DOUBLE MAP SUPPLEMENT: UNITED STATES • ITS GROWTH

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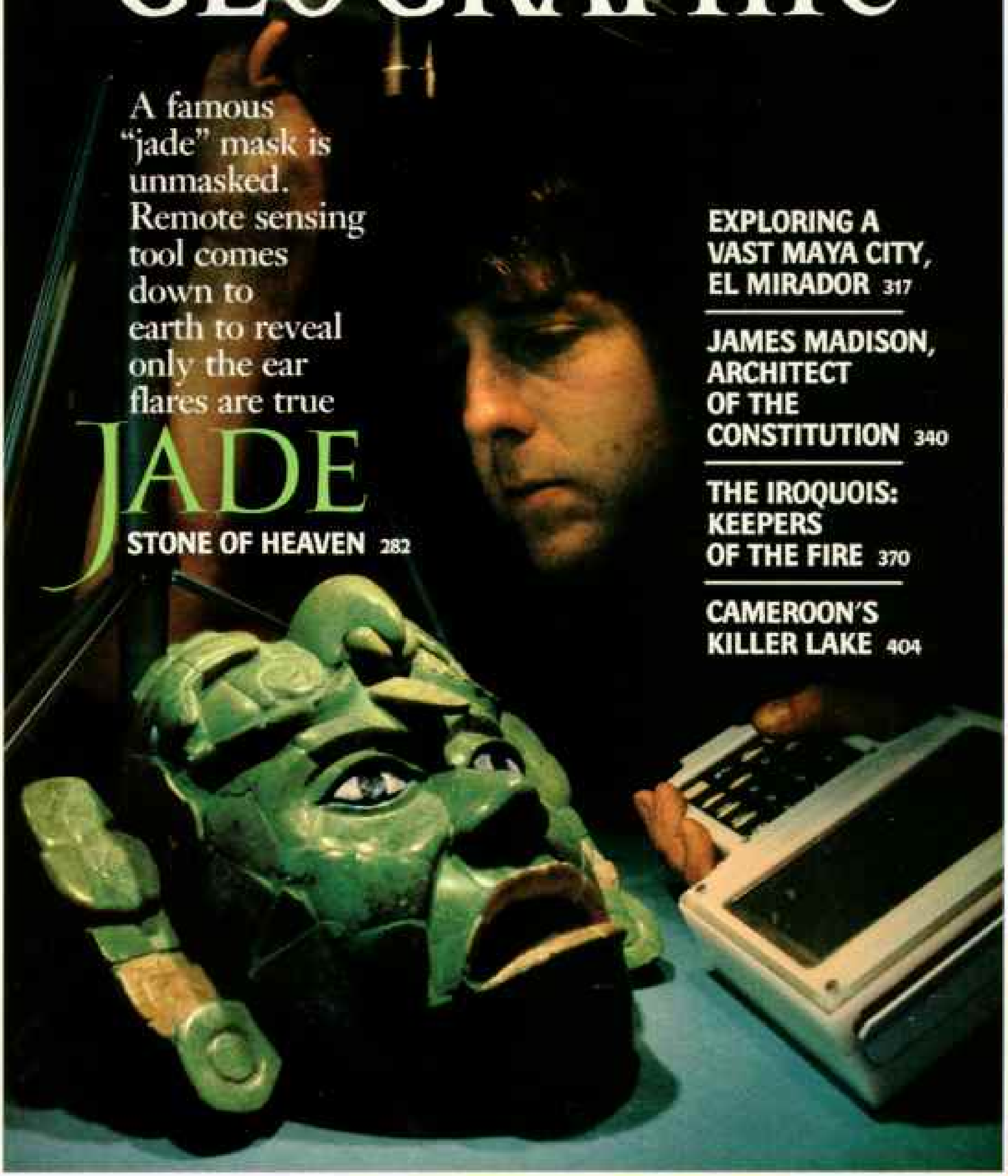
NATIONAL GEOGRAPHIC



A famous "jade" mask is unmasked. Remote sensing tool comes down to earth to reveal only the ear flares are true

JADE

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EXPLORING A VAST MAYA CITY, EL MIRADOR 317

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NATIONAL GEOGRAPHIC

SEPTEMBER 1987

THREE IROQUOIS CHIEFS arrived at my office not long ago with a genuine broken treaty. The recently discovered document was dated November 11, 1794, and bore the names of President George Washington's personal envoy, Col. Timothy Pickering, and 70 white and Indian signers. It recognized that much of western New York State belonged to the Six Nations Iroquois Confederacy. Today Iroquois lands have shrunk to barely 300 square miles.

Some 1,600 brightly painted Indians came to Canandaigua, New York, for the signing of the treaty, which guaranteed that "peace and friendship . . . shall be perpetual between the United States and the Six Nations." It also guaranteed the right of the Indians to sell their land to U. S. citizens.

By 1840 encroaching settlers had broken the pact. Chiefs Bernie Parker, Emerson

CHIEFS EMERSON WEBSTER, HANK ABRAMS, AND BERNIE PARKER (RIGHT) DISCUSS 1794 TREATY WITH NATIONAL GEOGRAPHIC EDITOR BILL GARRETT (SECOND FROM RIGHT) AND EXECUTIVE VICE PRESIDENT OWEN R. ANDERSON (REAR). PHOTOGRAPH BY STEVE WALL.

Webster, and Hank Abrams, who showed me the treaty, are still lobbying to have it honored. By a token annual payment of calico, the U. S. still recognizes its validity. The Iroquois feel it guarantees not only their lands but also their sovereignty. Bernie, an industrial electrician, recently tested this sovereignty by flying to Bogotá, Colombia, with four other confederacy members on Iroquois nation passports. Their attempt to mediate between Nicaragua's Miskito Indian guerrillas and the Sandinista government was not a success, but Indians seldom come out best in such disputes.

Eight Iroquois chiefs have visited the GEOGRAPHIC since we began work on the article appearing in this issue. Had events moved differently, they might have come to Washington not to visit or lobby, but to collect the rent.

Wilbur E. Garrett

EDITOR

Jade—Stone of Heaven 282

More revered than gold in antiquity, this stone of rainbow hues lures seekers to remote places. Author-photographer Fred Ward documents jade's special place in history and art.

El Mirador: An Early Maya Metropolis Uncovered 317

Was this one of America's first great cities? Archaeologist Ray T. Matheny's excavations at a 2,000-year-old site in the Guatemalan jungle have led him to new theories about the roots of Maya civilization. Paintings by T. W. Rutledge.

James Madison, Architect of the Constitution 340

A Virginia politician-scholar was the driving force and design master behind the document whose 200th birthday we now honor. Alice J. Hall brings to light little-known aspects of the unassuming Madison. Photos by Sam Abell.

Living Iroquois Confederacy 370

Proud descendants of once powerful Indian nations hold fast to their heritage. Harvey Arden and photographer Steve Wall chronicle the storied past and uncertain future of these keepers of "The Fire That Never Dies."

United States Map

A double supplement traces the country's territorial history from colonial days to the present.

Cameroon's Killer Lake 404

A cloud of carbon dioxide burst from a West African lake one August night in 1986, and 1,700 people died. Curt Stager describes the search for the cause; photos by Anthony Suau.

COVER: *To unlock the secrets of a Maya mask, Dr. Brian Curtiss tests the mosaic with a portable light spectrometer. Long thought to be made of jade, the pieces are look-alikes, except for the ear flares. Photograph by Fred Ward.*

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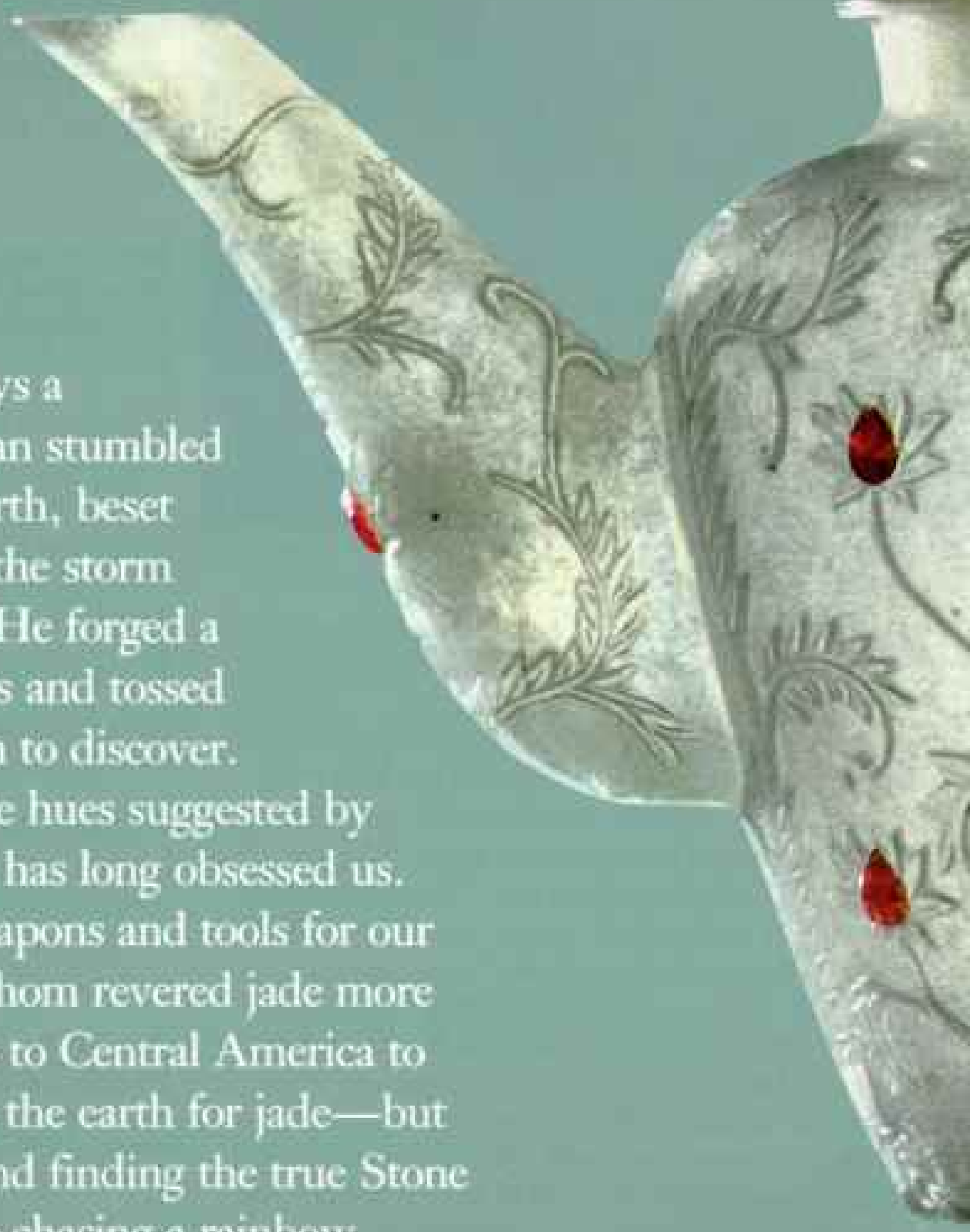
FOUNDED 1888

JADE
STONE OF HEAVEN

Article and
photographs by
FRED WARD
BLACK STAR



In the beginning, says a Chinese myth, man stumbled helplessly over the earth, beset by wild beasts, until the storm god above took pity. He forged a rainbow into jade axes and tossed them to earth for man to discover.

Appearing in all the hues suggested by the legend, this stone has long obsessed us. It yielded durable weapons and tools for our ancestors, many of whom revered jade more than gold. From Asia to Central America to Canada we still scour the earth for jade—but look-alikes abound, and finding the true Stone of Heaven can be like chasing a rainbow.

NEARLY PAPER-THIN, crowned with a synthetic ruby—probably a repair—and adorned with a genuine ruby and crimson spinels, a teapot of white jadeite typical of India's Mogul style was carved in China during the Qing dynasty, A.D. 1644-1911.

BAUR COLLECTION, GENEVA, SWITZERLAND; HEIGHT 13.5 CM

THIS WAS MY THIRD DAY looking for jade, hardly enough time for me to qualify as a "jade picker" but long enough to sense the vagaries of an elusive trade. Although I was standing in water, I was on the edge of one of the most severe deserts in the world, the Taklimakan, "the place from where no one returns."

This very stream, the Yurungkax, the White Jade River, is a mecca for jade lovers, origin of the material that has been at the traditional center of Chinese civilization for more than 5,000 years. If jade is the essence of China, then the Yurungkax is the essence of jade.

Resting on a boulder, I studied a landscape as desolate as any other on earth. No greenery broke the tan monotony. When I asked about the annual rainfall, there was a long consultation between the driver and the translator before they concluded there is no annual rainfall. The last time it had rained was one morning in 1980.

The city of Hotan, as far from an ocean as any place I ever was, lies 30 miles downriver and the fabled Kunlun Mountains about 70 miles upstream. Kunlun, the original "jade mountains," appear to have been Asia's sole source from prehistoric times until the 1700s. For centuries jade pickers have roamed these shores collecting riches washed down in the spring floods. Camel caravans traveling west through this famed stop on the Silk Road carried Cathay's fabrics to the Middle East, and on their return trips packed the heavy jade boulders more than 2,000 miles for the emperors' workshops in Beijing. In this isolated desert a European held Asian jade for the first time: Marco Polo in 1272 observed "chalcedony and jasper, which are carried for sale to Cathay, and such is their abundance that they form a considerable . . . commerce." What he saw but did not recognize was jade.

As I rose slowly for the long hot hike back to the gravel road, a ripple of light froze my step. Could it be? I splashed into the shallows to flip the rock. Too good to be true—white jade from the White Jade River! I turned the palm-size beauty over and over, the oily feel and brown, yellow, and tan rind verifying its composition: a white nephrite treasure—the Stone of Heaven—from this legendary site, the historical material of China's heart. I held a pebble such as museums display and contemporary carvers would offer a week's work for.

China, Mesoamerica, and the Maori of New Zealand considered jade the most precious possession, beyond gold and gems. "One can put a price on gold," so the saying went, "but jade is priceless." Chinese emperors spoke to God through ritual *bi*, disks of jade with holes in the middle, themselves the symbols of heaven. Richard Gump, whose San Francisco store became synonymous with jade, says succinctly, "China built a civilization around the stone."

Jade was the link in China between earth and heaven, the bridge from life to immortality. A Chinese gentleman paced his life by altering his gait to make the jades dangling from his belt tinkle to a measured beat. Confucius compared the virtues of such a gentleman with the virtues of jade, applying such traits as intelligence, loyalty, justice, humanity, truth, and more. Just as we use the word gold to embellish a phrase, the Chinese incorporate jade into thousands of expressions: "Jade person" is a beautiful woman; "fragrant jade" is a woman's skin; "jade shattered" is a beauty's death.

No price was too high, no effort too large, and no praise too great for a fine piece, exquisitely carved. Court members displayed their ranks with jade, and athletes won ivory for third and gold for second, with jade, a sign of health and luck, reserved for first place. Scholars' tables were appointed with jade implements. The respect for jade reached such a level that, after Emperor Qian Long assembled the best craftsmen for Beijing workshops, jade masters could be referred to as "Sir," a distinct honor in the caste-conscious empire.

CHOKING THROUGH SIDE STREETS in dust-covered Hotan, I stepped into the crowded courtyard of China's jade-buying station. Uygur tribesmen, the traditional jade pickers, had preceded me all morning, laying a carpet of burlap bags on the inch-deep bed of dust so their jade boulders would have a decent presentation. Ancestors of these Uygurs haggled in bazaars near this spot, selling the famous white *(Continued on page 290)*

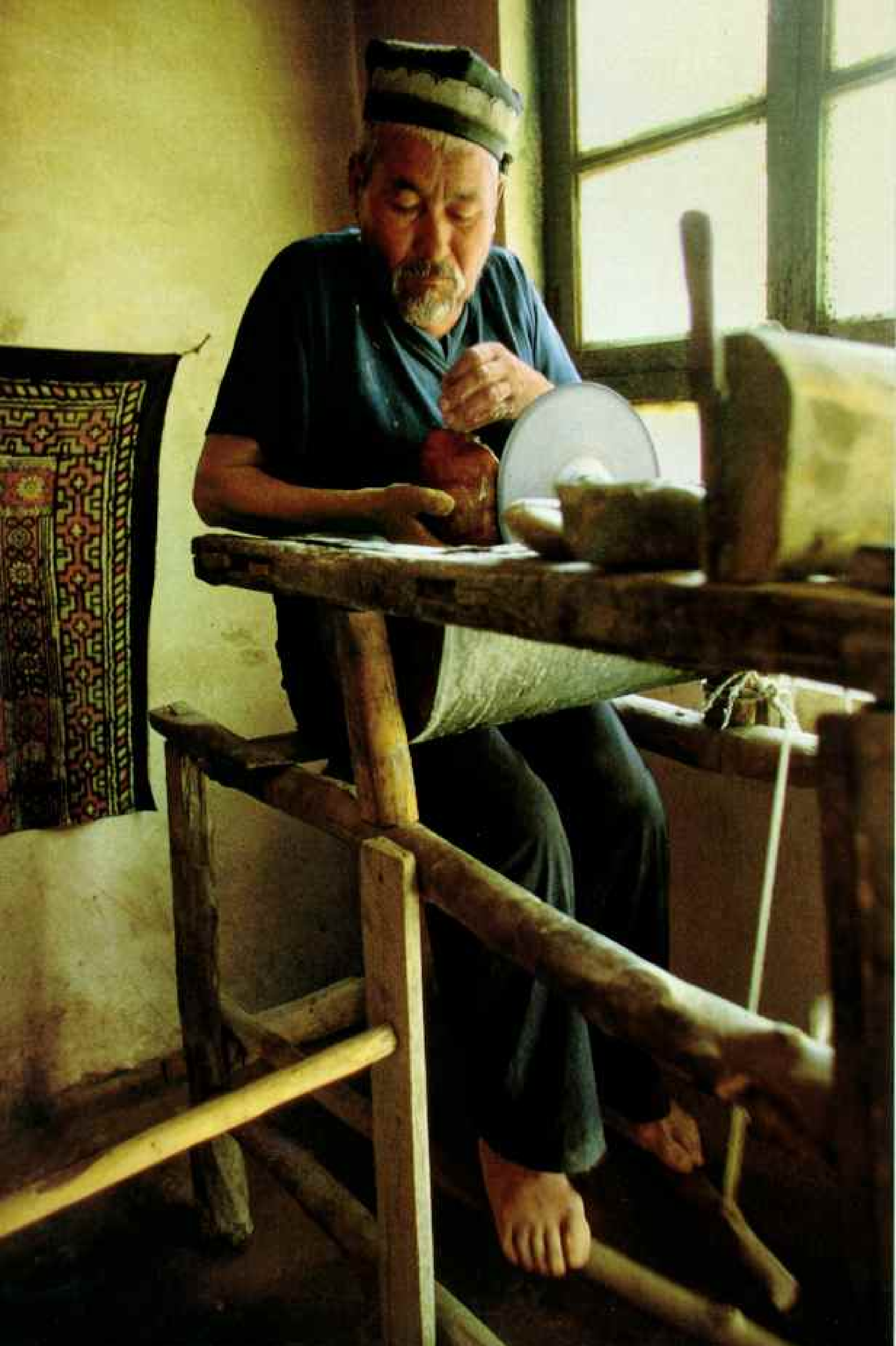
EMPERORS SPOKE TO HEAVEN through pi disks, such as one bearing dragons (above) carved during the Eastern Zhou dynasty, 770-221 B.C., from a type of jade called nephrite. The pi was one of the six ritual jade pieces used in burial rites by the Chinese, who saw the stone as the bridge to immortality.

