from the ground. His horse reared, kicking to clear an opening, but Mohammed was surrounded. He thrust the carcass into my hands.

Instinctively my horse whirled. I locked the goat under my leg and galloped for the flag, a quarter of a mile down the field.

"Namani! Begeer!" came shouts at my heels. "Grab it! Get him!"

National Sport Befits a Rugged Land

This was *buz kashi*, Afghanistan's national sport, a roughshod ancestor of polo with as many as a hundred horses on a team, a beheaded goat or calf for a ball—and almost no holds barred (foldout, following pages). Recently knives and chains have been outlawed, but sudden death on the playing field is still not uncommon.

My friend Mohammed had spent many hours teaching me the fine points of the game. He had loaned me a horse and invited me to play. "There is no greater thrill," he had said, "than a head-down gallop toward the circle with the rest of the world at your heels."

I knew now what he meant.

But hardly had I gained momentum when a giant Tajik rider, holding his whip between his teeth, rammed me broadside and jerked the goat out of my grasp. Before I had my mount under control, the Tajik had already thrown the carcass into the scoring circle.

After the game, Mohammed and I walked our horses along a stream that sparkled through the town of Baghlan, 115 miles north of Kabul, Afghanistan's capital. In the distance the foothills of the Hindu Kush range were already white with winter.

"I've broken both arms at this game, and once a leg. I've lost count of the ribs," said Mohammed. "Still, I can't wait for the cool season and the games every Friday."

For an Afghan, *tureh*—bravery—is a prime quality. Says an ancient Afghan song:

Better come home stained with blood
Than safe and sound as a coward....

In the veins of Mohammed, the farmer, flowed the blood of a hundred generations of warriors. Buz kashi means "goat-drag." It's no game for the timid—but a fitting sport for Afghanistan. It reflects the boldness, the tenacity, the fighting spirit of the Afghans themselves, dwellers in a rugged land where only men of iron and leather could survive at all.

Half desert, half mountains, Afghanistan covers a high, landlocked patch of central Asia almost the size of Texas (map, pages 310-11). Scattered along fertile valleys between the sands and the snows, most of the 15,000,000 Afghans farm and graze livestock, seared by 120° F. summers, sometimes snowbound by the long cold winters.

A natural barricade wedged between Persia, Russia, and the Indian subcontinent, Afghanistan has long been a pivot point of Asia. As keepers of the crossroad, Afghans have battled an endless stream of invaders who have funneled into their land through the high mountain passes.

Recently I spent three months in Afghanistan, traveling some 20,000 miles by Land-Rover, camel, horse, and yak—from the parched Desert of Death in the south to the snow-clogged passes of the northern Pamirs. I followed the timeworn trails of Alexander the Great, who founded proud cities here,* and Genghis Khan, who destroyed them. In between, Parthians, Kushan Buddhists, Persians, Arabs, and Seljuk Turks had reigned—then waned.

The turbulent Pushtun tribes—some isolated, some active in war and politics—were united by Ahmad Shah Durrani in 1747.

*See "In the Footsteps of Alexander the Great," by Helen and Frank Schreider, NATIONAL GEOGRAPHIC, January, 1968.

KODACHROME (ABOVE) BY S. MAHMOOD ISMAIL; EKTACHROME (FOLDOUT) BY THOMAS J. ABERCROMBIE © N.G.S.

"A man's world, Afghanistan," says the 38-year-old author, Tom Abercrombie, left—"as rugged and spectacular as *buz kashi*, the national sport." Here he spurs his mount into the thick of a game.

Whips in their teeth (foldout), buz kashi players thunder after the "ball" carrier, who charges at full gallop to fling a headless calf into a goal circle. In honor of the King's birthday, two regional teams battle in the stadium at Kabul, the Afghan capital. Always punishing—and sometimes fatal—the sport befits leathery tribesmen whose forebears rode against ceaseless waves of invaders: the legions of Alexander the Great, Arabs, Mongol hordes led by Genghis Khan and Tamerlane, and finally the British.

Marching out of Kandahar, he subdued most of the land; though the conquest was temporary, it foreshadowed the Afghan nation.

By the 19th century, two new great powers began to crowd Afghanistan. Alarmed when expanding Tsarist Russia supported Persian claims to Herat, the British invaded Afghanistan from India in 1839 and installed a puppet king.

But the first British "conquest" ended in tragedy. In January, 1842, the Afghans forced the British garrison to abandon Kabul. In freezing cold, 4,500 British and Indian soldiers and 12,000 civilians accompanying them were ambushed just east of the city. Only a handful escaped to India.

Again in 1878 the British invaded Afghanistan to set up a buffer state. Finally in 1919, after still another Anglo-Afghan war, Britain recognized Afghanistan's independence. In Kabul, the crowds celebrated for days.

Every August the Afghans set aside business, string the streets with lights, and celebrate the Jashin Isteqlal, or Independence Festival, with music, parades, games, and fireworks (pages 308-9). This year the fiftieth festival includes an international trade fair.

Kabul Teems With Many Tribes

It was late August, on the eve of the festival, when I first arrived in Kabul, dusty and tired after a thousand-mile desert drive from Teheran in Iran. The cool air of the 6,000-foot-high Kabul Valley was a welcome relief. Invigorating, too, was the excitement of the crowds already filling the streets.

Over the centuries, armies that ebbed and flowed left many cultural pools. Today people of some dozen ethnic strains, speaking more than 20 different languages, proudly call themselves Afghans.

Modern Kabulis in Western suits and lambskin hats mingled with turbaned Tajiks and Pushtuns, wearing Afghan knee-length shirts, tails out over baggy pantaloons. Here too were Uzbeks and Turkomans from the north, in high black boots and long striped robes. I saw stocky Hazaras, swarthy Baluchis, Nuristanis. Many had come from distant provinces for the eight-day festival.

Horse carts, jeeps, and Russian-built taxicabs honked their way through the throng. Crowds pressed into the teashops, drawn by the sizzle of shish kebab and the blare of Islamic music from scratchy loudspeakers. Nearby, enterprising young boys rented water pipes, a penny a puff. Bolts of silk and calico hung from cloth merchants' stalls. Jashin is a time for new clothes.

Broken Lance Puts Score in Doubt

Next morning I joined the crowds along Mohammed Akbar Khan Street for the military parade that opened the festivities (pages 314-15). Infantry, in German-style helmets and carrying Russian machine guns, marched past, followed by Russian-built tanks and rockets on mobile launchers. MIG-21 jets of the budding Afghan Air Force flashed overhead. His Majesty Mohammed Zahir Shah, in his olive uniform of commander in chief, saluted them from the royal pavilion.

Communist assistance to Afghanistan is double the American aid program there. The Afghan army is trained, equipped, and supplied almost entirely by the Soviet Union.

Meeting an army commander, Brig. Abdul Wali, after the parade, I expressed surprise that Afghanistan, traditionally suspicious of outsiders, would entrust so much of the preparation of its military force to this one powerful neighbor. His answer was beautifully Afghan: "When you ride a good horse, do you care in which country it was born?"

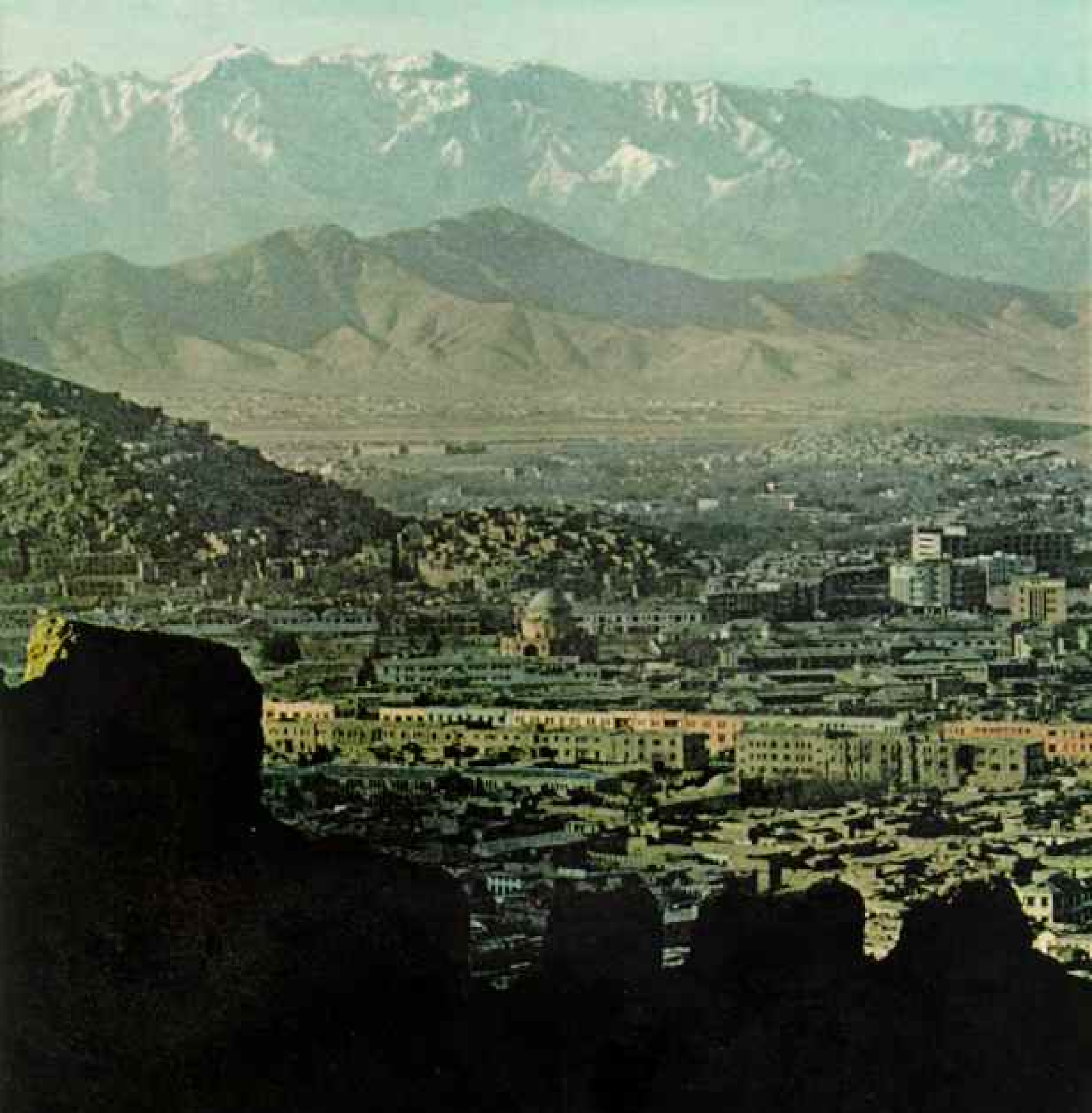
Good horses were gathering down the street at the Jashin grounds as visiting tribesmen cleared the field for a contest of *niza bazi*, or tent-pegging. One of the players, a red-bearded warrior from Ghazni, explained the history of the game to me as he tightened his saddle girth.

"The old raiders would storm an enemy camp before dawn and spear the tent pegs at full gallop," he said. "The tents would collapse on the defenders. Instantly the attackers had the upper hand."

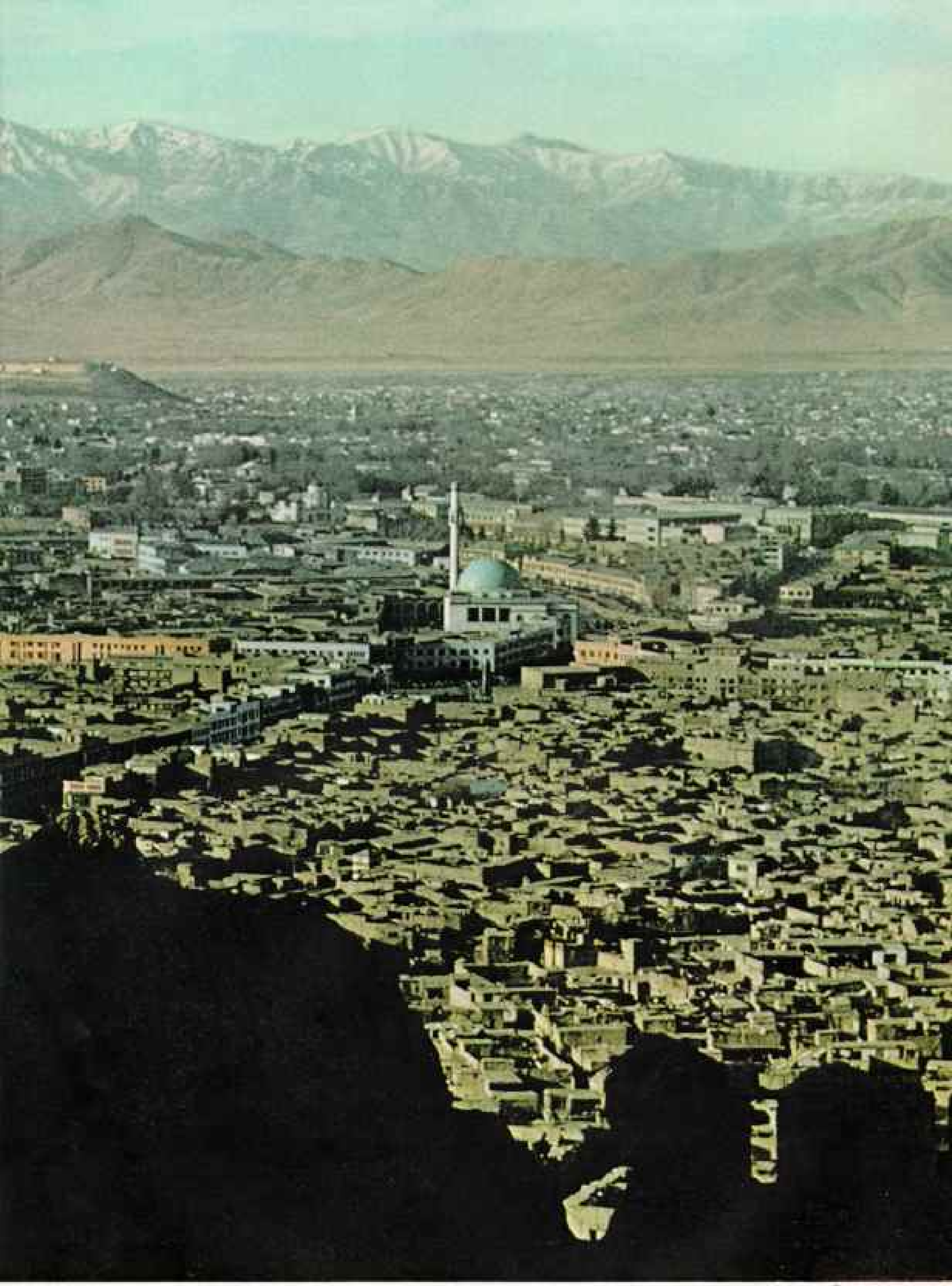
Drums started beating. My friend galloped to the far end of the field carrying a 10-foot lance. Near me an old man drove a poplar peg

(Continued on page 307)

Denied face and form by age-old custom, a woman of Kabul secludes herself in a sleeveless silk *chadri*; a pair of Old World goldfinches rides home from market on her head. Reflecting the forces of change at work in the land, Afghan law no longer requires the chadri, whose pleats echo a style of centuries ago (page 324). Women increasingly appear completely unveiled or hidden at most by a scarf or dark glasses.



Spilling unchecked across scarce level land, bustling Kabul sprawls beneath the battlements of old city walls. Blue-domed Pul-i-Hesti Mosque, the capital's largest, dwarfs multistoried shops lining the Kabul River. Winter snows sheathe jagged peaks of the Hindu



KODACHROME BY THOMAS J. ABERCROMBIE © N.G.S.

Kush—Killer of Hindus—in whose forbidding reaches many an invader and traveler has died. A heady melange of robed tribesmen and Westernized businessmen, of cars and trucks and languid camel caravans, Kabul today pulses with the vigor of a land astir.

firmly into the ground in the center of a five-foot circle.

The drums followed the beat of the horse's hoofs as the rider neared the target. He leaned low with his lance and impaled the peg at full gallop, waving the prize high over his head as he passed the cheering galleries.

When the last rider from the Ghazni team thundered down-field, his team was half a point behind. Spectators held their breath. He speared the peg so hard he snapped his lance, sending splinters flying.

A full point—or a half? A knot of tribesmen, shaking their fists, surrounded the referees as I left. It would take some time to settle that score.

On the Jashin grounds modern pavilions featured exhibits by government ministries and Afghan industries. I accompanied the royal party when the King officially opened the exhibition to the public.

The Afghan Textile Company, the country's biggest manufacturing industry, exhibited bright bolts of cotton and rows of mannequins draped in Western styles. The Afghan Wool Industries set out cashmere blankets and camel's-hair coats. The Steinbock shoe factory exhibited everything from high-heeled shoes to mountain-climbing boots. Cottage industries displayed knives and scissors, Turkoman carpets, carved alabaster and lapis lazuli, and karakul-fur coats and hats.

Afghan People "a Pleasure to Lead"

The King lingered at the Ministry of Agriculture display, inspecting the prize bulls, studying giant working models of irrigation projects, and watching fat silkworms convert mulberry leaves into shimmering strands.

"Agriculture is the base of our economy," His Majesty told me later at Karez-i-Mir, his private farm north of Kabul. Gone now were the brass and khaki of the military commander in chief, replaced by the comfortable tweeds of a country gentleman (page 314).

As we walked through his apple orchard, he explained his new graftings and snipped off an occasional errant shoot. Experimental specimens—bananas, cactus, aloe plants—filled benches in the greenhouse nearby.

"Of course, I'm only an amateur farmer," the King said in French. "But I take it seriously. One who doesn't know the Afghan soil could never understand the Afghan people.

"Only recently have the traditional patterns begun to change, as our industries begin to grow. It is not enough just to keep up with the changing times. We must keep ahead of them—to encourage our people to learn and to accept new responsibilities."

In 1964 Mohammed Zahir Shah promulgated the new constitution that gave real power to Afghanistan's parliament.

"The Afghans are used to running their own affairs. The power of the country's tribal leaders has always depended on the support of their people," the King said.

"The Afghan, with his natural spirit of independence, is a difficult man to command —but a pleasure to lead."

Cannon Blast Proclaims Midday

The city of Kabul, more than a mile high, lies at the intersection of two valleys. A brisk climb along the old city walls that wind steeply up a mountainside gave me a spectacular view of the spreading city below (pages 304-5).

The crumbling walls of stone and mud brick, more than 30 feet high and 12 feet thick, date back to the fifth century. Small wonder they were built, I thought. From these heights the city lay bare to any enemy.

Halfway down I stopped in surprise. On a rampart below, an old man was loading a cannon.

'I haven't missed a day in 35 years," he explained, tamping black powder and rags down the muzzle with an eight-foot ramrod. Old Mohammed Amman climbs the hill every day to fire the *top-i-chasht*, the noon gun. Once prisoners were strapped across the cannon's mouth and blown to eternity. Nowadays the roar merely announces midday.

"Times have changed since my beard was black," the noon gunner said, sweeping his arm across the panorama of busy streets to the south. "When I first climbed this hill, that whole valley was green with fields and orchards and vineyards."

Glancing at his silver Swiss pocket watch, the old man stuffed wads of cotton into his ears and laid the punk to the touchhole.

Dyed for a new lifetime of service, used clothing drip-dries in a Kabul street. Under the gaze of a veiled customer, the shopkeeper hangs out a shirt fished newly green from a dye pot in his nearby store. The garments, many of them imported from the United States, find their way to the country's remotest valleys. Bright colors delight Afghans.

Like parts of a giant machine, wheels of gymnasts perform in Kabul's Ghazi Stadium during an annual eight-day August celebration honoring Afghan independence. Across the field, cheering-section cards spell out "Homeland" in Pushtu, one of two official languages (the other is Persian) in a nation of many tribal tongues.

For Britain—its last invader—Afghanistan stood as a buffer state between Russia and India. The nation won independence in 1919. Wary of foreign involvement, it kept its borders closed for decades, then slowly opened them to the outside world. Today, still fiercely independent, Afghans tread a neutral course between East and West, accepting military and economic aid from both.

Unveiled daughter of today, attending the festivities, asserts woman's freedom.

REDACTED © NATIONAL GEOGRAPHIC SOCIETY

Baroooooooom! The roar nearly blew me off the parapet, and I was engulfed in choking smoke. But far below the noon gun was hardly noticed—lost in the din of traffic.

Though Kabul is the country's nerve center, the mountains are its soul. I decided to visit the Wakhan corridor first. There, in the high valleys of the Hindu Kush range, winters begin in early September.

Joining me was Lal Mohammed, a small wiry Baluchi. Lal, in his forties, was one of Afghanistan's first licensed drivers and had grown up with its struggling network of motor roads.

On the map, the Wakhan corridor arcs eastward from Afghanistan's northernmost wing like the neck of an eagle—Russia on one side, Pakistan and Kashmir on the other, with a nip of China in its beak (map, page 311).

Marco Polo traveled through here on his famous journey to China in the 1270's. In 1948 another Westerner traversed the remote Wakhan—a NATIONAL GEOGRAPHIC writer, now Associate Editor, Franc Shor.*

The Khirghiz and mountain Tajiks he found there had never heard of America, though he was heartily welcomed just the same. Twenty years had changed these people very little, I found. They still scratch out a meager living, farming the narrow banks of the Wakhan River (historically known as the Oxus) and herding yaks.

By the motor road, part of it newly paved, it's still a hard, four-day drive from Kabul to Qala Panja, 530 miles northeast at the end of the auto road. From Faizabad (pages 316-17)

*See "We Took the Highroad in Afghanistan," by Jean and Franc Shor, November, 1950.

CHINA
U.S.S.R.
AFGHANISTAN
IRAN
TIBET
NEPAL
PAKISTAN
PAKISTAN (EAST)
INDIA
ARABIAN PENINSULA
Arabian Sea
Bay of Bengal
CEYLON
Caspian Sea
Mashhad
Karshi
Dushanbe
Denau
Kurgan Tyube
Kerki
Amu Darya
Termez
Andkhui
Aq Chah
Birmazeed
Wazirabad (Balkh)
Mazar-i-Sharif
Shibarghan
Tashkurghan
Kunduz
Taliqan
Khanabad
Qizil Qala
Daulatabad
Buina Qara
Haibak
Baghlan
Narin
Sar-i-Pul
Aq Kupruk
Dahana
Pul-i-Khumri
Maimana
Tukzar
Qala Sarkari
Qaisar
Belchirag
Doshi
Banu
Bala Murghab
Tailan
Qala Shahar
Salang Pass
Chiras
Murghab
Band-i-Amir
Karez Ilias
Kushka
Saighan
Charikar
Bagram
Gulran
Qala Nau
Qala Niaz Khan
FIROZ KOH
Band-i-Amir Lakes
Shibar Pass
Bamian
Ghorband
Kushk
Qaddis
Paropamisus Range
Islam Qala
Tirpul
Karokh
Qala Ahangaran
Chakcharan
Nalak
Hajigak Pass
Tagab
Kabul
Ghurian
Zindajan
Herat
Chahar Burjak
Obeh
Hari
Minaret
Jam
GHOR
Daulat Yar
Koh-i-Baba
Panjao
Diwal Kol
Unai Pass
Shutur Khun Pass
Namaksar
Qala Shaharak
Tulak
HAZARAJAT
Maidan
Kulangar
Qala Adraskan
Farsi
Farah
Mat-i-Ashnul
Shaikhabad
Baraki Barq
Gardez
Koh-i-Sangan
Taiwara
Ghizao
NAWAR
Ghazni
Mandal
Shindand (Sabzawar)
Sang-i-Masha
Chahar Deh
Parjuman
Anardarra
Khush
Baghran
Sangar
Qala-i-Hazar Qadam
Go-i-Ahan
Mukur
Urgun
Jani Khel
Zarghun Shahr
Bailugh
Harut
Wahnai
Karezak
Zor Domandi
Shahjui
Naozad
Musa Qala
Kajakai Reservoir
Farah
Sultan Bakwa
Delaram
ZAMINDAWAR
Kajakai
Bara Khel
Wazi Khwa
Khash Desert
Jaldak
Kalat-i-Ghilzai
Juwain
Girishk
Boghra Dam
Shinkai
Hamun-i-Puzak
PUSHT-I-RUD
Arghandab Dam
Peshawarun
Hamun-i-Saberi
Khash
Nad-i-Ali
Lashkar Gah (Bost)
Kandahar
Maruf
Fort Sandeman
Zabol
Zaranj (Chakhansur)
Kang
Shamalan
Darweshan
Toba Kakar Range
SISTAN
Dasht-i-Margo (Desert of Death)
Registan
Spin Baldak
Chaman
Zhob
Helmand
Landi Muhammad Amin Khan
Deshu
Chahar Burjak
GARMSEL
Rudbar
Jat Poti
Quetta
Duki
Badorzai
Gaud-i-Zirreh
Zahedan
AFGHANISTAN
W. PAKISTAN
Chagai Hills
Hamun-i-Lora
Nushki
Sibi
Kahan
Qila Safed
BALUCHISTAN
Kalat
Yakmach
Hamun-i-Mashkhel
Jacobabad
Sukkur
Khairpur
Indus
0 50 100
STATUTE MILES
Roads Traveled by Author
Paved Roads in Afghanistan
Other Roads
Dry Salt Lakes
Deserts
Glaciers
Airports
Ruins
Elevations in Feet
Geographical Terms
Darya river
Dasht desert
Gaud saline tract
Hamun lake
Koh mountain range
Qala castle, fort

AFGHANISTAN

NEW SCHOOLS, irrigation, and industry are beginning to change this rugged land of turbaned individualistic farmers and nomadic tribesmen. Jets land at Kabul, the capital, and new asphalt highways link major cities, but horses and camels still serve as mainstays of the countryside. The snow-capped Hindu Kush range, a natural bulwark flanked on three sides by wide deserts, stands across Asia's ancient caravan routes. Here Darius, Alexander, and Genghis Khan rode in conquest, and Marco Polo followed the Oxus River to China.

AREA: 253,861 sq. mi. **POPULATION:** 15,000,000. Mainly Pushtuns and Tajiks; also Uzbeks, Khirghiz, Hazaras, and Turkomans. **LANGUAGE:** Some 20 spoken; Pushtu and Persian official. **RELIGION:** Moslem, 90 percent Sunni. **ECONOMY:** Farming (grains, fruit, nuts, cotton) and herding. Deposits of iron, copper, lead, coal, and oil not fully exploited. **MAJOR CITIES:** Kabul (pop. 450,000), capital; Herat, textiles and carpets; Kandahar, commercial center. **CLIMATE:** Wide variations; 50° change between day and night common. Winter temperatures in Kabul fall below zero; summers in southern deserts reach 120° F.

the track begins to climb steadily, and often seems little more than a mountain trail. We crossed rushing torrents that sometimes washed over the hood of the Land-Rover.

The last stretch, from Ishkashim to Qala Panja, follows the border between Afghanistan and Russia. At many places one could easily pitch a pebble across the narrow Panja River into Soviet territory. At intervals we passed watchtowers grimly guarding the Russian side. Were they built to keep the Afghans out, or the Russians in?

"It works both ways," said a young man who had hitched a ride with us. "Often we see the people across the river working in the fields. They are Moslems like us and speak the same language—some of us are from the same families. But we never meet."

Along the 800 miles of rivers that separate northern Afghanistan from Russia, there is not a single bridge.

Pass Imperils Horse and Rider

The commander of the small fort in Qala Panja arranged horses for us and sent along an escort. Our first day on horseback brought us to the village of Sargaz, on the banks of the Wakhan River, flowing here at an altitude of 10,000 feet.

A young Sargaz farmer, Ibrahim, invited us in. Like many Afghans, he had only one name. His simple house was built of stones and set deep into the ground; inside, it resembled a windowless dungeon. Women of the family were baking bread around a crackling fire of straw. A shaft of daylight stabbed through the smoke hole in the roof (page 321).

"It is better if you go on from here with yaks," Ibrahim said. "The horses are strong, but the trail is high and dangerous."

Next morning I added a pair of yaks to the caravan. The ridiculous shaggy beasts would do for the heavy baggage, but I kept the horses for riding.

By lunchtime, alternately riding and walking, we had gained 3,500 feet in altitude; the horses were breathing hard. Finally we led the animals over a snowy pass at 15,000 feet —higher than the summit of the Matterhorn.

Then I made a serious mistake. I remounted. It would be all downhill now.

Suddenly along a treacherous ledge my weary horse slipped, jamming his foreleg between two rocks. Down he went, pitching me headfirst. My lug-soled climbing boot hooked in the stirrup. I dangled by one leg over the precipice. The horse whinnied in pain and panic.

In an instant Lal and one of the yak drivers jumped to the rescue, hauling me up and freeing the horse. No bones broken, we continued down, the lame leading the lame.

We pitched our tents at 14,000 feet, near a summer camp of villagers from Sargaz. The spongy grass hummocks reminded me of the Alaskan tundra. Much of the year they are buried in snow.

"The yaks can't stand the summer heat in the valley," Lal explained. "Half the village spends the warm months with the herds."

Tajik women in long red dresses were milking rows of yaks. They hurried to finish before sunset. Now it was warm, in the mid-80's; half an hour after sunset, water would be freezing in our canteens.

Mountains Harbor Wary Wildlife

An easy day's ride brought us to the Touliboy Valley, one of the last preserves of the Marco Polo sheep *(Ovis poli)*. The government periodically opens the valley to hunters —who pay $6,000 to bag a single sheep. The difficulty of the hunt makes the massive spiral horns of the Marco Polo the most coveted of big-game trophies.

At a small camp I found Ali Gohar Sheikh, a leathery old hunter, who now spends his summers as game warden at Touliboy.

"I've taken over 200 sheep and ibex in these hills," Ali Gohar said. "Many hunters worked together, one team driving a herd to gunners waiting in stands near the passes. Those days are over. The government controls the hunting now. But if you're just shooting with cameras, I can find you some sheep."

Before dawn next morning, Ali Gohar was ready with three yaks. I rode behind him up the steep slope, guiding my shaggy beast with a rope rein tied to a ring in his nose. I soon found that the yak, though clumsy looking, walks nearly as fast as a horse and is far more sure-footed. I could feel his giant heart beating under the lambskin saddle as we passed 15,000 feet. Suddenly Ali Gohar stopped.

"There they are!" he whispered. I saw nothing but the gray hills. On foot we edged toward an outcropping of rocks, and Ali Gohar passed me his binoculars. Across a

Pick of the Afghan fruit basket invites shoppers at a market in the capital. Family gardens crowd the rich Kabul Valley, yielding pomegranates, lemons, oranges, eggplants, tangerines, and the region's renowned grapes. Framed mottoes ask Allah's favor.

Bloody Mary Red Label

EDWARD HOWES © N.G.S.

Proud past marches on as Russian-equipped Afghan troops parade before the gate to Kabul's Id Gah Mosque, eyes turned right salute the King. "O gods," begs an old Hindu saying, "from the venom of the cobra, the teeth of the tiger, and the vengeance of the Afghan —deliver us!"

Gentleman farmer, King Mohammed Zahir halters a cow under the watchful eye of his grandson, Prince Mohammed Nadir. A crossbreed, it merges American Jersey and a native Afghan strain. To stimulate Afghanistan's agriculture, the basis of the economy, the King experiments with livestock and crops at the royal farm near the capital. A constitutional monarch vested with broad powers, the King slowly expands his people's participation in government.

wide draw, perhaps a mile away. I could make out a flock grazing. We counted 24.

"We are lucky to see this many," Ali Gohar said. But the tiny gray specks were well beyond the range of my telephoto lenses. I was not destined to bag a Marco Polo sheep, even on film. They caught our scent and scampered out of sight.

I continued upward alone, slowly, trading a breath for each step. By noon I was on the summit.

The needle of my pocket altimeter nudged 17,000 feet, although this was only a minor, unnamed peak. To the northwest I could see the snows of Karl Marx Peak in Soviet Russia; to the south rose the higher crests of Pakistan. Beneath the distant clouds, 75 miles to the east, lay Communist China.

On the way down I flushed a covey of giant snow partridges *(Lerwa lerwa)* the size of chickens. "Soooooo, soooooo," they whistled, fleeing downward in a swift diving glide.

Just below snow level, a sound of falling stones stopped me. Upwind, not 100 yards away, a herd of ibex *(Capra ibex)* pranced down the steep cliff face.

Farther down, from behind a boulder, I watched a colony of jolly rust-brown marmots *(Marmota caudata)*. Suddenly they scampered, chirping, back to their holes as a great black shadow briefly blotted out the sun. I looked up, startled. It was an eagle, the biggest I had ever seen. Such giants carry off lambs and (so I am told) even attack calves. He decided I was not his dish, and rose slowly out of sight on the last warm currents of the afternoon.

It was already bitter cold when I reached camp. Lal was worried about the clouds to the west. I wished for more time in these unexplored hills, but winter was pressing us. And we did have a whole country to see.

U. S. and Russian Roads Cross Afghanistan

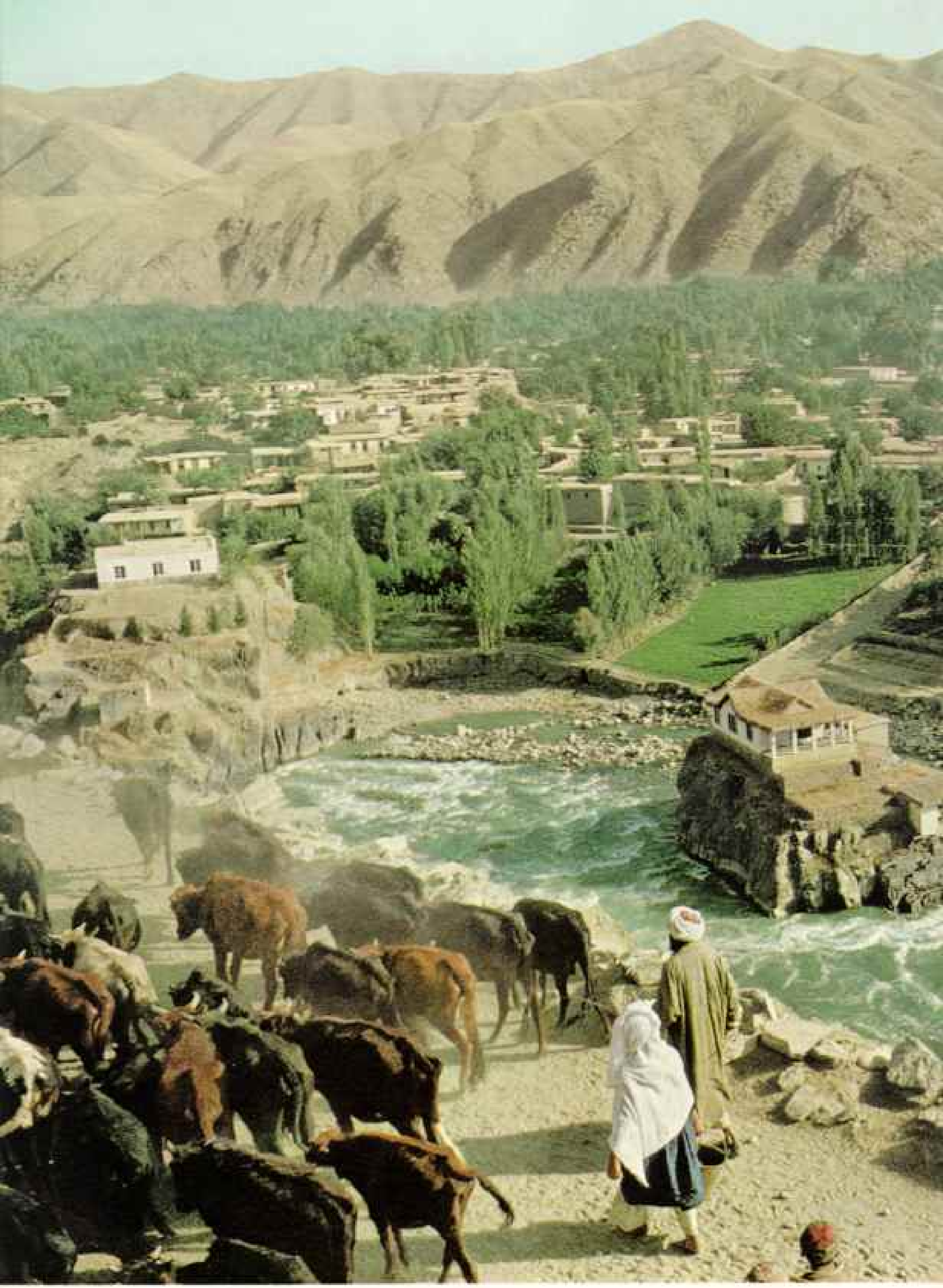
By Land-Rover from Kabul, Lal and I set out for a journey through Afghanistan's mountain heartland, the Hazarajat (map, page 310). We drove south on the asphalt highway that connects the capital with Kandahar, 300 miles southwest. It was built by the U. S. Agency for International Development. Another road, built by the Soviet Union, leads on around the mountains to Herat, 350 miles farther.

But an hour out of Kabul we turned west up the valley of Maidan. The trucks and buses back on the highway could be in Herat easily in two days. Over the rough mountain roads ahead, our trip would take two weeks.

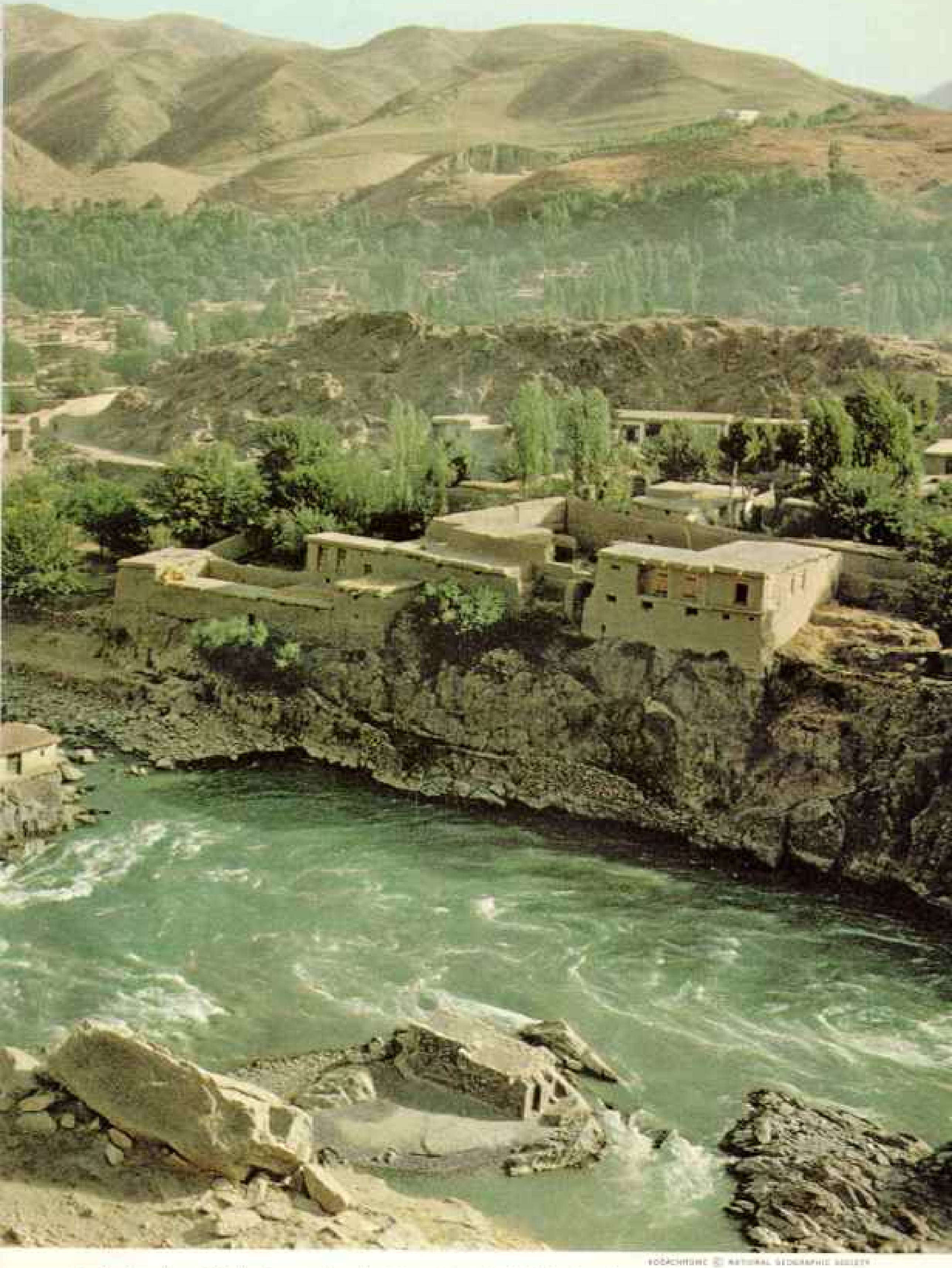
In Maidan, we stopped at a teashop across from the *ziarat,* or tomb, of Hadji Mohammed Naqaswar, a local saint. Like most such shrines, this one was festooned with hundreds of flags.

"Each means a prayer," Lal said. "Most are tied on by women asking Allah for cures for their children."

