

VOL. 129, NO. 1

JANUARY, 1966

# NATIONAL GEOGRAPHIC

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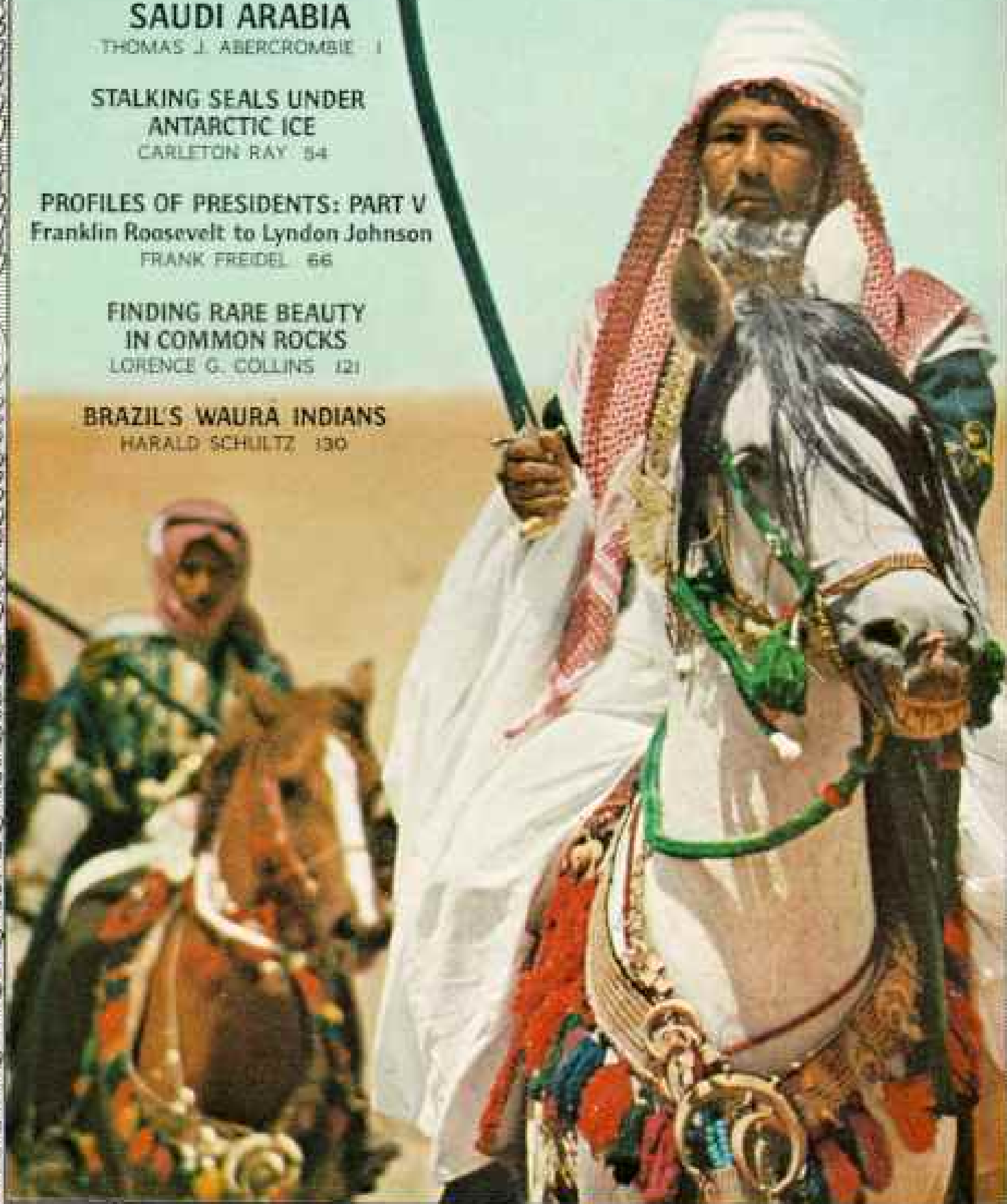
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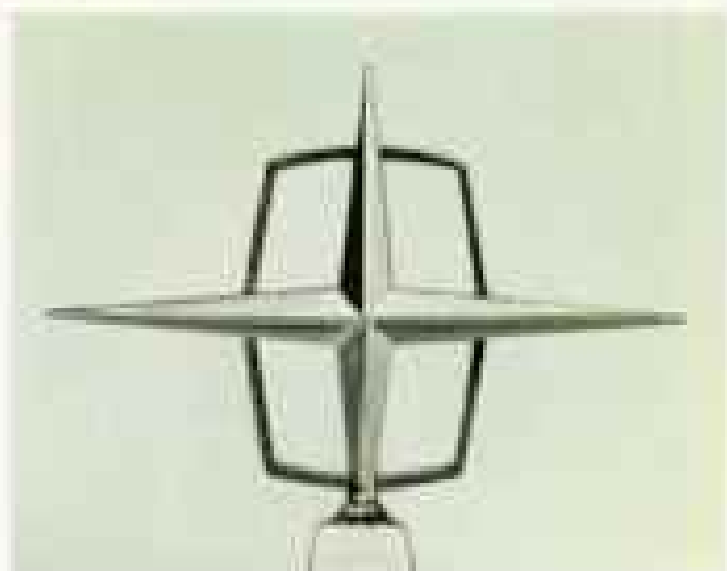
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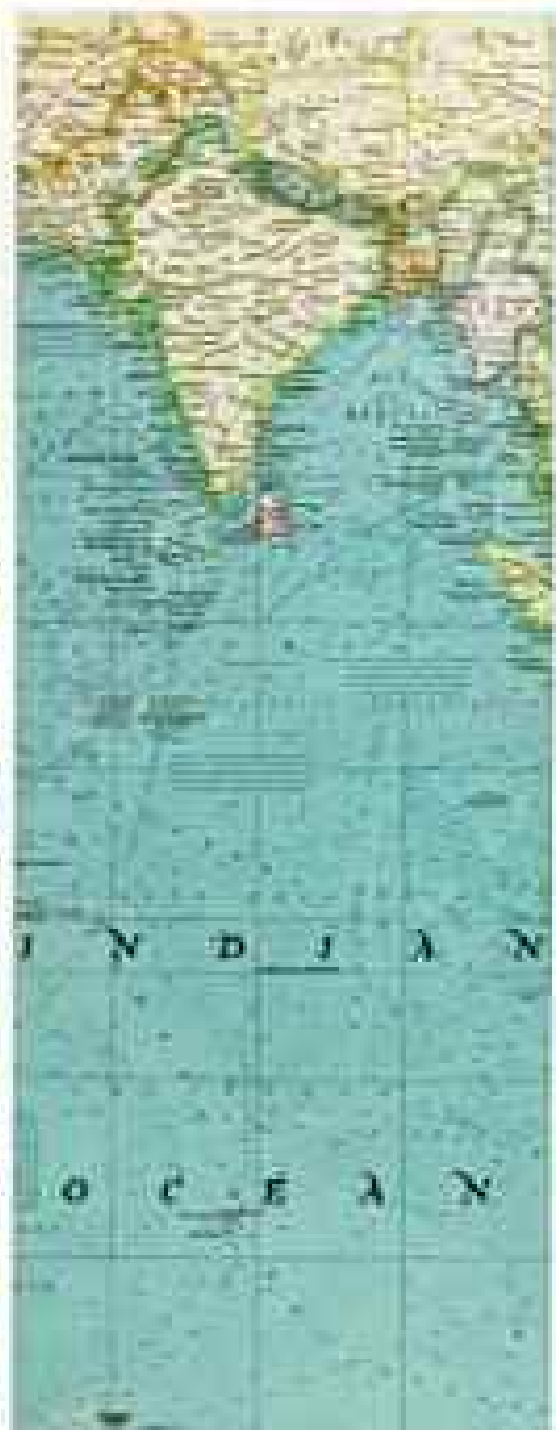
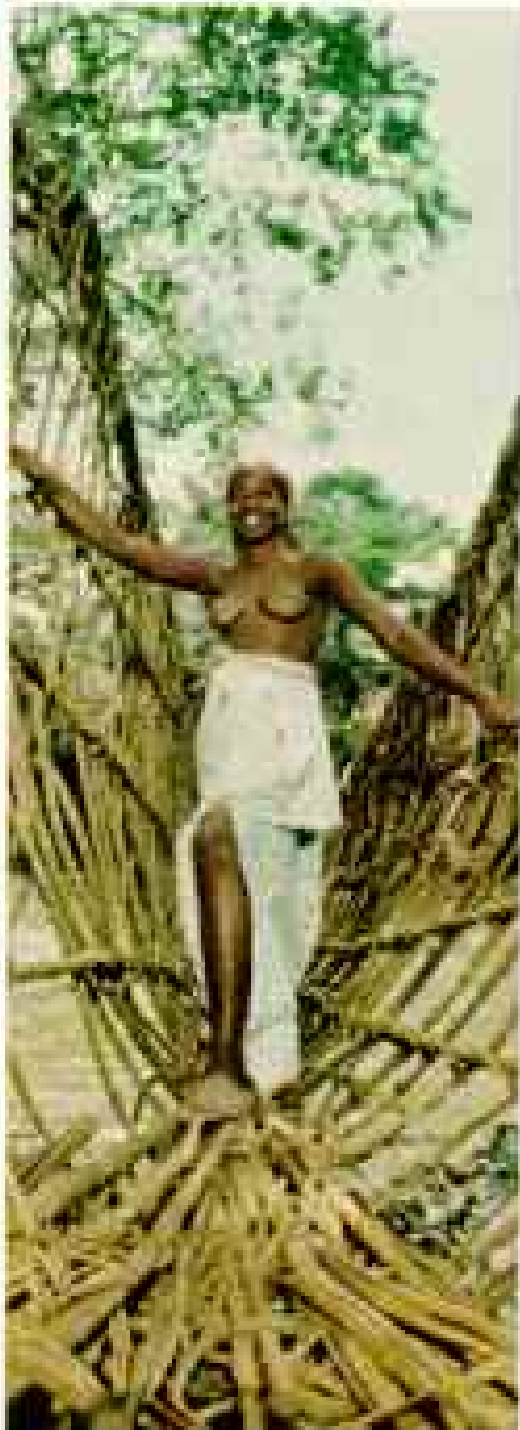
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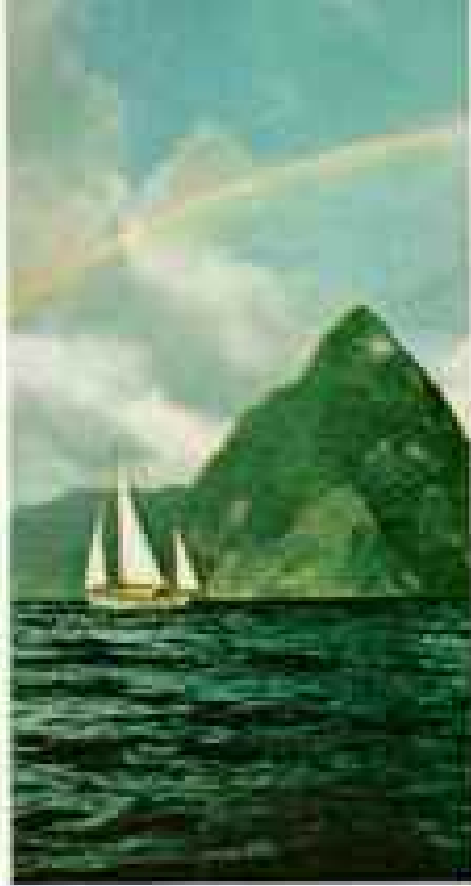
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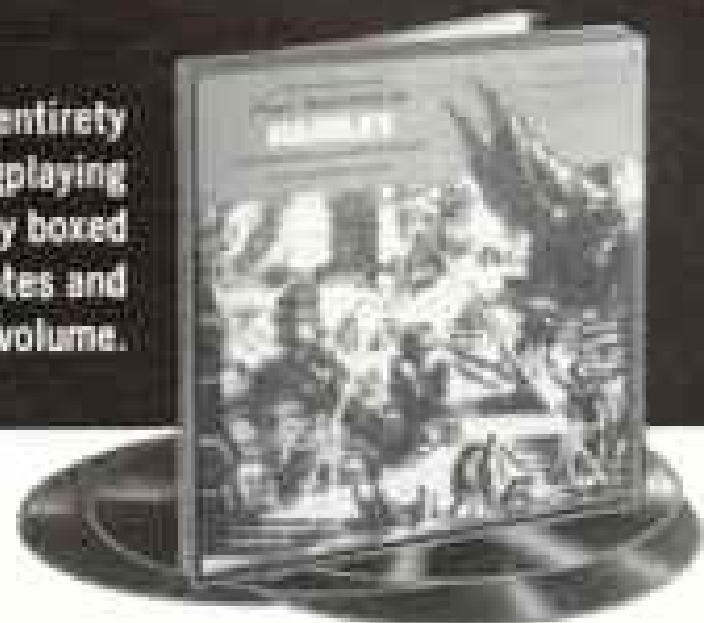
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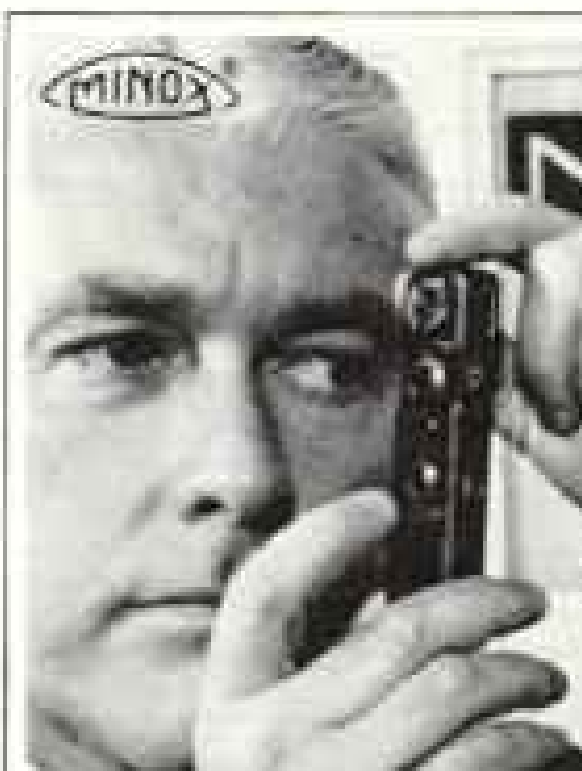
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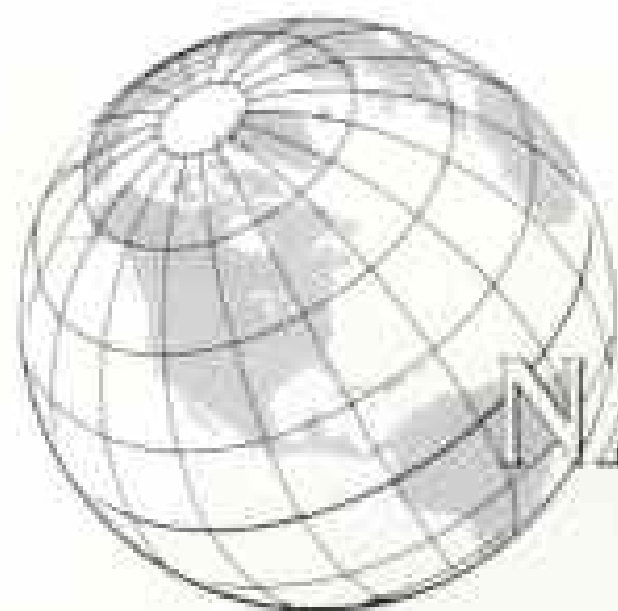
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# المملكة العربية السعودية

## SAUDI ARABIA

### Beyond the Sands of Mecca

ARTICLE AND PHOTOGRAPHS BY THOMAS J. ABERCROMBIE

National Geographic Foreign Staff

**M**ULTITUDES packed the sacred hills and plains surrounding Mount 'Arafāt, praying and waiting through the blazing afternoon. Around me the rocky desert landscape shone with the white costumes of the pious pilgrim throngs. They stood in silent devotion, as had the prophet Mohammed thirteen centuries before. The white-hot sun slowly quenched itself in the caldron of haze above Mecca.

Sunset was the signal—the spiritual climax of the annual Moslem pilgrimage. The murmuring prayers of a million souls reached a crescendo. "*La ilaha illa Allah!* There is no God but Allah!" shouted the immense congregation. "He has no partner. His is authority and praise."

A cannon boomed in the distance. The mountains came to life as a human landslide poured into the valley en route to the next holy place (pages 44-5).

From Khartoum, Cairo, and Istanbul they had come; from Pakistan, Nigeria, Iran, China, Indonesia—Moslems from all over the

world. Businessman, Bedouin, blacksmith, bureaucrat, pasha and pauper—all equal in the eyes of Allah, all individuality obliterated by the simple *ihraam*, or pilgrim's garb.

The newly built four-lane pilgrim's highway overflowed with taxis, red Ford pickups, enormous diesel trucks, buses (their roofs piled high with baggage and passengers), bicycles, Cadillacs, and donkey-drawn water carts. I inched my Land-Rover through the slow tangle that stretched out of sight into the dusk. The hundreds of thousands on foot moved faster than those on wheels. Motor traffic was awash in a human tide.

#### Saudis Cautiously Welcome Progress

Never had I witnessed a greater display of unity and faith, or greater problems of logistics. Amazingly, the world's biggest traffic jam takes place every year in desert Arabia!

But Saudi Arabia, I found, is full of surprises. Recently, as a Moslem and a guest of the Saudi Government, I made the journey to Mecca and the little-known Arabia beyond.





By Land-Rover, camel, and jet plane I traveled 20,000 miles through the sparsely settled peninsula, an area roughly the size of the United States east of the Mississippi.

Half of Saudi Arabia's 6,630,000 people cluster in booming cities and small oases that dot the desert kingdom. The rest, the hardy Bedouin, still graze their flocks across the endless sands (pages 18-19).

Like a Bedouin, I too roamed—from the green hills of Abhā to the sand-blown wastes of Ar Rab' al Khālī (the Empty Quarter), from ancient holy cities to modern oil towns along the Persian Gulf. Wherever I went, I found the Arabians welcoming the 20th century, but never with open arms. "Modernization we want, we need, and we will have," a Saudi friend told me, "but on our own terms."

From Jidda, an international port of entry, I flew to the government capital, Riyadh, to begin my journey (map, pages 8-9). The jet flight from Jidda was a typical Saudi blend of past and present. A Saudi prince wearing white robe and headcloth and black 'aba, or cloak, sat with his three wives; only their high heels showed beneath their all-covering black garments. A British geologist fanned his red mustache with a copy of *The Times*, while across the aisle a weathered desert sheik sat next to a bodyguard armed with a silver-mounted dagger and a Czech submachine gun.

We climbed above the steaming Red Sea coast, over the volcanic mountains of Al Hijāz, and across the Harrat Rahaṭ, a lifeless plain of black basalt boulders that even the Bedouin fear.

Egyptian popular music poured from

the cabin speakers while the steward served us cardamom-flavored Arab coffee from a long-beaked brass pot. We flew 500 miles across the desert plains of the Najd. Not a village or a palm grove did I see until we crossed the Jabal Tuwayq escarpment and let down into Riyadh.

It was here that I met young Soliman Alsaleh, my friend from the Saudi Ministry of Information.

"Modernization has changed the face of Riyadh since I was a boy," said Soliman as we climbed into his Volkswagen. "It's becoming a city of two different worlds."

Born in Riyadh and schooled in California, Soliman felt perfectly at home in both.

#### Glass and Steel Supplant Mud Brick

Huge glass-and-concrete buildings of the new Saudi Government ministries lined six-lane Airport Road (pages 12-13). Soliman pointed them out as we drove in from the terminal: Petroleum, Defense, Interior, Communications, Agriculture, Education, Health, Commerce and Industry, Finance—impressive symbols. I thought of the new responsibilities Arabia was taking on. Yet the old ways persist: In the shade of the Ministry of Finance a family of Bedouin had pitched their black tents.

In the busy suq, or market, around the Masjid al-Joma—the Friday Mosque—we wove through the colorful throng. A black-veiled woman clutched a bolt of gingham under her arm; a gray-bearded hawker waved bright red headcloths; a ragged boy peddled water from a pottery jug for two cents a glass.

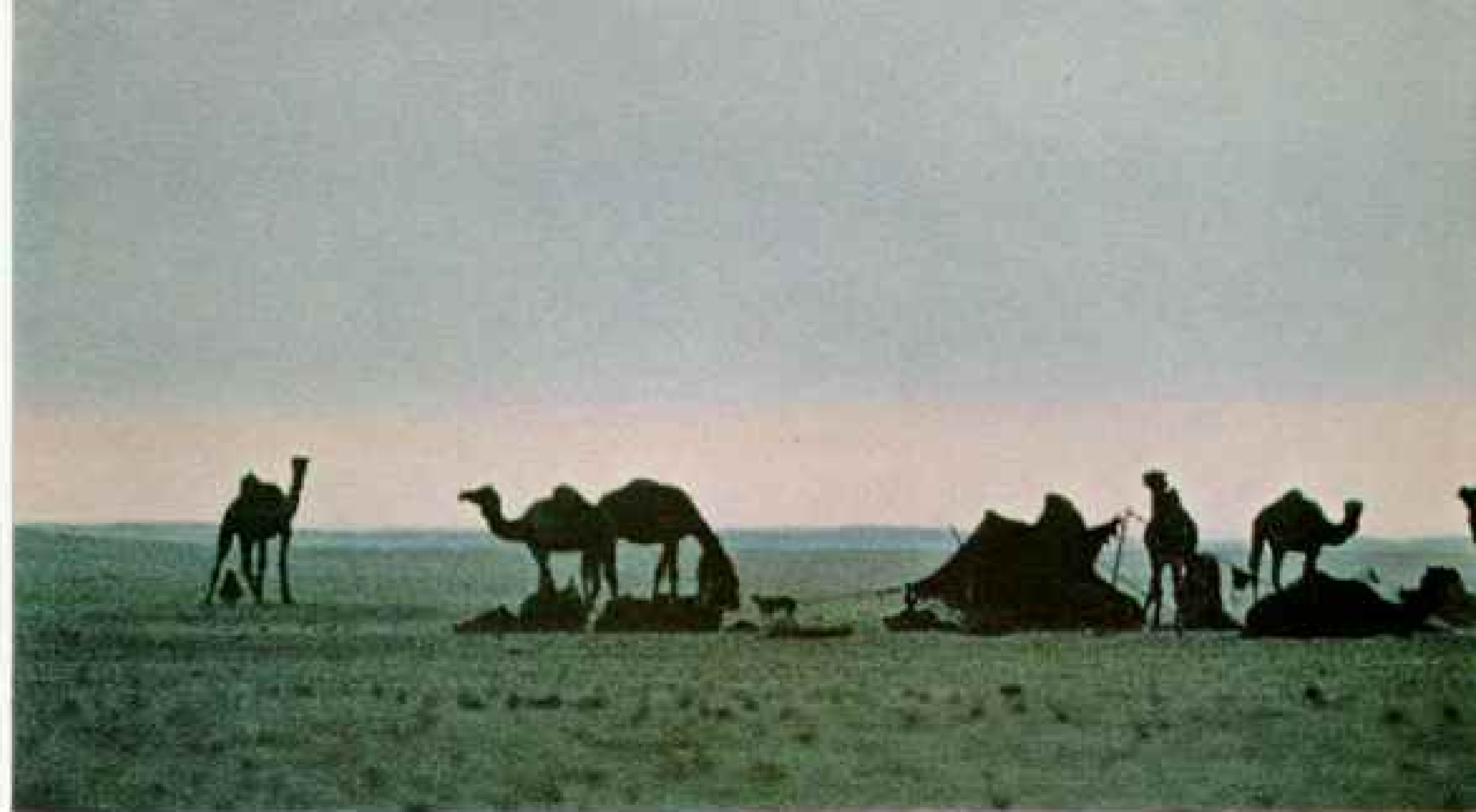
*(Continued on page 10)*

Emotions at fever pitch, a quarter of a million Moslems jam Haram Mosque in the holy city of Mecca to pay homage to Allah. In a milling mass, those in the center—blurred in this time exposure—circle the black-draped Ka'ba, most sacred of Islamic shrines. Shouting, weeping with joy, pilgrims seek to touch its granite walls and thus achieve the goal of a lifetime. Moslems believe the prophet Abraham—like Mohammed a messenger of God—and his son Ishmael built the first structure here. And five times each day, from across the globe, the world's 456,000,000 Moslems turn toward Mecca to pray.

PHOTOGRAPHS BY THOMAS J. ABERCROMBIE © W.A.S.

"Sand. Always sand. In my eyes, in my shoes, in my cameras." Author-photographer Thomas Abercrombie will never forget the cruel, gritty, all-pervading sand encountered during his four months of travel in the remote, long-mysterious kingdom of Saudi Arabia. As a Moslem, he obtained rare permission to photograph the annual pilgrimage to Mecca. As a guest, he found a welcome in homes of desert tribesmen and city dwellers alike. The result: an extraordinary portrait of a land isolated for centuries by its religion and its geography.

In the cool light of dawn, Bedouin break camp. By day they roam the deserts where only brittle shrubs scar the wastes. In bold contrast, the glittering airport terminal at Dhahran links the nation's far-flung cities by Saudi Arabian Airlines jets.





KHAIHONAH (ABOVE) AND BATALHONAH © NATIONAL GEOGRAPHIC SOCIETY





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# SAUDI ARABIA

**L**AND OF MOHAMMED and fountainhead of an empire that once stretched from Spain to India, the Kingdom of Saudi Arabia (whose name in Arabic script appears on page one) today works to catch up with the 20th century. Income from petroleum eases the way; the barren desert country happily sits atop an estimated 10 percent of the world's oil supply. The government receives half the profits from this subsurface wealth and puts most of it into new roads, airfields, schools, water projects, and hospitals.

Three decades have brought spectacular gains, notably in the towns, where air-conditioned offices and apartments rise. In Mecca and Medina, electricity and running ice water await the devout hadjis, or Moslem pilgrims, who come from all parts of the world. Despite such progress, half the people remain nomads. Another million are farmers; their thick-walled mud houses border groves of date palms and fields of grain that cluster around the scattered oases in this country lacking both lakes and rivers.



**GOVERNMENT:** Monarchy. **AREA:** 870,000 square miles. **POPULATION:** 6,630,000; 90 percent Arabs, 10 percent with Negroid ancestry. **LANGUAGE:** Arabic. **RELIGION:** Exclusively Moslem. **INSCRIPTION ON FLAG (above):** "There is no God but God, and Mohammed is the prophet of God." **ECONOMY:** Oil provides 83 percent of the nation's revenues. Pilgrims to Mecca bring in several million dollars a year. Dates, millet, wheat, and vegetables grown. **MAJOR CITIES:** Riyadh (population more than 170,000), royal capital; Jidda, port; Mecca, Medina, holy cities. **CLIMATE:** Dry and hot. Temperatures may soar beyond 120° F., and villages may go without rain for years. Humid coastal areas, temperate mountain localities. Riyadh average daily high 107° F. June-August; January maximum 70°, minimum 40°.



Piles of gaudy merchandise spilled from tiny stalls into the narrow, crowded lanes. At one shop Bedouin haggled over giant brass coffeepots, leather sandals, and decorated incense burners. Next door a swarthy merchant sold expensive bits of aromatic wood and frankincense from an iron strongbox.

Later that afternoon we pulled up crude wooden chairs at one of the outdoor teashops in the midst of the market place. Metal shutters clanged down around us as we sipped the last of our hot, heavily sugared tea. Radio Riyadh, sounding through a transistor set at the next table, switched from music to readings from the Koran.

"*Salaat! Salaat!* Prayer time!" shouted a green-turbaned *mutawwa'*, or religious policeman. He rapped loudly on shutters to speed closing for the evening devotions. When, moments later, the muezzin called from the minaret, the streets were deserted.

### Daring Raid Launches a Nation

At the turn of the century, Riyadh was a small town administered by the powerful Rashid family. The traditional rulers, the Sa'ud family, smoldered in exile in Kuwait. On a cold moonless night in January, 1902, a small, bold expedition, led by 23-year-old 'Abd al-'Aziz ibn 'Abd al-Rahman Al Faisal Al Sa'ud, set out to regain the disputed capital.

'Abd al-'Aziz and 40 followers slipped into a palm grove just outside the town. With six of his men, he scrambled over Riyadh's high mud-brick walls. He quietly opened the gates to the rest of his band. They hid throughout the night, drinking coffee and eating dates. They slept a little, and prayed.

Next morning, they attacked Emir 'Ajlun as he emerged from his fortress with his bodyguards. Though outnumbered two to one by the emir's guards, they won the short, fierce battle and the town of Riyadh. The seed of the Saudi nation was sown.

A decade after re-establishing the house of Sa'ud in Riyadh, young 'Abd al-'Aziz had consolidated most of central Arabia. In 1912 he founded the first of many cooperative farming communities of *Ikhwaan*, or Brethren. These colonies offered the Bedouin a more stable life and provided 'Abd al-'Aziz

with a ready supply of loyal, zealous soldiers.

The following year the rising desert leader drove the Turks from the Eastern Province. By 1921 he had annexed the southern highlands of the 'Asir. Mecca and Al Hijaz had fallen to him by 1925. 'Abd al-'Aziz now controlled most of the peninsula and was proclaimed king. In 1932 his new nation assumed its present name, Saudi Arabia.

### Wives Still Live in Old King's Palace

As the empire of 'Abd al-'Aziz grew, so did his capital. After World War II, on the tide of oil prosperity, Riyadh overflowed its walls and burgeoned into a desert metropolis of more than 170,000 people.

One day in Riyadh, Soliman and I drove along the high pink walls of the famous Nasteryah Palace built by former King Sa'ud. As the oldest surviving son of 'Abd al-'Aziz, he became king when his father died in 1953. (Both were known in their times simply as Ibn Sa'ud.) Until he was deposed in 1964, the son reigned here in splendor and extravagance.

"Scores of his wives and ex-wives live in the palace with their children and servants," said Soliman. "Would you like to go inside?"

The mile-square palace complex was a city within a city, complete with mosques, schools, shops, and playgrounds. Rows of sumptuous villas lined the four-lane avenue leading to the giant pink reception hall. A few black Cadillacs passed us, their passengers hidden behind windows of one-way glass.

Otherwise it was quiet. The paint of some of the buildings was beginning to blister; here and there oleander and bougainvillea were drying up, untended. Electric traffic lights at once-busy corners blinked no more.

By contrast, Saudi Arabia's present ruler, Sa'ud's half-brother King Faisal, lives a simple life in the same modest palace he occupied for years as foreign minister. His only wife, Emira Iffat, though never seen in public, works behind the scenes to better the place of women in the kingdom.

I waited for my audience with King Faisal at his new ultramodern office building, the Qasr ar-Riyaasa (literally, the "Palace of the Premiership"). Promptly at 4 p.m. sirens announced the arrival of His Majesty.

Enlightened monarch of 6,630,000 subjects, King Faisal ibn 'Abd al-'Aziz Al Sa'ud seeks to shepherd his desert domain into the 20th century. While still in his teens, Faisal fought beside his father to unify Arabia. Later he traveled widely in the West and led Saudi delegations to the United Nations before succeeding his half-brother on the throne in 1964. Here in his garden in Riyadh, Saudi Arabia's royal capital, His Majesty wears traditional robes topped by a gold-wrapped agal, or headband.





Two-faced Riyadh keeps one visage turned to the past (left) and the other toward the present. Only a desert town twenty years ago, the capital prospered with the postwar oil boom. Palaces, apartments, schools, hospitals, and a university sprouted along wide avenues as Riyadh's population grew to 170,000, making it the kingdom's largest city.

Here gleaming new buildings housing government ministries flank tree-lined Airport Road (above). With assistance from the United Nations and other groups, the government plans similar urban-renewal projects in 40 other towns.

In the heart of Old Riyadh, castellated walls of mud brick shade rooftops where Saudi families often sleep to escape summer heat. Daytime temperatures rise as high as 115° F. and may fall no lower than 90° at night.

Date groves in the distance separate city from desert.



ROADS IN RIYADH, SAUDI ARABIA. PHOTO BY AP/WIDE WORLD

Beheaded traffic symbol identifies a pedestrian crosswalk in Riyadh. The sign placates Moslem puritans, who resent any form of human image.



Two red jeeps manned by soldiers followed the blue Chrysler up to the portico. King Faisal climbed the steps behind a phalanx of personal bodyguards wearing gold-mounted swords and daggers.

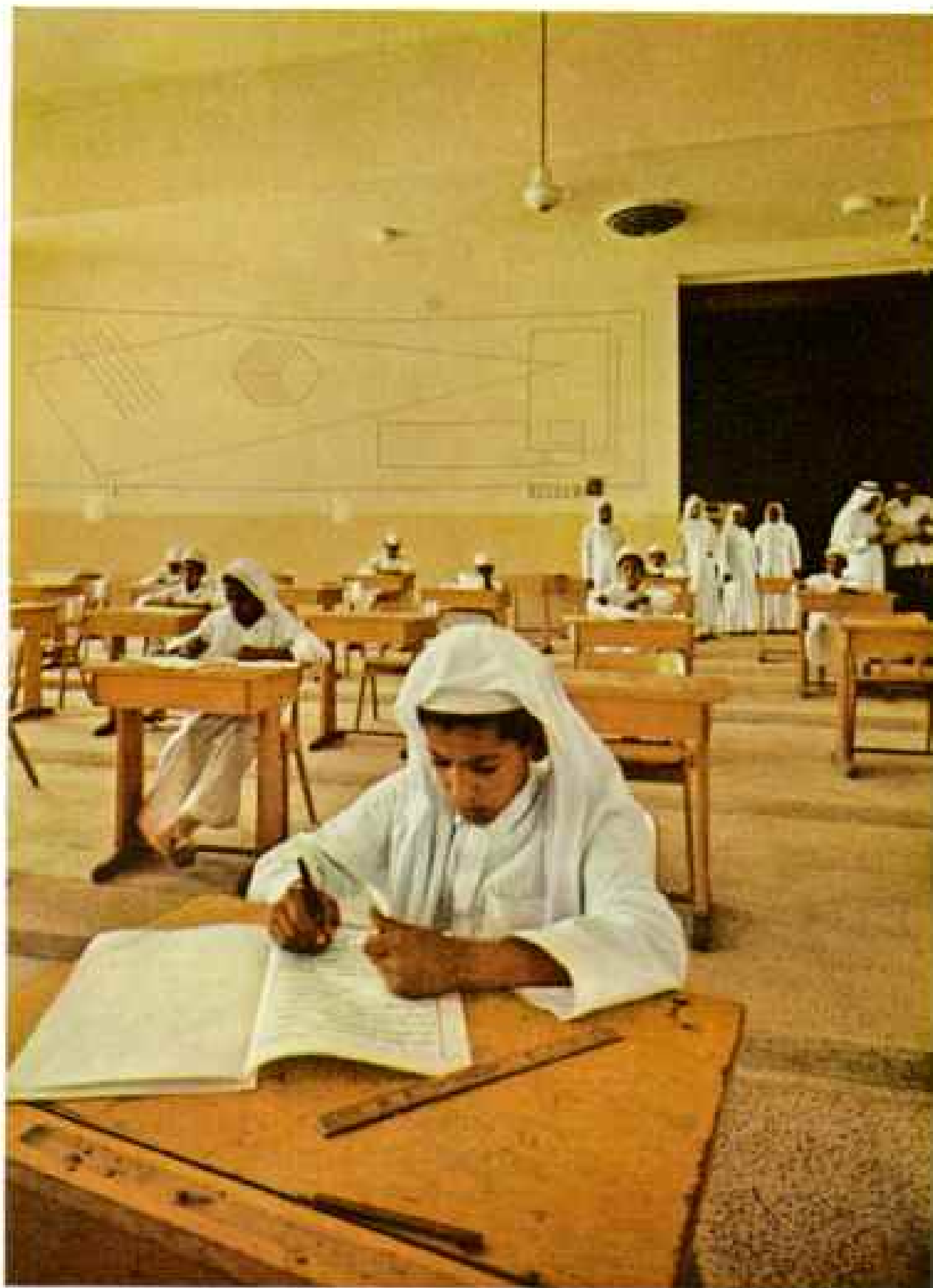
As I crossed the deep Oriental carpet of his office, the King came from behind an enormous walnut desk and led me to a divan set along the wall. A servant, in white and wearing a black leather pistol belt, poured coffee, then tea. His Majesty's manner was gracious, his expression calm and reflective. But his dark eyes glinted as he talked.

"Oil is our bounty from Allah," he said. "Our coffers are full, and we are thankful. But it will take more than money to develop our country. It will take time and experience.

"Most of our people do not even have a dependable supply of water to drink. Think of it—such a basic thing!

"Our country is large and the population is scattered. In the next ten years we must build 10,000 miles of new roads. We must encourage industry, foreign trade, improve our agriculture, expand our communications facilities, build and staff more hospitals.

"Education is the key that will open the way for all these things," His Majesty assured me. "We are making strides. Hardly a town is without its school. For the first time we are



**Challenge of education** absorbs boys at Riyadh's Model Capital School; they write in flowing Arabic script from right to left. A showcase institution, the school offers courses in art, mathematics, and chemistry, as well as traditional lessons from the Koran and Arabic literature. Within the past ten years the kingdom's Ministry of Education has tripled the number of schools. Today, as Saudi Arabia begins educating its women for the first time, nearly 60,000 girls attend public—but not coeducational—schools. Thus the nation seeks to recapture the glorious era when Arabic scholars helped keep learning alive during Europe's Dark Ages.

**Bachelor's last fling:** Clapping hands beat out the rhythm as a wedding dancer whirls on a street of Jidda. The groom invited these male guests; the bride's friends will gather at her home. Saudi parents arrange most marriages, usually between cousins.

enrolling girls in public schools—shattering traditions centuries old to do it.

"We continue to drill wells for water and oil; but most important is the well of knowledge."

Before leaving Riyadh, I visited the Institute of Light, one of the most impressive schools I have seen anywhere. I was greeted by the young, energetic director, Mr. Abdallah el-Ghanim. Abdallah was born 31 years ago in a small village near Riyadh. There, as a child, smallpox had blinded him.

"Being blind is perhaps less of a handicap in Saudi Arabia than in other countries," Abdallah explained. "Most Arab schools used to rely on oral education and memorization. But I knew if I was to amount to anything, I must learn to read. An Iraqi teacher in my village taught me Braille."

Soon Abdallah was not only reading with his fingertips, but teaching a small group of other sightless Saudis to do the same.



ENTRAPPED BY THOMAS J. ABERCROMBIE, NATIONAL GEOGRAPHIC STAFF © R. S. L.

"We met at my house or in the mosque," he continued. "The shortage of material in Arabic Braille was our greatest problem. I began to study English in Braille to translate more material into our growing Braille library."

When Abdallah visited King Sa'ud in 1958 with plans for a small school for the blind, the King backed him generously.

"For the handicapped here, the world is changing rapidly," Abdallah said. "We must keep our eyes, so to speak, on the future!"

#### Cars Battle Donkeys in Jidda Streets

I decided to make my headquarters in Jidda, on the Red Sea. As the gateway to Mecca, Jidda had grown slowly over the centuries with the pilgrim trade. After World War II, spurred by oil money, it began to mushroom. Nowadays 35 ships at a time crowd its harbor, Saudi Arabia's largest.

Ten-story office and apartment buildings

have risen above the automobile showrooms and department stores along bustling King 'Abd al-'Aziz Street. During the early-afternoon rush hour, squadrons of bright red American sedans jostle and honk. Strangely, the ear-splitting noise perturbs neither the bold breed of Jidda pedestrians nor the laden donkeys, which often add a bray of their own to the cacophony. I took refuge from the din in the covered suq nearby (following page).

I love the atmosphere of the Arab market place: The sound of the money-changers clinking coins; the shouts of the hawker selling holy water brought down from Mecca; the smell of saffron, cinnamon, and freshly roasted coffee; stray beams of sunlight flashing on bright-colored carpets and bolts of brocades.

But here, too, the noisy, persistent 20th century intrudes. A transistor radio blared the latest twangy tune from Cairo, the "*Hajji-Baba Cha-Cha-Cha*," making bargaining for

Latticed balconies fronting tall stone houses of Jidda shelter ladies of the harems, or women's quarters, who peer discreetly at life pulsing in the streets of Arabia's major port. Early each evening, following sunset prayers, men gather to gossip at their favorite *gahwa*, or sidewalk coffee house. Gateway to the holy city of Mecca, Jidda owes its growth to pilgrim trade. Today steamships and dhows crowd its harbor, and cars jam both old and new sections of the city.

Camel saddles to carburetors, water pipes to water skis, Korans to comic books—Jidda's arcaded suqs offer goods that span the centuries. Customers may bargain for prayer rugs, tent poles, transistor radios, air conditioners, or holy water from Mecca. Here a veiled Bedouin wife carries home a roll of palm matting. Machine-woven carpets from Italy hang from rafters.