A nephrite blade in an antler socket with a handle of ash made a sturdy ax (left) for people of a stilt-house culture on Swiss lakes some 4,000 years ago. Later Europeans knew jade only as an exotic import from Asia and as New World souvenirs.

DISK: NELSON-ATKINS MUSEUM OF ART, ARLEAN FUND, KANSAS CITY, MISSOURI; DIAMETER 18.5 CM. AX: BERNISCHES HISTORISCHES MUSEUM, BERN, SWITZERLAND; LENGTH 26 CM

CHINA'S MOST BELOVED JADE washes from the Kunlun Mountains in Xinjiang Province into the bed of the White Jade River (above), where a Uygur tribesman hunts for nephrite. From this lode, for a long period outside China's control, jade boulders once were borne by camel 2,000 miles east to emperors' workshops. Today factory representatives come to the source, arriving at Hotan (below) where Uygurs offer a dwindling supply of jade cobbles. The government sets a price—here $19 a kilogram—and brooks no haggling.

Ashimu, a carver in Hotan (right), turns a blade with a traditional treadle, adding water and an abrasive to create a nephrite bangle.



An animal kingdom of jade

THE NATURAL WORLD, a favorite motif for carvers both ancient and modern, is reflected in the only two stones legally accepted today as jade—nephrite and jadeite. Nephrite, more common, is a silicate of calcium and magnesium. Harder to scratch than most steel, it is reputedly the most difficult of all rocks to break. Jadeite, a silicate of sodium and aluminum, is harder than nephrite but not quite as tough. Various trace elements color both stones.

DELICATELY WRITHING, a nephrite dragon pendant (above right) was carved during the Eastern Zhou dynasty. Prized for its superb craftsmanship, a sleeping nephrite horse (right) dates from the Song dynasty, A.D. 960-1279. Fanciful terms for jade colors include mutton fat, apple, spinach, kingfisher, and scores more.

BOTH ART INSTITUTE OF CHICAGO; PENDANT LENGTH 18 CM, HORSE, 11.5 CM

MODERN CLASSIC, a Canada goose takes wing (above right), released from within British Columbian nephrite by Vancouver carver Lyle Sopel, who sold the work for $850 U. S. The angular lines of a praying mantis (right) find expression in bright green Burmese jadeite carved in China during the Qing dynasty.

SHOWN: COLLECTION OF LYLE SOPEL, VANCOUVER, B.C.; MINIATURE: BAUR COLLECTION, GENEVA, SWITZERLAND; LENGTH 9.4 CM

FLIGHTS OF FANCY: Erwin Klein, a contemporary West German carver, fashioned from black Australian nephrite one of that nation's famed black swans, with a coral bill (below left). A Qing dynasty artist, contemplating a piece of white nephrite, used reddish oxidation on its surface to adorn a mythical winged unicorn (below).

SWAN: PRIVATE COLLECTION, ADELAIDE, AUSTRALIA; LENGTH 17.8 CM. UNICORN: ASIAN ART MUSEUM, THE AVERY BRUNDAGE COLLECTION, SAN FRANCISCO; LENGTH 10 CM

(Continued from page 284) jades destined for the emperors' courts. Although collecting has changed little in 5,000 years, economics have. Under the Communist government, there is no bargaining. These Muslims are Chinese citizens now, although that status was not necessarily welcomed. Sinkiang (Xinjiang) and Tibet (Xizang) were among the last two areas pacified when China expanded to its present borders.

Zhang Yu Ruh, manager of the Hotan District Industrial Art Company of Xinjiang, China, is a fairly laid-back representative of the central government in this distant corner, somewhat like being a lone fur buyer in Alaska in the 1800s. "There are only 50 to 60 full-time jade pickers. The others are farmers who go out two or three times a year to supplement their income. It's hard, often unproductive work, but a few of them have an eye for it."

Abdulanur (Uygurs use only one name) sat behind a large pile of jade of mixed quality. I watched as Zhang and a buyer from the carving factory in Yangzhou made their way up the line to him. Imperiously tossing and kicking rocks aside, they disdained most of what they saw. Still, there was some passable material on Abdulanur's mat. A few pieces received the coveted red marks indicating class one to five. Mainly, his did not. However, enough did—along with his "out of class" but still usable jade—to weigh in at 250 kilograms (550 pounds). When he had finished lugging each cobble to the battered old scale, he found he had made 500 yuan, about $130 U. S. Not bad for three months collecting. My government translator has to support himself in Beijing on $321 a year. The most successful picker in Hotan made ten times that last year, but he lives far up the river and spends full time searching.

I was disappointed by the small amount of white jade. "Ah," Zhang replied, "good jade is a rarity. We ship less than a ton a year of class one, for which we pay 60 yuan [about $16] a kilo. We even let jade pickers buy rice at the lower state price, but it doesn't help."

Just how rare became apparent as I visited carving centers along China's east coast. Beijing's case is typical, but larger in every way. The four workshops of the Beijing Jade Carving Factory employ 1,800. More than 1,500 carvers hunched over individual stations, each with a whirring diamond-tipped burr to grind out intricate designs, a process that I imagined looked and smelled much like the labor of hundreds of 19th-century dentists. They certainly were cutting stone, but seldom was it jade.

IN CHINESE the word *yu*, which we translate as "jade," actually refers to any rock worthy of being carved. Some 30 to 40 kinds in China are called yu. To complicate the matter further, there are actually two chemically distinct materials that the world legally accepts as jade: nephrite (*lao-yu*, old jade, or *bai-yu*, white jade) and jadeite (*fei-cui-yu*, kingfisher jade). Both are technically rocks, since they are mineral aggregates.

The more plentiful nephrite, a silicate of calcium and magnesium (usually with some iron), is the jade from Hotan. It is also found in British Columbia, Australia, New Zealand, the U.S.S.R., South Korea, Switzerland, Italy, Poland, Taiwan, California, Alaska, Wyoming, and in small amounts at a few other sites. With the same chemical composition, a white stone with regular crystals is tremolite and a green one, actinolite. It is nephrite only when its needle-shaped grains are tightly interwoven in a felted, fibrous structure—a physical state produced during its underground formation. Nephrite (5.5 to 6.5 on the Mohs' scale) is harder than most steel (5.0 to 6.0) and reputedly the toughest of all rocks, a measure of resistance to breaking. Depending on trace elements, nephrite occurs in a variety of colors, including "mutton fat" white, which the Chinese long favored.

Jadeite, a silicate of sodium and aluminum, has the bright green associated with jewelry, though it is also found in a rainbow of less valuable colors: lavender, black, white, duller greens. Commercially it comes only from Burma, Guatemala, and the U.S.S.R., though small amounts have been found in Switzerland, Japan, and California. Jadeite (Mohs' 6.5 to 7.0) is slightly harder than nephrite but is not as tough.

Maybe the carvers, buyers, dealers, and sellers know what rocks they are using, but it has become all too convenient to name any stone operation a "jade factory." Marketing the cheaper output as jade to unsuspecting

DIFFERING RECIPES of chemistry, heat, and pressure determine deposits of the two forms of jade. Nephrite ranges from China, the Soviet Union, South Korea, and Taiwan south to Australia and New Zealand. Europe has a handful of reserves, and more extensive ones lie in British Columbia and Alaska. Jadeite in quantity comes only from Guatemala, Siberia, and Burma—the latter now prized for its bright green imperial jade.

tourists is rampant in China, Hong Kong, and Taiwan. Let the buyer beware!

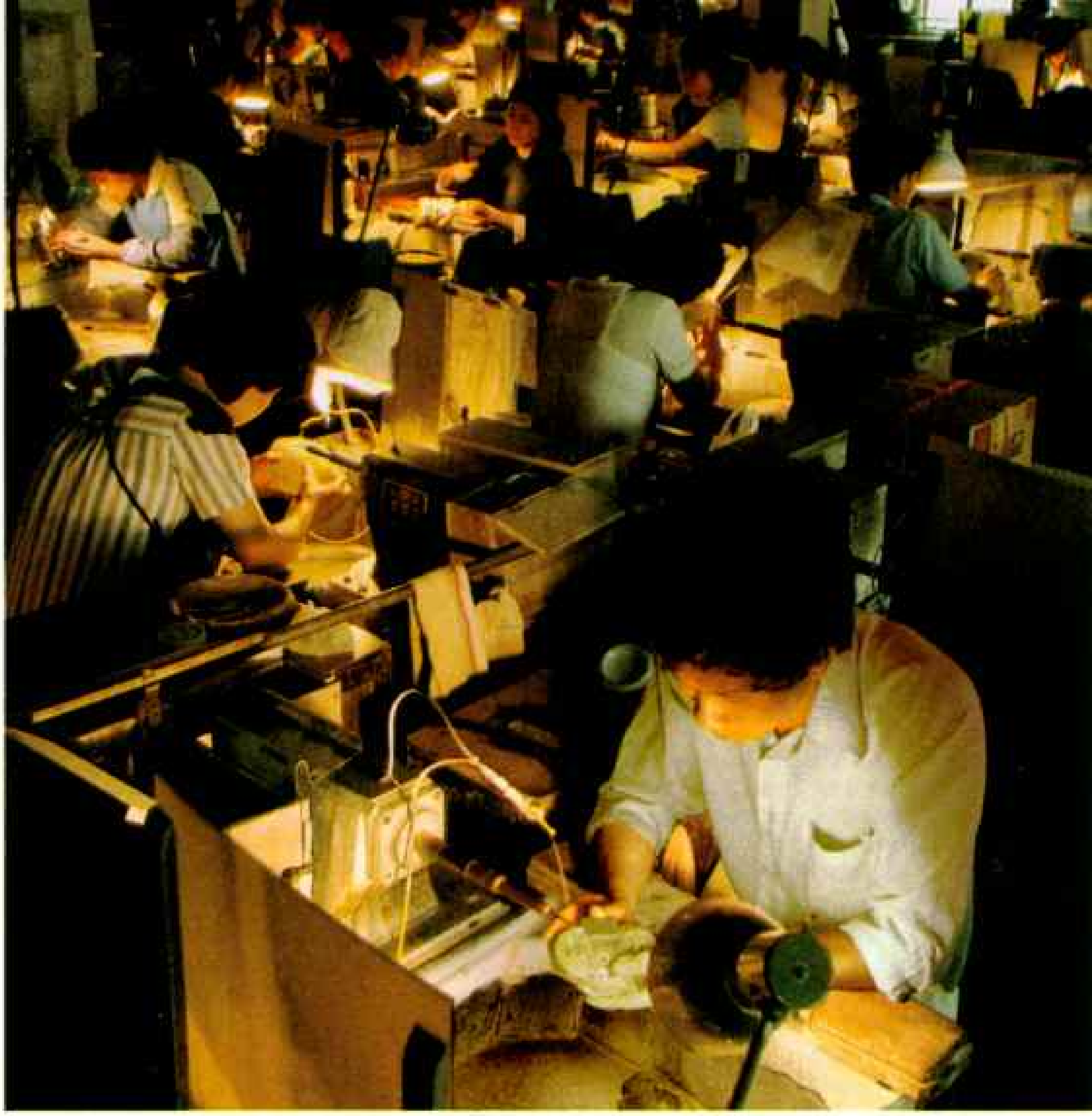
After walking past scores of workers, I asked Beijing manager Chang Ji Li if there was any nephrite. "Very little," he answered. "We sell finished pieces worth 15 million yuan [four million U. S. dollars] a year, but mainly they're soapstone, *xiu-yu*. That and agate account for 75 percent of our work, with Burmese jadeite making up most of the difference. We probably don't order a ton of lao-yu a year."

THE SOUTH JADE CRAFTS FACTORY in Guangzhou (formerly Canton) is a step back in time. Young carvers—toiling 48 hours a week in a darkened expanse punctuated only by a dim incandescent bulb over each drill—grind out thousands of bangles and Chinese angels. A factory official explained: "We don't do white jade or nephrite. Carvings we do in soapstone. We use $700,000 worth of Burmese jadeite annually, 45 percent of it bought at the Burma government auction, 50 percent smuggled through Thailand, and 5 percent smuggled in through Yunnan. We make jadeite jewelry because that's what clients buy, almost two million dollars' worth a year."

Direct Burmese smuggling to China is a new wrinkle in the shady world of jadeite trading—and unknown to outsiders until now. Much closer to the Burmese mines than Thailand, this Yunnan connection lets the People's Republic of China (PRC) avoid middlemen while becoming a dealer itself. Already a government jade office in Kunming markets Burmese jadeite rough to Hong Kong buyers.

In Nanjing, at the Jadeware Workshop, director Zheng Jing Guo dropped his usual smile as he admitted there was no jade for his 65 carvers, or for me. "Actually," he confided, "we haven't had either type for over two months. It's difficult to get good rough here, so we've been working soapstone and coral. Usually we do have some jadeite."

Had China rejected its jade heritage? I continued to meet numerous young carvers



TOKYO NATIONAL MUSEUM

BAUBLES AND BANGLES, not of jade but of soapstone, plus a little Burmese jadeite, are shaped for the Hong Kong market in China's South Jade Crafts Factory in Guangzhou (above). Jadeite, imported into China in quantity only after 1784, has overwhelmed the native nephrite, prized for millennia but now carved only in a few factories such as one in Yangzhou (right), where a diamond-tipped burr inscribes a nephrite disk. Traditional methods required endless patience, as shown by an artisan (left), who with a drill shaft attached to a bowstring draws the bow back and forth, working bit into stone with water and abrasive. The Chinese call old nephrite lao-yu, and jadeite fei-cui-yu, or kingfisher jade.

who had never put a drill to nephrite. And in factory stores I saw far more Burmese jadeite jewelry than nephrite.

My outlook was a little restored at the Yangzhou Jade Carving Factory. Director Lei Shou Yan, with crew cut and wearing running shoes, led me into an airy sunlit semicircular studio. Four craftsmen sculptured scenes into small nephrite boulders, and three were well along with intricate jadeite carvings. This factory even retains five foot-treadles so a few artisans can still create pieces the slow, old-fashioned way.

"Yangzhou is different," Lei explained, "because of its history. We have always been famous for our 'jade mountains.' When Emperor Qian Long received the largest chunk ever to be worked, he didn't send it to his Beijing workshops but to Yangzhou. After our revolution the tradition continued. Even so, jadeite accounts for only about half the dollar output from our 370 workers."

IF EVER THERE WAS A CASE of the tail wagging the dog, it is Burmese jadeite. The top nephrite colors might sell for $50 to $100 a kilogram, while a brilliant green, translucent jadeite cabochon (weighing no more than an ounce) can fetch more than $50,000. Virtually unknown in China before 1784, when a shipment arrived in Beijing following a Burma trade treaty, the flashier jadeite in 200 years effectively displaced nephrite for jewelry and commerce, much to the consternation of serious collectors, who view the import as a young upstart. After all, any culture that considers everything after the Han dynasty (206 B.C.–A.D. 220) to be modern history might be expected to venerate a glorious 5,000-year tradition of subtle nephrite carvings before directing much attention to shiny green jadeite jewelry.

Burma takes the opposite tack. A handbook for its bizarre annual Gem Emporium unabashedly claims, "The land between the Chindwin and Uyu is the home of jadeite, the only true jade and the source of imperial jade," neatly sidestepping any reference to China's nephrite legacy. At Rangoon's rundown Russian-built Inya Lake Hotel, some 400 buyers arrive each year to make silent-auction bids on pearls, rubies, sapphires, and jadeite boulders. This pet project of

Chairman Ne Win brings in about 12 million dollars a year, roughly 2 percent of Burma's foreign exchange. Jade accounts for more than three million dollars of that, with China out-purchasing everyone else.

One disgruntled dealer, who looked like a "hurricane party" participant laden with bottled water, beer, canned food, tinned coffee, peanut butter, and crackers hand carried from Bangkok, complained, "They would sell more and we could buy more if the Burmese government ever understood pricing. Of the first 52 jade lots of 262 offered, only three sold because the floor prices were so ridiculously high." A Hong Kong factory owner added, "We seldom see quality jadeite here. We just come for the commercial and utility grades. The good colors are smuggled out."

Smuggling is more than the national pastime in Burma, albeit technically punishable by death. Most experts say that more than half the socialist country's gross national product is black market. One U. S. Embassy official familiar with the problem jokes, "Burma grows the tallest teak trees in the world. No matter which way you cut one, it falls in Thailand." With jade, smuggling is the norm, even though it means lugging heavy boulders through the mountains and jungles to Thailand, at least a 12-day trek, using human porters. Everyone I saw agreed that well over half the annual tonnage from the Mogaung area in contested northern Burma is clandestinely carried from the Kachin State, through the Shan State (where drug-smuggling warlords levy 15 percent safe-passage taxes) to northern Thailand. Since the government controls only part of the mining area, Gem Emporium jade comes only from that small holding and from intercepted smuggled goods.

FOLLOWING THE SAME ROUTE that the 300 Hong Kong buyers at the emporium use for completing their jadeite inventories, I headed north via Bangkok to the jade-smuggling capital of the world. I knew Chiang Mai would be different when, at my first lunch, I realized I was the only person without a gun. Four houses of jade sell the smuggled goods relatively openly, within local Thai laws, and handle more than half the jadeite sold in the world.

The four act as brokers, bringing the Burmese merchants-owners-smugglers (usually of Chinese heritage) together with the Hong Kong or PRC buyers. The trade in jadeite is, after all, a Chinese business. They bargain in a godown (warehouse) between Hong Kong-bound crates stacked to the ceiling. Besides a gooseneck lamp and a bucket of water, there is only the jade. If others are present, the negotiators are likely to hide their offers by using hand signals under a towel. None of the three parties—smuggler, broker, purchaser—wants any part of the transaction publicized.

A deal is struck, the rocks are flown to Hong Kong, the jade house's agent there is paid on arrival, the funds are deposited, a telex is sent verifying the payment, and the smuggler then gets his money, less a 7 percent house commission and any advances for expenses, food, mules, women, etc. A hotel manager, who requested anonymity, commented on the various interactions of the trade: "It's the perfect business, almost without risk. The house puts up little money, doesn't do the smuggling, doesn't own the jade, is in no personal or financial danger, and gets rich from the 7 percent."

And China and Hong Kong get the jade they need. Two days later I was in a dingy Hong Kong factory viewing the same stones I had seen haggled over in Chiang Mai. It is said that any carver with a business card and a drill (perhaps 4,500 people in Hong Kong) is a factory. Lai Kai Cheung, owner of Po Shan Jade Factory, explains, "I don't even

EXTRAVAGANZA IN STONE: It took 1,000 people and many horses three years to haul this six-ton nephrite boulder from remote Xinjiang Province. It took seven more years, until 1787, for carvers to create the mountain landscape ordered by perhaps the most passionate patron of jade, Emperor Qian Long. His personal seal appears at upper right, and he graced the other side with a poem. The legendary scene commemorates the taming of Yellow River floodwaters in the 21st century B.C. by Yu the Great, who triumphed after 13 years of canal digging. His emperor awarded a black jade tablet to Yu, who later became the first ruler of the Xia dynasty.