The ancient keeper offered to show me around, pointing out the marble slab, engraved with verses of



Water from the mountains, cattle from market wind through the northern provincial capital of Faizabad. Rushing from a gorge at right, the Kokcha River all but maroons a government guesthouse, furnished with simple beds and open



KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

to all travelers. Off the beaten track of invaders, the Faizabad region early became a refuge for fleeing tribes. Today their descendants mine the bleak hills for amethysts, lapis lazuli, and salt, and farm the narrow valleys for grain.

the Koran, that covered the grave of the venerable holy man. Ibex horns adorned the walls. On Fridays sheep's-fat lamps burned in niches beside the sepulcher. The old caretaker wore a tattered vest made of patches from the flags to symbolize his vow of poverty. On his shoulder was pinned a *tawceez*, a small silver box with sacred scriptures folded inside—to ward off disease.

I thanked him and explained that I, too, was a Moslem and a hadji—I had made the trek to Mecca in 1965.* He stared into my blue eyes in disbelief. I asked to borrow his Koran and read several verses in Arabic. Overcome, he seized my hands and blessed us for the long journey ahead.

Great Stone Buddhas Watch Over Bamian

Though the Afghans have been Moslems for a thousand years, I often found the religion overlaid with the symbolism of former faiths. Earlier animistic religions held the wild animals of the highest mountains as symbols of distant purity—hence the ibex and mountain sheep horns decorating the *ziarats*. The prayer flags reminded me of Buddhist shrines in the Nepalese Himalayas.

Our next stop, Bamian, was once a thriving Buddhist center. The isolated valley is still guarded by colossal sentinels, two standing Buddhas carved into red sandstone cliffs between the second and fifth centuries. The larger towers 175 feet high. The cliffs around it are honeycombed with cells where more than a thousand monks once lived and contemplated the Perfect One (page 324).

I stood at the crumbling feet of the enormous statue. The face was gone—destroyed by Moslem image breakers—and the rich scarlet of its robe had long ago faded away. I explored the grottoes around the statue, picking my way upward through tunnels and galleries, stepping out finally atop the giant's head.

Here and there traces of ancient frescoes remain: Buddhist deities seated in serene contemplation; sensuous dancers frolicking on the walls of the enormous niche.

Far below I could hear the hammers along the street of the tinkers in the Bamian village bazaar. Farther out in the fields, farmers shouted, driving teams of oxen around threshing circles. The valley life went on, oblivious of the past.

At nearby Shahr-i-Ghulghula, the "city of noise," an ocher-colored citadel sits on a hill in the center of the valley. Its name recalls the cries of the populace, massacred 750 years ago by Genghis Khan in his fury over losing his favorite grandson in battle near here.

"It was that evil woman," claimed a brawny Tajik farmer winnowing wheat below the ruined citadel. He paused to tell me the legend.

"It was Lala Khatun, the daughter of the king. She sent a note to Genghis Khan, camped just over there," he pointed with his wooden pitchfork, "telling him about the secret underground canal that brought water to the city. The Mongols destroyed the canal; the city had to surrender or die of thirst."

And the Mongols killed them all, the whole city, the whole valley—not a chicken was spared. The khan, no admirer of treachery, ordered Lala Khatun stoned to death.

Serais Still Mark the Passing Miles

At Panjao, in the shadow of the big red fort, we filled tanks and jerrycans with green Russian gasoline from a pile of rusty barrels. Ahead lay 400 miles of low-gear driving.

We had spent the night in the fort, guests of the local police chief, Mr. Abdul Bakir, and he came out to see us off. Nearby, a string of camels bawled in protest as caravaneers strapped on heavy loads of firewood and salt.

"It won't be long before the trucks put the camels out to pasture," said Abdul Bakir. "Oh, the nomads will always come through with their caravans every season—but the new motor roads are changing our lives. Already there are plans for a paved highway through the Hazarajat."

West of Panjao we saw fewer and fewer trucks. Regularly we passed ancient caravanserais along the roadside. These square, high-walled fortresses, motels for the caravans, lie a day's march apart—about 12 miles. Here caravans could spend the night, safe from raiders. But improved roads are bringing

*The author told of his pilgrimage in "Saudi Arabia: Beyond the Sands of Mecca," January, 1966.

"**Marco Polo Highway,**" author Abercrombie calls this fragile ledge in the Wakhan Valley leading to Communist China. Traveling to Cathay in the 13th century, the Venetian explorer followed the same mountain corridor. Here the author's party of yaks, horses, guides, and soldiers threads a narrow shelf made of rocks propped with poles and thinly covered with dirt. Each year snow and rock slides sweep sections into the river 150 feet below.

government and soldiers; the raiders are turning to more peaceful pursuits. Most of the caravanserais are crumbling. Still, wherever we stopped to ask directions, distances were always given in *serais*.

A few serais beyond Chakcharan, the new capital of Ghor province, we turned off in search of the Minaret of Jam, one of the most impressive monuments in Afghanistan, and the tallest, rediscovered only 26 years ago.

Traffic Record: 14 Cars in 9 Months

Growling dogs greeted us at Jam, a cluster of mud huts. Steep brick-red hills dropping from an indigo sky walled in the narrow valley shaded by flaming yellow poplars and clumps of crimson apricot trees. Women at their outdoor looms added still more color to the autumn scene.

Here motor cars and foreigners are still a novelty. It had been a record year for traffic in the valley; our car was the fourteenth in nine months. Villagers swarmed around us as we sought out Mohammed Azzam, a town elder and the keeper of the minaret.

"Of course you will honor me by being my guest," Mohammed insisted, ushering us into his home. The small stove was soon burning and tea was brought. I hadn't noticed many chickens in this poor village, but outside someone was noisily killing several hens.

I have been spoiled by hosts all over the Middle East, but in the art of hospitality no one excels the Afghan. It was just turning dark when Mohammed's brothers carried in a giant tray of rice and chicken, slabs of bread, and brimming bowls of yogurt. Over more tea we traded news from the outside for some of the valley's legends.

Finally our host brought in armloads of mattresses and thick quilts. He unrolled them around the stove and bade us goodnight.

It was still dark next morning when I stumbled down the gully behind Mohammed. I wanted to meet sunrise at the Jam Minaret. At dawn we came around a hill and there it was, rising 20 stories above the canyon floor.

I stopped, awed, first by its size, then by its beauty. The entire column was lavishly decorated with flower patterns and graceful Arabic script. To some mosaic bricks still clung a pure turquoise color that rivaled the morning sky (page 328).

Most amazing of all, the remarkable monument stood in this remote valley unnoticed by outsiders for centuries. Of course Mohammed Azzam had known about it. He had guided Afghan officials here in 1942.

Mohammed opened a small wooden door. We squeezed through an opening only 14 inches square and slowly climbed 250 spiraling steps to the topmost gallery.

During the middle of the 12th century a powerful civilization, the Ghorid dynasty, rose from these valleys. From its capital at Firoz Koh, Turquoise Mountain, here in the mountains of Ghor, it swept across Afghanistan and India as far as Bengal.

Bold in battle, the Ghorids were also patrons of art and learning, but they spread their empire thin. The homeland was neglected, then forgotten. Looking down from the Jam Minaret, I saw only some ruins scattered on the hill across the river. The rest was wilderness.

Artist Paints With a Single Hair

Where the mountains of Ghor meet the Iranian desert stands the walled city of Herat, often called "city of artists." Fortified and enlarged by Alexander the Great in 330 B.C., it has been sacked and burned by many conquerors. But Herat always recovered, nurturing painters, poets, mystics, and scholars.

Much of Herat's glory lies in ruins scattered around the city (page 331). But the brilliant carpets that line her bazaar, the fine filigrees of her silversmiths, the silk looms, the richly tiled Friday Mosque—these still recall Herat's artistic legacy.

Herat's greatest artist was Kamal ud-Din Bihzad. During the 15th century, Herat's "golden period," he painted miniatures never excelled. I visited one of Bihzad's modern disciples, Senator Said Mohammed Mashal Gohri, at his studio on the outskirts of the city.

As a member of parliament, Senator Mashal spends much of his time in Kabul, but his first love is his painting. I found his hearty bulk hunched over a small square of silk.

Smoke-hole spotlight brightens the gloom of a cavelike home at Sargar, a village 10,000 feet high in the Wakhan Valley. With their fire crackling, the women prepare to bake *nan*, an unleavened bread of rough-milled flour that serves as an Afghan mainstay. At night the family—grandparents, parents, and children—sleep on an earthen ledge against the shadowy wall.

Meticulously he traced the hairs of an old gentleman's beard on a face a quarter of an inch high.

"Yes, Bihzad was a master craftsman," he said. "No tiny detail was unimportant to him. Much of his work was done with a brush like this—a brush with just one hair." He opened a folio of Bihzad reproductions.

"But it was his love of nature that made him immortal," Senator Mashal continued. "Look at the grace of the animals, the details of the smallest flower. Even the rocks and the trees seem almost ready to speak."

Before I left I had bought one of Mashal's paintings. The tiny scene showed Herat in Bihzad's time. The central figure was the famous mystic poet, Jami, a contemporary of Bihzad, seated in his garden. Behind rose an indigo dome against a sky of gold leaf.

Not far from Mashal's studio I paused at Jami's simple grave. A gnarled pistachio tree shaded a marble stele engraved with one of the poet's most famous verses:

Behold, the palaces in ruins,
The wrath of rulers disappeared in air
No trace of pomp and glory remains,
But poets live in letters through the ages.

I walked back into the busy city through the dust of late afternoon. How little had changed since the time of Bihzad and Jami, I thought amid the crowds of turbaned men

and veiled women, the files of camels, the horse-drawn taxis. As they bustled past the blue Friday Mosque set against a hazy sky of gold, it was almost as though the precious miniature under my arm had come to life.

Zaranj Rises on an Arid Plain

For four hours we enjoyed the luxury of the smooth pavement south of Herat, and then turned at Dilaram across the rutted sands toward one of the country's newly formed provinces, Nim Roz. For a while we followed the Khash River, dried to a trickle at this time of year. When we left the riverbed, the track split and rambled. I kept an eye on the compass and the odometer.

"It's good we didn't come in summer," Lal laughed. "It's usually 120° this time of day." Now, in September, it was probably 100°. Small consolation.

We pulled into the new town of Zaranj—a few stark buildings set in neat rows in the middle of nowhere. Here and there, masons laying mud bricks worked slowly under ragged awnings. Camels hugged patches of shade; shopkeepers dozed. Only the flies seemed busy, swarming around the shop where we relaxed over tea and bread.

After lunch I met one man who was very much alive, the young provincial governor, Abdul Kadr Kazi. "It's a difficult job, building a province from scratch—and we've only

FOOKSHOKEE © N.G.S.

Standing room only: Turbaned riders jam a truck converted into a bus—the usual means of public transportation in a country without railroads. Flying flags improvised from scarfs, enthusiastic young villagers from the hinterland head for Kabul to be inducted into the army.

Linoleum luxury, patterned after oriental rugs, surrounds the driver of a truck-bus; a ceiling mirror enhances the gaudy motifs, common across the Middle East and Asia. Wide-angle lens exaggerates the cab's roominess.

started," he said in excellent English, learned at the University of Pennsylvania. "The old city floods nearly every spring, so we had to build a new capital, too.

"The river is at once our best friend and our worst enemy," he went on. "We have the driest climate in Afghanistan—less than two inches of rain a year. The river is our only hope."

It wasn't always this way. When Alexander the Great passed through here, Drangiana, a Persian satrapy, flourished along the river bank. But around 1380, Mongols led by Tamerlane swept through, slaughtering the populace and wrecking intricate canal systems that had taken centuries to build.

In a bouncing Russian-built jeep I rode out with Amanullah Sherzad to reach the ruins. Amanullah is a tall, handsome Baluchi, with long hair and flashing eyes. He was working as a contractor in the new city. Lal followed with the Land-Rover as we headed out into the Dasht-i-Margo, the infamous Desert of Death (pages 334-5).

"It's safer with two cars," Amanullah said. "It's easy to get stuck in this sand. A serious breakdown could be fatal."

When we stopped near midday, the scorching *siah bad*—"black wind," as the Baluchis call it—seemed to suck the very life out of me.

"Over there you can see parts of the old irrigation system." Amanullah pointed across the sand. I could make out the outlines of wind-swept ditches and a silt-choked canal.

Only One Remains of Amiran's Million

For five miles we drove through the jagged ruins of a city, then finally stopped beside the rubble of what was once a mosque. Here stood a ziarat, the tomb of some long-ago local saint, guarded by a ragged old man living off the charity of passing caravans.

"This is all that is left of the city of Amiran," said Amanullah. "Once maybe a million people lived here. Now there is one."

Back in Amanullah's village, near Zaranj, we lunched on *sawad*, a platter of bread soaked in chicken broth. We washed it down with tall glasses of murky water from the shallow village well.

Thick mud walls and a high, arched ceiling minimized the heat inside Amanullah's house. Outside a small window, servants had piled thorn bushes and doused them with water. Presto: Baluchi air conditioning.

As I left, Amanullah dropped half a dozen silver coins into my hand. I could just make out "... Allah, Mohammed is the prophet of Allah" in Arabic beneath the tarnish. There was no date, but from the script I guessed tenth century. I handed them back.

"No. They are for you," Amanullah said. "A souvenir of once-great Amiran, and your friends here who hope to build it again."

HAVA Brings Life to the Desert

Some 150 desert miles to the east, a massive irrigation project harnesses the water of the Helmand River and its chief tributary, the Arghandab. Combined, the two rivers drain nearly half the country. Backed by American loans and grants, the Helmand-Arghandab Valley Authority is slowly changing the face of the land.

Two large dams were built to hold back devastating spring floods. As water became dependable, old lands were revitalized; new fields sprang up on what was once desert. In Lashkar Gah, a new town growing up where the two great rivers meet, I visited the headquarters of HAVA and talked with Abdul Tawab Assifi, chief engineer for the project.

"This is the biggest job Afghanistan has ever attempted; for several years it was allotted 5 percent of the national budget." With maps and charts Assifi outlined the complex enterprise. "Our primary mission is to improve the lot of farmers by improving the land and its use. The key is water. At the same time we're building schools, roads, power plants, health centers, agricultural research stations. In short, we're raising the standard of living for half a million people."

Across the Helmand from Lashkar Gah I drove along gravel roads lined with silvery tamarisks, through rich farmland laced with canals and ditches. With Sultan Mohammed Omar of HAVA's land settlement office, I headed for Nad-i-Ali, one of its boldest projects.

Along the road we passed camps of *kuchis*, Afghan nomads. Their black goat's-hair tents

Lord of the World," Buddhists of the Bamian Valley called this 175-foot statue of the Perfect One. Carved fifteen to eighteen centuries ago, it stands within a sandstone cliff honeycombed with caves where monks once contemplated the teachings of Buddha. Moslems invading the valley drove out the monks and over the centuries smashed the face and hands of the massive figure. Fires glow in observance of Afghanistan's independence.

Self-damming lakes help solve an Afghan problem: too many mountains and too little water. Mineral deposits from the lake slowly built up the curving dam at lower left. Crediting the phenomenon to the powers of Ali, the Prophet Mohammed's son-in-law, local Afghans

PHOTOGRAPHED BY THOMAS J. ABERCROMBIE © N.G.S.

call the reservoir Band-i-Amir, Dam of the Saint, and honor him with a lake-shore mosque, center. Seen here from a hillside 1,600 feet above the lake, the author's Land-Rover appears as a speck on the road at right. Irrigation ditches curl away beyond the dam at left.

were banked with piles of thorn and brush, fuel for the coming winter. Nad-i-Ali, too, was a kuchi settlement—but a permanent one.

"Each family got a house, up to 15 acres of land, a pair of oxen, simple tools, and cash for seeds," Sultan Mohammed explained. "But it's a hard life, even for an experienced farmer—worse for the inexperienced nomad. Hundreds of families gave up after a year or two."

In one of the new villages I met Hadji Wakil of the Durrani tribe, one of the first settlers. We took the customary tea in the shade of an arbor of grapevines, then walked the fields with Hadji Wakil. Nearby his son plowed the small plot with a team of oxen.

"For 17 years I've fought this soil," the old man said, crumbling an ash-brown clod between his fingers. "It takes work as well as water. But we've won. In three more years I'll have the deed to this land. Something to pass on to my sons."

Most of Afghanistan's 2½ million kuchis are still on the move. Every autumn they strike their summer camps and thread down through the passes into the warmer plains. Often we had passed their caravans on the narrow mountain roads.

Late one afternoon north of Kandahar we approached a kuchi encampment—six black tents huddled against the chill evening wind. A pair of snarling mastiffs, ears and tails clipped, stopped me a hundred paces from the camp. A tall, lean nomad strode out to meet us.

"Staray ma-shi!" We shook

Golden finger thrusting skyward, the 227-foot Minaret of Jam pierces the dawn in the mountains of Ghor. Its caretaker, Mohammed Azzam, peers from midway up the lavishly decorated shaft. It leans at about half the angle of Pisa's tower.

Where muezzins stood to call an empire to prayer, Mohammed Azzam looks across land almost deserted. Twin stairways spiral down the Minaret of Jam. Built eight centuries ago during the short-lived dynasty of the Ghorids, the tower stood forgotten by the outside world until Azzam, an elder of the nearby village, led officials to the site in 1942.

hands over the traditional Pushtu greeting. "May you not be tired!"

He slung his rifle and led me past the watchdogs to his campfire. Figures filled the circle to appraise the intruder. Behind us, women flattened dough into disks of unleavened bread.

I hoped to march with them for a few days, pitching my tent beside theirs. The invitation came with the first cup of tea.

Suddenly the chatter stopped and everyone was on his feet. Into the firelight stepped the patriarch of the clan, Mahmud Karim Khan Girmayl, wrapped in sheepskins and crowned with a turban of white cotton.

"Har kala rashi," he said. "Welcome." His face was a web of wrinkles above a hawklike nose and a beard frosted with age. But his voice was strong, his hand steady. An old soldier who refuses to fade, Mahmud Khan claims 111 years.

These were Ghilzai tribesmen, the most famous of Afghan warriors. Four times the old man has mustered his riders against the British, the last time in 1919.

"Those were exciting times," he recalled, and memories brought a glint to his eye. "Good horses, brave comrades, the smell of powder, and the spoils of battle. Once we ambushed the British at Toba and captured 1,200 rifles. . . ." He opened a silver snuffbox and thumbed a pinch into each nostril. "But life has changed since the border was closed."

I knew the history. In 1893 the British set up the Durand Line between Afghanistan and British India, an arbitrary boundary cut through tribal territory. When the British left in 1947, some 5,000,000 Pushtun tribesmen found themselves under the rule of a new state—Pakistan.

"When we moved freely, we prospered," said the old man. "We brought almonds, carpets, raisins, and Afghan horses as far south as the Indus, bringing back spices and bolts of cloth to trade. When they closed the border, we had to decide between Afghanistan and Pakistan. We are Afghans, but our world has been cut in half."

Kuchi Band Treks 1,000 Miles a Year

So the yarns were spun through a dinner of dried mutton strips, bread, yogurt, and rounds of tea. Finally the fire died and the cold drove us all to our bed rugs.

A cold wind was blowing sand against a gray sky when the first clatter woke me. Outside, shivering men herded in the hobbled camels while the women knocked out tent

pegs and wrapped meager furnishings in the tent cloth.

I helped the men load their kneeling camels. The beasts groaned their displeasure under sacks of straw, skins of oil and water, carpets, mattocks, and blackened pots. Babies, wrapped like mummies, were lashed atop the loads.

In less than half an hour all was ready. Ninety nomads, 50 camels, 12 donkeys, 5 horses, and 600 sheep began the march south with the wind. Everyone walked, except for the old khan and the children. I walked with Mohammed Naim, eldest son of the khan, a mere 70 years. He carried a pistol, an English rifle, and battered binoculars.

"Since we left our summer camp in Nawar over a month ago, winter has been close behind us," shouted Mohammed Naim. His words were nearly lost in the keening sandstorm. "But in Garmsel it will be warm."

Garmsel, in fact, means "warm valley." A winter settlement 250 miles to the southwest, it lay another month's march across the Registan Desert. Every year the nomads make this thousand-mile round trip.

I wondered how these people, especially the old ones, could survive such a hard life. They never moved fast, true, but they never stopped for a minute to rest during the day's eight-hour march. My legs felt the pace. The old khan chuckled from his chestnut mare.

"The open air is the place for a man, not the smoke of the towns," he said.

Silent survivors of a golden age, abandoned minarets stand watch outside the walls of ancient Herat, at the edge of the western desert. A caravan of nomads plods south, fleeing advancing winter. An outpost for Alexander the Great 2,300 years ago, Herat blossomed as a cultural center during the 15th century. Smaller and less important today, the town still enjoys fame for its craftsmanship in silver, silks, and tiles (left).

The making of a mosaic: Behind one completed panel, tileworkers of Herat assemble another face down for restoration of the city's 800-year-old Friday Mosque. Cement poured on the back will hold the multicolored bits together.

HEINCHROME (ABOVE) AND SATACHROME © NATIONAL GEOGRAPHIC SOCIETY

On the third day we neared Kandahar, Afghanistan's second largest city.

"I'd prefer to go around it," the old khan confided, "but the young men look forward to a day in town." There would be silver filigree to buy for a prospective bride, some tea and sugar, a visit to the gunsmith's.

We picked our way slowly through outlying fields and villages; from rooftops children jeered as we passed. The old khan staked his horse in a stubble field near the city. But the first tents were barely up when an angry farmer burst into our midst. "Your unholy camels are stripping my pastures!" he shouted.

Mohammed Naim smiled apologies and sent two young men to investigate. But the farmer would not hold his tongue. "Why can't you sons of devils stay in the desert where you belong?" I think at first the kuchis admired his pluck—he was outnumbered fifty to one—but he spat another curse. An angry tribesman grabbed him. I stiffened as guns were drawn. With arms raised the old khan quieted his men.

Then quickly the farmer spread his long coat on the ground in the direction of Mecca. No one could deny it was proper time for afternoon prayer—and the farmer's sudden attack of piety spared him violence.

The relationship between the nomad and the settled people in Afghanistan has always been strained. Historically they have needed each other, but now as the trucks and transistor radios bring the goods and the news, villagers have less and less need of the kuchis.

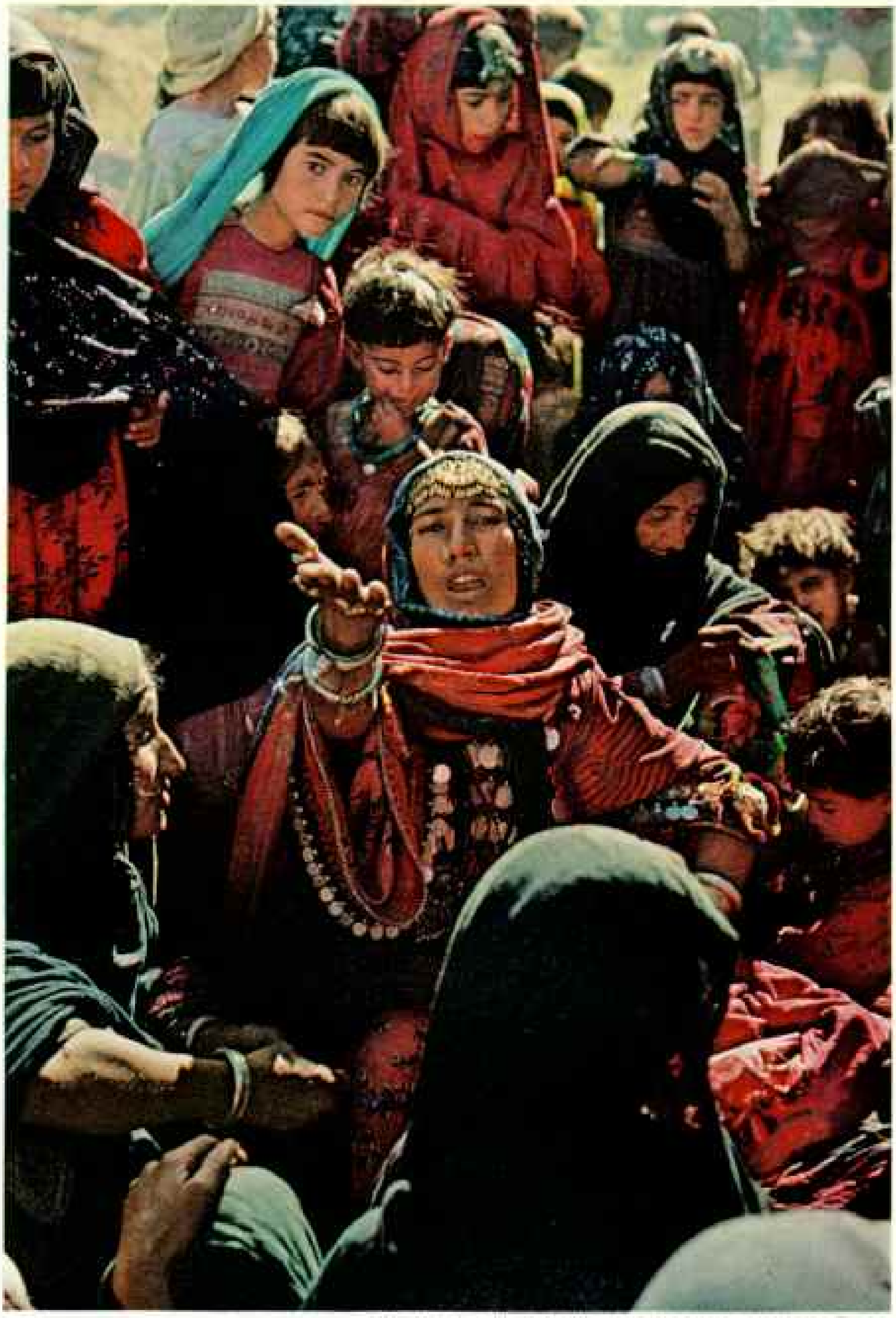
I went to say goodbye to the old khan.

Barefoot dancer stamps to the beat of gazelle-skin drums at a wedding reception in the village of Nad-i-Ali. As the music quickens, he turns with ever-increasing speed. Bespangled women at right gather to boil ten lambs for the feast. These *kuchi* tribesmen recently settled on small tracts given by the government. Others, nearly 2½ million strong, still crisscross the land yearly in pursuit of seasonal pastures.

He was reading a worn book through spectacles with only one thick lens (page 337).

". . . and prayers of peace upon the Prophet and His family, as many prayers as raindrops in the sky, as grains of sand in the desert . . ."

Small wonder, I thought, that great religions have sprung from the desert. Here one has little room in his pack for idols. Nor is there need for them. On the mountaintop, or among the endless dunes, one feels close enough to his God to speak to Him.



PHOTOGRAPHS BY L. MAHMOUD ISMAIL ABDUL AND THOMAS J. ABERCROMBIE © N.G.S.

In mysterious Kafiristan, literally "land of the infidels," lived the last of Afghanistan's idolators. For nearly a thousand years the Kafirs isolated themselves in a mountainous pocket 150 miles northeast of Kabul. Not until 1895 did the Afghan armies of Amir Abdur Rahman march in to burn their idols and convert the Kafirs to Islam. Now the area is called Nuristan, "land of light."

Nuristan is still off the beaten path, and I needed special government permission for my visit. Officials were worried by recent rumors of tribal fighting.

Along a raging river in the heart of Nuristan our Land-Rover was hailed by a band of armed men. They were returning to their village from a skirmish with the Gujars, they told us, and did we have room for them? We managed to squeeze all six in amid our baggage.

The leader of the footsore squad was Ghulam Dastigir Khan. He was as tall and thin as his rifle, with fine features and a pointed beard.

His broad brown beret, instead of a turban, stamped him as a Nuristani.

"We surprised the Gujars from two sides," Dastigir said, "but they fled into the forests. We'll get them this winter at their valley camps." The Gujars are semi-nomadic herdsmen who roam the high pasturelands. Some of them had contracted to shepherd Nuristani goats for a percentage of the flocks. But there were arguments over payments, and many of the villagers' goats had disappeared.

In Nuristan goats are money. The size of a man's flocks determines his social position. The price of a house, a gun—or a bride—is still quoted in livestock. The quarrel with the Gujars was serious business.

Origins of the Nuristani Obscure

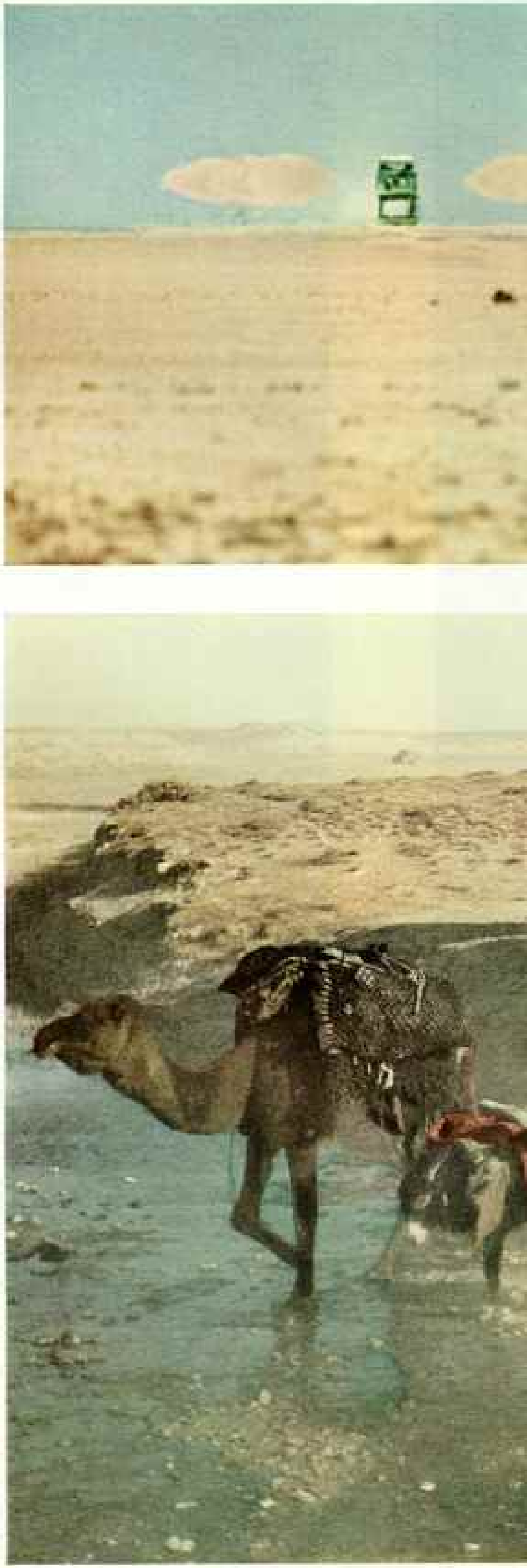
At Urmir we parked the Land-Rover and climbed for two hours up a trail through forests of holly oak to Kamdesh, the region's largest village. Leading the way were Richard and Emmorette Strand, a young couple from Cornell University spending a season here studying the Kom language, one of five distinct tongues spoken in Nuristan.

The 500-odd houses of Kamdesh cascade down from the crest of a steep hill (pages 338-9). They are built of wood—squared logs chinked with stones and mud. On the flat roofs corn, walnuts, mulberries, beans, and apricots were spread out to dry.

Below the village, women toiled in patches of millet and barley, lugging the harvest uphill in tall baskets on their backs. The men gathered in small groups, drinking tea.

"Except for hunting and fighting, the men do very little," Strand explained. "All the artisans—the potters, the smiths, the weavers, the carvers—are *buris*, members of a class who were slaves in pre-Islamic times. For a few, their situation is still close to serfdom.

"These villages of Nuristan are remote and independent," Strand said. "Outside laws



Like drifting clouds, hilltops mirrored in a mirage appear to float beyond the author's Land-Rover. Heat waves shimmering in 120° F. temperatures on the Dasht-i-Margo —Desert of Death—create the illusion.

A stop for water, a time for play: Bedeviled by heat and dust, kuchi caravaneers pause at an irrigation ditch on the edge of the Desert of Death. They flee from mountain snow and bitter cold at the other end of their 500-mile migration.

ROMANCHOMES BY THOMAS J. ABERCROMBIE © N.G.S.

still have little effect—but let's take a look at the bari quarter."

Strand led me across rooftops and down the steep narrow streets through the heart of the village. We passed a bari lumberjack with a pair of axes on his shoulder.

"*Lesta sha!*" he said. "How are you!" Strand returned the Kom greeting, adding, "*Kor yenji! Kaa unji!*" meaning "Where are you going? What are you doing?" He was not prying; these inquiries are part of the normal greeting ceremony.

Shy women in black dresses—some with eyes outlined in red mascara—hurried past, lugging baskets of firewood. I was surprised by the light complexions among the villagers. A few even had blond hair and blue eyes.

"Some say the Nuristani descend from an early Greek colony," Strand said, "but judging from the language, it's unlikely. The truth is, nobody knows their origins."

We stopped to watch a young shoemaker sewing a pair of red goatskin boots. We were joined by a villager who introduced himself as Abdul Hanan.

"Once such a shoemaker would have been a slave," he said. "Slavery is illegal now, but years ago a good artisan like this one could be bought for 12 cows or 120 goats."

Despite the baris' inferior position, they often fight beside their social superiors in tribal wars. Some have been elected to village councils. One bari, Wakil Abdullah, served as *wakil*, or representative, from Nuristan to the Afghan parliament in Kabul.

I met Wakil Abdullah at his house in Kushtus, a two-hour walk around the mountainside from Kamdesh. Abdullah offered us fresh grapes and green peaches and told us stories of his life, his visit to Singapore as a young merchant sailor, his years in Kabul.

Now he was content to spend his last years back home. He had been saddened, he said, by the recent death of his wife, but added philosophically: "Allah be praised, I still have two left."

It was pleasant for a change to sit up off the floor again. In most Afghan homes the only furniture is a carpet, but the Nuristanis use simple chairs and tables. Abdullah's collection, dating from pre-Islamic times, was elaborately carved.

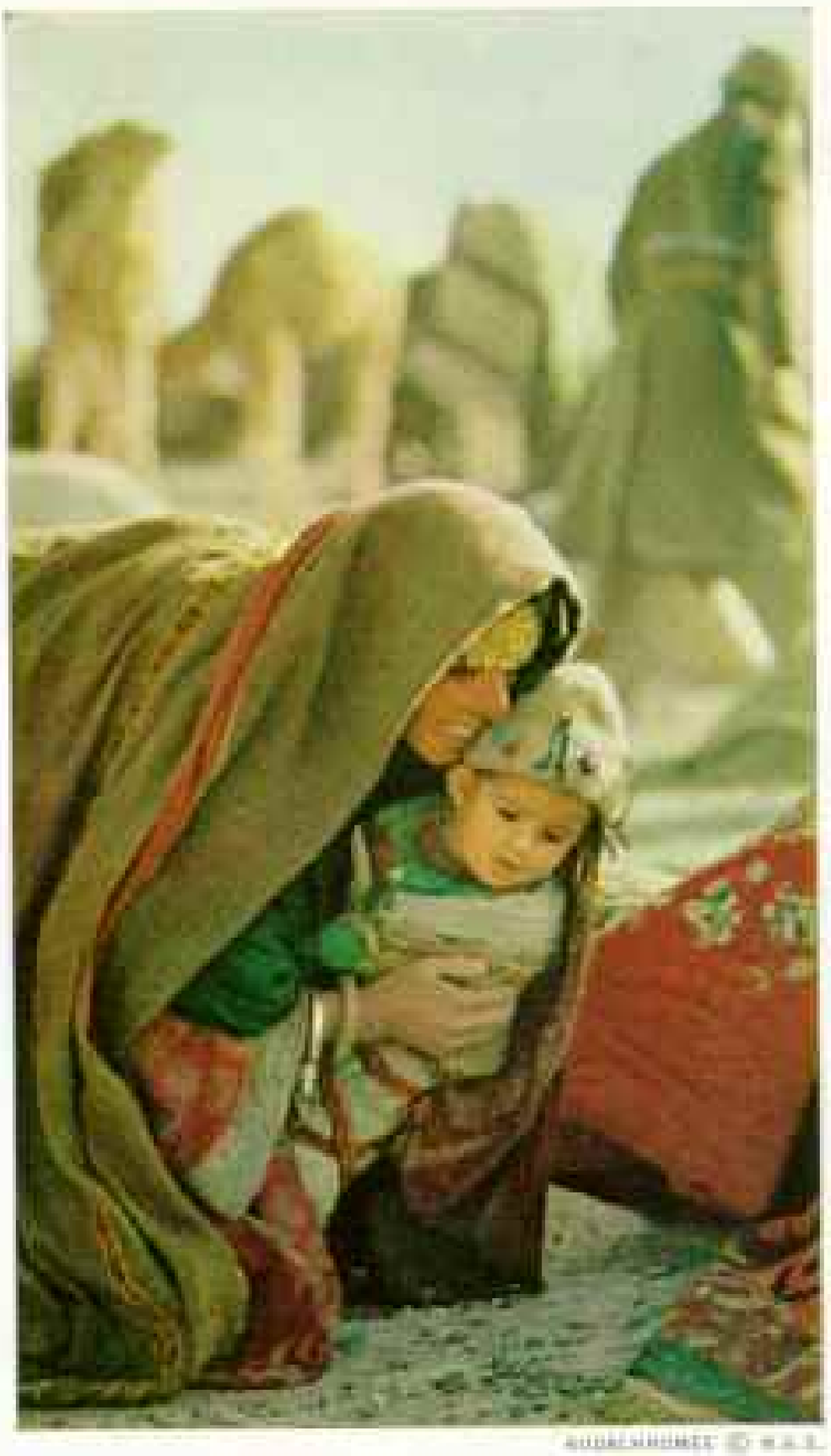
Unlike many Nuristanis, Wakil Abdullah was not ashamed of his infidel ancestors. "Islam was our salvation, but it's a pity so little of our old culture survived it."

Then, tapping out the rhythm on the floor with the handle of a small ceremonial ax, he crooned an old Kafir song his father had taught him:

O Sunnuri, open your door,
For tomorrow I string my bow
And march to war.

Warfare is still the Nuristani's way of settling an injury to the tribe. As I packed my rucksack to leave Kamdesh, talk continued of the coming winter skirmish with the Gujars. The gunsmith was the busiest man in town.

Even after December snows had closed the high trails of Nuristan, the weather remained mild in Mazar-i-Sharif, 250 miles northwest in Balkh province. Mazar stands only



Wrapped against wind and sand, a kuchi mother lifts her baby to a camel. Only children and the elderly ride between camps; all others walk, helping drive herds of fat-tailed sheep on the tribe's seasonal migrations.

Word of Allah refreshes the spirit of Hadji Mahmud Karim Khan Girnayi, a kuchi patriarch who claims to be 111 years old. He uses one half of his broken spectacles as a monocle. The King recently commissioned him a general for his role in the 1919 war of independence against the British.

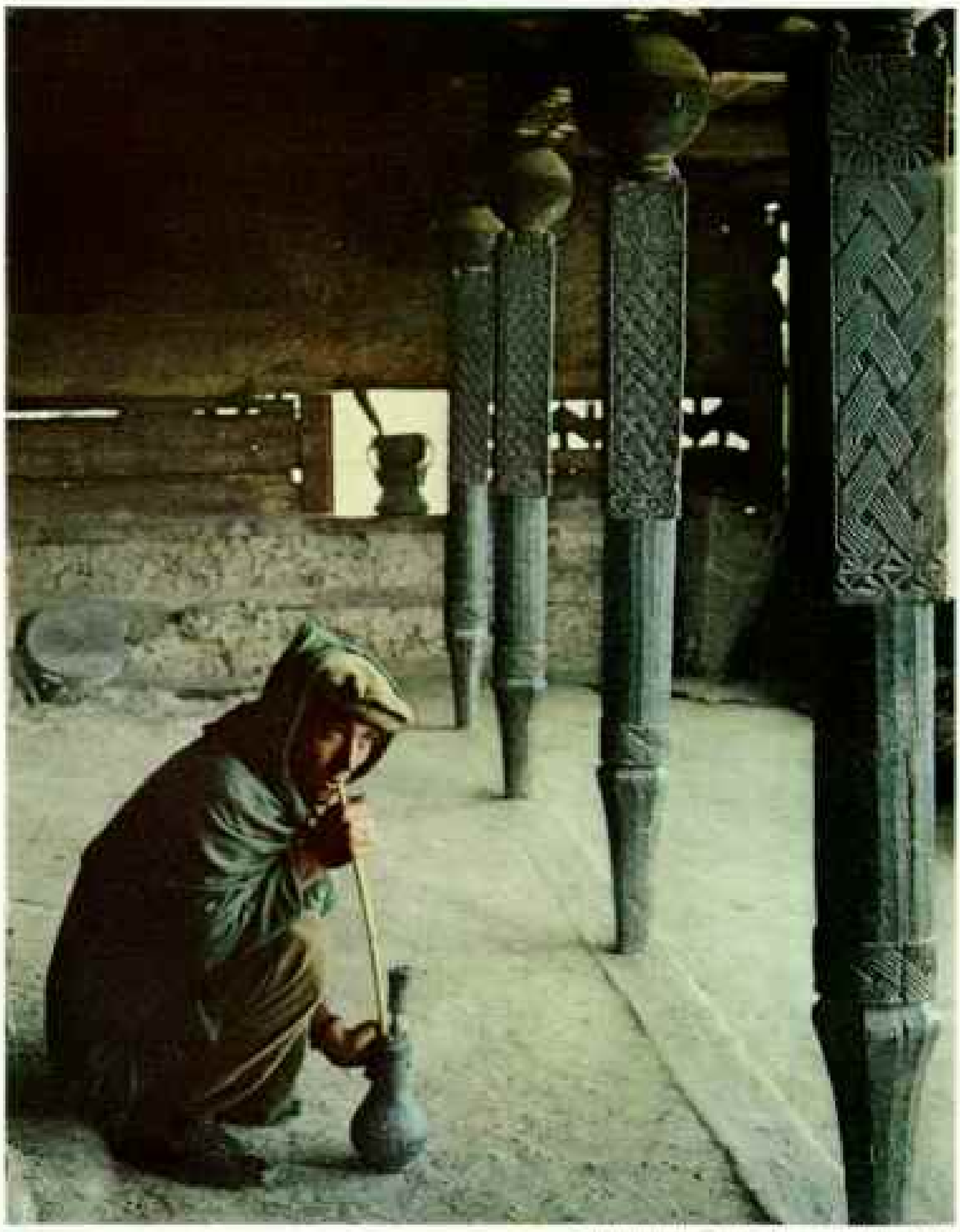
1,200 feet above sea level, on the plains south of the Amu River.