EXTRAORDINARY (ABOVE); 1949 PHOTOGRAPH © H. G. S.

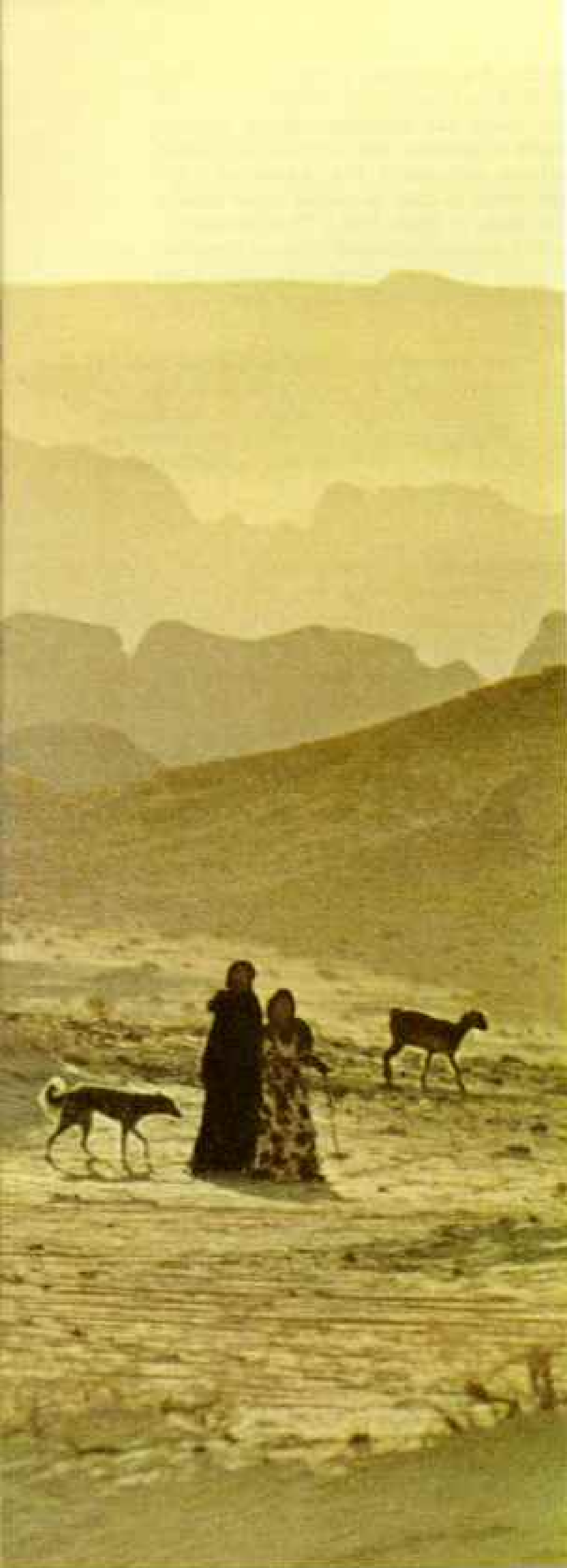








On endless trek, desert-roaming Bedouin shepherds lead their flock past tattered hills near Al'Ulá. Watchdogs guard against strangers and an occasional wolf. Half of Arabia's



ESTABLISHED BY THOMAS J. BIRCHERDIE © S.S.L.

population wanders constantly in search of pasture for goats, sheep, and camels.

a handful of pistachios almost impossible. Labels on the "Persian" carpets showed they were woven in Italy. Half a block away bulldozers were knocking down walls for a cross-town expressway.

Later I followed a bevy of water-bearers up a narrow street, past a precariously leaning minaret, to the heart of the old city. I had a midmorning appointment with Sheik Mohammed Nassif, a scholar who bore the noble title of sharif, at the House With The Tree.

Even in the labyrinth of tall stone houses in Jidda's old city (pages 16-17), Sheik Mohammed's home was easy to find. The spreading greenery of a giant Indian neem tree, a close relative of the chinaberry, shaded his doorway and rose to the roof of his five-story mansion. Sheik Mohammed, heavy-set but still spry at 90, met me on the front steps. He wore a spotless white turban, and a white suit coat over his robe.

#### Days in Arabia Begin at Sunset

Long retired from office, the old sage now divides his time between his friends and his books. In his cozy first-floor study, bookcases lining the wall from floor to ceiling house Jidda's finest private library. Over small glasses of mint-flavored tea, we talked about his tree and his city.

"Fifty years ago, when I planted my tree, the townspeople thought me mad," Sheik Mohammed told me. "Because of the water shortage, there was not another tree in all of Jidda. In those days water cost a man as much as his bread. Luckily, we have a small well under the house. Our family sprinkled the tree each day with water left over from ablutions. Now, of course, water is piped in from the mountains, 20 miles away."

Sheik Mohammed led me up the stairs to his penthouse, cool in the steady sea breeze. Here former King 'Abd al-'Aziz often spent his nights when visiting Jidda. Twenty windows offered a splendid panorama of the city. In the distance I could see Jidda expanding into the surrounding desert. Hundreds of spacious villas were springing up, framed by green gardens and shaded with billowing tamarisks, pines, and eucalyptus. Sheik Mohammed's tree was no longer alone.

That evening I was to attend a Saudi wedding. Leaving the hotel, I checked my wristwatch. Specially made in Switzerland for the Arabian market, it has two dials and four hands. Reckoning Arabic time is simple enough. The day begins officially at sunset, which is always 12 o'clock. This puts noon



ESTABROOKS © NATIONAL GEOGRAPHIC SOCIETY

**Relic of revolution,** a rusting locomotive blasted by Lawrence of Arabia in 1917 still lies beside the abandoned Hejaz Railway north of Medina. The controversial British scholar and soldier T. E. Lawrence aided the Arabs in their successful revolt against the Turks in World War I. Then this train—which originally carried pilgrims from Damascus, Syria, to Arabia's holy cities—sped Turkish troops to ambush and death.

In festive frocks, children scamper through the doorway of their home in Al 'Ula. For three days following Ramadan, the Moslem fasting month, Arabians put on new robes and stream through their villages visiting friends and relatives.

well-wishers, musicians tuned their drums over a blazing wood fire. Tonight's guests were men only. Tomorrow the bride would entertain the women at her home.

The bridegroom passed out tea and soft drinks. Men took turns in the circle, whirling and spinning to the quickening drumbeat, while the crowd chanted and clapped (pages 14-15). The groom seemed as nervous as any groom anywhere.

"It's his first wedding," teased an old man. "The second, third, and fourth marriages are always easier."

I could understand the young man's worry. Taking a bride one has never met before, and pledging a bride price of 5,000 riyals (about \$1,100) for her, sight unseen, must certainly heighten any man's anxiety.

In Arabia the parents usually arrange the weddings, and most marriages are between cousins. A proverb I heard that night summed up the traditional Arab feelings on matrimony: "He who marries not his cousin deserves to have only girl children."

#### Arabian Lunch—Western Style

But many younger Saudis are beginning to break with tradition. Take my friend Hassan Vassin, for instance. The son of one of 'Abd al-'Aziz's most trusted advisers, Hassan spent much of his boyhood in Cairo schools, then four years at the University of California. He returned to Jidda with a master's degree in political science and a pretty American wife.

I stopped in at Hassan's small air-conditioned office at the Ministry of Petroleum and Mineral Resources. In typical Arab style he entertained many guests at the same time, plying us with cups of hot mint tea. In American

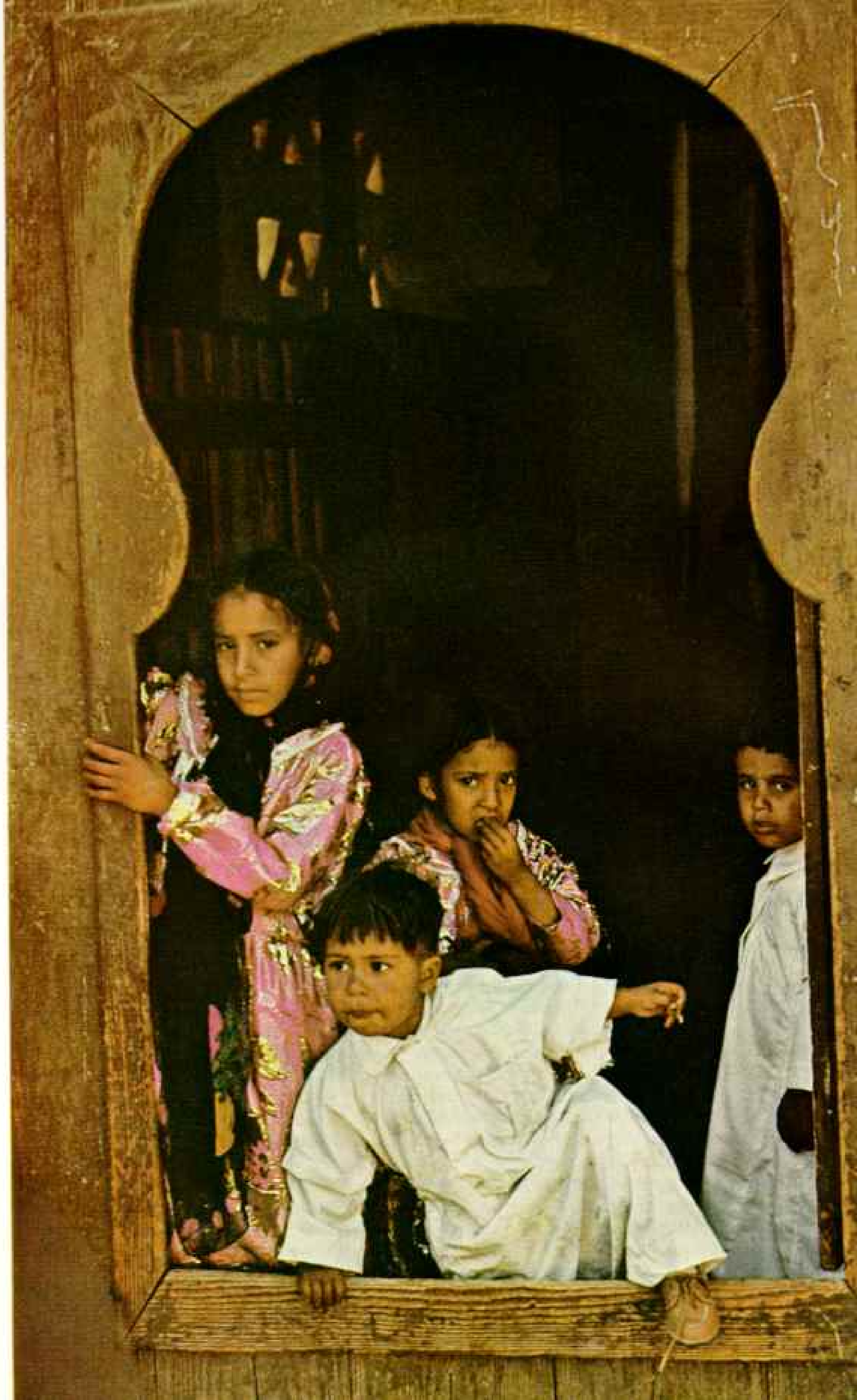
at about 6 a.m., depending on the time of year.

But Jidda's foreign colony complicates things. Most embassies, for instance, use "sun time," which is Arabic plus six. The military (and sometimes Saudi Arabian Airlines) take Greenwich time plus three. Out in the Eastern Province the Arabian American Oil Company uses daylight-saving time.

"I'm used to Friday being the weekly holiday," said the wife of one diplomat. "We all juggle our week accordingly. But then, if Friday is Sunday, I must remember not to serve meat to Catholic guests on Wednesday."

More than once I missed an important date, though my watch showed me both Arabic and sun time. Worse, the conflicting systems sometimes cost me a meal. In my hotel, the Kandara Palace, the reception desk was on different time from the dining room.

I arrived at the wedding promptly at four—or rather, ten—anyway, in plenty of time. The three-day festivities had just begun. The narrow street was aglow with strings of electric lights. In the midst of the noisy crowd of





*Sandstone sepulcher casts its shadow across a surrealistic setting at Madā'in Šālīh, 400 miles north of Mecca. A lone Bedouin trudges past one of more than 100 rock-hewn tombs, legacy of a once-prosperous people. For two centuries before and after the time*

style he conducted his business with efficiency and dispatch. People came in with problems, and left with solutions.

Hassan and his bride Betty invited me to lunch at their home with some of their Saudi friends. I was the only one in Western dress. The meal was delightfully and thoroughly Arab—heaps of deliciously spiced rice and mutton. But I felt right at home in the lively discussions of the new jazz program on Radio Mecca, city planning, a cook-out at the beach on Friday, the newly formed women's club.

Arabian hospitality, though justly famous, is usually more apparent among men. At rare mixed functions the women of the visiting families eat with those of the household in the privacy of the harem, unseen by male guests.

Today was different. Around a large table set with silver and fine china, we all sat together, men and women alike. I enjoyed the

bold departure. It was one of the few chances I would have to meet the women of Arabia. The conversation turned to their role in a changing world.

"Polygamy is now rare among the educated classes," Hassan pointed out. "The Koran allows four wives—but all must be treated equally. Many of us believe it would be hard to do justice to more than one wife."

I wondered whether the Saudi women would ever be freed from the confinement of the veil. Though Betty does not wear one, many American and European wives of Saudi officials have resigned themselves to discreet anonymity in public. Women are still forbidden to drive in Arabia. If one is caught behind the wheel, her husband risks jail.

"You are lucky in your country," said Hassan. "You have no deep roots. Here, changes must fit into the patterns and traditions of



EXTACHROME © NATIONAL GEOGRAPHIC SOCIETY

of Christ, the Nabateans grew rich on the peninsula's caravan trade in incense and spices; then Rome destroyed their power. Today many Arabians, awed by the sand-swept solitude and legendary past of the valley, believe it to be haunted.

orthodox Islam, for Islam is Arabia's law as well as its religion. This will take time."

The pressures of change in Saudi Arabia were first felt 750 miles east of Jidda, in the oil-rich sands along the Persian Gulf.

Oil is the lifeblood of modern Arabia. It gushes through shining pipes across the deserts where weary caravans once plodded. Each day the reeking black crude brings more wealth than all Arabia's frankincense and myrrh once brought in a lifetime.

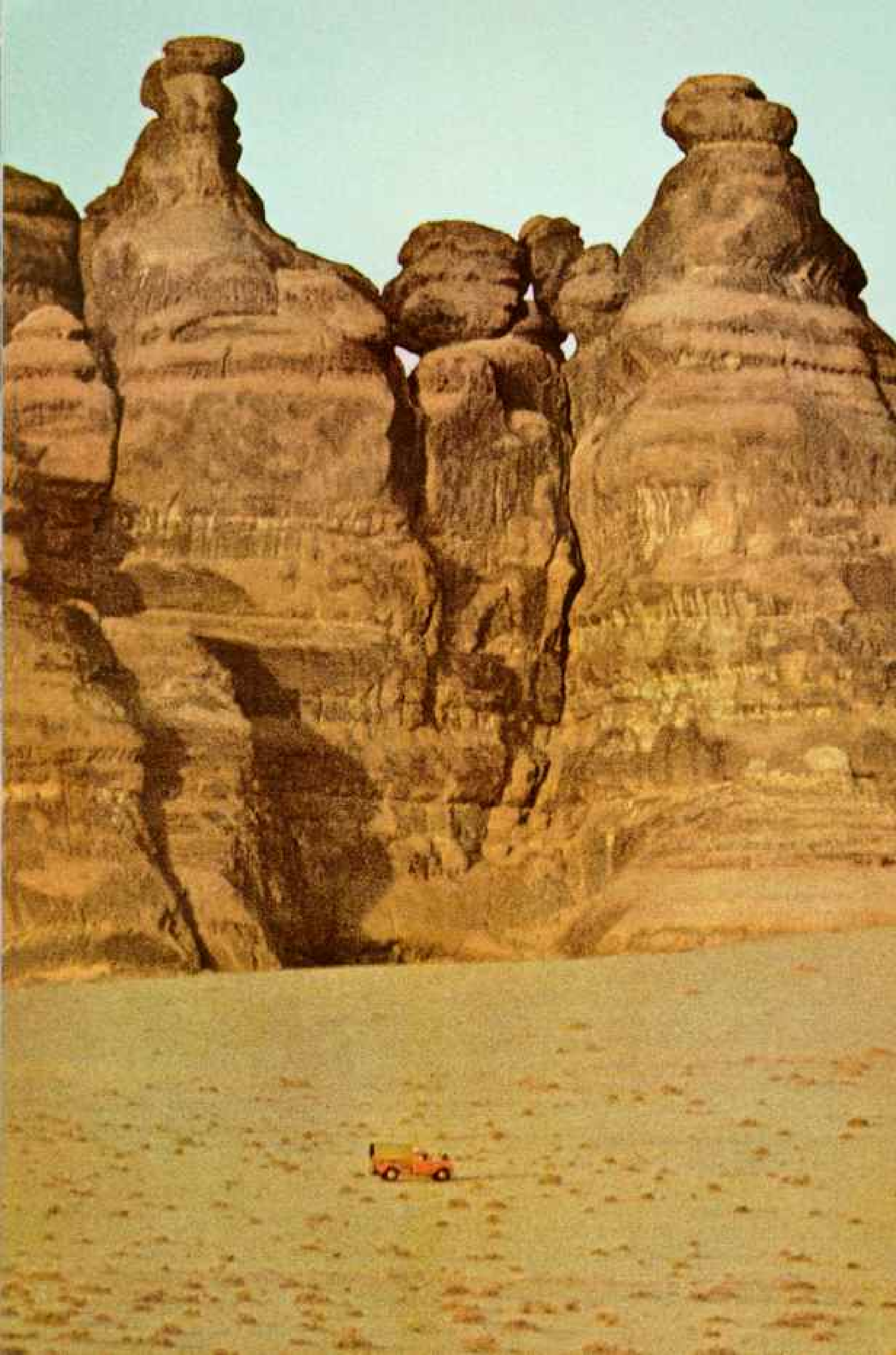
#### **Oilmen Tame Arabia's Eastern Deserts**

Soon after the first oil agreements were signed between the Standard Oil Company of California and the Saudi Government in 1933, a trio of American geologists arrived at the small port of Al Jubayl on the Persian Gulf. By camel and truck they set out to explore the huge concession: 370,000 square miles of

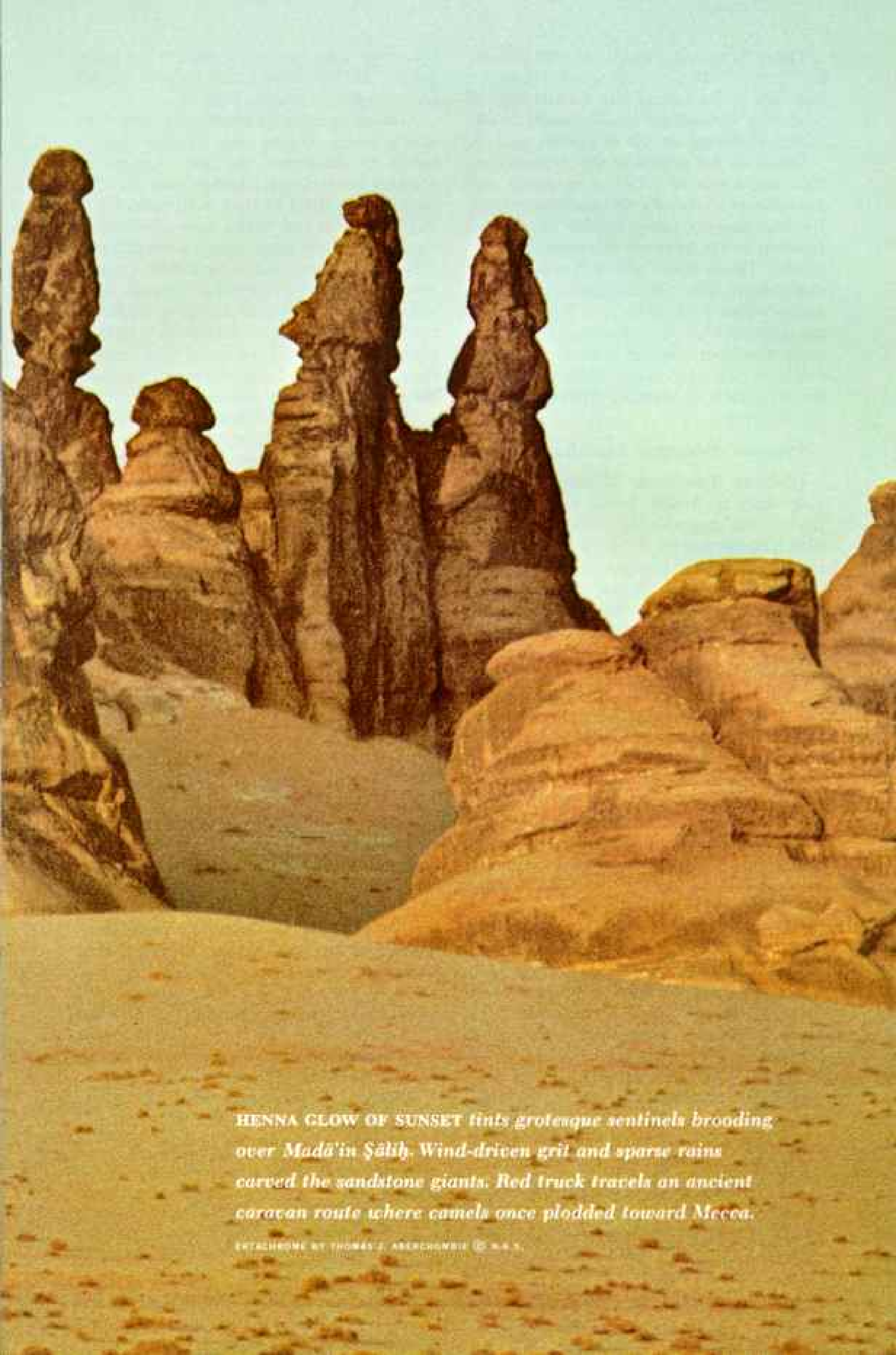
little-known desert, an area bigger than Texas and Oklahoma combined.

In 1938 drillers in Dhahran struck oil in commercial quantities nearly a mile beneath the sand. Soon after the end of World War II, increased oil demands spurred development. Drill crews worked night and day. By 1946, four American companies had joined in the ownership of Aramco, the Arabian American Oil Company.

In 1950 the trans-Arabian pipeline began carrying crude oil across 1,000 miles of desert to the Mediterranean port of Sidon. In the Persian Gulf, teams of seagoing oil workers floated giant platforms onto the shallow water at Safaniya to bring in the world's most productive offshore oilfield. On shore, welding crews laid pipelines creating a 300-mile-long complex of wells, pump stations, and a refinery and tanker port on the Persian Gulf.







*HENNA GLOW OF SUNSET tints grotesque sentinels brooding over Madā'in Šālīh. Wind-driven grit and sparse rains carved the sandstone giants. Red truck traces an ancient caravan route where camels once plodded toward Mecca.*

EXTREMES BY THOMAS J. ABERCHAMBE © 2005

Today Aramco handles more than two million barrels a day, putting Saudi Arabia second only to Kuwait among Middle East oil producers. Beneath the Saudi sands lie an estimated 60 billion barrels of proven reserves.

Dhahran, the capital of the Aramco complex and home of 1,100 of its senior staff members, is a centrally air-conditioned town. Cooling stations pump chilled air through conduits to the homes of the company's employees. Green lawns and well-watered gardens nearly hide the bungalows lining the palm-shaded streets that curve from the modern supermarket up past the library, the swimming pool, and the Little League baseball field. Dhahran today looks more like a sedate suburb of Phoenix, Arizona, than an oil boomtown.

#### "Bonanza" Telecast in English and Arabic

Dhahran Television, HZ-22-TV, broadcasts daily in Arabic. Koran readings open the evening program. Most popular are wrestling matches and the Egyptian movies on the late show. Arabic dialogue is dubbed in on "Bonanza"; English-speaking viewers listen by radio to the original sound track, broadcast simultaneously by Aramco's radio station.

Much of Aramco's success in Saudi Arabia has been a result of its excellent relations with the Saudi people, Aramco president Thomas Barger told me. We talked in Aramco's gleaming glass-and-aluminum headquarters building in Dhahran.

"The geologists felt at home out on the sands," he said. "There was a sort of spiritual bond between us and our Bedouin guides. We both loved the simple life and the freedom of the desert. Of course as our operations grew and thousands of American workers arrived with their families, relations became more complex. We had to work at it."

"We've built training centers and roads and we guarantee home loans for our Saudi workers," interjected Homer Mueller, head of Aramco's Policy and Planning Staff. "Our Medical Center is as up to date as any in the Middle East."

"But our cultural exchange is even more important," Mr. Barger added. "Most business is conducted bilingually. Americans are given time off from work to study Arabic;

some 140 young Saudi employees are being trained in U. S. and Middle Eastern schools and colleges in Aramco programs."

Aramco's good-will campaign often touches subtle areas. During the Moslem fasting month of Ramadan, the firm shortens its working hours. Once, it turned over one of its cooks to the royal kitchen in Riyadh. Every day it wrestles into Arabic such technical oil terms as "fractionator reflux accumulator."

By truck, plane, and motor launch I toured Aramco's far-flung complex. Twenty miles out on the gulf, aboard Safaniya rig No. 1, two crews worked around the clock in 12-hour shifts (page 29). I sipped coffee with some of the Saudi drillers. Former farmers, Bedouin, fishermen, they were oilmen now.

"It's a completely different way of life for us," said Ali ibn Isa al-Majhad. "At first, working for the company was a shock: strange clothes, a thousand things to learn—and regular hours. *Wa-llaah!* To become a slave to the clock! But regular hours mean regular pay."

"I used to dive for pearls. It was dangerous work—seasonal too—and my split of the pearls was small. Now I earn as much in a month as I did in a year. Next year, Allah willing, I'll buy my own house."

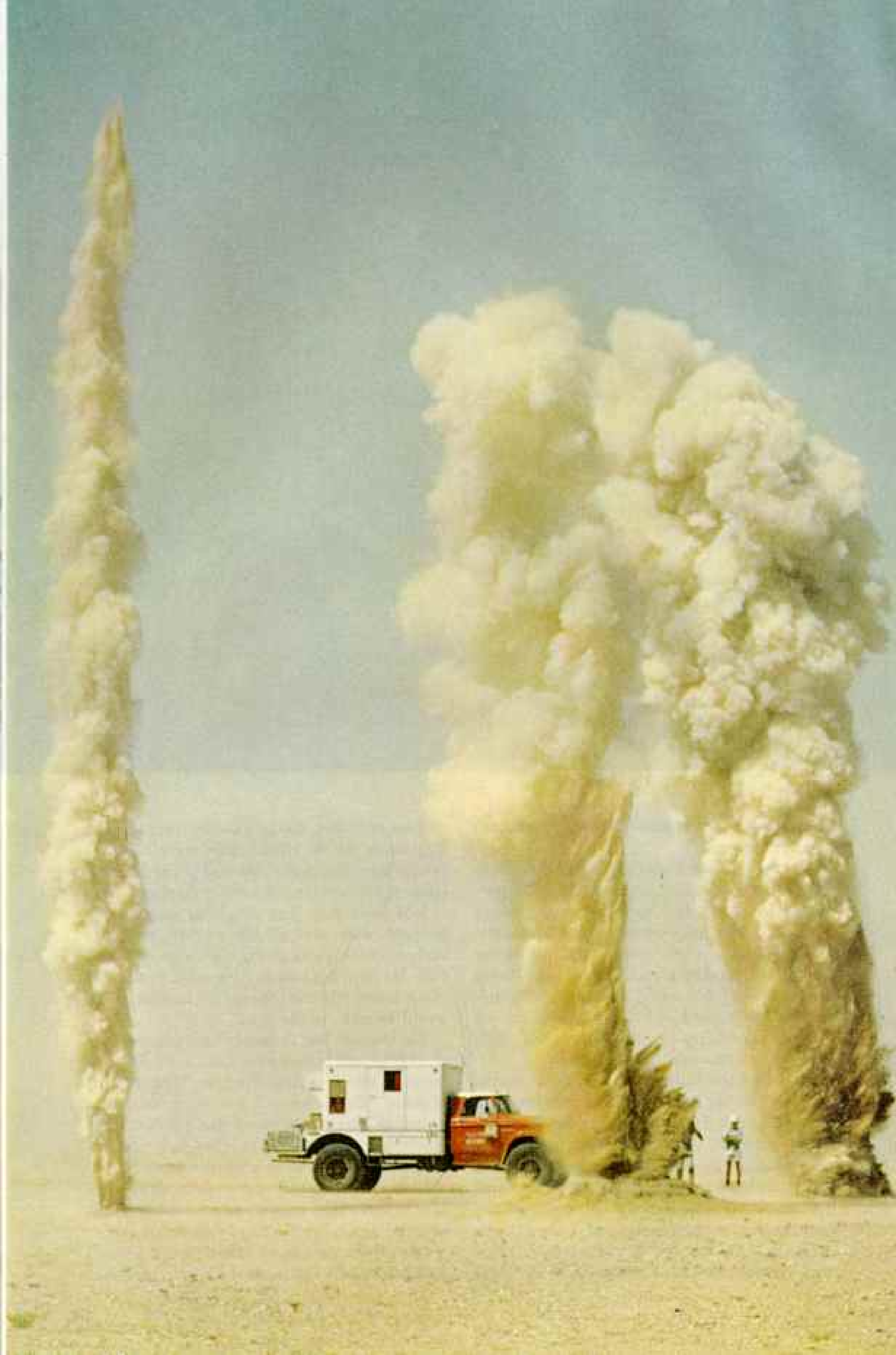
#### Bedouin Bring Rumors of Giant Meteorite

Three hundred miles south of Dhahran, Aramco's seismographic crews were mapping the underground structures of promising future oil reservoirs in Ar Rab' al Khāli. I was determined to visit this windswept wilderness whose name, literally, means "the Empty Quarter"—especially after talking with young James Mandaville. Jim, a second-generation Aramcon, had grown up in Arabia and loved it. He spoke excellent Arabic and knew Bedouin dialects as well.

"The Bedouin have talked for years about a chunk of iron near a crater at Al Hadidah, halfway into the Empty Quarter," said Jim. "They say it's the size of a camel's hump. Some of our exploration teams have visited the craters; they saw three of them, quite close together. They found only a few prune-size bits of meteoritic iron."

The Empty Quarter is one of the last of earth's great unknown areas. It remains a blank spot on the map, an undulating sea of

Geysers of sand explode from the desert of eastern Arabia as geologists probe for oil-bearing layers a mile beneath the surface. Delicate seismographs in the truck record reflected sound waves and provide clues to the region's mineral potential. American oilmen began in 1933 to explore an area the size of Texas and Oklahoma combined; their discoveries led to the formation of the Arabian American Oil Company.





sand as big as Texas (page 34)—its permanent population: zero.

"A trip into the Empty Quarter is no Sunday excursion," Jim warned me. "There's danger involved, and some fancy navigating. More than 400 miles with hardly a landmark. You'll have to carry every drop of water you'll need. God help you if your Land-Rover breaks down." I worried, too, about the lateness of the season. Any day a *shamaal*—a summer northerly—could plague us with stinging sandstorms.

My wife Lynn joined me in Dhahran just in time for the big adventure. For her it would mean a break from housekeeping routines.

The emir of the province assigned us a hefty Dodge Power Wagon, with a driver and cook, as a back-up vehicle. Aramco's exploration department briefed me and outfitted the Land-Rover with 900-x-15 sand tires. Lynn supervised the loading of canned food, charcoal, green coffee for baksheesh, or tips, 200

gallons of water, 400 of gasoline, and a small live lamb. At Al Hufuf oasis we picked up young Jabr, our guide. He was of the Murrah tribe, most famous trackers in Arabia.

Jabr was lean but tough as leather. He brought with him all his worldly goods: a turban, short white gown, cartridge belt, and rifle. He kept his hair in long ringlets and his black beard trimmed short, and he looked the world straight in the eye.

We crossed the Dammam-Riyadh railway at Haraq and followed a faint trail for four hours to our first stop, Nadqan Well. A herd of noisy camels pressed around it; nearby a group of Murrah Bedouin had pitched their black tents (pages 32-3). One belonged to Jabr's father. We were among friends.

I left Lynn to set up camp and walked with Jabr to meet the camp's senior member, gray-bearded Emir Rashid ibn Nudaylah.

"*As-salaam 'alaikum!* Peace be upon you!" shouted Jabr. They rubbed noses in greeting.



EXTRACTING TUBES AND SUBSIDIARY BY THOMAS J. ARNOLDSON © N. S. S.

Diamond-toothed drill bores a well at Safaniya, world's most productive offshore oilfield, which extends 50 miles out in the Persian Gulf. Aramco's 10,300 well-paid Saudi employees represent a new and dynamic element in Arabian society.

Gas flares fire the night at Aramco's Ras Tanurah refinery, north of Dhahran. Each day sparkling towers convert more than a quarter of a million barrels of crude oil into a variety of fuels, including aviation gasoline.

"*Wa-'alaikum as-salaam,*" answered the old one. "And on you, peace."

We sat cross-legged on cushions in the welcome shade of the *bait ash-sha'r*, literally, "house of hair." Woven of black goat's hair, it was some 40 feet long. A colorful partition muffled the giggles and gossip of the harem. The emir had spotted us on the horizon. The coffeepot was already on the fire.

#### Fair-skinned Beauty Worth 45 Camels

The emir himself poured a swallow of coffee into a tiny china cup. Politeness demanded that I take three cups. I was tired and parched. I took them with relish. A gallon bowl of cool, sweet camel milk was passed around, followed by handfuls of dates.

The Arab loves his coffee break. It's the sum total of his social life (following pages). It often lasts all day, and it is strictly a man's affair. But this was a special case, and novelty won out over convention. At the emir's

insistence, Lynn joined us around the fire.

We talked about rising prices of rifles and wives. The emir had three of each.

"*Wa-llah*, but this fair-skinned one is a jewel," said the old emir with a nod toward Lynn. "Worth thirty camels at least."

"Fifty," I countered, defending Lynn's market value.

"Possibly thirty-five."

"Forty-five (may you live long), forty-five!"

It was Lynn's first time on the auction block. She began to fidget—until all broke into laughter.

Inevitably the talk turned to the grazing. The Bedouin's harsh life is a constant search for grass for his camels, sheep, and goats. A few scattered showers had made this a good year, bringing up thin patches of grass and sedge between the dunes.

On our way down we had crossed the wide *Wādī aṣ Ṣahbā'*, a shallow depression in the sandy landscape. Here water could be had for

the drilling. The Saudi Government had sunk wells and started a small experimental farm. Eventually it plans to settle a thousand Bedouin families on five-acre plots. Had the emir and his people ever been tempted to settle down, I asked.

"Trade the whole world for a garden? Never!" he answered adamantly. "And what would happen to our camels? They give us the milk of life and hair for our rugs. They carry us and our burdens without complaint. They are our freedom."

Next morning we headed south over the sands. With Lynn and Jabr beside me, I led in the Land-Rover. The two vehicles bobbed over the dunes like small rafts on an ocean. By noon the Land-Rover was a crucible. Now not even a shadow broke the monotony of the blinding landscape.

Suddenly I hit the brakes. Just in time, I had stopped short of a sharp crest of sand. Another ten feet would have plunged us headlong down the steep 60-foot leeward side of the dune!



KIDACUDOMES © NATIONAL GEOGRAPHIC SOCIETY



Five times a day we halted for prayer. Each time I checked my compass and odometer; Lynn put a check mark on the map. But when I drove, Jabr was my compass. With a faint wave of his hand he set the course.

Jabr broke the silence. "Two summers ago my family followed the rain clouds south. We took this same track."

Track! I saw nothing but dunes and, in the distance, a tiny black speck. As we drew nearer, I recognized it as the carcass of a long-dead camel. Jabr smiled. We were on course.

Just before sunset, 13 hours south of Nadqān, Jabr justified my faith in him.

"*Al-hamdillaah!* Praise be to God!" sighed Jabr. "Here is Wabar." I saw nothing. Then, over the dune, there was the crater.

We killed our lamb and feasted round the campfire. Jabr and Wahier, the cook, told us stories about the evil city of Wabar. Allah had destroyed it with fire from the sky.

I cross-examined Jabr, hoping for the secret of his remarkable navigating. Jabr couldn't explain his "sixth sense."



## Hospitality at a Bedouin Well

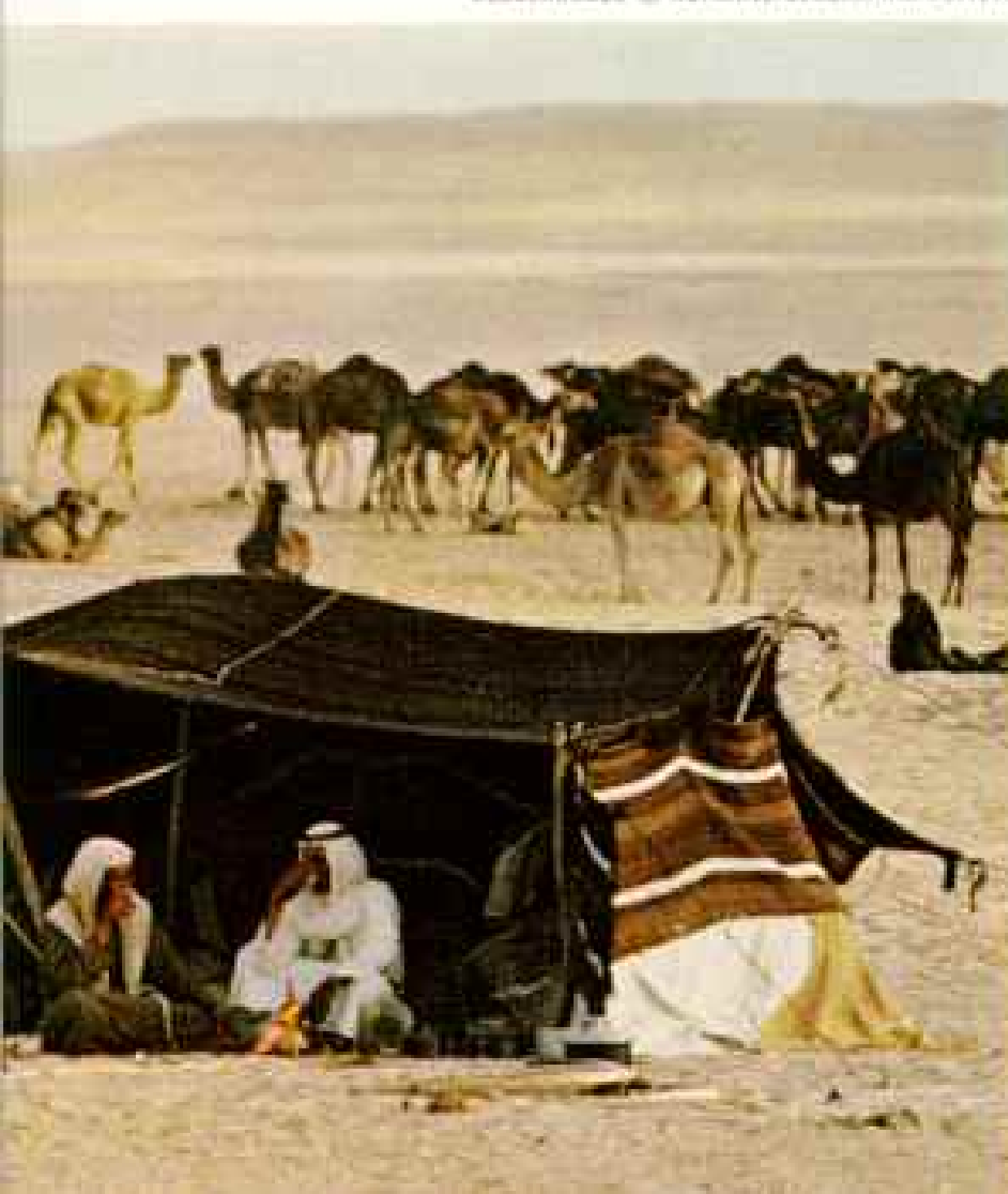
THOUGH an arid, barren wilderness of boulders and sand, Arabia's *Ar-Rab' al Khālī*—the Empty Quarter—provides a home to the hardy Murrah tribe. In summer, when temperatures soar to 120° F., these eternal wanderers camp close to wells along the northern fringes of a vast wasteland the size of Texas. After a day of grazing on the burning dunes, camels drink smelly, brackish water unfit for humans. Their masters live for months without drinking water; to quench their thirst, they milk the camels (upper left). Pitching his tent near Nadqān Well, Emir Rashid ibn Nudaylah offers guests large bowls of the fresh milk and heaps of delicious dates. His son (upper right) pours coffee—spiced with cardamom and ginger root—from a long-beaked pot into tiny china cups. Earlier, he boiled the water over a brushwood fire and ground the beans in a brass mortar. A guest customarily accepts three servings; shaking the cup with a rapid twist of the wrist signifies a sufficiency. Hospitality is a duty as well as a joy for the Bedouin. He will kill his last sheep to feed the stranger at his tent.