THE PALACE MUSEUM, BEIJING, CHINA

have a jade factory any more. I job almost everything out. Figuring I need 2,000 kilos of jade a year, I bought 4,000 kilos at the emporium, then another 4,000 in Chiang Mai. The quality was down and the price up in Burma, but I can still resell jade here to people who can't afford or don't want to go, and I make a profit without carving. Look at the green line in this rough from lot 85. I'll make 150 rings for about 110,000 Hong Kong dollars [$14,000 U. S.], sell them for $150,000 HK, and have the rest left for other things."

When I repeatedly asked if nephrite was carved, factory owners usually countered, "You mean soft jade?" indicating how little regard and knowledge people in the Chinese jade trade today have for the Stone of Heaven. In Hong Kong traditional reverence for nephrite survives mainly among collectors. They are preserving their heritage amid dealers who act as if jade began with jadeite in the late 1700s and who hawk recent carvings in a variety of cheap substitutes as "high-quality new jades."

Overlooking Chung Hom Bay, Chung Wah Pui and some of his friends shared a quieter, gentler, more scholarly approach to jade as we examined their treasures assembled for my study. Loving terms described the objects, small nephrite carvings more than 2,000 years old: magical, luscious, perfect. No other culture has ever treated a substance with more esteem and devotion than the Chinese once reserved for nephrite.

EUROPEANS, who usually love to label everything, never classified the same rock, which was used for tools by Swiss lake stilt-house dwellers some 4,000 years ago. But Spanish conquerors adopted the Mesoamerican Indian belief that the bright green material could cure kidney disorders. So Spaniards began wearing the talisman too, calling it *piedra de ijada*—stone of the loins. The name stuck and should have been translated into French as *pierre de l'ejade;* but through what some think a printer's error, it appeared as *le jade*.

The Renaissance threw Europe into a scientific revolution, resulting in Latin terms for everything. Thus, the Mesoamerican rock was called *lapis nephriticus* (after the Spanish *piedra de los riñones*—"stone of the kidneys"), which became "nephrite" in

SHEETZ C. M. WONG COLLECTION, SINGAPORE; LENGTH 14.5 CM

JADE HEAD: HEBEI PROVINCIAL MUSEUM, SHIJIAZHUANG, CHINA. HORSE: VICTORIA AND ALBERT MUSEUM, LONDON; LENGTH OF FACE 11.3 CM

ARMOR AGAINST DECAY, a nephrite head (right) was part of a full suit that encased a local king, Liu Yen, buried in A.D. 90 near Shijiazhuang, southwest of Beijing. A nephrite cicada (below), symbol of resurrection, was often placed in the mouth of the dead.

Equine themes were popular, such as a nephrite horse (above) dating from the Six Dynasties period, A.D. 220-589.

To authenticate communiqués between a general and his emperor, messengers carried a nephrite signet (top) that had to match the recipient's signet.

CICADA: MUSEUM RIETBERG, ZURICH; LENGTH 6 CM

English. After the Indians who weren't killed were enslaved to dig gold and silver for the Spanish, they forgot their precious stones and even the mine locations. And their jades, which had just been named nephrite, were about to be renamed.

COMMERCE with Asia brought carvings to Europe. They too were called jade until, in 1863, French scientist Alexis Damour noticed that some of the bright green examples from Burma looked different from ancient Chinese carvings. With new analytical tools he determined they were two separate compositions and created the name "jadeite" for the rocks from Burma, switching the Chinese material to the term "nephrite," and leaving the world with two jades. Further analysis revealed that the Mesoamerican jades, for whom the word nephrite had been created, were actually jadeite, like Burma's. Too late to straighten out the mineralogical tangle, scientists agreed that, although distinctly different, both would be jade.

The pair live in disharmony most visibly in Taiwan, where commercialism tends to blur ancient aesthetics. Although the National Palace Museum in Taipei has some of the finest nephrite carvings ever done, here is also the marketplace largely responsible for the world's current disdain for nephrite. As Kirk Makepeace, a jade mine owner in British Columbia, says, "Taiwan and B.C. miners caused the mess we're in. We produced too much and sold it for peanuts. Then Taiwan cheapened it with junk jewelry and carvings, making people think jade was just shabby and green."

Amid claims and countercharges, a few things about Taiwan's supplies and marketing are clear. The country's only operating mine, near Hualien, is one of the few underground ones anywhere. I visited it on a day when there were more than 50 earthquakes and aftershocks, prompting the suddenly striking miners to race down the almost vertical mountain just as I skidded up in an open jeep during a tropical thunderstorm. The jade quality, low anyway, is made worse by shortsighted dynamiting, which reduces the 400 metric tons extracted annually to less than 100 usable tons. In addition, more than 400 tons of British Columbian

TOUR DE FORCE in the Mogul style, a translucent, foliated bowl of nephrite (above) may have graced the table of a Qing dynasty emperor. The Taj Mahal's builder and Mogul ruler of India, Shah Jahan sipped wine from a nephrite cup (right) inscribed with his name and adorned with an ibex head; the cup is inverted to show its flower base. It was carved in India for him in 1657.

BOWL: ASIAN ART MUSEUM, THE AVERY BRUNDAGE COLLECTION, SAN FRANCISCO; DIAMETER 18 CM. CUP: VICTORIA AND ALBERT MUSEUM, LONDON; DIAMETER 18 CM

nephrite is imported into Taiwan annually, carved, and then unethically exported as Taiwan jade, complicating the buyers' perception of sources. The island tends to import lower quality nephrite for less than five dollars a kilogram, substantiating the misimpression that jade is dark green, dull, and suitable only for costume jewelry.

Snakes were being skinned alive outside our "Snake Alley" restaurant in Taipei while mine owner C. C. Liang told me, "Root beer franchises are my real business. I bought the mine because I thought jade was valuable. When I look at museum jade, I realize there's not enough serious carving now, and too much production. It's a real waste."

THE BURMA CONNECTION: Dealer Frank Mastoloni examines jadeite at Rangoon's annual state-controlled Gem Emporium (below). But rebels hold much of Burma's best jadeite and smuggle it into Thailand. Cut Burmese jade is also sold within the country on the black market, such as these stones on a Rangoon vendor's flashlight (below right).

THE WORLD'S major nephrite production occurs across the Pacific, from the gigantic surface deposits of British Columbia. All other sources, except possibly Australia, are insignificant in comparison. Bouncing north from Smithers over snowcaps and glaciers in a 1952 Beechcraft 18, Matt Waldner, minerals division manager for Mohawk Oil Company, explained: "Canada has three areas, three companies, and quite a few prospectors. Mohawk's leases are in the Kutcho Creek area, in north-central B.C.; the Cassiar asbestos mine up near the Yukon produces jade as a by-product, which we market; and Kirk Makepeace mines Ogden Mountain. We three can easily produce 500 tons of nephrite annually."

We rolled to a stop among a hundred tons of boulders. Matt laughed at my surprise, saying, "The trick is not finding it, but moving it. We're 1,500 miles north of Vancouver and 60 miles from the nearest road—and no one wants to pay to fly out rocks." Mohawk is basing much of its future with nephrite on decorative tiles made from medium-quality rough being sold for $100 a square foot as an alternative to marble.

Ogden Mountain once again proves that jade seldom occurs where it is wanted or needed. The mine and camp, 90 miles northeast of Smithers, are on a plateau 5,000 feet up the 6,000-foot-high mountain. I arrived the only possible way, by a float-equipped Beaver to Squawkbird Lake, a dammed pond that is long enough for landings and just a trifle short for takeoffs. Kirk Makepeace (page 304), the energetic proprietor, bounded across the dock to collect my bags,

bursting with pride about his operation. Lurching his four-wheel-drive over foot-tall rocks, Kirk sounded like a born-again revivalist. "I've been just as guilty as any other miner, but no longer. I once let jade go for 50 cents a kilo. This is a precious, nonrenewable resource that the world used to treasure, and we treat it like everything else mined in B.C., just something to dig up and sell."

Talking between thuds, Kirk described his strategy. "I'm going to be independent of Taiwan now, refusing to sell my jade at giveaway prices. My secret weapon is China. I've broken into that market. Last year I sold about 104 tons: 100 to China, and only four to Taiwan."

Kirk's surface-mining operation is a beehive of activity, with Kirk, his parents, and helpers Chris Kalyn and Rich Hampton as the entire perpetual-motion work force. Five fuel-powered saws slice blocks while a monster skidder, a refugee from a nearby logging project, drags 14-ton jade boulders into line.

Chris looked a lot like the Chinese circus plate-balancing act, dashing from one saw to the other, filling tanks, adjusting the water coolant, lowering the blades, moving the jade to keep everything humming during the short three-month season.

Splashing water onto what may have been the largest piece of jade ever found, Kirk continued, "Big Papa here is famous. When they started cutting from this end in 1972, it was estimated to be 150 tons, not the best but the biggest. So the Chinese came already fascinated with the idea. They took 20 tons of Big Papa for top price, $10 a kilo—$200,000. Paid for my season right there. Then bought 80 tons more! I've seen the light. Nephrite can be sold at a profit, and B.C. has the lion's share."

THE ONLY PERSON likely to challenge Canadian supremacy is an unlikely miner in South Australia, 48-year-old Graham Robertson, a quiet former Adelaide stockbroker who controls the enormous Cowell surface jade deposit. As he said while tapping out a tune with his pick on a nephrite outcrop, "We're on a paved road to deepwater ports. There's at least 80,000 tons, and we haven't reached the bottom of any deposit yet."

Aggressively selling this huge deposit would have a considerable impact on both British Columbia and Taiwan. But Graham is proceeding judiciously. Settling down for lunch in a jade quarry as four kangaroos hopped across the road, Graham and I, along with manager Hilary Carmody, found ourselves well-shaped jade seats, with smaller boulders for footrests. Graham explained his selling dilemma: "I don't like what I see in the market. It's not scarce here; we're surrounded by jade. But nephrite is a rare and wonderful material, treasured by every culture that's had it. The world does not need any more cheap green trinkets."

Cowell is like no other mine I saw. There

FIT FOR AN EMPRESS'S FINGER, a ring of Burmese jadeite—imperial green, the best quality—cut in a cabochon and surrounded by diamonds, recently sold in Hong Kong for a reported 32,000 U. S. dollars. The dealer bought its parent boulder in Burma about 20 years ago, "and we make money just by holding those rough stones," he told the author.

is no activity or equipment. "We don't have any," Graham confirmed. "Every two years I rent a bulldozer and a couple of trucks for two weeks to haul out 200 tons, which we put behind a chain link fence in town. Compare that to the jade pickers in China or those poor guys freezing up in Canada."

What is unusual at Cowell is that, in addition to its fabulous quantities of green nephrite, Graham has a deposit of rich black jade, ideal for exotic applications, once he determines what they might be. Tossing a brownish lump whose surface flaked in my hands, he said, "It's rusting. Inside is pure black. The green color in nephrite is caused by iron, anywhere from one to four percent. This is over eight percent iron, so green it's black. Wyoming once had black nephrite, and now I do."

Hilary has taught himself to cut and polish jade. All day Sunday I learned to shape cabochons and bring their surfaces to a smooth gloss. "This black jade is the best in the world, the finest textured nephrite found," he offered, as I struggled for the perfect oval. "Fit to be an emperor's mirror. We sell it for $54 a kilo and the green for $7."

"WALKING ON JADE, is he?" Cliff Dalziel exclaimed as I told him about Graham's deposit. "I'm walking half a day just to look for jade." The fit, gray-haired, 57-year-old New Zealand prospector has chosen a tough life, patterned after his father's. From his home north of Greymouth, on the windswept western coast of South Island, Cliff drives an hour and a half to where the Arahura River emerges from the Southern Alps. Then he starts walking, up and up, for four hours, to his camp on Jade Creek, a cabin in a crevice so tight I disbelieved helicopters could get in. "It's the only way I know to do it," Cliff explained as he used a bar to wedge out a 400-pound boulder he'd hidden underwater in the creek bed. "When I have 1,200 pounds, I walk out and hire a helicopter, at 750 New Zealand dollars an hour [$445 U. S.]—an expensive way to mine." And a far cry from the ancient Maori canoe expeditions from North Island to South Island to hunt for jade, or *pounamu*, in the west coast rivers.

Recent Maori militancy has polarized both the New Zealand population of 3.3 million and jade prospectors, or "fossickers." Leading the fight is a big, burly, balding, likable native activist with an unlikely name, Tipene O'Regan. "Our aims and wishes are basic," he called between hops from rock to rock in the river the Maori consider sacred, the Arahura. "We had these islands, we lost them to the Europeans, and now we want them back. The two Maori organizations I chair already have 15 million New Zealand dollars in land, and the Maori now own the Arahura riverbed from its source to the sea. Not a bad beginning."

I stopped, balancing on spheres, staring at a shimmering green shape below the surface. One of the three "aunties" who were doing their Sunday afternoon jade prospecting with us came over, glanced at my object of interest, and said wryly, "We call that one leverite." Smile. "Leave 'er right there, because it's just a rock."

While we *(Continued on page 308)*

THE STONE AGE was an age of jade to the indigenous Maori of New Zealand, because their stone was nephrite, or pounamu. From it they made a fearsome war club, the mere (right). Their hei-tiki amulets (far right) became popular after James Cook's 1769 visit; millions were reproduced in Germany from 1900 to 1914.

The Maori now own the bed of the sacred Arahura River (facing page), where carver-prospector Cliff Dalziel watches a helicopter transport a nephrite boulder from his claim on the mountainside. Another New Zealand carver, Ian Boustridge, carries a Maori koru spiral motif to intriguing effect (below).

HERE: COLLECTION OF TOM FARLEY, ROARING ISLAND, NEW ZEALAND; LENGTH 30 CM. KEPTED: NATIONAL MUSEUM, WELLINGTON, NEW ZEALAND; HEIGHT 14 CM. SCULPTURE: COLLECTION OF IAN BOUSTRIDGE; HEIGHT 12 CM.

JUST A CHIP off the old block, an eight-ton piece of British Columbian nephrite (left) that was once part of a 150-ton monster dubbed Big Papa is split by Kirk Makepeace. Beyond, diamond-tipped saws cut more tractable chunks. The jade must be hauled 200 miles from Kirk's Ogden Mountain mine to the railroad. Formerly locked into the Taiwan market, Kirk last year sold 100 tons of Big Papa and other nephrite to China.

In Guatemala, Jay and Mary Lou Ridinger mine jadeite in the remote Motagua River Valley. In a test aimed at removing jade piecemeal, a worker in their factory uses a magnesium torch on a jadeite boulder (right) that cracked when doused with water.

Near California's Big Sur, carver Don Wobber and friends beach a nephrite prize (below) raised by inner tube from the bottom of Jade Cove.

Exquisite jade collectibles

PAGES OF JADE carved nearly an eighth of an inch thin (above) were embossed with gold-leaf characters for a book of Buddhist sutras, studied by an empress. Even more nimble were the fingers that drew an intertwined and knotted length of cord from a piece of nephrite in the Ming dynasty, A.D. 1368-1644.

BOOK: C. N. WONG COLLECTION, SINGAPORE; HEIGHT OF 5 CM. CORD: NATIONAL PALACE MUSEUM, TAIPEI; HEIGHT OF 6.4 CM

SHOW OF FORCE, a Fabergé cannon of Siberian nephrite inlaid with gold (below) was given by Tsar Nicholas II to Kaiser Wilhelm II, possibly after the two concluded an alliance in 1905. Other jade objects from the Fabergé workshop included a tiny, functional flower watering can, a Louis XVI-style miniature end table, and a table bell to summon servants.

CANNON: STICHTING HUIS DOORN COLLECTION, DOORN, NETHERLANDS; LENGTH OF 21 CM

AN IMAGINATIVE CARVER used the reddish surface of a Burmese jadeite boulder for the dragons on a Qing dynasty belt buckle (above). Buttons on the back attached each piece to the end of a belt.

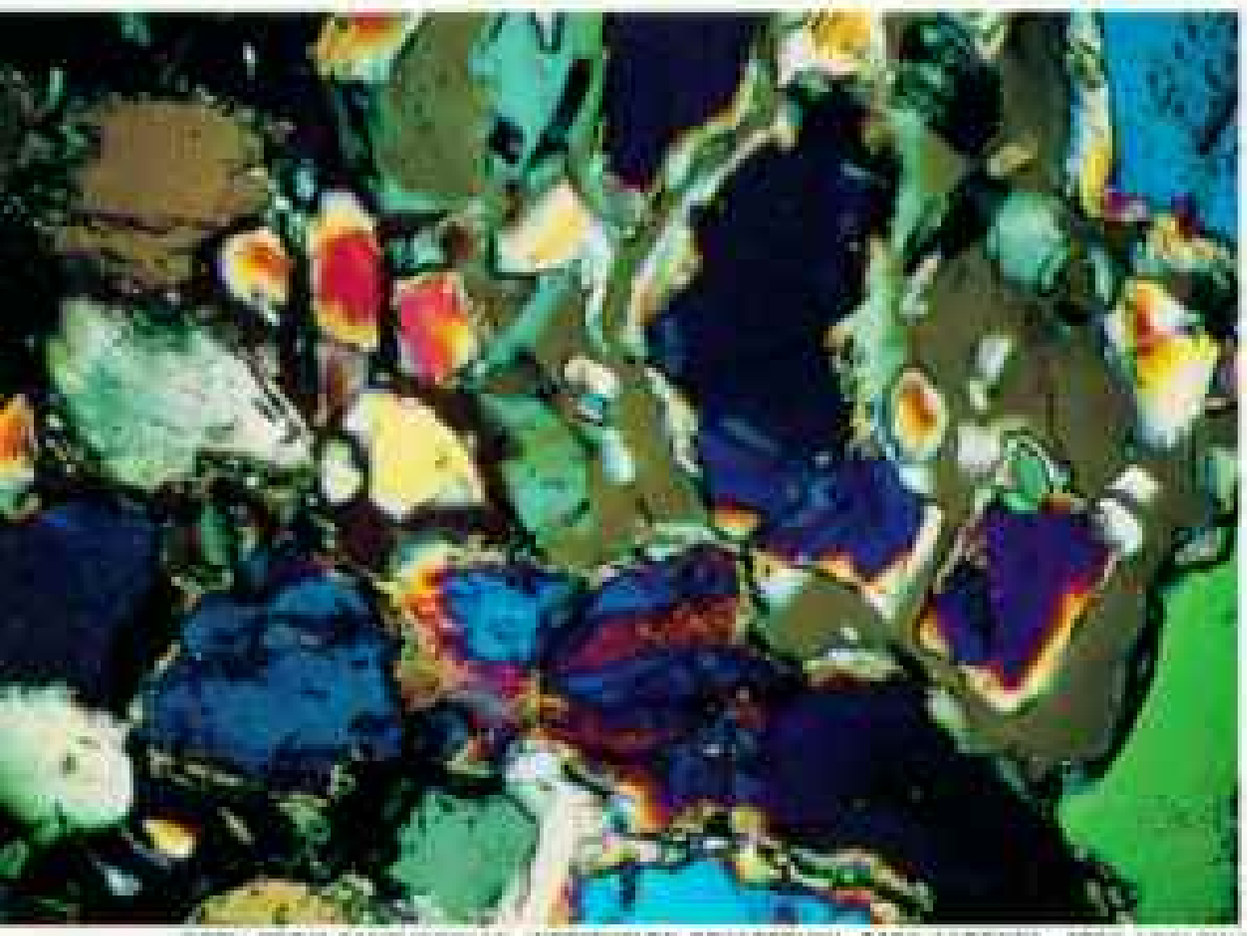
BELT BUCKLE: COLLECTION OF EDWARD SCHIFF, BEVERLY HILLS, CALIFORNIA; CENTER 8.5 CM

(Continued from page 302) threaded the Jet Ranger through the thin window between Southern Alps peaks and a low winter cloud cover, Russell Beck's encyclopedic knowledge filled my notebooks. The Renaissance man of New Zealand jade uses it to examine history. "There is a parallel between the Maori during their almost thousand-year rule and other jade cultures. Apart from food and shelter, the major needs of every civilization are tools, weapons, religion, and art. Only one stone served all these needs." And for defense, nothing beats a jade *mere*, the Maori club that could fell an enemy with a single blow.