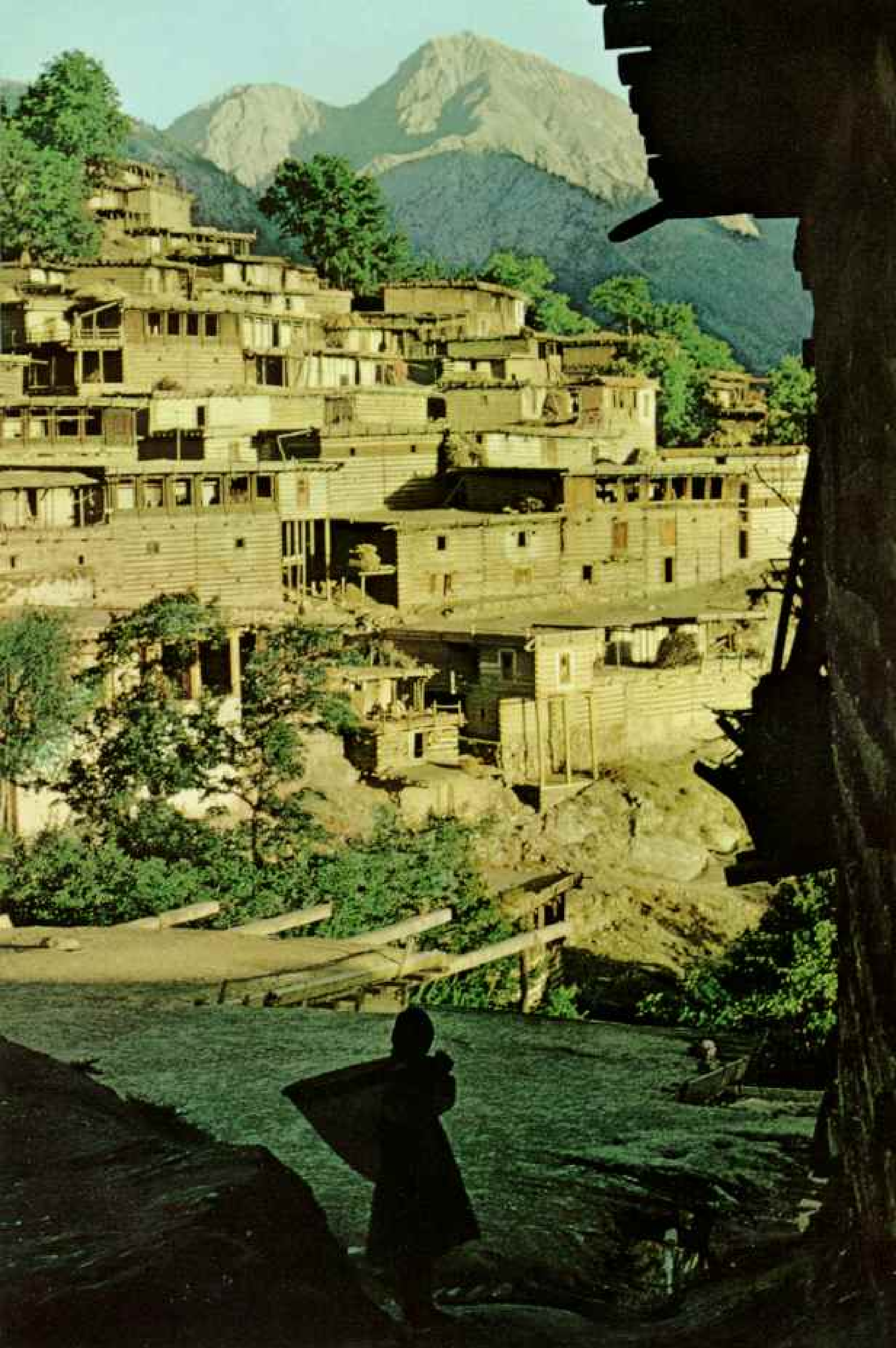
Mazar-i-Sharif means "tomb of the saint." The city grew up around a shrine which Afghans believe is the burial place of Ali, son-in-law of the Prophet. Its shining blue domes rise above the everyday smoke and dust of the streets (pages 340-41). Flocks of sacred white doves flutter about the streets and gardens.

Earlier followers of Ali, the Shiahs, split from the orthodox Moslem traditions. Though scarcely 10 percent of the Afghans embrace the Shiah sect—the rest are Sunnis—all revere Ali as a saint.

I spent a Friday in Mazar during Ramadan, the holy month of fasting. Throughout the month Moslems neither eat nor drink from an hour before dawn until after sunset. Restaurants and teashops are closed, and streets are strangely quiet.

Aerie of the "People of Light," Kamdesh climbs a sunlit mountainside in Nuristan, one of the highest and wildest regions of Afghanistan. Its pagan inhabitants were called Kafirs—"unbelievers"—until 70 years ago, when they were forcibly converted by the sword of Islam and given the name Nuristanis. The idol-hating Moslems destroyed the ancient Kafir gods, leaving only geometrically decorated pillars (below) as vestiges of Afghanistan's pagan past. Nuristan's snug log houses, rare in this nearly forestless nation, once served as fortresses against raiding enemies.





Resplendent in turquoise, the domed mosque and mausoleum at Mazar-i-Sharif honors Ali, Mohammed's son-in-law and one of his successors. Moslems dispute Ali's

final resting place; some believe he lies entombed near Al Kufah, Iraq—others revere the sepulcher here. To ensure paying their respects, many pilgrims visit both sites.

Stains of his trade color a boy's hands, clutching a bright skein of yarn at a dye works in Tashkurghan.

With a flash of her knife, a Turkoman tribeswoman trims one of seven million knots that will be tied to the warp of a rug. The weavers work at a home loom in the village of Birmazeed, settled in the 1930's by refugees fleeing from the Russian rug-making region of Bukhara. Starting work at seven years, the girls learn to tie nearly a knot a second; acquiring such skill, they bring their fathers prime prices as brides. Roughly two years will be spent completing this rug, which will be worth about $660 in the Kabul market.

In a small office at the tomb I found Imam Hafiz Abdul Ghafur, keeper of the shrine. He wore the small white turban of a mullah, or religious leader. A hennaed beard brightened his otherwise long and serious face. He told me the tomb had been built because of a vision.

"Ali was killed at Al Kufah in Iraq, and many believe he is buried there," explained Imam Hafiz. "But centuries ago a local holy man dreamed that Ali's remains had been moved here. Scholars dug, and found his skeleton."

How they identified the bones was never made clear, but as further proof, Imam Hafiz showed me a Koran, believed to have been hand-lettered by Ali himself, and a marble stele that legend says accompanied the body.

"Afghan Moslems have long revered the site," the Imam continued. "Centuries ago the people of Mazar buried the original smaller shrine under a huge mound of earth to hide it from the Mongol invaders. Most of the inhabitants were killed or fled."

The tomb had been so thoroughly hidden that it wasn't discovered again for two hundred years.

Villagers who had come to spend a Friday in Mazar filled the shrine. One in particular caught my eye. Seven times he circled the rotunda, past

the old men chanting in the sunshine near the window, past a niche set with flickering candles, past the women at prayer, heads buried under the crimson drape covering the bier.

On small tables around the wall lay giant hand-lettered Korans. Reverently the man touched his eyes, then his lips, to each. On his way out—leaving nothing to chance—he kissed the heavy bronze knockers on the high green doors.

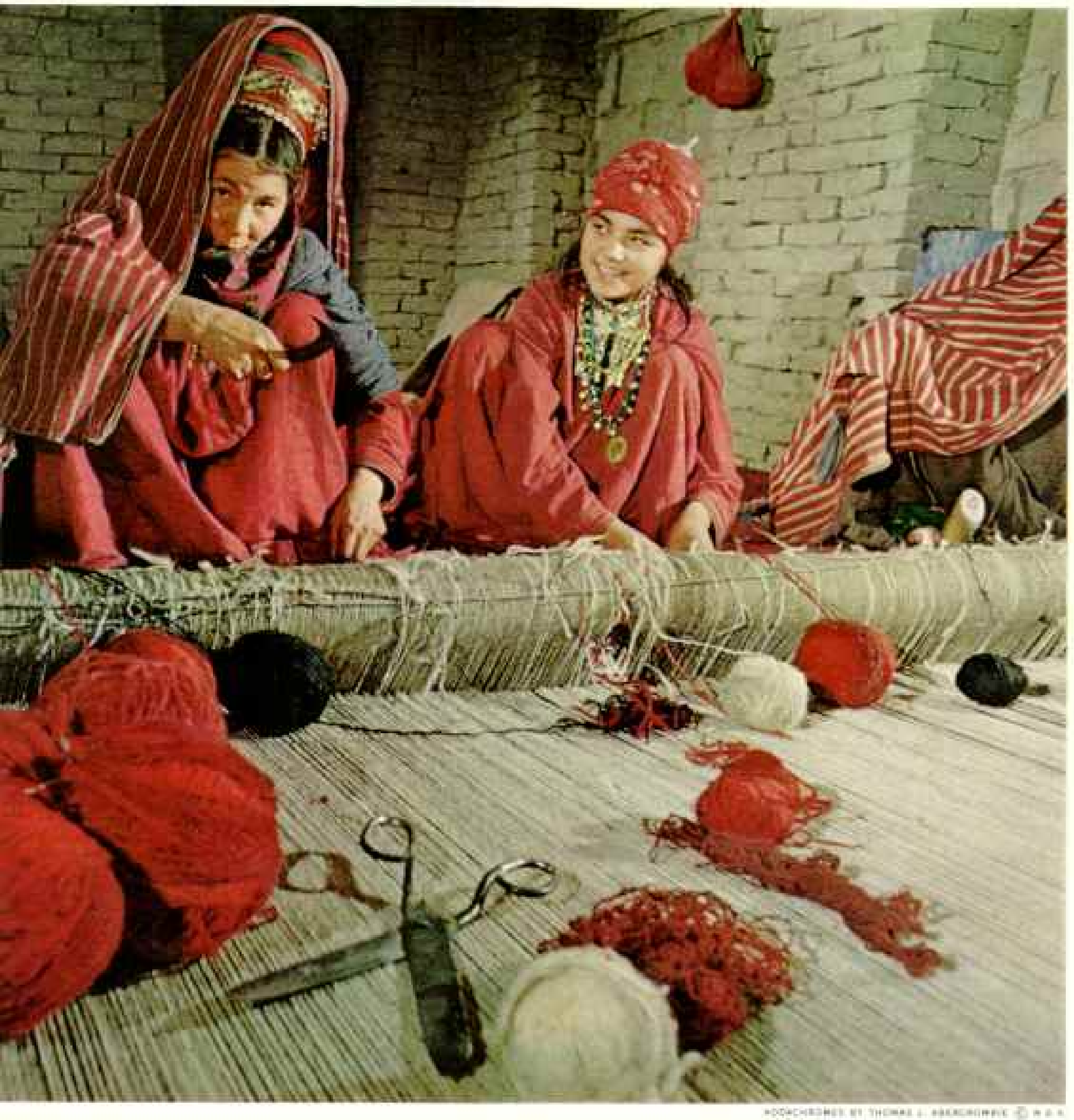
Feast and Song End Daily Fast

A little after midday I followed the call of the muezzin to the new mosque adjoining the tomb. Outside, amid piles of pointed slippers, shopkeepers' sandals, and Turkoman riding boots, I left my tennis shoes.

The formal prayers in Arabic were followed by a lengthy animated sermon in Persian while we all sat back in rows, facing Mecca. Lal whispered a running translation; it was clearly hell-fire and brimstone. Faces around me wore looks of uneasy piety.

By late afternoon everyone was home preparing for *iftar*, literally "breakfast"—the first meal of a long day. At the hotel we broke the fast with *qaymaq*, a special Ramadan treat of clotted cream, then dined on *kabili pilao*—chunks of mutton heaped with rice, carrots, and raisins.

Outside I heard voices that sounded like carolers. When I opened the window, I found a chorus of five boys, coats pulled over their heads to keep warm, singing a special "trick-



PHOTOGRAPHED BY THOMAS J. ABERCROMBIE © N.G.S.

or-treat" ballad in a garble of Persian and Turkoman. Lal unraveled some of the verses:

Ramadan, Ramadan, for thirty days
we call,
Hungry but full in heart,
We wait for coins beneath your wall.

Scattered on the flat plains north and west of Mazar lie Turkoman villages famous for their fine carpets. Typical is Birmazeed, a small hamlet divided into family compounds by high mud-brick walls. At one picket gate I was invited inside by a hospitable villager, Subhan Berdi. We were soon joined by other men, many carrying infants. With winter plowing finished, they were baby-sitting while the women kept busy at their looms.

"Most of us came as refugees from Russia 37 years ago," Subhan said. "My father and I helped build these fields and canals—the whole village—from a patch of desert."

These Turkoman families from Bukhara brought their weaving skills with them. Encouraged by a Kabul carpet company which supplies wool, sets standards, and provides steady markets, the village developed a profitable cottage industry. Today a girl who can weave commands a high bride price. Carpets are more important than crops.

Graying Beard Allays Suspicion

I asked for a chance to photograph the weavers at their looms. My request started heads shaking and tongues wagging.

"By custom our women are secluded from men outside the immediate family," Subhan explained. "But no harm, we agree, in a visit from one with so much gray in his beard."

Not exactly flattered, I followed Subhan.

The large deep-red carpet nearly filled the room. It was stretched taut across a simple horizontal loom made of poplar logs. On it, amidst balls of bright yarn, sat a row of women and girls dressed in bright red. All wore tall hats covered with silver coins and bangles that jingled as they moved with swift hands across the warp (preceding pages).

They tied nearly a knot a second—a red, a white, three reds, a black—trimming the tufts with a small sickle-shaped knife, all in one motion. I tried my skill. My knot took eight seconds, was the wrong color—and I nearly trimmed off my little finger. The shyness of the women was lost in laughter.

"Soon this one will be finished," said Subhan. "In Kabul it will bring at least 50,000 afghanis." More than $660, but still a bargain. In this 10-by-16-foot carpet, I calculated, were some 7,000,000 knots.

"A carpet like this one takes two years to make," Subhan said, "but it will last for centuries."

Afghans Thrive in a Rugged Land

On the way back to Kabul we ran head on into winter. In driving sleet we inched slowly up the twisting Salang Pass. Higher up, bulldozers battled 10-foot drifts. Finally, 10,800 feet above sea level, we entered Salang Tunnel, which bores nearly two miles through the mountain. This new route, opened in 1964, shortens the distance between Kabul and the northern provinces by 120 miles.

Before I left Afghanistan in late December, winter had settled on Kabul. Wet snow frosted the flat rooftops and muffled street sounds. Shopkeepers in open stalls still did a brisk business, huddled under quilts around charcoal burners. Street merchants hawked wooden snow shovels and weighed out precious bundles of firewood. The vivid capital I remembered from August was now a stark study in black and white. Yet the mood was cheerful.

"Kabul would sooner be without gold than without snow," says an old proverb. No one knows better than the Afghan that the snow of winter waters the flowers and crops of spring. Surely it was the very harshness of this wild and beautiful land that had forged such strong people and welded them into a determined nation.

Now, finally at peace with her neighbors, Afghanistan marshals strength for the most important battle in her long and turbulent history. With modern weapons this time—with roads and bridges, with dams and ditches and canals, with factories and schools—this rugged land will be conquered once more.

This time by the Afghan people themselves.

THE END

Mountain man's flintlock, with parts made in England more than 160 years ago, recalls frontier skirmishes against the British and ambushes at the Khyber Pass. The lock plate bears the date 1802 and the initials V.E.I.C., for Venerable East India Company. The old hunter sold his gun to the author at Salang Pass to get money for a new Russian shotgun. By Afghan definition, a boy becomes a man when he can carry a gun.

"TWO AMERICAN PLANES were shot down, but their pilots were rescued." Such laconic reports are all too familiar, yet few of us have even an inkling of the deeds of self-sacrifice and valor behind the terse words. Here now is the little-known story, told by intrepid writer-photographer Howard Sochurek, author of three previous GEOGRAPHIC *articles: "Viet Nam's Montagnards, Caught in the Jaws of a War," April, 1968, "American Special Forces in Action in Viet Nam," January, 1965, and "Slow Train Through Viet Nam's War," September, 1964.*—EDITOR

Air Rescue Behind Enemy Lines

Article and photographs by
HOWARD SOCHUREK

THEY ARE CALLED Jolly Green Giants and Big Ugly Fat Fellows, and when they hover above North Viet Nam's perilous ocean of jungle, life hangs in the balance. They are watched over by Sandys and succored by Crowns. Inside them ride men called PJ's and others wearing King Arthurs—and they are among the bravest and most selfless men I have ever known.

These are the strange, casual terms in the vocabulary of the Aerospace Rescue and Recovery Service: 5,000 American airmen engaged in rescue work around the globe—most dramatically, in saving downed fliers from capture or death at the hands of the Viet Cong and North Vietnamese.

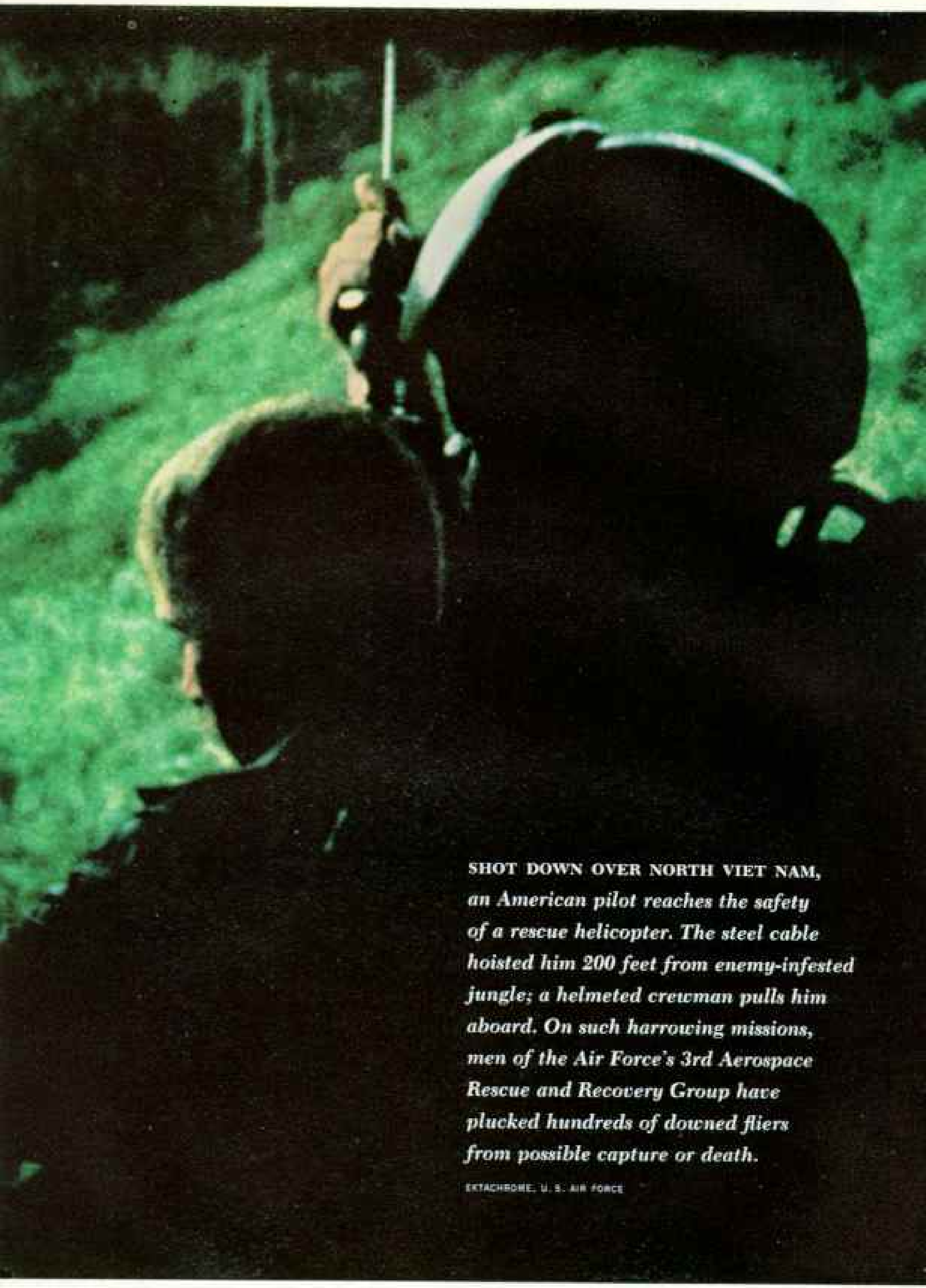
Whatever the outcome of the war and the peace talks—both in progress as I write—this is a drama that should be recorded. One of the things that war leaves in its brutal wake is the memory of acts of courage undertaken to save human life in the midst of so much taking of life.

"Impossible to Describe the Sense of Joy"

Earlier this year I made my nineteenth trip to Viet Nam, this time to report the deeds of those detachments of the ARRS that fly to North Viet Nam. My notebooks have seldom recorded such moving experiences, related by the men who lived them.

Sgt. Jack Hoover of Salisbury, North Carolina, told me of his rescue of a pilot: "I was holding him cradled in my arms. He had been in the jungle for three days. There were tears in his eyes and he just kept patting me on the back endlessly. . . ."

I listened to the men who were rescued, like Capt. John A. Corder of Fort Worth, Texas: "I had a death grip on that penetrator. I didn't let go, not even after they had pulled me into the



SHOT DOWN OVER NORTH VIET NAM, *an American pilot reaches the safety of a rescue helicopter. The steel cable hoisted him 200 feet from enemy-infested jungle; a helmeted crewman pulls him aboard. On such harrowing missions, men of the Air Force's 3rd Aerospace Rescue and Recovery Group have plucked hundreds of downed fliers from possible capture or death.*

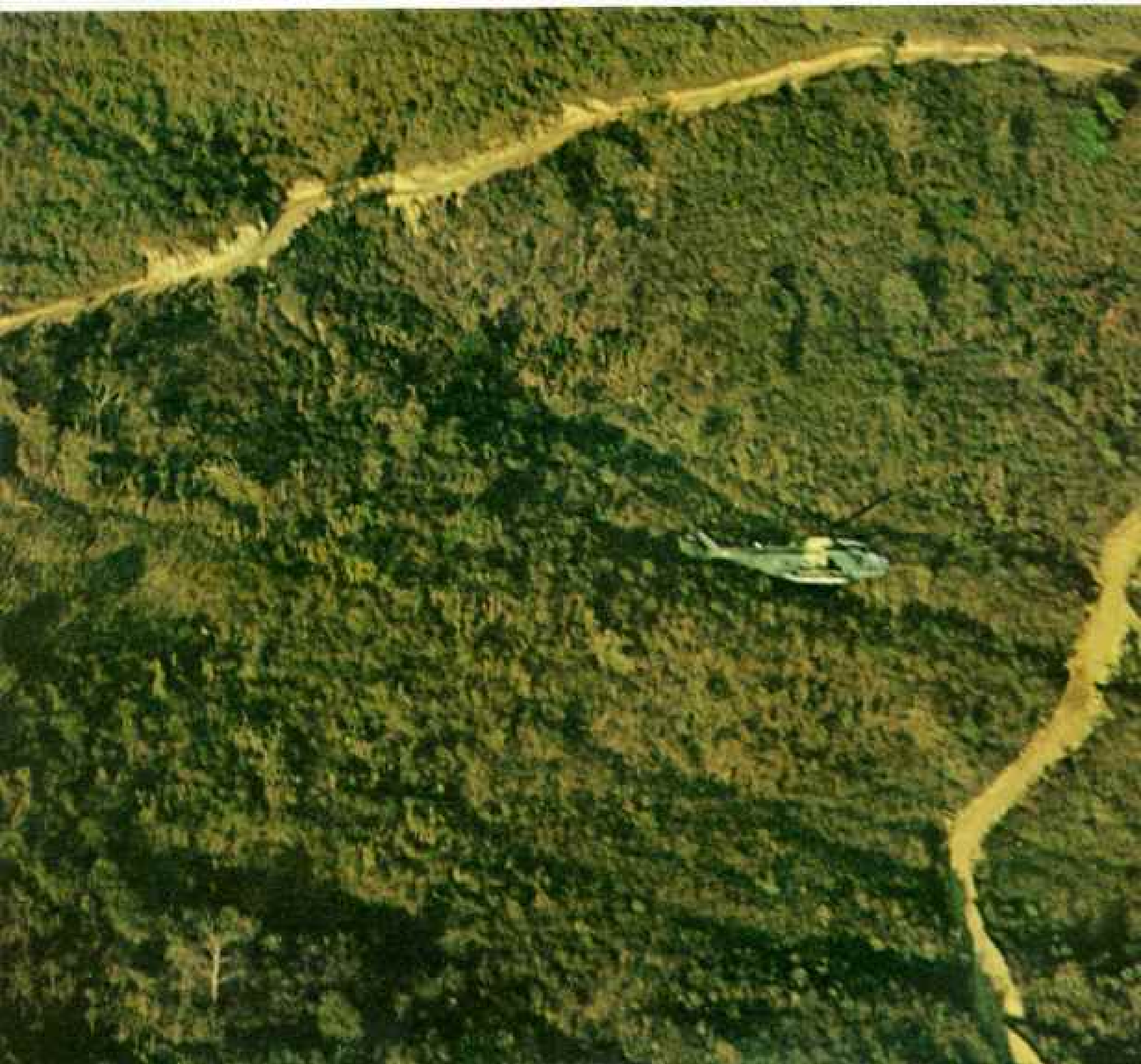
EKTACHROME, U. S. AIR FORCE

Mercy bus of the air war, a Sikorsky HH-53B crosses strands of the Ho Chi Minh Trail, the web of dirt roads that feeds men and munitions to Communists in South Viet Nam. Fliers call the craft Buffs—Big Ugly Fat Fellows. They nickname smaller HH-3E's Jolly Green Giants, after a vegetable cannery trademark. In a typical rescue operation, fighter escorts strafe to suppress ground fire, and a circling tanker refuels choppers on long missions.

"Rescue's my lifework," says Sgt. Kerry Kelley (left and preceding page). He has trained intensively in medicine, survival, and even scuba diving to save fliers downed at sea. Scorning danger, he and his fellow pararescuemen eagerly toss coins to decide who will descend first into enemy territory to help disabled airmen.

Close to the action, rescue teams fly from forward bases at Udorn and Nakhon Phanom in Thailand, and Da Nang in South Viet Nam.

For a large-scale map of this area, see **Viet Nam, Cambodia, Laos, and Thailand**, issued with the February, 1967, GEOGRAPHIC, and still obtainable. Paper map, $1.10; fabric, $2.30; index, 55 cents (postage paid).



GEOGRAPHIC ART DIVISION © NATIONAL GEOGRAPHIC SOCIETY

helicopter. It is impossible to describe the sense of joy you feel when others have risked their lives to save yours, and all of you have made it."

Aerial rescues in a combat area have never before been tried on such a scale, or with such success. As of this writing, U. S. Air Force teams in Southeast Asia have brought back 1,300 American servicemen, many of them wounded, plucking them from dense jungle with steel cables, snatching them from blazing fields of battle, fishing them from enemy waters.

The Air Force, with its Aerospace Rescue and Recovery Service under the Military Airlift Command, has the over-all responsibility. But in areas where the Navy operates, equally skilled naval crews carry out their own rescue operations. Aboard a carrier and at bases in Viet Nam and Thailand, I saw the men and machines in action. The Air Force men fly Sikorsky HH-3E helicopters—Jolly Green Giants—and the larger Sikorsky HH-53B's, the Big Ugly Fat Fellows, or Buffs, which are also called Super Jollys. Navy rescue teams use Sikorsky SH-3A's—Big Mothers—and Kaman UH-2 Seasprites.*

Big Mothers, guarded by carrier-based fighters, have often reached into North Viet Nam to pluck Air Force and Navy airmen from hills around Haiphong. Most Navy rescues are made at sea, however, where destroyers and helicopters keep an eye on returning aircrews (pages 368-9).

Thirty Men Risk Lives to Save One

"When a man is downed," Col. Paul E. Leske observed at an ARRS station in Thailand, "he is far more than a statistic. He is a fellow American, with a family at home, with hopes and dreams and a potential that cannot be measured. He is a man in trouble, and he needs help fast."

On one occasion, Colonel Leske, commander of the 3rd Aerospace Rescue and Recovery Group, which covers all Southeast Asia, committed 11 aircraft, crewed by 30 men, to 123 combat sorties during 10½ hours of rescue efforts to bring one pilot back to safety.

The air-rescue teams assigned to missions in North Viet Nam are stationed at Da Nang in South Viet Nam, at Nakhon Phanom Royal Thai Air Force Base in Thailand, and at Udorn Royal Thai Air Force Base, due west of Nakhon Phanom (map, above).

February 27, 1968, was an unusually chilly day at Udorn. It was just before the rainy

*See "The Incredible Helicopter," by Peter T. White, NATIONAL GEOGRAPHIC, April, 1959.

Battle tension grips a backup team at Udorn during a massive lifesaving mission (following pages). Listening to radioed reports from the scene, worried pilots and pararescuemen—called "PJ's" from an older designation, parajumpers—share the strain of their buddies under fire. On the telephone, operations officer Lt. Col. Garland York receives an order from nearby command headquarters: "Alert reserve chopper."

season, and a gray sky stretched over the base. Far to the east, in the jungle mountains south of the Mu Gia Pass and north of Khe Sanh, the sun was beaming down on a disaster. An aircraft with nine men aboard had been shot down near the Ho Chi Minh Trail.

The 37th Aerospace Rescue and Recovery Squadron had responded immediately. Maj. Frederic (Marty) Donohue, who usually has a pipe clamped in his mouth but is always losing it nonetheless, was piloting a Buff at "full blower," nearly 200 miles an hour, toward North Viet Nam as I arrived at the operations shack at Udorn.

With Major Donohue was his copilot, 1st Lt. Leone Russo, a small and bald man called "Lennie the Gnome"—a name that had stuck to him from the days when he did the "Lennie and Liz" Saturday morning children's show on WKSU in Kent, Ohio (page 355). Both pilots were wearing armored vests called King Arthurs. Also in the crew were two pararescuemen—still known as PJ's for their old name, parajumpers—and an engineer to operate the ingenious rescue device called the penetrator.

Smoke Puff Signals Hovering Chopper

Homing in on beeper signals from radios carried in every airman's survival vest, the rescue helicopters hover over the area, 50 to 200 feet above the ground. Because the jungle is so dense and tall, crewmen seldom see the man they are trying to rescue, but usually they are in radio contact. The chopper waits until the downed flier "pops smoke," and the telltale wisp of white or red from the chemical-filled canister drifts through the canopy of leaves.

On the right side of the Jolly Green, an outrigger holds a hoist mechanism with 250 feet of 3/16-inch steel cable wound on a drum. Attached to the free end of the cable is the jungle penetrator, a 26-pound metal device shaped like a giant arrowhead with three narrow paddle seats folded against its sides. It is partially wrapped in a canvas cover to minimize damage as it plummets downward, penetrates the jungle roof, splinters branches, skids off tree trunks, and finally lands—as close as possible to the anxious airman. He pulls a paddle down, straddles it, and holds on for dear life as the hoist reels him up to safety. If the survivor reports by his hand radio that he is injured, a PJ rides down on the penetrator and brings him up.

The rescue crews in the Jolly Greens must push luck and endurance to the limits if they are to succeed. They must worry about the fuel holding out, about control of the ship when a man is on the penetrator and ground fire is knocking holes in everything, about

EXTRACHROME BY KODAK ©NATIONAL GEOGRAPHIC SOCIETY

hanging the survivor or the PJ in the iron grip of a tree, about the weather closing down suddenly, about heading for an emergency field only to find it overrun by the enemy.

The men who gathered now around the radio in the operations shack at Udorn were solemn because they lived daily with those worries (above). The rescue team was converging at the site of the downed plane. Four fighter planes, Douglas A-1H Skyraiders, had scrambled from Udorn at the first news of the crash. In the rescue team, the fighters are called Sandys. Their job is to protect the helicopters during the rescue.

The plane and the nine men had been down for about an hour when the radio at Udorn crackled on. It was Sandy Lead reporting from North Viet Nam: "Made low passes. No ground fire as yet. Have most of the parachutes located."

Two Jolly Greens from Da Nang and two others from Nakhon Phanom were nearing the area, and now Marty Donohue, in the Buff from Udorn, came on: "Give me a heading. We'll be there in 15 minutes."

There is a roaring amount of radio chatter during a rescue—helicopter crewmen coaching their pilots, Sandys talking amongst themselves, choppers talking to Sandys, beepers from the jungle below going in everyone's ears.

Like a swarm of buzzing hornets, a precision team zooms in to snatch airmen from the enemy's grasp. On a slope above the Ho Chi Minh Trail, a U. S. plane shot down by North Vietnamese antiaircraft billows black smoke, right. Twin-tailed Cessna spotting planes, still on the scene, spied crewmen's parachutes. Now one of four Douglas Skyraider A-1H's, foreground, spits gunfire and rockets at machine gunners near a

PAINTING BY PIERRE MION © NATIONAL GEOGRAPHIC SOCIETY

prisoner-of-war camp, left. Close by, a hovering Jolly Green hoists a flier aboard; two others spot chutes and a red smoke flare, and home in on radioed distress beeps. A Buff searches near the smoldering wreck; a refueling plane circles at upper left. After five grueling hours, seven survivors rode copters to safety. Eyewitness accounts and artist Mion's own experience in Viet Nam enabled him to re-create an actual rescue.

At 1:30, Sandy Lead reported again: "Jolly Green 10 going in to make a pickup." And a little later: "Jolly Green 10 is over another who is hanging upside down in his chute."

Lt. Col. Garland York, the detachment operations officer (page 351), was standing beside me. He said: "I'll bet Marty has bitten his pipe stem in two. Da Nang's got two already." Tremendous rivalry exists among the rescue men; each team wants to make more combat saves than the others.

I could visualize the scene, for I had been in that enemy area—5,000-foot jungle mountains that slope into high valleys. Sheer, white-faced cliffs of limestone stand out from the green forest like islands with flat rock tops (preceding pages). I remembered the dusty roads along the edges of the fast rivers, and the thatched mountain villages that cling to the high ground. All of us at Udorn knew that those roads were alive with enemy troops hurrying to capture the downed Americans and to break up the rescue with ground fire. Every moment was precious.

Three Jolly Greens were now at the scene, and Donohue in the Buff and the fourth JG were held in reserve. Before 2 o'clock, Sandy Lead reported again: "Have six people aboard the Jollys, three still in area. Might have to launch alpha romeo up here if we get in a bind. Jollys had to dump fuel."

Crown Feeds Fuel to Flying Jolly

"Alpha romeo" means aerial refueling. The smaller choppers had needed all the power they could muster to hover in that high, thin mountain air. They had dumped their extra fuel overboard to lighten the load, and some did not have enough to return to base.

When that happens, as it often does over North Viet Nam, a Crown joins the Sandys, Jollys, and Buffs. It is a Lockheed Hercules HC-130P that has been circling high above the action and out of antiaircraft range.

The Jollys have 7-foot probes that can be extended to 16 feet for refueling. With their load of saved—and sometimes wounded—men, they often must seek out the Crown for fuel. Their probes gulp as much as 200 gallons a minute once they link up with the drogue hoses that trail behind the big Lockheed (page 365).

Now Udorn command was urgently asking Sandy Lead: "Did everyone get out of the wreckage?"

"Jolly Green 10 has copilot of plane aboard and he advises he saw only four chutes besides his own. . . ."

Then, at 2 o'clock, came another report: "JG 37 is making another pickup."

Smiles broke out all around in the operations shack.

"That's seven out of nine," said Colonel York. The record number of saves over enemy territory up to then was eight at one time, and the men at Udorn were elated at the spectacular success of this rescue mission.

It was now after 2 o'clock. Two Jollys headed for the Crown to get aerial refills, and two others turned for home. Then a beeper signal was reported from the ground. Was it a trap?

Enemy Tries to Lure Rescue Crews

This is one of the constant worries of the ARRS over North Viet Nam. Using captured radios, the North Vietnamese put up beeper signals, hoping to lure a rescue team within range of their guns.

As a countermeasure, Rescue Control Headquarters keeps a secret question-and-answer card for every airman on a mission to the north. Before a JG is committed, the man on the ground is quizzed by radio.

I learned later that during this rescue near Khe Sanh, one of the Jollys had asked one of the downed men for authenticating answers.

"What kind of car do you drive?"

"A Volkswagen," came the reply.

"What is the code name of your mission?"

"Classmate."

"What is your wife's first name?"

There was a long and awkward silence. Stress does strange things to the mind. Finally: "Good Lord, I can't remember!"

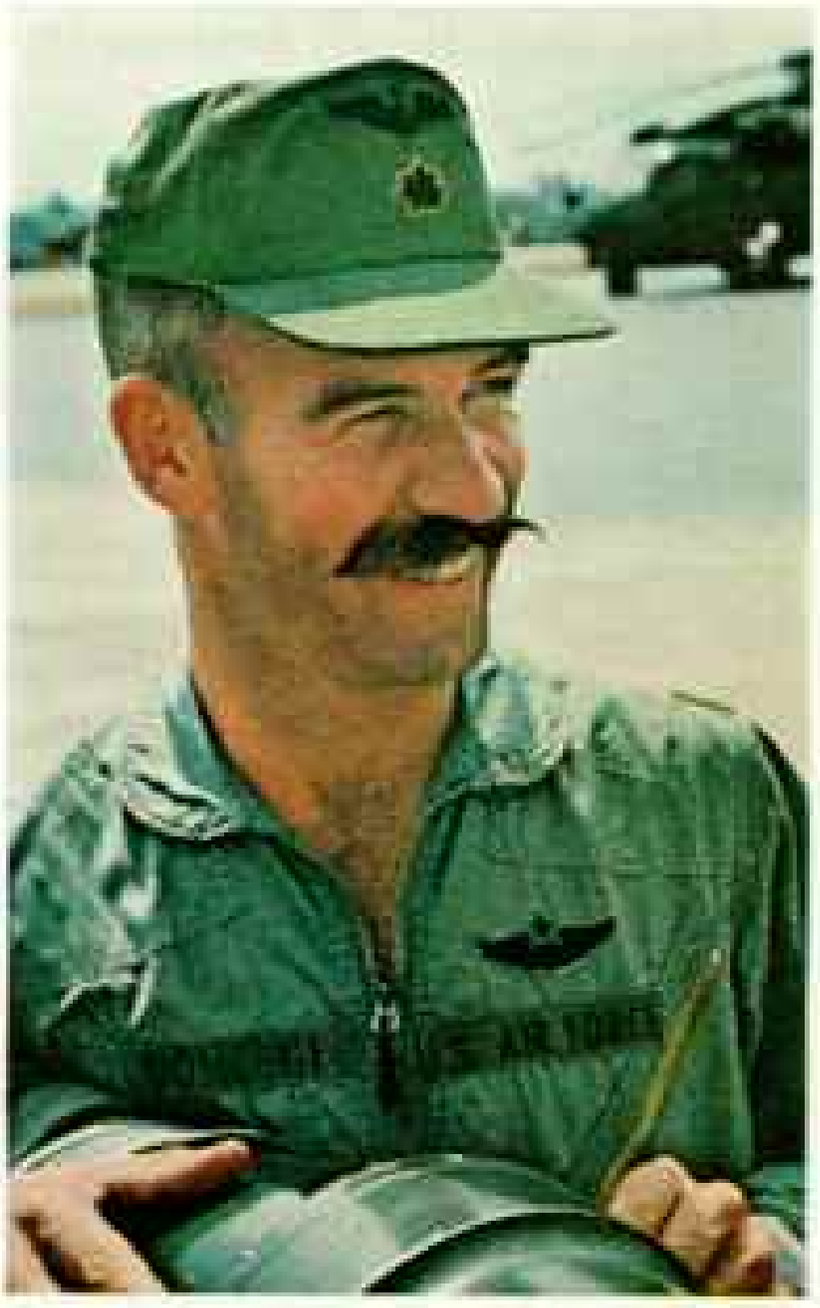
The man was saved, but he might have faced a fate worse than capture if his wife had found out about that lapse.