RESEARCHER © NATIONAL GEOGRAPHIC SOCIETY



"We are Bedouin," he said. "It is our life."

They were still chanting Bedouin songs when Lynn and I laid out blankets under the blazing stars.

Next morning we explored the 250-foot crater. Sand had nearly filled it. On the higher, western rim we picked up torn chunks of limestone bedrock and fragments of glassy slag—sand melted by the impact of a meteor.

"Here! Over here!"

It was Jabr's voice in the distance. We followed his footprints a quarter of a mile across the sand. Rumor had become reality; the biggest iron meteorite ever found in Arabia lay at our feet (page 35).

It was too big. Shaped roughly like a saucer, it measured about four feet in diameter and two feet thick at center. A little quick geometry put its weight at almost two and a half tons. We couldn't possibly bring it back.

#### Breakdowns Force a Desert Detour

The great nugget rang like a bell as I chipped a sample off the edge. Meanwhile, Lynn made a sketch map of its location. We surveyed the crater; then, our work finished, we retreated northward. The last item packed up was my thermometer. It read 127° F.

Troubles plagued our return trip; the heat and rough terrain of the Empty Quarter are hard on the best of vehicles. The Power Wagon threw a fan blade. I used up most of my first-aid kit on a torn radiator hose. Ali, the driver, patched the radiator with a mixture of barley flour and camel dung.

Then a short circuit in the Land-Rover burned out the generator, which began to screech. We decided to detour and stop for repairs at "Seismo-4," an Aramco exploration camp. I had the address in my notebook: Lat. 23° 40' 00" N., Long. 49° 32' 24" E.

The camp manager, Bob Anderson, greeted us with dishes of chocolate ice cream, promises of spares, and bunks for the night in one of the camp's air-conditioned trailers.

Like a black ghost at Halloween, a Bedouin woman peers through a slit-eyed veil. Henna stains her work-worn hands. Patterned drapery on the tent, hand-woven from dyed wool and goat's hair, partitions off the harem. Moslem law allows a man four wives—but only if he can treat them equally.

Bawling for water, thirsty camels await their turn to drink at Nadqān Well. Men sip coffee in the shade of goat-hair tents, while women tend to early-morning chores.



A long day's drive brought us safely into Dhahran. There I left Lynn back in the 20th century and flew across the country for a camel ride along one of Saudi Arabia's last regular caravan routes. Despite the hazards of sand, dust, and chassis-shattering roads, most of the kingdom's colorful caravans have given way to jeeps, buses, and giant trucks.

### Two Days' Journey to Abhā Market

In the village of Ad Darb, on the sultry Red Sea coast, I caught up with tall, raw-boned Fahd ibn Muhassan, the boss of the camel drivers.

"*Ah-lan wa-sahlan!* Welcome!" he said, with a smile as wide as his beard. "You are just in time; we leave before sunset. We will be in Abhā for the Tuesday market, Allah willing, but it is two days' journey and two nights. And the road is steep."

We filed out of the village on foot, leading a string of 48 camels bawling under heavy loads. How different was this coastal desert from the rest of Arabia! The village of Ad Darb was typical—a cluster of tall, pointed huts, framed with poles and thatched with palm rope (pages 38-9). The dark-skinned people dressed for the sweltering climate. Men wore only striped loincloths and broad-brimmed hats; women walked about in bright calico, seldom veiled. The scene struck me as more African than Arabian.

Not until the first stars appeared did we mount. Fahd coached me in the art of climbing aboard a moving camel.

"We can't stop the whole caravan to get on and off," Fahd explained. "It would take an hour with the stick to get them moving again."

I tied my rifle and cameras opposite the clay water jug and coffeepots and pulled down slightly on my camel's head as I walked.

**Silent shadows** on the sand, Murrah Bedouin and their camels plod the Empty Quarter in search of grass. Wind-created "dunes" only a few inches high show as light streaks in the lee of scattered bushes.

**Smashing in from space**, this 4,800-pound meteorite dug a sandy grave near Al Hadi-dah in the Empty Quarter. The author found the iron-nickel nugget, largest ever discovered in Arabia, after Murrah Bedouin guided him across 400 miles of desert.

"Gurrrrah! Gurrrrrrah!" I trilled, quickly putting my knee in the crook of her powerful neck. Instantly I was airborne, swinging safely into the saddle.

Her good balance had earned my camel the name of Midwam, which means "spinning top." Now, loaded with 400 pounds of coffee and sorghum stalks, she moved with an especially smooth gait. I sprawled among the mixed baggage and tried to sleep. Far ahead in the dark, Fahd moaned a love ballad:

"The quickening wind unveiled a glimpse;  
A slender neck, dark lovely eyes . . ."

Never had I seen such a show of stars. The night wore on. I dozed fitfully. The Big Dipper turned slowly round Polaris and finally poured out the red dawn. We stopped to rest.

Before noon we were loaded again and moving painfully across the hot, breathless desert, impatient for the cool mountains rising in the haze ahead.

We flushed larks and coveys of sand grouse and, once, a red-headed Arabian woodpecker.

COACHMAN BY THOMAS J. ABENHORBIL © N.C.S.



I spied a pair of gray hornbills hooting from the yellow blossoms of a thorny *talh* tree. We passed a splendid iridescent blue lizard. He was doing push-ups on his forelegs on his rock perch. The camel drivers called him *dhubb as-salaat*, the praying lizard.

Suddenly I heard the terrifying sound of screams and rolling rocks on the hillside above us. I grabbed my rifle.

"Don't shoot!" laughed Fahd. "They are only baboons." I looked closer. A whole colony was on the move. The husky males formed a cordon around the females and young ones.

"They are harmless unless you scare them; then they shower you with stones," he said.

Some of the camels lagged. "Haaaa! Haaaa! A curse on your first milk!" shouted Fahd, driving them up to pace. As we trudged the last stretch of stony switchbacks, the air freshened and we passed cool springs. Goat-herds, high above us, waved salutes. By afternoon we reached the windy pass.

#### Vista of Green Rewards Climbers

I looked back. Seven thousand feet below, the desert and the sea were veiled by sultry mist. Ahead, the trail led down through green terraces to Abhā.

Paying a courtesy call on the governor of Abhā, Emir Turki bin Madhi al-Sudairi, I found him holding *majlis*, a sort of "open court." At the far end of a richly carpeted room he sat in great dignity, hearing complaints and settling disputes, flanked by a dozen stern bodyguards wearing thick leather cartridge belts and armed with English rifles. I left my shoes at the door and advanced humbly. He met me halfway to trade the usual Arab greetings:

"Peace be with you!" I opened.

"And with you, peace!"

"Morning of goodness, O Emir."

"Morning of light."

"God grant you life."

"Our family, our gardens, be yours."

With dispatch, he settled the day's business. Two brothers disputed ownership of a small family field. The emir awarded it to the

younger, who had planted it each year since his father's death. A woman was divorced because she was barren; her husband was ordered to return the dowry.

Outside, in the shadow of the emir's towering palace, the Tuesday market was reaching a climax. Here I met Husain Zaphir, a native of the region who spoke excellent English and offered his services as a guide. He led me through the bustle. Farmers crowded the temporary stalls to buy sheep and coffee, charcoal, tools, and trinkets. Others filled the noisy teashops that lined the town square.

#### Fodder for a Nonexistent Donkey

Young women from the nearby villages sold bundles of herbs and alfalfa. Few were veiled; many were striking in bright red or green dresses, beautifully embroidered at the neck and cuffs. Heavy silver anklets and bracelets rattled as they sorted their wares.

A smiling girl in a sheepskin coat and wide straw hat bargained with us over her wares.

"Ah, there are no more beautiful women in all Arabia," Husain assured me. "Here on Tuesday a man could find a bride."

Enchanted, he bought a bale of fodder. I remarked that it was too bad we had no donkey. Husain blushed and tossed the bundle of alfalfa in the back of a jeep we had hired.

We drove up the winding motor road above Abhā to the village of Sūqah. Near a crumbling stone watchtower, set among green terraces, we found an old farmer damming a small brook to water his field of barley. Here, I thought, was a man at peace with his land.

"It was not always peaceful here," the old man remembered. "Villages often fought each other, and the Bedouin raided us all. Twice, when I was a young boy, I huddled in this tower with my family, while raiders looted our homes and livestock."

"But 'Abd al-'Aziz (Allah's peace be upon him) put an end to the raiding. Now, you see, we use the watchtower for a granary, our rifles for hunting. Allah be praised."

Later I followed a shepherd's trail to the summit of nearby Jabal Sawdā', highest point in the kingdom. My pocket altimeter read

Waves of sand from a desert ocean lap the date groves of Al Hasā, the kingdom's largest oasis. Driven by the prevailing *shamaal*, or northerly wind, the crescent-shaped dunes choked hundreds of acres of fertile farmland and buried whole villages. Now fences and rows of tamarisk trees, pines, and castor plants help to halt the relentless invader. Scores of bubbling warm springs water this island of fertility.



Onion domes of thatch shelter the villagers of Ad Darb, who farm Arabia's coastal plain by the Red Sea. Donkeys bearing pottery water jugs plod in never-ending procession to and from the community well. Women of this seldom-visited region rarely wear veils.



Shaped like a knight's helmet, cap of woven palm leaves protects a farmer of Ad Darb from the sun. He raises sesame and presses oil from the seeds with camel-powered mills.

10,279 feet. Here, where the mountain milked precious raindrops from the clouds, I found a small "rain forest," perhaps 20 feet wide, along the edge of the escarpment. Tangles of gnarled junipers, bearded with gray-green lichen, sheltered tall red-blooming aloes. Tiny alpine flowers glowed among the rocks. A lazy hawk watched from a sapphire sky.

#### Lamb Slain for Emir's Guests

On my return to Abhā, Emir Turki bade me to lunch. The Arab is a determined host. For him hospitality is an obligation, a part of his code of honor, a bond between friends, and a truce between enemies. A poor Bedouin will boil his last rice for the stranger who appears in his camp; an important emir favors his guests with a feast.



I squatted on one knee at the emir's right, and the bodyguards took their place around the huge tray of rice piled high with steaming meat. A lamb had been killed for the occasion. Around the centerpiece lay dishes of salad, eggplant, and custard, and folded sheets of flat bread.

"*Bismi llaahi r-rahmaani r-rahiim,*" the emir whispered, signaling the beginning of the meal. "In the name of Allah, the compassionate, the merciful."

We ate, as is customary, with the right hand only. The guards, I noticed, never took their left hands off their rifles. The emir tore out pieces of the lungs (good for the digestion) and the tongue and laid them before me.

"Who eats the tongue will speak the better for it," the emir promised with a smile. Often



APRIL 1953 © NATIONAL GEOGRAPHIC SOCIETY

in Arabia I was so honored, but it did little to improve my Arabic.

During the meal we spoke little and ate quickly. We rolled handfuls of rice into compact lumps and popped them into our mouths. A bowl of drinking water was passed around, then dishes of custard sprinkled with almonds.

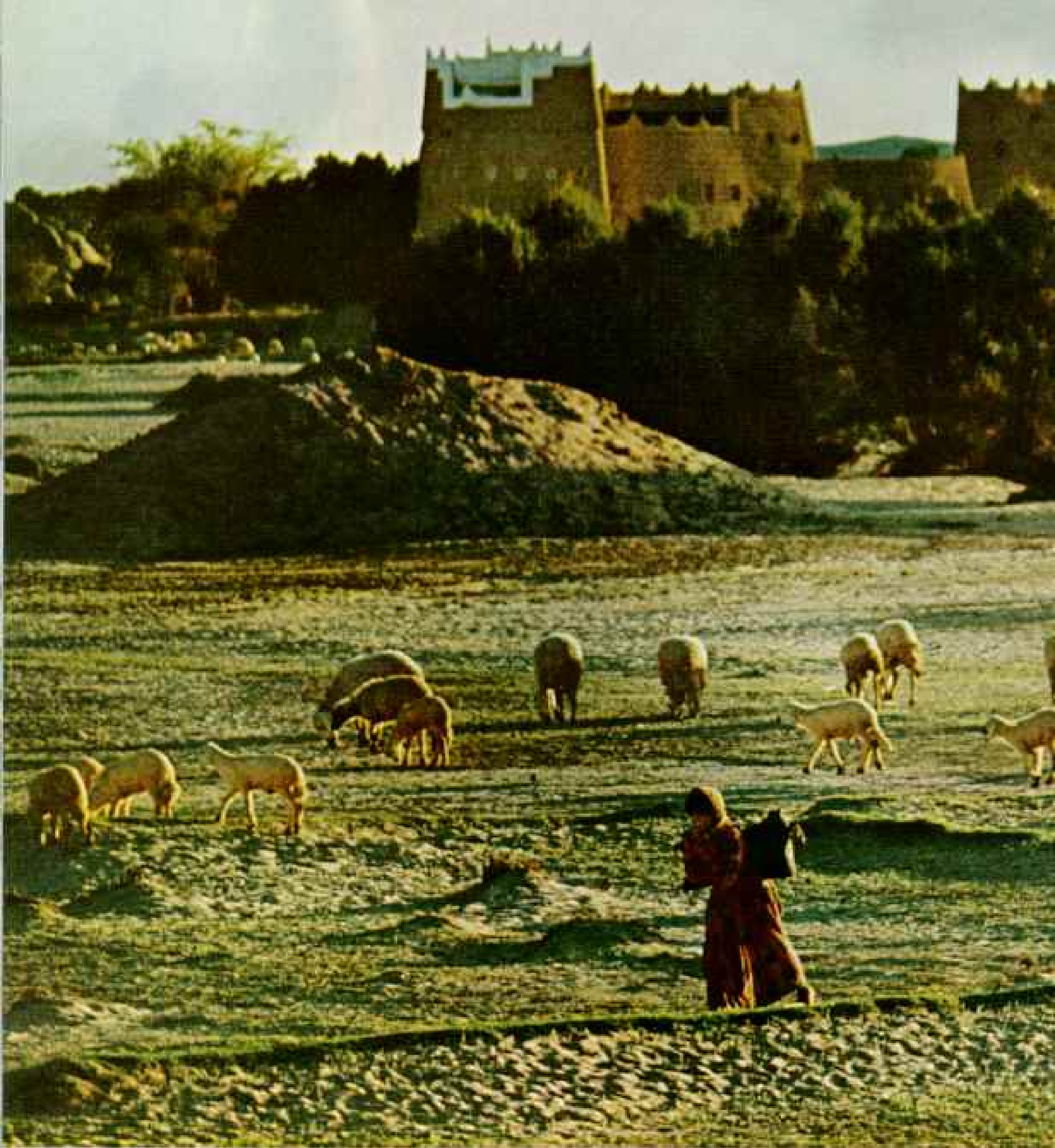
#### Incense Smoke Marks Feast's End

Suddenly the emir stood up; the meal was over. We washed under a graceful brass pitcher held by a household servant. Another brought rose water for our hands and faces. A third passed around the incense burner. Each in turn, we held it under our headcloths to soak fragrant smoke into our beards. This signaled the party's end. The Arabs have a saying: "*Bakhkhir wa-ruuh*. Take the incense and go."

By the time I returned to Jidda, thousands of hadjis (pilgrims) were already arriving for Islam's greatest pageant, the climax of the long journey to Mecca.\* The harbor was crowded with ships strung with festive lights. Brightly painted buses jammed the square. Regular airline service was suspended as special pilgrim flights droned into Jidda International Airport. In a few days the population of Jidda would double.

Jidda enjoyed the bustle. Many small merchants would count more profit during *Dhu l-Hijja*, the month of pilgrimage, than in all the rest of the year. The streets and market place overflowed with newcomers changing money and buying food, pilgrim clothes, and

\*See "From America to Mecca on Airborne Pilgrimage," by Abdul Ghafur Shelkh, *Geographic*, July, 1953.



souvenirs. Some pilgrims were selling carpets (two are allowed duty free) for expenses.

Hotels and pensions were full to the rooftops. Special new barracks built by the Ministry of Pilgrimage along the waterfront and at the airport helped absorb the overflow. Thousands slept under buses in the park, or on the streets.

I had encountered the religion of Islam before, in the deserts of Iran, in the mountains of Yemen, along the coast of Turkey, and was impressed by its message.\* It includes much that is familiar to us in the Old Testament

and the New, and adds much. True, its rites are colored by the harsh desert life that nourished it. So, too, is its majestic simplicity. But in its essence Islam never veers from the oneness of God.

To the Moslem mind, Mohammed was God's messenger—no more than that—as were Jesus and Abraham before him.

A trip to the *qadi*, or religious magistrate, in Jidda to file my petition of intention, a note scribbled under the Saudi visa in my passport

\*The author described his travels "Behind the Veil of Troubled Yemen," in the March, 1964, *GEOGRAPHIC*.





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—and I was admitted to the brotherhood of Islam.

“*Mubaarak! Blessings!*” said my friend Husain as we left the *qaadi*. He had driven back with me from *Abhā* on his way to the pilgrimage. Now we would go together.

Husain and I donned the *ihraam*, the pilgrim dress, consisting of two pieces of seamless white cloth, one wound around the waist, the other draped over the left shoulder (page 47). All pilgrims wear the same garb, from the lowliest servant to the King himself.

Money belt, sandals, and a green umbrella

Castles of mud rise above the village of *Khamis Mushayt* in the cool ‘*Asir* mountains. Fagot of firewood on her back, a young shepherdess heads homeward. She crosses a dry wadi, where ditches trap rain water to nourish scant grass and terraces of wheat and sorghum. The author reached this mountainous region after an arduous three-day camel trip from the Red Sea coast. Invited to dine with the local emir, he sat down to a banquet of whole roast lamb served atop a tray of steaming rice.

completed my costume—except for a small handbag filled with cameras and film. The Saudi Ministry of Information had arranged special permission for me to photograph the pilgrimage.

#### Pilgrims Ring Ka'ba 250,000 Strong

That afternoon we sped in my Land-Rover along the four-lane expressway that connects Jidda with Mecca, 45 miles away. Not so long ago the pious crowds crossed these sands on swaying camels. Now fleets of taxis, trucks, and buses hurried the pilgrims on their way. Soldiers examined our passes at the check-point just outside the sacred precincts, which extend roughly 15 miles from the city. Signs

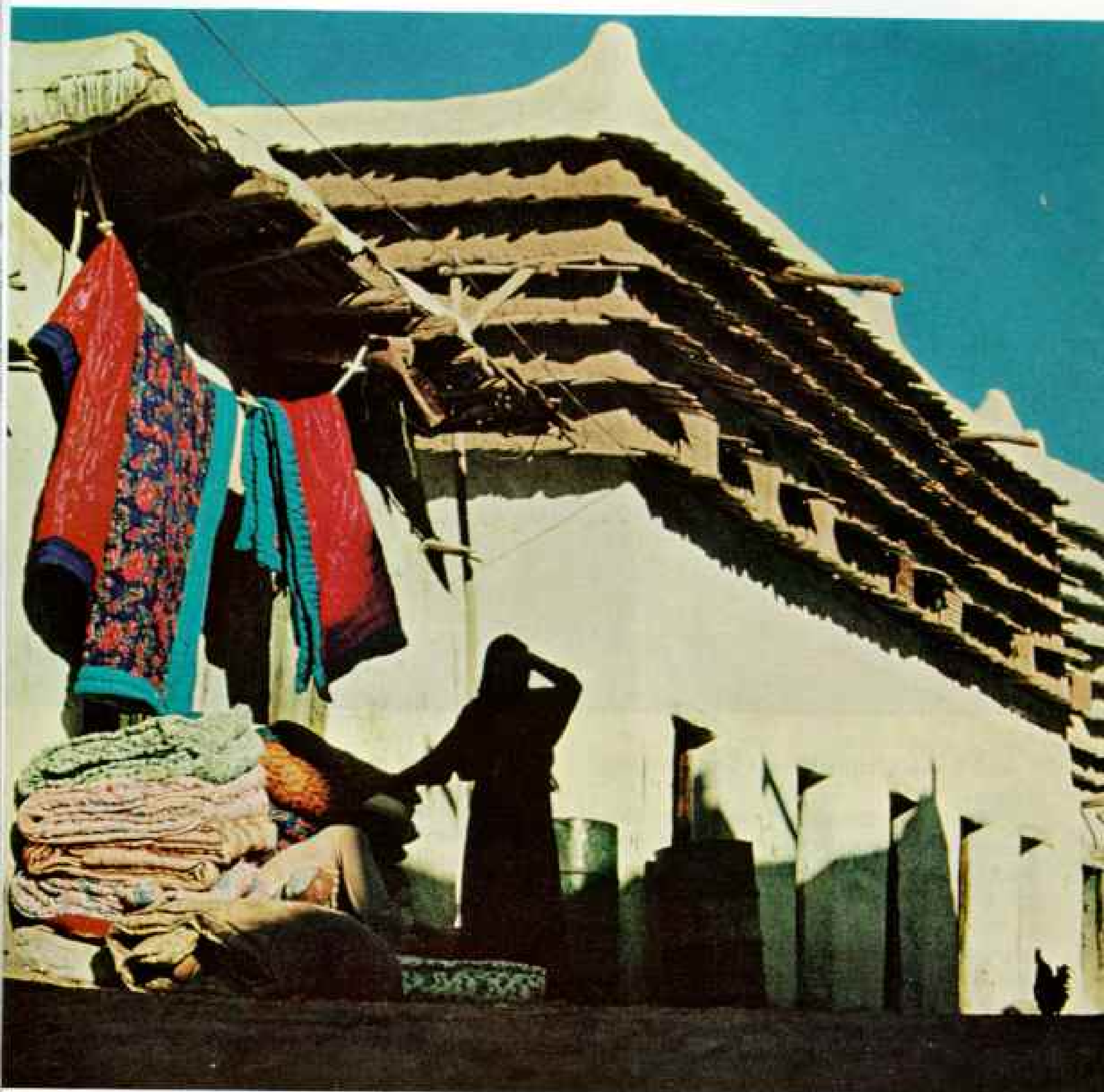
in English and Arabic warned: RESTRICTED AREA, MOSLEMS ONLY PERMITTED.

We passed huge new mansions and army barracks in the sandy outskirts of Mecca. Then, as we rounded the foot of a hill, the holy city itself burst into view.

*"Labbayka Allahumma Labbayka!"* At the sight, we shouted the traditional pilgrim's cry. "Here I am, at your service, O God!"

A wide avenue cut through the labyrinth of tall pastel-colored houses that crowded a protected valley and climbed up the steep black hillsides. Modern shops and hotels lined the square around the Haram Mosque, Islam's holiest shrine.

We washed, then, carrying our sandals,



entered the enormous outer galleries beneath two towering minarets. Just inside, young Mohammed Noor offered his services. He was a *mutawwif*, a professional pilgrim guide.

He led us across the carpets through the mosque's newer section. This \$100,000,000 addition, now nearing completion, covers 15 acres and completely surrounds the original mosque, begun in the eighth century. We passed through the Gate of Salvation into the turbulent inner court.

Before me, rising above the white-robed crowds, stood the Ka'ba, the cube-shaped House of God, made of Meccan granite and draped with black brocade. Moslems believe the original, long destroyed, was built by

Abraham and his son Ishmael. Wherever a Moslem may be, he turns toward it five times each day for prayer.

Barefoot, I followed my guide seven times round the Ka'ba, repeating after him in Arabic the proper phrases of devotion.

"O mighty Allah. This mosque is your mosque. This peace is your peace. This slave is your slave."

Each time we passed the sacred black stone set in silver on the eastern corner, we raised our hands and shouted "*Allahu Akbar!* God is greatest!"

Bearers carrying the sick and the lame jostled us with their heavy wooden litters.

*(Continued on page 48)*



Layer cakes of slate, jutting from whitewashed walls, protect the mud-brick houses of Abha from seasonal downpours. In autumn, the southwest monsoon dumps torrents of precious rain on this city beside Saudi Arabia's loftiest mountain, 10,279-foot Jabal Sawdah'. In Abha's market place (below), hand-embroidered wedding dresses for sale emblazon a spice shop.

PHOTOGRAPHS BY THOMAS J. BRIDGEMAN © R.C.T.



GHOSTLY HOST AT TWILIGHT, drawn as moths to a sacred flame, streams across the plain of 'Arafāt, hallowed by its ties to Abraham. Each year a million pilgrims journey to Mecca and the surrounding countryside in answer to an edict in the holy Koran: "And proclaim unto mankind the Pilgrimage. They will come unto thee on foot and on every lean camel . . . from every deep ravine." Here cars, trucks, and buses join the slow-moving throng, creating the world's greatest traffic jam.



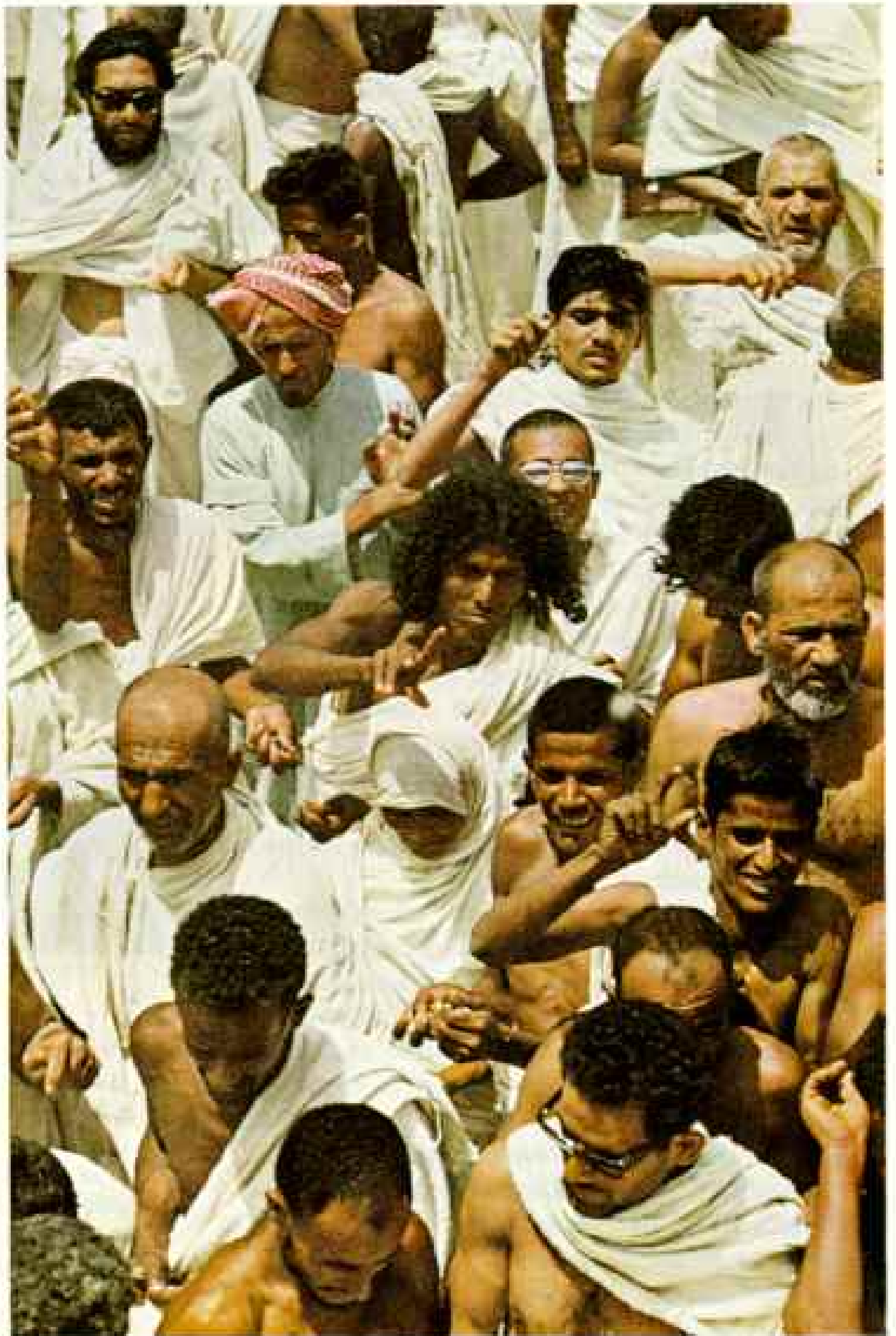






Beating the devil, stone-throwing pilgrims jam the streets of Mina, a village six miles from Mecca. In this Fisheye-lens view, visitors hurl the traditional seven stones, a yearly event in the hamlet. Some toss shoes. The pillar marks one of three spots, Moslems believe, where the devil tempted Abraham as he prepared to sacrifice his son to God. Finding Abraham's faith steadfast, God substituted a ram.

Faces alight with glee, Moslems from Morocco to Indonesia pelt the pillar. Later, outside the village, they will slay thousands of sheep, cows, and camels to commemorate Abraham's offering. Men wear prescribed pilgrim garb, the white two-piece *ihram*.



ENTRICHOMED BY THOMAS J. BRONKHORST © N.C.S.

My legs and heels were torn by a thousand toenails. Old women, lean Bedouin, bearded savants, husky soldiers, whirled together, pressing and parrying. Tears of joy streaked the faces of many, for they were reaching at last the sacred goal of a lifetime.

After circling the Ka'ba, Husain and I ran back and forth seven times, as custom commands, between Safa and Marwa. These two hills, though nearly half a mile apart, have now been enclosed within the giant mosque. Moslem legend tells how Abraham left Hagar here in the desert with their son Ishmael. Frantically she ran between Safa and Marwa, searching for water for the child. Finally the angel Gabriel led her to a spring.

The same miraculous spring still feeds the Well of Zamzam. We stopped to wash our faces in its holy waters. The more pious doused themselves from head to foot.

#### Pilgrims Pause for Sunset Prayer

I climbed to the roof of the mosque and entered one of the minarets over the Gate of Abraham. I had taken a moment out from the pilgrimage rites, seeking a vantage point for my cameras. In darkness I groped my way up the precarious stairway that led around and upward inside the tower. Just at the call of sunset prayer I reached the cupola, 300 feet above the courtyard. I watched breathlessly while the most sacred and beautiful pageant of Islam unfolded (pages 2-4).

A quarter of a million people stopped where they were and turned toward the Ka'ba. They seemed to form an immense and beautiful Oriental carpet—each tuft a white-clad pilgrim—woven in ever-widening circles around the black square. Lamp posts added symmetrical patterns of luminous rosettes. Arcades and galleries of the giant outer mosque formed a border around the design.

The hushed whispers of the crowd rose in a muffled chorus under the Meccan sky. "Al-laahu Akbar!" In unison, all foreheads reverently touched the gravel of the courtyard.

After prayer, the carpet came to life as crowds once more began their churning around the holy Ka'ba. Beyond the spectacle the first lights of evening began to twinkle throughout the winding Mecca valley. The blood-red sunset retreated before a charging full moon and its army of stars.

Next day on the plain of 'Arafat, 14 miles east of Mecca, the pilgrimage came to a climax. In hundreds of thousands of tents packing the valley, the pilgrims, often whole families, spent the day resting and praying (pages

**Shave of grace:** White-bearded pilgrim in Miná bares his head to a sidewalk barber, completing the pilgrimage ceremonies. Now the man will shed the ihram and put on his regular clothes for the trip home.

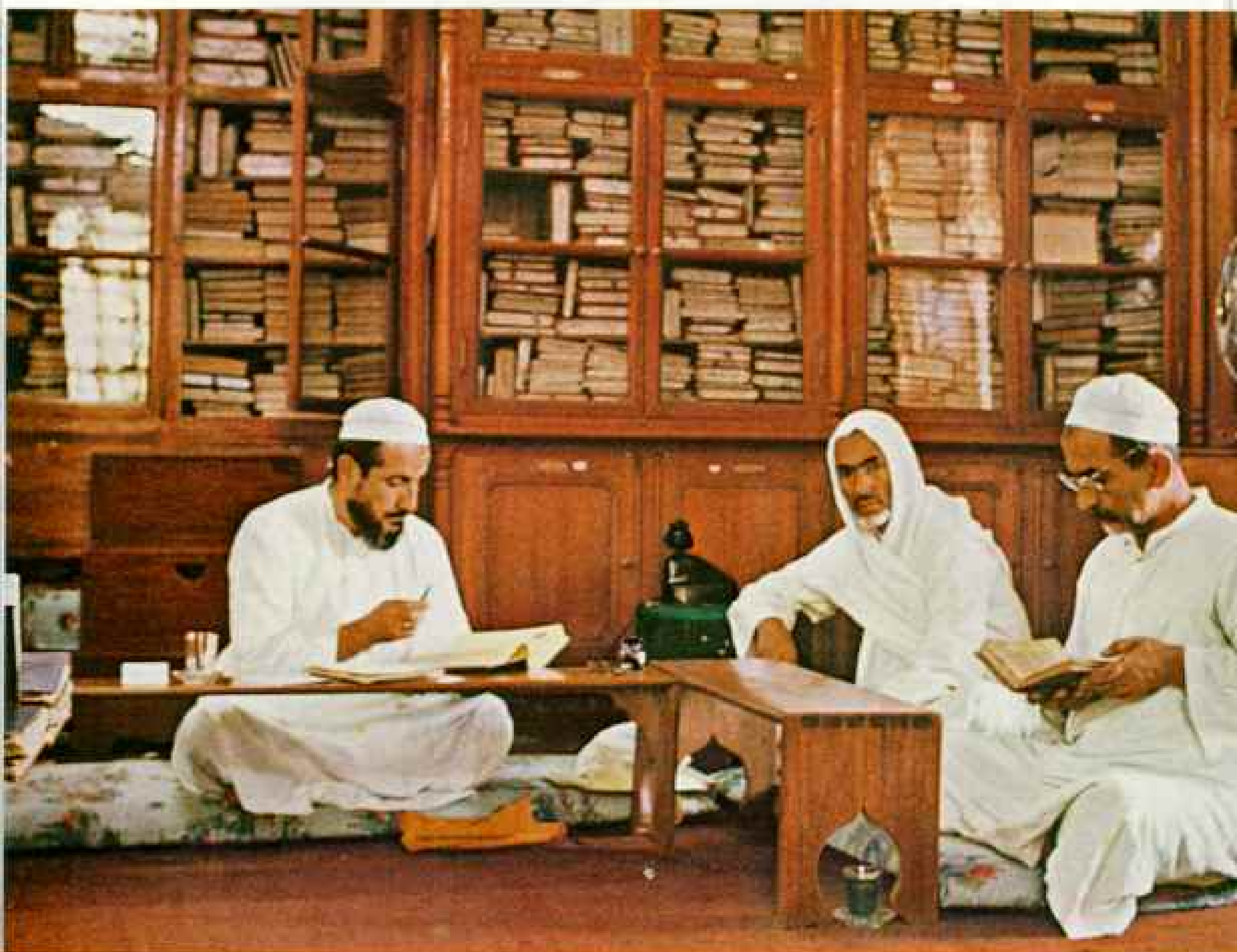


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**Parched pilgrim** pleads for water at the doorway of a hotel during the three-day rites in Miná. Wealthy Moslems book rooms in the village's large new hotels as long as a year in advance; others crowd the houses lining Miná's main street or pitch tents in the nearby hills. Thousands spread prayer rugs on the ground and sleep in the open. To cope with the annual invasion, the Saudi Government has built housing centers, drilled wells, and set up field hospitals.







BAAGIRKUM (TOP); BY SAFOUR NASSAB; DETOURING AND DOCKING (RIGHT); BY THOMAS A. ARSCROW © B.C.



44-5). Then, precisely at sunset, as a cannon sounded the signal, everyone left at once for the next stop, the village of Minā.

Soldiers and policemen, carrying camel sticks and wearing pistol belts over their pilgrim clothes, kept stern order during the exodus. They wrote no tickets, but dragged an occasional offender from his truck and thrashed him soundly with their sticks.

In our Land-Rover we ground through the deep sand around the stalled road traffic and the surging crowds, making the six-mile drive to Minā in two hours. Many trucks and buses didn't arrive till next day.

#### Blue Eyes Puzzle a Texas Arab

Husain and I checked in at the Taysir, one of several ten-story hotels that have sprung up recently in the small village.

"*Min fain inta?*" asked the young desk clerk. "Where are you from?" He stared suspiciously at my blue eyes. I showed my passport.

"America? Y'all from Washin'ton?" he gasped in fluent, southern-fried English. "Ah jist lef' Texas less'n two weeks back! Ah'm back heah helpin' in Dad's hotel fuh the rush season."

The rush season in Minā lasts only three days. During the rest of the year, I learned, the village is practically empty. That explained the high room rate: \$100 a bed in a four-bed room. I was lucky at that. Most of the pilgrims were camped in tents in the bleak basalt hills around the town. Hundreds of thousands more slept on small prayer rugs in the hot dust of the streets.

Nonetheless, the days at Minā were happy ones. The rigors of the journey were forgotten in celebration of a successful pilgrimage. Swept along with exuberant crowds, I threw the allotted seven stones at each of three devil pillars in Minā's main street (pages 46-7). These stone columns mark the places where Moslems believe the devil tried to tempt Abraham to refuse to sacrifice his son as God had commanded. In the end, God provided a ram which Abraham sacrificed instead.

That sacrifice survives in tradition. Throughout the day, in the official slaughterhouse just outside town, pilgrims slit the throats of thousands of sheep, cows, and camels, and distribute the meat to the poor.

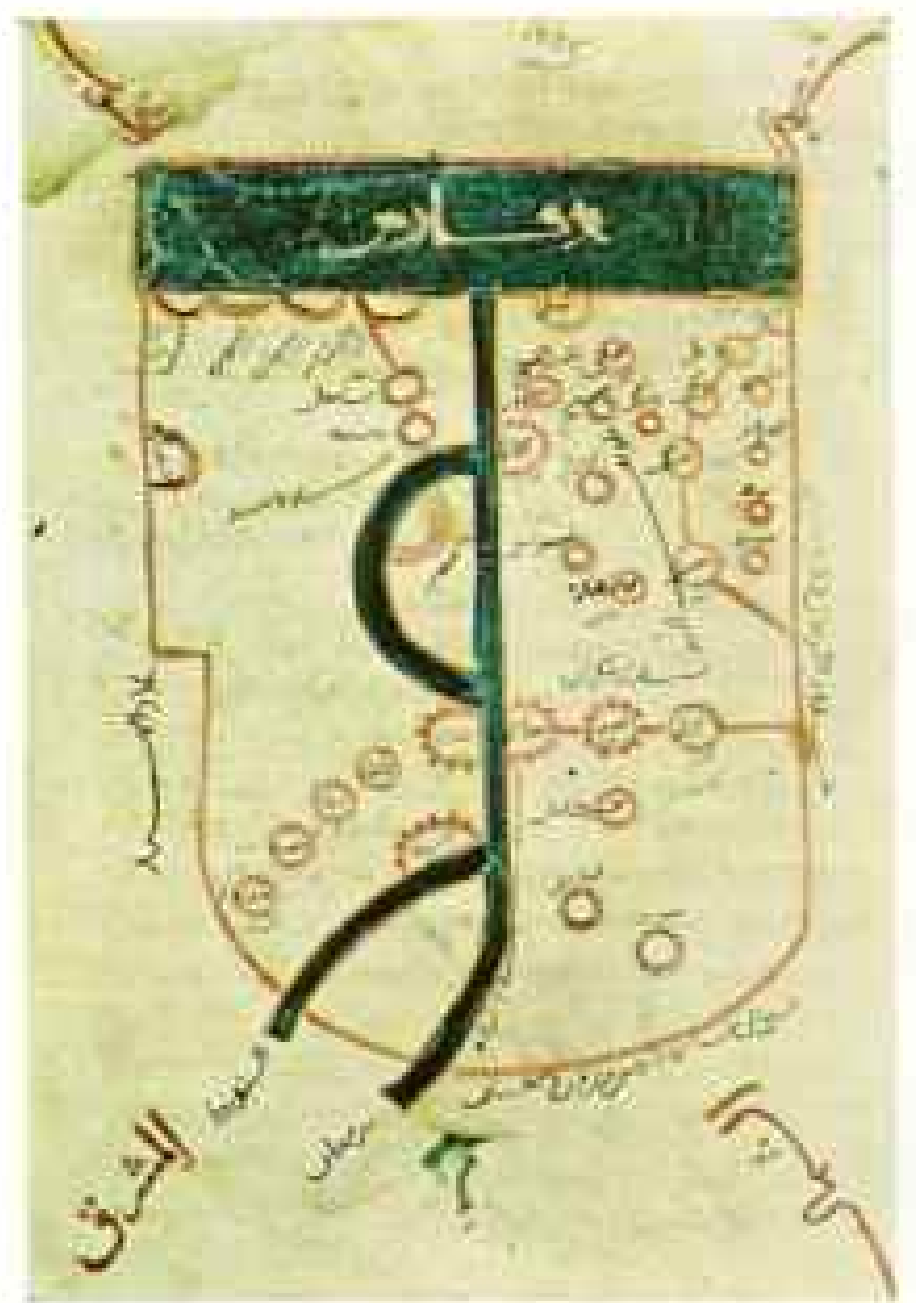
On the second day at Minā everyday clothes take the place of pilgrim's



Glittering minarets spike the skyline of Medina the Radiant, second only to Mecca among the holy cities of Islam. Mohammed spent the last ten years of his life here, after fleeing from Mecca in A.D. 622.