After landing beside a creek above 2,000 feet, we hiked with senior park ranger Brian Ahern across a soft mossy floor, through a forest of mountain beech, to a 25-ton jade boulder lying between two small falls. "This is what we're trying to save," Brian said, rubbing its corner. "We've reserved 4,000 acres in Mount Aspiring National Park as a 'special area,' which limits public access and bans mining. I cite this as the only place in the world where nephrite is protected."

Later, as we drove through a June alpine snowstorm, I asked Russell, who is director of the Southland Museum in Invercargill, why nephrite was at the core of Maori life. "Simple," he replied, snacking in the backseat. "It's unique. It doesn't break when you hit it or heat it. For the Maori, a neolithic culture, nephrite's hardness and toughness provided metal-like qualities. I have made European-design nephrite tools, hammers, chisels, even nails, and found the Maori jades equal or superior to the metals that explorer James Cook brought, except that they couldn't be melted and poured or worked into different shapes. Any group that had jade, here, in China, or in Central America, had a clear superiority over its neighbors."

Even though the Chinese and Mesoamericans had advanced to metal cultures, the Maori were still in the Stone Age when Cook



BOTH FROM SMITHSONIAN INSTITUTION COLLECTION; 240X (ABOVE), 480X (BELOW)

"I WAS DELUDING MYSELF." Fritz Ragatz later realized that he and his wife, Barbara (facing page, at left), shopping at the Canton Trade Fair, had paid far too little for purported jade to stock their Wisconsin retail store. Though their agent earlier had declared the goods genuine, analysts back home called them bowenite—not jade. Micrographs using polarized light enhance jade's true structures: interlocked crystals of California jadeite (left) and a fibrous, tightly woven texture in Austrian nephrite (below).

arrived. All three groups worked jade in the same basic ways. Slices were cut using abrasive saws moistened with a slurry of quartz or garnet or sand. Holes were drilled by spinning bamboo, wooden, or metal points coated with a wet abrasive. Carvings were polished with jade powder or sand. Months or years were often required to fashion a single piece.

QUALITY CARVING, though rare, is far from dead. A few Westerners have become what Hilary Carmody calls "jadeaholics." I met, in addition to Russell Beck, three other fine contemporary New Zealand nephrite carvers in their studios. Each had gone through his "Maori" period before evolving a highly individualized style. Ian Boustridge, who also prospects for jade to assure his supplies, has taken the Maori *koru* spiral motif and transposed it to exquisite jewelry designs. His large exotic female heads are already collector's items. Donn Salt's unusual carvings are gorgeously finished fantasies springing from flights of imagination. John Edgar keeps condensing his creations to more basic forms, to see how purely he can fuse shape and stone.

This small group, along with British Columbia's Lyle Sopel, Alexander Schick, Tom Duquette, Deborah Wilson, and David Wong and California's Don Wobber are among the best of the world's contemporary jade sculptors. These innovators are letting the material speak to them in ways suggested by an old Chinese saying about jade carving: "Our job is to subtract; we cannot add."

Perhaps the world's most unusual jade-mining operation is just off the California coast south of Carmel, under 30 feet of water in Jade Cove. Don Wobber, a wiry, well-muscled 60-year-old, and I skittered down the narrow, steep path that drops 180 feet to a rocky shore below. Don's passion for jade is total. "Everyone knows there's nephrite here, but hardly anyone except me takes out anything but souvenir pebbles," he said.

It is easy to see why. This is hard, strenuous, dangerous work in frigid waters that throb with tricky swells powerful enough to slam divers to a pulp. "Mind you," Don noted on the beach, "I'm not much of a threat to British Columbia. I've only floated about 15 boulders since 1973." Another victim of "green fever," he slabs boulders, some two tons or more, for tabletops and shapes mottled jade free-form sculptures that have an enthusiastic local following. He once tested how pre-Columbian Indians used jade as handy cooking implements. Don explained, "You won't believe how well it works. After we got the rocks red hot in a fire and threw

NEPHRITE

JADEITE

Putting jade to the test with light

MAYA MASTERPIECE, a mosaic funeral mask from a Tikal tomb in Guatemala (opposite, below) was thought by archaeologists to be jade. When author Fred Ward had strong doubts, Mary Lou Ridinger, an archaeologist who mines Guatemalan jade, visually identified as jadeite only the two-part ear flares (below right), believing some stones to be a jadeite-diopside mix.

The GEOGRAPHIC then financed a test with a portable instantaneous display and analysis spectrometer (PIDAS)—here operated by geologist Brian Curtiss (above) of the Center for the Study of the Earth from Space. Developed for Caltech by the Jet Propulsion Laboratory and funded by the W. M. Keck Foundation, PIDAS is normally used for earth-science studies. Now it has a new application—analyzing valued artifacts.

Spectrometers that measure reflected light can be used to identify minerals by their wavelength signatures. But other laboratory spectrometers are immobile; test material must be brought to them. Scrapings taken for other modes of testing would deface an art object. The 67-pound PIDAS can go to a test site and construct signatures of very small objects—harmlessly.

In Guatemala City the Maya mask was compared with test signatures of jadeite and jade look-alikes (graphs, above and below). Ward's intuition and Ridinger's eye were confirmed: Only the ear flares are jadeite.

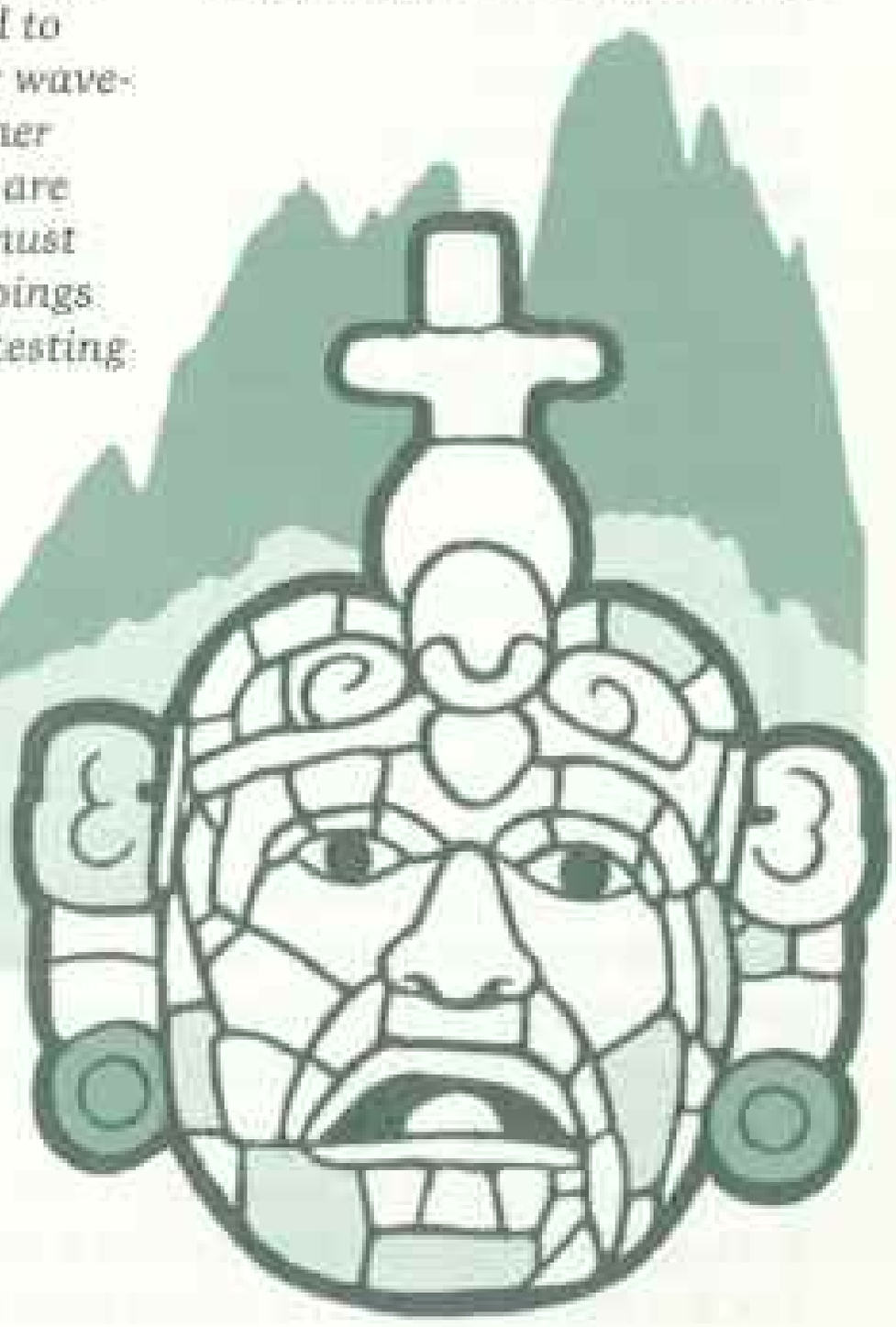
SERPENTINE

CHRYSOPRASE

CHRYSOLITE

AVENTURINE

JADEITE SIGNATURE OF EAR FLARES, DARK GREEN, IS SHOWN IN THE TOP GRAPH. LIGHT GREEN PIECES GIVE THE LOWER GRAPH THE SIGNATURE OF DIOPSIDE.



WITH FLYING COLORS, other museum objects passed the PIDAS jade examination, among them this Maya mosaic portrait jar (left). It was found in the eighth-century tomb of Double-Comb, the gifted ruler who brought the city-state of Tikal to its cosmopolitan zenith, before its sudden and mysterious demise.

JAR, 24 CM TALL, PHOTOGRAPHED BY NGS PHOTOGRAPHER VICTOR R. BOSWELL, JR. MASK, 32 CM, BOTH NATIONAL MUSEUM OF ARCHAEOLOGY AND ETHNOLOGY, GUATEMALA CITY.

them in a pot, they brought water to a boil in seconds, and they didn't even crack. We also cooked food wrapped around hot jade as kind of a reverse oven."

THE THIRD GREAT JADE CULTURE is the most controversial among scholars and collectors. For 3,000 years Mesoamericans used jade amazingly like their Oriental counterparts. They even developed comparable beliefs regarding the stone's influence on health and honored dead chiefs with mosaic jade masks and ornaments. Moctezuma, the Aztec ruler who confronted the Spaniards, pinpointed the difference between his Indian values and those of metal-crazed Europeans. After his first meeting with Cortés, Moctezuma reportedly told his advisers the equivalent of, "Thank God they're only after the gold and silver. They don't know about jade."

But jade in Central America is often not what it appears. Indigenous jade is jadeite, like the rocks from Burma. However, the world places a higher premium on Burmese jadeite, practically bypassing the less brilliant Guatemalan colors. And, as Bennet Bronson, an associate curator at Chicago's Field Museum says, "Few museum people want to get too involved with Central American carvings because most are recent fakes, and many of the authentically old ones aren't even jadeite."

"If I hadn't seen it, I wouldn't have believed it." Bob Stroessner, the Denver Art Museum's curator of New World art, almost gasped while watching Ron Bishop, senior research archaeologist in the Smithsonian Institution's Conservation Analytical Lab, and me dunk the museum's three-pound green plaque into methylene iodide. I had ordered the test fluid blended to a specific gravity of 3.0, the exact mixture to sink jadeite, suspend nephrite, and float many other stones. Popping to the surface of the heavy liquid undeniably proved this Copán plaque wasn't jadeite. Drying the artifact, Ron said, "It looks like albite. I don't know how many of these are fakes, but there are plenty. Of more concern to me is which of the authentics are really jadeite and where the jadeite was mined." Ron has spent years analyzing artifacts in an attempt to discover sources of the bright green Maya jadeite

ALL THAT'S GREEN AND CARVED is not jade, discovers an incredulous Bob Stroessner (right, at left), the Denver Art Museum's curator of New World art. Ron Bishop, at right, a Smithsonian archaeological scientist, applies a specific-gravity test to a Maya plaque (below) from Copán, Honduras, that Stroessner believed to be jade—and it fails. Author Fred Ward procured a special chemical mixture, mainly methylene iodide, prepared to a specific gravity of 3.0. Jadeite's is 3.2 to 3.4, and it would thus sink. Many Central American stones such as albite, serpentine, and chrysoprase are known as jade simulants, have specific

gravities of less than 3.0, and would float. The floating Copán plaque is probably albite. Two other Maya plaques believed carved from the same piece of jade tell a different story: One floats and is probably chrysoprase (right), and the other, probably jadeite, sinks (far right).

Five other museums refused tests with this harmless method, some conceding that artifacts labeled jade might not be. "This doesn't diminish archaeological value, but I think if you can test objects and not hurt them, it's a gross oversight not to do so," says Ward.

and all the Costa Rican raw material. He laments, "This is the only case I know in history where a culture's most treasured substance has been lost to the world."

As we later tested the extraordinary 600-piece Frederick R. Mayer collection in Denver, Ron observed, "Many collections of Costa Rican 'jades' are only about 20 percent jadeite. Most pieces are quartz, diopside, chrysolite, etc. Elsewhere in Central America we see aventurine, chrysoprase, albite, and many other green rocks. I doubt if half the artifacts from this region exhibited anywhere are really jade." If the stone was green, the Mesoamericans carved it. Scientifically and legally, only nephrite and jadeite should be called jade. Archaeologists are confusing an already muddled history by introducing a new term to encompass all carved green material—"cultural jade."

I had first contacted Ron after a Central American tour convinced me that most of what I had seen was not jadeite. Archaeologists and museum directors in the U. S. and overseas said repeatedly that the substance didn't matter as long as the piece was authentic and green. Would they label all displayed yellow metals as gold, I wondered?

I contacted major museums, including the Peabody, the British Museum, and Dumbarton Oaks, seeking verified chemical analyses or permission to do specific-gravity tests. For varied reasons, among them apprehension over any testing, they refused.

Then GEOGRAPHIC Editor Bill Garrett told me of a new portable light spectrometer called FIDAS that had potential for artifact analysis. Though designed for remote earth sensing, it might differentiate jadeite from diopside and chrysolite, two green simulants that also sink in specific-gravity tests. After confirming my original results in Denver, I took the unit to Guatemala, where its success in analyzing the mosaic pieces of the Tikal mask (pages 310-11) points to a revolution in artifact authentication and may let museums safely verify their own collections.

"OTHER FOLKS may not have the real thing, or know it when they see it, but everything around us is mainly jadeite." That was Jay Ridinger talking as we prepared for a spectacular experiment in the outside storage

HALF A WORLD APART, Chinese and Mesoamericans both seized upon the touchstone of jade. A nephrite pendant of a bearded figure (middle) from the Han dynasty, 206 B.C.–A.D. 220, bears striking resemblance to a Costa Rican ax god carved from a jadeite blade about the same time (far right). Also from that era, another Costa Rican ax god seems to have leaped light-years into the future (near right). Perhaps both the Mesoamericans and the Chinese realized, after wearing their fingers to the bone carving jade, that it was indestructible, a stone of eternity.

area of his Jades, S. A., factory in the preserved Spanish colonial town of Antigua Guatemala. Jay and wife Mary Lou came here from the U. S. in 1973 and made their first find in 1975. "Any source for pre-Columbian jade was lost for 450 years from the arrival of the Spanish until 1955," Jay noted, "when the first boulder was discovered in the Motagua Valley." Locating jade and getting it out of an isolated, roadless valley are difficult where everything moves on mules and people's backs.

Jay's magnesium-packed steel tube roared like a mini-inferno, generating sufficient heat to melt its way through the jade boulder, which instantly cracked when dashed with cold water. "If this proves cheap enough, we'll split rocks where they lie instead of taking in a gasoline saw."

Unquestionably the Ridingers and others are mining jadeite from a source the Maya used. Ron Bishop is unconvinced it is the only one. As he said while we examined dozens of the Fred Mayer Costa Rican ax gods, "The Motagua Valley has the right chemical profile for a number of excavated artifacts. It doesn't have the bright green we see from Belize or Chichén Itzá, nor the Olmec or Costa Rican blue." Either the best Maya jade was worked out, which is unlikely and has never happened anywhere else, or there are deposits yet to be found.

With the scholarly disarray on my mind, I visited American Bob Frey, who heads London-based Friends of Jade, a loose assemblage of several hundred enthusiasts. "Most members," he explained, "shy away from Central American art and collect Chinese." In the rabbit-warren storerooms at

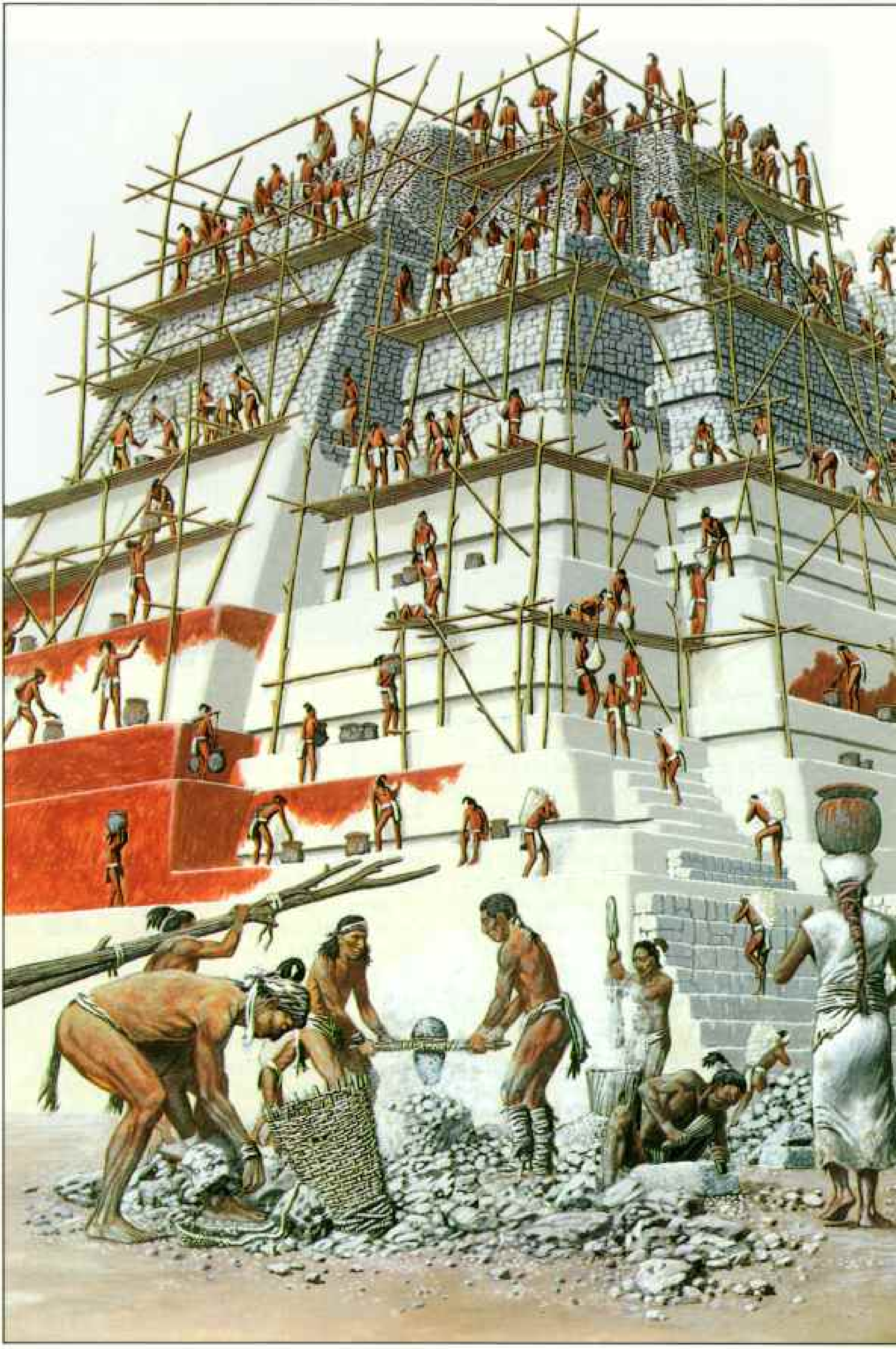
MUSEUM OF JADE, INSTITUTO NACIONAL DE SEGUROS, SAN JOSE, COSTA RICA; HEIGHT 18 CM. MIDDLE, ASIAN ART MUSEUM, THE AVERY BRUNDAGE COLLECTION, SAN FRANCISCO; HEIGHT 8 CM. RIGHT, MUSEUM OF JADE; HEIGHT 6 CM

nearby Spink & Son, Ltd, St. James's art dealers since 1666, Roger Keverne moved from cupboards to drawers to shelves, exposing a profusion of carvings at every turn. "We are jade specialists," he said, holding small Han animals in each hand, "and have seen tremendous changes in client tastes. It appears to take an older, more mature connoisseur to appreciate jade. It's just not in with yuppies. Old Chinese works still fetch fine prices, but the business is clearly divided: collectors of Chinese nephrite carvings and buyers of Burmese jadeite jewelry."