Now Major Donohue was ordered in to investigate the last beeper signal. One of the survivors in the Jollys had said he thought a man was still in the plane and wounded. But no further signals came from below. Perhaps the man was too badly wounded to reply. Or was it the enemy down there, watching and waiting with loaded guns?

No word came from Donohue until nearly 3 o'clock. Then we received this:

"Heavy ground fire. Receiving heavy ground fire. Have a leak."

The men in the shack stiffened. It *had* been a trap! Colonel York kept saying to himself,



PAINTINGS BY HOWARD SOCHUREK © N.G.S.

"The bravest men I've met"

THUS AUTHOR SOCHUREK, veteran of 19 trips to report on the Viet Nam war, characterizes the selfless men of the Aerospace Rescue and Recovery Service. Capt. Gregory A. M. Etzel, still on crutches, crashed while attempting to recover seven downed fliers west of Hanoi. He and his crew lived off the jungle for three days before another team pulled them out. First Lt. Leone Russo (upper right) flew as copilot with Maj. Frederic M. Donohue (center) in the dramatic rescue portrayed on pages 352-3; their Buff limped back riddled with 24 bullet holes. Checking in after a long and exhausting mission, Lt. Col. James M. Dixon (lower), commander of a rescue detachment, wears the war on his face. All dedicate themselves to the ARRS motto, "That others may live."

"Return the fire, return the fire." Each Buff is equipped with three Miniguns, 7.62-mm. automatic weapons. Now the Sandys, too, reported heavy fire, and Udorn command ordered all rescue craft out of the area.

I asked Colonel York what shape Major Donohue was in.

"If the hydraulic system fails, the controls can go in a split second and you can't fight it. If the leak is in the fuel tank, thank God. There's special sealant in there, or we would have lost three aircraft by now."

Sandy Leads Crippled Buff to Safety

As we talked, the radio broke in with an urgent message from a Sandy to Donohue. "You are going into a bad area, a bad area."

The crippled Buff was about to cross a heavily defended branch of the main north-south supply route from North into South Viet Nam. It was bristling with 37-mm. and 57-mm. radar-controlled antiaircraft guns, probably the same ones that had brought down the plane they went in to help.

The Sandy guided Major Donohue safely around the bad area, and he eventually landed at an emergency strip. Later he called in on "lima-lima"—land-line telephone—with a battle report: One bullet hole through the tail rotor drive shaft. Two hydraulic lines severed. One hit in the electronics compartment. One bullet stuck in the refueling probe. Twenty-four bullet holes in the helicopter. But all hands survived.

A few days later I chatted at length with the 3rd Rescue Group's commander.

"Things were a little makeshift when we first started the rescue operation out here," Colonel Leske recalled. "Before the Jolly Greens, and later the Buffs, appeared, we flew the little Kaman HH-43 Pedros with wooden counter-rotating blades. We carried 50-gallon drums of fuel aboard. When the tanks ran low, we would crank a pump by hand and

load the fuel through rubber hoses. Then we would kick the barrel out of the helicopter to make room for the survivor."

With Sikorsky engineers, Colonel Leske helped tailor the Air Force CH-3C to rescue needs. The result was the HH-3E, the Jolly Green now in use over North Viet Nam. The cabin of the still-newer HH-53B, the Buff, is roomy. Two gas-turbine engines drive its rotors. These ships have witnessed every imaginable emergency.

Flier Ejects Into Pitch-black Night

One episode, which I found unforgettable, involved Capt. Herbert (Hesh) Altman of Boston. I heard about it when he dropped by Udorn to thank the PJ's who saved his life.

Hesh graduated from the Air Force Academy in 1962. At 29, lean and round-faced, he had the virile look that a bad scar on cheek and forehead gives a handsome man. He was on his fifteenth mission, flying as navigator in the back seat of a McDonnell F-4D Phantom II, when he ejected, or "punched out."

"We were on a night mission to hit the supply route just south of the Mu Gia Pass," he said when I asked him the details. "You know the place. It's an area of volcanic crags and steep limestone cliffs. We rolled in over the trucks on a rocket pass, pickled two rockets against the trucks, and jinked."

Hesh used "pickled" for "fired"; by "jinked," he meant making a sudden change in the plane's altitude and direction to keep radar-controlled weapons from scoring a hit.

"As we jinked, I saw tracers cross in an X right over our canopy, and I said, 'Judas, they almost got us,' to nobody in particular. But they *had* got us. We pulled up suddenly and then nosed over. We were down from 6,000 feet to 4,000 in 15 seconds.

"My pilot yelled, 'Get out, Hesh, get out, get out,' and I ejected. It was 7 o'clock and a pitch-black moonless night.

EASTCHROMES © N.G.S.

With luminous hieroglyphs, Thai airmen record positions of enemy and friendly aircraft on a transparent plotting board. It gleams at the rear of the Control and Reporting Center at Udorn (left), jointly manned by Thai and U. S. personnel.

Watching through radar eyes, the Control and Reporting Center follows aircraft as lighted blips on its scopes. It assists in rescues by maintaining precise fixes on disabled planes, even when the pilots have lost their way. Once the nerve center pinpoints a crash, pararescuers still approach warily. Speaking English over captured radios, North Vietnamese sometimes lure rescuers over gun positions. Headquarters keeps a list of personal questions for every combat flier; when shot down, he must verify his identity by answering correctly.

Over a landscape seemingly serene, a Buff roves North Vietnamese highlands that can erupt with enemy fire at any moment. Milky clouds screen the craft from ground fire, but also hinder

"I saw the plane continue its dive after I got out. It buried itself in the steep slope of the cliff beneath me, doing 500 knots in a 30-degree dive, and when it exploded, parts of it hit me while I was still falling. I thought I was going to die right there.

"Then my chute popped, and I was in the air only five seconds before I hit. The chute caught in tree branches, slowing the fall before I slammed into a rock crevice so tightly that circulation was cut in both my legs. I noticed I had lost my watch, and the right side of my head was wet and sticky from a burn where I had been hit by the flying debris.

"I got out my radio and called the wingman who was circling overhead. I told him, 'I'm stuck in a crevice down here next to the burning airplane.'

"He answered, 'Have you spotted.'

"I looked down the mountain slope below me, about 1,000 feet straight down. On came North Vietnamese truck headlights along the

PHOTOGRAPH, U. S. AIR FORCE

the search for survivors. Outboard gas-turbine engines can drive the chopper at speeds close to 200 miles an hour; bomb-shaped auxiliary fuel tanks can be jettisoned in emergencies.

Ho Chi Minh Trail. It looked like a Los Angeles freeway. I will never know why they couldn't see me hanging in that rock [page 366]. In a period of about 20 minutes, I counted 40 trucks.

"Then my pilot, who was down somewhere near me, came in on his rescue radio, talking to the wingman in the air.

"He half whispered, 'They're coming down the hill with lanterns. There are bad guys all over the place. I don't think I'm going to make it. I'm signing off. Don't come in on beeper in the morning.'"

Hesh wondered where his pilot was. He later learned that the pilot had buried himself in shrubs at the bottom of the slope near the road and had remained hidden the whole night as regular North Vietnamese soldiers searched for him with lanterns.

"After a long time," Hesh said, "the Sandys showed up and advised that rescue was not going to attempt a pickup that night. They

ATTACHMENT, U. S. AIR FORCE

told me to hang loose and they would be back at dawn."

All through that long night Hesh had visitors, small animals he could hear scrambling around him. He was illuminated at times by fires started by chunks of burning aircraft.

Visitor Entertains a Lonely Airman

"About midnight," Hesh went on, "a chestnut-brown monkey came to see the burning wreckage and I said, 'Hi, monkey.' I petted her for about an hour, happy to have company. I scratched her under the chin and she really liked that. Seemed to me that she had been petted before. She crawled up and kept playing with my vest. I was trying to get my strobe light out in case I had a chance to signal. I had to take off my gloves to do it, and the monkey stole my gloves.

"I dozed off, but every time the wind blew, parts of the aircraft would fall out of the trees. I imagined noises behind me, even thought I heard bolt-action rifles being cocked.

"About daybreak I felt numb from the waist down and was hurting everywhere. It took two hands to use my radio. My batteries were loose and had to be held in place.

"About 0600 a Crown showed up and asked me for ten seconds of beep. I gave it to them.

"Then my pilot came on the air from down below and asked the Sandys to strafe the road. A work crew had appeared at dawn and was working 20 feet from his position.

"There was no firing other than their strafing, but over the hill a war was going on as Sandys hit AA gun positions.

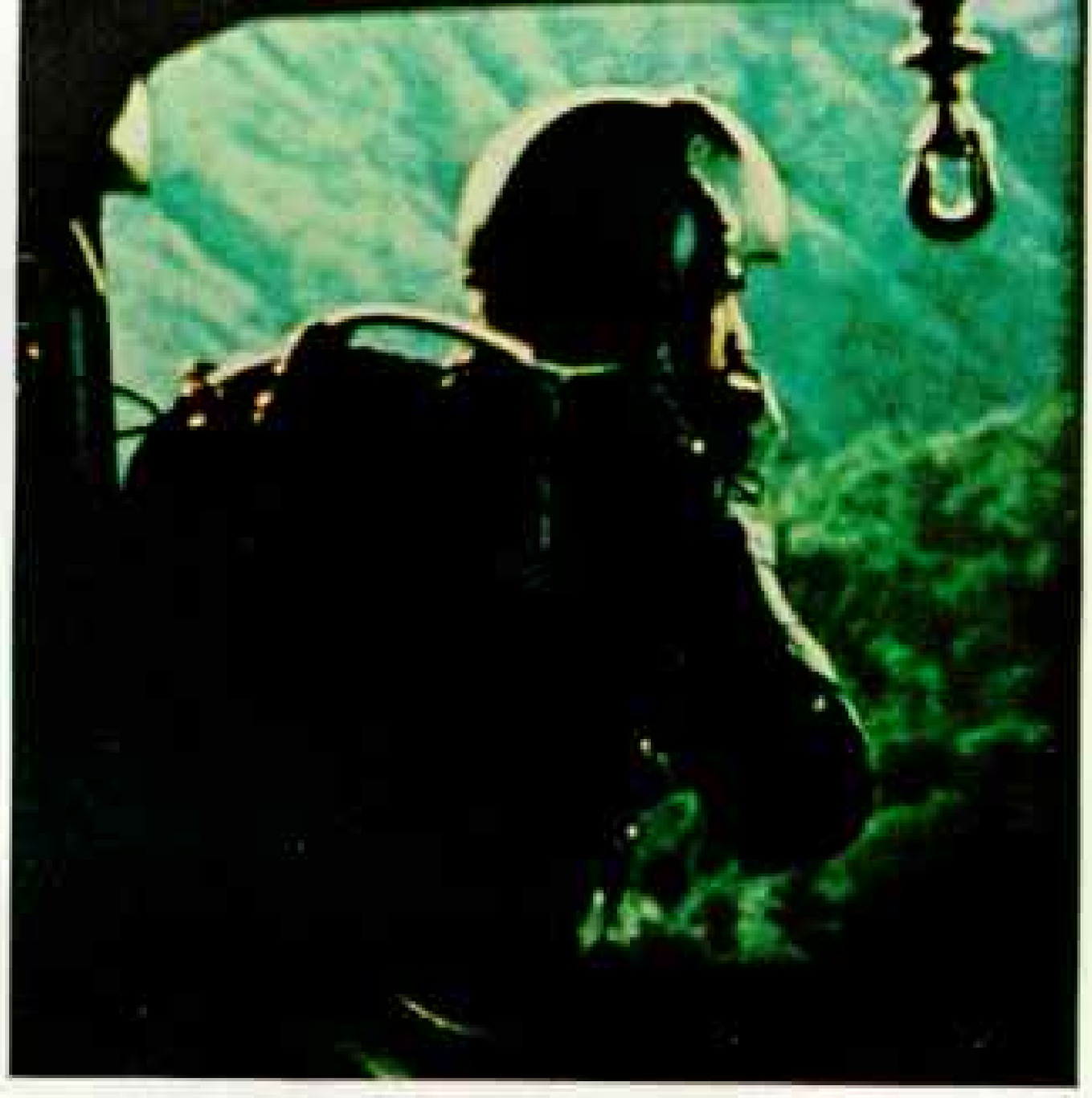
"At 0745 I heard the choppers come in. I told them to get my aircraft commander first because he was down there with the bad guys. I had a bird's-eye view of the rescue with the chopper only 100 yards away.

"After they pulled the AC aboard, the same chopper came after me. Then we ran into problems. I was wedged in the rock and couldn't move. I asked to have the PJ come down to get me, but every time he got close he missed me. They just couldn't hover near enough because of the sheer cliff.

"The down draft whipped my parachute around my neck. Finally they swung the

Rescue!

With a flash of fire (left), a Buff's Minigun pins down enemy snipers. On the ground fighter pilots Tracy Dorsett and John A. Corder await the outcome of a race between rescuers and prowling Communists. An hour earlier, the Air Force captains' plane was hit during a bombing run near Hanoi, and they ejected. Their wingman alerted rescue headquarters, and soon two choppers were on the scene.

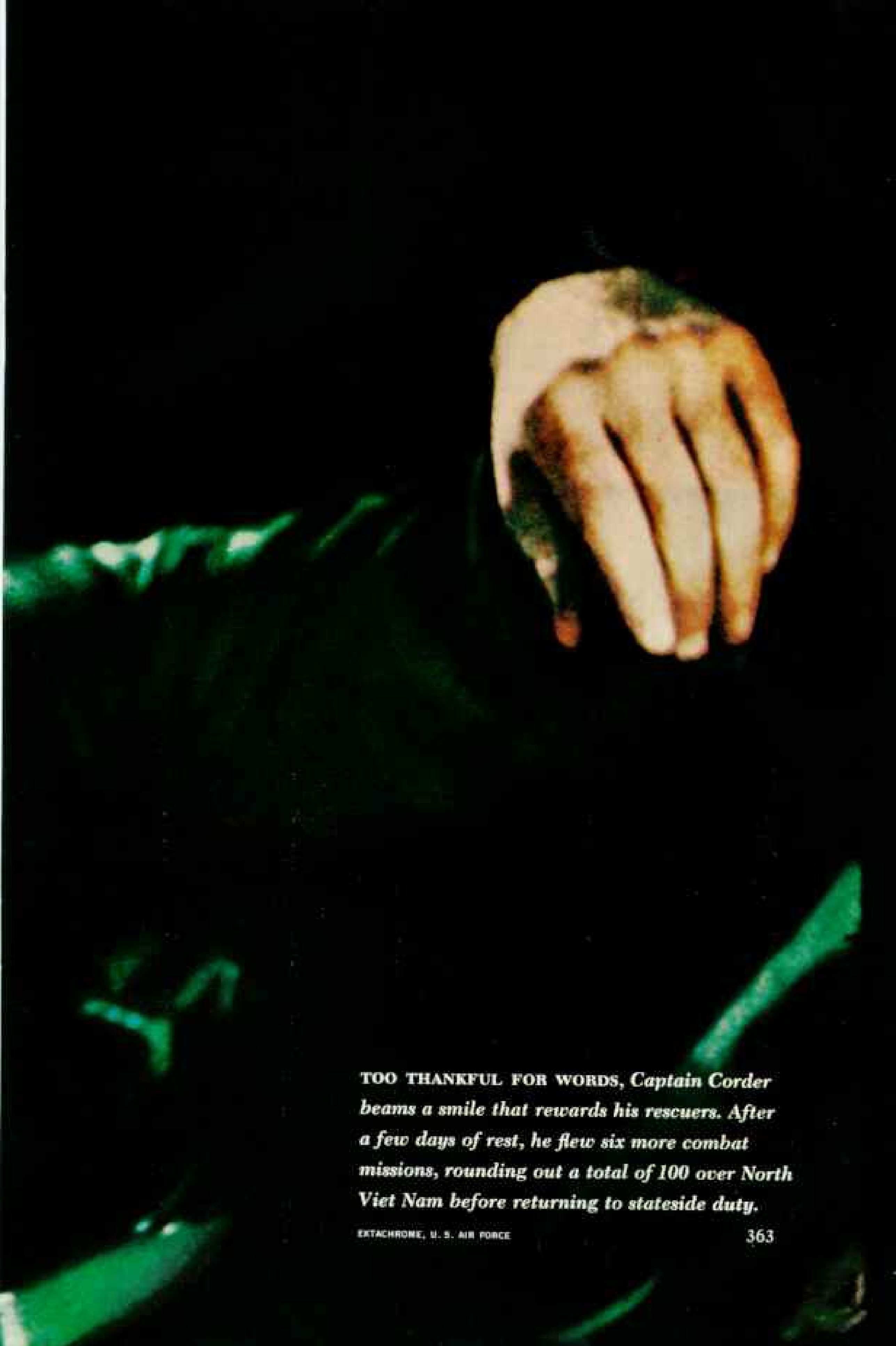


Searching from a chopper, flight engineer Sgt. Gene A. Sellers (top, right) spots Corder's smoke flare and picks up the sound of his beeper. Coaching the chopper pilot, Sellers directs the 20-ton bird until it shudders to a standstill 200 feet above Corder, still hidden by dense foliage. Sellers reels out a cable, lowering a collapsible chair lift called a jungle penetrator to within arm's length of Corder. Unseen below, the captain unfolds a seat on the penetrator and straddles it as he would a merry-go-round horse. Then he signals to Sellers.

Riding the penetrator, Captain Corder clears the treetops in his perilous ascent. His crossed legs extend to the left, and his flying suit appears almost white against the jungle's deep green in this frame from a 16-mm. movie sequence. So far his luck holds; no snipers fire on him.

At the threshold of safety, Corder still shields his head with his arm. Sellers leans from the hatch to pull the pilot aboard. As Corder gained the sanctuary (here and following pages), a second chopper descended for Captain Dorsett.

EKTACHROME, U. S. AIR FORCE



TOO THANKFUL FOR WORDS, *Captain Corder beams a smile that rewards his rescuers. After a few days of rest, he flew six more combat missions, rounding out a total of 100 over North Viet Nam before returning to stateside duty.*

EXTACHROME, U. S. AIR FORCE

penetrator in like a pendulum and I grabbed it and pulled myself out of the crevice [page 367]. I went up and down three times, messed up in chute, shroud lines, and branches. The third time up, they pulled me aboard, and I just lay on my back in the helicopter looking up at the PJ.

"I said, 'God, you look beautiful.'

"These Jolly Green boys are a breed all by their lonesome. As happy as we were to get picked up, the Jolly Greens were even happier to have done it."

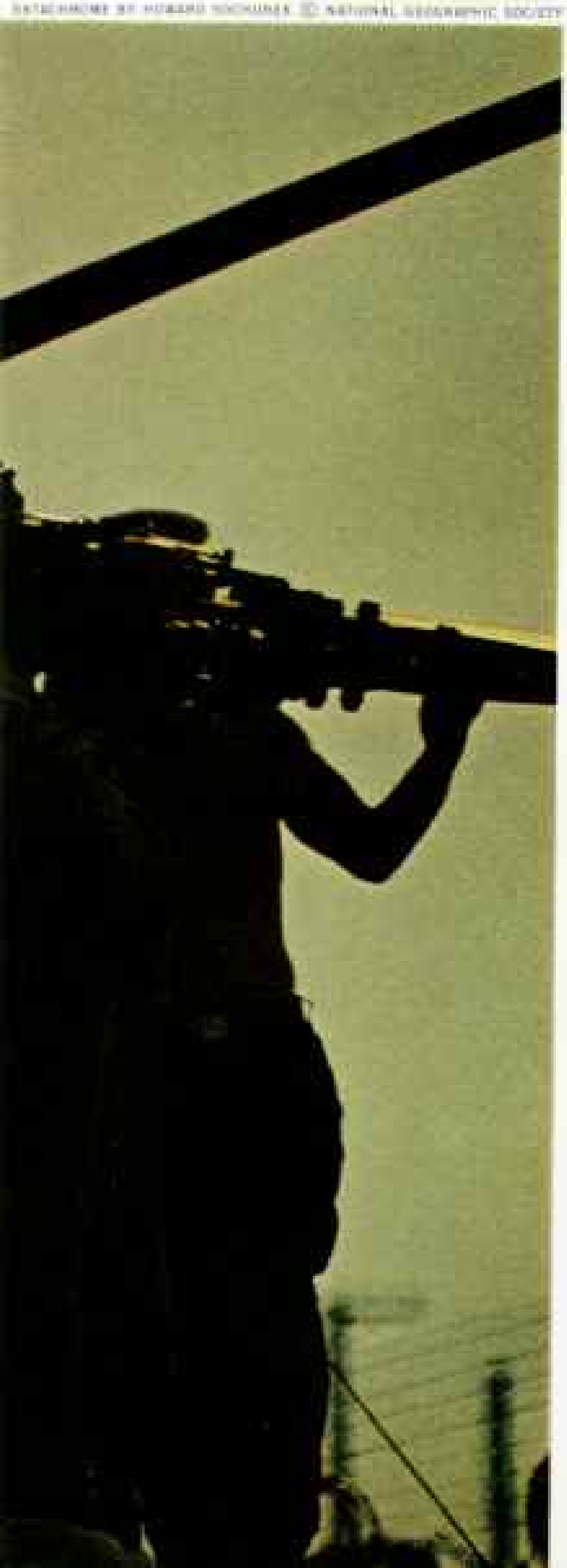
Another visitor to Udorn when I was there was Capt. Gregory A. M. Etzel from Albany, Georgia, who wears the coveted Air Force Cross among his decorations. He came limping in on crutches one morning (page 355). He was injured on January 15, 1968—a day those who lived through it will never forget.

It began when an Air Force plane with seven men aboard was hit by an air-to-air missile fired by a MIG-21 and went down about 80 miles west of Hanoi. When rescue got the call, Captain Etzel with a crew of four took off in a Jolly Green for the crash site.

"Visibility was 50 feet," he said, "and clouds were pouring like milk over the edge of the cliff. We had one more ridge to cross when we hit the mountainside. The rotor blades broke on impact, the right front section of the cockpit fell off, and I was thrown clear of the ship still strapped in my seat."

The rescue crew suffered serious injuries. Captain Etzel had a broken leg. Capt. David Holt, the copilot, had a broken foot. The PJ, Sgt. Angus Sowell, had broken both a leg

EXTRACORPOREAL, U. S. AIR FORCE



EXTRACORPOREAL BY HOWARD SOCHUREK, © NATIONAL GEOGRAPHIC SOCIETY

Thirsty bug, a Buff refuels by slipping its 16-foot proboscis into a flowerlike drogue on one of two fuel hoses that trail behind a Lockheed HC-130P. The chopper must synchronize speed for as long as ten minutes while it drinks from the flying filling station, called Crown.

War dictates the workday as Udorn airmen labor on into sunset; they repair twin rotors of a Kaman HH-43B Pedro, a helicopter used for base emergencies. Rushing in fire fighters and equipment, it can hover over a burning crash so the downwash of its rotors blasts back flames, clearing a path to the cockpit.

and an arm. Two others in the crew, A2c James Sadderley and Staff Sgt. Elwood (Jim) Beam, had escaped injury.

The five men found themselves on a rock face that dropped at a 45-degree angle. Clouds and mist swirled over them, making prompt rescue impossible. The rock they were on was black and slippery with wet vegetation and moss. They tied stretchers to the ruins of the helicopter to keep the injured men level and waited in the fog.

Now there were two ships, the Air Force plane and the rescue helicopter, with a total of 12 men, down in North Viet Nam.

The uninjured men of the rescue crew, Sadderley and Beam, found some jungle water vines on the mountainside below the wreck and worked for almost two hours squeezing out one and a half quarts. On the morning of the third day, hoping to find a spring, they climbed down to a little ledge, but heard noises and voices through the thick fog about 20 feet away. They quietly crept back up the hill and broke out weapons. There they sat, a small and crippled armed camp.

The weather cleared on the morning of the 17th, and the men at Udorn set out to find both downed crews.

The pickup of the plane crew came first. I spoke later with Airman Michael Dodd of San Antonio, Texas, and

Sgt. Jack Hoover—the PJ's who pulled the plane survivors out.

Dodd said the jungle was so thick they passed right over the aircraft commander at 50 yards. When he popped smoke, it took three minutes to drift up through the foliage.

Assignment Decided by Toss of a Coin

The plane commander had a broken leg, and Dodd went down on the penetrator to get him. He had won the toss that morning; the winner among the PJ's goes down first.

They located two other survivors. Hoover remembers when they got the second one, a pilot-navigator, up to the Buff. "He went to the back of the cabin where his aircraft commander was lying on a stretcher, and they just hugged each other for a long time out of relief at being saved."

No trace was found of the other four crew members, who presumably were captured.

A second Udorn Buff, under the command of Capt. Russell Cayler and with the operations officer, Colonel York, aboard, had been searching in vain for their comrades lost on the mountainside.

"Our escort Sandy," Cayler told me, "had engine trouble, so we started back. We were about five minutes on our way home when I decided to make a last effort to find Captain Etzel and his crew. We turned around and went back alone. About that time, another Sandy showed up and spotted the wreckage. He snapped his wing to indicate the position and then we saw a pen flare and red smoke."

What followed is a measure of the caliber of the nerves of men of the ARRS. Again, it is best told largely in the words of Captain Cayler, who lived it: "Now we really started to sweat. The Sandy was reporting only five minutes to complete cloud cover. For some unknown reason fuel was leaking from our main fuel tanks. With the leak we were only 15 minutes to 'bingo' fuel [just enough to return to base].

"The communications jam-up was impossible. I was getting voices from Crown, from Sandys, from my own crew, and beeps from the survivors' radio. I remember hearing the engineer say 'Sir, the cable is fraying' and then 'Sir, I don't think the cable will hold' and finally 'Sir, are you listening?' I finally had to order everyone off the air so I could talk to my hoist operator. I thought to myself, Cayler, if you don't get these boys now, you won't have a second chance.

"Well, we made seven trips on that hoist with the cable fraying and recovered the five survivors and our own two PJ's. We were hovering about 100 feet off the cliff and occasionally tipped the tree branches with our rotor blades.

"The Sandys kept warning us about the weather, and Udorn kept asking us about our fuel level. With all survivors now aboard, we started to gain altitude. I remembered a chimney of limestone right behind us, but in

PAINTINGS BY PETER WEIR © N.G.S.

Night on the brink of disaster: Pinned where he landed in a rock crevice, Capt. Herbert Altman becomes an unwilling spectator as trucks rumble south along the Ho Chi Minh Trail 1,000 feet below. The navigator bailed out during a night strike last December. Drawn by the flaming wreckage of his plane, enemy troops search the area; a friendly monkey keeps him company. At dawn, a chopper arrives and lowers a yellow jungle penetrator, right. Catching it, Altman wrenched himself loose from the crevice, but became enstarled in a tangle of parachute lines and branches; three pulls from the hoist finally freed him for the lifesaving lift.

CATACOMBS, U. S. NAVY

Lifesaving the Navy way

GUIDED by the radio beeps of a carrier pilot downed off Haiphong, a Navy helicopter warily approaches haystack-shaped coastal islands, here seen beneath the craft's overhead engine controls (left). Moments later, crewmen sighted Lt. (j.g.) Cody A. Balisteri, the pilot. Near Hanoi, ground fire had crippled his LTV F-8 Crusader, and he headed for open water to ditch. Parachuting onto an island, he crawled down steep rocks to the water's edge.

Hovering off the treacherous rocks, the chopper lowered pararescueman Gary W. Smith, who swam to Balisteri and inflated a raft. Now he helps the pilot aboard (left).

Swimming, Smith tows the pilot clear of the rocks and helps him into the chopper's horse-collar sling. But the cable hoist fails; now the chopper must descend for the pickup—a perilous maneuver in which a single gust can drive the craft into the sea. Only five feet above the waves (opposite), Petty Officer Royce L. Roberts thrusts down a saving hand to pull Balisteri on board. Smith waits his turn as the team completes one of the feats of heroism that have become routine in Viet Nam.

less than 15 seconds we were in the clouds. Everything whited out. Finally we broke out at 4,000 feet and, bam, both engines began to die. We started sinking back into the soup. The rpm on the left engine gauge unwound and dropped to 20 percent, the right engine to 50 percent. Without thinking, I shouted: 'Mayday! Mayday! Mayday!'

"I slammed the right engine into cross feed, thinking it was fuel starvation. Colonel York slammed the left engine to cross feed. The right engine caught and came back. The left engine went dead completely.

"A Sandy pulled up alongside. 'We've got only one engine going,' I told him.

"He asked, 'Can you hold your own?'

"I answered, 'I think so.' "

Captain Cayler explained that his only hope was to reach an emergency field. He was low on fuel and had trouble holding altitude. He had two heavily defended main roads to cross, and he'll never understand why he didn't get shot down. But he made it, with ten exhausted but happy men.

Flaming Grass Draws Enemy Fire

Two other fliers came to Udorn on trips they had not expected to make—Capt. Tracy Dorsett and Captain Corder, whom I mentioned earlier. Their F-4D Phantom II was leading a strike on an airbase northwest of Hanoi in February, 1968, when both engines and the fuel system were damaged by anti-aircraft fire.

"I thought at first," said Captain Corder, "that we could rendezvous with a KC-135 and refuel, but we were burning it up too fast. Tracy asked me to look for an ejection

CATACHROME, U.S. NAVY

spot, and we headed for the highest and roughest terrain we could find. I punched out first and Tracy followed. We went down into trees that must have been 150 feet high, but my chute snagged on a small tree, and I was left hanging only six inches above the ground."

Captain Dorsett, the aircraft commander, told me that his chute went through the trees without catching, and he spilled down a steep slope of knee-deep grass and vines. He found himself on a ridge line about a mile from Corder. A well-traveled road skirted the area; both men knew that meant trouble.

Their wingman, circling overhead, alerted rescue headquarters. Sandys were on the scene in 15 minutes, followed by Buffs from Udorn.

When Dorsett set a flare to mark his position, he accidentally set the grass around him on fire. As the smoke billowed up, North Vietnamese troops on the road started firing toward it. One of the Udorn Buffs closed in and returned the fire while another made the pickup of Corder (pages 360-63).

That was when Corder hung onto the penetrator so hard they almost had to pry it out of his hands. The pickup of Dorsett followed.

Few Jobs So Satisfying

When the history of the Viet Nam war is written, there should be a place in it for the air-rescue drama and the words of Air Force Capt. Jerrold D. Ward:

"Your first pickup," he told me, "is really something—to look back and see the smile on that guy's face. There are very few jobs devoted to saving men's lives, and this is one of them. I may never do anything else in my life that is so satisfying." THE END

New England's
"Lively Experiment"

RHODE ISLAND

By ROBERT DE ROOS

Photographs by
FRED WARD, Black Star

LIKE EVERY SCHOOLBOY, I once rejoiced in the knowledge that Rhode Island is the smallest state in the Union. When I also learned that this vest-pocket land of 37 by 48 miles is one of our most highly industrialized states, I had the image of a crowded workshop where almost a million people rub elbows under a cloud of smog.

Nothing could be further from the truth. During days and weeks of wandering the state, I found it a spacious domain.

I drifted along through autumn woods where only the rustle of golden leaves broke the stillness. Everywhere blue water danced under the sun—in Narragansett Bay and in dozens of fresh-water ponds that dotted the glacier-gouged lowlands. Scarlet sumac leaves and golden fronds of ferns recorded the first frosts. Wiry beach grasses silvered the shoreline, and white egrets splashed among henna-gold reeds in salt marshes.

Yet, beyond the timeless shore and marshes, change has been the order of life for the state. Its swift streams and skilled people helped father America's industrial revolution, and its factories still churn out a never-ending flow of goods—costume jewelry by the sparkling ton, silverware, tennis shoes and

Seeking a haven "for persons distressed for conscience," Roger Williams in 1636 founded Providence, Rhode Island's earliest settlement. Here the First Baptist Meetinghouse on College Hill marks the spot where Williams organized America's first Baptist congregation in 1638. Today Rhode Island, chartered as a "lively experiment . . . in religious concernments," sets a lively pace in commerce and the arts.

rackets, golf balls, textiles, knives, heavy machinery, and electronic equipment.

Another revolution, America's war against King George III, had a root here, too. Rhode Islanders drew blood in several skirmishes with the British long before the Boston Tea Party. On July 9, 1764, Newporters fought sailors from H.M.S. *Squirrel*, seized Fort George, and fired a cannon shot that struck the warship. On June 9, 1772, the packet *Hannah* lured the British revenue cutter *Gaspee* into shoal water. Merchants threatened by the tax laws rowed to the scene in small boats, burned the *Gaspee*, and wounded her skipper.

The citizens of "Little Rhody" were also the first to declare their independence of Great Britain—on May 4, 1776, two months ahead of the rest of the Colonies. They still celebrate Independence Day twice a year.

One bright October morning, I walked up the slope of a grassy knoll to the white marble State House to visit John H. Chafee, Rhode Island's dynamic Governor. I took a few minutes to stroll the grounds. Chiseled above an entrance is a sentence from the Royal Charter of 1663, granted by King Charles II, which stated one purpose of the colony: "To hold forth a lively experiment that a most flourishing civil state may stand and best be maintained with full liberty in religious concernments."

In the Governor's elegant reception room a full-length portrait of George Washington, painted by Rhode Islander Gilbert Stuart, looked down on me. I saluted two other Rhode Islanders: Commodore Oliver Hazard Perry, the hero of the Battle of Lake Erie, and Gen. Nathanael Greene, a onetime Quaker who enlisted as a private in the Revolution

and rose to the command of the southern forces under Washington.

Governor Chafee, a tall, urbane man with Lincolnesque features (next page), greeted me in a more workaday office.

Progress Stalled When Jobs Moved South

"The atmosphere here is one of great resurgence," he said. "We suffered a severe economic loss when our textile mills moved south after World War II. We lost 47,000 textile jobs—47,000 jobs out of a total of 300,000 of all types. That was a terrible blow. But today, 340,000 Rhode Islanders are at work, unemployment is down to 3½ percent, construction is at a record high, the highway program is forging ahead. I think you will find that we are making a new start, and a good one." *

As I left the State House, I waved to the Independent Man, a statue standing 235 feet in the air on a huge lantern atop the capitol. With his feet planted firmly, the bold figure seemed to defy a sky full of racing clouds.

The statue was originally proposed to represent Roger Williams, who founded Providence, the first settlement in Rhode Island, in 1636. Even before that royal charter of 1663, he had decreed that the colony should forever be dedicated to religious freedom. When the statue was commissioned in 1899, no one could discover what Williams looked like—no reliable portraits exist—so the figure became the Independent Man, symbol of Rhode Island's concern for personal freedom.

Every Rhode Islander knows about Roger Williams. His most enduring achievement,

*See "Rhode Island, Modern City-State," by George W. Long, NATIONAL GEOGRAPHIC, August, 1948.

"Clambake's ready!" The traditional New England feast of lobsters, clams, corn, and potatoes cooks in pungent seaweed spread over heated stones, a technique that settlers borrowed from the Indians. Members of the Newport Rotary Club sponsor the outing.

Leviathan of lobsters, this 15-pounder eluded fishermen for two decades until trapped by Martin Dahl off Galilee. Rhode Island is a major lobster producer.

Colleen from Connecticut, Joan Fitzgerald attends Rhode Island's Vernon Court Junior College, whose 65-acre campus embraces 12 Newport estates.

in addition to the state itself, is the organizing in 1638 of the first Baptist congregation in the New World.

Rhode Islanders also remember William Blackstone, who gave his name to the Blackstone River (map, opposite). Blackstone studied at Cambridge and became an Anglican clergyman, but he could never agree with his fellow churchmen. About 1625 he became the first white settler of Boston—then Shawmut—and greeted the earliest colonists of the Massachusetts Bay Company when they landed there five years later. But he found the Puritans narrow neighbors and, mounting the back of a milk-white bull, he jogged south in 1635 to become the first European settler of Rhode Island.

Blackstone chopped away at the forest, built a home, and set out an orchard with apples "of the sort called yellow sweetings that were ever in the world, perhaps, the richest and most delicious. . . ." Occasionally he rode his bull to Providence to dispute religious questions with Roger Williams.

Providence cherishes such memories. I stopped in to chat with John Simmen, Chairman of the Board of the Industrial National Bank of Rhode Island.

"The Yankee heritage is strong here," he said. "We still have the old families who grew up in trade and manufacturing. But the state was a melting pot, so the later European influence is strong, too. The Yankees lost political power to the Irish and Italians; yet today we are back under the influence of an old Yankee family, represented by the Governor.

"Some people say, 'We don't want to change,' but nothing is more inevitable. The change should come, though, by the process of restoration or improvement, not by any break with the past."

Providence-born Governor, Republican John H. Chafee serves a third term in predominantly Democratic Rhode Island. As a Marine he fought on Guadalcanal in World War II and led a rifle company in Korea.

Report Spurs Urban Transformation

A fine example of that philosophy is College Hill, where Roger Williams and his followers built the first settlement on a pleasant height north of the Providence River. By the 1920's much of the area was badly run down.

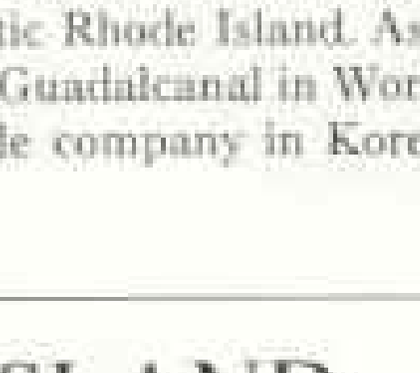
But on the morning I walked Benefit Street with Mrs. William Slater Allen, the tall, determined lady who was the first President of the Providence Preservation Society, it was evident that College Hill had again become a community asset. Tall elms cast their shadows on beautifully kept old houses occupied long ago by silversmiths, judges, doctors, and merchant princes.

"The Preservation Society began when some College Hill neighbors got together to protest the planned demolition of old dwellings on the Hill," Mrs. Allen told me. "City of Providence planners, the Preservation Society, and the Federal Housing and Home Finance Agency produced a pilot study on rehabilitation of historic homes which has become nationally famous.

"That report inspired one of our members, Mrs. Malcolm Chace, to form a corporation, which bought 17 deteriorating historic houses on Benefit Street. It restored their

RHODE ISLAND

THE STATE of Rhode Island and Providence Plantations—the Union's smallest in area and longest in name—has three times the population of Alaska, the largest, yet preserves winding lanes and empty beaches. Vast industries contrast with elegant resorts, and colonial landmarks with atomic submarines.



AREA: 1,214 sq. mi.; ranks 50th. **POPULATION:** 900,000, ranks 39th. **ECONOMY:** Industrial, especially jewelry, electronic equipment, metal products, plastics, rubber, textiles. **MAJOR CITIES:** Providence (pop. 187,000), capital; Pawtucket, industry. **ADMISSION TO UNION:** 13th.

RHODE ISLAND

STATUTE MILES

KENT ... county
LINCOLN ... township
Built-up area

DEPARTMENT OF GEOGRAPHY
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MASSACHUSETTS
CONNECTICUT
MASSACHUSETTS
RHODE ISLAND
Millville
Blackstone
Slatersville
Woonsocket
William Lake
BURRILLVILLE
NORTH SMITHFIELD
CUMBERLAND
Manville
Pascoag
Harrisville
Dorr Monument marks the end of the 1842 rebellion aimed at securing the vote for all men of the State
Chepachet
NORTH CENTRAL STATE AIRPORT
Ashton
Berkeley
LINCOLN
SMITHFIELD
Lonsdale
Valley Falls
GLOCESTER
Georgiaville
Esmond
Saylesville
Central Falls
Greenville
Pawtucket
East Killingly
Jerimoth Hill
North Scituate
Providence
Seekonk R.
Rumford
East Providence
JOHNSTON
SCITUATE
FOSTER
Thornton
Foster Center
Cranston
Auburn
Riverside
Somerset
Scituate Reservoir
Benefict Monument to Music
a stage for outdoor concerts with a natural amphitheater
Pawtuxet
Fiskeville
BARRINGTON
Barrington
Warren
Lippitt
River Point
WARREN
BRISTOL
Fall River
Coventry Center
West Warwick
Arctic
Anthony
Apponaug
Oneco
Washington
Crompton
Warwick
COVENTRY
WEST WARWICK
Greenwich Bay
Bristol
Narragansett Bay
Mount Hope Bay
North Tiverton
East Greenwich
West Greenwich Center
Nooseneck
EAST GREENWICH
TIVERTON
WEST GREENWICH
Tiverton
Prudence Island
Portsmouth
Monument to Rhode Island Red commemorates the breed's development near Adamsville
Exeter
NORTH KINGSTOWN
PORTSMOUTH
Adamsville
Lafayette
Wickford
Rhode Island (Aquidneck)
Codrington Cove
MIDDLETOWN
LITTLE COMPTON
Middletown
Little Compton
Hope Valley
Saunderstown
JAMESTOWN
Newport
Kingstown Pond
RICHMOND
Jamestown
Conanicut Island
Kingston
SOUTH KINGSTOWN
Great Swamp
Wakefield
Narragansett Pier
HOPKINTON
Pawcatuck River
CHARLESTOWN
Rhode Island Sound
Sakonnet
Charlestown
Pawcatuck
Westerly
WESTERLY
Point Judith
Ninigret Pond
Quonochontaug
Weekapaug
Misquamicut
Watch Hill
Block Island Sound
NEW SHOREHAM
Great Salt Pond
New Harbor
Block Island
Block Island
Mohegan Bluffs

Topping the marble dome of the State House stands the Independent Man, substituted for a likeness of Roger Williams because no authentic portrait exists. Sculptors later produced idealized monuments to the state's founder such as this in Roger Williams Park.