Squatting at mahogany benches, scholars consult Arabic texts on science, law, and religion at the Sheik Hagmud Library in Medina. Priceless books and hand-lettered manuscripts crowd the shelves.

Time-stained map illustrates a centuries-old Arabic geography. The chart shows fortified cities as red circles and the Indus River flowing through present-day Pakistan on its way to the Arabian Sea. The Sheik Hagmud Library treasures the volume.



garb. Once a uniform white, crowds now are brightened by colorful costumes from many lands: brilliant red calicos from Nigeria, green turbans from Iran, blue Yemeni caftans, striped Egyptian galabias, and sarongs from Indonesia.

### Medina Exerts a Special Pull

Few pilgrims return home without making the 300-mile trip north to Medina, Arabia's second holy city. Mohammed spent the last ten years of his life there after idol worshipers, alarmed at his rising popularity, drove him and a handful of followers from his native Mecca. The Moslem calendar dates from the year of his Hegira, or flight, in A.D. 622.

Before I left Arabia, I paid my respects to Mohammed's memory at his tomb in Medina, under the green dome in the Masjid ar-Rasul, the Mosque of the Prophet (opposite). Praying to Mohammed is forbidden by the Koran, but most visitors offer a prayer here to Allah for the Prophet. With his own hands, the Prophet helped build the first mosque on this spot. Over the centuries it has been rebuilt and enlarged, most recently by the Saudi Government in 1955.

Although the pilgrimage season was over, crowds still filled the mosque at prayer time and afterward bargained with cloth merchants on the front steps over bright-colored bolts of cotton and silk (below). Others, in the

market place, purchased prayer beads and Korans. I bought a small morocco-bound edition for myself, taking care to argue only about the price of the binding. The holy pages inside are always included free.

That evening from the roof of my air-conditioned hotel I stared out across the city. In the rose twilight the first lights began to twinkle, then quickly outshone the starry desert night.

Al Madīnah al-Munawwarah, the City of Light; it seemed a fitting name tonight. The sacred precincts were illuminated by roaring generators outside the town, manned by two lonely Englishmen. Welcome, 20th century, says Arabia, but don't rush me.

Medina was the seed from which sprouted the great Arab empires that stretched from Gibraltar to India. Dipping into the wisdom of Greece, Persia, and Byzantium, they re-lighted the lamps of Europe's Dark Ages. Now the West returns in kind. Slowly the impact is felt, modified, and finally accepted.

Arabia shone with the light of Islam long before Edison's electric illumination. It prospered without oil wells, occupied the deserts without trucks and fertilizers, conquered great distances without jet planes.

Now with all these modern boons, it will rise from its slumber, Allah willing, to shine anew, and put Aladdin's lamp to shame.

THE END



Bolts of bright cotton in a Medina market contrast with the somber garb of four Saudi women.

Banded arches of limestone and basalt with geometric designs—orthodox Moslem art bans human images—support the ceiling of Medina's Mosque of the Prophet. On rich red carpets men pray and read their Korans. They believe Mohammed helped build the original mosque of clay and palm trunks.

Religion remains the guiding force of Saudi Arabia, dictating its civil laws, monitoring its manners, and refreshing its spirit with the ecstasy of worship at holy sites.



# Stalking Seals

**W**ITH SIX FEET of ice over my head and 300 feet of frigid water below, I swam through the half-light for our access hole to the surface. Ahead, bubbles streamed intermittently from the Aqua-Lung of Lt. David Lavallee. And toward us, aiming for the same objective, swam a nine-foot, 800-pound Weddell seal.

We eyed each other curiously, the seal and I. The thought occurred to me that this big fellow might not like the idea of our using his breathing hole.

Dave gave a final kick of his flippers and entered the hole. Now the seal was just inches from my swim fins. As I swam up behind Dave, the animal grasped my right fin gently in his powerful jaws, holding on for perhaps ten seconds. Then, as Dave hauled himself out of the water, the seal let go of my flipper.

Almost together the seal and I popped our heads through the access hole. On an impulse, I gave him a gentle pat on the snout, and then heaved myself out of the water.

Dave and I watched the animal breathe deeply and repeatedly for three minutes, his nostrils dilating and contracting like giant mechanical valves. Before he clamped his nostrils shut and dived again, he gave us one brief glance and that was all.

I couldn't have been more delighted by his casual acceptance of us—apparitions wearing rubber suits, face masks, and metal tanks. To him we were fellow marine creatures, and he was proving our motto: "If you want to study a seal, *be* a seal."

The Weddell seal, *Leptonychotes weddelli*, is the world's most southerly mammal—a behemoth that reaches 10½ feet in length and well over 1,000 pounds in weight. Our first expedition in 1963—supported by the National Science Foundation's United States Antarctic Research Program under a

**Puppy-faced Weddell seal gulps air through its window on the world, a hole in six-foot-thick Antarctic ice. Daring scientists, diving through such openings into the unknown, for the first time swam with the huge mammals to learn the secrets of their life in polar waters.**

ILLUSTRATION © NATIONAL GEOGRAPHIC SOCIETY



# Under Antarctic Ice

Article and photographs by  
CARLETON RAY, Ph.D.

Curator, New York Aquarium  
New York Zoological Society





ILLUSTRATION BY WILLIAM E. SCHEVILL © NATIONAL GEOGRAPHIC SOCIETY

Antarctic aquanauts brace for a plunge into the eerie, mysterious realm beneath the ice: Author Carleton Ray (left), chief diver Lt. David O. Lavalley, USN (center), and photographer Peter R. Gimbel. "The touch of sea on bare skin felt like the stab of an ice pick," Ray said after water seepage in his specially made suit of foam neoprene added pain to danger.

grant to the New York Zoological Society—had shown us the possibility of a unique research mission. Now, on a five-week expedition the following year, we were planning to study these marine mammals in their natural habitat—under the ice!

We wanted to learn, first of all, how seals navigate far beneath the ice-covered surface, where less than one percent of the overhead sunlight penetrates. How, after dives of perhaps 1,500 feet and half an hour's duration, do they find their way back to the holes they use for breathing? And how do they find the fish and shrimplike creatures they feed upon in the darkness of the depths? (We suspected that they use echo-location, or sonar.)\*

Secondly, we wanted to know whether they

communicate with each other by voice. What is the nature of seal "talk"?

Thirdly, how, in the coldest realm on earth, can seals bear the extreme temperatures on the surface and in the icy waters below?

In our search for answers, we joined forces with the Woods Hole Oceanographic Institution in the persons of bio-acousticians William E. Schevill and William A. Watkins—whose work was also supported by the National Science Foundation. The New York Zoological Society contingent included two extraordinarily capable biological divers and underwater

\*NATIONAL GEOGRAPHIC published "Birds That 'See' in the Dark With Their Ears," by Edward S. Ross, in February, 1965; also "How Bats Hunt With Sound," by J. J. G. McCue, in April, 1961.

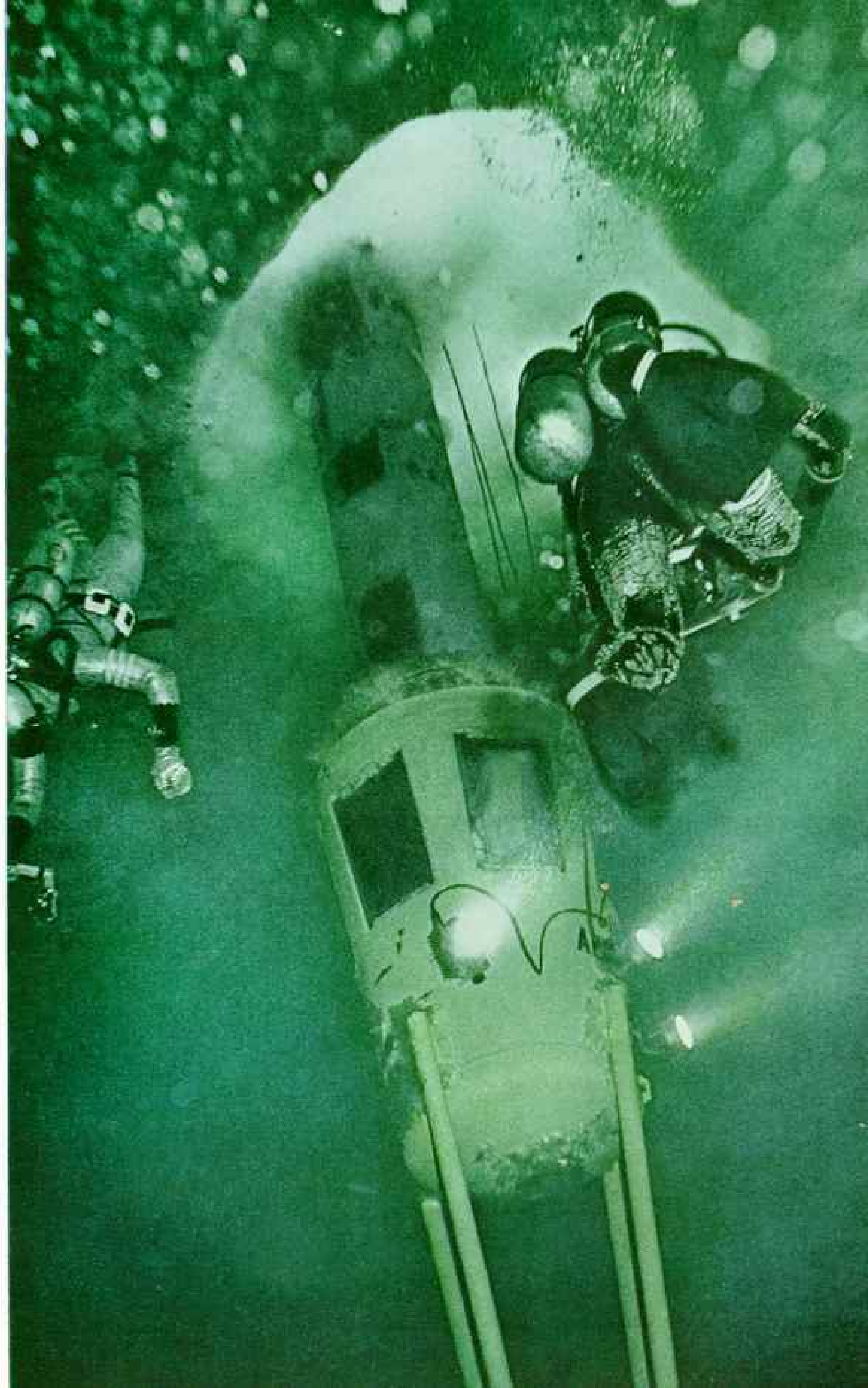




Earth's coldest domain harbors the seal named after British navigator James Weddell, who discovered the Weddell Sea in 1823. Expedition's camp lies on sea ice three miles from McMurdo Station, permanent United States research base.

Above and below the ice, scientists study how seals navigate, communicate, breathe, and forage. Submerged hydrophones capture seals' "talk" for a tape recorder in the hut; their vocabulary ranges from high trills to low moans. Divers drop through holes on photographic missions. Down below they face the risk of losing their way and running out of air. Though seals accepted the men as seagoing mammals, the equipment aroused their curiosity (below). One Weddell bit a hydrophone; another, hearing a playback of seal sounds, surfaced through the lab hole to see who was talking.







**Isolated porthole**, the only one in half a mile, means life or death to the seal, who must find it to breathe. Dr. Ray (left) believes the animals use sonar, bouncing voice signals off the ice to locate such passageways. Constant use keeps the holes open even in the coldest weather; the seals enlarge them by sawing with their teeth. Blubbery bodies smooth the edges.

**Sleek as a bullet**, an 800-pound Weddell plunges through its hole in the ice. It survives long dives by constricting surface blood vessels to ensure a steady supply of blood to heart and brain. The Weddell also tolerates large amounts of carbon dioxide in the blood. Thus it can remain submerged for half an hour or longer, seeking food at depths as great as 1,500 feet—the deepest dive known for seals.

**Flood-lamp eyes** peer from the bucket-shaped capsule into the undersea gloom as divers—like astronauts afloat in space—circle amid a swarm of air bubbles. Light-reflecting paint flakes off the suit of the diver at right. Barring leaks in their suits, the men can withstand the 28.6° F. water for almost an hour. Submerged 16 feet below the icy surface, the observation chamber gave team members longer, more protected sessions in the deep. Scientists spent up to two hours in the cylinder despite temperatures in the chilly 30's. Like a submarine's periscope, the 12-foot access tube thrusts up through the ice. Long struts hold ballast for the six-foot-high compartment.

Around the hole "sunlight filtered through the ice as a bluish haze that resembled a cloudy sky," recalls Dr. Ray. "But dim surface illumination rapidly faded into blackness below."



ENTRANCE (TOP) AND HOLE (OPPOSITE) BY CARLETON RAY;  
WEDDELL (TOP) BY PAUL W. CARROLL © N.S.C.

photographers, Peter R. Gimbel\* and Lt. David O. Lavallee, USN, and myself. We made our base near the United States' McMurdo Station, 840 miles from the South Pole (map, page 57).

For our work we air-freighted close to two tons of equipment to Antarctica—everything from the most complex sound systems to thermal long johns and sun glasses. All our acoustical gear for listening to and tape-recording seal sounds would be installed in a 12-by-20-foot prefabricated, insulated hut equipped with an oil stove and a picture window. We would lower our underwater microphones through a hole in the floor of the hut.

#### "SOC" Designed to Keep Watch on Seals

To watch the seals while we listened, Bill Schevill had suggested, and David Lavallee had designed—and the National Science Foundation had had built—one of the strangest contrivances ever seen in Antarctica, the Sub-ice Observation Chamber, or "SOC." This tapered orange-yellow cylinder, with a 12-foot access tube and six windows, could hold two men. It would be secured by cables anchored to the underside of the ice.

We hoped to hear underwater seal sounds within a radius of five miles. We estimated there were 400 to 500 seals in the area of McMurdo; one day we counted almost 300 whiskered snouts on the ice at one time.

Here on the coast in the Antarctic spring, the coldest day we experienced was only 22° below zero F. in the shade. The temperature sometimes would climb to about freezing. Even in the much colder interior, it is the sudden and wild storms, especially winds, that make Antarctica so forbidding. That, and the continent's complete isolation by the Antarctic oceans—the most violent known.

Weddells are remarkable animals to be able to live on and under the ice of these cruel seas. They feed underwater, yet must breathe and whelp on the surface. Holes, kept open the year round through constant use and sawing with their teeth, comprise their only link between the two worlds.

During October and November—spring-time down here—most of these seals gather in rookeries, where females give birth to 60- to 70-pound, 5-foot pups. On warmer days adult seals sunbathe like groups of lizards, while pups wander a bit. But on colder days the



**Popping up for air,** a Weddell surveys its domain, dominated by Mount Erebus, Antarctica's only active volcano, at left. Whitespotted chest and benign expression distinguish this gentlest of seals. Two other animals stretch out to soak up the sun.

"They can sleep through gale-force winds in temperatures far below zero," says Dr. Ray. "But when a seal gets too cold in the wind, it slips under the ice to snooze while holding its breath. To my knowledge, our expedition was the first to observe seals sleeping beneath the ice."

**Galaxy of starfish** gleams 30 feet beneath the surface of McMurdo Sound. These creatures, smaller than a man's hand, detect food and light with upturned armlike rays. Like little mops, the starfish scour the sea floor's volcanic ash for shellfish and marine plants.

\*Mr. Gimbel illustrated "By Parachute Into Peru's Lost World," by G. Brooks Buckland, NATIONAL GEOGRAPHIC, August, 1964. Dr. Ray himself contributed "Three Whales That Flew," in the March, 1962, issue.



KORCHPINE (BOUVE) BY DAVID W. LAYBELL; BRACHPINE BY LAWLETON MAY © N.S.S.





PHOTOGRAPH BY CARLETON RAY © NATIONAL GEOGRAPHIC SOCIETY

Food for seals, big Antarctic "cod" rarely reach the surface except when brought up from the depths by Weddells. Cruising in darkness, the seals find *Dissostichus mawsoni* by echo-location, scientists believe. Philip M. Smith, representing the United States Antarctic Program, scrutinizes two 60-pound specimens—no relation to the true cod—mauled by seals shortly before.

Flippers kicking, a diver swims toward a crystalline stalactite dangling from the sea ice. Water-filled pockets within the icy stalactite hold living creatures, including a smaller species of Antarctic cod and tiny shrimp-shaped amphipods.

Like a jeweled pin an inch in diameter, a brittle star adorns the sea floor.

snow-encrusted young huddle in the lee of mothers (pages 64-5). Within six weeks, pups approach 200 pounds, lose their fluffy tan hair, called lanugo, and take to the water.

Other adult seals gather in nonbreeding colonies along cracks in the sea ice or near the shore. Communal living is not, however, an invariable rule; individualists occasionally are found near isolated holes in the ice.

Our explorations beneath the ice by scuba diving, hydrophones, and observation from the SOC would help us understand the other side of the life of these amphibious beasts.

#### Cacophony of Sound Deluges Listeners

Shortly after we arrived at McMurdo, a C-130 Hercules landed with the observation chamber. We wanted a location well away from the base and the path of icebreakers, in about 1,000 feet of water. After several soundings, we found such a site and started to make a place for the SOC in the ice.

In four days a chain saw, ice drill, tongs, and dynamite removed about 22 tons of six-foot-thick ice to make three holes: one for hydrophones in the floor of our bio-acoustics hut; another for divers and seals just outside the hut's picture window; and a third, seven feet square, for the SOC (diagram, page 57).

We started moving our hut toward its hole three miles away, but were beaten back by a gale after the first half a mile. Next day we hauled the hut the rest of the way. By nightfall Bill Watkins had one hydrophone in place, and we settled in to listen.

What we heard held us transfixed for hours. The water was alive with the sounds of seals. There was not a moment's silence in the "silent world," but instead a never-ending chorus of seal trills, chirps, and whistles.

"No wonder the seals haul out onto the ice," said Dave Lavalley. "They have to get away from all that racket below!"

Two days later Navy Seabees, with their usual ingenuity, lowered the SOC into place. Two seals were already "in residence," using as a breathing hole the same opening the SOC was in. We were soon seeing and hearing the Weddell seal simultaneously, in the first prolonged acoustical-behavioral study of any large marine mammal in its own environment.

Lavalley, Gimbel, and I first dove near the SOC to install lights and clean its windows. Then it was time to "become seals" ourselves. Along a crack in the ice near shore, where the water was shallower, we found four holes made by seals, two of them large enough for divers. We would be going down with



standard breathing equipment, but our suits had been specially fabricated for us of 5/16-inch-thick foam neoprene. The only exposed skin was a little area around the mouth, which we knew from experience would not get uncomfortably cold in the 28.6° F. sea water. We adjusted our outfits against leakage, and entered the water one by one.

As we descended, penetrating this forbidding frontier, we had a feeling of otherworldliness. I was apprehensive. This was truly the unknown, as hostile an environment as is found on earth. But, as we got accustomed to this blue crystalline world, the apprehension became mixed with a pleasant weightless feeling. We were one with the sea.

#### Antarctic Waters Teem With Life

Visibility proved excellent. We could see some 75 yards horizontally along the silver band of the crack. Overhead, from clusters of ice crystals—sometimes three to four feet long—emanated a blue-white light. The underside of the ice was stained brown with diatoms. Among the crystals dwelt a species of Antarctic "cod," one to three inches long, and little shrimplike amphipods (above).

In the water itself we found a multitude of delicate creatures: small ctenophores, or

comb jellyfish; little pteropods, or winged snails, up to three-fourths of an inch long, flapping their "wings" like men trying to warm themselves on a cold day; huge jellyfish, as much as two and a half feet across the bell, with tentacles up to 35 feet long.

We followed the rays of light downward and on the bottom observed a plenitude of life: starfish, ranging from two to eighteen inches across, of two different species—a big orange type and a smaller blue one always found with the tips of its arms upturned, probably tasting for food (page 61); brittle stars; nemertine, or proboscoid, worms up to three feet long and an inch in diameter.

Here and there patches of ice crystals had formed on the mud. The same fishes and amphipods found among the crystals above were also present among those on the bottom.

Many of these bottom animals fed on seal feces. The seals were contributing to an incredibly rich food chain by feeding far afield, bringing back nutrients, and fertilizing the area. All in all, I would judge there was as great a collection of bottom life as occurs anywhere in the world. In fact, during the summer, the Antarctic oceans are considered to be the richest on earth. Twenty-four hours of sunlight and the nutrients that accumulate



when the sea is ice-covered stimulate an amazing growth of plants and animals.

Seal-watching proved relatively easy. The animals seemed indifferent to us, and let us approach them in their various moods. We never saw them feed or mate, but we did spot them sleeping directly under the ice.

The Weddell will do this at times, the air in its lungs giving it the buoyancy needed to remain securely up against the ice.

One marvels at the magnificent metabolism allowing rest in the coldest environment known on earth, for the thermal conductivity of water at this temperature is 23 times greater than that of air at the same temperature. This means that the human body, for instance, would cool 23 times faster in 28.6° F. water than in air at the same temperature. The unprotected body could not produce heat fast enough to survive more than a few minutes.

Occasionally we saw seals fighting, at times rather vigorously. I witnessed one such fight from the SOC, while Lavallee and Gimbel

were swimming outside. The two seals squared off just five feet under the ice, almost ignoring the divers a dozen feet away. When the seals approached each other, I heard one emit a long descending trill. Then they made loud chugging sounds, their throats pulsating with the power of the "music." They opened their mouths and wagged their heads, circling about counterclockwise. Then they lunged and once or twice made harmless contact. They squirmed and contorted, feinting. This continued for about 30 seconds; then the seals separated and swam away.

The struggle seemed to be for dominance, with each seal trying to assert authority over the other. In another fight, the seals were a bit more serious. They circled, each trying to get at the other's throat. They closed and whirled furiously, drawing no blood. This seemed to be a fight to protect a breathing territory and drive away an intruder.

Weddell seals kept us amused, amazed, and quite busy for the weeks we watched them.





PHOTOGRAPH BY CARLETON RAY © NATIONAL GEOGRAPHIC SOCIETY

The data—including more than 75 miles of tape recordings—have not been completely digested and analyzed, but we've come to several tentative conclusions. Broadly speaking we are, of course, convinced that these seals echo-locate in much the same way some porpoises are known to do to find food. As yet we have no concrete proof, just sounds that indicate the capability.

We are pretty sure the seals use echo-location to find breathing holes and to hunt for food, particularly during the long Antarctic night. We recorded several distinct types of sounds while observing our subjects closely. We think a short chirp may be used by the seals to echo-locate. The Weddells may use this or other sounds to orient themselves to the sea floor or to the surface.

We are also convinced that Weddell seals can communicate with each other after a fashion. When one is severely agitated, it will clap its teeth and jaws together. This sound is a warning or threat. He's saying, "Watch it!"

On guard over her three-week-old pup, a mother Weddell cries "wa-a-a-ah" in protest over human intrusion. Whelped singly, seals weigh 60 to 70 pounds at birth; they feed on milk that contains up to 50 percent butterfat, gaining three to four pounds daily. Some adults grow to more than 1,000 pounds.

Another noise, a chugging grunt, sounds like someone getting hit in the belly. This, too, is a warning or a threat.

A fourth noise we heard, a melodious bird-like trill, would start high on the scale and end in a low "chug!" We heard this only when a seal was near a hole. He seemed to be saying, "See that hole. It's mine. That's where I breathe." We plan to gather more evidence of seal "talk" on future expeditions.

#### Blubber Protects Against Extreme Cold

We also reached several conclusions as to how the seals are able to live in the frigid Antarctic. Their unusual metabolism offers part of the answer. Metabolism is sometimes likened to a furnace, and the Weddell seal's heating system burns more than twice as fast as that of land animals. Furthermore, the seal has an inordinately thick layer of blubber, one of nature's best insulators. This, together with an extraordinary ability to constrict its blood vessels, keeps the heat of the furnace from escaping.

Weddell pups are able to live through infancy on the ice because of the fluffy tan hair which coats them for the first six weeks or so. If this layer of wool-like fur gets wet, the moisture almost immediately freezes, and the ice crystals fall off, keeping the pups dry. Paradoxically, warmer temperatures are more hazardous; if the moisture does not freeze, the young seal's skin remains wet and chilled. By the time the pups shed the lanugo, they have built up sufficient blubber to protect themselves in the sea. Weddell seals' milk is 40 to 50 percent butterfat. On this rich diet infant seals gain three or four pounds a day—much of it blubber.

All this, and the other information we gathered, is just a small beginning. Much remains to be discovered about the relationship of the seal to its Antarctic environment.

Man has just begun to probe one of the greatest realms of mystery left on earth—the undersea. We are at the beginning of a new era of Antarctic exploration. The heroic age is over, but the scientific age of underwater exploration has barely begun in the globe's least hospitable domain. THE END

Profiles of the Presidents: The last of five articles\*

# THE ATOMIC AGE: Its



**Fearsome fireball** of a 1952 hydrogen test explosion, spawning an ominous mushroom cloud, symbolizes the perils of the Atomic Age. The atom's annihilating force, unleashed during Franklin D. Roosevelt's Administration, has challenged the powers of every subsequent President in a tireless search for peace. Yet the "fearful engines of atomic might,"

By FRANK FREIDEL

Professor of History, Harvard University

# Problems and Promises



THE PRESIDENTS of the middle decades of the 20th century bore perhaps the heaviest responsibility in the history of the office: to guard the peace in a turbulent world while assuring the well-being of all the Nation's citizens. Much was demanded of these Chief Executives, from Franklin D. Roosevelt through Lyndon B. Johnson, and each labored long and hard to meet his obligations.

Their primary task was to maintain stability and prosperity, acting with Congress to throw the weight of the Federal Government into the economic balance as needed. Franklin D. Roosevelt's first goal was to pull the Nation out of a disastrous depression and to halt plummeting deflation. Each of his successors worked to prevent recessions from turning into depressions, and, during two decades of unprecedented prosperity, to restrain inflation.

With the outbreak of World War II, President Roosevelt assumed another major responsibility—to

\*Earlier installments appeared in the November, 1964, *GEOGRAPHIC* (Washington through John Quincy Adams); January, 1965 (Jackson through Buchanan); May, 1965 (Lincoln through McKinley); and October, 1965 (Theodore Roosevelt through Hoover).



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as President Dwight D. Eisenhower described the nuclear devices, can serve mankind. In 1953, he proposed the Atoms for Peace program to the United Nations.

Taming the atom revolutionized scientific endeavor in fields as varied as medicine and ship propulsion. Metal fingers in a shielded chamber hold a uranium sample for analysis.



foster collective security. Succeeding Presidents have been largely occupied with marshaling the economic resources and armed strength of the United States in behalf of poor or threatened nations.

Maintenance of economic stability at home and peace abroad have been frustrating and often thankless tasks, demanding the full energies and resourcefulness of each of these Presidents. Each has contributed his own approach to these persistent problems.

Roosevelt, within a humanitarian framework, was frankly experimental. Harry S. Truman demonstrated an ability to make perilous decisions quickly and calmly. Dwight D. Eisenhower, the consolidator of the achievements of a score of years, stressed moderation. John F. Kennedy, bringing youth and style, focused on the demands of an urban age. Johnson, contributing a consummate skill in obtaining legislative action, has led the Nation toward a "Great Society."

The complex problems that these modern

Presidents have faced contrast sharply with the basic problems that confronted George Washington: to establish a firm executive department for the fledgling Government and to obtain respect and security in a world dominated by unfriendly monarchies.

#### **President's Task Remains Unchanged**

The present generation knows both promise and peril beyond the farthest vision of the Founding Fathers, Kennedy pointed out in his Inaugural Address:

"The world is very different now. For man holds in his mortal hands the power to abolish all forms of human poverty and all forms of human life."

Nevertheless, he noted, the same beliefs for which Washington's generation had fought were still at issue throughout the world.

Thus President Johnson in proposing a national health program prefaced his message to Congress with a thought from Thomas Jefferson, as appropriate in the 1960's as in 1787:



“Without health there is no happiness. An attention to health, then, should take the place of every other object.”

In a basic way, the role of the President has remained unaltered through almost 18 decades and the tenure of 35 Chief Executives. President Johnson expressed it eloquently in his State of the Union Message to Congress in January, 1965:

“A President does not shape a new and personal vision of America. He collects it from the scattered hopes of the American past.

“It existed when the first settlers saw the coast of a new world, and when the first pioneers moved Westward.

“It has guided us every step of the way.

“It sustains every President. But it is also your inheritance and it belongs equally to all the people that we all serve.

“It must be interpreted anew by each generation for its own needs. . . .

“It shall lead us as we enter this third century of the search for ‘a more perfect Union.’”

### From the High Tide of War Rise Hopes for Peace and a New Frontier in Space

D-Day, June 6, 1944, saw the Allies storm Hitler’s western wall at Omaha Beach (center) and four other Normandy beachheads. Lessons of history’s costliest war convinced world statesmen of the need for a permanent peace-keeping organization. Helping to establish the United Nations (left) and to strengthen it amidst the uncertainties of the cold war occupied the minds of America’s mid-20th-century Presidents.

In the face of a shaky peace, successive administrations moved forward in the cause of freedom: rebuilding ravaged countries, aiding new nations emerging from the remnants of empire, and transforming the American economy from war production to a postwar prosperity dedicated to eradicating poverty. The United States entered the era of manned space flight in 1961 with the sub-orbital ride of Astronaut Alan B. Shepard, Jr. (right). By 1965, the Nation was making giant strides in its announced goal of putting a man on the moon by 1970.



Franklin D. Roosevelt

THIRTY-SECOND PRESIDENT 1933-1945

**F**RANKLIN D. ROOSEVELT sought a more abundant way of life for the American people, and for all humanity. He demonstrated his warm concern for mankind with a flair for brilliant improvisations; like a 19th-century Yankee inventor, he sought his great ends through trial-and-error experimentation. His love of innovation, his wit and jaunty optimism made him an exciting leader.

He became President at a time of national despair, at the depth of the Great Depression. First he helped the American people regain faith in themselves; then he led in the enactment of the most sweeping program of social legislation in the Nation's history.

In World War II, he assumed leadership for the United States in the struggle against totalitarianism and helped plan the United Nations to maintain the peace. He died in office shortly before final victory in 1945, having served longer than any other President.

Roosevelt, like his fifth cousin Theodore Roosevelt, came from a patrician New York family. He was born in 1882 on a pleasant estate overlooking the Hudson River at Hyde Park, New York (page 76). Both his parents

and his headmaster, Endicott Peabody of Groton School, impressed on the young Roosevelt his responsibilities toward those less fortunate. Throughout his career this attitude shaped his thought and action.

At Harvard he became editor-in-chief of the *Crimson*, the student newspaper, then attended Columbia University Law School. On St. Patrick's Day, 1905, he wed his distant cousin, Anna Eleanor Roosevelt, a willowy, shy young woman, who was given in marriage by her uncle, the President.

#### Franklin Idolized Cousin Theodore

Following the example of the first President Roosevelt, whom he enormously admired, Franklin D. Roosevelt decided to enter public service through politics. He had joined the Harvard Republican Club and in 1900 marched in a torchlight procession hailing the ticket of William McKinley and Theodore Roosevelt. But in 1910, in line with the tradition of his own branch of the Roosevelt family, he chose the Democratic Party. Campaigning flamboyantly in a red Maxwell automobile, he won election to the New York Senate.

FRANKLIN D. ROOSEVELT LIBRARY

**Crisis President:** The Nation's gravest depression and greatest war burdened Franklin Delano Roosevelt during his 12 years and 40 days in office—the longest span served by any American Chief Executive. Roosevelt fought for social justice—a “new deal for the American people”—and for a lasting peace based on international cooperation.

“I have seen war. . . . I hate war.” Roosevelt performed brilliantly as Assistant Secretary of the Navy during World War I, but he itched to get close to the fighting. Several times his inspections of U. S. bases took him within range of German artillery. Here he disembarks from a Navy seaplane at Pauillac, France, on August 14, 1918.





WHITE WORLD

Gay and jaunty, cigarette holder cocked upward, the smiling F.D.R. won the confidence of millions of Americans who elected him an unprecedented four times. Here, at Warm Springs, Georgia, Roosevelt drives a Ford for which he himself designed hand controls for clutch, brake, and throttle.

Undaunted by his handicap, Roosevelt refused to become an invalid. He sailed and swam, developing the powerful torso of an athlete. Here, in 1933, he steers *Amberjack II* on a cruise from Marion, Massachusetts, to Campobello Island, New Brunswick, his beloved Canadian summer home.

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There he immediately began to capture headlines as a progressive reformer.

President Wilson appointed him Assistant Secretary of the Navy, a post once held by Theodore Roosevelt, and during World War I Franklin D. Roosevelt became known in Washington as a man who got things done. He was Democratic nominee for Vice President in 1920 and campaigned vigorously for the League of Nations. This won him a national reputation, and the Harding landslide did him no harm.

But in the summer of 1921, when he was 39, disaster struck. While vacationing at Campobello, after swimming in the icy Bay of Fundy, he was stricken with poliomyelitis. With indomitable courage, he fought to regain use of his legs, particularly through swimming.

"The water put me where I am," he remarked, "and the water has to bring me back." He found the water so beneficial at a resort in Georgia that he risked his none-too-ample inheritance to buy the property and set up the Georgia Warm Springs Foundation to treat polio sufferers (page 77). His Little White House there is a state memorial.

Despite the wishes of his mother, Sara Delano Roosevelt, that he give up politics, he continued to be active behind the scenes, and dramatically appeared on crutches before the 1924 Democratic Convention to nominate Al Smith as "the Happy Warrior." In 1928, when Smith received the Democratic nomination, he persuaded Roosevelt to strengthen the ticket in New York by running for governor. Asked whether Roosevelt was physically qualified to serve, Smith retorted, "A Governor does not have to be an acrobat."

While Smith lost the Presidency, Roosevelt won in New York by 25,000 votes. In Albany he proved a strong governor, remarkably the master of a Republican legislature.

#### F. D. R.'s "Hundred Days" Stir the Nation

He was elected President in November, 1932, defeating President Hoover. The depression grew steadily worse, and by the time he was inaugurated, on March 4, 1933, industrial production had sunk to almost half that of 1929; one worker in four was jobless.

To the disheartened Nation Roosevelt brought hope. He promised prompt, vigorous action and asserted in his Inaugural Address, "The only thing we have to fear is fear itself." His first moves were reassuring to businessmen—the proclamation of a national bank holiday; then a cautious reopening of banks that could prove their solvency, along





PUBLIC SERVICE, UNITED STATES DEPARTMENT OF AGRICULTURE

Replanting a charred hillside, Civilian Conservation Corps men help change the face of America. Three million jobless, including thousands of Indians and veterans, served in Roosevelt's peaceful army. They put out fires, protected wildlife, fought insect pests, and restored historic landmarks. Many former CCC youths served the Nation gallantly in World War II.

ENTRICHING BY JOSEPH J. STARBUCK © U.S.S.



Social Security pioneer Miss Ida Fuller of Ludlow, Vermont, a retired legal secretary, received the first benefits under the Roosevelt-instituted program. Her initial check, for \$22.54, was dated January 31, 1940. When payments increased in 1965, she again received the first check and a congratulatory telephone call from President Johnson—both on her 91st birthday. She now receives \$59 a month.



with deep cuts in Government expenditures.

Next came the remarkable legislation of his first hundred days. He proposed, and Congress enacted, a sweeping program to bring recovery to business and agriculture and immediate relief to the unemployed and those in danger of losing farms and homes. Further, with the establishment of the Tennessee Valley Authority, he led the Federal Government into a precedent-setting venture in regional planning and development.

Like Teddy Roosevelt and Wilson, Franklin D. Roosevelt vigorously used all the powers of the Presidency. Like them, he wished the Government to function as an impartial arbiter among businessmen, farmers, workers, and consumers. But he went beyond them be-

years, and used the Government to provide strong aid to each group.

By 1935 the Nation was achieving some measure of recovery, but businessmen and bankers were turning against the "New Deal." They feared Roosevelt's experiments and concessions to labor, and were appalled that he had taken the Nation off the gold standard and allowed budget deficits.

Roosevelt's response to the attacks from the right was to push through Congress a new legislative program: Social Security, heavier income taxes, new controls over banks and public utilities, and an enormous work-relief program for the unemployed.

In 1936 he defeated Governor Alf Landon of Kansas, a Republican liberal, by a top-heavy margin, winning in every state but two.



**Rebirth of a region:** Tennessee Valley Authority, with its vast system of public and private dams, brought new life to a river basin encompassing seven states. Here Fontana Dam spans the Little Tennessee River. A Government-owned corporation, TVA generates power and provides flood control, produces fertilizer, facilitates navigation, and conserves natural resources. TVA power helped develop nuclear energy at Oak Ridge, Tennessee, during World War II. One of the most successful of Roosevelt's "New Deal" agencies, TVA has inspired similar projects throughout the world.

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HARRIS AND EWING



**Fireside chats** brought Roosevelt's warm and vibrant voice into living rooms across the land. In calm, reassuring tones, F.D.R. explained his policies to the people. "His face would smile and light up as though he were actually sitting on the front porch or in the parlor with them," recalled his Secretary of Labor, Frances Perkins, first woman to serve in a Cabinet post.

**Latter-day St. George:** Cartoonist Jerry Doyle of the *Philadelphia Record* pictured Roosevelt fighting the dragons of fear and deflation during early New Deal days. F.D.R. wields the sword of confidence and the shield of the National Recovery Administration, an agency that managed Roosevelt's emergency program for revitalizing industry. But a Supreme Court decision in 1935 brought NRA to an end.



COURTESY JERRY DOYLE

He was inaugurated on January 20, 1937—the first President sworn in on the new date provided by the Twentieth Amendment. In his Inaugural, he declared:

“I see a United States which can demonstrate that, under democratic methods of government, national wealth can be translated into a spreading volume of human comforts hitherto unknown, and the lowest standard of living can be raised far above the level of mere subsistence. But here is the challenge to our democracy. . . . I see one-third of a nation ill-housed, ill-clad, ill-nourished.”

The Supreme Court had been invalidating key New Deal measures as unconstitutional, sometimes by a narrow 5-to-4 decision. Early in his second term, Roosevelt sought legislation to increase the size of the Court. Vehement protests were raised against “packing the Court,” and in their midst the Court began to hand down decisions favorable to the New Deal, often by a one-vote margin. Roosevelt

lost his Supreme Court battle, but a revolution in constitutional law took place. Thereafter the Government could legally engage in extensive regulation of the economy.

In his first Inaugural, Roosevelt had pledged the United States to the policy of the “good neighbor,” and in our relations with American republics to the South he transformed the Monroe Doctrine. From a unilateral American manifesto it became a mutual arrangement for concerted action against aggressors.

In Asia and Europe aggressor nations threatened a second world war, which was precipitated in 1939 by Hitler’s invasion of Poland. Roosevelt tried through neutrality legislation to keep the United States out of war, yet strengthen nations under attack.

After France fell and Britain came under siege in the summer of 1940, Roosevelt began to send Great Britain all possible aid short of war. In September the United States gave the British 50 over-age destroyers, freshly





FRANKLIN D. ROOSEVELT LIBRARY

"He who plants must cultivate," the Roosevelts read the motto on their coat of arms. Roses in a field represent the family name. F.D.R. could claim relationship by blood or marriage to 11 former Presidents—Washington, both Adamses, Madison, Van Buren, both Harrisons, Taylor, Grant, Theodore Roosevelt, and Taft.

**Portrait of a zestful lady:** Wife, mother, writer, humanitarian, Anna Eleanor Roosevelt filled a multitude of roles. "She would rather light a candle than curse the darkness, and her glow has warmed the world," the late Adlai E. Stevenson said of her upon her death in 1962. This magnificent and unusual portrait by Douglas Chandor—the only one for which she formally posed—hangs in the White House.

**Stately Roosevelt home,** a national historic site since 1946, overlooks the Hudson River at Hyde Park, New York. The original Victorian frame house in which the President was born evolved into this stucco and field-stone mansion through additions, many by F.D.R. himself. He and Mrs. Roosevelt lie buried in the rose garden. Presidential papers and mementos crowd the nearby Franklin D. Roosevelt Library. More than 300,000 people a year visit Hyde Park.



**Soothing waters** of Warm Springs buoyed Roosevelt's spirits. The President inspired and led the March of Dimes that financed polio's eventual defeat through the Salk and Sabin vaccines.



ENYER PICTURES



Christening a gallant ship: Mrs. Roosevelt helps launch the carrier *Yorktown* in 1943. With her stands Rear Adm. Elliott Buckmaster, captain of the vessel's namesake and predecessor when the Japanese sank her in the Battle of Midway the previous year.