I was pondering that division in Beverly Hills when I met 70-year-old dealer-collector Edward Dominik, who professes to enjoy a blend. With a still heavy Viennese accent, he asked, "Why shouldn't people appreciate two jades? I like selling and owning both. What bothers me," he complained, turning a $50,000 diamond-edged Burmese jadeite pendant, "is to see a Hong Kong dealer sell a $600,000 jadeite necklace but not have a single piece of old Chinese nephrite in his home. These Chinese have lost their heritage." Perhaps they have, along with the Mesoamericans and Maori.

NO WONDER the world is confused about jade. Dealers in China, Hong Kong, and Taiwan claim three dozen different stones are jade, while many curators and archaeologists suggest it doesn't really matter what Mesoamerican carvings are as long as they are green. The early jade users treasured it above all other possessions, centering their cultures around its utility, beauty, and perceived powers. Now a noon shopper in New York can buy a ten-dollar necklace carved in Taiwan from British Columbian nephrite. Tell her she has just bought the Stone of Heaven and be prepared to defend your sanity. Maybe there is too much jade available. Or perhaps when we started measuring time in nanoseconds and calculating attention spans as the time between commercials, we also lost the patience to appreciate a uniquely conceived and executed work of art, delicately subtracted from the river pebble where it began.

Too bad. Jade deserves better. □



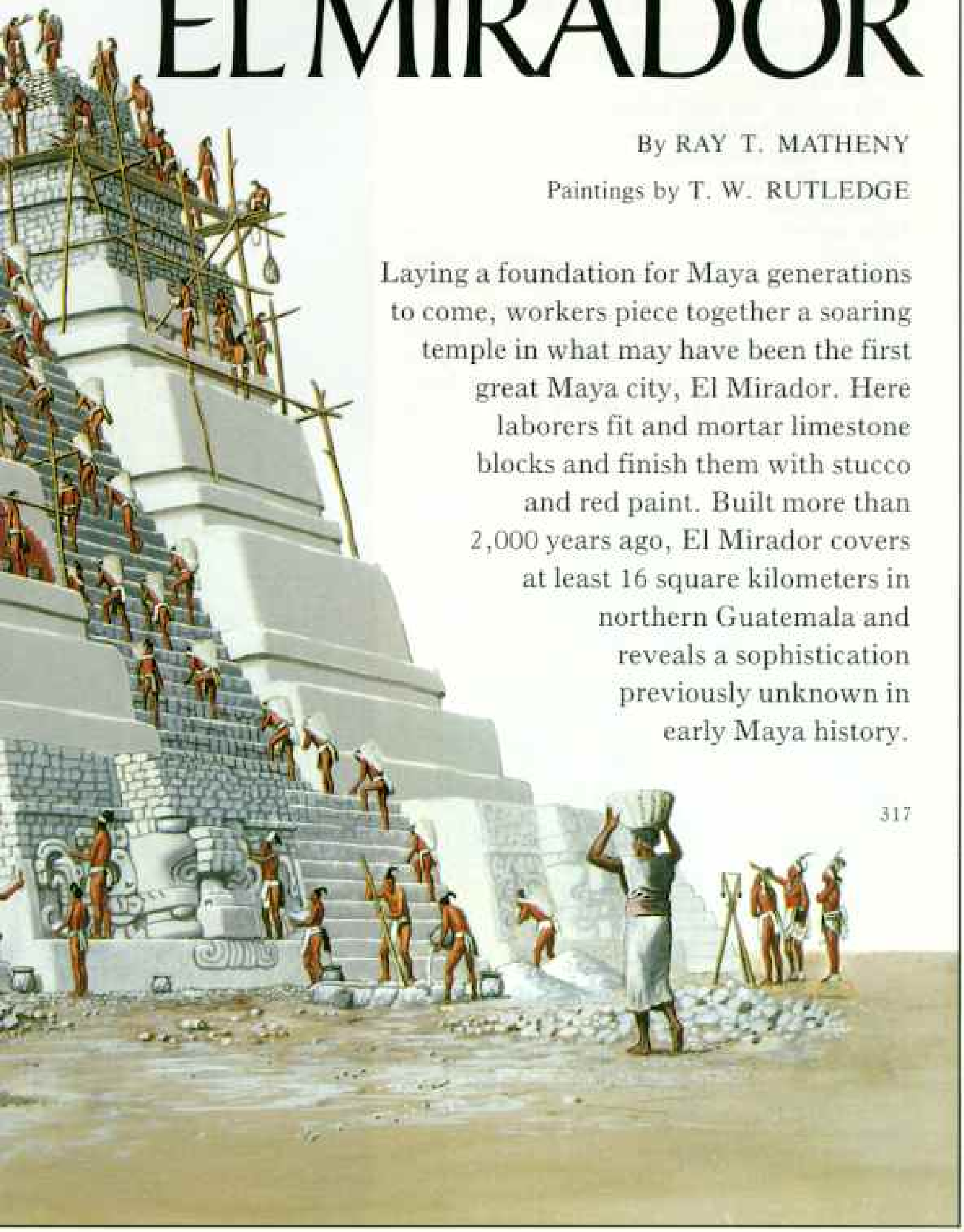
An Early Maya Metropolis Uncovered

EL MIRADOR

By RAY T. MATHENY

Paintings by T. W. RUTLEDGE

Laying a foundation for Maya generations to come, workers piece together a soaring temple in what may have been the first great Maya city, El Mirador. Here laborers fit and mortar limestone blocks and finish them with stucco and red paint. Built more than 2,000 years ago, El Mirador covers at least 16 square kilometers in northern Guatemala and reveals a sophistication previously unknown in early Maya history.



STANDING IN THE COCKPIT of an aged Douglas DC-3 in 1980, I asked the pilot how he navigated without radio aids over this monotonous and remote tropical forest in northern Guatemala. Capt. Edgar Suhr pointed to a low range of hills on the horizon: He always kept those jungle-covered heights off the right wing to avoid crossing the Mexican border.

"Edgar," I said, "those aren't hills. They are ancient Maya buildings of El Mirador."

He shook his head emphatically. "*¡No es posible, son cerritos naturales!*"

His surprise was itself natural, for at that time few other than archaeologists knew that this navigation point of "hills" was indeed a once mighty metropolis, buried and forgotten for nearly two millennia.

The city may have been the first constructed by the Maya and still represents the largest concentration of civic and religious buildings ever recorded in Maya lands. With an estimated size of 16 square kilometers (six square miles) and a population in the tens of thousands, it was one of the first large cities on the North American Continent. It may have served as the great metropolis of northern Guatemala and southern Mexico, where hundreds of other, smaller Maya ruins lie under the jungle canopy.

A hidden city *lies beneath jungle 360 kilometers (225 miles) north of Guatemala City. From the air the Danta Complex appears as a massive mound whose top has been gashed by erosion (right). Hills on the horizon conceal other Maya structures. A drawing peels away overburden to reveal a pyramid and its underlying structure (above). El Mirador was discovered in 1926, but remained uncharted by archaeologists until 1962.*

NATIONAL GEOGRAPHIC EDITOR WILBUR S. GARRETT

For the record, *an artisan readies a limestone stela—a tall stone slab used to record notable events—for more detailed work (above). The illustration is based on a stela that was found on the wall marking El Mirador's Sacred Precinct. For unknown reasons it was left unfinished, and its meaning is unclear. At camp (facing page) artist Jody Harper Hansen copies the stela for study.*

El Mirador's ruins, mantled in tropical forest growth, soil, and fallen stone, offer archaeologists an unparalleled opportunity to gain new understanding of the origin of Maya civilization. Probes have shown that, below their covering, the ancient buildings are in a remarkable state of preservation.

Our work is in the early stages, but already our findings have challenged long-held views. Mayanists had thought that El Mirador, because of its great size and elaborateness, belonged to the Maya Classic period, from A.D. 250 to 900. Our discoveries prove that it predates the height of Classic development by more than 500 years. It must be assigned to the Preclassic period.

Scholars also believed the Preclassic Maya were governed by chieftains. Our new evidence indicates strongly that these early Maya already had a city-state organization.

El Mirador's vast acropolises are crowded with buildings, immense platforms, and plazas with stucco sculptures whose motifs can literally be "read." One pyramid, Tigre, is probably the largest ever built by the Maya. It soars 18 stories high.

EL MIRADOR rose more than a century before Christ; it declined, for unknown reasons, about A.D. 150. Later the site was occupied by the Classic Maya, whose splendid civilization ranged through Middle America from Mexico into Guatemala, Belize, Honduras, and El Salvador. But in the ninth century A.D. the Classic Maya also vanished in this area, and their abandoned monuments yielded to the jungle.

We have long known of the achievements of the Classic Maya. They built complex networks of trade routes and canals and developed advanced farming methods that relied on efficient management of soil and water. Their achievements in astronomy and calendar elaboration allowed them to count millions of years into the past or the future; they devised ancient America's most sophisticated writing system; their mathematics employed the zero notation. Now—at El Mirador—we are gaining new insights into the Preclassic Maya—those who laid the foundation for the Classic golden age.

El Mirador lies 360 kilometers (225 miles) north of Guatemala City, in the Petén forest. Archaeologists first visited the site in the early 1930s on the 16th Carnegie Institution Central American Expedition, remaining only a few hours because their water supply ran low. Archaeologist Ian Graham, now with the Peabody Museum at Harvard University, spent ten days here in 1962, exploring and mapping.

With the permission of the Guatemalan Institute of Anthropology and History, the first major investigation began in 1978 under the direction of archaeologist Bruce H. Dahlin, then with the Catholic University of America. I first visited El Mirador that year. After a day of exploration I was so overcome by the massiveness of the ruins and their extent that I resolved to spend the rest of

MARK PHILBRICK

my career studying this superb Maya site.

Superb—but not easy! It sits in a sea of forest. Even now, to reach the ruins by mule train is a three-day ordeal. On my first visit we walked 60 kilometers from the village of Dos Lagunas. The sun never penetrated the thick canopy of trees. Rarely did we glimpse the sky. No breeze eased the clinging heat. Hordes of mosquitoes arrived with nightfall.

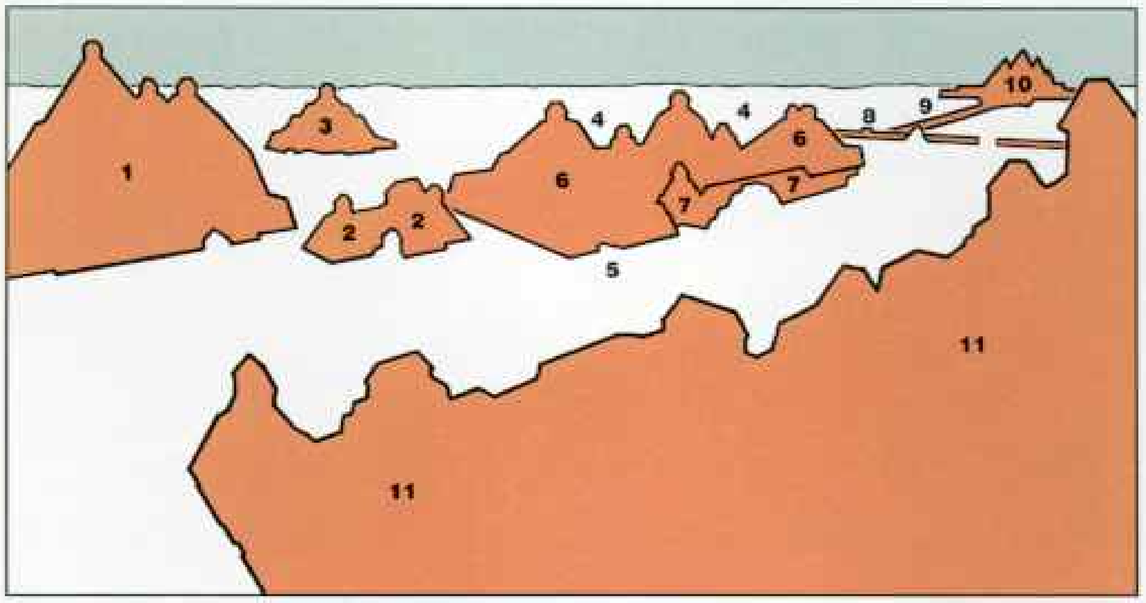
Tall trees rise in tiered galleries—splendid cedars; *chicozapotes*, from which chicle is harvested for chewing gum; mahoganies and other hardwoods.

When I began my excavation, in 1979, I realized quickly that we needed an airstrip. El Mirador demands air supply, and airlift out in the event of emergencies. Funded by the Brigham Young University New World Archaeological Foundation, we began cutting a swath *(Continued on page 328)*

A RESEARCH PROJECT SUPPORTED IN PART BY YOUR SOCIETY

The first great Maya city?

A MONUMENT TO MAYA GENIUS, El Mirador flourished for an archaeological instant from about 150 B.C. to A.D. 150, during the Preclassic era. Maya buildings were meticulously planned. Author Matheny—a professor of anthropology at Brigham Young University, who has led numerous expeditions in Maya lands—has discovered two inscribed lines on a floor that may have been on-site builders' marks. The city overlies an outcrop of limestone, the material used in its construction. Wood, burned to process lime mortar and stucco, was also abundant. Ferric oxide, a red pigment, was painted onto the stucco, possibly to deter erosion. The red also carried religious import. Blood was the medium used by kings to assert their power. In sacrificial rites



the king used obsidian lancets or stingray spines to pierce his penis, ears, or tongue—the blood summoned and sustained the gods.

El Mirador must have been home to tens of thousands. To feed the population, the Maya probably relied on intensively cultivated fields around outlying swamps. Crops included maize, beans, chili peppers, and squash. The city itself acted as a catchment for water; rain fell onto the sloped plazas and collected in several reservoirs. Some have been found with lime layered on the bottom, which may have purified the water.

The city is remarkably well preserved, though erosion and intruding tree roots have exacted their toll. Later the site was occupied by Classic period peoples, but it was not torn down or substantially built over. Instead, it was inexplicably abandoned and quietly reclaimed by jungle. Today the area is profoundly remote—the nearest inhabitants are a three-day mule trip away.

1 Tigre Pyramid
2 Tigre Temple
3 León Pyramid
4 Central Plaza
5 Central Acropolis
6 Buildings on Central Acropolis
7 Market stalls
8 East Gate of Sacred Precinct wall
9 Paved causeway
10 Danta Complex
11 Monos Complex

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RAY T. MATHENY (ABOVE); STEVE NORTHUP (LEFT)

Billboard of the times: *A stucco mask flanking the west side of the Tigre Temple (left) proclaims divine sanction of the king's right to rule. Reconstructed (below) by artist T. W. Rutledge, the mask displays symbols of royalty that appear in later Maya iconography: jaguar paws, ear flares, and knotted bundles. The south face of the Tigre Temple (above) bears heavy cornice stones that served to deflect rain from the wall.*

(Continued from page 321) for a runway.

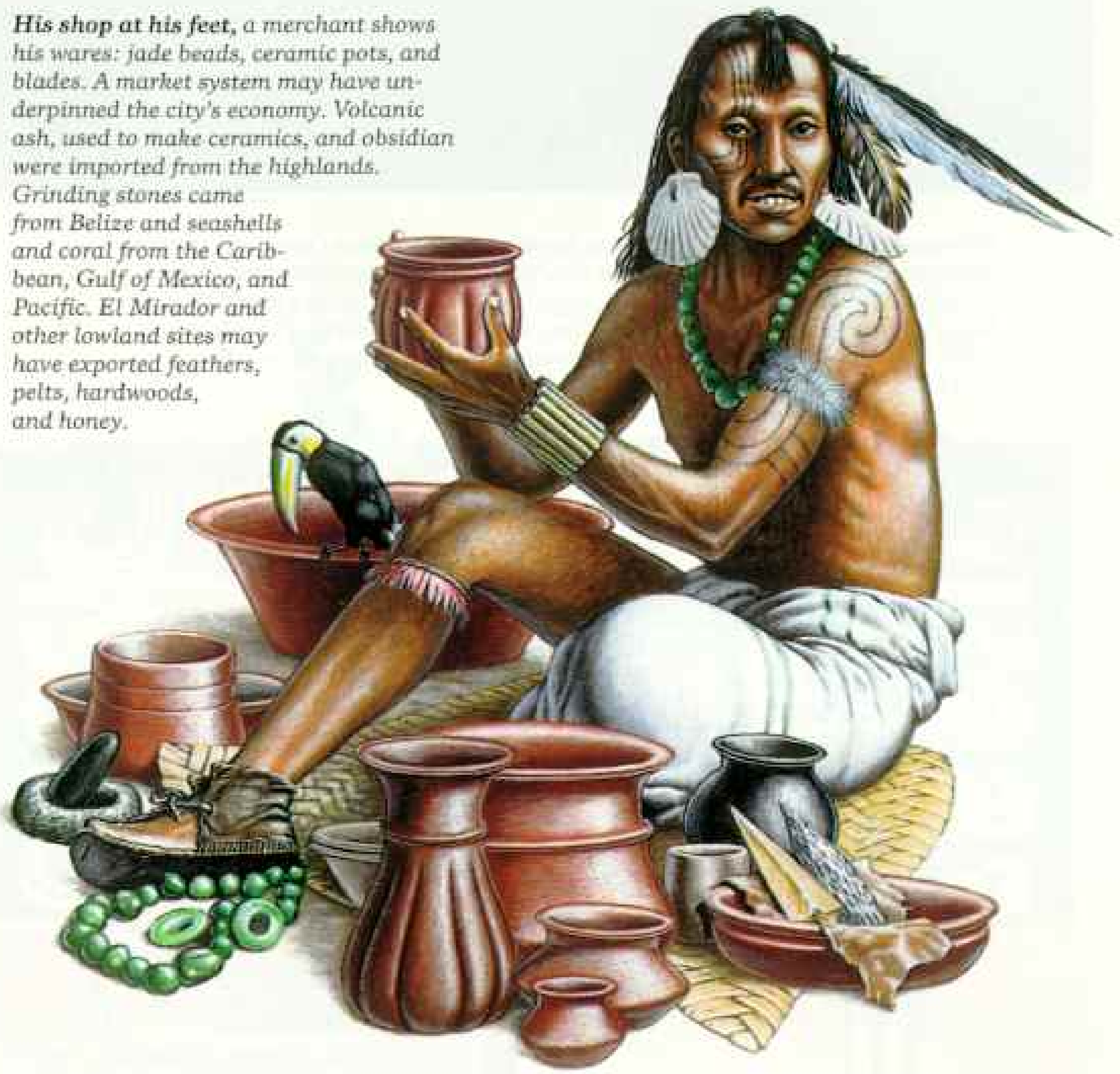
The following season, aided by a grant from the National Geographic Society, we completed the strip, which is about 300 meters (985 feet) long and 50 meters wide. We removed some 7,000 trees, sawing some into excellent lumber to build our camp lean-tos.