ROGER WILLIAMS STATUE

Flying Horse Carousel enters its second century of delighting children

Tomaquag Indian Museum's garden and settlement re-create Indian life

Historic Newport draws visitors to such attractions as The Elms, The Breakers, Marble House, Trinity Church, Touro Synagogue, and the Brick Market.

SCENIC LILLIPUT wedged between Massachusetts and Connecticut (inset), Rhode Island measures only 37 miles wide and 48 long. Its islands and water-scalloped peninsulas give the state a 400-mile coastline. The largest island, sometimes called Aquidneck, shares its more familiar name with the entire domain.

CANADA
UNITED STATES
MAINE
Augusta
Montpelier
VT.
NEW YORK
N.H.
Concord
Atlantic Ocean
Albany
MASS.
Boston
Providence
Cape Cod
Hartford
CONN.
Newport
RHODE ISLAND
N.J.
New York

exteriors but left the interiors largely untouched, so purchasers could adapt them as they wished. Many others restored homes, and today College Hill is again a charming and desirable area" (pages 370-71).

Proudest house on the hill is the brick John Brown mansion, built in 1786 for the pioneer merchant. Now owned by the Rhode Island Historical Society, the old house has been decorated and furnished to look much as it did when President George Washington stopped there to call on his friend John Brown.

I wandered through the high-ceilinged rooms, saw myself reflected in bright mirrors, and climbed the grand staircase. Looking down, I could imagine the mansion glittering in the light of a thousand candles, as it did at a party for Abigail Adams, wife of Vice President John Adams, in 1789. After dining there, she described the house as "one of the grandest I have seen in this country."

"John Brown, the Cleverest Boy. . . ."

It was a fitting residence for John Brown, one of the remarkable Brown brothers—the others were Nicholas, Joseph, and Moses—who dominated and shaped Rhode Island before and after the Revolution.

They were merchants whose vessels traded with China, Europe, and the West Indies; they engaged in banking, distilled rum, promoted turnpikes, spun cotton, and manufactured pig iron and spermaceti candles.

John Brown once wrote in his cipher book, "John Brown, the cleverest boy in Providence Town." He may well have been. He managed to be both a pillar in the Baptist Church and a firm proponent of slave trading until he died in 1803.

The brothers' most lasting and valuable legacy to Rhode Island is Brown University. The school began at Warren in 1764 as Rhode Island College, the seventh founded in the Colonies. The Browns led a drive to move it to Providence in 1770, and Nicholas's son Nicholas later contributed to the school so generously that in 1804 it was renamed for him.

Sailing into nowhere, sloops probe the fog off Block Island, 10 miles from the mainland. The island's Race Week, started only three years ago, became such a success that officials now must limit entries to 200. Setting sail from New Harbor, contestants circumnavigate the 17-mile coastline of the rocky isle. It bears the name of Adriaen Block, a Dutch explorer who landed there in 1614 while surveying Narragansett Bay.

Glass-breaker with a purpose, Dr. Herbert Kolsky studies the effects of explosives on brittle materials. As he detonates a small charge at the top of the glass, a rapid-fire camera records the spreading cracks. Dr. Kolsky's findings could help devise buildings safe for use in war zones. He directs a research project at Brown University, the oldest of Providence's six colleges and universities. Brown's enrollment of 5,000 includes 1,000 in Pembroke, the women's division.

Today John Nicholas Brown, a descendant, is Secretary of the Brown University Corporation and a leader in the state.

Brown's notable complex of libraries includes the John Carter Brown Library, with its priceless collection of Americana—more than 30,000 items dealing with all phases of life in pre-Columbian and Colonial times in the Western Hemisphere. For scholars of the period it has become a major research center.

Pembroke, Brown's coordinate women's college, occupies a campus a few blocks away. Pembroke girls attend classes at Brown.

Everywhere I went on College Hill I saw

Gleaming marble State House dominates the skyline of Providence, which houses a fifth of Rhode Island's 900,000 citizens. Many of its older traffic-tangling streets carry names extolling virtue and thrift—Benefit, Benevolence, and Hope; Dime, Dollar, and Cent. Atop the State House a symbolic bronze statue, the Independent Man, guards the domain of Roger Williams. Providence River, canalized and partly covered, right foreground, cuts through the commercial district to Providence Harbor on Narragansett Bay. Linked to the ocean by a 27-mile-long bay channel, the city ranks as one of New England's busiest ports.

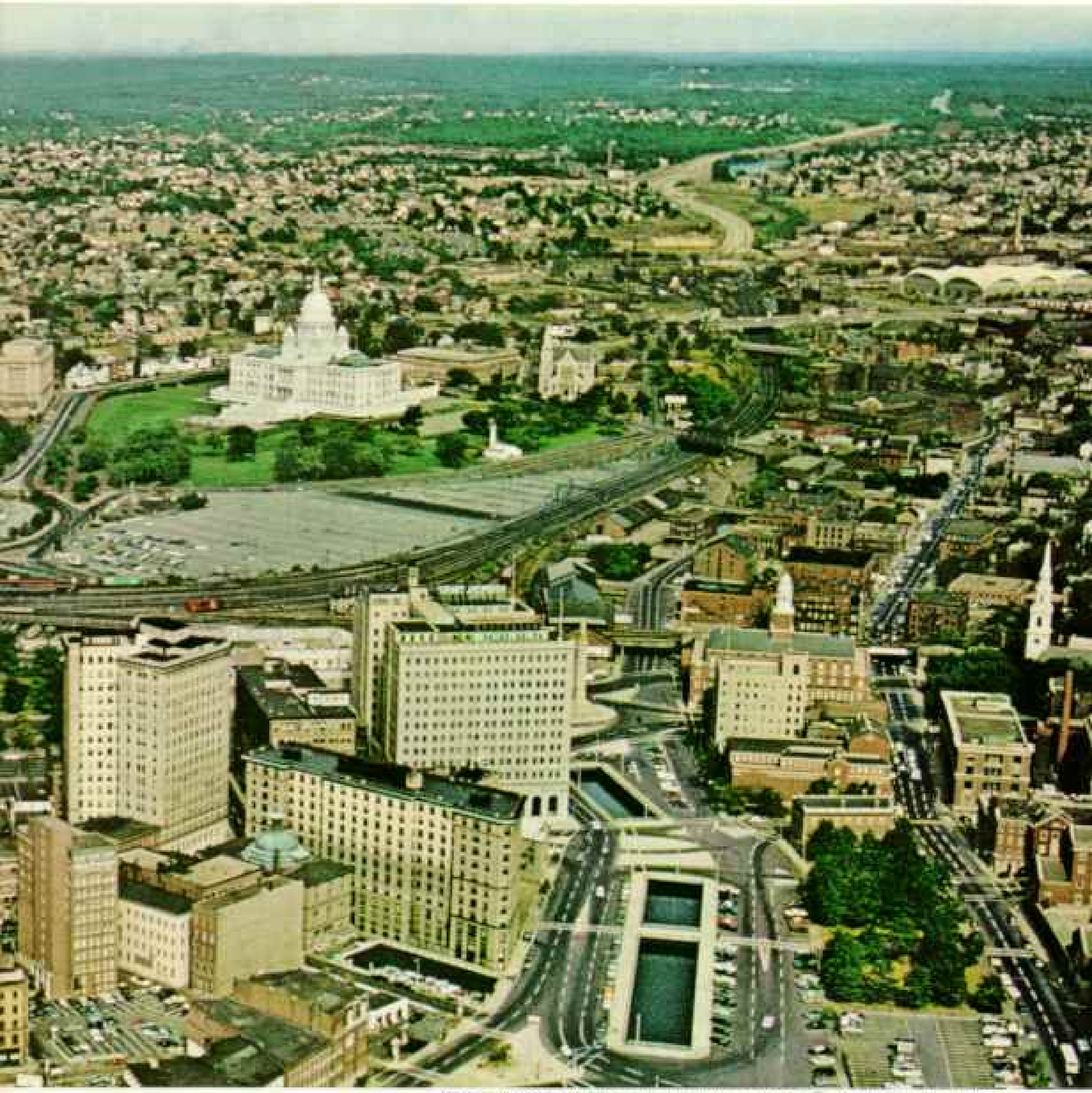
girls in jeans and bearded young men busily sketching the fall scene. I followed some beards down the hill to the main buildings of the Rhode Island School of Design. There I watched other intense students designing jewelry in a small factory, carving metal for etchings, pounding away in a cabinet shop.

The Departments of Graphic Design and Industrial Design share the rooms of 200-year-old Market House. I stopped there to read bronze tablets affixed to its bricks. One commemorates Providence's own Tea Party of 1775, when the townspeople gathered in Market Square to burn tea in protest against British tax. Another recalls the Great Gale which in 1815 drove water into the square to a depth of 11 feet, 9¼ inches. A third tablet commemorates the hurricane of 1938, when water reached a depth of 13 feet, 8½ inches at Market House, and all downtown Providence wallowed in sea water.*

New Dam Blocks Floods From City

Rhode Island's war with the angry sea reached a stalemate three years ago, when workmen built a hurricane barrier across the

*See "Geography of a Hurricane," by F. Barrows Colton, NATIONAL GEOGRAPHIC, April, 1939.



Providence River. The new dam has three 40-foot-wide gates that can be closed to bar storm-driven waters from the city.

Beyond the barrier lies Providence's busy harbor, a magnet for dozens of ships at a time, mostly tankers. "The port gives us a window to the world," G. William Miller remarked.

A slender, quiet man, Mr. Miller heads Textron, the $1,500,000,000 parent corporation of such Rhode Island concerns as Bostitch, Gorham, and Speidel, and other well-known firms across the country. I asked him why such a large company had its national headquarters in Providence.

"We are here because this is the ancestral home of the company," he said. "But more than that, Rhode Island is an extremely attractive place from which to operate a corporation. It's between New York and Boston, so we are near the international financial centers, but we are not burdened by the choking influence of a large city."

The very things that Mr. Miller regarded as assets, such as a location 40 miles south of Boston and 150 miles north of New York, used to have a deadening effect on the state's cultural life. But things have changed. Today Providence is proud of the Rhode Island Philharmonic Orchestra (conducted by its founder, Francis Madeira), the State Ballet of Rhode Island, and—most recently—the Trinity Square Repertory Company.

Sirens Wail for Julius Caesar

Trinity Square fairly leaped onto the scene. The company had only two professional actors in 1964; three years later it had a roster of 30. Favorable comment led to an appraisal of the troupe by the National Endowment for the Arts. As a result, Providence was chosen in 1966 to inaugurate Project Discovery, a program under which students from every senior high school in Rhode Island saw *A Midsummer Night's Dream*, *Saint Joan*, *Ah, Wilderness!* and *The Three Sisters*.

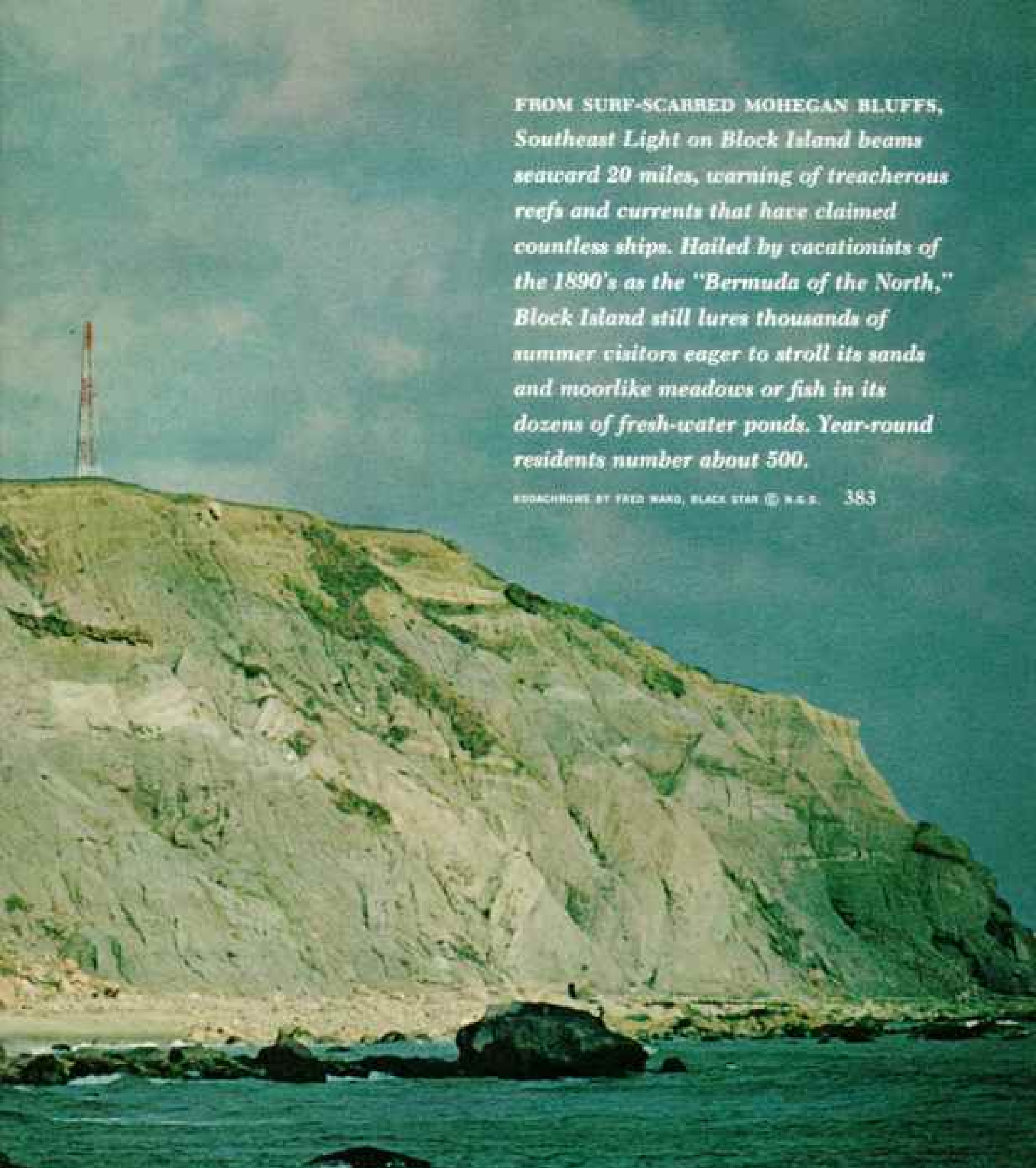
I met Adrian Hall, the wiry and talented

Society stylist Albert J. Sardella II fits a gown for Victoria Leiter at Newport. In the New England tradition of personal enterprise, he operates a one-man design and production shop, "sardella of newport."

Queen-size jewelry at budget prices: Cleopatra necklace, earrings, and brooches that will sell for $5 to $15 each sparkle at Coro, Inc., one of the world's largest costume-jewelry makers. Women, more dexterous than men, dominate the firm's Providence factory; during peak periods it employs 2,000 people.

Elegance for shining tables gleams on beds of coke at the Gorham plant in Providence, world's largest producer of sterling-silver products. The coke distributes heat as silversmith Charles Brandreth solders the spout of a $1,155 Chantilly teapot.

"Precision Park," Brown & Sharpe Manufacturing Company calls its 16½-acre machine-tool factory in the township of North Kingstown. Here men in the "runoff" area give final inspection to machines that will cut and shape parts for such varied hardware as space capsules and office typewriters.



FROM SURF-SCARRED MOHEGAN BLUFFS, *Southeast Light on Block Island beams seaward 20 miles, warning of treacherous reefs and currents that have claimed countless ships. Hailed by vacationists of the 1890's as the "Bermuda of the North," Block Island still lures thousands of summer visitors eager to stroll its sands and moorlike meadows or fish in its dozens of fresh-water ponds. Year-round residents number about 500.*

KODACHROME BY FRED WARD, BLACK STAR © N.G.S.

Harvest of the land: Colorful pumpkins and winter squash pile high at an Exeter farm, one of a surprising number in this tiny, heavily industrialized state.

Bounty of the sea: A fisherman aboard the *Roann* fills baskets with cod, scup, flounder, and bluefish. The trawler belongs to a 40-boat cooperative sailing out of Galilee, which shares with neighboring Jerusalem (next pages) the title of Rhode Island's fishing capital. Trucks transport the iced catch to markets as far away as Florida.

young director of Trinity Square, just before a school performance of *Julius Caesar*. "It was a terribly wild and traumatic first season," he recalled. "For a while we feared that the enormous tail of Project Discovery would wag the dog—our own repertory season for our subscribers—but the first year has worked out well. The people of Rhode Island seem proud that their children have an opportunity they themselves never had." The house lights dimmed, and Mr. Hall left me hurriedly.

Shakespeare's Globe Theatre never saw anything like Adrian Hall's *Caesar*. He uses red lights and motion pictures to spice the action. In company with several hundred high-school students, I sat glued to my seat, shocked by sudden drumbeats and shrill sirens. The stage was strewn with corpses.

Pawtucket Spawned Industrial Era

Underlying Rhode Island's artistic graces is a complex base of manufacturing, once predominantly textiles but now greatly diversified. It all began with cotton spinning, and I decided to start at the beginning—at the Old Slater Mill in Pawtucket, where the factory system in America began.

Samuel Slater, a lad from Derbyshire, England, learned the art of spinning fibers on machines driven by water power. The design of the machines, developed by Richard Arkwright, was so closely guarded that no mechanic who worked on them was allowed to leave England. But Slater slipped out as a farm worker and arrived in the United States in 1789. Financed by Moses Brown, he set out to duplicate the Arkwright machines.

He achieved this difficult feat entirely by memory, and the wheels of America's first successful water-powered machinery for spinning cotton began to turn in 1790. Slater built his first mill in 1793; it still stands on the banks of the Blackstone River in Pawtucket (page 388). Today the red-and-white frame building is a museum displaying early and modern spinning, weaving, and knitting machinery.

Samuel Slater prospered, and soon nearby rivers hummed with the activity of dozens of mills. Steam power supplanted water power, and finally electricity drove the machines. By the 1920's, spinning and weaving occupied almost 90,000 men and women, three-fifths of the state's manufacturing labor force. Today, even after the great textile decline, the industry still employs 22,000 persons.

The good new start mentioned by the Governor is symbolized in Woonsocket. Like

Pawtucket, this city stands beside the Blackstone River, which brought the textile industry to the region. Woonsocket was almost wholly devoted to spinning and weaving and was badly disrupted when many of the mills closed after World War II.

"In 1954, 10,000 people were pounding the pavement looking for work," Robert L. Smith, former President of the Chamber of Commerce, told me. "The community buckled down and formed an Industrial Development Foundation, with more than $400,000 contributed by community enterprises, unions, and individuals. The foundation brought in some factories and also bought 60 acres for an industrial park.

"Today, all that land has been sold, and an additional 68 acres is under development. The main problem now is to provide men and women for the jobs that have to be done."

Jewelry Store Starts a Vast Enterprise

Two other basic Rhode Island industries, inexpensive jewelry and expensive machine tools, also had early beginnings.

In 1794 Nehemiah Dodge, a gold- and silversmith who had learned his trade at his brother's silver-buckle shop, opened his own business. Dodge developed a process of dip-plating base metals with precious metal, and was thus able to produce jewelry for the masses. His output was enough to allow him

The surging Atlantic separates twin hamlets with Biblical names—Galilee, left, and Jerusalem. The channel, known as The Breachway, is only a hundred yards wide, but the communities lie 14 miles apart by road.

Paddling a passage through the reeds, a tame mute swan *(Cygnus olor)* brightens a Block Island pond. The Atlantic isle also serves as a stopover for many species of migrating birds.

to open a store for ready-to-wear jewelry —perhaps the first such store in America.

Today Greater Providence manufactures more costume jewelry than any other area in the country. Earrings, pins, watchbands, cuff links, rings, and the newly popular neck medallions for men sluice out of the plants in a sparkling flood.

The silverware industry also grew out of Nehemiah Dodge's jewelry shop. Jabez Gorham, an apprentice under Dodge, opened his own shop in Providence in 1818, and in 1831 began manufacturing silver spoons. Today the Gorham firm is the largest manufacturer of sterling in the world, a major producer of bronze castings, almost all of them grave markers, and a rising force in stainless-steel flatware and plated hollow ware (page 381).

When I toured the Gorham plant with Preston S. Copeland, manager of production and inventory, I was struck by the glittering view. Thousands of silver bowls, knives, forks, teapots, serving dishes, platters, sugar bowls, and candlesticks twinkled in the light. In the sterling shops, every bit of silver—925/1000 pure—is swept up and carefully recovered. Mr. Copeland showed me a vault where a wall of silver bars, each weighing 1,000 ounces, gleamed dully.

"We still do any number of hand processes," Mr. Copeland said. "There are at least 42 steps in the making of a teaspoon."

Cradle of America's factory system, the Old Slater Mill in Pawtucket casts its image on the Blackstone River, whose waters once powered the mill's spinning machinery. In 1790 master mechanic Samuel Slater reproduced from memory the intricate Arkwright machines that converted raw cotton into yarn in his native England. Their design, a closely guarded secret, had long given the English a monopoly on cotton spinning. Moved in 1793 to this small mill—today a museum—the machines helped launch the Nation's industrial revolution. Spinning and weaving dominated Rhode Island industry until the 1940's, when many mills moved south.

Sam Slater's cane wears a carved likeness of Moses Brown. One of four brothers who made fortunes in trade during the post-Revolutionary War era, Brown received a letter from the Englishman Slater in 1789, offering help in building cotton spinners. His reply: "If thou thought thou couldst perfect [the machines] . . . do it." So began a long and lucrative partnership. A Slater descendant, William Slater Allen of Providence, now owns "the Great Cane."

Nicholas Brown, a nephew of Moses, so generously endowed Rhode Island College that in 1804 it changed its name to Brown.

The deep roots of Rhode Island industry are evident also in the township of North Kingstown, where the Brown & Sharpe Manufacturing Company makes machines to make parts for machines to make other machines (page 380). Joseph R. Brown, a master clock- and watchmaker, began a repair business in 1833. In 1848 Lucian Sharpe signed on as an apprentice and three years later became a full partner. Today Brown & Sharpe makes thousands of products, from giant machine tools to delicate micrometers.

I visited Henry D. Sharpe, Jr., present head of the firm, in his bright, white office in a new 715,000-square-foot plant. Since Mr. Sharpe, incisive and aggressive, is a pillar of the Yankee community, I talked to him about Rhode Island as well as about machines.

"Rhode Island," he said, "has often been called a melting pot, but it took a long time for the pot to heat up so the fat could melt. Fifty, even 25 years ago, ethnic groups remained tight and self-contained.

"If your community is divided into power groups—old-line New Englanders, Irishmen, Italians, Jews, Portuguese, Negroes, and French Canadians—you've got a problem. Anybody trying to float a good idea for the whole community is apt to wind up with only a sliver of it behind him."

The state's businessmen, Henry Sharpe among them, took a unique approach to the problem—they threw their weight behind the United Fund as a means of raising money for welfare needs and, more important, of unifying the people of Rhode Island.

"The statewide United Fund touches everyone, either as a client or donor," said Mr. Sharpe. "In the past three years, the drive has been headed by a Jew, a Protestant, and a Roman Catholic—so progress is being made."

Sevellon Brown, then associate editor of the *Providence Journal* and *Bulletin*, confirmed this breakdown of rigid community grouping. "A generation ago," he told me, "you would rarely hear about the marriage of an Italian to an Irish girl, or a French girl to an Irish boy. Now you see it all the time."

Fish Squeal, Grunt, Snap, and Bark

A cold wind slapped my face as I left North Kingstown, and in the faraway sky a flight of ducks moved purposefully southward. I headed south too, to the Narragansett Marine Laboratory of the University of Rhode Island, six miles east of the main campus at Kingston. I had a date to listen to a whale sing.

William Mowbray, a large, quiet man, greeted me in his office. Outside, Narragansett Bay was gray under the wind, and a sailboat tacked close to shore.

Mr. Mowbray is working on an exciting project for the Office of Naval Research, carrying on the pioneer probings of Dr. Marie P. Fish, now retired. He is studying the noises made by fish and other marine animals—whales, sea lions, porpoises.

"It's not a new idea," he said. "Since the time of

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Battles without bloodshed unfold on a screen at the United States Naval War College at Newport, where electronic war games teach tactics with no risk to men or vessels. As officer-students in another room command simulated ships and planes in mock combat, computer-controlled projectors flash each move before these evaluators in the umpire area, who monitor every maneuver. Aircraft symbols on the blue screen represent carrier planes, the lines their track patterns. Critiques follow each mock battle. Established in 1884, the War College is the Navy's highest educational institution.

Home for the holiday, destroyers and a tender light up like Christmas trees at the Newport Naval Base. Newport's largest employer, the base encompasses a vast complex of schools, dormitories, storehouses, and piers spreading across Coasters Harbor Island and around Coddington Cove. Its Officer Candidate School has commissioned some 58,000 men since opening in 1951.

Aristotle, people have known that fish make noise. But nobody thought about it very much until World War II, when the noises began to interfere with underwater communications.

"The amount of noise is sometimes hard to believe," he continued. "Near the mouth of Chesapeake Bay in the proper season it is impossible for underwater listening gear to detect the approach of a very large ship because of fish of the croaker and drum family. They make a noise like a riveting gun, and in the aggregate the sound is a roar about as loud as Niagara Falls.

"We have the noises of 152 species of fish in these cans." Mr. Mowbray reached for a reel, which he snapped onto a tape recorder. The fish sounds ranged from thumps and squeaks to squeals, grunts, snaps, and barks.

A sculpin sounds like a mournful fog horn. A sea robin's call is staccato—a dog's bark. A swellfish creaks like a rusty door hinge. A toadfish repeats a low "pook-pook" over and over—a lonesome sound.

"Many members of the whale family make noises resembling the sounds of ships," Mr. Mowbray said. "During World War II, before the days of sophisticated listening gear, whales often interfered with submarine operations and were sometimes mistaken for ships. Perhaps some were even torpedoed."

He adjusted the tape, and a series of sharp clicks filled the room.

"Whales," he said. "That's their echo-location sound—their sonar."

Sailors Had Cause to Fear Ghosts

Then ensued a weird few minutes. Heart-broken groans, fierce yells, sharp whistles, eerie roars, loud gulps, whinnies, high-pitched squeals, and ululating calls of great sadness —frightening noises—engulfed us.

"Great hat! What's that?"

"Whales again," Mr. Mowbray said. "They make noises so wild your hair stands on end. I think old whalers' stories of jinxed ships probably started with noises like these. You can imagine sailors lying next to a wooden hull, which acts as a sounding board, hearing moans and groans and sounds of chains being rattled. No wonder they thought the ships were haunted."

Next morning the blustery wind had faded away and Indian summer was with me again as I drove north—and more than 300 years back into history—toward sturdy Smith's Castle. It stands where Roger Williams and a

ROOSEVELROWE, U. S. NAVY

fellow settler, Richard Smith, established Indian trading posts about 1637.

But, on impulse, I turned into a side road just to savor the woods, and was pleased to discover I was on my way to "a sweet hollow ringed by trees" and the red clapboard house near Saunderstown where Gilbert Stuart, the portraitist, was born in 1755.

The house sheltered a snuff mill—a similar mill is on the lower level today—and contains 18th-century furnishings as well as many mementos of the painter.

"George Washington sat for Gilbert Stuart three times," James Archie, the custodian, told me. "From these sittings Stuart did 124 paintings. He painted dozens of prominent Americans, including the first six Presidents of the United States."

Then I turned north again for Smith's Castle, standing beside a quiet cove in a region the Indians called Cocumscussoc, or "stony brook." Puritan militiamen from Connecticut and Massachusetts gathered at the castle—in those days the word denoted any fortified dwelling—to march out to the Great Swamp Fight. This was a quick and bitter battle in which the main body of Narragansett Indians was cut down and their winter food stores destroyed, ending a savage multitribal uprising known as King Philip's War, after its Indian leader.

Forty Puritans who fell in the battle share a common grave in the garden at Smith's Castle. The old house, guarded by an arbor of venerable trumpet vines, was lived in until 1945 and now is open to the public.

A short distance into the Great Swamp lies the rising ground—once an island—where the battle was fought. It was very quiet there as I read a plaque at the base of a rugged gray granite column: "Attacked within their fort upon this island, the Narragansett Indians made their last stand in King Philip's War and were crushed by the United Force of the Massachusetts, Connecticut and Plymouth Colonies in the Great Swamp Fight Sunday 19 December 1675."

King Philip's was one of the harshest Indian wars. Hundreds of colonists were killed and their homes burned; thousands of Indians lost their lives.

Late that night I pulled into Westerly, on the Connecticut line. Westerly no longer echoes to the sound of dynamite blasts in the granite quarries that ring the town. Today it

(Continued on page 396)

With a one-horse open grocery, Woody D'Agostino of Newport defrays college costs by selling vegetables door to door. Banjo and docile mount enthrall a youngster.

Clay captures beauty in the hands of noted sculptor Felix de Weldon as he completes a likeness of Newport summer resident Bonnie Buchanan Matheson in the studio on his 30-acre estate, Beacon Rock (opposite). Behind the head stands de Weldon's statue of Adm. Richard E. Byrd. Given to the Nation by the National Geographic Society, the figure in bronze stands on the Avenue of Heroes leading to Arlington National Cemetery. Busts copied from the statue commemorate Byrd in New Zealand and Antarctica.

The good life unfolds on sea and land. Sails furled, a pleasure fleet anchors in Newport Harbor off Beacon Rock, home of Mr. and Mrs. Felix de Weldon. The mansion, built between 1889 and 1891 for yachtsman Edwin D. Morgan, shows classical Greek influence in its court and marble columns.

Ida Lewis Yacht Club, on the spit at upper right, takes its name from a doughty spinster lighthouse keeper who in the late 1800's earned fame for her many daring rescues in stormy seas. The light is now part of the clubhouse.

EKTACHROMES (UPPER LEFT AND LEFT) AND KODACHROMES BY FRED WARE, BLACK STAR © N.G.S.

Heading back to the action, a member of Newport's surfing set balances her board. Surfers swarm to Easton's Beach, a cove on the Atlantic where gently sloping sands invite long, rolling combers.

Amid grandeur of the Gilded Age, guests dance at Newport's Tiffany Ball in magnificent Marble House. More than a thousand socialites attended the gala, climaxed by a champagne supper on the terrace at midnight. Sponsored by the New

DAYACHROME BY FRED MARS, BLACK STAR © NATIONAL GEOGRAPHIC SOCIETY

York jewelry firm, the benefit raised funds for the Preservation Society of Newport County. Marble House, built in 1892 for the William K. Vanderbilts, and other mansions maintained by the society are open to visitors from May through October.

stands quietly beside the Pawcatuck River, more interested in tending to boats and summer visitors than in wresting stone from its earth. Many of its citizens work in factories across the river, on the Connecticut side. The town newspaper, started by Seventh-Day Baptists, still does not print on Saturday but it does appear on Sunday afternoon, the only such daily paper in the land.

South and east of Westerly, long white arms of sand embrace salt-water lagoons and marshes, beaches that have attracted vacationists for a century or more. At Watch Hill stone, stucco, and shingle-sided houses rise amid the hillside trees.

Block Island's Grain Fields Vanish

A light plane whisked me from Westerly across the ruffled water to Block Island, shaped like a pork chop and named for Adriaen Block, a Dutch navigator who came ashore there in 1614 (map, page 375).

Block Island once reared huge oaks, glowed with fields of wheat and corn, and harbored sheep and cattle on its softly folded hills. Today it is an island of rambling old shingled hotels, a haven for yachtsmen, and a goal of anglers seeking swordfish, which can still be caught on hand-thrown harpoons.

"It used to be all farming and fishing, but the younger generation doesn't like that kind of life," white-haired Henry Mott, born on the island, told me. "There's a boom of sorts on now—27 houses were built last year.

"The year-round population is about 500," he said, "but it'll go up to 5,000 in the summer, not counting all the people on yachts that swarm into the docking areas."

The little island was crowded on the day of my visit: The Audubon Society of Rhode Island was aboard for its annual weekend of bird-watching. Men and women dotted the treeless moors, binoculars at the ready. I spoke to one woman, who said the birding was very good. She had identified a prothonotary warbler, a large flight of Cory's shearwaters, a house finch, and a black-legged kittiwake, but she wouldn't identify herself.

Block Island fishermen, like their fellow sportsmen anywhere, don't mind a bit of hyperbole. Paul Filippi, an island restaurateur, said flatly, "The water off Block Island is the world's greatest fishing area. Tuna, mackerel, swordfish, and bonito are taken by the thousands. I've seen bluefish by the millions—sometimes they make the water boil over a five-mile radius. And that's the best fish there is, gamy to catch and the best eating."

New Span Shortens Drive to Cape

As I savored the state's moods, I recalled a remark made by manufacturer Henry Sharpe. "Most people, unless they are careful, are apt to see Rhode Island only in passing; it's so small that it's easy to be too busy going someplace else." New highways now slash through the heart of Providence. Gone are the days when irritated motorists from Pennsylvania and New Jersey, slowed in their race to get to Cape Cod, formed the Society for the Eradication of Providence, Rhode Island.

The $53,000,000 Newport Bridge, connecting Jamestown with Newport, will provide Cape-bound tourists an even shorter route when it is completed early in 1969. It is a monumental, soaring structure whose main towers rise 400 feet and support a four-lane highway 215 feet above the water—high enough to allow aircraft carriers from Newport Naval Base and Quonset Point Naval Air Station to sail underneath.

The Navy plays an important part in Rhode Island life, contributing more than $200,000,000 a year to the economy. Quonset Point is the home base for Air Development Squadron Six, which supports U. S. scientific operations in Antarctica.

Best-known tourist attraction in Rhode Island is the city of Newport itself—famous for the *America*'s Cup yacht race (opposite), for its jazz, folk music, and opera festivals, and for its unique colony of palatial "cottages" built by barons of finance in an era of conspicuous wealth (page 400).

Newport has long been a symbol of the glamorous life of the very rich. Most of the "royal" names of America were represented there: Vanderbilt, Widener, Goelet, Duke, Astor, Mills. Mrs. Stuyvesant Fish had two ballrooms in her cottage. Forsythe Wickes, an

Duel at sea: The Australian challenger for the *America*'s Cup, *Dame Pattie*, cuts the choppy waves of Rhode Island Sound as she tries to overtake the United States defender, *Intrepid*. The American yacht defeated *Dame Pattie* by almost six minutes in the initial 28-mile race and swept the series with four consecutive victories in September, 1967. Newport has played host to the 117-year-old classic since 1930.

art collector, had a Newport house—and his wife had one too, next door.

Newporters say that at Belcourt Castle, Oliver Hazard Perry Belmont's home, the horses not only had three sets of tack, for morning, afternoon, and evening, but, like their master, slept under linen. And local lore has it that Robert Goelet, admonished by his pastor when he upholstered his church pew in gold plush, replied testily, "I was born in gold plush, I live in gold plush, and I intend to die in gold plush."

James Gordon Bennett, editor of the *New York Herald* and son of its founder, was piqued when members of the Reading Room expelled him because a guest of his rode a horse into that staid club. So he retaliated by hiring McKim, Mead, and White, one of the country's leading firms of architects, and building the Newport Casino. The shingled Casino was the scene of the first national men's tennis championships in 1881; now, a bit weather-beaten, it houses the National Lawn Tennis Hall of Fame.

Splendid "Cottages" Reflect a Golden Age

The Casino stands at one end of fashionable Bellevue Avenue. You follow it to reach three of Newport's most spectacular cottages, The Elms, Marble House, and The Breakers, open to the public under auspices of the Preservation Society of Newport County. Belcourt Castle is shown by its owners.

The Elms, an elegant French-style mansion which stands in a garden shaded by 38 kinds of trees, was scheduled for the wrecker's hammer when the society raised money for its purchase in 1962. Its furnishings had been auctioned off for $486,000, but diligent and affluent Newporters refurnished it with precious antiques. Today it stands as lavishly appointed as ever.

The mansion was built for Edward J. Berwind, a Philadelphia coal merchant, and every other Saturday night for many years Mrs. Berwind entertained at a gala ball. Now on summer Saturday nights the house again gleams with lights, and soft music accompanies visitors through the stately rooms.

I visited William K. Vanderbilt's Marble House, farther down the avenue, in late afternoon. The sun, streaming through tall windows, struck fire from heavy beveled-glass doors and mirrors, reflected brightly from gold walls, and glowed from red, yellow, and white marble (pages 394-5).

In the dining room, with mottled pink marble walls and Corinthian pilasters topped with gilded capitals, I tried to move one of the chairs. I could scarcely budge it, and was not surprised to find it was solid bronze. Footmen to move such furniture were essential at formal affairs, and Vanderbilt supplied them, liveried in maroon coats, black knee breeches, gilt garters, and patent-leather shoes.

William Vanderbilt had made a good try with Marble House, but his brother Cornelius dwarfed his multimillion-dollar achievement with The Breakers,

Tilted horn and ballooning cheeks identify jazz trumpeter Dizzy Gillespie.

Metropolitan Opera star Roberta Peters attends a "Meet the Met" party.

Transported by music, bass violist Larry Coreal strums at the Jazz Festival.

Big sounds in 'Little Rhody'

JAZZ, opera, folk songs, musical comedy—Rhode Islanders enjoy all without leaving the state. Newport vibrates each summer with a Jazz Festival and a week-long Folk Festival. The New York Metropolitan Opera has performed there the past two years. Providence prides itself on its philharmonic and its Trinity Square Repertory Theater, which presents six plays each season. Last month the troupe became the first U.S. professional repertory company to be invited to the International Festival in Edinburgh, Scotland.

Siren in a fish net, singer-pianist Nina Simone performs at the Jazz Festival.

Satire reigns in *The Threepenny Opera,* by the Trinity Square Repertory group.

a palace in Renaissance style and one of the most ornate houses on the continent.

Fire had destroyed the original Breakers in 1892. Mr. Vanderbilt immediately commissioned architect Richard Morris Hunt to design a new one. Platoons of stonecutters, sculptors, mosaic makers, and wood carvers and an army of laborers and carpenters were unleashed. They completed the amazing structure from the ground up in just two years.

The Breakers is overpowering: a mazelike conglomeration of limestone from Caen, France, marble in a dozen different varieties, wrought iron, massive chandeliers, alabaster, silver, crystal, antique tapestries, stained glass, gilt, huge rugs, ornate fireplaces, and tooled and gilded leather "wallpaper."

The Great Hall soars to a ceiling with a painted sky 45 feet above the floor; one glass wall looks out over the lawn to the sea. Close by, the huge dining room also has a distant ceiling devoted to a painting of Aurora at Dawn. Two large crystal chandeliers, fitted for both gas and electricity, illumine 12 red alabaster columns, above which life-size goddesses and nymphs disport themselves in ceiling arches.

The table, fully extended, can seat 34. Clearly this was no room for a quick snack, so the family had another dining room, with pale-green French antique paneling, for everyday use.

State Bird Gives Way to Other Breeds

Bedazzled by The Breakers, I got back my perspective by driving to Adamsville through Tiverton and Little Compton. This eastern section of the state has a comfortable look. White houses perch on long lawns that run down to the Sakonnet River; baled hay stands in the fields; honeysuckle-covered stone walls enclose a few black-and-white cows.

On the way I paused at Middletown to visit Whitehall, the restored clapboard house that from 1729 to 1731 was the home of George Berkeley. The Irish bishop and philosopher was awaiting funds from Parliament to found a college in Bermuda—funds that never came. The products of his busy pen included "Westward the course of empire takes its way. . . ."

At Adamsville I clucked at a bronze tablet erected to honor a chicken—the Rhode Island Red, a breed developed there in 1854. But I did not see any Rhode Island Reds. The chicken itself has been superseded by other, more modern varieties, but it still rules the roost as the official state bird.