The storied "Big E," the carrier *Enterprise* (below), goes down the ways at Newport News, Virginia, in 1936. A Navy booster since his days as Assistant Secretary of the Department, Roosevelt pushed a naval expansion program that built up America's defenses and provided work for thousands of unemployed.



repaired and equipped, and received 99-year leases on eight bases in the Western Hemisphere. It was, Winston Churchill later wrote, "a decidedly unneutral act."

In the winter of 1940-41, when British ability to buy arms was nearly exhausted, Roosevelt devised "lend-lease." If a neighbor's house were afire, he explained, certainly one would lend him a fire hose to extinguish the blaze. Roosevelt also brought economic pressure on the Japanese to try to prevent their taking over Southeast Asia.

Aid to Allies precipitated a bitter debate between U. S. isolationists and interventionists. In the campaign of 1940, however, Roosevelt's opponent, Wendell Willkie, also favored aiding the Allies. F. D. R. won, becoming the first President to serve a third term.

In January, 1941, though the Nation was not yet directly involved, Roosevelt proclaimed as war aims the Four Freedoms: of speech and worship and from want and fear. He met Churchill off Argentia, Newfoundland, in August, 1941, and they drew up the Atlantic Charter, which incorporated these aims.

#### Sunday Attack Brings War to U. S.

Before the year was out, the Nation was precipitated into the war. Japanese airplanes broke the Sunday calm of December 7, 1941, striking Pearl Harbor with devastating effect (opposite). Congress declared war the next day. Three days later, Germany and Italy declared war on the United States.

As wartime Commander in Chief, Roosevelt delegated much of his responsibility for home-front war production and concentrated on world-wide strategy and diplomacy. The ultimate decisions were his: the invasion of North Africa in 1942, the appointment of Dwight D. Eisenhower rather than George C. Marshall to lead the Normandy D-Day assault. He told Marshall, "I could not sleep at night with you out of the country." But even as he fought the war, he planned for peace, giving much thought to a United Nations.

In 1944, defeating New York's Governor Thomas E. Dewey, Roosevelt won a fourth term. But, as the Allies poised on the brink of victory over the Nazis, his health deteriorated. On April 12, 1945, while posing for a portrait in the Little White House at Warm Springs, Georgia, he collapsed and died of a cerebral hemorrhage. The Nation was plunged into mourning. As a sailor in Times Square lamented, "You know it's tough when one of your buddies has to go, and President Roosevelt was our buddy."



President and future President share a jeep in Sicily in December, 1943. F. D. R. had just named Eisenhower to command the Allied invasion of France. Roosevelt was the first President to travel outside the U. S. in wartime.

"Unprovoked and dastardly," Roosevelt termed Japan's attack on Pearl Harbor, December 7, 1941—"a date which will live in infamy." Here *West Virginia* (foreground) and *Tennessee* blaze in the chaos of "Battleship Row."

UNITED STATES ARMY







THIRTY-THIRD PRESIDENT 1945-1953

**H**ARRY S. TRUMAN, becoming President as World War II drew to a close, made some of the most crucial decisions in the Nation's history. He ordered the dropping of atomic bombs to hasten Japan's surrender. He broke the Soviet Union's post-war blockade of West Berlin with a titanic airlift. And he stemmed the Communist invasion of South Korea.

During his administration, the Nation grappled with problems of inflation and civil rights at home. Abroad, it initiated rehabilitation of war-torn areas, aid to underdeveloped countries, and new systems of collective security.

Truman was born in Lamar, Missouri, in 1884, and his birthplace there, at Truman Avenue and 11th Street, is now a state historic site. The son of a livestock dealer, he grew up in Independence, Missouri, and became a bank clerk. Then, needed on the family farm at Grandview, he spent 12 years, until he was 33, as a prosperous Missouri farmer, proud of his skill in planting a straight row of corn. He was the first President since Grant to have engaged in farming as an adult.

He went to France during World War I, and fought on the western

front in the field artillery. Returning home as a captain, he married his childhood sweetheart Elizabeth Virginia ("Bess") Wallace, and with an Army friend opened a haberdashery shop in Kansas City, Missouri. The shop failed, but Truman refused to go into bankruptcy and paid off the debts.

#### County Administrator Becomes a Senator

With the support of fellow veterans and the political machine of Tom Pendergast, boss of Kansas City, Truman was elected a "judge" (actually, an administrator) of Jackson County in 1922. Except for one defeat at the polls, when the Ku Klux Klan opposed him, he remained in office until 1934, building a notable reputation for honesty and efficiency.

He was elected Senator from Missouri in 1934, as a Democrat pledged to support Roosevelt, and was re-elected in 1940. During World War II he became famous as head

1944 HEBELUCK © CARTOON, THE WASHINGTON POST



"He met the war, the peace and old insistent friends with the same magnified modesty but also with clear self-possession," biographer Jonathan Daniels wrote of Harry Truman. Suddenly thrust into the Presidency, the man from Missouri held unshakable faith in his country and his countrymen.

Rocky road traveled in his first year might have destroyed a less valiant and resolute Chief Executive than Truman. In a volume of his memoirs, aptly entitled *Year of Decisions*, he recounts his meeting with Eleanor Roosevelt after her husband's death. "Is there anything I can do for you?" Truman asked. "Is there anything we can do for you?" she responded. "For you are the one in trouble now."



UNITED PRESS INTERNATIONAL

"We fired our first barrage on the night of September 6 [1918]," Capt. Harry Truman remembers. He led Battery D of the 129th Field Artillery during the Meuse-Argonne offensive of World War I. "We were occupying an old French position which probably was fairly well known to the Germans, and as soon as we had finished the barrage they returned the compliment. My battery became panic-stricken, and all except five or six scattered like partridges. Finally I got them back together without losing any men, although we had six horses killed."

Twenty-seven years later the veteran "red-leg," as an artilleryman is called, became Commander in Chief of a Nation at war, and his firsthand knowledge of warfare proved valuable. His Chief of Staff, Adm. William D. Leahy, said: "... he was amazingly well informed on military history from the campaigns of the ancients, such as Hannibal and Caesar, down to the great global conflict. ..."

of the Senate war investigating committee, checking into waste and corruption in defense spending. Its work, he has estimated, saved the Nation as much as 15 billion dollars.

In 1944, when the backers of Henry A. Wallace, James F. Byrnes, William O. Douglas, and Truman waged a vigorous contest for the Vice Presidential nomination, President Roosevelt settled it by choosing Truman. During his few weeks as Vice President, after Roosevelt's fourth-term victory, Truman scarcely saw the President and received no briefing from him on the development of the atomic bomb or the increasing difficulties with the Soviet Union.

#### Stunned New President Takes Command

Suddenly these and a host of other wartime problems became Truman's to solve when, on April 12, 1945, Mrs. Roosevelt told him that her husband was dead. Truman was President of the United States. "I felt like the moon, the stars, and all the planets had fallen on me," he told reporters the next day.

Quickly he was briefed on the acute problems of both war strategy and peacemaking. V-E Day, end of the war in Europe, came less than a month later, but at the Potsdam Conference in the summer of 1945, he discovered firsthand how hard it was to make agreements with Stalin.

At Potsdam the Allies issued an ultimatum to the Japanese to surrender. Urged by his advisers in Washington, Truman decided that if the Japanese did not surrender, the United States would drop the newly developed atomic weapons on Japan. Two bombs were dropped. Japanese surrender quickly followed, and World War II ended. The new machinery hopefully fabricated to preserve the peace, the United Nations, already existed. President Truman had witnessed the signing of the charter at San Francisco in June (page 89).

Thus far, the new Chief Executive had followed almost directly the lines laid down by his predecessor. But by the fall of 1945 he was developing his own policies, and presented to Congress a 21-point program, later named the "Fair Deal." It covered expansion of Social Security, full-employment measures, a permanent Fair Employment Practices Act to protect minority rights, public housing and slum clearance, and Government aid to scientific research. In additional messages he recommended Federal aid to education and health insurance.

The Fair Deal, Truman himself has written, "symbolizes for me my assumption of



UNITED PRESS INTERNATIONAL

"It is a mighty leap from the vice presidency to the presidency when one is forced to make it without warning," Truman declared. In the White House on April 12, 1945, Chief Justice Harlan Fiske Stone swears him in as the 33d President. Witnesses are (from left): Secretary of Labor Frances Perkins, Secretary of War Henry L. Stimson, Secretary of Commerce Henry A. Wallace, War Production Board Chairman J. A. Krug, Secretary of the Navy James Forrestal, Secretary of Agriculture Claude R. Wickard, Deputy Chairman of War Manpower Commission Frank McNamee (behind Wickard), Attorney General Francis Biddle, Secretary of the Treasury Henry Morgenthau, Jr., Secretary of State Edward R. Stettinius (almost hidden by Truman), Mrs. Truman, Secretary of the Interior Harold L. Ickes, Margaret Truman, Speaker of the House Sam Rayburn, War Mobilization Director Frederick M. Vinson, and House Minority Leader Joseph W. Martin.

the office of President in my own right."

Congress enacted only a few of the measures the President recommended. A limited full-employment program provided for a Council of Economic Advisers; the Atomic Energy Commission was established; and a considerable reorganization of Government agencies included unification of Army, Navy, and Air Force under a Secretary of Defense.

The Truman Administration's efforts to check inflation had hard sledding, since business opposed price controls and labor chafed under wage ceilings. By the fall of 1946 few controls remained, and Truman removed most of those after Republicans won decisive victories in the Congressional elections.

The new 80th Congress also made its weight felt in labor policy, overriding a Presi-

dential veto of the Taft-Hartley Labor-Management Relations Act, which placed restrictions on union activities. This law prohibited the "closed shop," in which a worker cannot be hired unless he belongs to a union, and allowed states to go still further by enacting "right-to-work" laws.

#### President Truman Criticizes a Critic

Truman delighted and sometimes dismayed the public with his peppery forthrightness. It helped him reach his great decisions and was invaluable in interpreting them to the Nation. But he created a national sensation, which he still relishes in retrospect, when he sent a blistering note to a Washington music critic who had written a harsh review of his daughter Margaret's singing.



His simple directness was a vital asset during the 1948 campaign. For 35 days he toured the country by train, traveling 31,700 miles, and making as many as 16 whistle-stop speeches a day. He had told Senator Alben Barkley, the nominee for Vice President. "I'm going to fight hard, and I'm going to give 'em hell!" In his plain, extemporaneous style, he did. And he won the crowds with his open affection for his wife and daughter. "How would you like to meet my family?" he would ask after his talk. Then he would introduce "the boss"—Mrs. Truman—and "my baby," who was also "the boss's boss," Margaret.

According to the polls, the President seemed to have little chance in the 1948 election. But directing his attack more against the Republican 80th Congress than against his opponent, New York Governor Thomas E. Dewey, Truman emerged the winner. He gathered the votes of many workingmen who resented the Taft-Hartley Act, of farmers disappointed by lawmakers' failure to provide crop storage

facilities, and of others who felt they had suffered from Congressional actions.

In foreign relations, President Truman provided his most effective leadership. When the Soviet Union pressured Turkey and, through guerrillas, threatened to take over Greece, the President, in March, 1947, asked Congress to aid the two countries.

#### Truman Offers Help to World's Poor

In his message he enunciated the doctrine that took his name: "... it must be the policy of the United States to support free peoples who are resisting attempted subjugation by armed minorities or by outside pressures."

Military aid was not enough; economic productivity had to be restored to counter the Communist threat. In June, 1947, Secretary of State George C. Marshall proposed a program of combined aid and self-help that came to be known as the Marshall Plan. Within three years, through the expenditure of 12 billion dollars, the United States helped lift



In a historic meeting, Allied leaders at Potsdam, Germany, draft an ultimatum to Japan in July, 1945, and debate postwar problems. President Truman sits at upper right, British Prime Minister Winston Churchill at lower center. Marshal Josef Stalin (leaning back) wanted to "act in concert about the surrender of Japan," although Russia had not yet declared war on the Asian nation.

**Act of surrender:** Aboard the U.S.S. *Missouri* in Tokyo Bay, Gen. Douglas MacArthur receives the Japanese surrender on September 2, 1945. Maj. Gen. Yohjiro Umezono signs for Japan. In a line beside Fleet Admiral Chester W. Nimitz (left) stand senior military and naval officers of the Allied powers. "My choice of the *Missouri* was an obvious one," Truman recalls. "She was one of the newest and most powerful battleships in our fleet; she had been named after my own state; my daughter Margaret had christened her...."

UNITED STATES NAVY (BELOW) AND UNITED STATES ARMY



Western Europe's economy above prewar levels and diminish the strength of its Communist parties.

In his Inaugural Address, on January 20, 1949, President Truman proposed that the United States extend its aid to the "more than half the people of the world . . . living in conditions approaching misery." He listed a number of ways to help them, including the now renowned "Point Four" of his address: to provide them with technical assistance and investment capital so that they could expand their economies.

Out of his proposal came the Point Four program, which grew in time into the Nation's multibillion-dollar outlays for foreign aid. To Truman, elimination of poverty seemed one of the most promising as well as humane ways to check the growth of Communism.

Direct military moves by the Communists also had to be met. As the Western powers laid plans for self-government in West Germany, the Soviet Union imposed a blockade

of Berlin in June, 1948.\* Truman countered with his famous airlift (following pages) and a new military grand alliance for the protection of Western nations, the North Atlantic Treaty Organization, established in 1949.

#### Russia Balks at Inspection Plan

A new and more dangerous threat from the Soviet Union appeared in the atomic realm. Since 1946 Truman had been recommending to the United Nations the adoption of a thoroughgoing system of international supervision of atomic energy, including on-the-spot inspection. The United States offered to place its stockpile of atomic bombs under international control when the system was put into effect. The Soviet Union steadfastly blocked the American proposals. Then, in the fall of 1949, President Truman announced: "We have evidence that within recent weeks an atomic explosion occurred in the U.S.S.R."

\*The GEOGRAPHIC published "Airlift to Berlin" in its May, 1949, issue.



PHOTOGRAPH BY NATIONAL GEOGRAPHIC PHOTOGRAPHER EMORY EASTMAN © N.G.S.





WALTER SANDERS, LIFE ARTIST, AND WILF WOLFF

**"Operation Vittles,"** President Truman's dramatic answer to a Russian blockade of war-shattered Berlin in 1948, delivered as many as 7,000 tons of vital supplies a day. For eight months during the Berlin Airlift, supply planes made a landing on the average of once every three minutes, carrying everything from medicines to coal. Standing amid ruins, these Berliners watch a USAF C-47 roar in at Tempelhof Airport.

With the Truman Doctrine, the American people came face to face with the responsibility of aiding hungry, devastated nations. The Marshall Plan, named for Truman's Secretary of State, Gen. George C. Marshall (right), reached the humblest citizens, as evidenced by this painting on a Sicilian donkey cart (opposite) displayed in the Smithsonian Institution in Washington, D.C. Panels depict delivery of tractors, the restoration of farms, and rebuilding of cities.





**First White House television tour:** Truman escorts commentator Walter Cronkite through the Diplomatic Reception Room in 1952. Portrait shows Angelica Van Buren, daughter-in-law of the eighth President.

A committee appointed by Truman in 1948 inspected the White House and found it "standing up purely from habit." Renovation took three and a half years and cost \$5,800,000.

**British lion, Winston Churchill, and Truman** motor through Jefferson City, Missouri, in March, 1946, en route to Westminster College at Fulton, where Churchill alerted the free world to Communist dangers: "... an iron curtain has descended across the [European] Continent."

ALL PHOTOGRAPHS UNITED PRESS INTERNATIONAL



"That's one for the books," a joyous Harry Truman said in St. Louis, Missouri, as he held aloft an early and erroneous headline in the *Chicago Tribune* of November 3, 1948. In a stunning upset, Democrat Truman defeated Republican Thomas E. Dewey by two million votes.



**Active in retirement,** former President and Mrs. Truman ride in a Venetian gondola during their 1956 European tour.

Harry Truman met Bess Wallace in Sunday school. "She had golden curls and... the most beautiful blue eyes," he wrote. They attended school together from fifth grade through high school, and married in 1919.

Mrs. Truman enjoyed being a Senator's wife, Truman later wrote, "and had fallen in love with Washington." But as First Lady she was "not especially interested... in the formalities and pomp or the artificiality which... surround the family of a President."



Truman's response to the Soviet test was to order rapid development of "super" atomic weapons, and on November 1, 1952, in Eniwetok Atoll, the first hydrogen explosion was set off, leaving a huge crater where a coral island had been (pages 66-7).

During these same years Communism was spreading rapidly in Asia, and by the end of 1949 had overrun the Chinese mainland. Suddenly, in June, 1950, the Communist government of North Korea launched a full-scale attack on South Korea. President Truman, conferring promptly with his diplomatic and military advisers, ordered American units into battle as the United Nations Security Council—with Russia boycotting its sessions—called all U.N. members to defend South Korea. The U.N. organized a force of other nations to fight beside the Americans and South Koreans.

#### U.N. Troops Hold Line in Korea

A long, discouraging struggle followed, as U.N. troops, predominantly American, were at first forced back, then drove almost to the Chinese border, only to be pushed back again, this time by hordes of Chinese. After counterattacks, the U.N. held a line above the old boundary of South Korea.

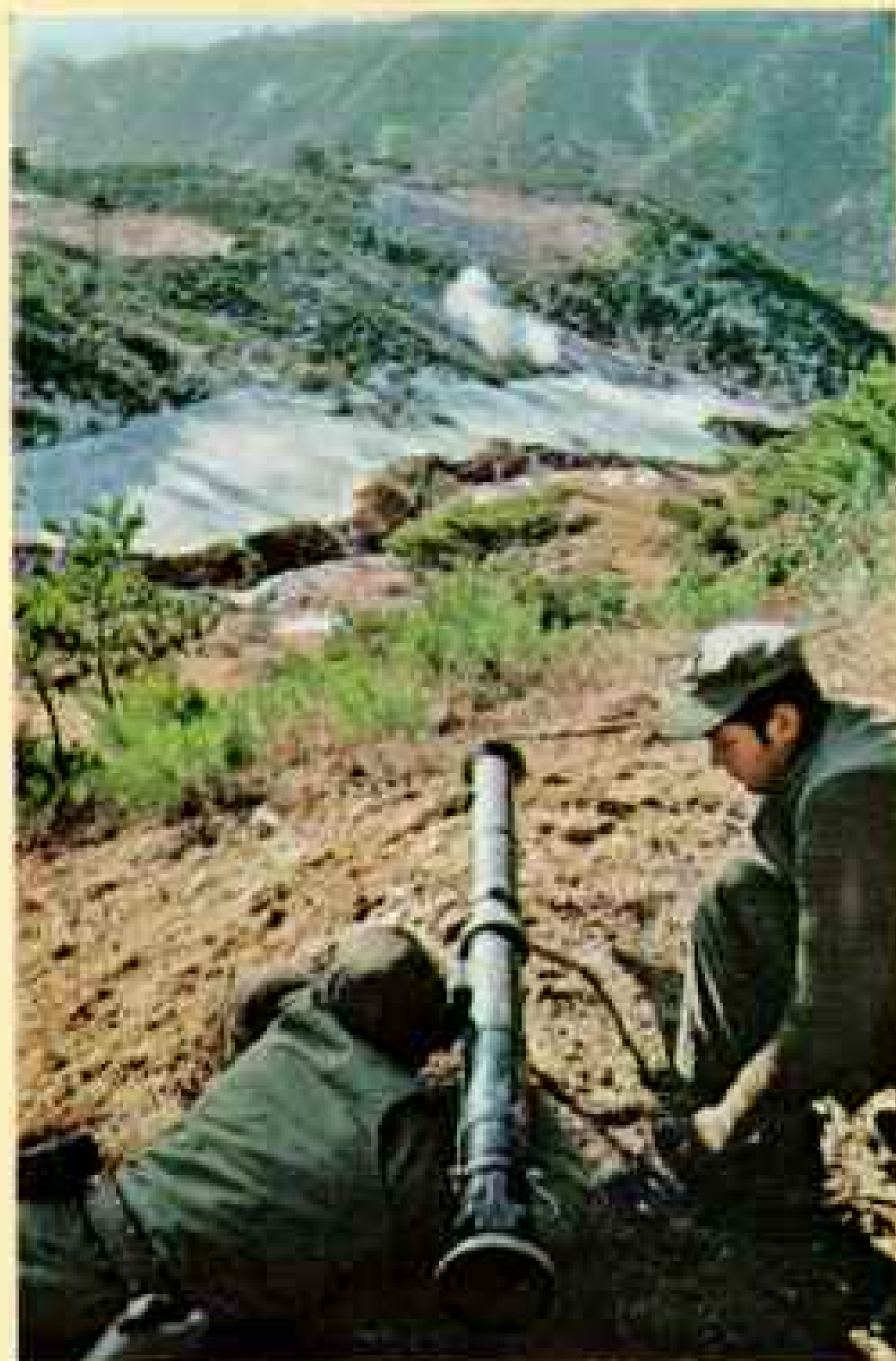
Truman insisted on a war of containment; he would not risk its enlargement into a major conflict with China, and perhaps Russia. When Gen. Douglas MacArthur, commander of U.N. forces in Korea, issued statements contrary to this policy, the President dismissed the "old soldier."

In 1953 Truman retired to Independence, Missouri, and continued to make lively comments on national and world affairs. He has published three volumes of memoirs and seen the creation of the Harry S. Truman Library and Museum. But his real monuments are the Fair Deal program and the collective security systems which stemmed the tide of Communism in Europe and Korea.

UNITED NATIONS



**Birth of the United Nations:** Secretary of State Stettinius signs the charter in San Francisco on June 26, 1945. Truman, witnessing the event, said of the U.N., "If we fail to use it, we shall betray all those who have died in order that we might meet here in freedom and safety to create it." Five years later, Communist North Korea invaded South Korea. Truman announced U. S. intervention; the U.N. called for a defense force. And guns boomed in Korea for three long years (below).



ARMOURY BY ROBERT BISHOP © P.A.A.



Dwight D. Eisenhower

THIRTY-FOURTH PRESIDENT 1953-1961

**D**WIGHT D. EISENHOWER brought to the Presidency not only his prestige as the victorious commanding general in Europe in World War II, but also a warmth of popular affection and respect.

He sought during his two terms to maintain peace and prosperity for the American people. He obtained an armistice in Korea and worked incessantly to ease the cold war between Communist countries and the United States and its allies. At home he pursued the moderate policies of "modern Republicanism," and as he left office he could say, "America is today the strongest, the most influential, and most productive nation in the world."

Born in Denison, Texas, in 1890, Eisenhower grew up in Abilene, Kansas, the third of seven sons of a creamery mechanic. Today the Eisenhower Presidential Library and Eisenhower Museum stand near his boyhood Abilene home.

In high school young "Ike" (a nickname he acquired as a child) excelled in football and baseball. At West Point he was a lithe, dynamic halfback until a knee injury ended his

playing days. Stationed in Texas as a second lieutenant, he met Mamie Geneva Doud, whom he married in 1916 (page 99).

During World War I he failed to obtain assignment in France but rose to the temporary rank of lieutenant colonel. Through long years in the peacetime army he especially excelled in staff assignments, serving under Generals John J. Pershing, Douglas MacArthur, and Walter Krueger.

#### Gift for Organizing Marked Ike's Career

Soon after Pearl Harbor, Gen. George C. Marshall, in the light of Eisenhower's knowledge of the Philippines, brought him to Washington to plan moves in the Pacific. Eisenhower showed such great organizational ability and dealt so tactfully with other branches of the armed services that Marshall assigned him to command American forces in the European Theater of Operations.

Arriving in England in June, 1942, he was shortly named commander of the Allied forces for the November invasion of North Africa. On D-Day, June 6, 1944, he was Supreme

After leading Allied armies to victory in World War II, national hero Dwight David Eisenhower was sought as Presidential standard-bearer by both Republicans and Democrats. But it was the Republicans who convinced him that he should seek public office in 1952. With shouts of "We like Ike" echoing across the land, Eisenhower swept his party to its first national victory in 24 years. Peace, progress, and prosperity were his keynote for eight years.

#### "Full victory—nothing else."

The Supreme Commander of the Allied Expeditionary Force exhorts men of the 101st Airborne Division near Newbury, England, on the eve of the Normandy invasion.





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WIDE WORLD (ABOVE) AND CARL MYRANE, LIFE



Ike pledged to go to Korea if elected in 1952. Here the President-elect visits the front in December of that year; six months later an armistice was signed.

**At the summit:** The Big Four meet in Geneva in July of 1955. Eisenhower (upper center), with John Foster Dulles on his right, faces Britain's Prime Minister Sir Anthony Eden and Foreign Secretary Harold Macmillan. Nikita Khrushchey (far left) and Nikolai Bulganin of the Soviet Union sit opposite Premier Edgar Faure of France. The Russians rejected Ike's "Open Skies" proposal—aerial inspection and exchange of blueprints of military installations—but this first postwar summit raised hopes for relaxation of tensions.

**Tireless diplomat John Foster Dulles,** Eisenhower's first Secretary of State, traveled the world in a quest for peace. Here he consults his President at a villa near Geneva.



UNITED PRESS INTERNATIONAL

Commander of the troops invading France. He directed the operations of millions of Allied troops with a skillful mixture of firmness and diplomacy that won him loyalty and acclaim. His rapid promotion reached a climax in late 1944 with the fifth star of a General of the Army, a rank Congress made permanent in 1946.

At war's end, Eisenhower confided to friends that he had tasted enough of glory and would like to retire and become president of a small college, perhaps doing some farming on the side. Instead he became President of Columbia University in New York City. Then he took leave from that post to assume supreme command over the new NATO forces being assembled in 1951 for the common defense of the United States and its European allies.

#### Political Leaders Offer Dazzling Prospect

To his headquarters near Paris came emissaries from the Republican Party to urge him to run for President. In 1948 he had refused similar overtures from public figures of both parties, but in 1952 he consented to run to ensure continued American leadership in international affairs.

The electorate that year was troubled by inflation, by charges of a "mess in Washington," and especially by the

drawn-out Korean war. The voters turned to General Eisenhower as a leader they thought could bring them security.

"I like Ike" was an irresistible slogan; he won a sweeping victory over Illinois Governor Adlai E. Stevenson.

"In the final choice," President Eisenhower declared in his first Inaugural Address, "a soldier's pack is not so heavy a burden as a prisoner's chains." Negotiating from military strength, he tried to reduce the tensions of the cold war. In the summer of 1953 the signing of a final armistice brought an armed peace along the border of South Korea.

The death of Stalin in the spring of 1953 also brought some shifts in relations with the Soviet Union. The new Russian leaders consented to a peace treaty neutralizing Austria. Meanwhile both the Soviet Union and the United States were developing hydrogen bombs—the Americans testing a device so powerful that it could have destroyed all New York City.

#### Nation Rallies to Stricken Chief

With the threat of such destructive force hanging over the world, President Eisenhower met the leaders of the British, French, and Soviet Governments at Geneva in July, 1955 (pages 92-3). At one of the sessions the President, putting down his glasses, unexpectedly proposed to the Soviets that they and the United States immediately exchange complete blueprints of their military establishments. He further suggested that each "provide within our countries facilities for aerial photography to the other country."

He explained, "I have been searching my heart and mind for something that I could say here that could convince everyone of the great sincerity of the United States in approaching this problem of disarmament." The Soviet conferees greeted the proposal with silence, but were so cordial throughout the meetings that a relaxation of tensions took place.

Suddenly, in September, 1955, President Eisenhower suffered a moderately severe heart attack while vacationing in Denver. As he lay in the hospital slowly recovering, tens of thousands of letters and telegrams came in. "It really does something for you," the President told Mrs. Eisenhower, "to know that people all over the world are praying for you."

As a birthday joke, White House correspondents gave him gaudy red pajamas with five gold stars embroidered on each collar tab;

when he began to improve, he good-humoredly wore them. He received Cabinet officers and more and more resumed his duties as President. After nearly seven weeks he left the hospital and flew back to Washington.

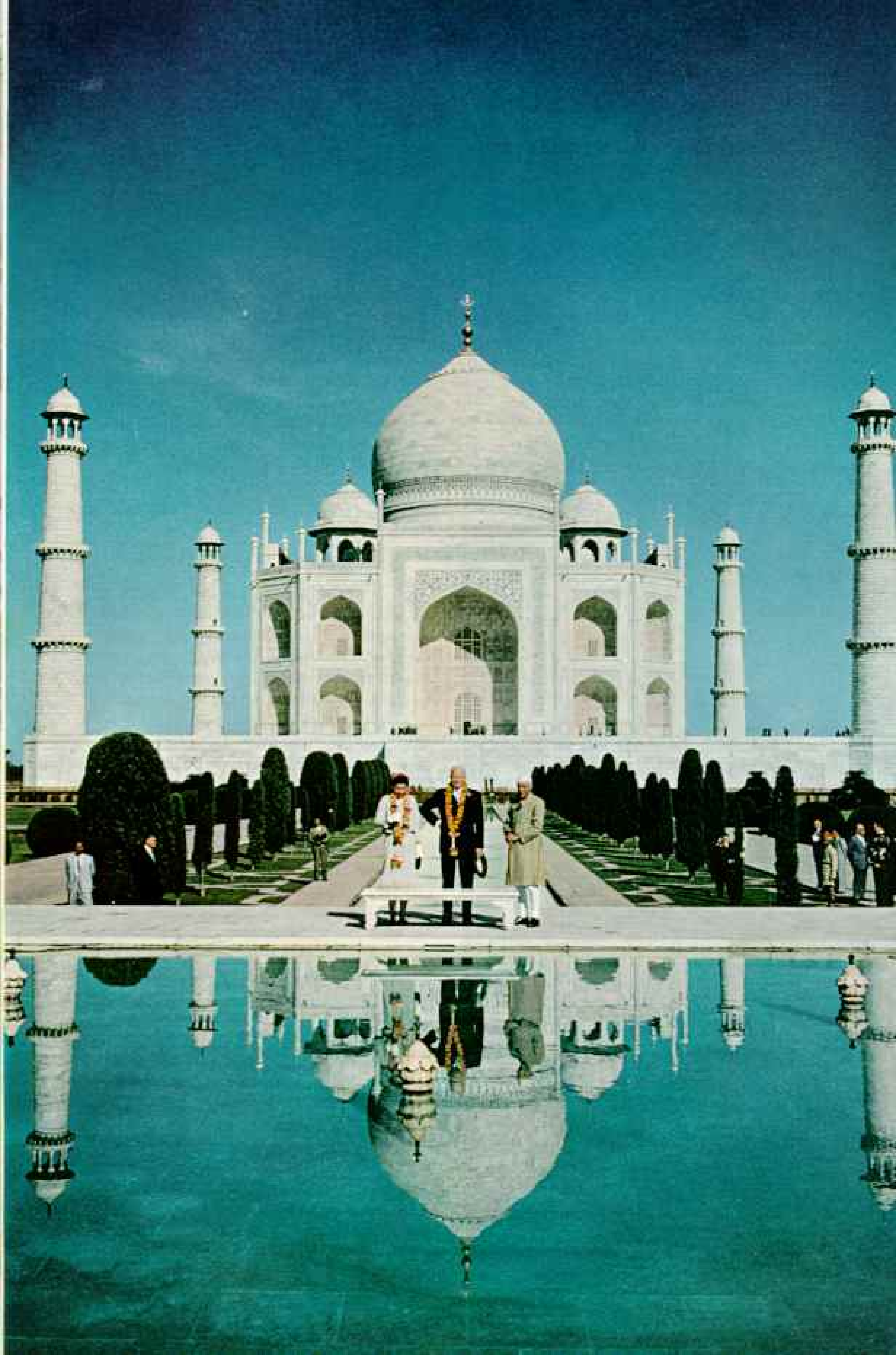
"Misfortune, and particularly the misfortune of illness," he said in a brief speech, "brings to all of us an understanding of how good people are." A panel of doctors in February, 1956, reported that the President's

OPPOSITE (BELOW) BY ROYCE WILLY, WASHDC; EISENHOWER BY GILBERT M. GROSVENOR © N.A.S.



Eisenhower's distinctive wave greets citizens of Anchorage, Alaska. "Ike is nifty, started out with 48; ended up with 50," rhymed a slogan in recognition of Alaska's becoming a state on January 3, 1959, followed by Hawaii eight months later.

Record Presidential traveler Eisenhower, his daughter-in-law Mrs. John Eisenhower, and the Prime Minister of India, the late Jawaharlal Nehru, pause beside the reflecting pool of the Taj Mahal. In the cause of world peace, Eisenhower visited 27 lands. His longest tour was reported in "When the President Goes Abroad," by Gilbert M. Grosvenor, *GEOGRAPHIC*, May, 1960.



injured heart muscle had healed. The way was clear for him to run for a second term, and in November, 1956, he again defeated Adlai Stevenson by a wide margin.

In domestic policy, modern Republicanism, as the President interpreted it, came to mean a middle-of-the-road course. He continued most New Deal and Fair Deal programs, but in a conservative way with emphasis on balancing the budget.

In 1954 Eisenhower obtained from Congress a tax-reform bill, almost a thousand pages long, aimed at stimulating business growth. In public-power development the President emphasized decentralization; he favored cooperation between the Federal

Government and local government or private enterprise over wholly Federal projects. For the Hell's Canyon project on the Snake River, he therefore preferred the construction of three power dams by a private utility rather than one large multipurpose dam by the Federal Government.

Similarly, he proposed limited programs of public health insurance and school construction, with the Federal Government helping underwrite local enterprise. He sometimes called this approach "dynamic conservatism."

Among Eisenhower's major achievements as President was his speeding of a large-scale highway program to build 41,000 miles of new interstate roads. About half this system—with the Federal Government paying 90 percent of the cost out of gasoline and other highway-user taxes—is now in operation, offering motorists multilane, limited-access roads with never a stop light.

#### History's Biggest Building Project

As Eisenhower has proudly described it, this is "not only the most gigantic federal undertaking in road-building" in U. S. history but also "the biggest peacetime construction project of any description ever undertaken by the United States or any other country."

During the Eisenhower Administration, Social Security and unemployment insurance were extended to millions more people. The 1959 labor-management act required union and business officials to file reports of transactions that affected the welfare of union members and the general public. The St. Lawrence Seaway was dedicated. And Alaska and Hawaii attained statehood.

As desegregation of schools began, in keeping with the 1954 Supreme Court decision, President Eisenhower sent troops into Little Rock, Arkansas, to assure compliance with the orders of a Federal court.

Eisenhower also ordered the complete desegregation of the Nation's Armed Forces. In 1957 he signed the first civil rights legislation to pass Congress in 82 years.

"There must be no second class citizens in this country," he wrote.

In his last State of the Union Message, while granting that problems of unemployment and recessions remained unsolved, Eisenhower noted the unprecedented economic progress during his two terms. With almost no new inflation, the productivity of the Nation had risen nearly 25 percent, the

EISENHOWER BY ERNST KRISTOF © N.G.S.







LANDMARKS FEATURE SERVICE

"Magnificent symbol" of Canadian-United States ties—thus Ike hailed the St. Lawrence Seaway as he and Queen Elizabeth II dedicated the joint project at Montreal in 1959. Biggest ditchdigging job since the Panama Canal, the system of locks, channels, and dams opened the Great Lakes to ocean shipping. Starting with Woodrow Wilson, every President had favored such a project.

Stairsteps to North America's middle, Snell Lock and six others lift vessels 224 feet in the 189 miles of seaway. Snell helps ships pass Moses-Saunders Powerdam, which harnesses Great Lakes drainage and generates electricity for the neighboring nations.

Concrete ribbons lace the states with high-speed expressways and fulfill a cherished dream. The Interstate Highway System, a joint state-Federal venture enacted in 1944, grew slowly at first. Eisenhower urged Congress to increase Federal participation to 90 percent, and it did so in 1956. Today motorists can travel half of the planned 41,000-mile network.



real wages of factory workers 20 percent, and average family income 15 percent.

Above all, President Eisenhower concentrated on keeping the peace in a world threatened with thermonuclear destruction. His Atoms for Peace program, announced in 1953, offered the United Nations loans of American uranium for peaceful use by "have-not" countries. Throughout his eight years in office, he tried to reach an accord with the Soviet Union to end atomic tests and limit nuclear armaments.

#### Rift Widens Despite Khrushchev Visit

In the fall of 1957 the hopes raised at the Geneva summit conference vanished. The Soviet Union, on October 4, launched the first earth satellite, giving rise to fears that it might now deliver thermonuclear warheads anywhere in the world.

The President responded to "sputnik diplomacy" by increasing American armaments and foreign aid, speeding an American satellite program, and then renewing his efforts to negotiate with the Soviet Union.

He even invited Premier Khrushchev to visit the United States, but, though the Premier came, new crises drove the two nations further apart: the shooting down of an American U-2 reconnaissance plane over the Soviet

Union, and the breaking of diplomatic relations with Communist Cuba. The Soviets still refused to agree to a secure atomic test-ban treaty, and the best that could be achieved was a temporary abstinence from testing.

To maintain security as well as to assist suffering peoples, Eisenhower year after year requested large appropriations for the foreign-aid program. He himself in his final months of office visited many nations around the globe (page 95). To cheering multitudes wherever he went, he repeatedly proclaimed the American desire for peace.

Before he left office in January, 1961, for his Gettysburg farm, he urged the necessity of maintaining military strength, but cautioned that vast, long-continued military expenditures could breed potential dangers to our way of life.

The retiring President pointed out that the "conjunction of an immense military establishment and a large arms industry is new in the American experience . . . We must never let the weight of this combination endanger our liberties or democratic processes. We should take nothing for granted."

He concluded with a prayer that "in the goodness of time, all peoples will come to live together in a peace guaranteed by the binding force of mutual respect and love."



Distinguished world traveler, Britain's Prince Philip receives the National Geographic Society's Special Gold Medal from President Eisenhower in 1958. Earlier, Society President Melville Bell Grosvenor, standing behind the Chief Executive, read the inscription: "To His Royal Highness, the Prince Philip, Duke of Edinburgh, whose questing spirit has taken him to the far corners of the globe and brought to millions a better understanding of our planet and its peoples." Dr. Gilbert H. Grosvenor, Dr. Hugh L. Dryden, and the late Dr. John Oliver La Gorce of the Society's Board of Trustees watch the presentation at the White House.

Four years before, Eisenhower had become the eighth President to present medals on behalf of the Society when he awarded the Hubbard Medal to Sir Edmund Hillary, Sir John Hunt, and Tenzing Norkey of the British Mount Everest Expedition for the first conquest of earth's highest mountain.

"I've found my career—and its name is Ike," said Mamie Doud Eisenhower early in her married life. Her experience as the wife of an Army officer and university president made easy the transition to First Lady. Mrs. Eisenhower's great interest in the historical traditions of the White House inspired donors to complete the Presidential china collection. Other contributions include Adam mirrors, a settee and three chairs for the Lincoln Room, and Federal-style furnishings for the Diplomatic Reception Room.

Her love for children prompted the First Lady to reinstate the custom of Easter-egg rolling on the White House lawn, a ceremony discontinued for 17 years during and after World War II.

**Proud grandfather and his son Maj. John Eisenhower watch young David take two of his sisters on a pony ride at the President's Gettysburg farm. The elder Eisenhowers purchased the rolling Pennsylvania acreage in 1950, and the remodeled farmhouse became the first home of their own since their marriage in 1916.**



PAINTING BY THOMAS S. STEPHENS, WHITE HOUSE COLLECTION



**Fast friends, the President and Winston Churchill tour Ike's farm in a golf cart. Sir Winston visited the Eisenhowers in both Washington and Gettysburg during his trip to the United States in 1959. The two leaders first met in wartime Washington in 1942. Mutual trials and responsibilities strengthened their ties.**



UNITED PRESS INTERNATIONAL  
LEFTS AND WIDE WORLD



*John F. Kennedy*  
THIRTY-FIFTH PRESIDENT 1961-1963

**J**OHAN F. KENNEDY, the first President born in the 20th century, called on the American people in his Inaugural Address to enlist in "a struggle against the common enemies of man: tyranny, poverty, disease and war itself." The struggle would not be finished in a hundred days or a thousand, he predicted. "But let us begin."

Kennedy did begin, urging the "New Frontier" program upon Congress and resisting the Communist threats even into the shadow of nuclear war. To the leadership of the Nation he brought realism, efficiency, verve—and the promise of increasing greatness.

Abruptly, in November, 1963, when he was scarcely past his first thousand days in office, he died by an assassin's bullet. Kennedy was the youngest man elected President; he was the youngest to die. Yet in his brief tenure he had firmly embarked the Nation on a forward course; his successor could pay no higher tribute than to proclaim, "Let us continue."

The second of nine children, Kennedy was

born in Brookline, Massachusetts, a suburb of Boston, on May 29, 1917. He was proud that his forebears came from Ireland, rising swiftly in America to wealth and political prominence. His maternal grandfather was Mayor of Boston; his father, Ambassador to Great Britain.

#### Young PT Skipper Saves His Crew

After graduation from Harvard, Kennedy entered the Navy in World War II. As a lieutenant (j.g.), he commanded a PT boat in the Solomon Islands (page 102). Shortly after midnight on August 2, 1943, a Japanese destroyer sliced through it. Kennedy's back, already weak from a football injury, was badly hurt, but after 15 hours in the water he led the survivors to a small island. He spent the rest of his naval service in hospitals and as an instructor.