We needed a small airplane designed for forest flying, one that operates on rough fields, uses only 100 to 150 meters to take off and less than that to land, and can climb steeply over high trees. I have been flying all my adult life, and decided that a Helio Courier was what we wanted.

Our little airplane makes regular supply runs. In the town of Flores we stock up on kerosene lamps, shovels, picks, rope, nails, first-aid items, buckets, hammocks. At the market in San Benito we buy watermelons, cabbage, potatoes, rice, beans, sugar, and other foodstuffs. The return to El Mirador takes 35 minutes. By truck and mule the trip would last five or more days.

IN OUR FIRST SEASON we took advantage of work done by unlikely helpers—looters. They had been quite active at El Mirador in recent years. They had excavated in dwellings and public buildings, searching for Classic burials with polychrome vessels adorned with hieroglyphs and human or animal figures. Such vessels command big black-market prices. But the looters stop digging if only monochrome vessels are found. Consequently looters began many excavations, then abandoned them.

Our cleanup of their trenches showed that the dwellings on the surface were all of



His shop at his feet, *a merchant shows his wares: jade beads, ceramic pots, and blades. A market system may have underpinned the city's economy. Volcanic ash, used to make ceramics, and obsidian were imported from the highlands. Grinding stones came from Belize and seashells and coral from the Caribbean, Gulf of Mexico, and Pacific. El Mirador and other lowland sites may have exported feathers, pelts, hardwoods, and honey.*

Ransacked, *a Classic period burial site was despoiled by looters who dug a trench and pirated prized polychrome vessels. They left behind less marketable vessels scattered among bones (right). A Preclassic Chicanel ware bowl (bottom right) was found near the East Gate of the Sacred Precinct. Chicanel ware bears a thick red slip and is key evidence in dating El Mirador.*

BOTH BY BOB GREENLEE

Classic age. But under almost every dwelling we discovered a Preclassic residence.

To our surprise, probes into huge structures and platforms, which we call public buildings, revealed that they were entirely Preclassic. We had expected to find that the public architecture dated from the same time as the Classic surface dwellings.

Other Preclassic dwellings were excavated in a National Science Foundation project directed by archaeologists Arthur A. Demarest of Vanderbilt University and Robert J. Sharer of the University of Pennsylvania.

Brigham Young University archaeologist Donald Forsyth analyzed thousands of pieces of broken pottery. Two-thirds of identifiable pottery pieces found in our excavations were from the Preclassic period. All pottery pieces taken from construction levels of the large buildings were Preclassic.

Our research group and other archaeologists were astounded. El Mirador, the evidence showed, was a Preclassic city!

WE FOUND many important clues about construction and occupation patterns in a part of the city called the Tigre Complex, excavated by Brigham Young University graduate student Richard Hansen. Covering 58,000 square meters, it gained its name because of its huge pyramid. This pyramid dominates the west of the city; its base covers 18,000 square meters, about the size of three football fields. Years ago *chicleros,* or chicle gatherers, named it for the most powerful animal in the forest, the jaguar, or *el tigre*.

Tigre Pyramid rises in truncated form to 12 stories, where the upper landing has three smaller structures on it. The center one raises the structure's height to 18 stories. The three structures represent a triadic theme expressed repeatedly at El Mirador.

In front of the pyramid is a long narrow plaza and row of smaller buildings. Atop one, which we call the Tigre Temple, looters had penetrated two rooms. We cleared these rooms of the looters' debris and excavated to floor level. There we found elegantly shaped, red Chicanel pottery that clearly was of Preclassic manufacture.

Further digging here in the next three seasons exposed well-preserved stairways and large stucco sculptures with part-human and part-jaguar features—a human-like head flanked by jaguar paws, coupled with ear flares and knotted bundles (pages 326-7).

All these features are thought to symbolize secular authorities with sanctions to rule from the gods. I believe these symbols are part of an incipient writing system. This assumption comes from recent breakthroughs in deciphering Classic hieroglyphs in which similar symbols have been found in repeated contexts.

The Tigre Complex is flanked on the south by Monos, a 40-meter-high complex of buildings and a plaza. Monos was named for the large, raucous howler monkey and covers nearly 17,000 square meters. Directly east of the Tigre Complex, and adjoining it, stands the great Central Acropolis and Central Plaza group. Radiocarbon dating of materials found here suggests construction between the second and first centuries before Christ.

THE CENTRAL ACROPOLIS and Central Plaza provided a grand setting for rituals and ceremonies. Looking down from the acropolis, one can see the entire centerline of the plaza below, and the disposition of all its buildings.

Here my mind's eye conjures solemn rites with plumed dignitaries. Conch trumpets and drums sound. An elder steps forward to proclaim the birth of a male heir. A servant girl holds up the infant, who is barely visible in his soft wrapping of "New World silk" from the ceiba tree. The assembled multitude—officials, relatives, servants, and others—cries out approval. . . .

I awaken to reality, slapping at insects and tormented by the heat. But the meaning of this place is clear. Here was the heart of El Mirador, the theater for the most important events: declarations of war, ostracizing of dissidents, imposing of tributes, religious ceremonies. Here a newly installed ruler would have interceded with the gods for his people—by cutting and bleeding himself before the people. The flow of blood would signal intercession with the gods.

Our excavations at the Central Acropolis, which is more than 300 meters long, support these visions. A wide stairway fronts the center of the acropolis, running from the plaza to the first level. The stairs were constructed with great skill during Preclassic times. Cut limestone blocks were uniformly shaped with stone instruments and carefully

Markers of Maya Culture

THE WORLD OF THE MAYA ultimately spanned territory in today's Mexico, Guatemala, Belize, Honduras, and El Salvador. Early Maya may have numbered in the millions. Author Matheny theorizes that El Mirador was a center for the development of Maya culture, where symbols later used in the Maya writing system evolved.

OLMEC TO HIGHLANDS

Olmec symbols moved to the highlands about 500 B.C. and developed individual styles. At Izapa symbols on a stela may illustrate a myth. An axhead found at El Sitio bears a linear arrangement of glyphs. They cannot be read as yet but may reflect Olmec influence.

Gulf of Mexico

Approximate limit of Maya area

▲ Archaeological site

0 80 km

0 80 mi

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PRODUCTION: ELLEN J. LARSEMAN, VISVADAS BHOPI
MAP EDITOR: ANN PLATIS
ILLUSTRATIONS: GEORGE E. STUART

Komchén
Dzibilchaltún
Mérida
Cancún
Chichén Itzá
Yaxuná
Cobá
Uxmal
Cave of Loltún
Cozumel
Tulum

Campeche

YUCATÁN PENINSULA

Edzná
Dzibilnocac

Kohunlich
Chetumal
Cerros
Hondo
Cuello
Dos Aguadas
Lagunas
El Mirador
Lamanai
Río Azul
Tintal
Nakbe
Carmelita
Uaxactún
Tikal
Belmopan
PETÉN
Lago Petén Itzá
San Benito
Flores
Usumacinta
Pasión
Seibal
1,122 m
3,681 ft +
Caracol
BELIZE
665 m +
2,182 ft
Salinas (Chixoy)
Río de la Pasión

GUATEMALA
Lago de Izabal
Negro
Motagua
Ulúa
Playa de los Muertos
HIGHLANDS
2,285 m
7,497 ft +
Copán
Kaminaljuyú
3,976 m
13,045 ft +
Guatemala City
HONDURAS
2,849 m
9,347 ft +
Yarumela
El Baúl
Monte Alto
Tegucigalpa
Santa Leticia
Chalchuapa
2,365 m
7,759 ft +
San Salvador
Choluteca
Coco
1,750 m
5,741 ft +
EL SALVADOR
NICARAGUA
Río Grande de Matagalpa

Islas de la Bahía

YUCATÁN

A bas-relief outside a cave at Loltún portrays a king and a short column of glyphs. The knotted bundles, ear flares, and trefoil show that this iconography spread to Yucatán by the first century A.D.

Caribbean Sea

PETÉN

Pyramids were built at El Mirador, Tikal, Uaxactún, Lamanai, and Cerros. Symbols on Preclassic period sculpture here—trefoils, ear flares, knotted bundles, and jaguar features—recur in later Maya writing. They are meant to be "read," and assert the king's right to rule.

HIGHLANDS

At Kaminaljuyú, carved monuments were used during the Preclassic period to reinforce the king's right to rule. Symbols here also occur at El Mirador, showing a link between highland and lowland cultures. Stelae at Chiapa de Corzo (36 B.C.) and El Baúl (A.D. 37) display a Maya-style bar-and-dot numbering system and calendar.

ROB GREENLEE (TOP); ROD MARKLE (ABOVE)

The logistics of fieldwork *entailed supplying provisions to a camp in remote jungle. At first, food was trekked in from Carmelita, the nearest village, a three-day trip by mule train. An airstrip, here under construction (left), shortened the run to 15 minutes. To build the strip, some 7,000 trees were felled.*

The author (below left) and his colleagues study artifacts in a field lab. Archaeology student Wayne Howell and Guatemalan artist Andres Corzo (right) record details of a stairway on the Pava Temple, part of the Danta Complex. Excavations were refilled at season's end to prevent deterioration of the site. Because of its unsurpassed vista the site was named El Mirador—"the lookout"—decades ago by the men who harvest chicle from the forest.

fitted, set with lime mortar, then plastered with a lime stucco skillfully finished for durability. It is likely that a coating of red paint, a mixture of crushed hematite and a medium such as water, was applied.

At the top of the stairs we found an altar platform of unusual form. It has 12 large, finely finished slabs set on the north and south faces. These slabs are about the size of carved stelae discovered in Classic cities, which herald occasions such as birth, death, accession to power. But the acropolis stelae slabs are blank. They once may have been painted with figures and other symbols memorializing an event. I found an altar stone that had a thick coating of red paint on the underside set next to a blank stela. These stelae attest that this was the most important section of El Mirador. This idea is supported by a similar find of stelae on the plaza below.

The Central Acropolis and Central Plaza seem to have been the focal area of what I call the Sacred Precinct, though religious and other ceremonies undoubtedly occurred at Tigre and at other complexes.

The Sacred Precinct is demarcated by a low wall. Elizabeth Chambers of the Catholic University of America excavated it in several places and found that it is made of large limestone blocks, mortared in place. She uncovered paved pathways that lead to rooms built into the wall. We interpreted the paths as formal entry points: Credentials could have been presented here, allowing selected persons into the Sacred Precinct.

A number of dwelling mounds that we have identified indicate a stratified society. As always, the rich and the powerful resided

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in choice places, probably nearest the large public buildings and temples.

We uncovered a rare elite Preclassic residence at the end of the western wing of the Central Acropolis. The residence consists of several buildings set in a compound surrounding a plaza.

Excavations by Brigham Young University graduate student Ellen Stutz Landeen revealed construction of the highest quality. Every room displays carefully cut stone, precise use of mortar, stucco covering, and red paint. Each room is reached from the plaza level by a well-preserved stuccoed stairway. Rooms have wide entryways, benches, convenient steps to different levels, and at least one room has a wide window in the back wall. Evidence of stucco sculpturing exists in some rooms.

We plan to continue investigating this unique place, a potential Preclassic palace in the Maya heartland.

EL MIRADOR must have depended on supplies and services from many communities outside the city proper. From the air I can readily make out the major avenues of communication—the raised causeways in the sea of trees. At the extreme western edge of El Mirador, three causeways nearly join in an area we call the Crossroads. The buildings in this part of the ancient city are of a different type than elsewhere. Tribute goods and foods or products from outlying communities may have been received here.

The design of the Crossroads layout suggests that anything entering or leaving the

THOMPSON CAUSEWAY

A raised road over swampy ground facilitated foot traffic between El Mirador and outlying communities.

CASCABEL COMPLEX

As yet uninvestigated, this complex marks the northern boundary of the Central Plaza.

CENTRAL ACROPOLIS

The city's centerpiece, this was the site of important events such as political announcements and sacrificial ceremonies.

TIGRE COMPLEX

Dominating the western part of El Mirador, these structures cover 58,000 square meters, the size of 11 football fields. The 18-story-high Tigre Pyramid faces the rising sun.

Sacred Precinct wall

approximate location

unmapped

aguada

aguada

Leon

245 m 804 ft +

Tigre Pyramid

Tigre Temple

Central Plaza

East Gate

500 meters to the Crossroads.

245 m + 804 ft

approximate location

TRAIL

unmapped

unmapped

250 m + 820 ft

250 m 820 ft +

Monos Pyramid

TRAIL

245 m 804 ft +

MONOS COMPLEX

Like Tigre, Monos exhibits a triadic architectural theme of one large and two smaller flanking structures, a distinctive design of the Late Preclassic period.

approximate location

WEST GROUP

These buildings form the Sacred Precinct—civic and ceremonial buildings partly enclosed by a wall. Gateways may have controlled access.

TRES MICOS COMPLEX

This uninvestigated complex adjoins the Sacred Precinct wall.

NGS CARTOGRAPHIC DIVISION
DESIGN: NANCY SCHWEICKART
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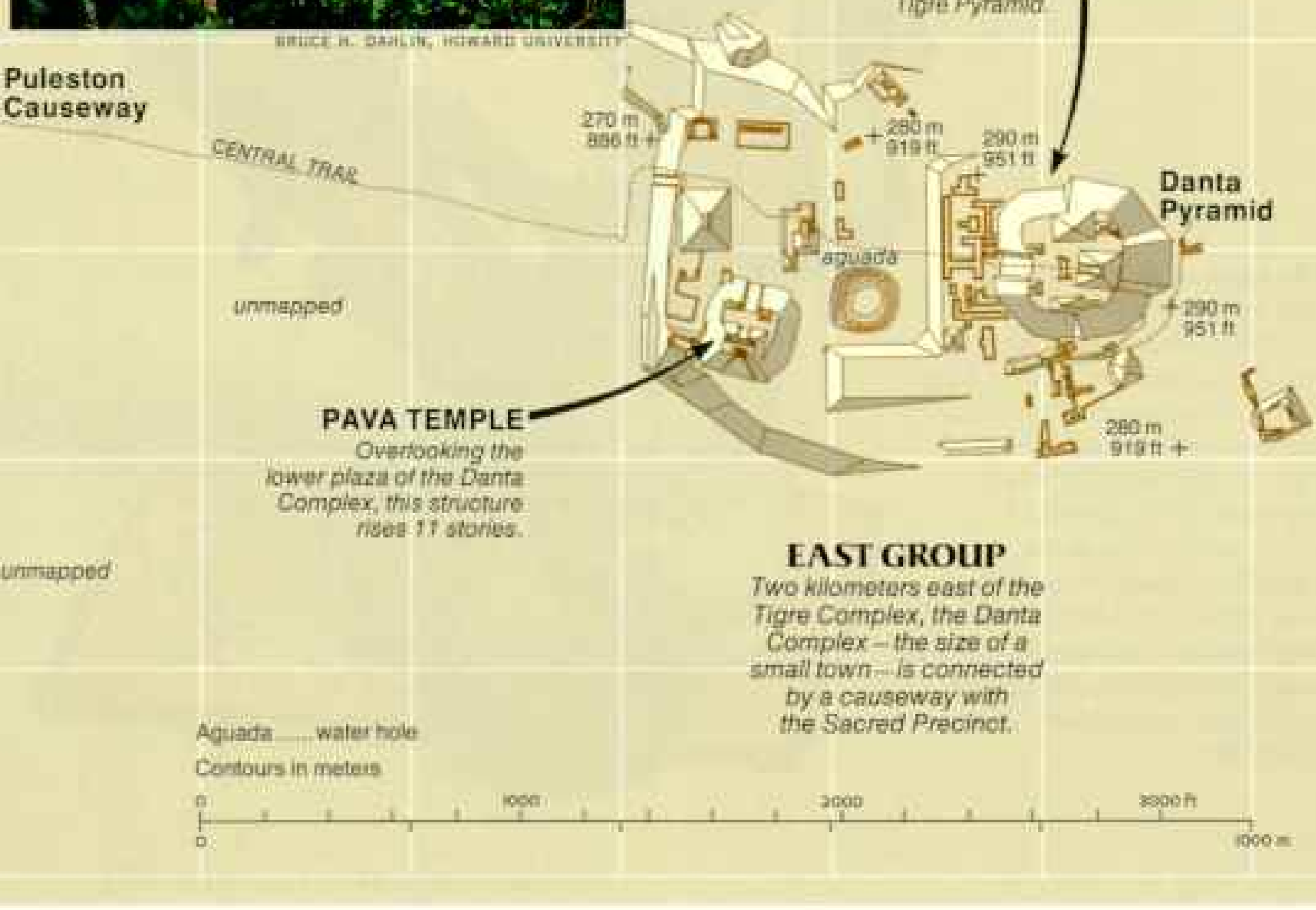
PRODUCTION: BARBARA CARTIGLIA
MAP EDITOR: GUS PLATIS

BRUCE H. DAHLIN, HOWARD UNIVERSITY

Blueprint of a 2,000-year-old city

SURVEYING THE SCENE, Mario Roberto de Leon helps map El Mirador from a treetop perch (left). As many as 200 buildings may remain undiscovered and unmapped. The city was undoubtedly a seat of Maya political and economic power in the Petén; at least 50 smaller communities surrounded it. El Mirador may have controlled trade networks extending to Yucatán and south. Traces remain of at least six thoroughfares leading to outlying areas. Like the Olmec civilization that preceded it and the Classic Maya culture that followed, El Mirador ends in mystery. The city was practically abandoned about A.D. 150. Theories include plague, war, crop failure, climate change, and diminished water supply. The question is one of the biggest riddles of Maya archaeology.