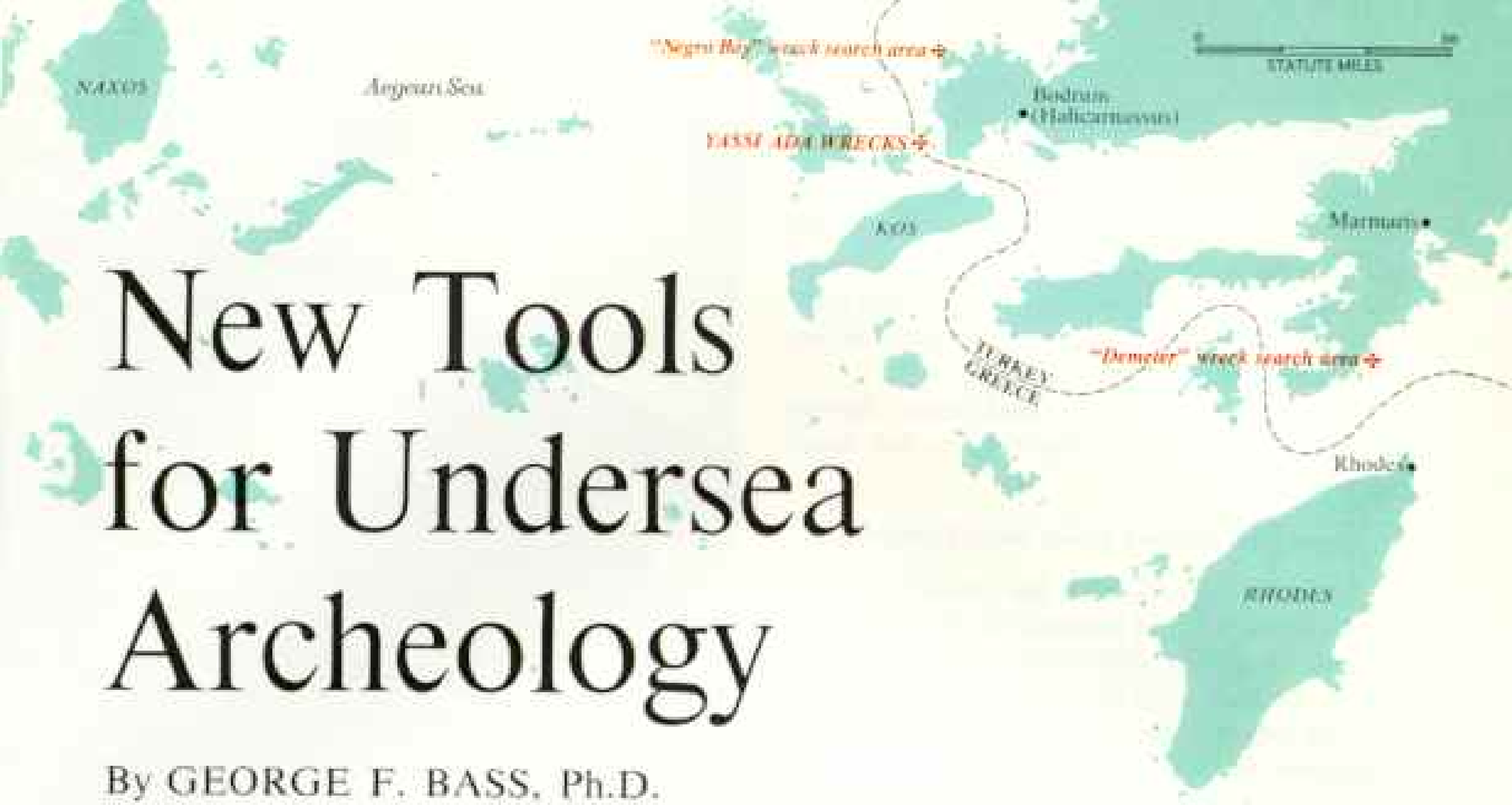
On one of my last days in Rhode Island, nature put on a brilliant show for me, a sharp rainstorm just before sunset. A canopy of dark clouds hung over Providence. When the rain stopped, the low-lying sun cast a rosy glow that deepened the tone of the red-brick city, tinged the wet dome of the capitol, and struck a rainbow directly over the First Baptist Church.

I hoped it meant a bright tomorrow for the littlest state.

THE END

"**Summer cottages,**" multimillionaires called the pleasure palaces they raised from the Gay Nineties to the Roaring Twenties, when Newport was the playground of society's elite "400." A spectacular promenade called Cliff Walk rims the surf-dashed headland. Tudor gables crown The Waves, built by architect John Russell Pope, who designed the Jefferson Memorial in Washington, D. C.

AQUACHROME BY FRED WARD, BLACK STAR © N.G.S.



New Tools for Undersea Archeology

By GEORGE F. BASS, Ph.D.

Photographs by CHARLES R. NICKLIN, JR.

PERHAPS THE BYZANTINE argosy was sailing a kindly sea when the jagged rocks off Yassi Ada suddenly tore her bottom out. Or perhaps the powerful northerly *meltem* that sweeps seasonally down the Turkish coast smashed her, helpless, upon this frothing reef 13 centuries ago.

We shall never be certain how she died. But she came to rest with her deepest point at 120 feet; some of her cargo of wine jars lay only 20 feet from a Roman hulk that had preceded her by more than a hundred years.

Over the centuries, other ancient vessels have come to grief off the barren shores of Yassi Ada—Flat Island—and become deeply anchored by time in the pale sands of the Aegean Sea floor. We believe there may be a score or more. Collectively, this ghostly fleet from many ages offers an archeologist's dream.

Since 1961, with my colleagues from the University of Pennsylvania Museum, I have been eagerly pursuing this dream. For four arduous seasons we worked on the bottom, mapping, recording, photographing, and excavating the Byzantine wine carrier.*

Uncovering that wreck had been costly and tedious. In 3,575 separate dives we had spent 1,268 man-hours underwater, mapping and photographing every centimeter of the hulk at every stage of excavation.

My assistant expedition chief, Dr. Frederick van Doorninck, had spent an additional three years poring over our data. He studied the position of every tiny artifact and fragment of rotted wood; he pondered the meaning of every notch and nail hole. Meticulously he reconstructed the ship on paper.

His results were brilliant. As we reviewed his sheaf of drawings, I knew that all our pains to record and map each piece precisely had been worthwhile.

"As you know, she wasn't very big," Fred said. "Between 60 and 70 feet long, with a beam of about 17 feet. She could carry 50 tons of cargo—on her last voyage it was approximately 900 amphorae of wine.

"Here at the very stern was the ship's galley, a structure with a tile roof only a couple of feet above deck level [pages 418-19].

*In "Underwater Archeology: Key to History's Warehouse," in the July, 1963, GEOGRAPHIC, Dr. Bass described the first two seasons at the Byzantine wreck.

Vacuuming the floor of the Aegean Sea, a diver guiding an air-lift pipe sucks up sand cleared from the skeleton of a Roman ship. Jars called amphorae, once filled with wine, litter the foreground. Iron scaffolding supports a tower with a camera that plots each artifact's position. The wine-laden vessel sank more than 1,400 years ago off southwest Turkey. Close by, the author earlier uncovered a Byzantine wine ship, now studied so thoroughly that experts are able to describe it in minute detail (pages 404-5 and 413). Constantly developing new techniques, Dr. Bass reaps a growing harvest of history.

PHOTOGRAPH BY JOHN G. CASSIS © NATIONAL GEOGRAPHIC SOCIETY

See, here's a tile with a smoke hole, just over the hearth on the port side."

He showed me where the ship's anchors and grapnel had been stowed; where fishing gear and iron tools had been kept; how the mainmast had been braced; the size and location of the main hatch; where the steering oars had been mounted.

Now a GEOGRAPHIC artist, using this information, has shown the ship in her death throes (right).

New Techniques Bring New Optimism

In 1967, armed with the knowledge and techniques we had learned on the Byzantine wreck—together with new methods and devices we had since developed—we were preparing to tackle the wine carrier's older Roman neighbor. We had good cause for optimism on this expedition. For one thing, we had fine support. In addition to the National Geographic Society and the University Museum, our sponsors included the National Science Foundation, the Triopian Foundation, and New York businessman Mr. Nixon Griffis. Heaviest contributions, in funds and equipment, came from the United States Navy, which is of course interested in techniques for finding and surveying ships and planes lost at sea.

Our expedition would concentrate on the Roman ship. But we would also search for two exciting new wrecks in deeper water, whose existence we only suspected—so far.

Our optimism was based also on our new equipment. Much of it we had adapted or devised especially for this project, including:

- An underwater telephone booth to serve as a means of communicating with the surface and as a place of safety for divers.
- A large truck-mounted air lift to suck up sand and mud cleared from the wreck.
- A stereophotogrammetric mapping system to record precisely and speedily the location of artifacts on the wreck.
- A submersible decompression chamber near the wreck site, controlled by heavy cable from the island, 60 yards away.

We were also to use a new metal detector to pinpoint objects beneath the sand, a high-pressure water jet to wash the overburden from the wreck, and a basket that could raise half a ton of cargo to the surface by means of an air-filled balloon (painting, pages 410-11).

This time we planned a larger staff; a total of 45 persons would stay at our camp on Yassi Ada before we finished the season.

The Roman ship lay on a slope at a maximum depth of 140 feet—about the limit at

PAINTING BY NATIONAL GEOGRAPHIC STAFF ARTIST ROBERT F. MAGIS © N.G.S.

Shipwreck! Their stricken argosy foundering, crewmen crowd a dinghy in choppy seas. One survivor clings to the broken-off mast. The Byzantine cargo carrier of 1,300 years ago ripped her belly on a low reef menacing busy sea-lanes near Yassi Ada, or Flat Island (maps opposite and page 403).

Details of the shipwreck scene are imaginary, but the vessel itself is not. Carefully analyzing every artifact and scrap of wood of the Byzantine ship, assistant expedition chief Dr. Frederick van Doorninck pieced together on paper the most detailed reconstruction ever made of an ancient Mediterranean wreck (page 413). Guided by this unprecedented blueprint, artist Magis re-created the little craft. About 60 or 70 feet long and 17 wide, she transports some 900 amphorae of wine on this last voyage. Aft of her open hatch, a table-like platform may have supported the helmsman, who manned two steering oars. A tile roof shelters a small but elaborate galley in the rakish stern (pages 418-19). Anchors lie forward of the mast. A small grapnel behind the galley confirmed that the vessel carried a dinghy—perhaps, as here, the crewmen's lifeline to shore.

which Aqua-Lung divers can excavate efficiently. I needed strong, rugged divers. Where would I find them? I asked for volunteers from my graduate seminar in ancient seafaring at the University of Pennsylvania. Hands flew up: Marilyn Rosenberg, Marie Ryan, Cynthia Jones, Nancy Palmer. Only one had ever been underwater. Were these to be my tough, brawny divers?

They were, indeed, after a concentrated diving course—together with 20 other young men and women students. And before the summer's work ended, we had logged 1,700 dives without a serious mishap.

Tent Village Rises on Yassi Ada

Architect Matt Kaplan and chief diver Claude Duthuit left for Turkey in April to prepare for the long summer ahead. While Claude arranged for boats, barge, and equipment, Matt sailed out to Yassi Ada. He spent the next month on that barren island, supervising ten Turkish workmen. When he landed, he did not know a word of Turkish.

By the time I arrived at the end of the month, the bleak face of Yassi Ada had been transformed (page 409). Quarters for men and women were going up, foundations for a work shed were under construction, tents stood in a row along the crest of the island, the concrete floor for a darkroom was being poured. And Matt Kaplan was speaking Turkish.

One of our most ticklish jobs was unloading a three-ton recompression chamber from the Turkish trawler *Kardeşler*, our research vessel commanded by Capt. Mehmet Turgutekkin. The arrival of the four-man air-conditioned chamber gave me special peace of mind. In more than 3,500 dives at Yassi Ada we had had only one case of the bends—caused by nitrogen bubbles in the bloodstream—which can paralyze or even kill a diver who decompresses too rapidly. Our diver was rushed to the nearest chamber (in İstanbul, 300 miles away), and fortunately recovered. Now, with our own recompression chamber on the island, we could treat the victims of other such accidents immediately.

When we began diving on the Roman ship, it looked like most other classical wrecks in the Mediterranean.* Only a huge mound of amphorae was visible; apparently, like the Byzantine wreck, this ship had carried wine. Sand and seaweed concealed the rest.

Within weeks the scene had changed completely. Over the entire cargo we constructed a scaffolding of angle iron on pipe legs, such as we used on the Byzantine shipwreck, to support a movable tower (page 412). The tower gave us a stable platform from which to photograph every detail.

Not more than ten feet from the wreck stood my favorite new device, our underwater telephone booth. The booth is a Plexiglas hemisphere attached by iron legs to 1,500 pounds of steel-plate ballast. As many as four divers can stand inside, dry from the chest up, breathing fresh air pumped into the dome (pages 414-15). The device was meant as a communications center. Divers could discuss problems with each other or by telephone with people on the barge overhead or on the island. It soon became clear that it was also an excellent refuge in time of trouble.

In midsummer I was cleaning sand from some wood fragments when

*See in NATIONAL GEOGRAPHIC: "Thirty-three Centuries Under the Sea," May, 1960, and "Oldest Known Shipwreck Yields Bronze Age Cargo," May, 1962, both by Peter Throckmorton; and "Fish Men Discover a 2,200-year-old Greek Ship," by Capt. Jacques-Yves Cousteau, January, 1954.

Like a thief in the night, diver Ben Jones shoulders an amphora in the gloom 135 feet down. A huge sponge sheathes the jar's base; shells and pebbles sifting through a broken seal long ago replaced the wine. White identification tag, recording the amphora's position on the sea bed, guides island-based draftsmen in plotting a master plan of the Roman ship and its cargo. Divers working with amphorae quickly learned to be cautious: The jars make fine homes for octopuses and razor-toothed moray eels.

Concern for colleagues working below shows on the faces of expedition leader George F. Bass and assistant Susan Katzev. Dr. Bass is Associate Professor of Classical Archaeology at the University of Pennsylvania and Curator of the University Museum's Underwater Section.

As if wrestling a huge bubble, divers prepare to launch a unique underwater telephone booth (pages 414-15) from a barge above the Roman wreck.

Re-creating a link with the past, Michael Katzev makes a cast of a chain possibly carried by an Islamic ship that sank near the Roman wreck (page 411). Like the wrecks' other iron tools and fittings, the link had long ago rusted away, but not before sediment had formed a mold around it. After cutting this cross section with a diamond-tipped saw, Mr. Katzev pours in a rubber compound that hardens into a cast.

REDACTOGRAM BY CHARLES E. RIGAUX, JR. © NATIONAL GEOGRAPHIC SOCIETY

Island once ruled by rats, bleak Yassi Ada blossoms with the expedition colony. Frame dormitories, screened against the island's swarming rodents and insects, hold most of the author's team, 45 strong. Green and white tents shelter married couples. Black-hulled diving barge and the Turkish trawler *Kardeşler*, especially equipped to aid the summer excavations, anchor over the site of the Roman wreck.

I felt a hand on my shoulder. I looked up and saw Gail Hillard run her index finger across her throat, the sign she was out of air. It was 135 feet to the surface, but with three kicks of her flippers she was breathing fresh air inside the dome. I followed her.

"Ran out of air," she said calmly, "and my reserve didn't work."

I took her mouthpiece and tested it. "I think you've enough to get to the hoses at the decompression stop. I'll stick close by, so if you can't make it we can share my air. Let's go."

From then on we kept an emergency air tank hanging in the telephone booth.

The big air-lift device and the water jet steadily removed the sand from the hulk. For cargo, we built a large basket capable of holding 20 to 30 amphorae. This we sent to the surface regularly with our air-filled balloon.

It was in the area of mapping, however, that we expected our greatest increase in efficiency. For this we hoped to use our most sophisticated piece of equipment, the *Asherah*. This highly maneuverable little two-man submarine, named for a Phoenician sea goddess, can dive to 600 feet, stay down for hours, and move at speeds as high as four knots (page 423).

A pair of aerial survey cameras with special underwater lenses, mounted on the *Asherah*, could be triggered electronically to take stereoscopic pairs of photographs. Thus the submarine, in one half-hour dive, could provide the data for a three-dimensional plan of the entire wreck—something that took a dozen divers more than a month with earlier methods.

Unfortunately the *Asherah* was delayed in shipment and did not arrive until halfway through the summer. By that time she was scheduled to begin the second phase of our work, a complex search mission for two other important ancient wrecks.

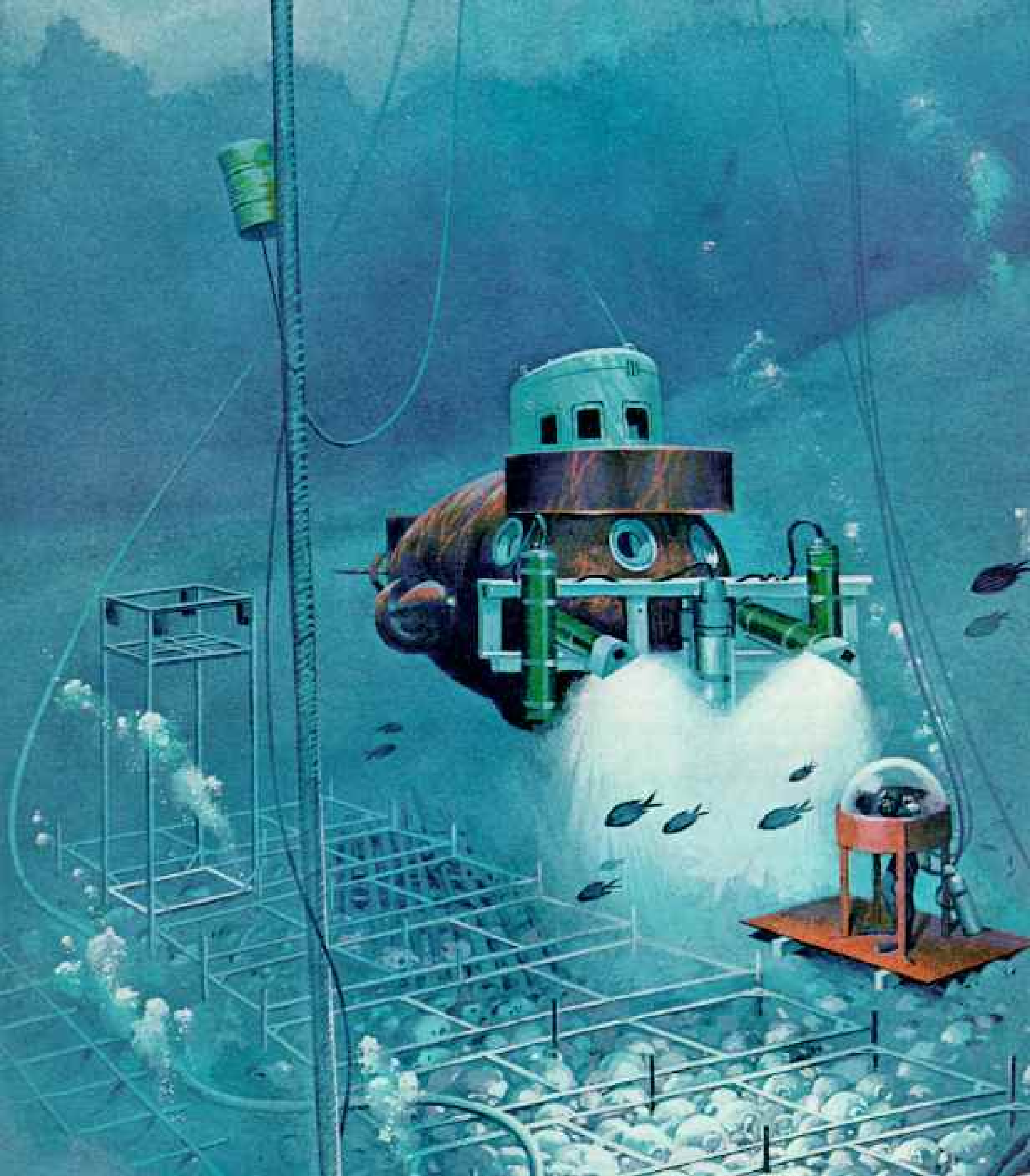
We continued to map with the photographic tower. As we excavated, the wood of the ancient hull began to appear. We found bits of the ceiling, or inner hull lining, sticking to solid ribs. Beneath the ribs were the strakes, or outer hull planks. I noted with satisfaction that the wood was much better preserved than that of the Byzantine ship.

Strange Pottery Poses a Mystery

Each day we hoped we would come upon the ship's galley. There we expected to find small articles that would accurately date the merchantman's last voyage. Finally we thought we had found a clue. Tableware began to appear. But it was covered with bright-green glaze—unlike any Roman pottery we had ever seen.

Adding to our bewilderment, some of the timbers we uncovered ran off at an oblique angle from the rest of the ship. Only slowly did we realize that this was a second, more recent, wreck lying under the sand, and resting directly on top of the Roman hulk!

Yüksel Eğdemir, a commissioner assigned to our group by the Turkish Department of Antiquities, was asked to direct this new excavation. Tracing the hull away from the Roman ship, he found that it almost reached



In the workaday world underwater, men and machines map a wreck as painstakingly as they would record a dig on land. Combining many days' activities in this scene, artist Davis Meltzer depicts the ingenious tools of the Aqua-Lung archeologist.

Stroboscopic lights of the research craft *Asherah* push back the twilight as two exterior cameras make stereophotographs of the Roman wreck site, the first undersea use of aerial-survey techniques by a submarine. A closed-circuit television camera at the center of the bow mount gives the two-man crew a view of the sea bed below. The *Asherah* supplemented the 15-foot photo tower, left. Carrying a camera, the structure moved along the iron scaffolding from section to section, slowly making a systematic record of each stage of the excavation.

In the glare of the *Asherah*'s lights, the telephone booth stands on metal ballast plates leveled with timbers. Diver at left guides an aluminum vacuum pipe, 10 inches in diameter, along a double track 70 feet long. The pipe sucks up sand thrown in its path by a high-pressure water jet which uncovers the wreck. An air-filled barrel keeps the 70-foot pipe vertical. Sand spewed from its top drifts away in currents that sweep the reef.

An amphora-laden basket rises toward the surface, right, beneath a balloon inflated by a diver with an air hose. Men walk up the steep slope to Yassi Island guiding a wire basket filled with pieces of timber and buoyed by a balloon. Another team member steers an electronic metal finder that works like a mine detector; an air canister on the front makes the device neutrally buoyant for ease of handling. In the distance floats the submersible decompression chamber, held underwater by a cable passing through a pulley attached to five tons of ballast.

Timbers of another, later wreck overlie part of the Roman ship near the metal detector. This vessel carried no cargo, but pieces of glazed pottery found by the scientists suggest it may have been an Islamic craft of the 13th or 14th century.

The Byzantine ship, its remains almost entirely removed during the author's earlier excavations, lay nearby on the slope at right.

PAINTING BY DAVIS MELTZER © N.G.S.

the spot where the Byzantine ship had rested.

So three ships, centuries apart, had come to grief off Yassi Ada and settled virtually one on top of another. We now think the newest was an Islamic ship of six or seven hundred years ago.

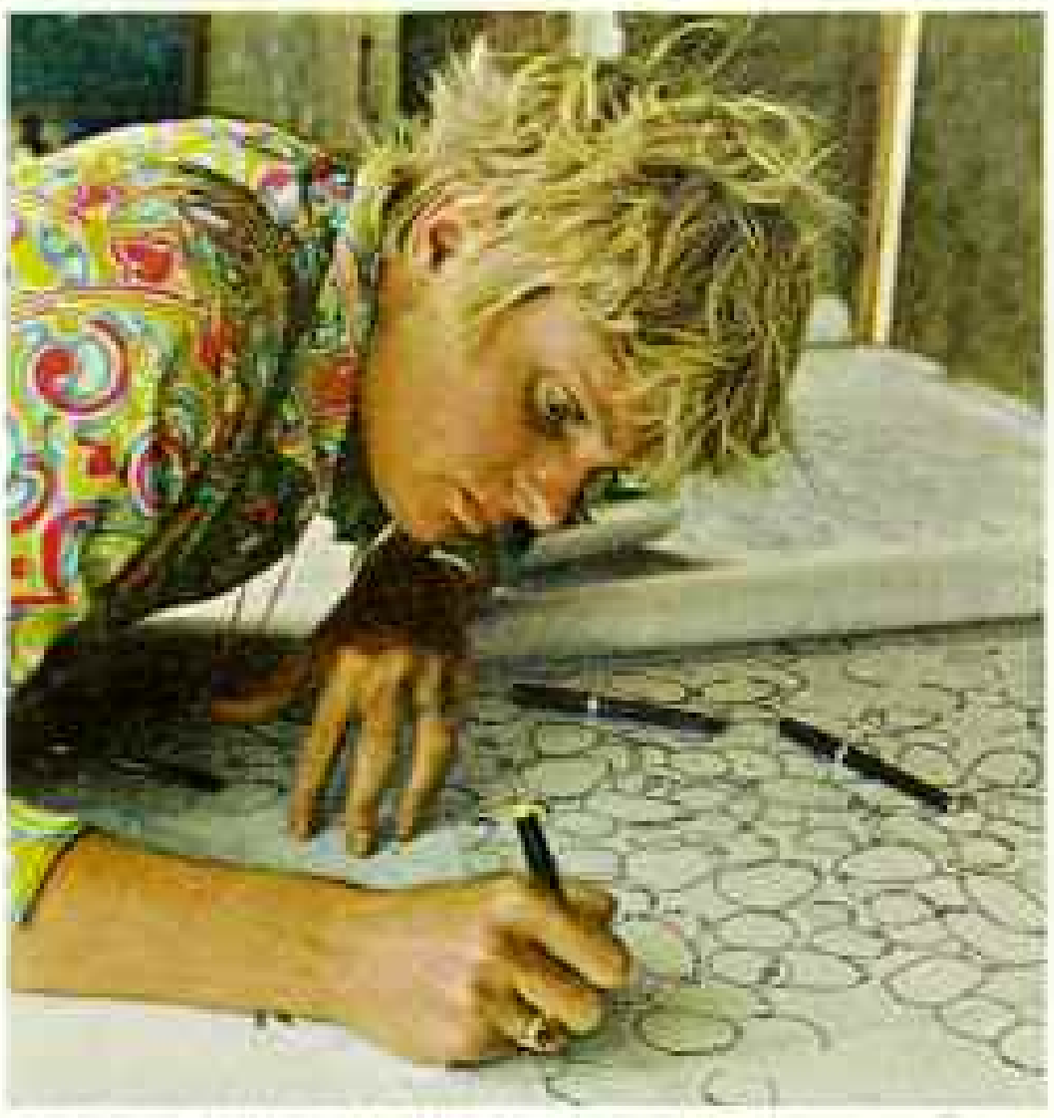
One of our biggest problems has always been decompression. The deeper we dive and the longer we stay on the sea bed, the longer we must decompress to avoid the bends. On our earlier expeditions we had to hang on a rope beneath the barge, breathing off the dangerous nitrogen dissolved in our systems.

Even the discovery that paperback books hold up pretty well under water did not really make this method of decompression pleasant (page 417). But we kept a bucket dangling just 10 feet beneath the barge, and into this each diver put his favorite volume. I read a whole novel there, hanging onto a rope like a commuter clutching a subway strap and reading his morning paper.

In our new submersible decompression chamber, last summer for the first time four of our divers could sit in dry comfort while rising to the surface in safe, slow stages. The SDC is basically a steel sphere with an entry hatch underneath. Inside we read, played chess, and even played a kind of insane soccer with a volleyball. We could talk by telephone to the island camp, whence a compressor supplied us with air through a hose.

In case a diver should come down with the bends during decompression, we had designed an air lock on the sphere through which he could be placed in a chamber and lifted to the surface (page 416). There, always under pressure, the stricken diver could be put into the large land-based chamber for treatment. Fortunately the emergency never arose.

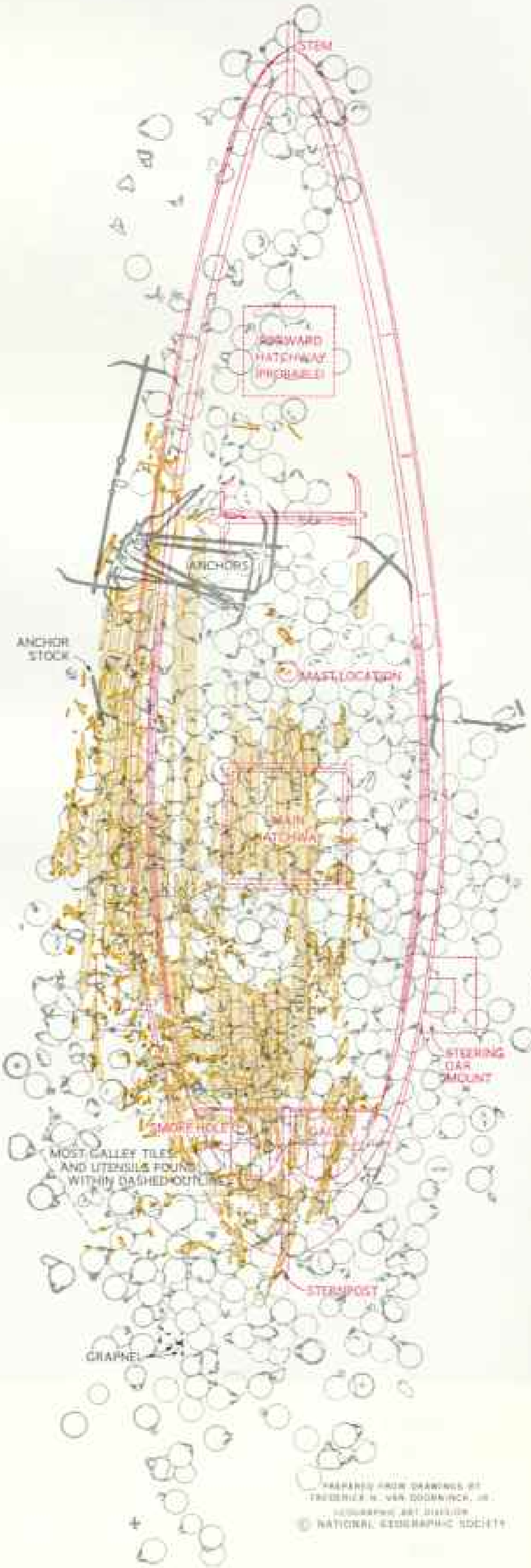
The submersible chamber itself, however, presented an unexpected worry. Its cable ran through a pulley anchored to the bottom with five tons of ballast, and then to a winch on shore. The upward pull of a six-and-a-half-foot sphere filled with air is tremendous. Often the surge of rough sea lifted the ballast several inches off the bottom. How long could



EXCHROME (OPPOSITE) AND KODACHROME BY CHARLES P. KAYLOR, JR. © N.G.S.

Pieces of the puzzle fall into place as Susan Katzev records the location of jumbled amphorae on the Roman ship. She transfers information from stereophotographs to an overlay for a master plan of the wreck.

Framing an ancient still life, a diver positions the camera tower above a grid. Workers have removed most of the amphorae, but buried deeper under the sand lie the Roman ship's ribs and outer hull, which the author found much better preserved than those of the later Byzantine ship.



Composite blueprint of the Byzantine ship and its cargo emerged from the painstaking photographic and plotting techniques used by the expedition. By analyzing every plank and timber excavated—about 10 percent of the ship's total, shown here in brown—Dr. van Doorninck graphically reconstructed the hull, outlined in red. Gray indicates the amphora cargo, strewn down the slope on which the ship came to rest.

Direct line to the surface: In a telephone booth at 125 feet, Yüksel Eğdemir, Commissioner for Underwater Archeology in the Turkish Department of Antiquities, reaches for the speaker; he removes his mouthpiece to talk with colleagues aboard the barge or on Yassi Island. Four divers can stand inside the Plexiglas dome, dry from the chest up in fresh air pumped from the barge. Intended as a communications center, the booth became an emergency haven. A Fisheye lens gives this 180-degree view.

the cable take these successive jerks? If it broke, the SDC would shoot to the surface. The sudden drop in pressure might rupture the lungs of any divers inside.

In fact, it almost happened to me. In order to replace the pulley, another diver and I had slackened the main cable completely and flooded the SDC to sink it to the bottom. After finishing the task, I shoved the air hose through the bottom hatch, intending to refill the sphere with air and let it rise to the surface by itself.

Anxious Ascent in a Runaway Chamber

As the great yellow ball grew buoyant and began to stir on the ocean floor, I thrust my head and shoulders up into it, and tried to free the hose. It was tangled and would not come free.

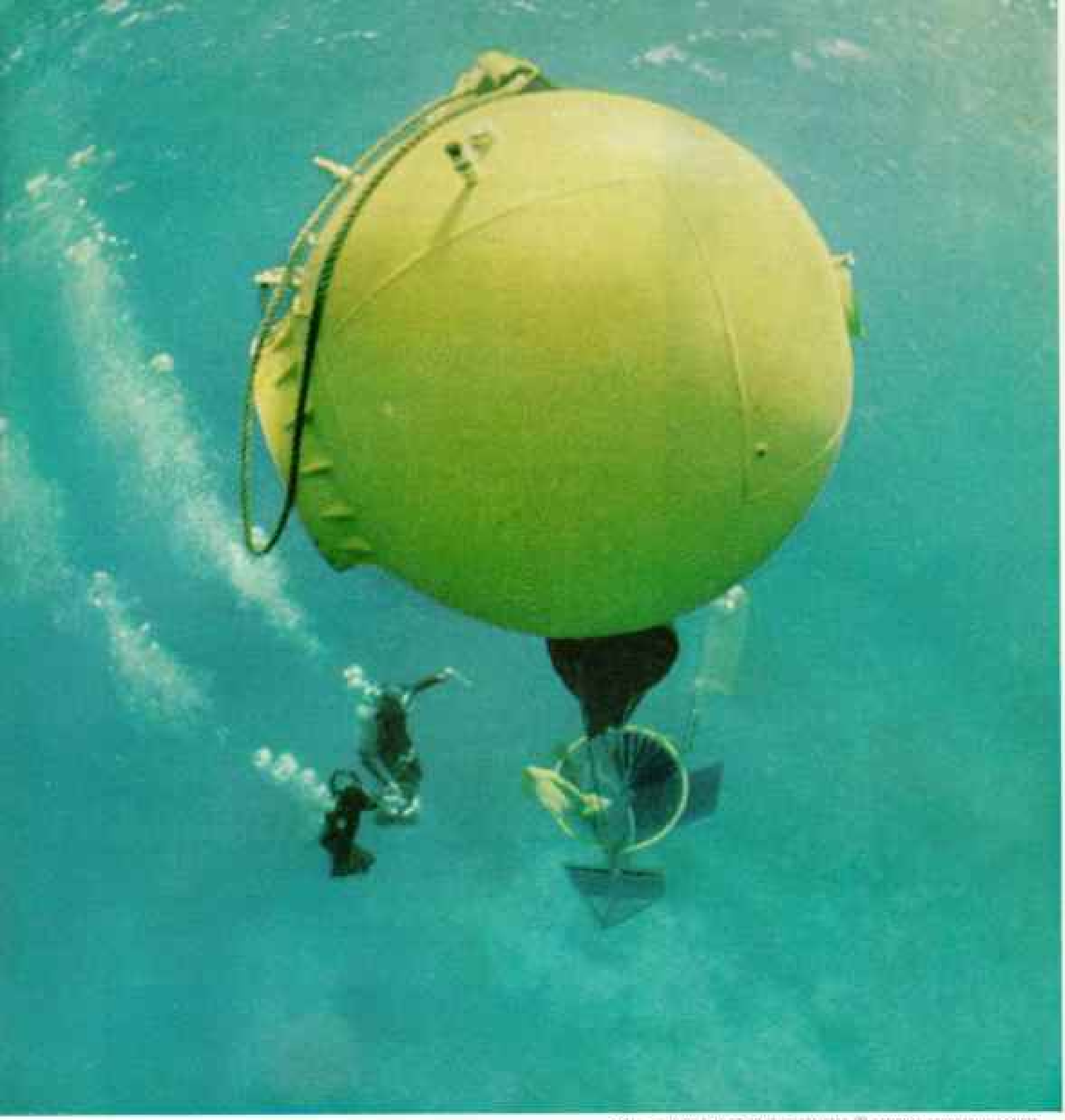
By then it was too late. I felt the sudden rush of water against my legs dangling outside and realized that I was on the way to the surface. As the ball rose through the water, the air inside expanded, making it ever more buoyant. The chamber picked up speed and rushed upward like a missile.

Just before we hit the surface, I pushed downward with all my strength, tumbling backward and out. A ton of auxiliary ballast, bolted to a cable just a few feet below the rising sphere, shot up past my head. It missed me by inches.

With my eyes closed I rolled into a ball and let myself sink back to the bottom. I knelt in the mud, wondering if I had burst a lung, waiting for a sign of blood or pain. I simply did not know if I had been exhaling on the way up, the only way to prevent a lung rupture. By some miracle, I was unharmed.

EXTRAVAGANZA BY FLIP SCHULKE, BLACK STAR © N.G.S.

"Time's up—let's go topside," Dr. Bass signals to a man in the booth. Expedition members decorated the device with an ancient Egyptian, left, and an Aztec—symbols of the University Museum.



EXTRACTING BY FLIP SCHULKE; BLUE'S STAR © NATIONAL GEOGRAPHIC SOCIETY

As the summer progressed, Claude Duthuit and Oktay Ercan, a Turkish diver, decided to build their own house on the island, in the style of a Tahitian hut Claude had once seen. They spent spare moments constructing it of scrap lumber and reed mats.

That reed hut proved to be the coolest and most popular spot on the island. Every afternoon its mat floor was covered by sleeping divers trying to escape the oppressive heat of the tents and frame dormitories during the siesta hour. In the evenings we sat by lamplight around a giant samovar, talking and listening to Claude play his *saz*, a long-necked stringed instrument popular in Turkey.

Not every evening could we stop to talk. Photographs had to be developed and printed daily, and the darkroom generator usually ran far into the night. Plans of the Roman ship's cargo were being completed. We could see how the amphorae had been stacked in the ancient hold. The shapes of these wine jars suggested that they were from the fifth or sixth century, but we expect firmer evidence as the excavation progresses.

One day the *Kardeşler* returned from a brief trip to İzmir with a four-and-a-half-ton, bright-red metal monster resting on her afterdeck. *Asherah*, built by General Dynamics for the University Museum, had finally arrived.

In charge of the little submarine was Donald Rosencrantz. He had first dived with us in 1963, and had gone on to help in the design of the *Asherah*. Our submarine pilot was

Sphere of safety beckons to divers ending their half-hour shift on the sea floor. The 6½-foot steel chamber, designed by the author, enables as many as four divers at a time to decompress as they rise in stages toward the surface. In the warm, dry interior they talk, read, or play chess. Side hatch at left serves as emergency exit should a diver be stricken with the bends during decompression. Through it he would be placed in a pressurized cylinder lowered from the surface, raised, and rushed to a recompression chamber on Yassi Island.

Underwater reading helps pass the time during decompression. Nancy Palmer and Susan Katzev share a magazine as they dangle from a weighted barrel beneath the barge, breathing off nitrogen that dissolved in their systems under pressure in the depths. Divers now use this method only after brief underwater stints that require little decompression.

Squatting like a frog, an expedition diver settles himself into the submersible chamber to decompress. A pretty visitor who snorkeled down, Professor Belkis Mutlu of the University of İstanbul, pops up through the bottom hatch.

our Turkish commissioner, Yüksel Eğdemir.

Don and Yüksel promptly began to photograph the Roman wreck from the *Asherah*. This was valuable work, but we had an even more important assignment in mind for the little undersea vessel.

In 1963 a Turkish sponge fisherman had presented the Bodrum Museum with a beautiful old statue of a Negro youth wearing a toga (page 420). Capt. Mehmet Imbat had netted the bronze about 15 miles north of Yassi Ada while dragging for sponges 300 feet deep. Not many years before, his uncle Ahmet Erbin had hauled up a large bronze bust, thought to be of Demeter, goddess of grain. It was from a similar depth many miles away.

We knew from experience that when one statue is found, there are likely to be others in the same shipwreck—as at Cape Artemision and Andikithira in Greece, and off Mahdia in Tunisia. Each of the Turkish statues might represent an entire cargo of classical art treasures.

Locating those wrecks presented enormous problems. We knew, because in 1965 we had spent the entire summer searching for them. For two months we had towed a television camera across the sea bed in the areas where the bronzes had been snagged. For two months we watched the television screen for eight hours a day, staring constantly at the monitor in the trawler's cabin. We could clearly see the patches of seaweed on the sandy bottom 300 feet below us. In one area

we even saw an occasional isolated amphora. But we never saw a wreck.

Before the end of that summer a new invention called a Towvane arrived. Shaped somewhat like the Mercury space capsule, except that it has movable vanes or wings on its sides, the Towvane is a manned capsule for the exploration of "inner space."