Early in 1946 Kennedy fought his first political campaign, in a Democratic primary for a Congressional district in the Boston area.

Dashing vigor and handsome features of John F. Kennedy, youngest elected President, stirred the Nation and the world. With his strong sense of purpose, his tough yet supple mind, he projected an image of confidence that promised progress. But an assassin's bullet ended his life on November 22, 1963. This photograph was among Mrs. Kennedy's favorites; an official portrait had not been painted before his death.

Elegant and eloquent, Jacqueline Kennedy enriched the White House with art treasures and conducted a tour of the Executive Mansion on nationwide television. Traveling abroad with her husband, whom she called an "idealist without illusions," she charmed dignitaries with her command of languages. Here, in 1961, she holds Caroline, age 4, and John, Jr., 1.

PHOTOGRAPH BY ELLIOTT ERWIT, WASHINGTON, COURTESY SATURDAY EVENING POST, OFFICIAL WHITE HOUSE





Awaiting action in the Pacific during World War II, Lieutenant Kennedy relaxes in his torpedo boat, PT 109. When a Japanese destroyer cut the craft in half, Kennedy saved his crew and won the Navy and Marine Corps Medal. Asked how he became a hero, he replied: "It was easy—they sank my boat."



The 28-year-old candidate stumped energetically among the working people and received nearly twice as many votes as his nearest opponent. He won easily in November.

During his six years in the House, Congressman Kennedy labored for the betterment of his constituents, voting for slum clearance and low-cost housing bills, and opposing the Taft-Hartley bill to restrict labor unions. At a Washington dinner party, he met beautiful Jacqueline Lee Bouvier, whom he married on September 12, 1953.

By this time, Kennedy had advanced from House to Senate, defeating Republican Senator Henry Cabot Lodge in the 1952 elections. As Senator, Kennedy made good his campaign slogan to "do *more* for Massachusetts." But increasingly he took a national view; he voted for reciprocal trade legislation and the St. Lawrence Seaway, even though they were not popular in Massachusetts.

#### From Pulitzer Prize to Presidency

Kennedy's old back injuries had become increasingly painful, and in October, 1954, he underwent a critical operation. While convalescing, he wrote *Profiles in Courage*, sketches of eight Senators who had risked their careers for their convictions. The book won a Pulitzer Prize for biography.

In 1956 Senator Kennedy came close to receiving the Democratic nomination for Vice President; in 1960 he went forthrightly in quest of the Presidential nomination. He fought intensely in several primaries and won, and at the Democratic Convention was nominated for President on the first ballot. He offered to share the ticket with his most powerful rival, Senate Majority Leader Lyndon B. Johnson.

"We stand today on the edge of a New Frontier," Kennedy proclaimed in his acceptance speech. Millions watched his vigorous television debates with the Republican nominee, Vice President Richard M. Nixon (opposite). Kennedy won the election by 303 to 219 electoral votes, but his margin in the almost 69,000,000 popular votes was a hairline 118,574. He was the first Roman Catholic to be elected President. The only other Catholic nominated by a major party had been Democrat Alfred E. Smith, badly defeated in 1928.

On a tide of youth, Kennedy sweeps the nomination for President at the 1960 Democratic Convention in Los Angeles. "The torch has been passed to a new generation of Americans," he said at his Inaugural.

In his Inaugural Address, Kennedy, aged 43, said "a new generation of Americans" had taken leadership. To all Americans he said: "Ask not what your country can do for you—ask what you can do for your country."

His vision of America extended beyond the Nation's material needs to the quality of American life and culture. Perhaps no President has ever so recognized the central place of the arts in a vital society (page 108).

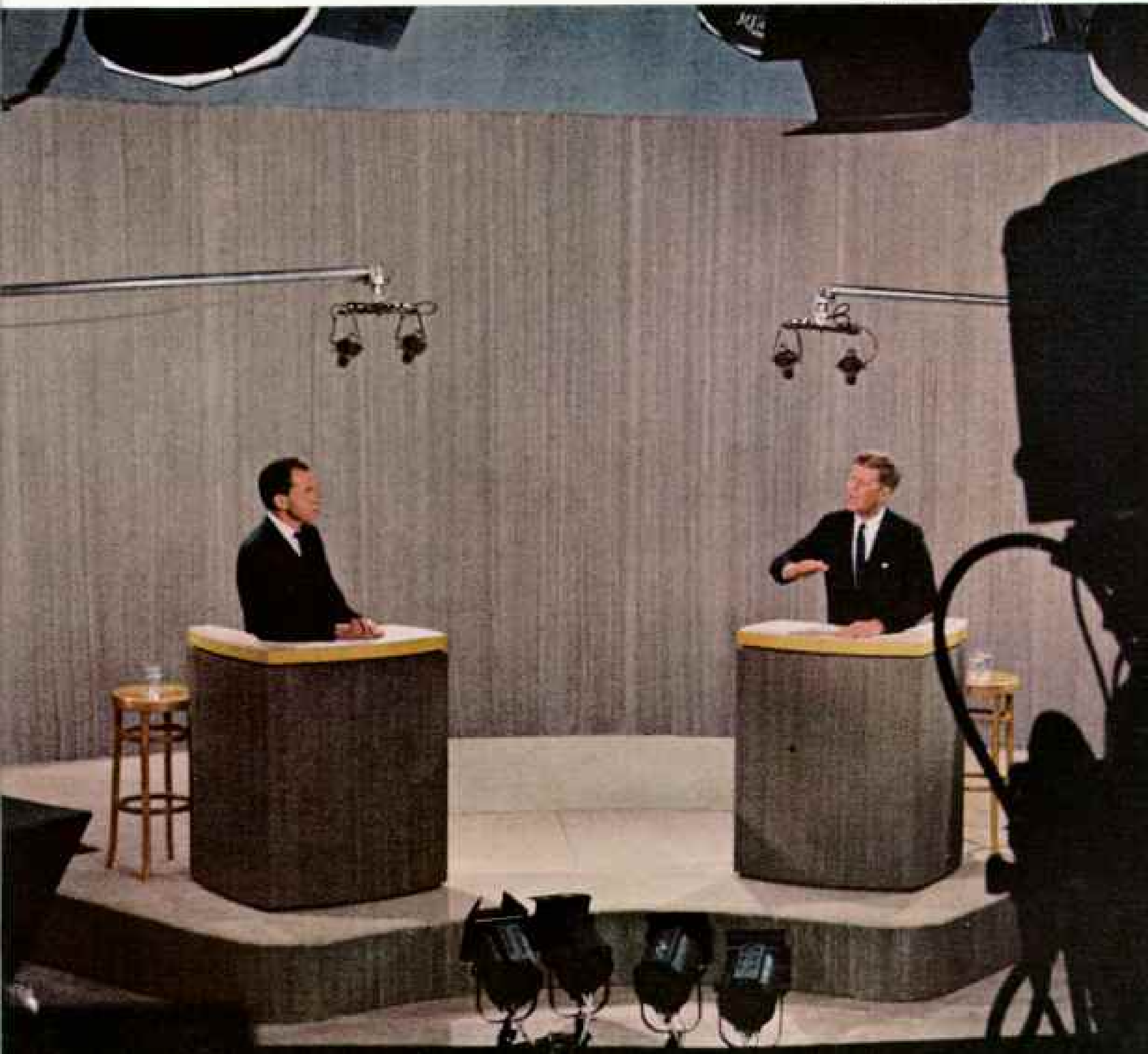
Kennedy sent message after message to Congress to outline the New Frontier program. He called for legislation to speed economic growth, cut unemployment, rehabilitate depressed areas, reform the tax structure, modernize cities, husband natural resources, improve the lot of farmers, aid education,

and provide medical care for old people.

For the next two years, he faced a conservative Congress. Nevertheless, he obtained much new legislation, including a reciprocal trade act, aid to higher education, and measures to pull the Nation out of the economic setback of 1960-61. In 1963, he fought hard for new civil rights legislation and for a cut in taxes to stimulate the economy. Both bills became law after his death.

Under Kennedy, the United States made strides in space. In May, 1961, shortly after Astronaut Alan B. Shepard, Jr., had completed the first American suborbital flight, the President asked Congress to undertake Project Apollo, to land a man on the moon by 1970 and return him safely.

First Presidential candidates to debate on television, Kennedy and Republican nominee Richard M. Nixon argue issues in a New York studio in October, 1960. This and three other verbal clashes, which reached four out of five voters, recalled the Lincoln-Douglas debates of 1858 in impact and had a decisive effect at the polls.





UNITED STATES ARMY (UPPER) AND WIRE WORLD

"*Ich bin ein Berliner*—I am a Berliner." Kennedy practiced the phrase so he could speak it to West Berliners during his European tour in 1963. He termed it "the proudest boast" in the world of freedom. With Mayor Willy Brandt (center) and Chancellor Konrad Adenauer, he sets out to inspect the wall that tragically divides East and West Berlin. Crowds cheer (below) as Kennedy rides past the war-scarred spire of the Kaiser Wilhelm Memorial Church.

First Roman Catholic President calls on Pope Paul VI in Rome (opposite). Last October, Kennedy's successor, Lyndon B. Johnson, met with the Pontiff in New York—first visit of a Pope to the Western Hemisphere.





In foreign affairs, Kennedy asserted energetic, imaginative, and effective leadership—though his administration began with a fiasco. He permitted a force of anti-Castro Cubans, armed and trained by the United States before his Inauguration, to land on the coast of Cuba in April, 1961, in a disastrous attempt to overthrow the dictator.

In the aftermath of this setback, Kennedy pressed his Alliance for Progress program to eliminate the poverty that might lead to further Castro-style revolutions. This was "a vast new ten-year plan for the Americas, a plan to transform the 1960's into an historic decade of democratic progress." The United States offered loans and grants to assist our hemispheric neighbors in their development.

Another Kennedy program was establishment of the Peace Corps, which has trained thousands of idealistic Americans—mostly

young people—and sent them to work in underdeveloped countries all over the world (page 106).\*

In June, 1961, Kennedy went to Vienna to talk with Soviet Premier Khrushchev, particularly in regard to Soviet pressure on Berlin. But Khrushchev seemed to be set on driving the Western allies out of that city; he fixed an end-of-the-year deadline for settlement of the Berlin issue, and in July announced a one-third increase in the Soviet military budget. Kennedy reacted firmly, requesting Congress to authorize strengthening of American forces.

In August, Communist East Germany erected a wall of barbed wire and concrete blocks between East and West Berlin, and the Soviet Union announced a series of nuclear

\*Peace Corps Director Sargent Shriver and several of his Volunteers reported on "Ambassadors of Good Will," in the September, 1964, *GEOGRAPHIC*.

WIDE WORLD



tests that doubled the fallout from all previous tests. Reluctantly Kennedy resumed small-scale American tests. The tension over Berlin eased, only to be succeeded by the Cuban crisis.

In October, 1962, Kennedy received photographic proof of Soviet missile bases in Cuba. With intermediate-range missiles installed, Khrushchev could have commanded an arc covering the contiguous forty-eight states and parts of Canada.

Acting deliberately and coolly, President Kennedy, in a memorable telecast, announced a naval quarantine on all offensive weapons bound for Cuba. "I call upon Chairman Khrushchev to halt and eliminate this clandestine, reckless, and provocative threat to world peace," the President declared. "He has an opportunity now to move the world back from the abyss of destruction."

A week of tension followed. Kennedy personally directed the quarantine fleet, forbidding interceptions far at sea in order to give Soviet ships laden with missiles more time to stop and turn around. Finally Khrushchev removed the missiles.

After this confrontation, Kennedy repeatedly emphasized the necessity of great powers working together to preserve the human race. He obtained an agreement with Russia banning nuclear tests in the atmosphere, in space, and under water—the first arms-control treaty since the cold war began.



**War on human misery:** Rita Helmkamp and Edward Dennison, Peace Corps Volunteers in Bolivia, vaccinate a youngster against smallpox.

President Kennedy launched the Corps in March, 1961. Today its members number more than 12,000 and serve in 46 countries. Forsaking many luxuries, this good-will army performs a host of jobs to aid self-help efforts of other nations. On Caribbean islands, Volunteers teach in schools and toil on farms; in Tanzania they work in busy hospital wards; in India they have fostered a chicken industry.



BOTH WIDE WORLD

**Showdown on the high seas:** In October, 1962, Americans learned that Russia was building missile bases in Cuba. "This . . . clandestine decision to station strategic weapons for the first time outside of Soviet soil . . . cannot be accepted by this country," Kennedy declared on television (right).

In Florida the largest invasion force since World War II massed to meet the Red threat 90 miles away. Simultaneously, the U. S. Navy established a quarantine around Cuba to block Soviet shipments. But the crisis ended when Russia met Kennedy's terms and ordered withdrawal of the missiles. The destroyer *Barry* (foreground) checks a Soviet freighter removing rockets from the island. Navy observer plane flies overhead.





For Dr. Melville Bell Grosvenor - with our deepest appreciation and good wishes always.  
 6-28-62  
 Jacqueline Kennedy  
*(The White House)*

PHOTOGRAPHS BY NATIONAL GEOGRAPHIC PHOTOGRAPHER THOMAS BROWN © N.G.S. UNITED PRESS INTERNATIONAL (REPROD. BY)

"And here's one for you too, Mr. President." The Chief Executive smiled approvingly as Dr. Grosvenor reversed protocol by presenting the first leather-bound souvenir copy of the White House guidebook to Mrs. Kennedy as its guiding spirit. The First Lady had invited the National Geographic Society, as a public service, to produce the guide (right) for the nonprofit White House Historical Association, headed by David E. Finley (center); the book sells for \$1.25, providing funds for refurbishing the mansion. The Society's President later received this autographed picture.



Patrons of the arts, the Kennedys entertain novelist Pearl Buck and poet Robert Frost at the White House. For the Inauguration, Frost recited his poem, "The Gift Outright"—a J.F.K. favorite.



Before Kennedy could build further on these auspicious beginnings, he was murdered. On November 22, 1963, while riding with his wife through the streets of Dallas, Texas, hailed by happy crowds, the President was shot from behind by an assassin. The Nation mourned his death with an outpouring of grief comparable to that which marked the death of Abraham Lincoln.\*

He is buried at Arlington, Virginia, in a simple grave marked by an eternal flame. Hundreds of sites and memorials around the world have been dedicated to his memory. The most famous are Cape Kennedy, the

\*In "The Last Full Measure," in the March, 1964, *GEOGRAPHIC*, President-Editor Melville Bell Grosvenor and the Society's staff told how the world paid tribute.

United States space center in Florida formerly known as Cape Canaveral; Mount Kennedy, a peak in the Canadian Yukon; and three acres of ground and a memorial at historic Runnymede, England. Future memorials will include the John F. Kennedy Center for the Performing Arts in Washington, D. C., and a library at Harvard University.

Kennedy exemplified intelligence, vitality, charm, and what he had referred to as "that most admirable of human virtues—courage." President Johnson, two days after the funeral voiced the feeling of the Nation: "No words are sad enough to express our sense of loss. No words are strong enough to express our determination to continue the forward thrust of America that he began."

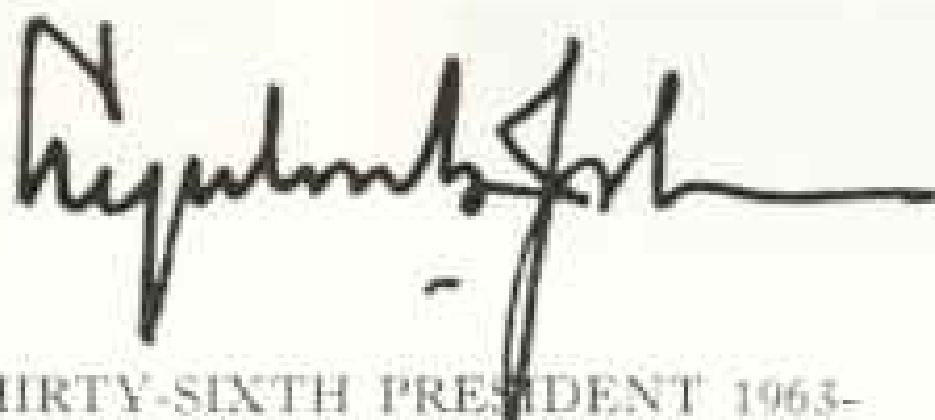
Signing the nuclear-test-ban treaty in October, 1963, the President seals a pact outlawing atomic explosions in the atmosphere, space, and under water by the U. S., United Kingdom, and Soviet Union. Vice President Lyndon B. Johnson (right) and other dignitaries cluster in the Treaty Room of the White House. Restored to its Victorian elegance, the chamber had not beheld such a ceremony since the signing in 1898 of the protocol that ended hostilities in the Spanish-American War.

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PHOTOGRAPH BY COL. E. STEPHENSON © R.S.S.







THIRTY-SIXTH PRESIDENT 1963-

**L**YNDON B. JOHNSON rallied the American Nation toward a "Great Society." In his first years in office, backed by a broad consensus of the electorate and heavy majorities in Congress, he gave the country a legislative program of extraordinary scope.

Congress acted on the President's recommendations with unusual speed. It passed historic measures to protect the civil rights of minorities, to wipe out urban and rural pockets of poverty, to provide medical care for the aged, to assist education, to improve transportation, to beautify the countryside, and, through tax cuts, to stimulate the economy. By means of such legislation, Johnson sought to bring the Nation closer to its goal of a more abundant and meaningful life for every level of American society.

Johnson was born on August 27, 1908, in the grasslands of southwest Texas, not far from Johnson City, which his family had helped settle. His grandfather had fought

in the Confederate Army and served as a member of the Texas Legislature; his father, who also served in the legislature, was a firm opponent of the Ku Klux Klan.

Johnson felt the pinch of rural poverty in the 1920's; while attending high school he worked as a shoeshine boy.

"I know that as a farm boy I did not feel secure," he has reminisced, "and when I was 14 years I decided I was not going to be the victim of a system which would allow the price of a commodity like cotton to drop from 40 cents to 6 cents and destroy the homes of people like my own family."

While working his way through Southwest Texas State Teachers College, he took a year off to teach Mexican-American children at Cotulla, Texas. A classmate remembers him as "a beanpole who was 6 foot 3, as tall as he is now, but who then weighed only 135 pounds. Lyndon was full of nervous energy ... always doing two or three things at a time."

With a "Great Society" as his goal, Lyndon Baines Johnson signed into law more major bills in his first two years than any President since his mentor, Franklin D. Roosevelt.

The dynamic Texan entered the Presidency with greater legislative experience than any predecessor. He had come to Washington as secretary to a Texas Representative in 1931. Election to the House of Representatives followed, then to the Senate, and finally to the Vice Presidency. Upon Kennedy's tragic death, Mr. Johnson became Chief Executive, and in the 1964 election won by an unprecedented popular majority.

Under sunny Texas skies, the President strolls with Mrs. Johnson and daughters Luci Baines (left) and Lynda Bird at the LBJ Ranch. Roots here run deep: Mr. Johnson was born in a modest homestead only 800 yards down the road. In Austin, 65 miles east, he courted and won Claudia Taylor, known from childhood as Lady Bird.

REDACTED BY GEORGE F. WURLEY © U.S. UNITED PRESS INTERNATIONAL





WIDE WORLD

"I do solemnly swear. . . ." Only two hours earlier a sniper struck down President John F. Kennedy as he rode through cheering throngs in downtown Dallas, Texas. Now Vice President Johnson takes the oath of office, his right hand raised in pledge, his left hand on a small leather-bound Bible. Thus, in the midst of chaos, the orderly transfer of power takes place. The Nation was shocked by the fourth Presidential assassination in its history, but it was not paralyzed.

At 12:30 p.m. on November 22, 1963, Mr. and Mrs. Johnson rode two cars behind President and Mrs. Kennedy in a motorcade through the Texas metropolis. At the first crack of the rifle, a Secret Service agent threw himself across the Vice President in a protective move. The Johnsons' car sped to the hospital where the mortally wounded Kennedy had been taken. Alert to the possibility of a widespread plot against the Government, Mr. Johnson hurried under guard to the Presidential plane at the Dallas airport for the flight to Washington. After Mrs. Kennedy boarded, Federal District Judge Sarah T. Hughes swore in the 36th President of the United States, becoming the first woman to administer the oath of office. Beside the new President at the sorrowful oath taking stand Mrs. Johnson and Mrs. Kennedy, who still wears the pink suit chosen for what had promised to be a gay occasion.

Arriving in Washington that evening, President Johnson made a brief statement, concluding: "I will do my best. That is all I can do. I ask for your help—and God's."

Across the land, the people mourned. Addressing Congress five days later, President Johnson paid tribute to his predecessor and recalled Kennedy's dreams for the Nation. He urged, "All my fellow Americans, let us continue."

After graduation, while he was teaching speech at a Houston high school, his inner drive for public service steered him into politics. In 1931 he went to Washington as secretary to a Texas Congressman, Richard M. Kleberg. On a visit to Austin in September, 1934, he met Claudia "Lady Bird" Taylor, who has said she was taken aback at first, "then I realized he was handsome and charming and terribly bright." They were married in November.

Johnson became the Texas director of the National Youth Administration in 1935, and within two years developed what was regarded in Washington as a model among state youth programs. In 1937 he campaigned for the House of Representatives on a New Deal platform and defeated his nearest opponent two to one. In the House he became an effective lieutenant of Majority Leader Sam Rayburn and a protégé of President Roosevelt.

Immediately after Pearl Harbor he volunteered for active military service, and as a Navy lieutenant commander, won a Silver Star in the Pacific before he and other Congressmen were recalled to Washington.

#### Heart Attack Fails to Halt Career

In 1948, after five and a half terms in the House, Johnson won the Democratic primary contest for Senator by a margin of 87 votes. Once nominated, however, he easily defeated his Republican opponent.

The young Senator was elected Democratic Minority Whip after only three years' service and, in 1953, Minority Leader at the age of 44—the youngest in Senate history. When the Democrats gained control of the Senate in 1954, Johnson became Majority Leader and a commanding figure in Congress.

He suffered a severe heart attack in July, 1955, but made a complete recovery. As a Democratic Majority Leader in a Republican administration, he won a reputation for the statesmanlike way in which he supported or opposed White House measures on their basic merits. He refused to engage in partisanship as he guided through the Senate vital measures of national security and civil rights.

When Johnson failed to obtain the Democratic nomination for the Presidency in 1960, he accepted Kennedy's offer of the Vice Presidential nomination. On November 22, 1963, when President Kennedy was assassinated in Dallas, Texas, Vice President Lyndon Johnson was sworn in as the 36th President of the United States (above).

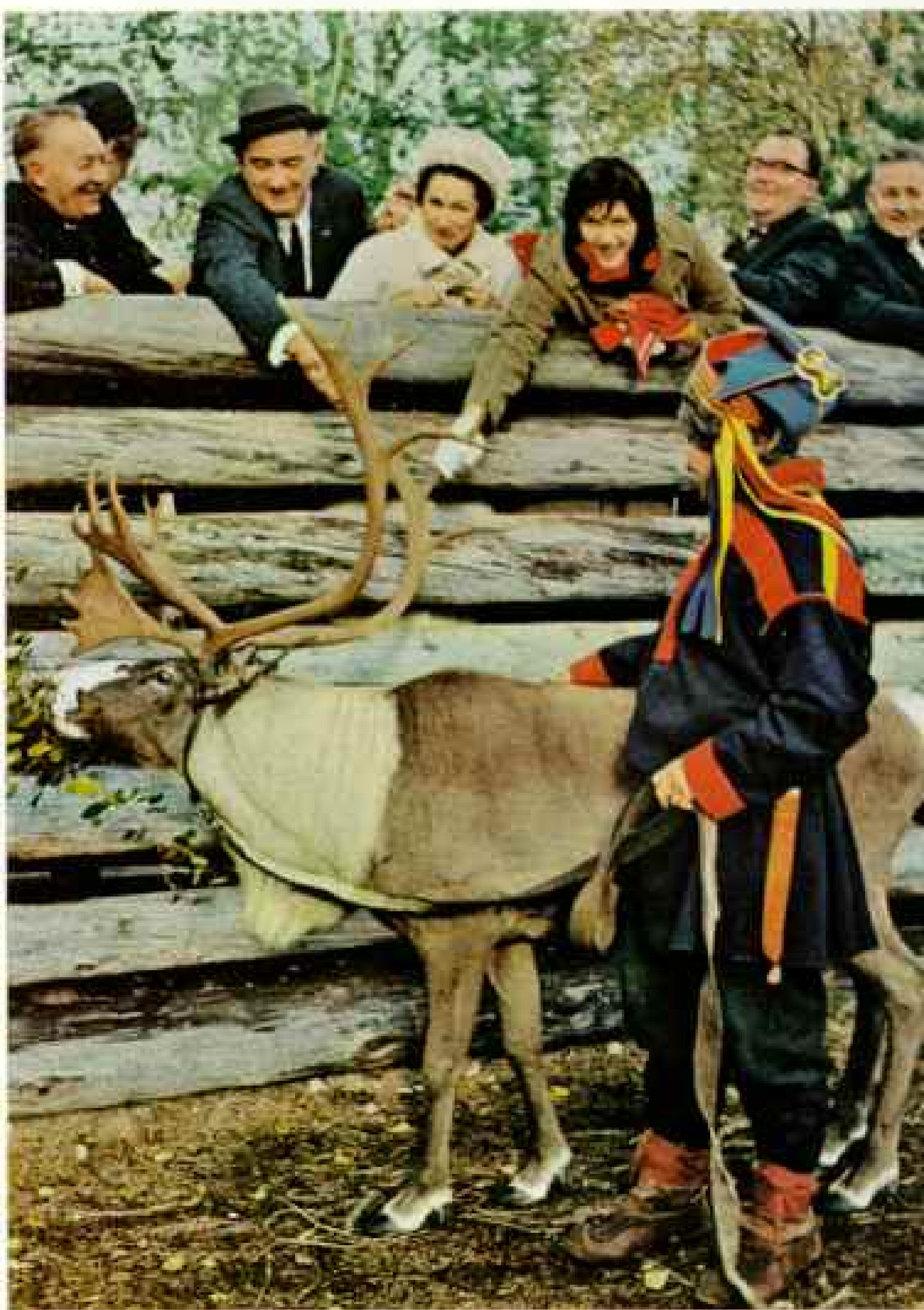
As President he tried to exemplify the view



Making friends for the United States, the genial Texan visited 27 countries as Vice President. The National Geographic Society recognized his extensive travels on June 8, 1962, by presenting him with its Jane M. Smith Award, a citation praising his "efforts to bring the peoples of the world closer together." He made a trip to Scandinavia in 1963, the first time such a high-ranking U.S. official had toured that area. Here, with Lady Bird and Lynda, he inspects a Lapp's reindeer in Finland. Vice President Johnson described his journey in the February, 1964, NATIONAL GEOGRAPHIC.

One of the most active Vice Presidents in history, Johnson was chairman of the National Aeronautics and Space Council, the National Advisory Council of the Peace Corps, and the President's Committee on Equal Employment Opportunity.

"Come now, and let us reason together." In the spirit of his favorite Biblical verse—Isaiah 1:18—Senate Majority Leader Johnson confers with colleagues in 1960: Senators Mike Mansfield (center) of Montana, Joseph S. Clark (left) of Pennsylvania, and William Proxmire of Wisconsin. Working 12 to 16 hours a day, Johnson piloted through the Senate the first civil rights act in 82 years. He impressed even opponents as "one of the ablest political craftsmen of our time."



SYNCHROME CAPTURED BY VOLKMAR BERTZLA © W.A.S., GEORGE STANLEY, NEW YORK TIMES





EXTRACHROME BY AL CHANG © R.G.S.



"A triumph for freedom as huge as any victory won on any battlefield," the President calls the 1965 Voting Rights Act, which struck down practices denying minorities the vote. His words echo around statues of Lincoln in the Capitol Rotunda. He signed the bill in the President's Room, where, in 1861, Lincoln freed slaves impressed into the Confederate Army.

**Strike against Viet Cong:** In South Viet Nam, copters land paratroopers seeking out Communist guerrillas. Mr. Johnson ordered bombing of Red supply bases in North Viet Nam and by late 1965 had increased the U. S. troop total in South Viet Nam to more than 160,000.



Waging war on poverty, Mr. Johnson inspected the economically distressed Appalachian region in April, 1964. "I know what poverty means to people," he has said. "I have been unemployed. I have stood in an employment office, waiting for an assignment. . . ." Here he visits a jobless sawmill worker.

"Immense excitement" marks the lively discussions at L. B. J.'s Cabinet meetings, according to former Postmaster General John A. Gronouski (left, foreground). Reviewing administration policy in July, 1965, from left: U.N. Ambassador Arthur J. Goldberg; Robert S. McNamara, Defense; Orville L. Freeman, Agriculture; W. Willard Wirtz, Labor; John W. Gardner, incoming Health, Education and Welfare; Anthony J. Celebrezze, retiring HEW; John T. Connor, Commerce; Nicholas deB. Katzenbach, Attorney General; Dean Rusk, State; the President; Henry H. Fowler, Treasury; and Stewart L. Udall, Interior.

EXALPHROME (BELOW) AND KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER JOSEPH S. SCHENCKEL © N.G.S.



he had expressed in 1958 that it was unacceptable in the American Nation for a question to be settled by a partisan majority overriding a minority. "I do not believe," he said, "we have arrived at an answer until we have found the national answer, the answer all reasonable men can agree upon." To Congress in January, 1964, in his State of the Union Message, he recommended what he believed to be some of the national answers:

"Let this session of Congress be known as the session which did more for civil rights than the last hundred sessions combined; as the session which enacted the most far-reaching tax cut of our time; as the session which declared all-out war on human poverty and unemployment in these United States. . . . All this and more can and must be done."

Congress did accept these answers. The

Civil Rights Act of 1964 strengthened earlier legislation, opened large categories of public accommodations to Negroes, and enlarged their opportunities. Congress also enacted tax-reduction and antipoverty measures.

#### Great Society Becomes New Goal

Johnson envisaged going still further, toward the goal of what he called a Great Society. In accepting the Democratic nomination for the Presidency in August, 1964, he declared: "This nation, this generation, in this hour has man's first chance to build a great society, a place where the meaning of man's life matches the marvels of man's labor."

In the 1964 election, Johnson won against Republican Senator Barry Goldwater by the biggest popular margin in American history—more than 15,000,000 votes.



ESDACHRONEL BY JIM ATHERTON © N. A. S.

Embarked on new careers, Job Corpsmen train at the Blue Jay Conservation Center in Pennsylvania. Bruce Templeman drives an end loader, Neil D'Camera sights through a level, as they build a new sewer line for the camp. Eventually, they will acquire skills in such fields as reforestation, fire control, and wildlife management.

Modeled after the Civilian Conservation Corps of the 1930's (page 73), the Job Corps gives out-of-school, out-of-work youths, aged 16 to 21, the basic education and skills needed to hold jobs. By late fall of 1965, 64 rural and urban Job Corps centers in 30 states housed 13,500 young people.

To the 89th Congress, meeting in January, 1965, he outlined his objectives: Aid to education, an attack on disease, urban renewal, beautification of America and elimination of air and river pollution, development of depressed regions, control and prevention of crime and delinquency, removal of every obstacle to the right to vote, honor and support to art and thought, and a vigorous campaign against waste and inefficiency. Congress, at times augmenting or amending, rapidly enacted the legislation he recommended to make a beginning on each of these programs.

Congress gave the President bipartisan support when, in response to the frustrations of Negroes seeking to register to vote in some areas of the South, he proposed a bill to strike down restrictions to voting.

"To deny a man his hopes because of his color or race, his religion or the place of his birth," Johnson declared, "is not only to do injustice, it is to deny America and to dishonor the dead who gave their lives for freedom."

For the signing of the Voting Rights Act of 1965, Johnson went to the President's Room in the Capitol, where Lincoln had affixed his name to a bill freeing slaves forced to serve in the Confederate Army.

#### Truman Proposal Finally Becomes Law

Similarly, he flew to Independence, Missouri, and signed the Medicare-Social Security measure in the presence of former President Truman, first Chief Executive to propose health insurance as part of the Social Security program. In the presence of Mayor Robert F. Wagner of New York, son of the leading New Deal proponent of public housing, the President signed a housing bill going far beyond any of its predecessors.

"We must make sure," he said, "that every family in America lives in a home of dignity, in a neighborhood of pride, a community of opportunity and a city of promise and hope."

Johnson enlisted the support of many Republicans as well as most Democrats. He was unusually successful in convincing businessmen that the Government wished to aid rather than hinder them. He made frequent and effective use of television.

Under Johnson the country scored spectacular advances in space. It so effectively cut the Russian lead that only 11 weeks after a Soviet cosmonaut floated outside his space vehicle, Astronaut Edward H. White II took a "walk" in space. Little more than two months later Astronauts L. Gordon Cooper, Jr., and Charles Conrad, Jr., kept Gemini V in orbit a



**Spadework for beauty:** The First Lady plants an azalea to dramatize her drive to make the Nation's Capital a showcase. Campaigning to beautify all America, she pushed legislation to restrict billboards and junkyards beside major highways; L.B.J. called it "Lady Bird's bill" and gave her the first pen he used in signing it.





record-breaking eight days. An unmanned vehicle, Mariner IV, after a flight of 325.1 million miles, transmitted the first close-up photographs of Mars.

In relations with other nations, President Johnson inherited a serious and perplexing problem in South Viet Nam, where the United States had long sought to stem the tide of Communism threatening Southeast Asia. Under the Geneva Agreement of 1954, all the Indochina states had won their independence and all—including North Viet Nam—had accepted neutralization. This agreement was flouted almost immediately. Communist guerrillas, the Viet Cong, encouraged and supported from the North, increasingly threatened to take over South Viet Nam.

The Eisenhower Administration sent aid and advisers, and Kennedy, stepping up the commitment, dispatched 3,200 military advisers and technicians in 1961. During the Johnson Administration the growth of Viet Cong forces led to still sterner countermeasures. American troops entered more directly into the fighting by the summer of 1965. President Johnson asserted that he was planning careful additional steps toward the paramount goal—"to bring an end to aggression and a peaceful settlement."

#### Dominican Revolt Brings a New Crisis

When reports of a revolution in the Dominican Republic reached the White House in the spring of 1965, President Johnson acted quickly. He landed troops to protect American lives in a situation that appeared to be developing sinister dimensions.

"The American nations," he later declared, "cannot, must not, and will not permit the establishment of another Communist government in the Western Hemisphere."

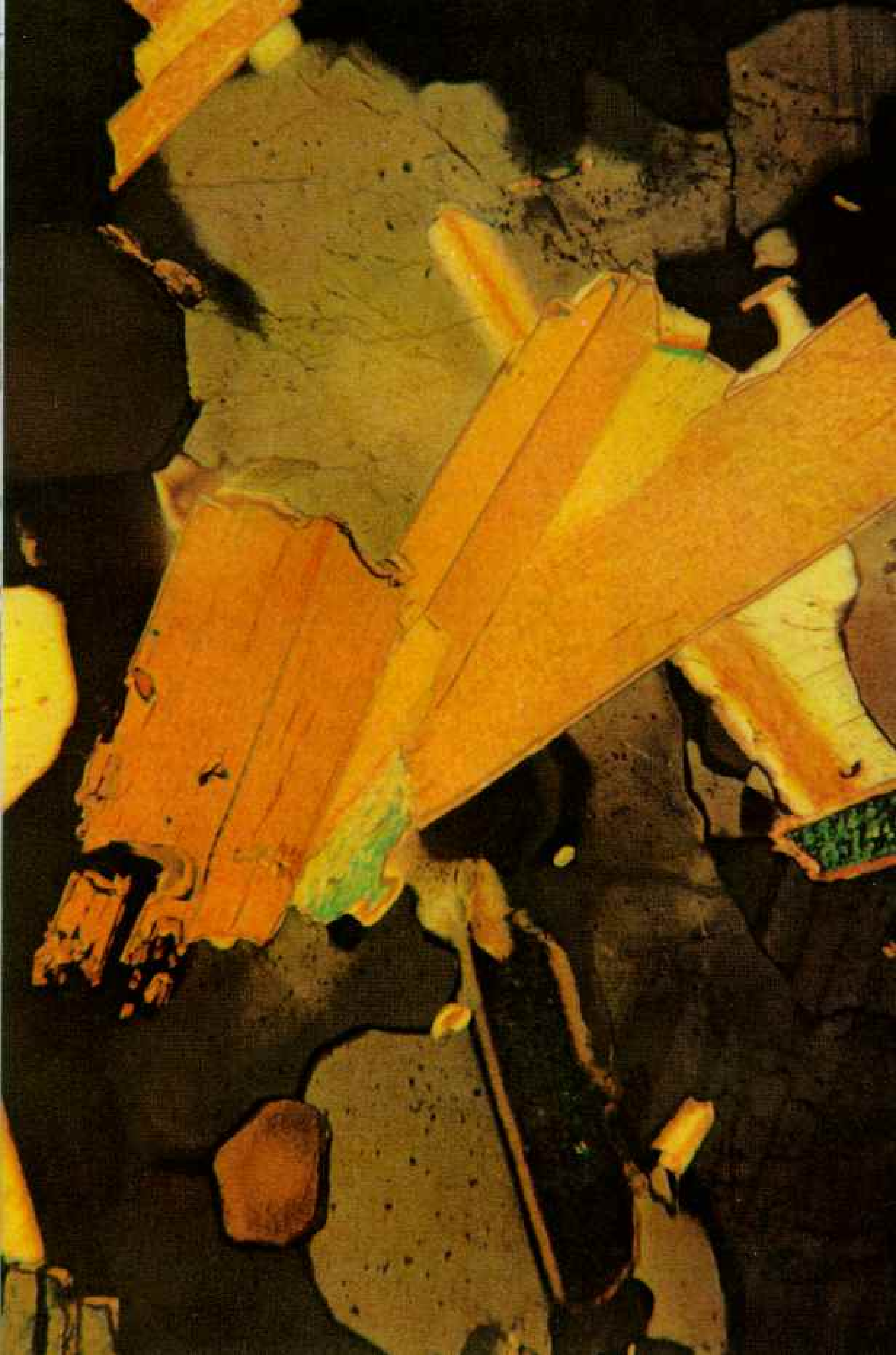
He turned to the Organization of American States, and within a few days that body negotiated a cease-fire, began to work toward a peaceable settlement, and dispatched an Inter-American Peace Force. By September, through these efforts, the rival factions had agreed on a new government.

Beyond and above these crises, President Johnson strove for the goals he enunciated to the United Nations a few weeks after he became President:

"We know what we want: The United States wants to see the cold war end; we want to see it end once and for all; the United States wants to prevent the dissemination of nuclear weapons to nations not now possessing them; the United States wants to press on with arms control and reduction; the United States wants to cooperate with all the members of this organization to conquer everywhere the ancient enemies of mankind—hunger and disease and ignorance; the United States wants sanity, and security, and peace for all, and above all."

THE END

"The best instrument yet devised to promote the peace of the world." Thus President Johnson described the United Nations when he renewed his country's support of the international body in an address to the General Assembly on December 17, 1963. He once defined a peaceful world as a place "where differences are solved without destruction, and common effort is directed at common problems."







# Finding Rare Beauty in Common Rocks

Article and photographs by  
LORENCE G. COLLINS, Ph.D.

**P**EOPLE cock an eyebrow when I tell them abstract art is about as modern as a dinosaur. In the first place, they can't imagine that a geologist knows much about art. Yet I work with a dazzling array of colors and free forms every day.

To prove my point, I project a few slides from my collection. The doubters usually admit that no museum can match my display of abstract shapes and colors.

Churning forces within the globe have been creating "modern art" since the beginning of geologic time. Volcanoes, earthquakes, and seeping water stir earth's crust into infinite patterns of beauty.

Unfortunately, few people see them. So I enjoy showing my photographs of rock thin sections—wafers of stone three times thinner than this page—taken through the petrographic microscope. Such a microscope differs from others in that it polarizes light. Like picket fences, crystals in the microscope's optics block out all rays except those that filter between the crystals' parallel rows, or planes,

Nature's genius and polarized light create a masterpiece that a painter might entitle "Autumn Leaves." The geologist, peering through a petrographic microscope, sees muscovite, biotite, quartz, and feldspar crystals—here magnified 100 times—and calls the mixture common gray granite.



of atoms: As did Alice with her looking glass, I use this instrument to enter another world—a microscopic realm of dancing colors and shapes.

Nature builds rocks with tiny particles of minerals. Most minerals crystallize into characteristic shapes and boast a distinctive set of optical properties. Like lenses and prisms, the crystals bend light and break it into separate rays.

The color of a mineral seen through the petrographic microscope depends on the mineral's alignment with the plane of polarization. As I rotate a thin section in polarized light, the mineral alignment continually changes, and I can see a constantly shifting assortment of colors. It reminds me of a child's kaleidoscope.