AFTER BRUCE H. DAHLIN, 1984, WITH MODIFICATIONS

city could have been controlled easily. The causeways cross *bajos*, or lowlands, to higher ground and afford the only practical passage over these seasonally flooded areas. It is likely that bajos surrounding the city were intensively farmed, but farther away they held an almost impenetrable mix of stunted trees, underbrush, and mud. The maintenance of these causeways was crucial to the city: Smaller towns and communities probably contributed labor for this purpose.

Aerial photographs show about 20 segments of causeways near El Mirador. These can be traced to Tintal, a large Maya site 21 kilometers southwest; to Nakbe, 12 kilometers southeast; and to other Preclassic sites. This suggests an even larger network of causeways, a lively flow of trade.

The range of that trade in Preclassic times is partly indicated by what we have found at El Mirador: seashells and coral from the Pacific, the Caribbean, and the Gulf of Mexico; volcanic ash from the Guatemala highlands 300 kilometers away; granite and marble, the nearest source of which is Belize; the red pigment used to color countless pots and to paint the great buildings—probably also from the highlands.

I often reminded myself that along with trade items, ideas also moved along the causeways—ideas that, when exchanged and examined and reshaped, led to the full flowering of Maya civilization.

THE CHICLEROS are masters of name-giving. They named Danta Pyramid, the highest structure on the site, after the large and powerful tapir. The Danta Complex and its pyramid sit on the eastern edge of the city, somewhat apart from Tigre and the other complexes. One can see this pyramid from an airplane more than a hundred kilometers away. Though slightly smaller than the 18-story Tigre Pyramid, its top rises 45 meters higher since it stands upon a hill.

The two pyramids oppose one another—Tigre greets the morning sun; Danta observes the setting sun. This is consistent with a Maya obsession with the sun and its

On the loom of time, *past and present intertwine in a pattern perceptible to the discerning eye. The backstrap loom used by a Maya woman—whose water lily headdress and decorated mat bespeak royal lineage—is still used by present-day weavers in Guatemala. Everyday wear of the Maya elite may have been thin cotton, perhaps grown in fields surrounding El Mirador. Ceremonial costume was elaborate and used precious materials such as feathers, jade, shell, and fur.*

cycle. Evidence from other sites shows that the Maya regarded themselves as "keepers of the sun," and often held religious ceremonies at sunrise and sunset.

When the base of the Danta Complex was constructed, the ground was first cleared and leveled for a light pavement of lime stucco, which has mostly disappeared. Upon this surface a lone blank limestone stela, still standing, and a round altar stone were found approximately on the centerline of the entire complex. A few meters behind the stela and altar, a vast platform rises seven meters and extends north and south for 300 meters. On my first visit to Danta, in 1978, I found it hard to accept the fact that this base platform was only part of a larger construction.

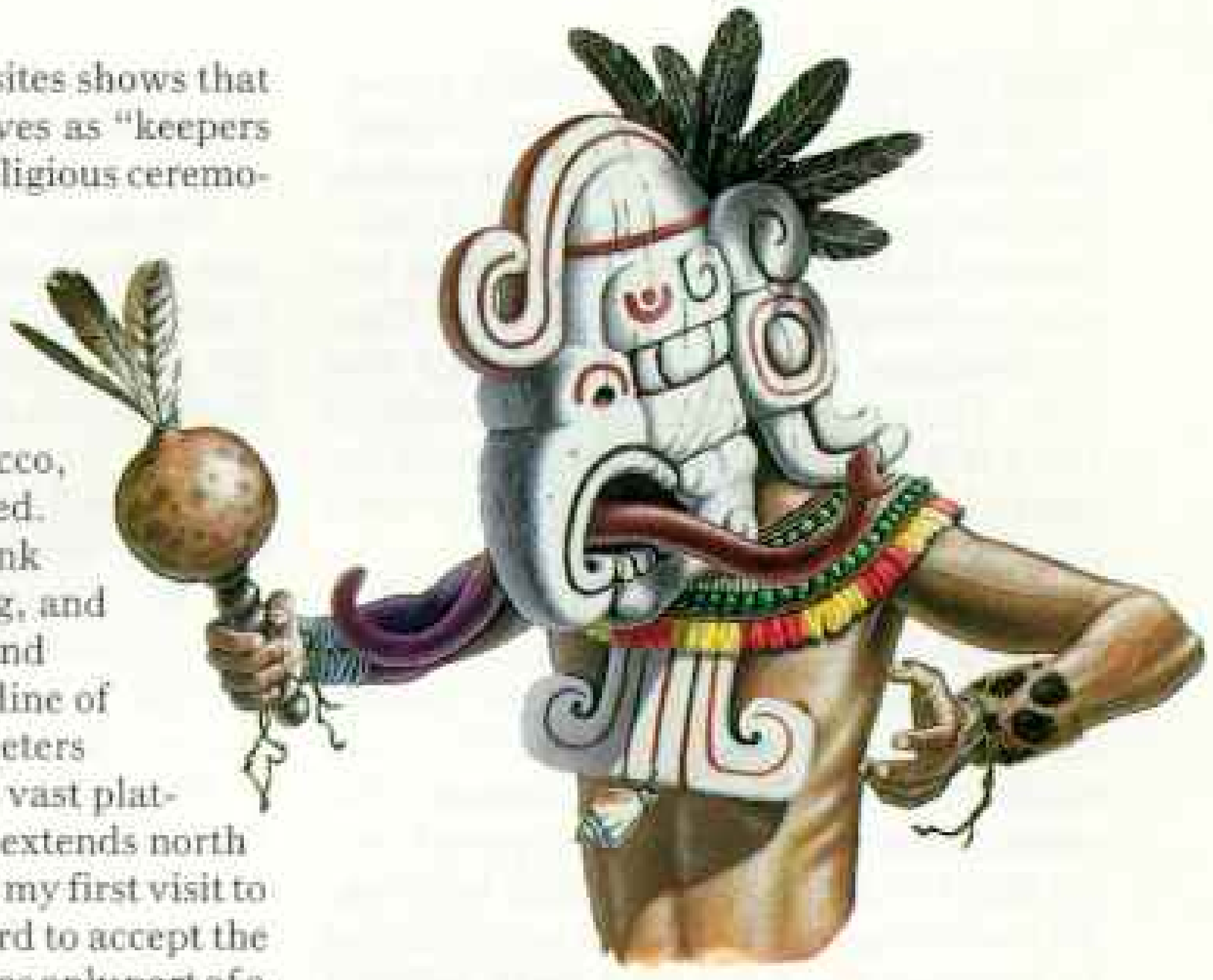
I remember climbing atop the platform to be greeted by two temples, each ten or eleven stories high, several large residences, and numerous smaller structures.

At the east end of the platform, another platform rises an identical seven meters. It is 200 meters long and parallel to the first. When I reached the top of it, I was startled to detect about 50 Classic dwellings and a central building only a little smaller than the Tigre Pyramid, two kilometers to the west.

The central building rises at a steep angle for 21 meters. Climbing, I had to grasp vines and roots to pull myself up, only to find at the top another cluster of buildings. From here the central structure rose another 21 meters. This final ascent was by far the hardest, the angle being 80 degrees, the surfaces deteriorated.

When I reached the peak, a magnificent panorama humbled me. Unbroken forest spread as far as the eye could reach.

The loneliness of the forest and the isolation of El Mirador struck home. From this vantage I liked to think of how the city and its surroundings would have appeared in its heyday: a bustling place, thousands at work. Men felling chunks of the forest for fuel to cook with and to convert limestone into plaster. Farmers tilling nearby land. In the city, workers clearing drainage systems, repairing reservoirs, so that when the rains came they could be caught and stored.



The bridge between *the otherworldly and the everyday was spanned by practitioners of ritual like this impersonator-dancer. He wears a wood mask bearing a design found on a stela between altar platforms on the Central Plaza. The mask's snout and scrolls reflect deity. The snake symbol was often part of such ceremonies. The dancer wears a shoulder band of jade, shell, and parrot feathers.*

Water was life! The city itself was a huge catchment area and so had to be kept clean. All took enormous effort.

BUT QUESTIONS tugged at my mind too. What made the Maya first settle here? And why did they then construct such a great city? Unlike most large Maya sites, El Mirador has no lake, river, or seacoast at hand. There are few natural resources, only the limestone rock for building, the forest for fuel. Today the area is unpopulated, not a soul within 60 kilometers, save the occasional chicle gatherer.

I believe the reason must have been strategic—perhaps from here near the base of the Yucatán Peninsula they could control trade over the region. And what caused the collapse of this and other Preclassic cities? Was it a failure of the culture? Some catastrophic event? I simply don't know.

The uniqueness of El Mirador lies not only in its size but also in the fact that it was not torn down or substantially built over by

Maya who lived here in the Classic period.

Classic Maya were present in considerable numbers, as evidenced by their residential compounds in several areas of the site. Deanne Matheny, my wife, along with five other archaeologists, excavated three Classic dwellings just outside the Sacred Precinct. This community of about 70 dwellings and a few principal buildings shows all the signs of an elite population that have been found at other Classic sites.

What is missing at El Mirador are public buildings exhibiting the Classic period corbeled vault to span open spaces; carved stone stelae with writing, calendrics, and mathematics; and sumptuous palaces. Our evidence shows that the Classic period people failed to erect a single public building. We conjecture that the Classic population at El Mirador was ruled by a weak political structure, one that did not have the power necessary to control a large population.

We have turned up some evidence of Classic ceremonial activity. On the first landing of the Tigre Pyramid, about 35 meters above the plaza, we found Classic pottery and numerous obsidian lancets and knife points. We had them tested for trace elements to determine their origin. All came from obsidian flows in the Valley of Mexico, about 1,000 kilometers west.

Someday we'll probably discover there was a great deal of long-distance trade in Classic times between such sites as El Mirador and Teotihuacán, far to the west, and Kaminaljuyú, to the south.

A piece of the Maya puzzle, *a potsherd (above) provides a clue to intellectual life. The character, to some epigraphers, reads ahau, or lord. If so, the 2,200-year-old symbol could be an early example of Maya writing. Though pots such as these on a cacaste, or wood frame (facing page), may have been trade items, El Mirador's most enduring exports were ideas. It was here and at other Preclassic sites, say scholars Linda Schele and Mary Ellen Miller, that "the template for Maya kingship and their world view was set for the next one thousand years."* MARK PHILBRICK

WHAT DO THE EXCAVATIONS of El Mirador tell us about the ancient Maya? It should be remembered that our work is in its initial stage; only test and salvage excavations have taken place. But we can make some observations.

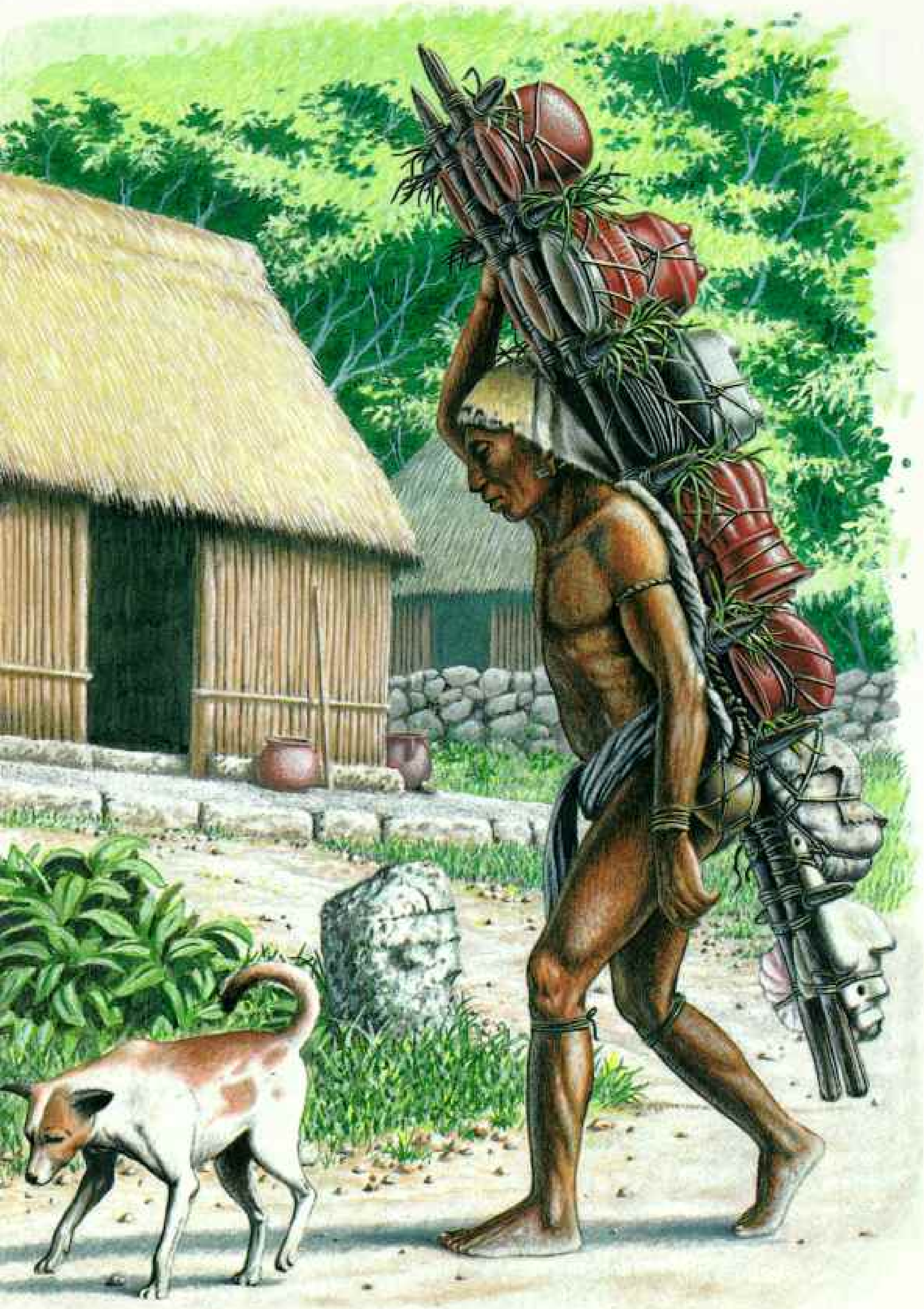
First, it was surprising to most Mayanists that so large a city, and one showing such superb engineering skills, could have been built during the second and first centuries B.C.; after all, the Preclassic Maya were not thought to have been capable of such achievement. Second, it was also believed that these early Maya were not capable of organizing a city-state type of government—that they were ruled by warring chieftains.

I have difficulty visualizing El Mirador having been built by a chieftain. I believe that a dynamic political force mobilized a stable population of tens of thousands for the time it took to do the job, and then maintained its economic and political importance in the Petén forest.

A city of this size could not have been built without enormous resources of people and raw materials. A city is part of a cultural system extending well beyond the city itself. No city can exist in isolation, but instead interacts with other cities, towns, villages, and hinterland populations for diverse foods, products, talents, skills, and knowledge.

El Mirador was a city that required the best that a society had to give. Architects, engineers, craftsmen, astronomers, artists, priests, politicians, warriors, laborers, farmers, traders, and a huge supporting population had to be pulled together to create this magnificent metropolis. These elements did not come together by chance but by organization of a high order that I prefer to call the primitive city-state.

Still rich with promise beneath its jungle shroud, El Mirador will no doubt continue to throw brilliant new light on the beginnings of the Maya civilization. □



JAMES MADISON
Architect of the Constitution

By ALICE J. HALL
ASSISTANT EDITOR

Photographs by SAM ABELL

A GIANT IN INTELLECT, diminutive James Madison convinced the squabbling states to send representatives to Philadelphia 200 years ago to "form a more perfect Union." For the Constitutional Convention, he prepared a scheme of national government untried in the world. His Virginia Plan described three separate branches of government with power emanating from the people.

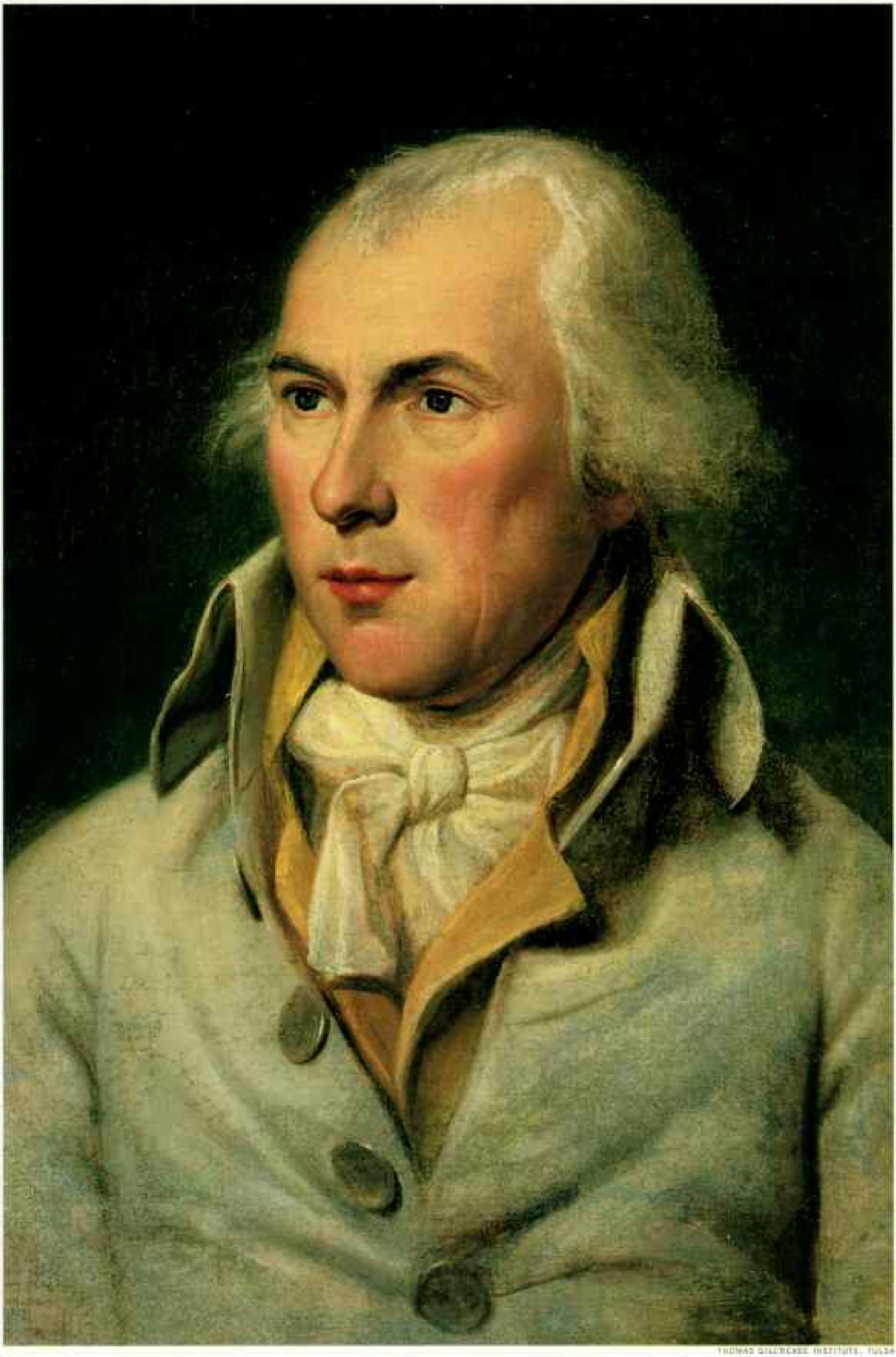
Son of a Virginia planter, Madison devoted his life to public service and the idea that Americans could govern themselves. A 41-year-old congressman in 1792, he posed for this portrait by his friend, Philadelphia artist Charles Willson Peale. It later hung in Peale's museum among portraits of other Presidents—in 1808 Madison was elected fourth Chief Executive of the new republic he had helped invent.