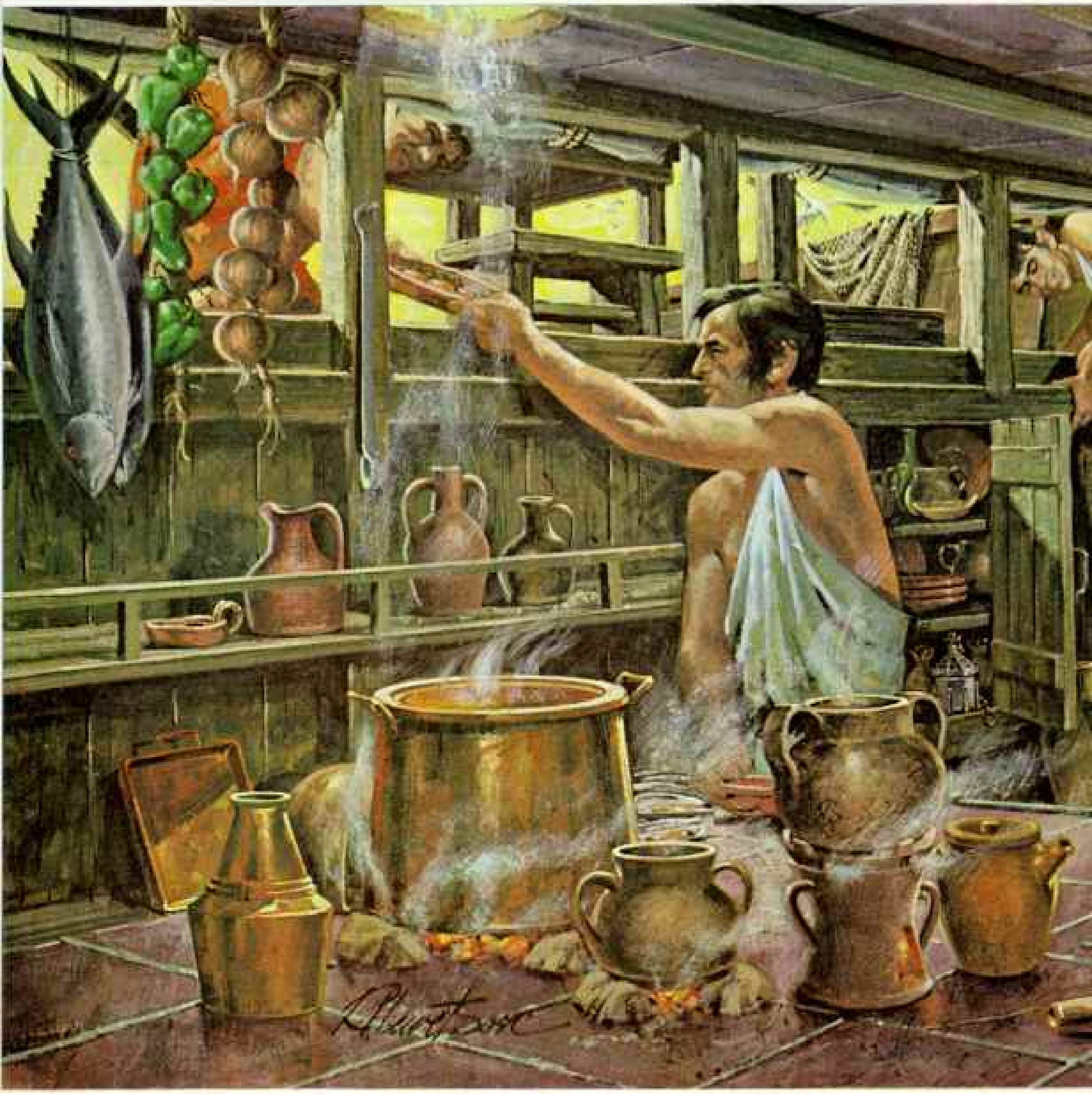
The capsule was lowered over the stern of our trawler and towed behind on a thousand feet of nylon line. The pilot inside, by manipulating the vanes, planed down to the bottom 300 feet deep and leveled off. He looked out through a wrap-around Plexiglas window and gave directions to the captain over a telephone.

"How do you know you're not going back and forth on the same path?" I asked him.

"Oh, it's easy. I just bump the sandy bottom every now and then and leave a trail!"

Although we did not find the wrecks, the television and Towvane had taught us a lesson: Visual search was too limited. We could see a path only 10 to 30 feet wide.

We also learned that the sea bed in our search areas is almost absolutely flat. We needed something that could sweep this level sand for hundreds of feet at a time. Side-scan-



ning sonar seemed to us the best answer.

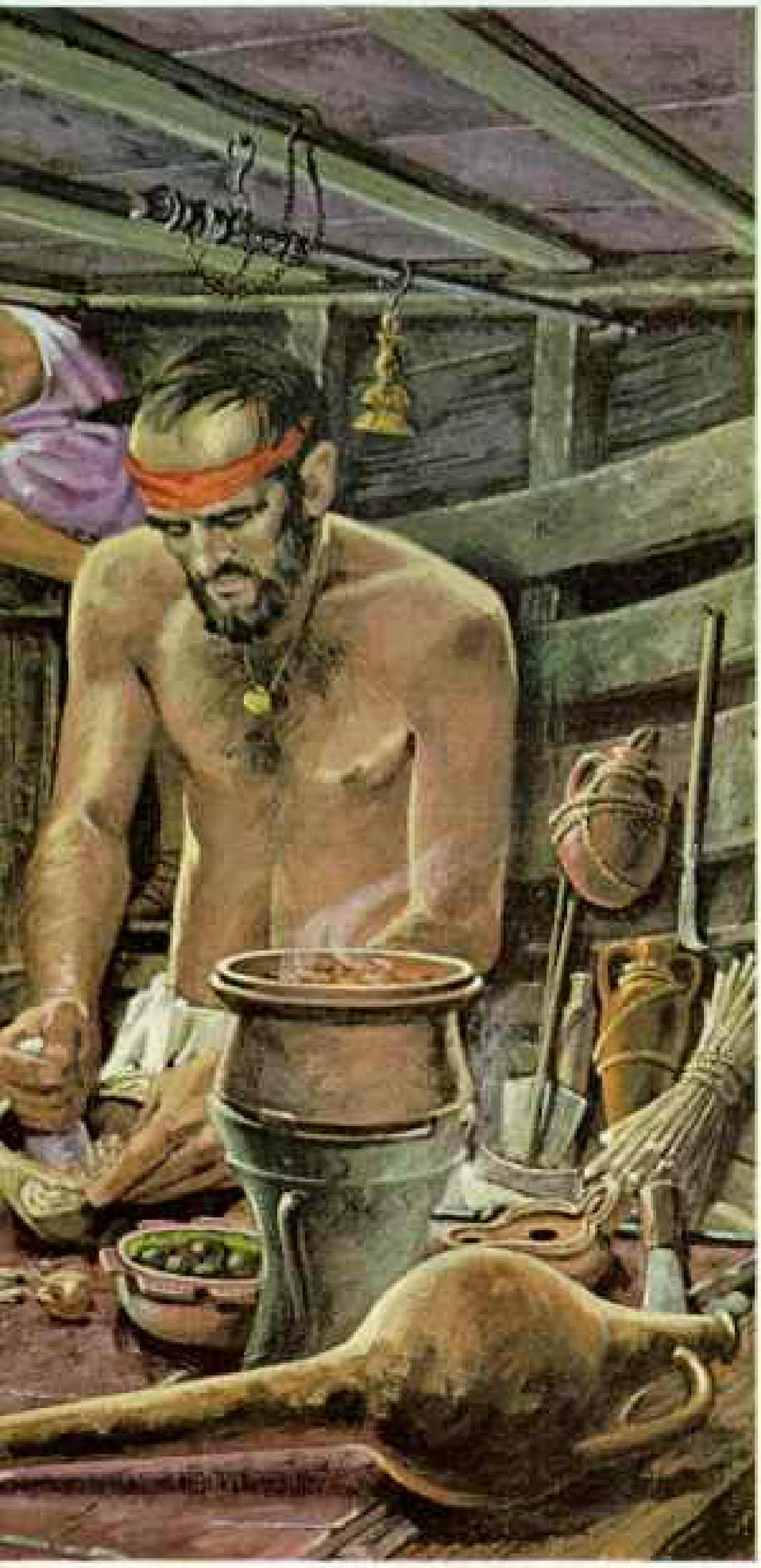
The sonar vehicle, part of an echolocation system, is mounted in a metal-and-rubber housing and towed along beneath the surface by the research vessel—in our case, the *Kardeyler*. Sound waves beamed out from each side of the "fish" would scan the flat sea floor in a path 1,200 feet wide on each run (following pages).

We decided that in 1967 we would search for targets with sonar and then visually inspect each one with the *Asherah*.

With U. S. Navy help, we arranged to try two side scanners during that summer. The first arrived in August with a team from the University of California's Scripps Institution of Oceanography.

The sonar team sailed south to the area where the Demeter bronze had been found. Within ten days, they had picked up more than a dozen likely targets—lumpy irregularities on the sea bottom. Now they were ready to look for what we called the "Negro Boy" wreck (map, page 403) in an area so near they could return each evening to Yassi Ada.

I went with the search team when they set out for the second time. An hour's sail north of Yassi Ada we saw Wreck Rock, an island

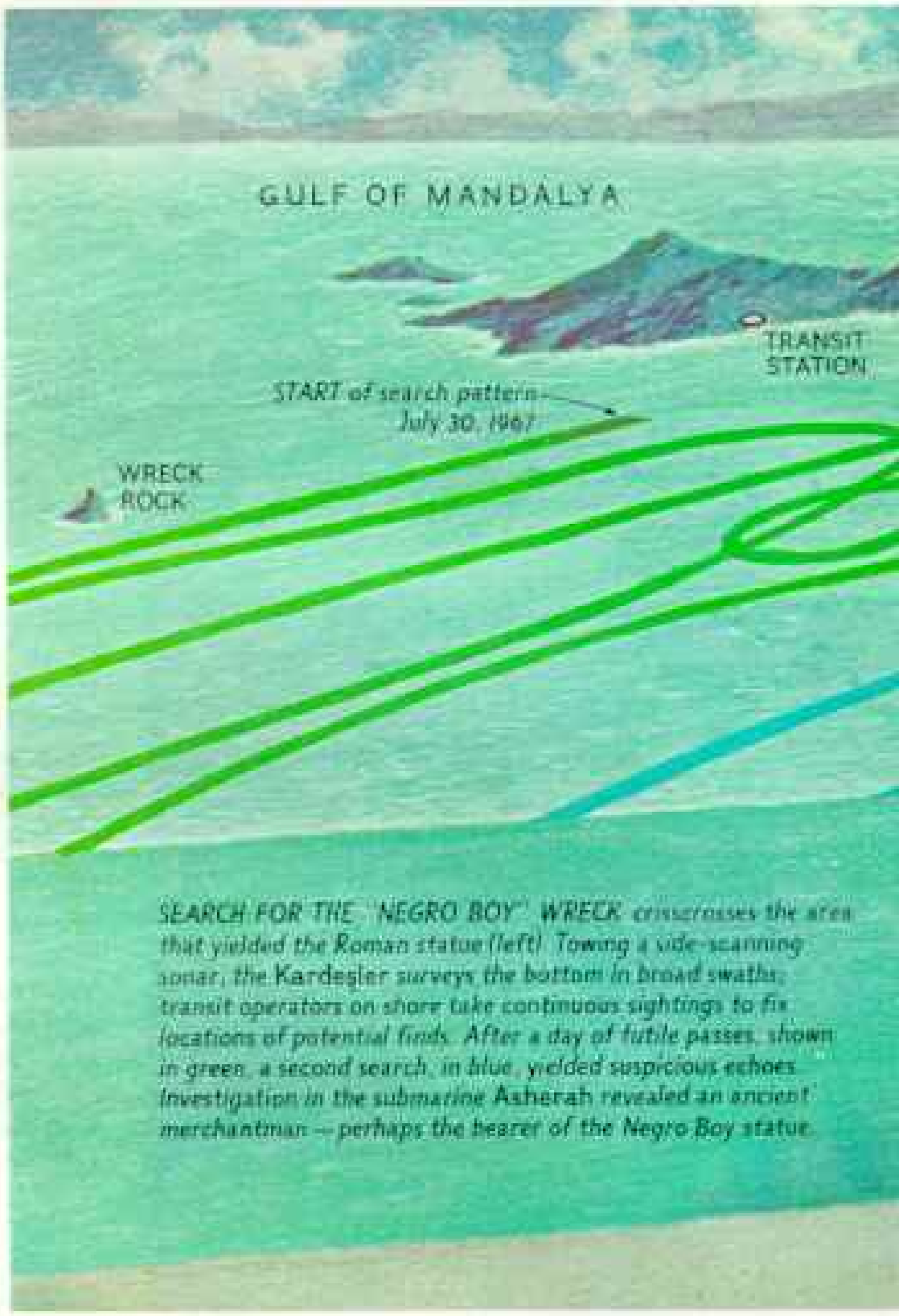


Glimpse into an ancient ship's galley—an archeological first—rewards seven years spent in excavating and plotting most of the artifacts portrayed in this scene aboard the Byzantine vessel (pages 404–5 and 413). As the cook grinds spices with mortar and pestle, his helper hands a crewman on deck a plate of mussels, whose shells were also found. Freshly caught tuna hang at left. Behind the helper a cupboard's bottom shelf holds a lanternlike censer, used for scenting beards and bodies after meals, and bags of gold and copper coins—perhaps money left in the custody of the captain by the crew. A fish net, verified by discovery of lead net weights, dries outside the narrow opening between main deck and tiled galley roof. A copper kettle heats on the tile hearth supported by iron bars above the galley deck; steam rises to the smoke hole. Charcoal-burning braziers flank a clay jug, shown below. Scales for weighing the cargo of wine jars hang above the cook, and behind him rest iron tools used for cutting firewood ashore.

PAINTING BY RON HEWETSON, ADAPTATION BY ROBERT B. GOODMAN © N.G.S.

One of about a hundred utensils found in the galley, this terra-cotta pot may have held beverage or olive oil. The excavators painstakingly pieced together its shattered spout and located its lid in the debris.

Clue to sunken treasure, this bronze statue of a toga-clad Negro boy came to the surface in a sponger's net near Yassi Ada. The 1963 find touched off an exhaustive search (right); archeologists believe the statue may have ridden a Roman ship laden with classical art.



SEARCH FOR THE "NEGRO BOY" WRECK criss-crosses the area that yielded the Roman statue (left). Towing a side-scanning sonar, the Kardegler surveys the bottom in broad swaths; transit operators on shore take continuous sightings to fix locations of potential finds. After a day of futile passes, shown in green, a second search, in blue, yielded suspicious echoes. Investigation in the submarine Asherah revealed an ancient merchantman — perhaps the bearer of the Negro Boy statue.

that rises straight from the sea like a sentinel guarding the search area.

First we put three of our divers ashore, about a mile from each other, with surveying transits. They were to follow *Kardegler* closely and periodically report bearings by radio, so that we on the ship could fix our exact position and plot a precise search pattern.

The *Kardegler* moved off into deeper water, and the sonar fish was lowered over her stern. Then we started our runs. A search usually begins with excitement and soon settles into boredom. Every two and a half minutes the three transit operators radioed our bearings, from them, we fixed our position in the search area. At the same instant the sonar record was marked and numbered.

It was important that no leg of the search pattern be more than 600 feet from the previous leg. This ensured that every square foot of the sea bed was scanned twice by the sonar.

By 2 p.m. the meltem, the prevailing north wind, had begun to blow. The rising waves soon caused scattered reflections on the sonar records; hundreds of false targets appeared on the sonar paper. We hurried to pick up the transit operators before the waves began to crash over the rocks where they stood.

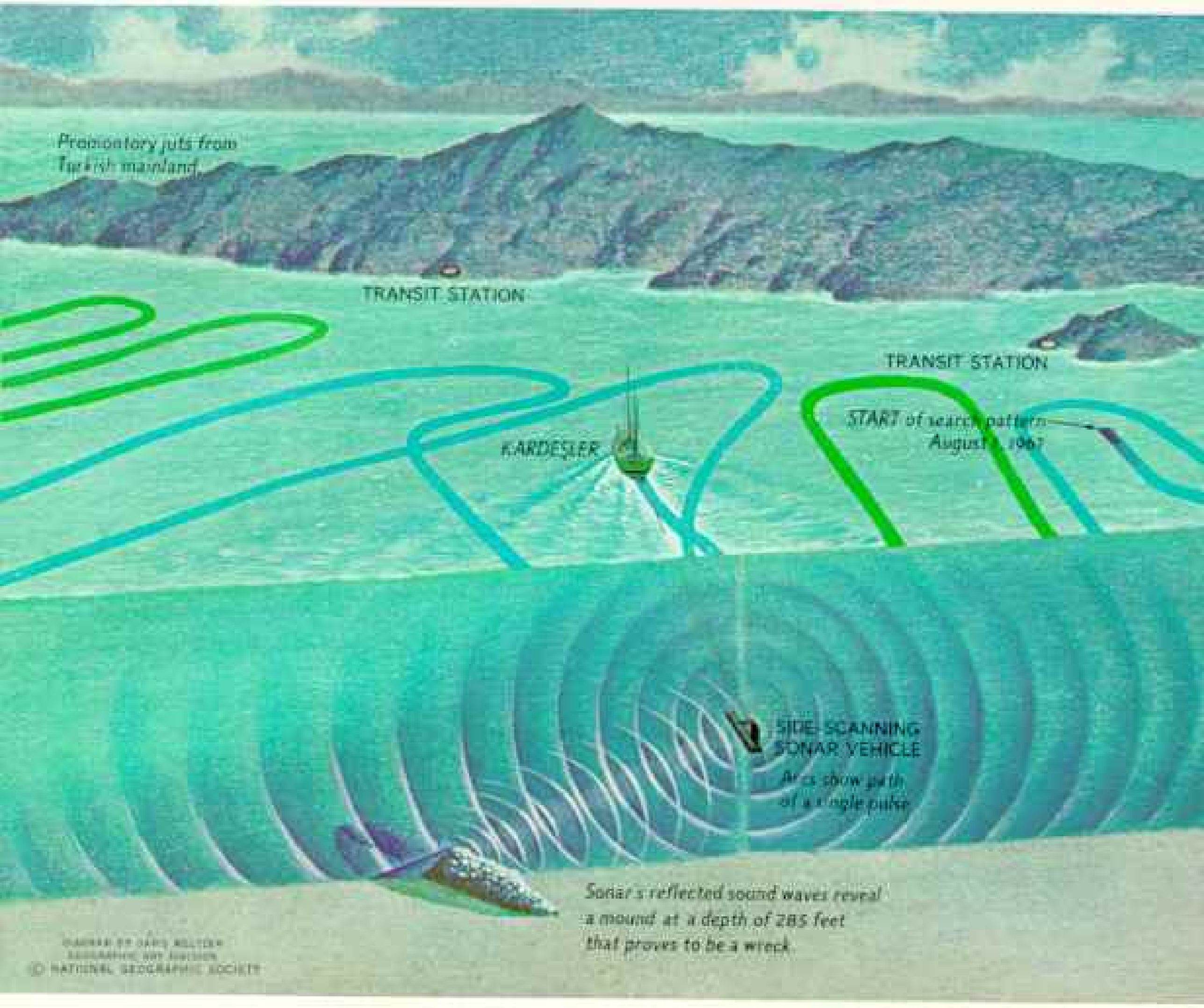
Most Promising Clue: a Purple Smudge

Nothing special about today, I thought, back on Yassi Ada. But the team from Scripps was already poring over the day's results, two pieces of wrinkled paper about two feet wide and 50 feet long. Maurice McGehee called me over to the table in the work shed.

"That's your best target."

He pointed to a dark, purple smudge in the midst of what seemed to me to be many similar lines and smudges.

The wind that rose that afternoon did not die for days. The sonar team had to return



to California for another assignment. They had had only two partial days to search the area where the Negro Boy had been found, an area we had fruitlessly crisscrossed with television for more than a month two years before.

The season was drawing to a close. Our team, made up of students and teachers, had to return to their classrooms. The wood of the Roman wreck at Yassi Ada was photographed for the last time, and then we re-covered it with the same sand that had preserved it for so long. Submersible chamber, air lift, tracks, photo tower, water jet, and telephone booth were all raised to the surface and carried to nearby Bodrum for storage.

Twice during this time the wind dropped for a day, and we made desperate attempts to inspect the sonar target near Wreck Rock with the *Asherah*. Both tries failed.

Another unit arrived—this one in the charge of sonar expert Martin Klein of Boston, Massachusetts. He had received his training under Dr. Harold Edgerton, famed inventor of the electronic flash lamp for high-speed photography, who in recent years has turned his attention toward sonar devices.

But now I had to return to my own teaching. I left our chief diver, Claude Duthuit, in charge and started for home.

Second Sonar Scores a Bull's-eye

Meanwhile the *Kardeşler* headed back to the sonar target identified by the Scripps team. Transits were set up to get the trawler on the same course it had followed when the target was first spotted. Marty Klein's sonar fish was put overboard and trailed behind the *Kardeşler* as she approached the target.

Don Rosencrantz called to Marty, "Watch that recorder. In a few seconds. . . ."

Then it appeared. Marty shouted: "Look at that! We've really got something big."

They crossed the target again at right angles, then again, and again. Each crossing provided additional fixes for the transits. Finally, when the sonar showed *Kardeşler* directly over the target, a buoy was dropped.

Then *Asherah* was towed out from a neighboring cove where it had been anchored earlier. Yüksel and Don lowered themselves into its pressure hull. The heavy hatch clanged shut and was locked in place. Gauges were checked. The submarine moved slowly into place by the buoy.

"We've got the buoy string in sight," Don reported over the *Asherah*'s surface radio. The bubbling sound of flooding ballast tanks was soon mixed with the rising whine of the twin electric motors as Yüksel threw on full power to force the submarine underwater.

"We're at 250 feet and still can't see bottom . . . now we're at 270 feet. . . ." Don kept up a stream of unnecessary reports to assure the topside crew of their safe descent.

Asherah Settles on Ancient Cargo

Then it seemed that everything had gone wrong! Shouting mixed with crashing and whistling sounds came over the underwater radio. Was the *Asherah* collapsing?

Only Don and Yüksel were unconcerned. At 285 feet the craft had reached the bottom of the buoy's anchor string. Visibility down there that day was limited to two feet, but the shapes of amphorae—amphorae everywhere—could not be missed. They had settled directly on top of an ancient cargo!

"It's the biggest wreck I've ever seen!" Don shouted, as Yüksel whistled and cheered. Don yelled again into the microphone, "It's a wreck, it's a wreck!"

The sound reverberated through the tiny steel sphere in which they sat, mixed with wild banging on a tambourine which Don had, incredibly, taken on board.

Final Answers Must Await Future Dives

The search which had started in 1963 with the discovery of a small bronze statue of a Negro boy in a sponge-dragger's net, the search which had led to the building of the *Asherah*, the search which produced nothing but frustration in 1965, seemed to be over.

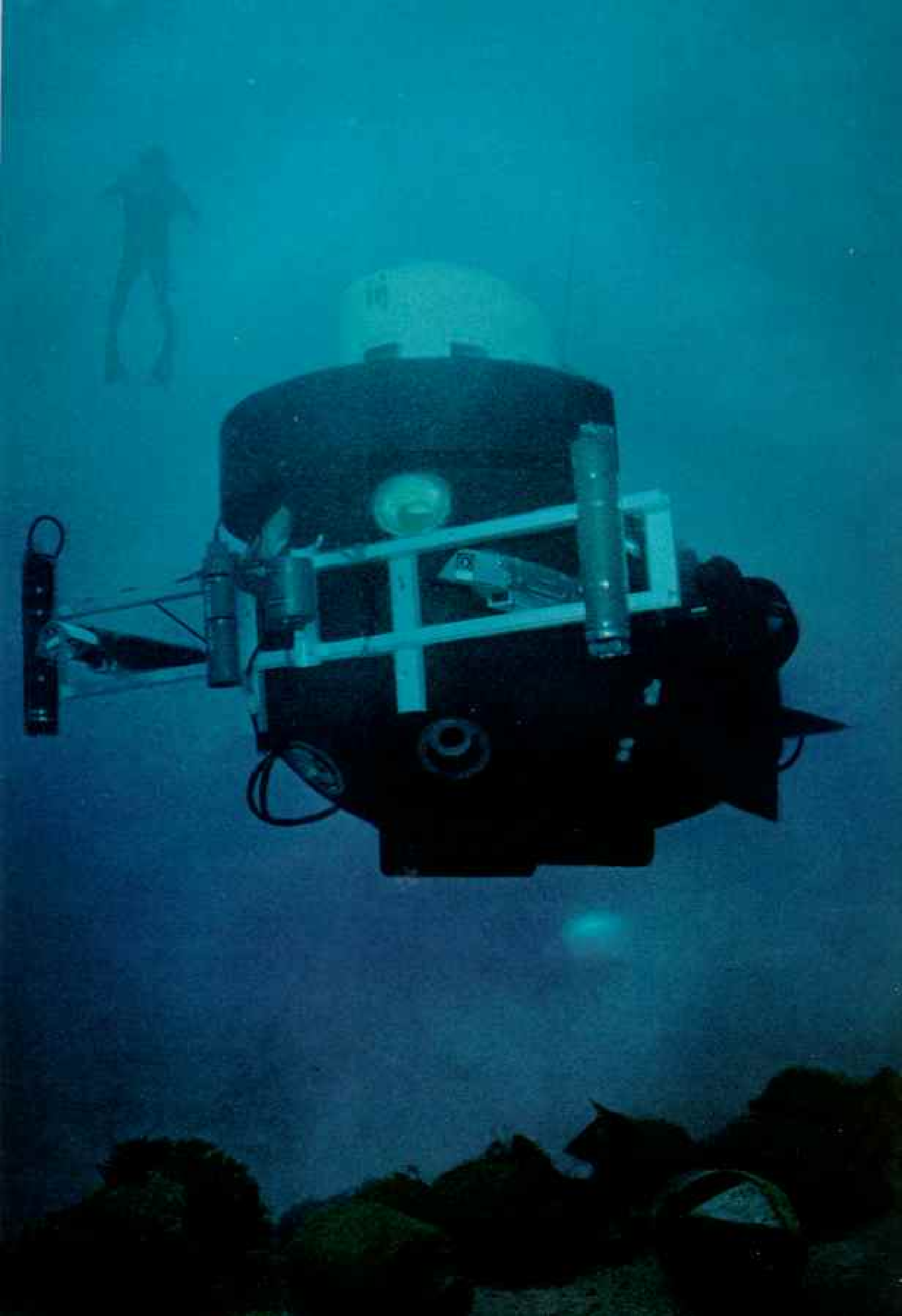
The next day the *Asherah* dived again. The roof tiles of the ancient merchantman's galley could be seen, and what must have been the ship's water-storage jar. Visibility was still too poor to allow the stereophotos we wanted so badly, but Don turned on the exterior lights and snapped a few pictures through a port as Yüksel steered close by the cargo of amphorae (below).

As much as we would have liked to stay, the expedition had to end that day. Only packing and shipping—and questions—remained. What will we find in the ancient hulk near Wreck Rock? What are the dozen or more sonar targets in the area where the Demeter bronze was found? What else lies just beneath the sand back at Yassi Ada?

Of one thing we could be sure. During years of hard work we have learned how to excavate ancient wrecks. And now we know how to find them. THE END

Camera-laden sea scout glides above amphorae at the Roman wreck. Distant glow marks the underwater telephone booth. Named for a Phoenician sea goddess, the research submarine *Asherah* can dive to 600 feet, travel at four knots, and hover motionless while its cameras scan the bottom.

Target of the future, encrusted amphorae mark an ancient wreck that may have yielded the Negro Boy statue. Murky 285-foot depths—a new challenge to the archeologists—limited visibility to two feet when this photograph was snapped through *Asherah*'s porthole.



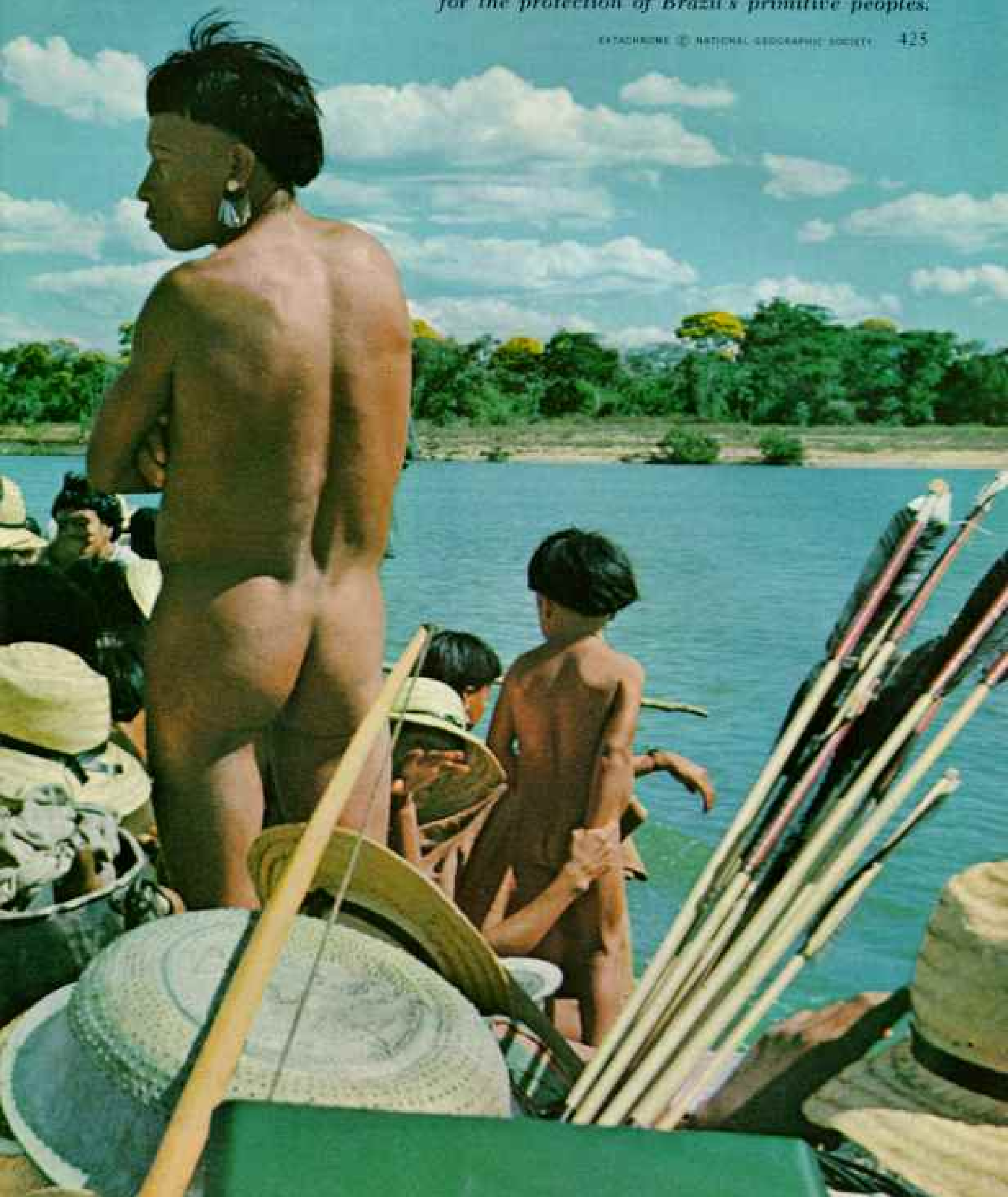
Saving Brazil's Stone

By ORLANDO and CLAUDIO VILLAS BOAS

Photographs by W. JESCO VON PUTTKAMER

Age Tribes From Extinction

FIRST GLIMPSE OF A PROMISED LAND: *Tchikao Indians approach Xingu National Park, a preserve set aside for the protection of Brazil's primitive peoples.*



THE RAUCOUS CRIES of macaws had ceased abruptly, and the booming voices of monkey troops had gone silent. The only sounds now breaking the jungle stillness were the hiss of flying arrows, the rustle of their passage through the dense foliage, and an occasional "thunk!" as one of these six-foot missiles struck the gigantic tree behind which my brother Claudio had taken refuge.

Naked Stone Age Indians, knowing nothing of civilization but the shattering noise of airplanes and of gunfire, were reacting quite normally to his presence in their unexplored gallery forest along Brazil's upper Xingu River (map, page 431). Tense and terrified, they sought to kill him.

Years of experience in the steaming Amazon Basin dictated my brother's reaction to the familiar sound of flying arrows. He signaled to his men to fire guns into the air. The unseen bowmen ran away. Claudio left presents on the riverbank—axes, knives, beads, things of this sort—to show friendly intentions, and then went quickly back to the Batovi River, where he had hidden his boat.

Reluctantly he headed back toward Pôsto Leonardo, the frontier settlement whence he had come. One day Claudio and I would come

Friends from the sky, the authors land near the Tchikao village on Brazil's remote Jatobá River. Orlando Villas Boas (left) comforts a child. Claudio (right) listens as tribesmen tick off the names of Tchikao killed by diamond hunters. The friendly reception reflects years of patient pacification. The suspicious, warlike Tchikao (pronounced chee-KUH-ow) were among the least known of Amazon tribes until the Villas Boas brothers, the administrators of Xingu Park, searched them out in the 1950's as part of Brazil's effort to save Indians threatened with extinction. White invaders, lured by riches in diamonds, gold, pelts, and land, spread disease, and at times even machine-gunned the tribes. Today only 53 Tchikao survive of an estimated 400 a decade ago.

back to see whether the gifts had been accepted. If so, we would try again to meet and, eventually, to "pacify" the Indians, as the government puts it.

Friendship Won by Infinite Patience

The process could take weeks, months, more likely years. In fact, the incident with which we have opened our story took place in 1956, and it was not until eight years later that we succeeded in meeting these particular Indians, the Tchikao, on a friendly basis.

To us, time means little. It is our work to seek out and make peace with some of the last unknown peoples in one of earth's last unexplored fastnesses. To it we have dedicated our lives.

It is work with a double objective. We make it possible for crews of the government's Central Brazilian Foundation to build airstrips and roads in safety from Indian attack. Then our beloved country can harvest the treasures locked in her trackless heart, and with their aid take her place among the progressive nations of our times.

But as the years have passed, we have come to love and respect the Indians, and we feel now it is of equal importance to abate the tragedy that is inevitable when the waves of civilization crash against the shores of primitive cultures. We consider ourselves, first and foremost, protectors of the tribes.

We administer Xingu National Park for the National Indian Foundation, a department of the Ministry of the Interior.* Our brother Leonardo worked with us until tropical fever claimed his life in 1961, the same year the park was created; it is for him that park headquarters, Pôsto Leonardo, is named.

The 8,500-square-mile Xingu Park lies near the geographical heart of Brazil. Here, in a borderland between two worlds, menaced—and menacing—primitive tribes could find a new and more peaceful way of life. Here fate could decide their future, either to enrich Brazil's national culture with their own, or to follow into oblivion that 90 percent of the original Brazilian population that has vanished since the white man first came.

We do not lead the people of the watery forests into the sanctuary until it is quite clear they cannot survive outside it. And when they are here, our administrative hands are feather-light.

We vaccinate against the diseases of civilization which, because primitive peoples lack immunities, can wipe out entire tribes in a few days. We teach the Indians not to hasten their own extinction by warring with other tribes that have now become their unaccustomed neighbors. Otherwise they live their own lives.

Journeying into unexplored wilderness to find unknown tribes can be difficult at times. We have more than once been lost, and used all our supplies, and finally found our way back to our base barefooted, without shirts, and with the fires of malaria coursing our veins. If, however, another tribe of Amazonia follows at our heels, their faith in us outshining

EXTREME UPPER LEFT AND HEADHUNTERS © W. L. S.

*The National Indian Foundation is successor to Brazil's Indian Protective Service, dissolved in 1967.

the fear and bewilderment in their liquid-black eyes, the privations are as nothing.

We travel sometimes together, sometimes separately. Claudio was alone except for eight trusted Indian companions when he braved the shower of arrows mentioned earlier. And 11 years passed before we led the Tchikao Indians into the park.

We had not even heard the name Tchikao until the early 1950's, although we knew that Indians speaking a tongue no one else understood came from the unknown jungle and attacked Xingu villages. The villagers looked to us for protection. They belonged to many tribes—among them the Waurá, Trumái, Bakairi, and Kalapálo (the presumed killers in the 1920's of British explorer Col. Percy Fawcett and his son).

From the village of the Nahukuá tribe, the chief, Kamalive, came to us one evening in an excited state.

"*Tueleva omare inhicorro vegue!*" he exclaimed.

"*What* savages have attacked your village?" one of us asked.

"*Tchikao inhicorro!*" Kamalive replied.

The invaders, said the chief, had killed 12 Nahukuá, abducted several girl children, and burned the village. The Trumái, Waurá, and Mehináku had been attacked on other occasions, we were told.

Tribal Warfare Threatens to Erupt

In spite of our noninterference policy, we knew that one day we must seek out these Tchikao and make friends with them. The day arrived in 1956. The Tchikao raided a Waurá village on the Batovi. The Waurá* and other injured tribes planned retaliatory attacks that could turn the Xingu countryside into a battleground.

We could not afford to wait any longer. Claudio and his eight Indian comrades, who had four different tribal languages among them, set forth in a boat.

On the eighth day of their trip they saw abandoned campsites, old fishing implements, and other signs of the Tchikao. On the tenth day they found a bamboo arrow floating in the river, and on the eleventh a trail into the jungle from the riverbank.

They hid their boat and took this trail, moving in absolute silence. After three hours they heard men calling to each other, as Indians do to keep in contact in the jungle.

Soon they were close enough to the Tchikao village to hear the voices of women and children. They crawled through a final tangle of

Wiry warrior, Milowoo shoulders his bow and six-foot arrows. Tchikao men rarely exceed 5½ feet, but their marksmanship and reputation for ferocity and witchcraft made them formidable foes of other Indians. Milowoo wears a tribal sign on his cheeks—black lines representing teeth of the capybara, world's largest rodent. The mark, tattooed in childhood, fades with the years.

Around the neck some men wear "magic" whistles (below) made from the hollow wing bones of a bird. Once they sang and blew the whistles to scare away a thunderstorm.

KODACHROME © N.G.S.

lianas and dense foliage. Peeping out, Claudio became the first *civilizado* to see the Tchikao around their home campfires.

One Indian, an old man whose body was painted a brilliant red, sat quietly on a log. The others slept in hammocks, for it was the hour of siesta, noon in the forest, when the heat is most intense. Blue smoke rose lazily from the smoldering fires. Pet birds walked about—macaws, several other kinds of bright parrots, and curassows.

Claudio stepped from concealment. He was

(Continued on page 433)

*The January, 1966, issue contained a vivid account of this tribe, "The Waurá: Brazilian Indians of the Hidden Xingu," by the late Harald Schultz, author of six memorable NATIONAL GEOGRAPHIC articles on the primitive peoples of the Amazon Basin.

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

EKTACHROME (BELOW) AND KODACHROME BY W. JESCO VON PUTTKAMER © N.G.S.

Arrow-straight but unusable, a gully-riven and stump-studded airstrip runs from the Tchikao village to the Jatobá River, upper right. To encourage visits from the authors, who always brought gifts, the tribesmen built the landing field on their own initiative. Though appreciative, the Villas Boas party continued to land on a flood plain a few miles away (page 426). Paths threading the wilderness lead to fields for primitive farming and to the site of a former village, at right, abandoned after two tribeswomen died.

In the riverine heart of Brazil, the government has set aside 8,500-square-mile Xingu National Park as a refuge for indigenous peoples. There dwell the remnants of tribes whose total population in 1884 was estimated at 3,000. Today fewer than a thousand survive. Some tribes, such as the Yawalapití and Trumái, number fewer than 30.

Snowstorm of butterflies eludes the grasp of scampering Tchikao boys, their bodies glistening from a dip in the river. The Tchikao bathe thrice daily; mothers carrying babies wade into the Jatobá despite the danger of attack by piranhas.

EXTACHROME © NATIONAL GEOGRAPHIC SOCIETY

Rhythmic thumping echoes in a sun-dappled forest as Tchikao women pulverize maize in a crude trough; one uses an ax handle as a pestle. They will bake the crushed grain into bread, or steep it to make soup. The Indians prize the white man's tin can, upper right, and bowl. Both men and women wear earrings chipped from river shells and use razor-sharp piranha teeth to create their bowl-shaped hairdos.

(Continued from page 428)

unarmed. In his hands, raised above his head, he carried a few of the brighter and flashier presents the party had brought.

Claudio and the old man on the log stared at each other. It was as if all the fund of human knowledge, accumulated over thousands of years, lay as a barrier between them.

The silent confrontation endured only a few seconds. The old man came shouting to his feet. A hundred naked Indians exploded from hammocks and from underbrush in which they had been resting. Women and children raced into the forest. Yelling men reached for their bows. The great man-killing arrows came whistling. Claudio stepped behind a tree.

Encounters Governed by a Humane Rule

The jungle fell silent. The arrows continued to fly. Soon, as the Tchikao stole to the flanks, the missiles began coming from dangerous angles. Reluctantly the men Claudio had left behind in the jungle fired into the air.

They followed a precept stated long ago by the late Marshal Cândido Mariano da Silva Rondon, who accompanied President Theodore Roosevelt on a famous exploration trip to the River of Doubt. Rondon, who also loved the Indians, said:

"Die if necessary, but never kill."

The guns boomed harmlessly. The arrows ceased flying. The Tchikao could be heard running away through the forest. Claudio and his companions retreated to their boat.

Before we could find opportunity to revisit the tribe, tragedy threatened the Tchikao—a tragedy we hoped to avert. Men came into the Batovi country in search of the gold and diamonds that lie in the beds of Brazilian rivers. Hunters of animal skins came, and the tough survey parties sent by men back in the cities who planned to speculate in new land.

All too many of these invaders were true desperadoes. As in the American Wild West at a comparable stage of national development, the forces of law and order could not always cope with the illegal depredations of such people.

We heard of the invasion before the intruders reached the Tchikao area, and hastened our plans to make contact. Meanwhile, we learned later, the Indians prudently changed the site of their jungle camp.