Gleaming diamonds, rubies, sapphires, emeralds, and opals in thin sections appear almost colorless, to the amazement of my new students in petrography at San Fernando Valley State College. But shimmering beauty may lurk in a drab, lichen-covered stone that nicks your lawn-mower blade.

By systematically studying samples ground to uniform thickness, geologists have determined the characteristics of every mineral. Now we can quickly learn a rock's mineral components by observing the colors and shapes of thin-section grains.

The relationship of different crystals to one another and changes in them caused by chemical reactions, heat, or pressure also tell important stories. Sometimes they lead us to the hiding places of petroleum or metal ores.

While geologists employ petrographic analysis to study earth's crust, other professions as well find it helpful. In the police crime laboratory, it can turn up valuable clues, such as the source of dirt particles on a suspected slayer's shoes. It helps military researchers assess the sea ice of potential Arctic airstrips. When scientists of Project Mohole recover the first sample of earth's mantle from three miles beneath the ocean floor, they will prepare thin sections for petrographic inspection.\* Undoubtedly, the first men on the moon will gather rocks for study under the petrographic microscope.

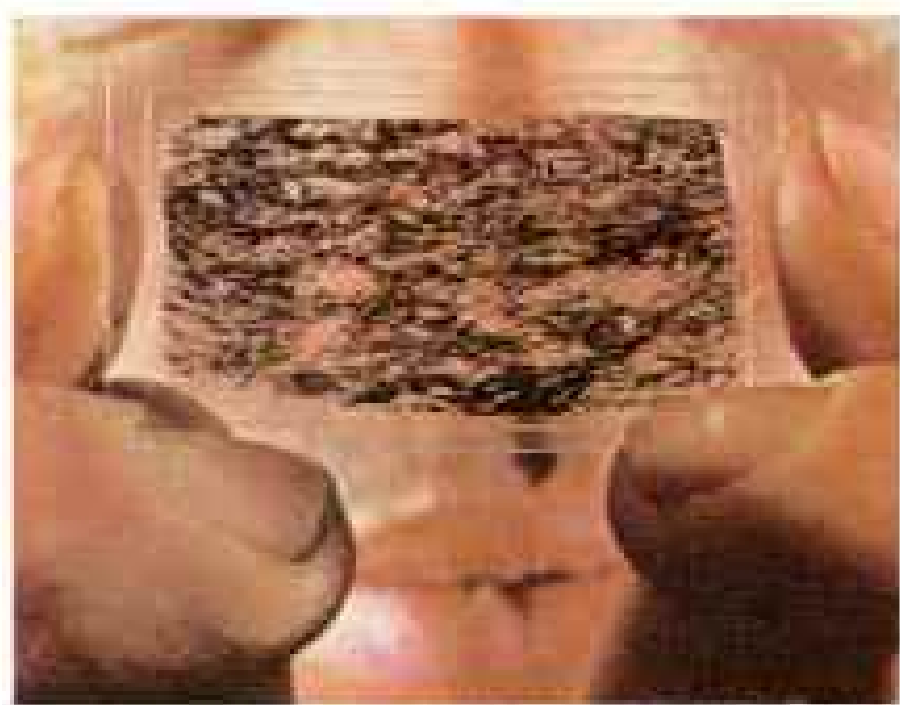
For me, the colors and patterns that unfold the mysteries of matter turn a tedious task into gripping adventure. And when I hear artists declare they have broken the bonds of objective art, I know nature really did it first.

\*Samuel W. Matthews described the first steps of Project Mohole in the November, 1961, NATIONAL GEOGRAPHIC.

**Close-up of a stained-glass window?** Farmland from 30,000 feet up? Neither. Rose, orange, and mottled pink identify augite. Geologists recognize the other colors as hornblende, usually green or brown in thin section. Combined, the two minerals produce pyroxene amphibolite—a black rock to the naked eye.



The author films nature's abstracts with a camera atop his petrographic microscope. Dr. Collins uses his slides in classes at San Fernando Valley State College, Northridge, California, where he teaches petrography—rock description and classification.

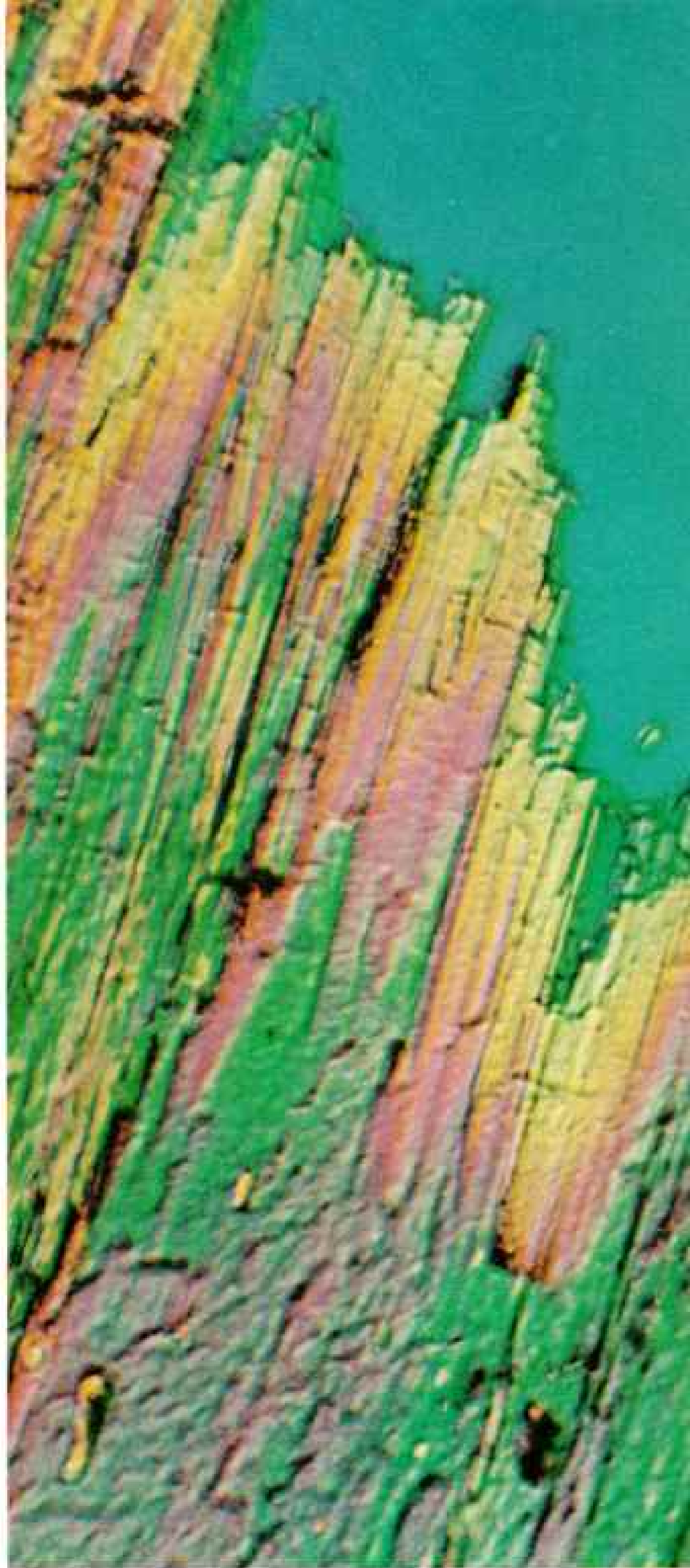


PHOTOGRAPH BY THOMAS REEDER © N.G.S.

**Rock thin section** appears drab in ordinary light. Polarized beams kindle sparkling hues in its tiny crystals. Technicians prepare thin sections by slicing wafers from rock samples with diamond saws. They cement the wafers to glass slides, then grind each to a thickness of 1/1,000 of an inch.



Crushing force, perhaps millions of years ago, shattered portions of tremolite-actinolite. The small granules, rotated during crushing, have alignments different from the solid center; thus light from them is affected differently, many appearing brown instead of yellow, red, and blue.

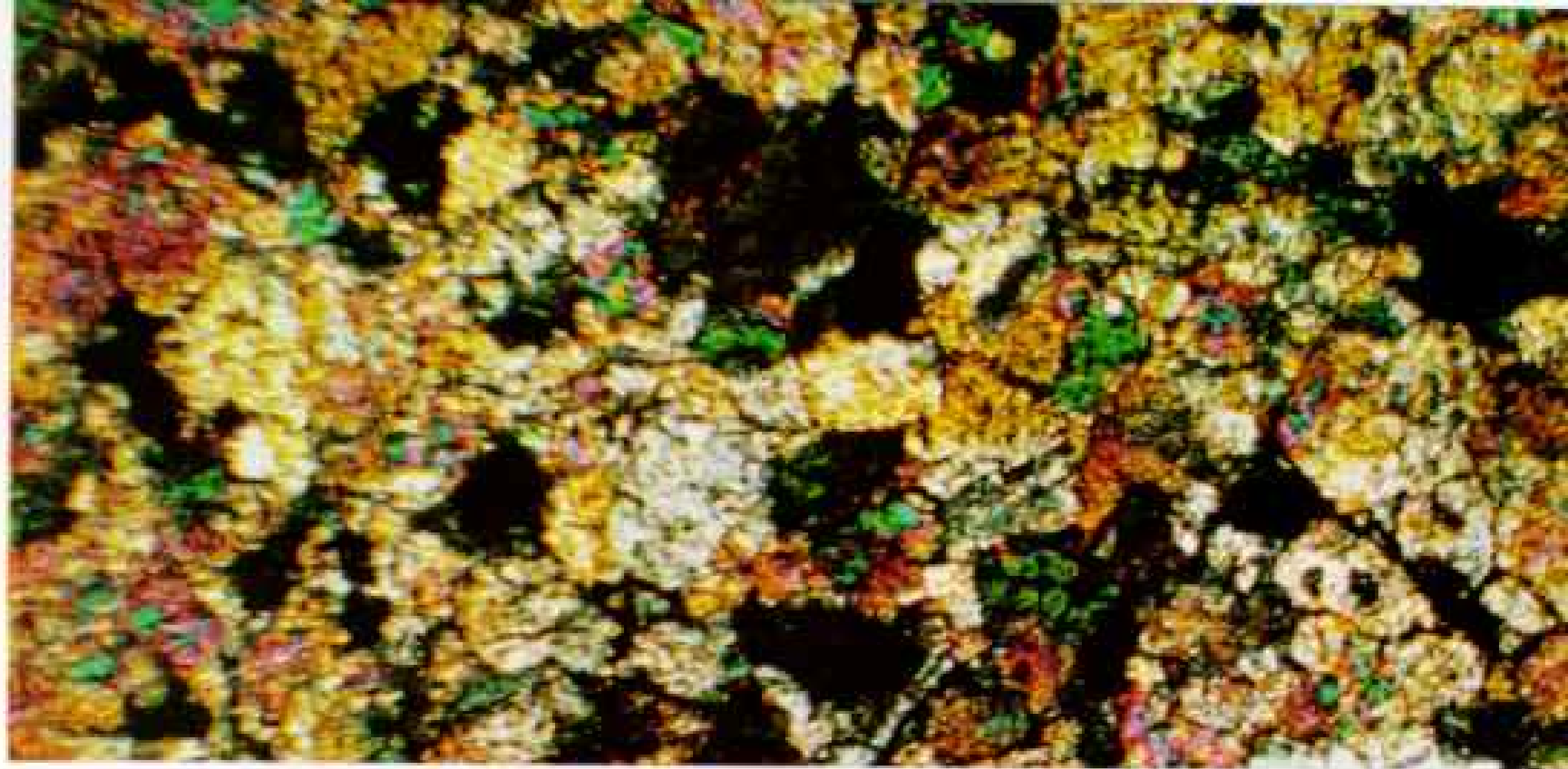


Snakes writhe in a lava bath. Formed in molten rock, olivine fractures when it cools and hardens. Water seeps into the cracks and sets off chemical reactions that alter the reddish-appearing olivine to serpentine (green). The author inserted a quartz wedge into the microscope to enhance the colors of this rock, which otherwise appears dull.

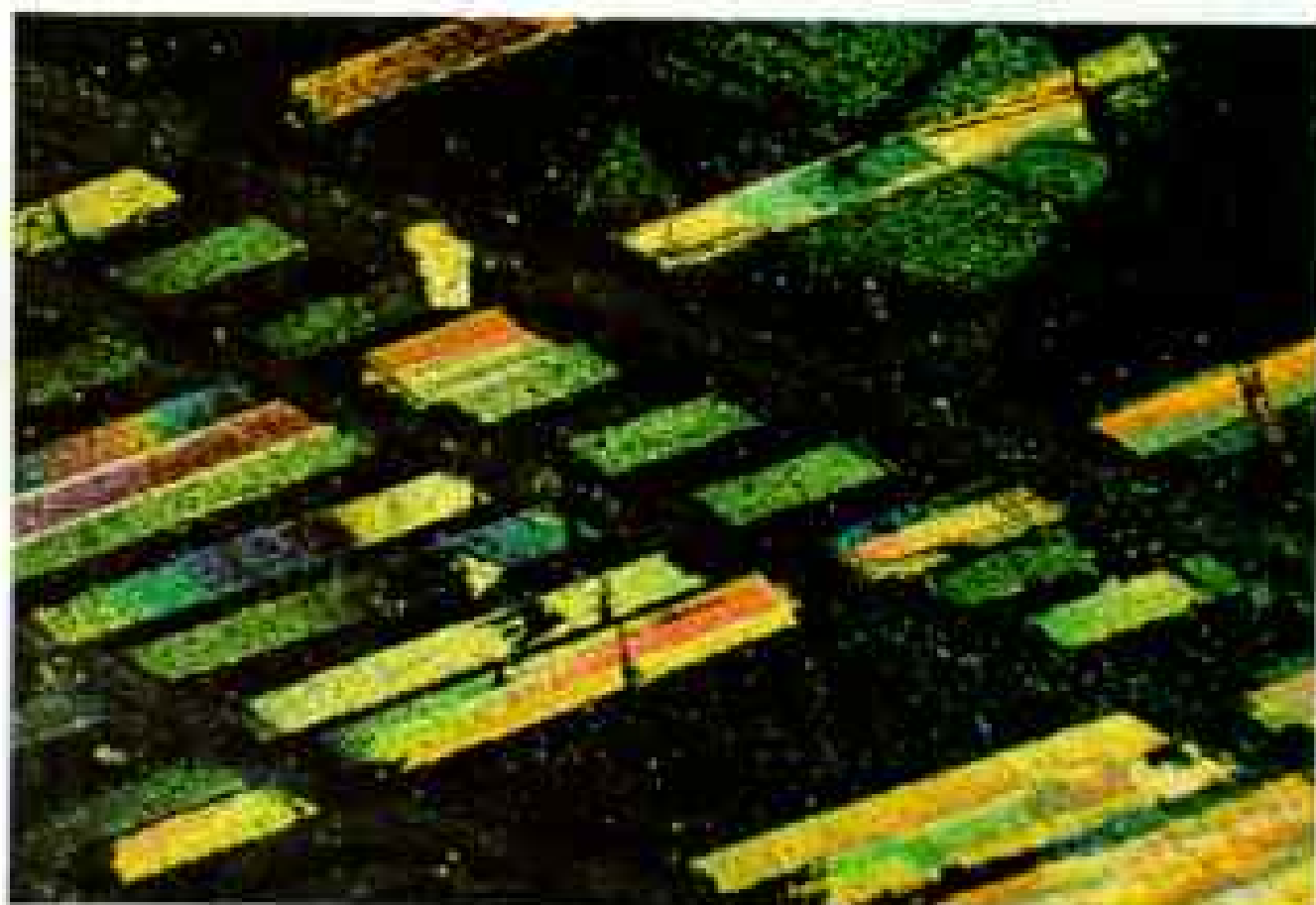


ADORNMENTS BY LORENCE S. COLLINS © NATIONAL GEOGRAPHIC SOCIETY

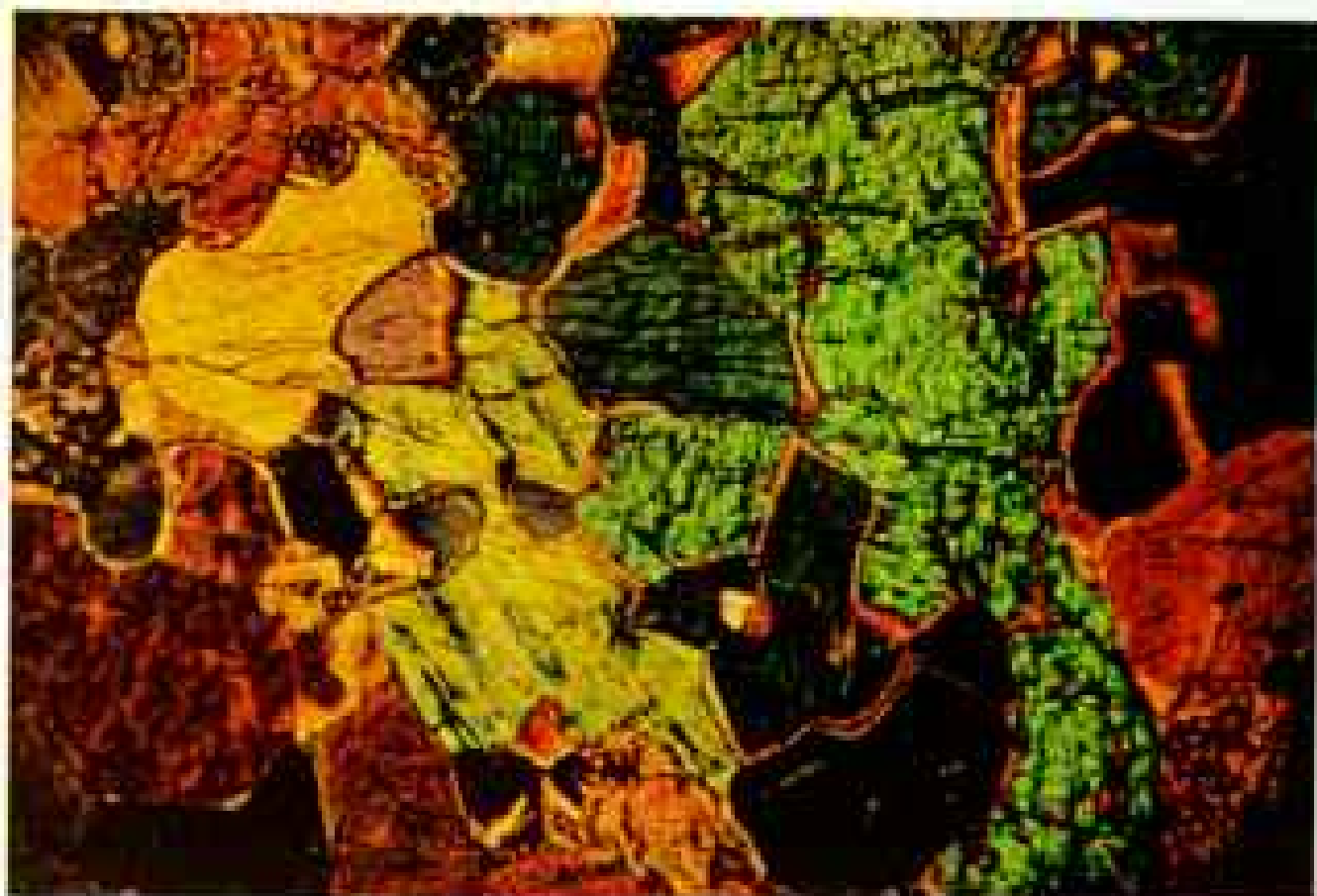
Sunrise glows on a skyscraper skyline traced by the jagged edge of a tremolite-actinolite thin section—another view of the same mineral seen at upper left. Dr. Collins's years of training as a geologist had little to do with his selection of pictures for this article. "I tried to look down my microscope with the eye of an artist," he explains. "You might find any of these rocks in a vacant lot. Certainly, none of the pictures reveals anything startling to a geologist. But I think they do demonstrate that nature puts brilliant beauty into even its humblest creations."



Bold bars of rainbow color march in a "modern" abstract design created eons ago (below). Cleavage planes of a single calcite crystal cast these rhomboidal patterns.



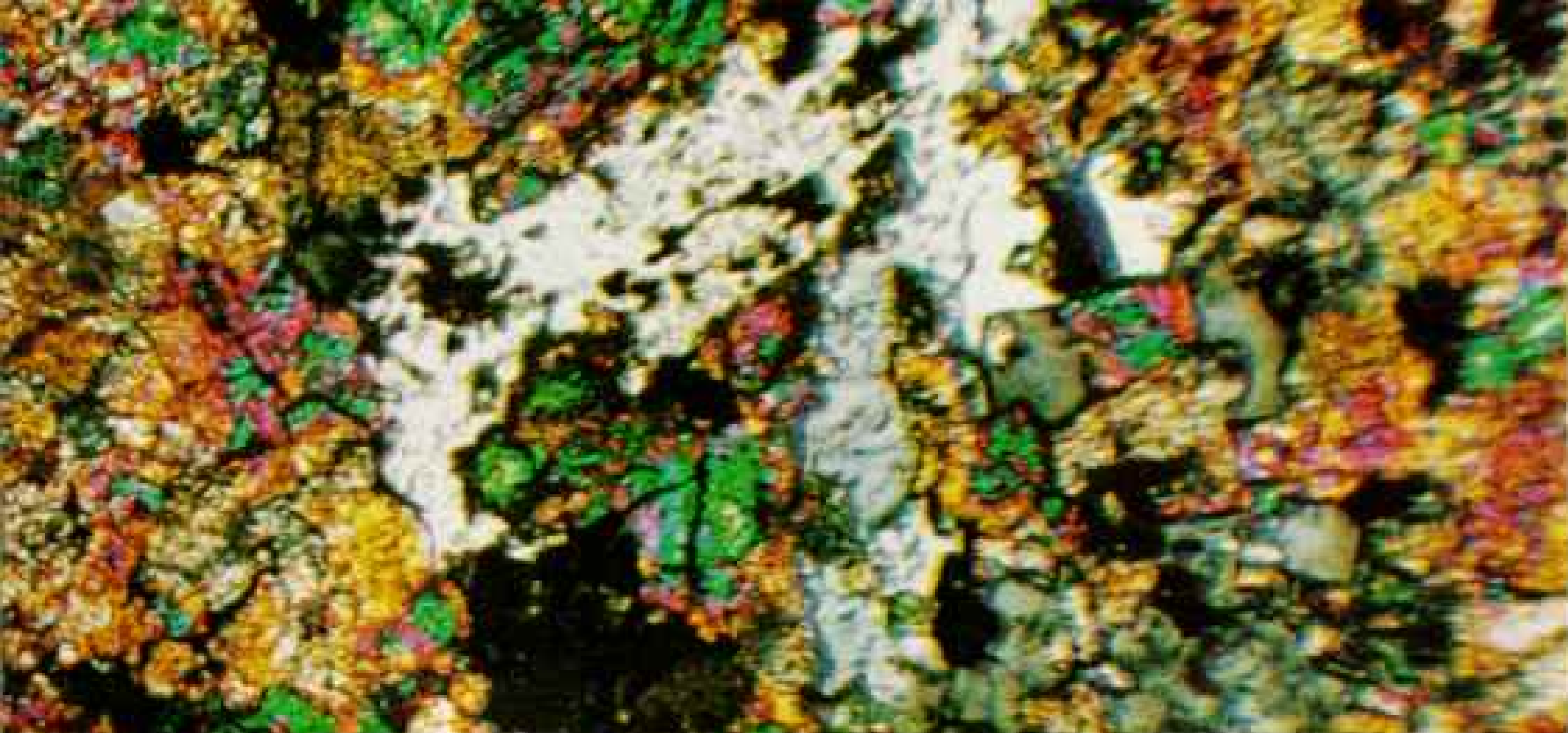
Dazzling free forms created by heat, pressure, upheavals, and chemical reaction daub a miniature "canvas" (below). Hornblende provides the green pigment, feldspar the yellow, biotite the red.



"Fossilized flounder" of olivine swims in a marble sea. The tiny crystal tells geologists that very high temperatures haked the marble from limestone.



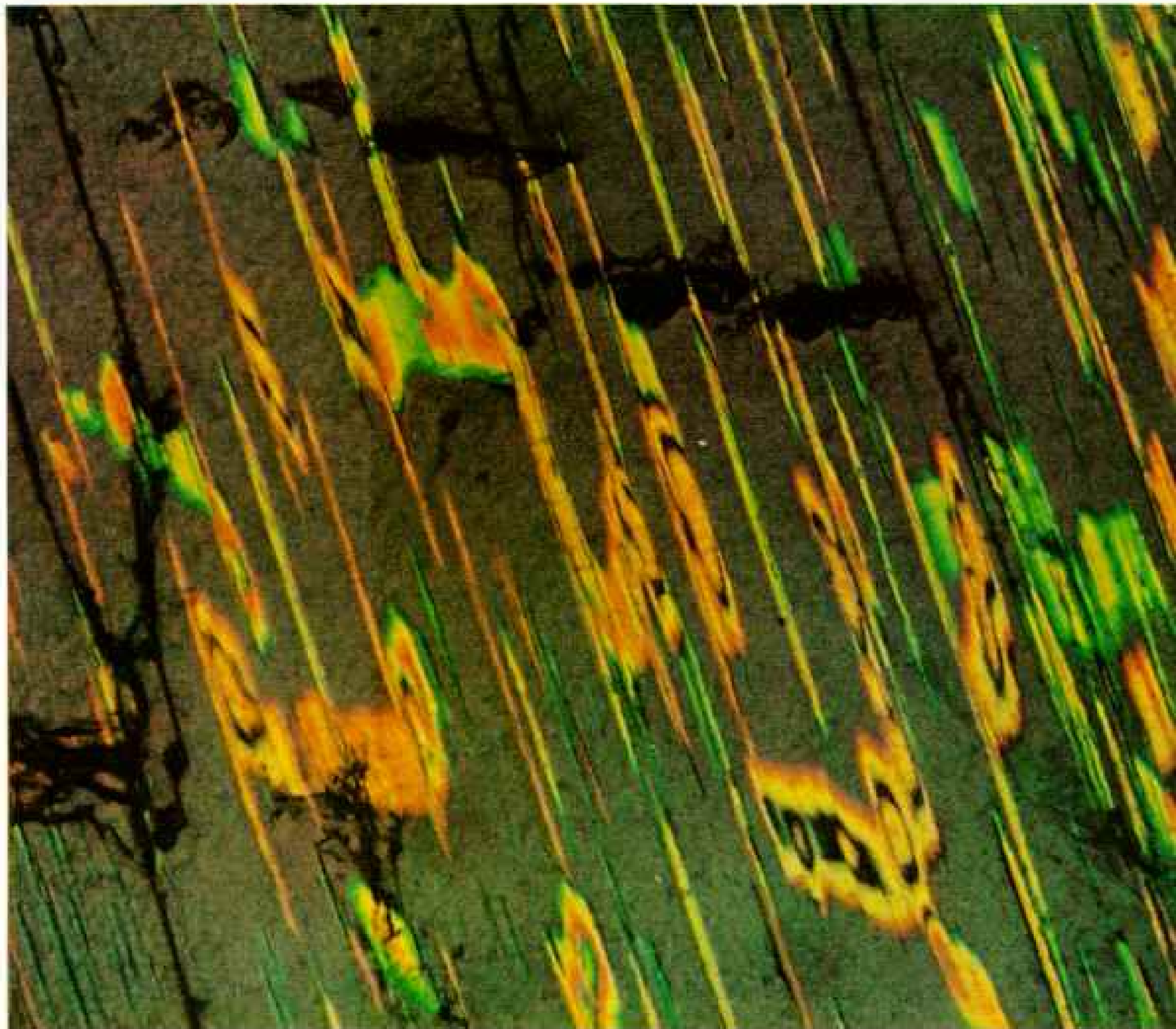
Ghostly yellow grain of quartz floats in dead tree limbs; actually, fracture lines brand the augite background.



ROBERT HODGES © NATIONAL GEOGRAPHIC SOCIETY

Mottled mosaic records the transformation of grayish feldspar into golden grains of epidote. Hot-water seepage, deep in the earth, works the seeming magic.

Meteor shower of muscovite, an ordinary mica, rains through a midnight sky of microcline feldspar. Like frightened birds, fractures flit through the downpour.





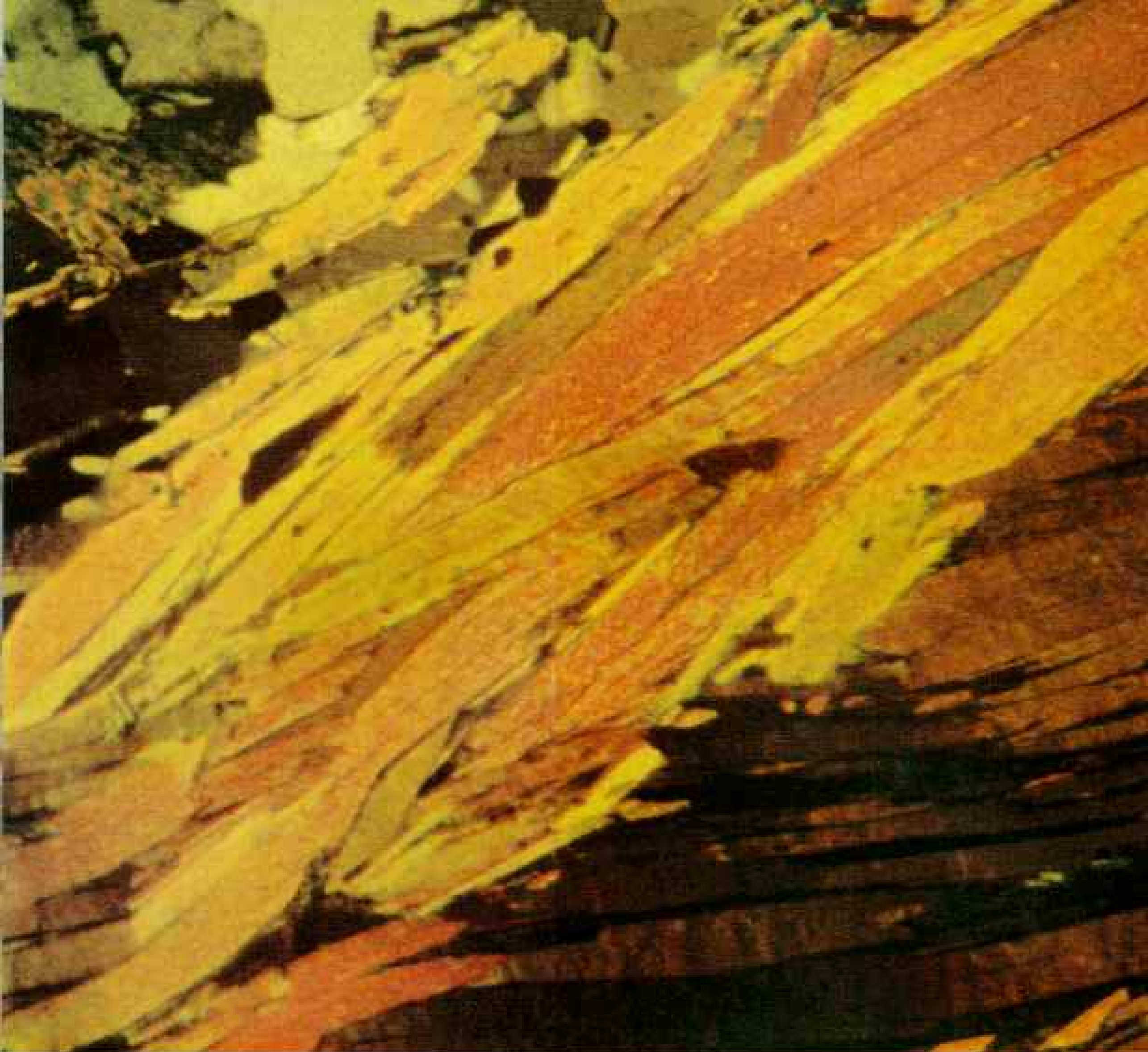
*Fiery river of muscovite roars down a quartz canyon. Extreme heat and pressure created this brilliant display in what probably was once sandy shale. A single mineral presents many faces and hues to the petrographic microscope. This semicircular arrange-*



*“Butterfly wings” flutter as the microscope stares down a fracture. Muscovite fans out into microcline feldspar when moisture enters the fracture and starts the metamorphosis. The muscovite glistens with gemlike luster in a microscopic world of polarized light. Ironically, diamonds, rubies, emeralds, and sapphires—minerals man prizes because they sparkle on his finger—offer drab, colorless thin sections.*

*Students study a granite thin section in a geology class. Since only one student at a time can see a slide under the microscope, Dr. Collins photographs and projects thin sections for an entire class to view at once.*





EDUCATED BY LORENCE G. COLLINS AND (BELOW) NATIONAL GEOGRAPHIC PHOTOGRAPHER THOMAS WEBER © 2013

ment of muscovite blushes through every intensity of color as the fingerlike grains are rotated a full 360 degrees on the stage of the microscope. Startlingly different portraits of muscovite appear at bottom left and on page 127.

THE END

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# THE WAURÁ

## BRAZILIAN INDIANS OF THE HIDDEN XINGU

Article and photographs by HARALD SCHULTZ

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Taut young warrior measures his scarecrow enemy before hurling a spear.



**I**N THE BEGINNING, there was no man. Flying through the darkness, the son of the bat fell in love with the daughter of the jatobá tree. Out of their love, two boys were born: the sun and the moon.

The brothers made many bows and arrows and set them up next to each other in a long row. Then they made large cigars and blew the smoke against the bows and arrows, changing them into human beings—the ancestors of all the Indians who dwell among the headwaters of the Xingu River. . . .

We are flying toward the remote heart of Brazil. The shadow of our Brazilian Air Force DC-3 skitters batlike over the green roof of the endless Amazon forest, reminding me of the creation myth of the upper Xingu region—our destination, and one of the last fortresses of primitive man.

Far to the south, the Mato Grosso Plateau gives rise to five major rivers. Trickling across savanna, coursing through stands of towering forest, gushing in foaming rapids, they finally merge in the jungle to form the Xingu River

The game sharpens his skill for a joyous mock war with a neighboring tribe.

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REDAGHONY © NATURAL GEOGRAPHIC SOCIETY



(pronounced sheengoo), some 1,000 winding miles from its confluence with the Amazon (map, page 135).

The immense wilderness separating these rivers is a hidden world ringed by once-dreaded tribes: Chavante, Tshikão, Tshukahamae, Cayapó. . . .

Here too dwell many peaceful tribes who cling to an ancient way of life. One of them, the Waurá, is particularly fascinating to me as a scientist and student of Brazilian Indian culture.\* The Waurá know the secret of making pottery. They still practice age-old ceremonies. I now had the rare opportunity to live among them.

### Park Created to Save Ancient Tribes

The jungle rises to meet us. We glide down through roiling heat currents to a patch of red earth in a forest clearing. Our plane bumps and rolls past mud-walled huts to a stop before a large wooden sign:

PÓSTO LEONARDO VILLAS BOAS  
PARQUE NACIONAL DO XINGU

The bearded men who meet us are Orlando and Claudio Villas Boas. With their late brother, for whom this jungle post is named, they have spent many years befriending, pacifying, and protecting Indians of the Xingu from the fatal onrush of civilization. They now control admission to the area.

When the German explorer Karl von den Steinen first entered this region in 1884, he found a populous paradise of 3,000 Indians; they spoke a medley of tongues and lived in 35 villages. In 1962 the World Health Organization reported a population of only 500.

In an effort to halt this devastation, the Brazilian Government created Xingu National Park in 1961 and set rigid admission rules. Experienced jungle pilots of the Brazilian Air Force, navigating to landing strips—no more than scratches in the wilderness—keep open the lifelines. Without them, study of these tribes would be almost impossible.

The plane must return to civilization. Soon after, clearance for my visit is granted, and I set out with three Waurá guides in a bark canoe for the journey to their village.

The village lies by a lake at the end of a long path from the Tamitatoala River. Five houses

stand like giant haystacks around a large square of beaten earth (pages 134-5). Here live 85 Waurá Indians, the last in the world.

Ikiana, a chap about 22, steps forward. He has worked for a year at Campo de Diauarum, an outpost of civilization 65 miles to the north. He can serve as my interpreter among the Arawakan-speaking Waurá.

"Where shall I go with all my belongings?"

"We will build a house for you," says Malakiyauá, the courteous and kindly chief of the village. "You must give everyone who helps build it a bush knife and an ax."

As the days pass, about eight men work continually. The sides of the house are made of thin tree trunks. The roof is covered carefully with sedge.

"Your house is finished!" says Malakiyauá. "Now you must pay." He calls the youths and men together. They line up in long rows.

"Here are eight knives and axes," I say.

"No!" replies the chief seriously and firmly. "Everyone gets an ax and a knife."

There are 18 men and youths. Not all of them worked at the same time, but nearly all the village seems to have worked a little. But I gladly pay, for Malakiyauá knows how to look after the welfare of his village.

### Too Many Cooks Crowd the Hearth

"Now I have a house, I need a cook."

"I will be your assistant. I can cook, too," Ikiana says to me.

The following morning not one but two cooks are stirring the fire.

"This is Akaintobi, the son of Chief Malakiyauá. He is my assistant."

In the afternoon still a third works around our hearth. "And who is he?"

"It is Apá, the son of the storyteller Praguai. He is Akaintobi's assistant."

At breakfast two of Ikiana's nieces and nephews appear at the table—a large flat tree root set upon four posts.

"These little ones get only a half cup of chocolate. This is the end," he says.

\*Memorable accounts by Harald Schultz of other remote Brazilian tribes have appeared in NATIONAL GEOGRAPHIC: "Children of the Sun and Moon," March, 1959; "Tukuna Maidens Come of Age," November, 1959; "Blue-eyed Indian," July, 1961; "Brazil's Big-lipped Indians," January, 1962; and "Indians of the Amazon Darkness," May, 1964.

**Tinkle of a bronze bell**, given by the author to his friend Kari-Kariis, sounds a whimsical counterpoint to the rhythm of a war dance performed now only for games. Living in Brazil's jungle with other pacified Xingu tribes but surrounded by still-savage and marauding Indians, the last 85 Waurá left in the world preserve an ancient, primitive culture. Vivid festivals highlight the dry season, a time of plenty.



If the plane were not bringing more supplies, we would indeed be nearing the end.

Nights during the dry winter—July to September—are bitterly cold. Inside the large communal houses, each Waurá family keeps a fire crackling. They hang their hammocks close to the blaze.

In the house the Indians built for me, I huddle in wool blankets, but still the chill creeps in. This house has no door that can be locked, and in the middle of the night I sense someone standing next to my rubber mattress. It is pitch black. I fumble for my flashlight and ask, "Who is there?"

"Corimágua!" says a soft unfamiliar voice.

At last I find the light. In its beam stands a strange person in rags, holding his hands over his eyes against the glare.

"Who are you?"

"Corimágua!" he answers. He appears to be cold and points at my blanket.

"Go away and let me sleep. We will talk about it tomorrow."

"Corimágua!" he says reproachfully.

I am a little frightened and cannot get back to sleep for a long time.

In the welcome light of morning, I ask Ikiana, "Who is Corimágua?"

"It means 'I am your friend.'"

"And who goes about nights into the houses and disturbs the sleeping?"

"It is the widower, Kaulukumã. Come, I will show you 'your friend.' He lives with me."

In Ikiana's large dark house, where several families dwell, is a cage made of arrow shafts. Inside on an old hammock lies "Corimágua."

"Whenever someone loses his wife," Ikiana explains, "his head is shorn and he is locked up in a cage inside the house, like the young fellows who will soon be men and the girls when they reach womanhood. Only at night can the widower leave his hiding place to roam around and visit his friends. When his hair has grown long again, he is free."

Many of the Indians of the Xingu fear the spirits of the dead. The widower must remain in his cage until it is certain his wife's spirit has departed.



Pot of poison beneath her sieve, a Waurá woman grates juicy manioc root. Boiling disposes of the volatile prussic acid and leaves a potable soup. Coarse paste, rolled into balls (background), as well as starchy residue in the tub, will be dried to make *beiju* cakes, tribal staff of life.

Gleaming arteries of water cross the heart of the South American Continent and join to form the Xingu River, which flows north 1,000 miles to its confluence with the Amazon. In 1961 Brazil set aside 8,500 square miles of dense tropical forest to form the Xingu National Park for the protection of primitive tribes and flora and fauna.

Haystack houses in a forest clearing comprise the remote village of the Waurá Indians. Path at right leads to a large lake. In the white patches around the dwellings, women make manioc flour during the dry season. The author lived in the house under construction near the landing strip, used by the Brazilian Air Force to fly in medical aid.



REDUCTIONS BY HARALD SCHULTZ © N.G.S.



Blood-red helmets of hair decorate men for daily wrestling bouts. Sticky dye, made from the oil of pressed *urucú* seeds boiled into paste, wards off both supernatural beings and real insects. Men believe that tight bands on arms and ankles increase strength. The mask house, an exclusive male “club,” provides storage for painted faces and straw suits that represent spirits (pages 148-9). Men meet here after work and paint themselves for tests of strength. Sacred flutes (page 140), which women may see only on their deathbeds, lie hidden in the thatch walls.

RESEARCH BY © NATIONAL GEOGRAPHIC SOCIETY



“I have no wife who can make me a new hammock,” the widower says. “Look how old and worn it is. Give me your hammock.”

Such a pitiful widower! I give him a hammock and a blanket. A few weeks later, during the visit of a Yalapiti Indian, he trades them for something else he wants.

“Corimagua,” he says brightly.

#### Dancing Amazons Relive a Legend

It is still early morning. Mist hangs in the air. The men are gathered in the village square. Chief Malakiyauá is seated on a stool cut from a solid block of wood.

A chorus of women is singing in the chief's house. In the gloom of the vast interior, two groups are decorating each other blood-red with *urucú* dye. They are putting on new *aluri*—tiny triangles of fiber—their only body covering. Two of the women are adorned

with magnificent diadems of yellow feathers, from which protrude long arara, or macaw, tail feathers.

One of the leaders appears in the dark entrance of the hut. She dances across the square toward Malakiyauá, singing and swinging two arrows up and down (pages 142-43).

The chief rises, carefully takes the woman by the hand, and leads her for a few steps. She continues alone until she disappears again into the chieftain's house.

Shortly after, the second leader of the dancing Amazons appears. She repeats the dance across the square.

Then the chorus appears in two long lines, one moving forward with swaying hips and the other taking small steps sideways. While singing, they dance into and out of the houses.

Praguai, the wise village storyteller, begins his tale: “Once there lived the Jamarikumá





Nature's dazzling patterns inspire makeup for war games. Markings indicate tribal rank, from lowly sea gull to kingly jaguar. Takara tops off a wild-fowl motif with a plaited straw hat (left). Lapokitee wears a precious necklace of jaguar claws (center). Under a diadem of treasured toucan feathers, Kapalukate models the dashing raiment of a hawk (bottom). Waurá boys (below) wear customary gull design, but the chief's grandson enjoys the right to a privileged pattern—polka dots.



KOLLECHIKORAL © NATURAL GEOGRAPHIC SOCIETY







**LIVING GALLERY OF GEOMETRIC ART:** *Abstract designs symbolic of jungle creatures—hawks, pumas, armadillos—whirl, dip, and bob during a rousing dance following daily practice for war games. Warriors shoulder blunt-tipped spears for mock combat and carry wooden spear throwers.*

tribe. For many days the men stayed away and sent no fish to the women. An old man named Kamatápirá, who had been left behind, told the women that their men were bad and would return to kill them. Going to the jungle, he found three giant armadillos. He commanded the animals to dig a long tunnel. Then he and the women followed the armadillos far into the earth, until they came out again at the Tamitatoala River.

"The women danced, painted with urucú and adorned with yellow feather diadems. They made bows and arrows and learned to use them. They learned to live without their men. Nothing more has ever been heard from them. We know only the place by the river where they came from the ground."

In two long lines the chorus of women dances across the square, stamping behind the leaders, retelling with song and step the

old story of the lost Amazons of the Xingu.

These Jamarikumá dances are a welcome change for the Waurá women, who work from dawn to dusk during the long dry season. Each morning they dig out the heavy roots of the bitter manioc plants growing in the nearby fields. Using the starchy pulp from these roots, the Indians make *beiju* cakes—their staff of life (page 135). Manioc is "bitter" because it contains deadly prussic acid, a small portion of which would kill a man.

#### Trouble Stems From Secret Skill

Mats are spread under open palm shelters behind the houses. Here the women peel the manioc roots with clam shells and grate them on boards set with pointed teeth of palmwood. The pulp is then squeezed on a palm-rib sieve to press out the poisonous fluid which, along with fine particles of starch, is collected



in a pot. Coarse pulp left on the sieve is formed into balls and dried as *beiju*. The liquid, boiled to rid it of prussic acid, becomes nutritious soup. Starchy residue in the pot is dried to make fine flat cakes.

The large pots used for preparing manioc, and the smaller gray ones adorned with images of forest animals, confer upon the Waurá great prestige. Of all the tribes living in the upper Xingu, only the Waurá have the secret of ceramics, learned in an unremembered past (page 150).

This skill is also the cause of personal grief. While nearby tribes acquire their pottery by trading with the Waurá, the wild hunters of the distant forests, like the Tshikão, prefer to "steal the factory"—attacking before dawn to carry off Waurá women. The raids are an ever-present danger, even though the steady approach of civilization and the diplomacy of

the Villas Boas brothers make their occurrence less and less frequent.

Dusk gathers. The village square is now quiet. Children and women sit in the doorways of the huts.

Vatuku, the best fisherman of the village, carries a glowing ember, a wooden stool, and some large cigars to a place near the mask house, where the masks and sacred flutes are kept. He is joined by Praguai, the storyteller, and Ayumá with the kind eyes, then by Kraptá, the brother of Chief Malakiyauá. Other men gather. Finally comes the chief.

In the evening they sit on stools in a circle and smoke long cigars.

"Come sit with us, Kukoi." The Waurá have difficulty with *Vuvu*, the name given to me by the Kraho Indians. The closest they can come to pronouncing it is "Kukoi."

Now there is deep concern.

## Her "shadow" gone, a woman dies

**E**VIL SPIRITS lurk in lakes and streams to steal human "shadows," or souls, the Waurá believe. When spirits hold a shadow in captivity, a person grows ill and will perish unless his soul is rescued. In these rare photographs the author captures a poignant struggle to ward off death. Shaman (above) blows magic smoke over a woman whose shadow has been stolen. Chief shaman (right), with assistant, inhales cigar smoke to induce a trance during which he sees spirits and asks for the soul's return. In a last attempt to save her, men play the sacred *jakui* (left), flutes of awesome power; women hide indoors. When even these spirits fail, the tribe ascribes death to witchcraft invoked by another tribe.



ENTACHROME (ABOVE) AND BODACHROME BY HARALD SCHULTZ © N.O.S.





Striding out of a legend, Waurá women tell by step and song the tale of the Jamarikumá Amazons—legendary Xingu women who fled from their selfish husbands and learned to make weapons and live without men. Dance leader (opposite) offers a gift of ceremonial arrows to the chief, representing an old man who helped the Jamarikumá wives escape. Early explorers named the Amazon region after seeing armed women like those the Xingu myth describes. Living isolated in tropical jungle, the primitive Waurá wear little or no costume the year round, recalling Christopher Columbus's account of Indians on San Salvador Island in the Bahamas, "quite naked as their mothers bore them."

In the chief's house, where several families live, Kregmá's wife has been lying for a long time in her hammock. She is wasting away. The shamans think that an evil water spirit, a *sapukiyauá*, has stolen her "shadow," or soul, away. A shaman must go to see the water spirit and ask for the return of the woman's shadow. He can do so only in a state of trance, for only then are the spirits visible to him.

Five large cigars are lying in front of Malakiyauá. On an empty stomach, he smokes one cigar after another. He inhales deeply, then with a hissing sound, he quickly exhales the smoke through half-closed teeth.

#### Trance Turns Shaman Into "Mad Dog"

His solid round face grows stiff; sweat covers forehead and neck; his eyes are tightly closed. With a jerking motion he rises. Shrieking, he runs into the darkness. He disappears down the path to the lake, and soon can be heard crying, talking, and moaning.

He approaches again. Bowed, almost crouching, Malakiyauá runs across the village square. He is not the kind, serene chief I know so well but a strange animal that, driveling and crying, runs into the house where the sick woman lies.

Now crawling, now stumbling to his feet, the dazed shaman passes his hands over the woman's body. He groans and gasps as though contending with the invisible power of the water spirit. He turns in a frenzy, drops to his knees, and with flashing teeth bounds toward me like a mad dog. Horrified, I dash from the house. The men laugh loudly.

"Everywhere, in the rivers and lakes, the spirits wait to snatch the shadows of men," Ikiana tells me. "If Malakiyauá cannot get the shadow of Kregmá's wife back, she will soon die."

The shaman, groaning and moaning as though ill, returns to the circle of men and places his head in Kregmá's lap. Slowly he awakens. I speak to him.

"Did you want to bite me, Malakiyauá?"

He looks at me with surprise. He is again the serene, sensible, and always kind chief.

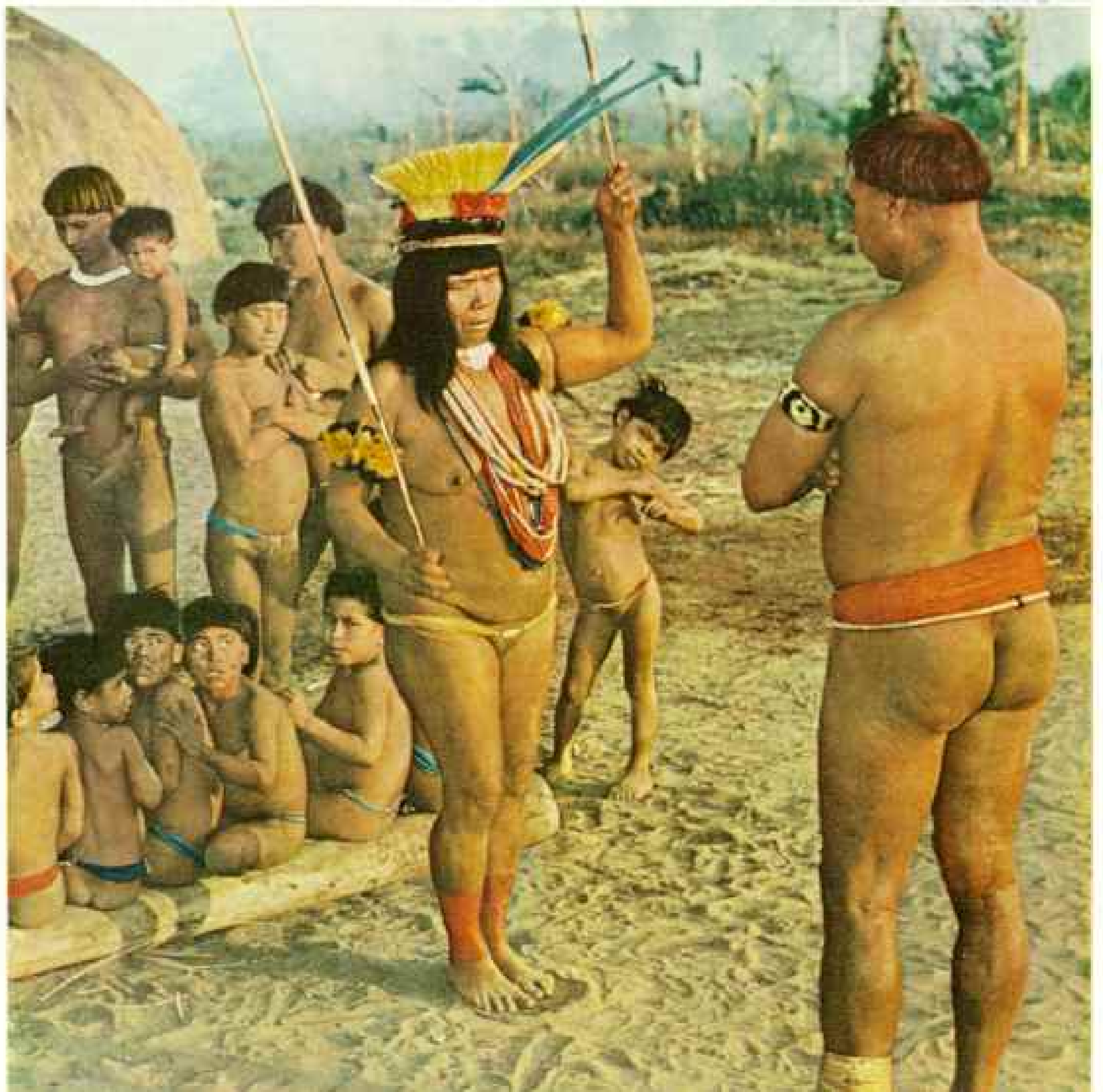
"I know nothing about it, Kukoi."

As time goes on, more attempts are made, while in a state of trance, to persuade the water spirit to return the shadow.

Whenever an ailing person recovers, he may after a time ask his friends to make a portrait of the spirit that held his shadow. These portraits are the masks that hang in



ATAKAPHINE (ABOVE) AND KOURICHOME © N. S. S.





### Clay Fish and Wooden Souls Work Magic

During the dry season, Chief Malakiyauá (left) hides a fish charm (above) in a wicker basket. Then it is sunk in the lake to lure a good catch. The Waurá found the image in a place five days' journey from their village where, they believe, the sun lived when he was a human. As the water level falls lower and fish seek deeper pools, the Indians perform the *patápu* ceremony with bull-roarers, wooden blades carved and painted to represent the souls of fish (lower left). Whirled from the end of a long pole by a skirted man (below), the blade creates a deep humming—a song to call fish back to fill empty Waurá nets.





the men's house. High-spirited Waurá men and boys use them not only in ceremonials but in lighter-hearted moments.

Hardly a day goes by without the lively maskers bounding out to harry the women for food or playfully deprive the fisherman of his morning's catch. Dressed as water spirits, wearing suits of straw, they stare from sightless shell eyes and talk in high falsetto voices to the busy women (pages 148-9).

"Give us beiju cakes! We are hungry!"

Finally, to be rid of the nuisance, the women oblige. Happy now, the maskers skip away, the small ones following spiritedly like little billy goats.

As afternoon shadows lengthen, more of the men return from fishing. They gather in the mask house to paint themselves with red urucú (page 136).

"Urucú is beautiful!" Ikiana says. "It also

protects us against the supernatural beings."

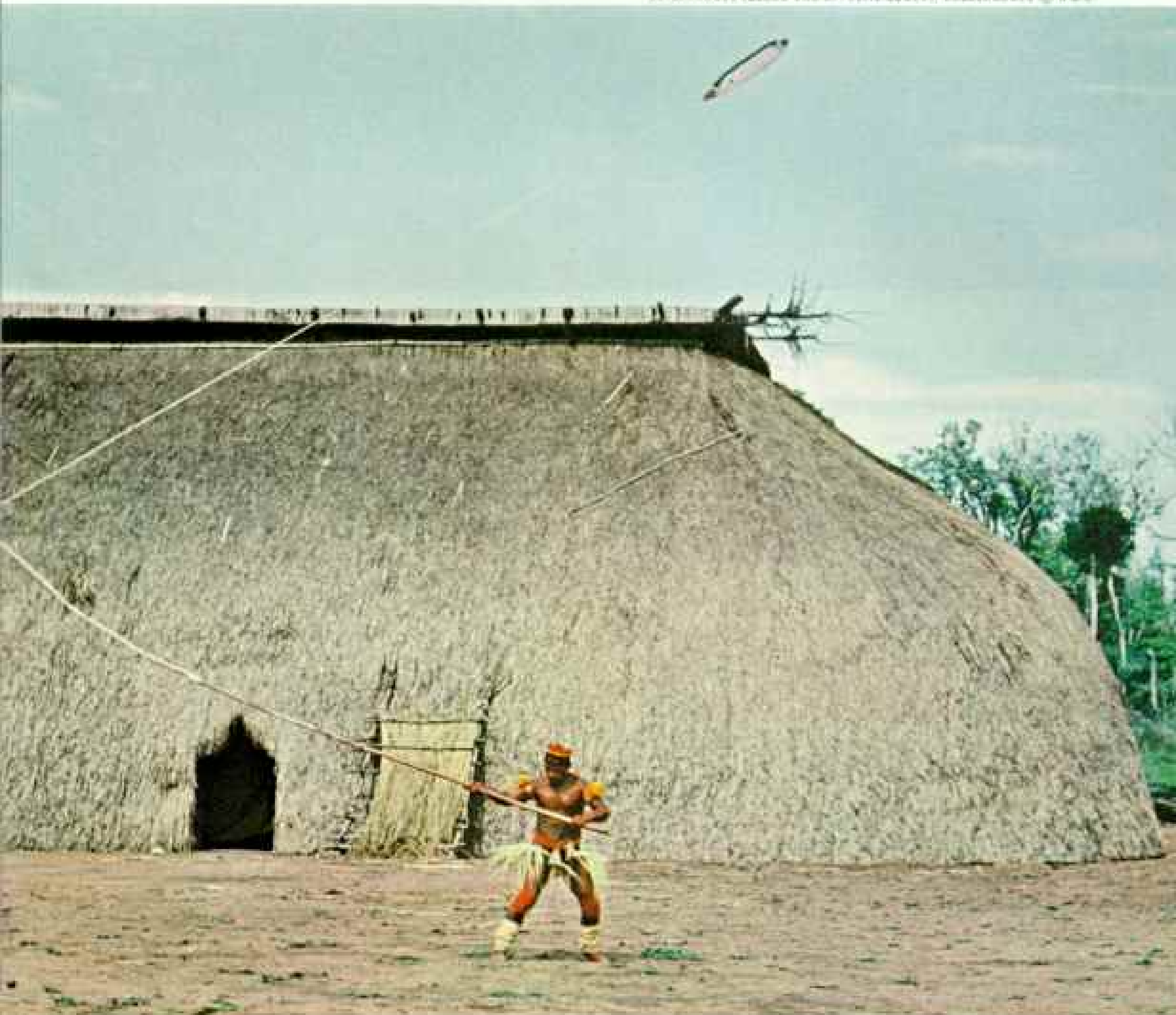
Laughter and joyous singing ring out, and then I hear another sound quite like the call of jaguars: "*Huka! Huka! Huka!*"

In the center of the village square, Ayumá and Kregmá are sparring with one another. With quick movements they roughen their hands with earth and crouch—fists held forward like the paws of beasts. They grasp one another's hands, seeking to get an armlock around the neck. Each tries to throw his opponent flat on his back.

One of them is thrown. He gets up again. The winner helps him. Another pair takes their place. The Waurá men wrestle nearly every afternoon the whole dry season long.

As dusk gathers the men form a long line. The women stand opposite them. Singing and rhythmic stamping fill the air. Tomorrow will be another day of work and joy!

PHOTOGRAPHS (BELOW AND OPPOSITE LOWER) EDZACHORREY © N.H.S.





It is the cold hour before dawn. Suddenly shrill cries ring from the square. A happy crowd of young boys bursts into my hut.

"Come and bathe with us, Kukoi!"

Each morning the boys of the tribe forsake their warm hammocks by the fires to race through the cold air to the lakeside. We go down the path, whistling and singing. Some of the boys carry burning logs, and others gather dry branches along the way. Overhead, a full moon washes the sky of stars.

Not far from the lake a fire is kindled. Smooth brown bodies huddle close to it. Then with a singing roar the boys dash into the icy water. Rhythmically thrashing hands and arms, they practice the warriors' chant, the stirring song sung at their war games. They keep this up for half an hour without breaking the tempo.

In the east, the sun, once a human warrior and father of all the Indians of the Xingu, casts a gleaming spear against the night. The boys leap from the water and race for the village, whooping in high spirits. They learn

early that nature gives nothing away and that life is a daily struggle, but one in which there can be beauty and fun.

#### Monkey Stew Precedes War Games

I am surprised one day to find the tribesmen stewing a big howler monkey.

"I thought you Waurá ate no animals."

"Has no one told you, Kukoi? It is coming time for *javari*—the war games!"

The *javari* are the climax of the dry season, a time of joy and festivity. This year there is a special excitement, for Malakiyauá has invited the tribe's recently dreaded enemies, the Suyá, to the games.

Only the older men will eat the rare meal of stewed monkey, but each man and boy in the village has a part to play in the games. They practice every day for weeks.

The boys have made a large straw man in the square. The tribe is divided into three battle groups. Youths under 15 are covered with white clay, then painted with black patterns. Screaming in high voices, running and



RODCHOWES © NATIONAL GEOGRAPHIC SOCIETY

hopping with deeply bent knees, flapping crooked arms, these are the sea gulls.

Older men paint themselves in the mottled patterns of wild fowl, hawks, otters, monkeys, and armadillos. But the kings of the javari games are the adult warriors who have proven themselves brave and skillful in combat. They wear the markings of the harpy eagle, the king vulture, the tawny puma, and the spotted jaguar. Most distinguished of all are the black jaguars, strong bodies painted with charcoal and white clay.

First the sea gulls, from the end of the line of battle, sweep to the attack, their long javari spears with blunt stone tips striking the straw figure. They are followed by the otters and hens and others of the middle group. Finally, the eagles and jaguars drive the shafts into the enemy, howling triumphantly at each hit (pages 130-31).

After weeks of practice, the Waurá begin a realistic rehearsal for the games. Praguai has stretched a flat layer of cotton over a ring of bark and painted it red. Wedged in his lower

Reaping a slippery harvest, Waurá fishermen flail the surface of a stream with long poles (left). Frightened fish, hidden under the dense cover of water hyacinth, dart into waiting nets held by men in the sterns of the canoes. For many years the Xingu tribes made boats by laboriously peeling large sections of flexible bark from *jatobá* trees and curling them by fire. Now the Waurá own dugout canoes, acquired by trading pottery with dugout-making tribes downriver.

Wealthy Waurá tribesman brings in a net of tasty *matrinchá* fish, a harmless relative of the savage piranha and a favorite food on the Xingu. Takara wears a necklace and three-strand belt of fresh-water clam shells, signs of affluence. Spreading from the end of a long pole, his net pulls shut when fleeing fish hit the palm-fiber mesh. Indians kill fish by biting the backbone and, after grilling, sprinkle them with salt extracted from water-hyacinth ashes.

lip, it is an excellent imitation of a Suyá lip disk. He is now chief Pentoti of the Suyá, the "big-lipped Indians." He struts into the square in an exact and amusing impersonation.

Malakiyauá, dressed in his finest fur headband and necklace of jaguar claws, receives his guest with great solemnity. The two chiefs sit on stools in the center of the square. The maneuvers begin.

Two lines of chanting, roaring warriors, stamping the ground with excitement, square off about 100 feet apart. Suddenly the air is filled with whistling, glinting spears unleashed from wooden throwers. The warriors on both sides dodge the missiles and the files close until only a narrow corridor is left between them.

Out steps a single warrior holding only a thick bundle of staves. His opponent, armed with a blunt-tipped spear, advances between the noisy columns. They feint and twist. The man behind the loose shield turns to make himself a difficult target. The enemy throws. With amazing agility the defender leaps aside as the spear whizzes past.

#### Shields Scorned by Bravest Waurá

Now the roles are reversed, as the attacker becomes the attacked. The enemy seizes a bundle shield and retreats. Again the whir of the long javari spear splits the air, and again it misses the target.

Two new warriors step into position. The attacks and counterattacks continue. So skilled are the combatants that few are hit. When one is, however, a peal of triumph resounds. The "wounded" man is expected to nurse his burning bruise with stoic calm.

Last of all, the birds of prey and great jungle cats step forth without shields of any kind. Standing proud in the sunlight, their skins vivid with color, the bravest of the Waurá offer their nude bodies to the spears of the enemy. They are seldom hit.

Malakiyauá is pleased with his men. In the

Slapstick spirits in straw suits and woven masks demand beiju cakes. With falsetto voices, they threaten cooks with a slashing fish-toothed weapon. The happy horseplay, intended to cadge extra food from hard-working women, occurs daily. In fashioning the masks, representing dangerous water spirits, artisans follow descriptions by sick persons whose shadows were rescued by shamans. After the author bartered for a mask, Waurá friends told him the spirits so resented it they charmed a live fish into the chief's stomach, giving him cramps.

morning, swift *pariatús*—messengers painted all in black—are sent to invite the Suyá. But others follow quickly to bring them back. A messenger swifter than any man has entered the village and soon will claim the soul of Kregmá's wife.

Carefully, the women have closed the doors of their houses. The village seems deserted.

Strange flute music resounds from the lake: The jakui, mightiest of spirits, are coming.

A procession of young men and boys, wearing crowns of yellow feathers, crosses the square. They play long flutes (page 140).



In the dark corner of the chief's house, the dying woman, wasted away to skin and bones, lies in a hammock (page 141). The young men step up close. The flutes fade away. The first one removes his yellow feather crown and places it upon her head, saying, "I offer you this feather crown, mother."

Each of the men repeats this simple ceremony. Then they blow cigar smoke over the sick woman. Sounds of mourning are heard. From everywhere Indians gather. The wailing grows louder as death comes at last.

In front of the mask house, men have dug a

round hole. Wrapped in her hammock, the woman is buried with her face toward the east: "So that every day she can see the rising sun." The widower's wailing is heard throughout the village. He repeats the same heart-breaking sounds for many days, until finally they fade away.

#### Fish Called by Singing Shadows

For weeks now, the water in the lakes and rivers has been steadily falling under a bright sun and cloudless skies. The boats must often be dragged over the sticky clay of exposed

RODALPHINE BY HAROLD SCHULTZ © N.E.C.





PHOTOGRAPHS © NATIONAL GEOGRAPHIC SOCIETY



Secret skill of ceramics, known only by the Waurá among Xingu peoples, confers prestige and trading power, but makes them the target of raids by unpacified tribes seeking pottery-making wives. To create a permanent finish, the chief rubs a dye of root juice and charcoal into the huge clay vessel and fires it upside down over burning logs.

Joy of invention absorbs a boy as he constructs an aircraft copied from those he has seen land on the little village airstrip.

Sculptured Birds by a young artist adorn the lake shore. The Waurá smooths mud "feathers" of an egret built on a skeleton of branches. Clay heron watches as a gull glides on the water.

riverbanks. The men no longer fish with mesh nets. Instead, they use woven baskets to capture individual fish in the shallow water. The day comes when not even the superb skill of Vatuku can fill his vine basket. The fish have gone downstream to the last deep pools.

During their evening smoke, the shamans agree that the time has come for the *patápu* ceremony to call the fish back.

In the mask house, the men are chanting as they carve and paint with bright colors the *patápus*—flat, elliptical wooden shapes representing the souls, or shadows, of fish. Each man makes two, male and female, tying them with long vine cords to slender poles.

Two of the men take their places in the square, while the women retreat inside. Slowly at first, the men swing the poles, whirling the heavy *patápus* around and around, higher and higher overhead. A deep humming sound grows in intensity until the whole earth seems to vibrate with its rhythm. The deep-throated roaring of the *patápus* goes on for several days as the men take turns swinging the fish souls through the sky (pages 144-5).

"Now," says Praguai, "the fish will be moving upstream from where the rivers join to form the Xingu. We made the fish shadows and they are singing to the fish to return. Now there will be plenty of fish. There will be plenty of *piquiá* too!"

For a long time no one has talked of any-

thing else but *piquiá*. The succulent yellow fruit and its juice provide a special treat for the Xingu Indians. All year they wait for it to ripen, then move to the groves and spend days on end gorging themselves.

"*Piquiá*," Malakiyauá says, patting his stomach, "is good!"

#### Dolls of Death Lure the Unwary

We have gone up the Tamitatoala to gather turtle eggs and hunt ducks.

Smoke rises from somewhere far away in the forest or out in the savanna. Someone is burning a new clearing before the rains come.

"*Tshikão!*" the Waurá whisper excitedly as they point to the smoke column. Their interest is aroused, but they have no fear.

A few years ago the wild *Tshikão* Indians from the southwest raided the Waurá village and carried off two children. In retaliation several Waurá men, joined by a group of Kamayurá Indians, paddled upstream and, after a march of a day and a half across the savanna, killed two *Tshikão* men.

The Suyá, until the Villas Boas brothers pacified them, also preyed on the Waurá.

Along the banks of the Tamitatoala we find nine fire sites and a small carelessly plaited basket containing bits of manioc. A straight path leads far into the savanna.

"*Tshikão!*" the Waurá whisper again as they eagerly inspect the sleeping places and

ROYAL CANADIAN MOUNTED BIRDS SOCIETY





DETACHMENT BY HAROLD SCHULTZ © N.A.S.

**Innocence of Eden** lights the painted faces of a young Waurá family. Despite the dry season's nighttime cold, the Indians wear no clothing. The Brazilian Government seeks to protect the peoples of the Xingu region and preserve their ancient way of life. Even limited contact with civilization has had a harmful effect upon all the Xingu tribes: an epidemic of measles a few years ago killed many Waurá.

ashes of a campfire left by the wild Indians. Then my friends freeze in their tracks. Seated upon three poles, blocking the path, are crude human figurines made of dried leaves tied together with thin vines.

Each of the dolls holds a tiny bow. In each bow is a tiny arrow aimed at our hearts. The effect of this sign of warning is grotesque, almost frightening.

I walk closer for a better look. But I stop immediately when a loud warning cry sounds out: "Kukoi! No farther!"

The earth opens at my feet. It is a trap! I stand on the brink of a pit. Ten feet below me, the tips of eight large spears are visible in the dark hole. Each one is capped by a point of needle-sharp jaguar bone.

A hideous death awaits the unwary who falls into such a trap. We pull the spears out and place in the pit an arrow pointing straight up. As a present, some feathers used in making arrows are hung over the shaft; I tie a

little steel knife to it—signs of wishing peace.

"If the Tshikão discover us here, they will crush our skulls. They attack before dawn. We must set up a watch."

The night's sleep is broken not by the feared attack but by a torrential downpour. The long dry season has ended. We huddle over a hissing fire until dawn.

#### Chief Offers a Farewell Gift

As we return, the streams are swelling. In the parched forest, fires ignited by lightning or Indians are going out. Nature is renewing itself. My visit has come to an end.

Malakiyauá says a sad farewell.

"Here, Kukoi, this is for you."

He hands me a simple wooden spatula that he himself has carved. Coming from this good man and his generous people, it is a gift I shall always treasure—a reminder of the dignity, simplicity, and tradition of their ancient way of life.





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If your hearing is normal, the telephone handset on the left is for you. It's what you use now.

But if hearing is a problem, the one on the right may be a help.

It's a transistorized handset for the hard of hearing that has been developed by engineers at Bell Telephone Laboratories.

The small, thumb-operated knob lets the hearer adjust the volume of the caller's voice as on a radio, making it as loud as desired. The handset fits any phone base, in any color. It's one of a number of telephone aids for the handicapped.

For the speechless, there is an electronic artificial larynx, also developed at Bell Laboratories. This provides a steady tone

in the throat cavity which can be modulated into words by shaping mouth and lips.

Several thousand bedfast children around the country keep in touch with classroom work from home or hospital via two-way Bell System amplified telephone circuits.

For the blind, there are switchboards that work by touch. Other devices for other impairments are being worked on.

Some of this equipment looks like the regular thing—some doesn't.

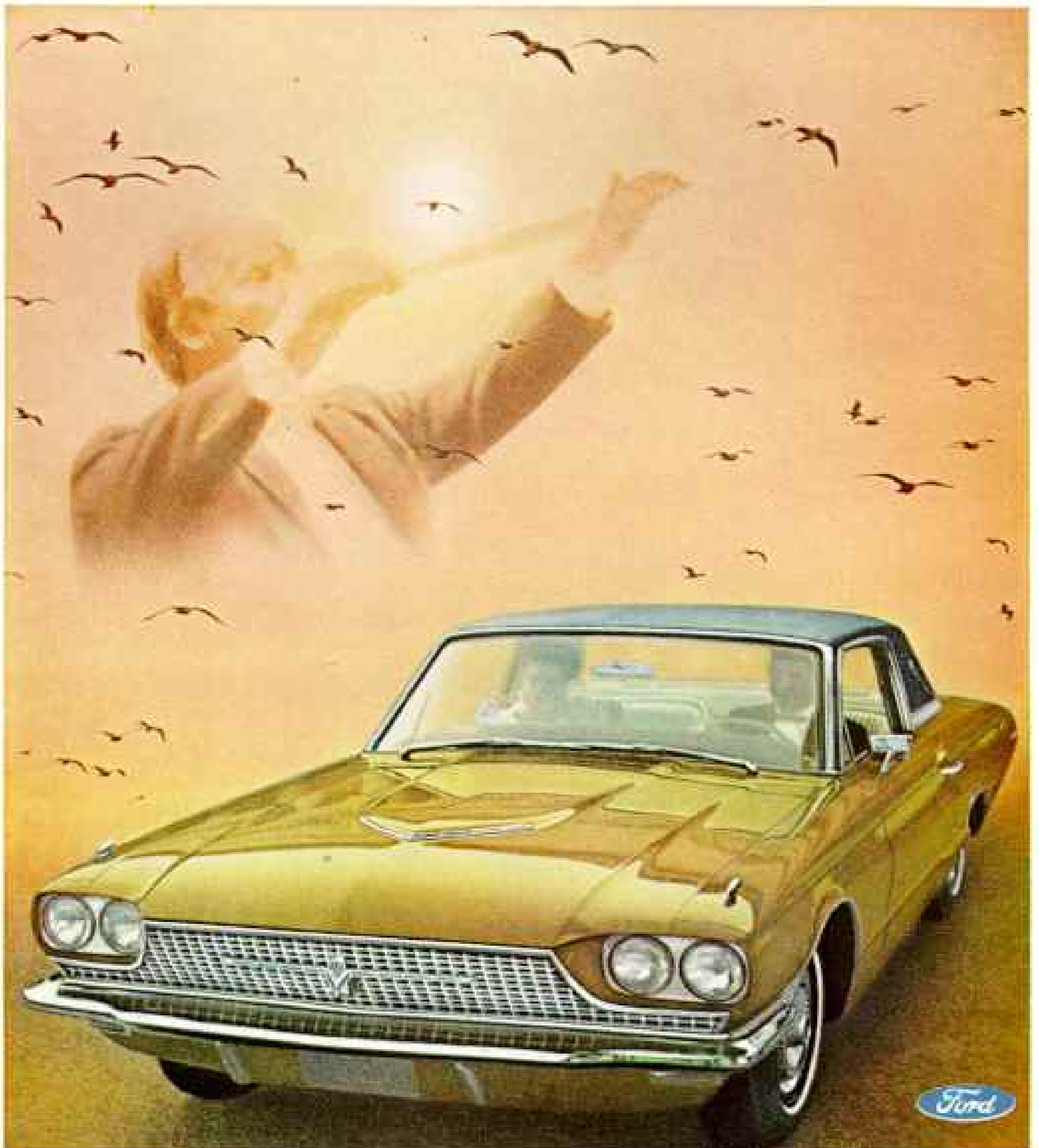
But the point of it all is to give the handicapped a quality of service that's as close to the regular as we can make it.

If you'd like more information about any of these special services, just call a Bell System Business Office, or ask a telephone man.



**Bell System**

American Telephone & Telegraph  
and Associated Companies



1966 Thunderbird Town Landau

### *The Thunderbird Touch: Stereo Tape at your fingertips...*

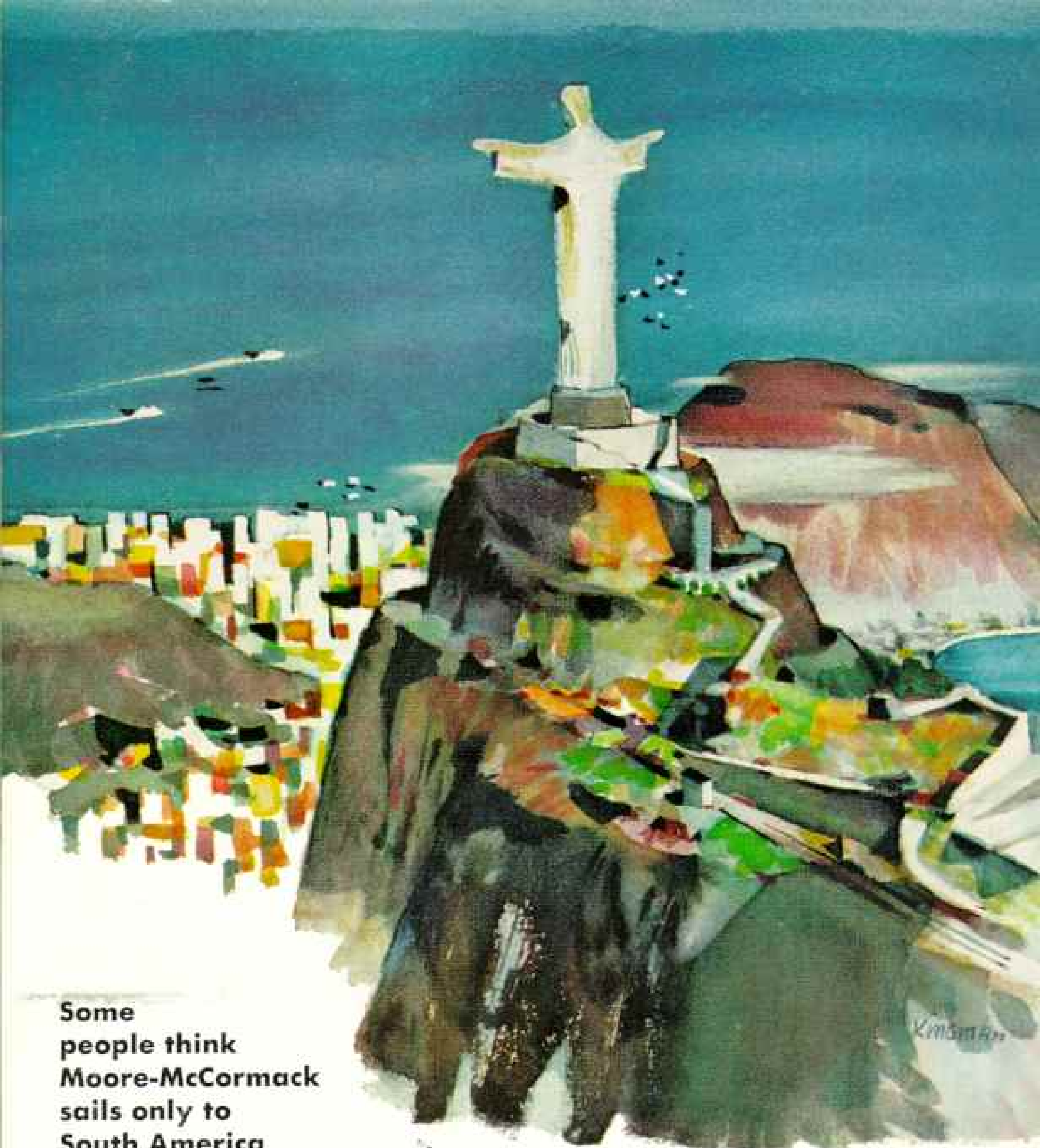
Listen! Thunderbird for 1966 has a new, optional Stereo Tape player that adds a new dimension of pleasure to Thunderbird motoring. This unique four-speaker system plays over 70 minutes of your favorite music on an easy-to-change tape cartridge. And Stereo is only part of the news. Other

new personal touches include: new overhead push button Safety-Convenience Panel on Town models; a more powerful standard V-8 or 428-cubic-inch V-8 option. And, the incomparable styling, engineering and craftsmanship that have made this car a classic in its own time.

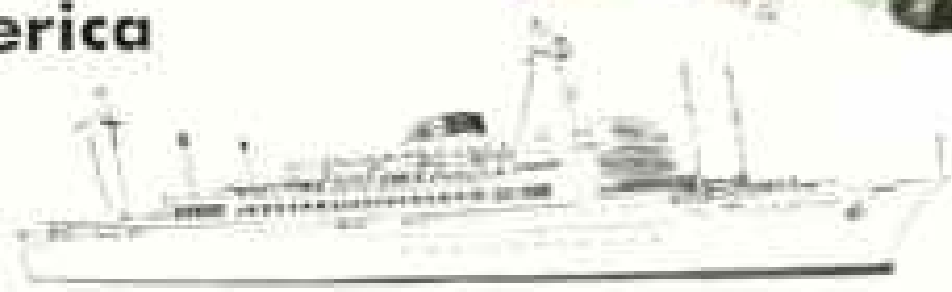
*Thunderbird*



LARGE IN ALL THE WORLDS



**Some people think Moore-McCormack sails only to South America**



And no wonder since we were the first there with passenger-cargo service. That was more than 50 years ago, when modern innovations such as individually air conditioned cabins and anti-roll stabilizers were unknown. Today America's newest, and most modern luxury liners, the *ss* Argentina and her twin, the *ss* Brasil, cruise also to the Caribbean, Mediterranean, Africa, Northern Europe, Scandinavia, and the Baltic. Maybe it's the names of our cruise ships that gave people that idea.

See your travel agent or write for brochures.

- Caribbean Cruises: 5 to 13 days from New York, Jan. 14, 28, March 31, April 5, May 27, June 2, June 16.
- Scandinavia-Baltic-Northern Europe Cruises: 34-days from New York, June 1, July 7, August 4.
- Iberian Riviera Cruise: 31-days from New York, Sept. 9.
- Sea-Safari Cruise: 63-days from New York to South America, Africa, Mediterranean, Jan. 24; from Pt. Everglades, Fla., Jan. 26.
- Carnaval-In-Rio Cruise: 35-days from New York, Feb. 9... from Pt. Everglades, Fla. Feb. 11.
- South America Cruises: 31-days from New York, March 18; April 22, July 1, Aug. 12, Sept. 23.

*ss* ARGENTINA • *ss* BRASIL

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