The new village proved to be only forty minutes' flying time from Pôsto Leonardo (map, page 431), but it was a long while before we located it in the green fastness. In the autumn

It takes a big arrow to stop a big fish. In a dugout acquired from diamond hunters, Mactombo retrieves his missile. The Tchikao also catch fish by stupefying them with timbo, a poisonous plant.

of 1964 we set out for it from Pôsto Leonardo, traveling in two airplanes. We planned to land on a dry flood plain not far from the Indians; this the pilots had already tested for firmness with touch-and-go landings.

First we flew over the village and dropped presents. Then we landed. The pilots remained at their controls, engines running for a hasty escape should the savages send the arrows whistling again. I—Orlando—descended.

I saw no Indians at first, but we could all hear them shrieking, howling, and screaming. From concealment they rattled bundles of arrows against their bows, making a frightful din intended to show us that they were in large numbers and heavily armed.

Holding presents, in this case machetes, above my head, I walked steadily toward the greatest concentration of noise. Suddenly three Tchikao burst from the forest and ran at me. My heart pounding, I stopped and held forth the machetes.

Then came the moment for which we had waited eight years. The warriors dropped their arrows at my feet; then they seized the machetes and ran back into the jungle.

"Quick, Claudio!" I shouted. "Bring more machetes."

Others in our party joined me: my brother; Dr. Eduardo Galvão of the Goeldi Museum in Belém, one of Brazil's foremost anthropologists; and Pionin, a young Kayabí we have raised almost like our own son since tappers of wild rubber trees killed his parents.

Holding the new supply of machetes, we again walked forward. From the forest the incomprehensible shouting of the Tchikao continued, and occasionally an Indian jumped into sight, waving his bow and arrows.

All of a sudden a score of Tchikao formed a line side by side and rushed screaming upon us. But the charge ended as had the first. Again they dropped arrows at our feet and took our machetes. This time they did not run back into the jungle.

We signaled the pilots to cut off the engines. The sound of the exhausts died away, along with the thumping of our hearts.

Matches Bring Screams of Delight

The process of becoming acquainted began. It followed a standard, familiar psychological pattern.

When we first tried to touch the Tchikao they ran away. But soon the warriors returned, and this time they brought their women and children, who gibbered with fright when we even looked at them.

We distributed presents. Axes and machetes brought shouts of pleasure. Matches first elicited the awed silence of people mystified by a magician, then brought screams of

Loot from diamond hunters bedecks Pavulu, Tchikao chief and shaman, as he fashions an arrow. He appropriated the trousers, hat, and glassless spectacle frames from passing prospectors. Spent shotgun shells plug his ears. The Tchikao salvaged the bottle and can from white men's trash; they treasure them as improvements over the gourds and bark vessels they normally use.

Pavulu sang for the authors in a lilting tongue akin to that of the Carib Indians, once widespread in the Lesser Antilles and northern South America.

delight. The Tchikao make fire by rubbing sticks together.

As each Indian received a gift, he or she ran into the jungle and hid it, returning immediately for more. When all the presents were gone, the Tchikao reached eagerly for our personal belongings, even our clothing.

We flew back to Leonardo for the night but returned the next morning. This time there were many more Indians waiting to see us.

One of the Tchikao women seemed especially friendly.

"She's been vaccinated!" exclaimed Dr. Galvão, and then we realized who she was. Daughter of a Waurá chief, she had been kidnaped as a child and was now happily married to a Tchikao warrior.

We tried to learn something of the Tchikao language, using her as interpreter, but she had forgotten her native Waurá tongue. We succeeded after great effort in learning about 15 Tchikao words.

Communication between civilizados and primitives is difficult, not only because of language barriers, but also because thought processes differ. For example, we sought to learn the Tchikao word for "fire" by lighting twigs, pointing to the blaze, and cupping an ear with a hand while assuming expectant expressions.

Each time, the nearest Tchikao merely blew the fire out in silence. Why? We do not know.

Somehow we must have given the Tchikao to understand that they should not raid the Xingu villages, for the other tribes thenceforward were left in peace. But we were unable to communicate a warning against contacts with the skin hunters and *garimpeiros*, the diamond hunters. Disastrous encounters followed our visit.

Tchikao Speak a Carib Tongue

During the next two years we visited the Tchikao by air and by boat, gradually increasing our knowledge of their language and culture. They came to understand that our cameras were harmless, and we made valuable photographic records in their pristine primitive period.

We learned that they were apparently related to the Carib peoples, whose numerous, far-flung tribes once inhabited the Lesser Antilles and much of northern South America. The language that was giving us such difficulty proved to be a Carib tongue.

We gathered that they numbered about 400 when they first came to our attention. Today only 53 survive.

Like other Amazon Basin tribes, the Tchikao made many implements from materials at hand. Their baskets, ceremonial feather headdresses, and fans of plaited palm strips were crude. Not so, however, their weapons.

Pride of Pavulu's old age, his young wife Chimairu knots a hammock of palm fibers, a craft at which the Tchikao excel. During the dry months, the Indians sleep outside in their hammocks with a fire nearby to keep away the chill.

Before the authors pacified them, Tchikao warriors raided other tribes to kidnap young girls for wives—the primary cause of recurring tribal hostilities. Small bands such as the Tchikao periodically run short of marriageable females, and the more aggressive groups solve the problem by kidnaping.

Bows and arrows were beautifully finished, and with them they could hit tiny birds at 40 yards. They did not have blowguns, which in Brazil are found only north of the Amazon, nor did they tip their arrows with poison.

From jungle fibers they spun a strong cord which they used to string their bows. They also wove the thread into arm bands. They made possibly the best fishing nets in all the upper Xingu region, knotting threads of palm fiber.

The Tchikao made no pottery; to hold liquids, they used gourds and excellent vessels made of bark. The latter were small replicas of their primitive bark boats, craft with little difference between bow and stern.

Tribesmen lived by hunting, fishing, gathering, and primitive farming. They killed all sorts of birds, including owls. They hunted and ate the common jungle red deer, the fierce jaguar, and the big rodents, capybara and paca. The meat of the tapir was apparently taboo.

Among the fishes, they ate those with scales —tucunaré, matrinchã, traíra, piranha. The larger fish they shot with arrows. Smaller ones they herded into enclosures and stupefied by poisoning the water with the juice of the timbo plant.

Airplane Hums in Shaman's Song

Tchikao women and children gathered roots, grasses, insects, frogs, and tadpoles for the table. They dug small pits in which they trapped lizards and other animals.

The Tchikao cultivated maize, gourds, cotton, and manioc—the latter the common, or

bitter, cassava. Manioc contains deadly prussic acid. Indians long ago learned how to get rid of the poison by scraping, crushing, and straining before making flour from the roots (above and right).

Not known among the Tchikao were plants common in the upper Xingu country—sweet potatoes, peanuts, and bananas—nor had our new friends ever seen a dog, so common in other Indian villages.

Although not frail, the Tchikao are lean and small of stature, rarely more than 5½ feet tall. Women and men alike go about naked. Both sexes wear earrings made of chips of river shells. Women adorn

Baking day in the jungle

SCRAPING, CRUSHING, SQUEEZING—hours of labor by village wives go into the preparation of manioc, the bread of the Tchikao. They dig up the cultivated roots when they reach the size of large sweet potatoes (left, center). With shells and pieces of metal the women scrape off the skin and pound the roots into pulp. To rid the manioc of its deadly prussic acid, the women strain the pulp through a sieve, probably stolen from diamond hunters. A bark trough catches the juice. In another step to remove the poison, the women put the pulp in a palm-fiber tube to be squeezed as dry as possible.

Baking the white mass on a ceramic griddle (below) drives off more acid, leaving only harmless traces, and yields the final product—a staple of tribal life. The Tchikao, to whom pottery-making is unknown, probably took the griddle from the nearby Waurá, the ceramic makers of the Xingu tribes. In addition to manioc, the Tchikao eat maize, fruits, fish, frogs, insects, birds, and mammals.

CROWDING THEIR ARK OF HOPE, *the Tchikao shove off in morning mist during the seven-day journey to Xingu Park. As officials watch from dugouts, each tribesman seeks the seat he occupied when the trip began—a routine the Indians adopted themselves. A woman carefully packs her precious manioc griddle (left); a youngster tarries to gaze at his reflection (right). The outboard-driven barge, loaned by the Brazilian Air Force, carried the entire tribe and its meager belongings.*

EXTACHROMES BY W. JESCO VON PUTTKAMER © N.G.S.

Joyfully stepping ashore on park land, the Tchikao cluster around Mavirá, a Kamayurá tribeswoman. From this site on the Culuene River, a jeep and trailer transported the Indians a few at a time to park headquarters at Pôsto Leonardo, seven miles away. When the newcomers arrived, the Waurá chief recognized his daughter, kidnaped by the Tchikao as a child; Waurá women have long been prized by other tribes because of their pottery-making ability. She peers from between her husband and a tree at far right. Days of persuasion by the authors were required to prevent a reopening of old tribal wounds.

themselves with necklaces of palm nuts.

The tribe, when we first met them, had fewer feather ornaments than other Xingu tribes. They painted their bodies with bright vegetable colors, especially favoring red from the urucú plant, which they cultivated.

Always a tense people, they sometimes relaxed sufficiently to dance and sing. Pavulu, their elderly chief and shaman, or medicine man, would sing for hours at our request, keeping time with his right foot. Villagers joined in near the end of each song. When in the midst of unknown words we heard Pavulu imitating the sounds of our airplanes, we knew he was improvising as he went along!

Old Pavulu had picked up a pair of eyeglasses without glass from a diamond hunter. These he proudly wore in conjunction with a pair of spent 12-gauge shotgun shells, one in each ear (page 434).

Once the Tchikao tried to calm a furious thunderstorm by singing and blowing on little whistles made from the hollow bones of birds (page 428). Each time the lightning flashed, they blew the whistles furiously.

So that we—and our presents!—might come to them more easily, the Tchikao built an airstrip beside their village. They did this completely on their own, without a hint from us and without telling us their plan.

However, they built on land slashed by gullies. They made the strip too narrow and left too many stumps. Sadly we passed over without landing on it (pages 430-31).

New Invasion Imperils the Tribe

In 1966 a flood of garimpeiros rolled over the hunting grounds of the Tchikao. From Cuiabá, capital of Mato Grosso State, more than a thousand diamond seekers came down the Jatobá River in boats; their supply planes followed (map, page 431).

Federal police, fearing the diamonds would be smuggled out of the country, came after them. Before the garimpeiros left, however, they clashed with the Tchikao and further diminished their numbers.

In the same period the construction gangs building a highway between Brasília, the nation's capital,* and the Amazon port of Manaus had reached the Xingu area and opened it to the world. The time had come to lead the surviving Tchikao into the park.

*See "Brasília, Metropolis Made to Order," by Hernane Tavares de Sá, NATIONAL GEOGRAPHIC, May, 1960.

They were pathetically eager to make the move. The invading garimpeiros were killing off their game and frightening them away from their plantations. They were ill, hungry, and dispirited. It was an emergency, and we moved swiftly.

Indians Enjoy Polkas—but Not Onions

From the Brazilian Air Force we obtained a barge, a U. S. Army bridge pontoon. Powered by two outboard motors, this strange craft set forth from Pôsto Leonardo with Pionin in command; serving as crew were two other Kayabí—Coa and Cavaip—and a Tchukahamei named Mecaron.

Because the tense Tchikao might fear a rescue party composed entirely of former tribal enemies, we also sent three Brazilian geology students. To prepare the way, Claudio and photographer Jesco von Puttkamer (who had been present on our earlier visits) flew to the Tchikao ahead of the barge; Jesco would return with it.

Pionin completed his trip in four days, but

it was weeks before the scattered Indians all assembled at the river with their meager possessions. During the period of preparing for the journey, Indians and civilizados learned much from each other.

The Tchikao came to like polkas Jesco played on an accordion, but when they tried to perform on the instrument themselves, they broke off the keys. Trying on a pair of boots, they put them on the wrong feet.

One man found a box of sulfanilamide pills with which several Indians were being treated for a skin ailment. The warrior ate all the pills —with no apparent ill effects.

We try to keep unaccustomed foods from the jungle Indians as a rule, but the Tchikao had so little to eat that Pionin was forced to supplement their rations with ours. They liked some of the new dishes if they were not salted. Onions, however, they spat out in disgust.

Entire Tribe Crowds Into One Boat

On departure day in July of 1967, 53 Tchikao came aboard the barge. There were also the four other Indians, Jesco and the three geology students, and the tribe's assorted pet birds. To put it mildly, the craft was crowded (pages 424-5 and 438-9).

Old enmities put aside, tribesmen already living in the park greet the new arrivals. The burly chief of the Kuikúro brings a gift basket of manioc bread to Pavulu, left. Kuikúro boys eye their former foes with suspicion; a young park visitor watches the meeting. The Kuikúro, like other Xingu tribes, plaster their hair with a paste made from urucú seeds.

At the urging of Orlando, resident tribes entertained the Tchikao with singing and dancing. Yawalapiti men (above) play *jakui* flutes. Like the large flutes of many New Guinea tribes, these sacred instruments may not be viewed by women.

Two Tchikao were seriously ill, one with a heavy cold, the other with a badly infected foot. One woman was expecting a baby—imminently.

Following our instructions, the ark traveled in leisurely fashion. The party camped each afternoon at four o'clock to provide time for bathing, hunting, fishing, and cooking.

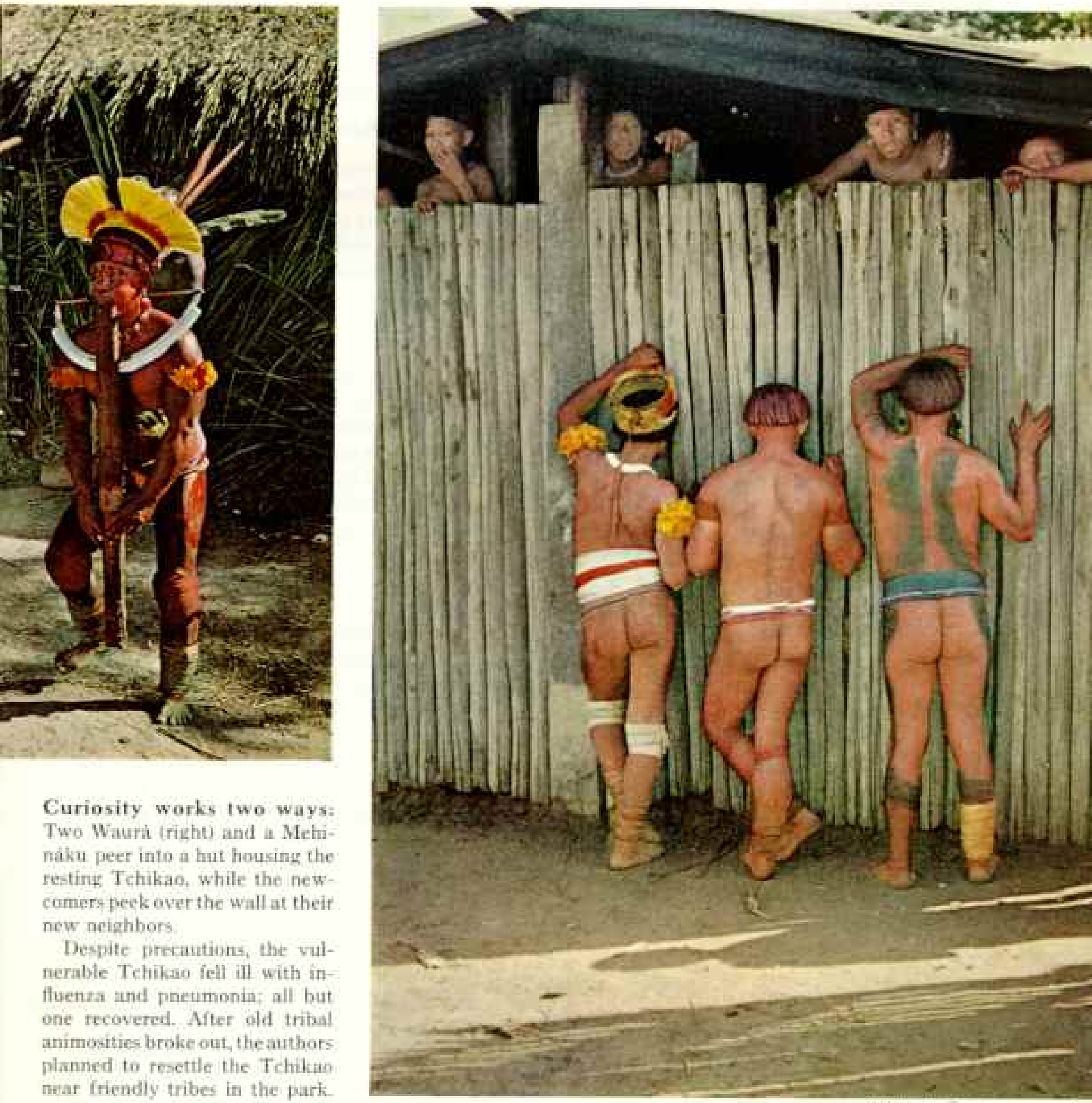
"Each camp was a scene of beauty," Jesco wrote in his report of the journey. "In the evenings the flames of the cooking fires danced into the darkness. Beyond in the night, uneasy jaguars growled and grunted.

"We fished and hunted. Pionin shot a swimming capybara. The 100-pound animal sank to the bottom of the river. Piranhas flashed to the feast.

"Five Tchikao nevertheless dived and retrieved the carcass. Although piranhas had already eaten part of it, not a Tchikao was bitten. More than ever, the other Indians believed the Tchikao possessed some very strong magic.

Tchikao Puzzled by "Cow Without Horns"

"We resumed our journey every morning at first light. Filing through the river mists like ghosts, the Tchikao took their same places



Curiosity works two ways: Two Waurá (right) and a Mehináku peer into a hut housing the resting Tchikao, while the newcomers peek over the wall at their new neighbors.

Despite precautions, the vulnerable Tchikao fell ill with influenza and pneumonia; all but one recovered. After old tribal animosities broke out, the authors planned to resettle the Tchikao near friendly tribes in the park.

on the raft without a word from Pionin."

The barge traveled three rivers successively, down the Jatobá and Ronuro, then up the Culuene. On the Culuene, during the sixth day, twelve Kamayurá tribesmen came to the bank to look at their old enemies.

"Flinging off bits of civilized clothes and seizing their bows, the Tchikao prepared for battle," Jesco reported. "In a few seconds the barge looked like a battleship. Pionin gave the motors full throttle. We raced safely out of arrow range."

A horse that had strayed from Pôsto Leonardo appeared on the bank. The Tchikao shouted in recognition. "Moo! Moo!" one said, putting fingers to head in a sign for horns.

The Tchikao had eaten some tinned beef and had been told it was the meat of a cow. The animal had been described Indian-fashion, by imitating the sound of its voice and indicating an outstanding characteristic, the horns, with the hands. The Tchikao assumed the horse was a cow and could not understand what had become of its horns.

When dogs also appeared, the Tchikao called them *acary*, their word for jaguar. Later, at the post, warfare based upon mutual misunderstanding erupted between Tchikao and dogs, with one or two Indians bitten.

Fiesta Welcomes New Arrivals

The scenes of those first few days tax our capacity to describe.

Pôsto Leonardo was a beehive. To see the primitive tribesmen arrive, planeloads of civilizados had come from everywhere, some with permission, some without.

Our park Indians had come in from the farthest reaches of the preserve. Good will toward their former enêmies filled their hearts. One tribe had given them a village in which to live, another a manioc plantation.

Warily, tensely, the Tchikao jumped from the jeep, carrying their bows and arrows. They were met with screams of pleasure and embraces, not enmity.

We relaxed. Not for long, however. A shout of rage rose from the milling throng of Indians. The Waurá chief whose daughter had been kidnaped suddenly recognized the girl (page 441). Charging into the Tchikao, he tried to drag her off. Weeping, she clung to her husband.

Somehow we managed to arrange a temporary peace. It was nevertheless many days before we convinced the Waurá father that times had changed, and that modern ladies have the right to marry as they choose!

The park Indians now put on such a fiesta of welcome as we had never seen in our 22 years in the jungles. Many great *jakui*—long magic flutes that women are not allowed to see—came out of hiding places and trilled in the moonlight. Warriors painted to the eyebrows sang in a dozen tribal languages, and whirled in primitive dances. Gaudy feather headdresses rustled. Leg rattles of dried *pequi* nuts chattered (preceding pages).

Disease Races Through the Tribe

The fiesta lasted all the next day and night. Then the exhausted Indians slept. The visitors flew away in the planes. But they unwittingly left something behind—the germs of influenza and pneumonia.

In a few days every Tchikao lay at death's door. For only one did the door open. Tended day and night by the park's chief nurse and by the famous Brazilian expert on Indian health, Dr. Noel Nutels, all but this one man returned to health.

The Tchikao moved into their new village—and old tribal enmities broke out anew. The park Indians could not, after all, forget the injuries the Tchikao had done them. Once, they drove the newcomers into the jungle, and we had to find them and bring them back.

We think we will soon resettle them near Diauarum in the very center of the park, where live Indians with whom the Tchikao have never fought. After that, there will inevitably be other difficulties, other tragedies we cannot prevent, but only diminish.

Sometimes people ask us if we do not know it is impossible to defend primitive Indians against civilization and, if so, why we continue to try. Our answer is brief:

"Yes, we know complete success is not possible. But that is no reason we should not try. We will continue our work."

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COVER: Her baby swaddled against the desert's harshness, a nomad tribeswoman of Afghanistan prepares for a long day's trek by camel caravan (page 336).

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Skull of a prehistoric man comes to light in Ethiopia

IN A CAMP beside the Omo River, Richard E. Leakey, right, pieces together a fossilized human cranium with a brain cavity larger than that of today's average adult. Bones and teeth of extinct animals litter the table. Scientists believe the skull may be 100,000 years old. It was found in the distant cliffs by Paul Abell, left, a member of the Kenya contingent of an international paleontological expedition to Ethiopia's Omo Valley last year.

The Kenya team was supported by the National Geographic Society and led by Richard Leakey, son of famed anthropologist Louis S. B. Leakey. The Leakeys hope that studies of the skull will fill a major gap in our knowledge of prehistory.

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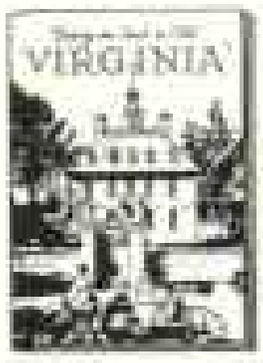

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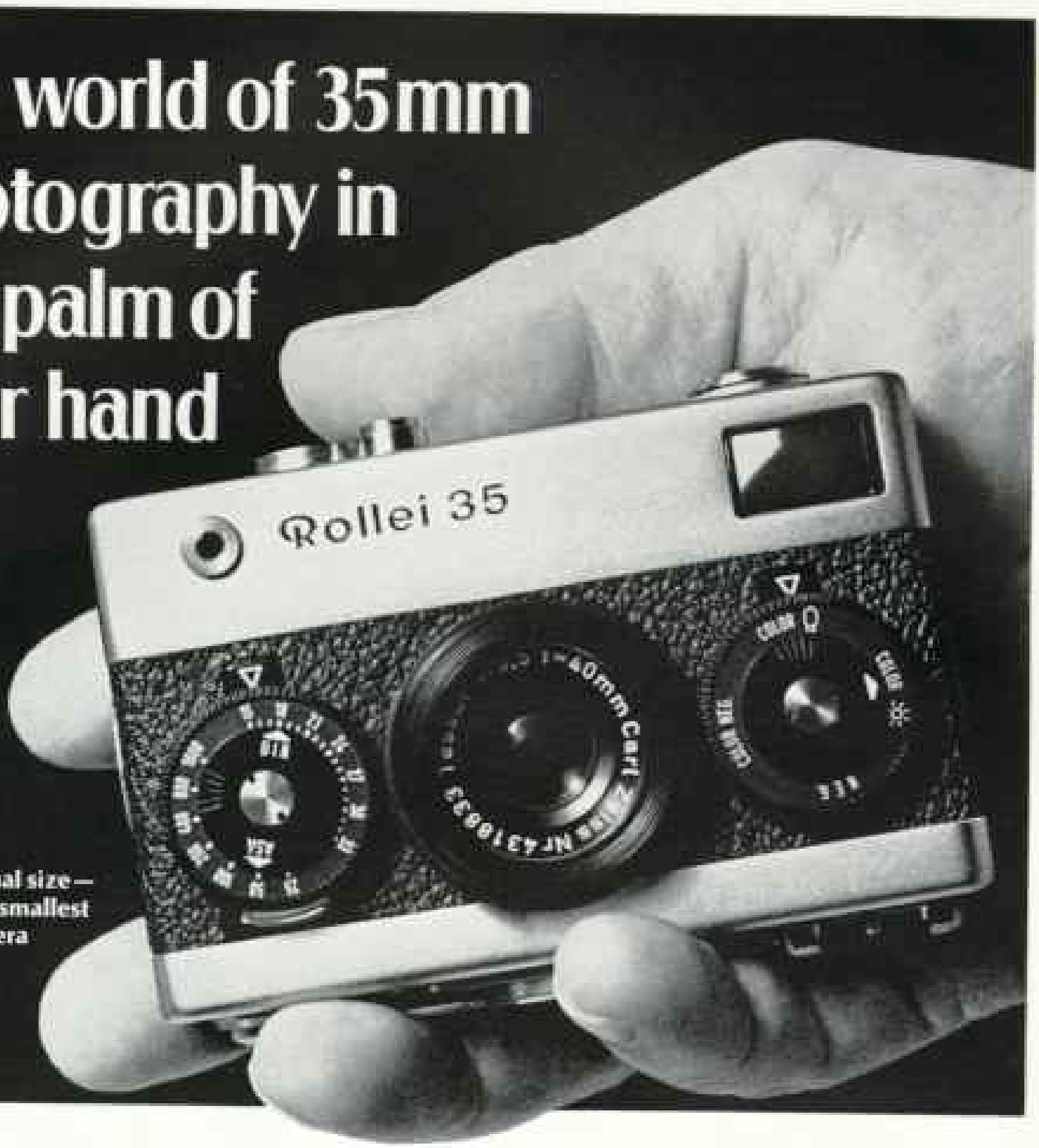

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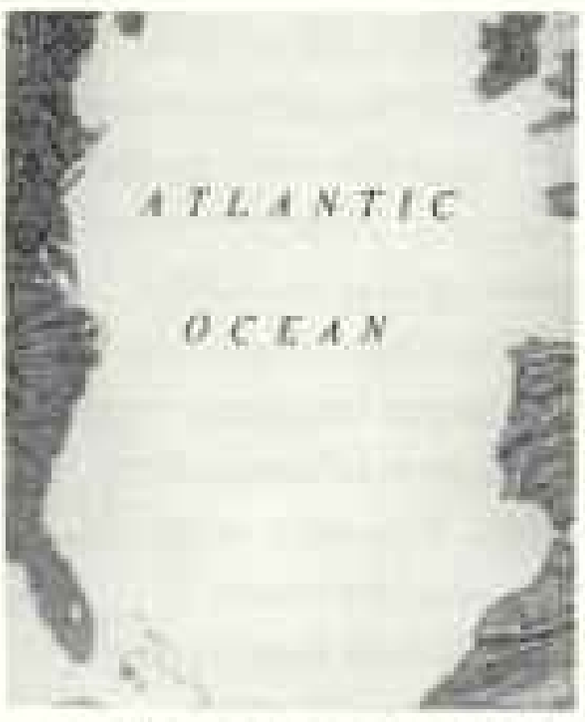

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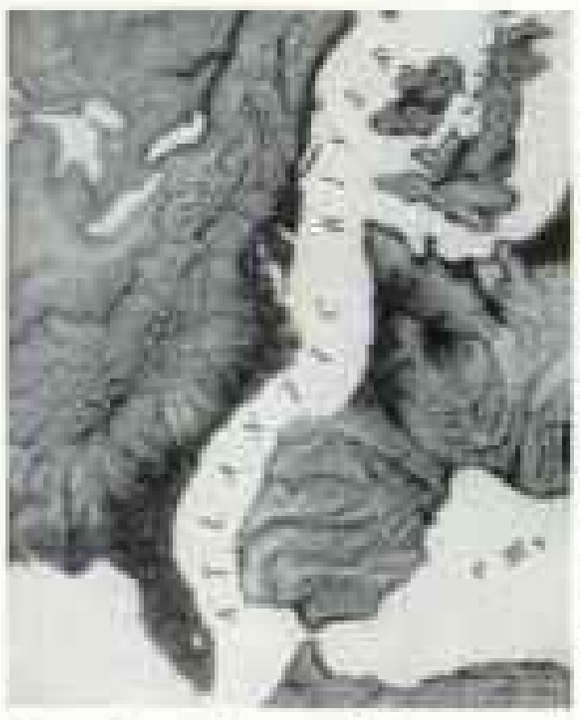

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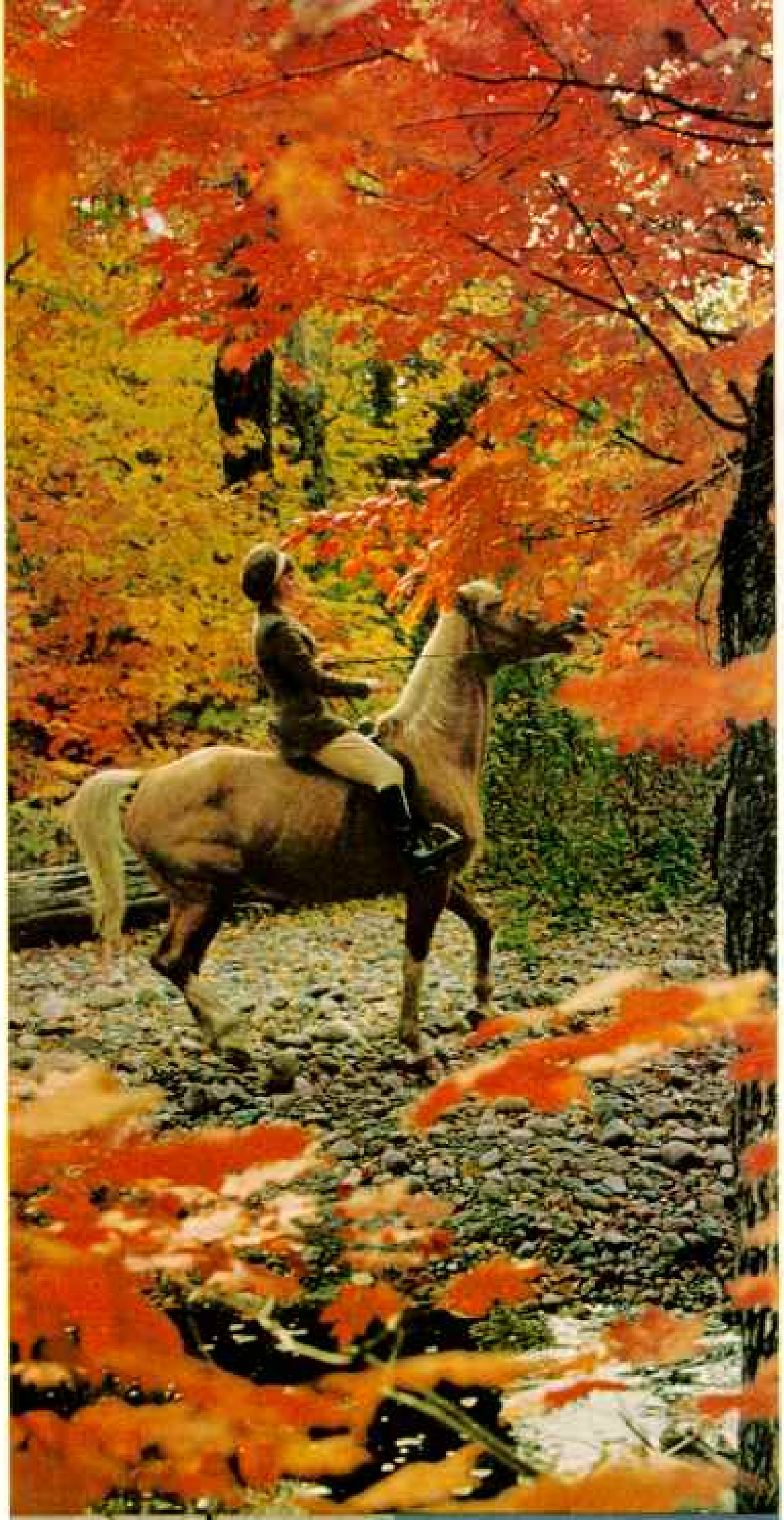

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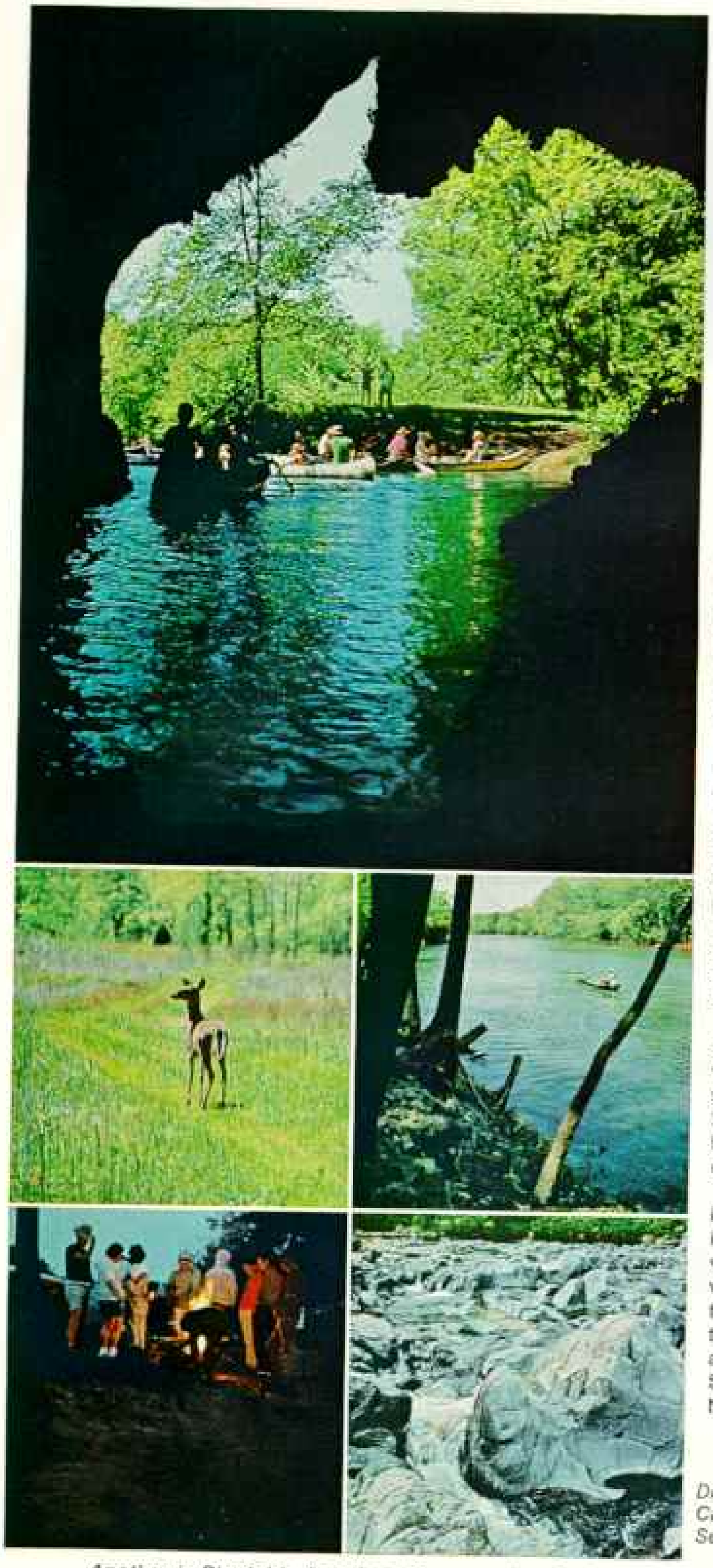

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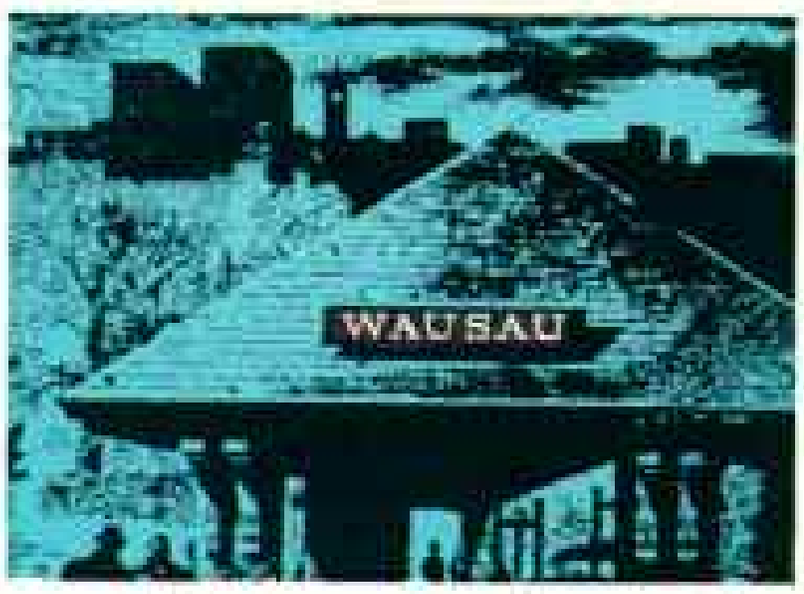

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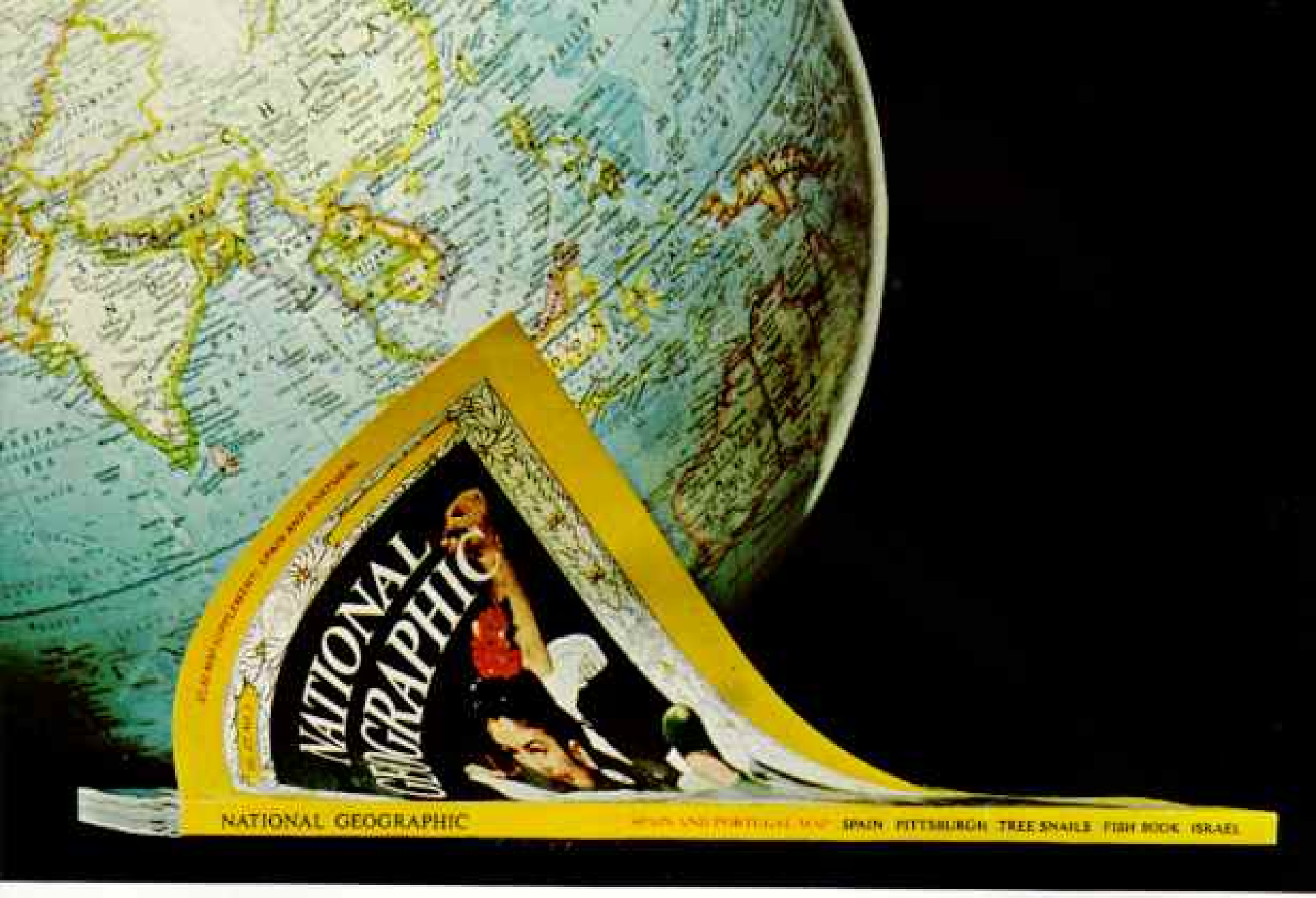

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