TOM JEFFERSON was impressed. Again he read the list of men meeting in Philadelphia to design a new government for the United States. The year was 1787, and Jefferson was based in Paris as minister to France. He paused at the name of one man—his close friend James Madison. Constitution making was in good hands. Indeed the group was "really an assembly of demigods." He probably smiled, thinking of Madison contradicting him with: "If men were angels, no government would be necessary."

But men *weren't* angels, and government *was* necessary. No one knew that better than the 36-year-old Madison. The Virginia politician had accumulated so much learning and practical experience of the issues dividing the country that he had "perhaps . . . the most correct knowledge . . . of any Man in the Union," according to delegate William Pierce.

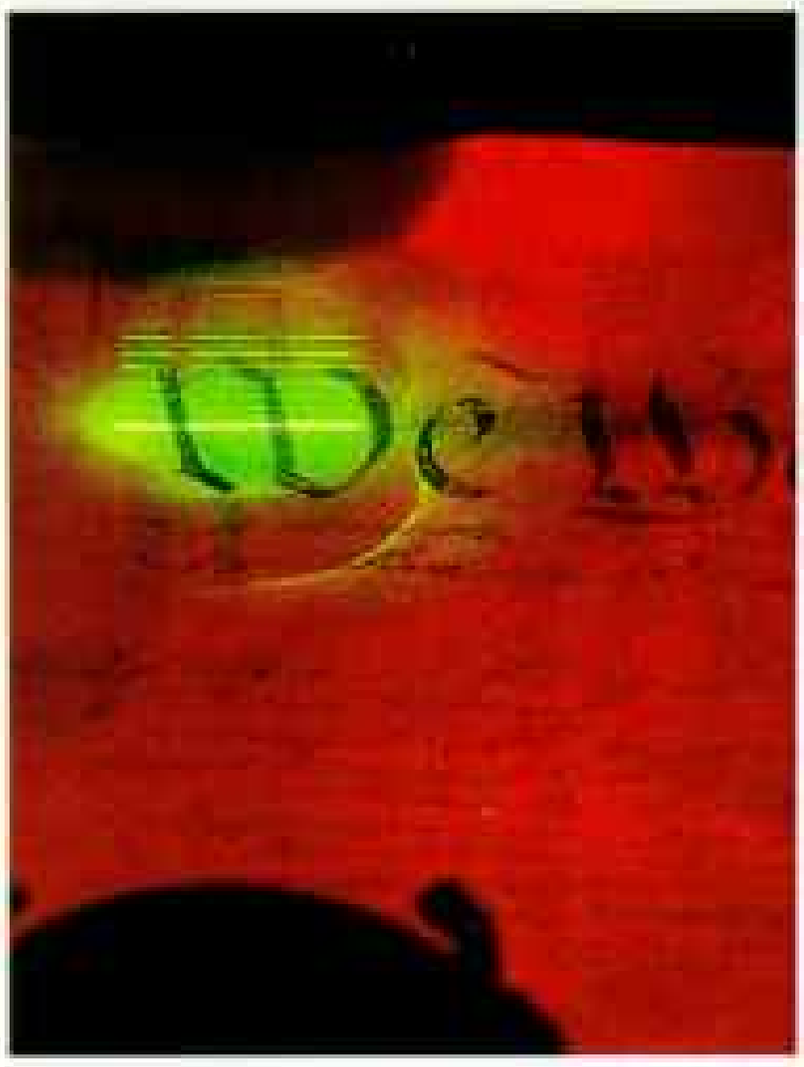
Madison would go on from that momentous summer of 1787 to win election as a four-term congressman from Virginia, to be President Jefferson's secretary of state, and to serve two terms as President himself. He would become partner in one of the most appealing marriages in American political life. But Madison's most significant legacy remains his role as architect of the U. S. Constitution, the oldest blueprint for government in the world today. To understand James Madison is to understand how the Constitution came into being.

James was a first son, born in 1751 to Nelly and James Madison of Orange County, Virginia. His people were, he noted, "planters and among the respectable though not the most opulent class." Like most immigrants to the royal colony, his ancestors had come from England not for religion or freedom but for profit. The first Madison, a ship's carpenter, landed in 1653. He acquired property by paying the passage for indentured servants and receiving 50 acres "headright" for each. His grandson Ambrose (James's grandfather) moved west to the rolling Piedmont to amass 5,000 acres, part of which became the plantation



THOMAS GILCREASE INSTITUTE, TULSA

PRESERVED in the nation's capital, studied the world over, the U. S. Constitution is on display at the National Archives. Each September 17, anniversary of its signing, visitors view the four pages of the Constitution. Ordinarily two pages, together with the Declaration of Independence and the Bill of Rights—the first ten amendments, which Madison guided through the First Congress—are shown. At night the documents in their airtight, helium-filled glass cases are lowered into a vault.



In the early days of the Republic the papers were stored in the Department of State. During the War of 1812 they were spirited out of Washington just ahead of an invading British force. During World War II they went to Fort Knox. They were on view at the Library of Congress before reaching the Archives in 1952.

To monitor the documents' condition, conservators record details of ink and parchment (above) in electronic images. Periodic measurements will reveal changes invisible to the eye, permitting swift action if more deterioration occurs.

PRINCETON UNIVERSITY LIBRARY (TOP); PRINCETON ART MUSEUM (FACING PAGE)

later called Montpelier, probably for the French university city.

The extensive Madison property was not unusual in those days, although most Virginians were dirt farmers subsisting on a few acres, with or without help from a slave family. But Montpelier is a rarity today, with 2,700 acres of field and forest intact.

To see the land as James Jr. knew it, I mounted a gentle hunter and joined a riding party on a crisp November morning. I soon felt the headlock this country put on young Jemmy and never let go. He inherited the estate, it was his only home, and in 1836 he was buried here in the family plot.

Geese were honking their way south as we rode up trails overgrown with scrub, carpeted with fallen leaves. Along ridges. Down ravines. Across trickling streams. Overhead, white and red oak, tulip poplar, hickory, and ash reached a hundred feet and more; some had rooted during Madison's lifetime. Some 600 acres of Montpelier is old-growth forest, an astonishing size for the agricultural Piedmont.

To the Madisons the timber meant fuel, house beams, and furniture. The stately black walnut also served as an indicator of rich moist loam that, once cleared, would nurture tobacco. That aromatic cash crop wore out the soil quickly, and planters opened new clearings rather than rotate crops or fertilize. They overproduced, and profits dropped. By managing slave labor on large-scale operations, a careful planter might survive and prosper. Madison's father doubled his slaves to 118 by 1782.

JEMMY and his brothers and sisters grew up playing among slave children in Walnut Grove near the big house. Some servants were like members of the family. When Jemmy needed an overseer, he chose the slave Sawney, a longtime servant. As much as Jemmy disliked being dependent on the institution of slavery, he could not cast off his inheritance. And Virginia public opinion would not tolerate abolitionists.

We rode up to the enormous hilltop mansion that stares northwest to the Blue Ridge. Greatly enlarged, it bears little resemblance to the Georgian brick house built about 1760, when Jemmy helped move in. Scant record remains of his privileged childhood. I find in the farm accounts of the 1750s in his father's neat hand only two purchases I can attribute to the first son: a cradle when he was three months old and "two banyons for Jemmy"—loose linen gowns—when he was three.

In their customs Virginia's colonial upper crust were mirror images of the British gentry. Imbued with a sense of noblesse oblige, Jemmy's father served as a vestryman of the nearby Anglican parish church. The vestry chose clergymen, maintained the buildings, and took care of the poor. They did it with tax money. Virginia, like Britain, wedded church to state; church attendance was a law, though not often enforced.

If religion was a public duty, education was a private matter. James Sr. provided the best for Jemmy, who took to books early and for life. For five years he boarded with Donald Robertson, a respected Scottish schoolmaster in King and Queen County. There the youngster studied English grammar, Latin, Greek, geography, and moral philosophy. He learned to summarize

"THE ADVANCEMENT and diffusion of knowledge," Madison wrote late in life, "is the only guardian of true liberty." His education blossomed at the College of New Jersey, today's Princeton University, where he resided, took meals, and studied with tutors at Nassau Hall (lower left, at left). He was greatly influenced by college president John Witherspoon (above), a Presbyterian minister recently arrived from Scotland with 300 books and challenging ideas. Witherspoon encouraged the testing of theories against common sense and experience. He would later be the only clergyman to sign the Declaration of Independence.

Jemmy, as Madison was known to intimates, joined a debating club, a tradition maintained at Whig Hall, where Nick Beldecos speaks in front of a bas-relief of Madison. Though weak-voiced, Madison developed into a fine debater; he addressed the Philadelphia Convention more than 200 times. Years later an opponent, Chief Justice John Marshall, called him "the most eloquent man I ever heard."

difficult passages, a most useful skill at the 1787 Convention.

After further study under the Reverend Thomas Martin, a tutor living at Montpelier, Jemmy was ready for college. The Anglican-dominated College of William and Mary at Williamsburg was nearby. But Martin favored the College of New Jersey, today's Princeton, founded by Presbyterians. Jemmy went with delight, although Anglican George Washington had refused to send his stepson to that "nest of Presbyterians."

With 115 students, many from other colonies, the college proved to Jemmy that the Virginia cast of mind was one among many. A typical student, Jemmy wrote his father: "Your caution of frugality . . . shall be carefully observed; but . . . the purchasing of every small trifle . . . consumes a much greater sum than one would suppose." He sent measurements to have shirts made but "not have them ruffled 'till I am present myself."

Jemmy undertook, he recalled, "an indiscreet experiment of the minimum of sleep and the maximum of application" to complete two years of studies in one. The exercise hurt his health. Years later his wife, Dolley, commented on how little sleep he required, and how he kept a candle burning all night so he could read or write if he awakened.

For fun Jemmy and his chums divided into debating societies and flung across the prayer hall ribald verse that had the tutors blushing. In the mildest of his couplets—censored by early biographers—he suggested that opponents "skulk within their dens together/Where each ones stench will kill his brother."

BEYOND COLLEGE WALLS, disputes between the Colonies and the motherland were going beyond debate. Parliament had been demanding increasingly onerous taxes to defray the cost of the Colonies' defense. Objecting to taxation without representation, some Colonies refused to pay and countered with pacts not to import British goods. Demonstrations culminated in the Boston Massacre on March 5, 1770, when redcoats fired into a crowd, killing five Americans.

Then New York merchants, stung financially, decided to resume imports and wrote to Philadelphians requesting concurrence. Princeton students obtained a copy of the letter, and, as Jemmy wrote home, it was "burnt by the Students of this place in the college Yard, all of them appearing in their black Gowns & the bell Tolling."

In one of the earliest buy-American campaigns, Madison's graduation class in 1771 appeared "in American Cloth." Jemmy cast off his birthright as an Englishman as easily as putting aside

COLD REMINDER of a clash that helped fuel the call for a stronger national government lies near Sheffield, Massachusetts. The marker commemorates Daniel Shays and other desperate farmers who, in 1786-87, joined in armed revolt when

their petitions against rising taxes and strict debt collection were ignored. Armed with clubs and muskets, they closed local courts to get attention. A private army attacked Shaysites in this farm field and killed more than 30 men, the bloodiest battle of Shays' Rebellion.

Alarmed by "rapidly approaching anarchy," Madison spoke more urgently for the proposed convention in Philadelphia to produce a government able to cope with such lawlessness. Once reluctant, George Washington agreed to attend.

British woolens. Always he counted himself with the patriots.

But to what end? His friends left Princeton fired with enthusiasm to preach, to start academies, to write novels, and to practice law and medicine. Back in Montpelier, Jemmy tutored the youngest children, read, and contemplated life in his "obscure corner of the world." He considered law, but found law books "coarse and dry." A malaise that included episodic seizures cast a pall, causing him not to "expect a long or healthy life." Despite recurrent illness, Madison would live to age 85. His endurance owes in no small part, I believe, to his finding a consuming interest in the political health of his country.

As the redbud and dogwood burst into bloom across Montpelier in 1773 and his doctors counseled "more activity and less Study," Jemmy felt better. Events were overtaking Virginia and his quietude.

"I do not meddle in Politicks," he wrote college friend William Bradford. He added a key word, *but*. Local issues—in this

MADISONS WORLD: Although he rarely ventured beyond this Middle Atlantic landscape, Madison read extensively and corresponded with leading figures, gaining a profound understanding of the larger world. From Montpelier, his beloved family plantation in the Piedmont, he often rode the rutted local roads—despite hemorrhoidal attacks eased in summer by visits to the mineral springs at Bath, today's Berkeley Springs. Fredericksburg was a mail drop and the closest port for Montpelier crops.

CLOUDS OF SMOKE—sign of the black powder used in Brown Bess muskets—engulf soldiers of the Old Guard, firing a volley to celebrate Madison's birthday, March 16, at Montpelier. The unit was raised by Congress in 1784 as the first national regiment and sent to the Indian frontier. Many early Americans disliked

the idea of a standing army, seeing it as a possible threat to personal liberty—albeit necessary for "the common defence," in the words of the Constitution. That document gave Congress the power to raise a national army and navy and to regulate state militias; it placed the President in charge as commander in chief.

SHY IN PUBLIC, Madison at 32 became enamored of 16-year-old Kitty Floyd. They exchanged watercolor-on-ivory miniatures to seal their engagement in 1783. But Kitty changed her mind, favoring a young medical student, William Clarkson. Leaving medicine for the ministry, Clarkson and Kitty eventually moved to South Carolina, where he died in 1812—the year Madison won his second term as President and celebrated the 18th anniversary of his marriage to Dolley Todd. Still sensitive years later, he recovered a letter to Jefferson about Kitty's "indifference" and tried to ink out his sentiments.

MINIATURES BY CHARLES WILLSON PEALE. RARE BOOK AND SPECIAL COLLECTIONS, LIBRARY OF CONGRESS

instance a scarcity of cash that reduced prices by half—affected everyone. That December, news of a violent tea party in Boston inspired resistance to British laws elsewhere. Jemmy ordered a map of Boston Harbor. Soon he was seeking information not found in the weekly newspapers: What was in the Pennsylvania charter? What was the extent of religious toleration there?

A religious revival was sweeping the Virginia Piedmont. Unlettered self-appointed preachers of the Separate Baptist sect preached without license in private homes and open fields. Anglicans were encouraged to be born again and to bear witness by hollering, singing, and swooning. Britain's Act of Toleration gave dissenters the right to apply to the Anglican establishment in Williamsburg for a license, but they refused to recognize government authority over matters of conscience.

Some counties tried to suppress the loud preachers by charging them with disturbing the peace. But even in jail they preached—through barred windows. Jemmy argued against that "Hell-conceived principle of persecution [that] rages among some. . . . the Clergy can furnish their Quota of Imps for this business." The controversy set him thinking along lines that trouble some Americans to this day. Could a free society stand without established religion at its foundation?

In the Virginia capital of Williamsburg a rump legislature issued the first call for a Continental Congress to meet in Philadelphia in 1774; Jemmy wished that he could attend. Virginians were ready, he wrote Bradford, "to join the Bostonians as soon as violence is offered them or resistance thought expedient." Jemmy drilled with the Orange County militia and handled a rifle so well, he bragged later, he "should not often miss . . . the bigness of a man's face at the distance of 100 Yards."

When Orange County organized a Committee of Safety to run local affairs in support of the new Congress, Madison Sr. was chairman and Jemmy a member. In May of the watershed year of 1776, James Madison, Jr., won his first election—to the Virginia Convention at Williamsburg. That act of confidence by his Orange neighbors set in motion a 40-year career in politics.

MADISON'S ENTRY into the public arena was not auspicious. He was remembered as "a small, frail youth, who, though he had reached his twenty-fifth year, looked as if he had not attained his majority." About five feet six inches tall, he wore black, down to his silk stockings and laced shoes. He powdered his brown shoulder-length hair and tied it behind. Edmund Randolph remembered enjoying "the banquet of his remarks . . . upon Grecian, Roman and English history," whispered during debates.

Madison joined the committee that drafted the state constitution. It "derived power from the people"—a revolutionary concept—and boasted a model bill of rights. When wealthy Tidewater planter George Mason listed those individual freedoms, Madison detected a subtle flaw in the phrase about religion: "All men shou'd enjoy the fullest Toleration." No, Madison said, the free exercise of religion should be an absolute natural right, not subject to the *toleration* of others.

The convention approved Madison's substitute, but this small victory was only an opening salvo in his lengthy battle to "extinguish forever the ambitious hope of making laws for the human mind." Ten years later, after helping to defeat a bill in the Virginia Legislature to give tax subsidies to all sects, Madison maneuvered Jefferson's statute for religious freedom through to approval. He was supported by Baptists, Methodists, and Presbyterians, who wanted no government money or involvement whatsoever. Finally, with the 1791 ratification of the First Amendment, introduced by Madison in the 1789 Congress, it was acknowledged that the U. S. would have no law establishing religion, a concept then rare in the world.

Back in 1776 Madison and his fellow legislators—acting on another revolutionary idea—made Virginia the first state to instruct its delegates in Congress "to declare the United Colonies free and independent."

Following the course of Madison's days in Williamsburg, I am reminded that Virginia—like the other states—was waging war with Britain, and the legislature had to raise and feed troops, obtain loans, deal with Loyalists, set up prison camps, and communicate with the Continental Congress. Its money came from head taxes and duties on goods "imported" from neighboring states and abroad. It printed its own currency.

One might expect a governor to handle much of the burden, but the legislators deeply feared a tyrannical executive. They

SOCIAL TRADITIONS live on at the Jefferson Cotillion in Charlottesville, where Virginia youngsters practice the waltz. According to an account book of Madison's neighbor Dr. Thomas Walker, local children received such instruction at Walker's Castle Hill plantation. Itinerant dancing masters taught boys and girls the minuet, jig, and country reels before overseeing a dance for the neighborhood. Of the mature Madison one lady admirer wrote, "his eyes are penetrating and expressive—his smile charming—his manners affable—his conversation lively and interesting."

named a fellow lawmaker governor (Patrick Henry, followed by Thomas Jefferson), then made him dependent on an eight-man council of state they also appointed. While on that council Madison formed a friendship with Jefferson that was "for life."

IN THE VIRGINIA LEGISLATURE, Madison gained experience with state supremacy that would lead him at the Philadelphia Convention to speak against it. There was, he said, "a constant tendency of the States to encroach on the federal authority; to violate national Treaties, to infringe the rights and interests of each other; to oppress the weaker party. . . ."

When Madison's colleagues in 1780 selected him to represent Virginia in the Continental Congress, they could not guess that they were aiding the rise of a man who would shortly work to deprive them of much of their power. And when Madison rode away from Montpelier, eager for action after being snowbound all winter, he little suspected he would not return for three years, and then wiser in the affairs of state—and of the heart.

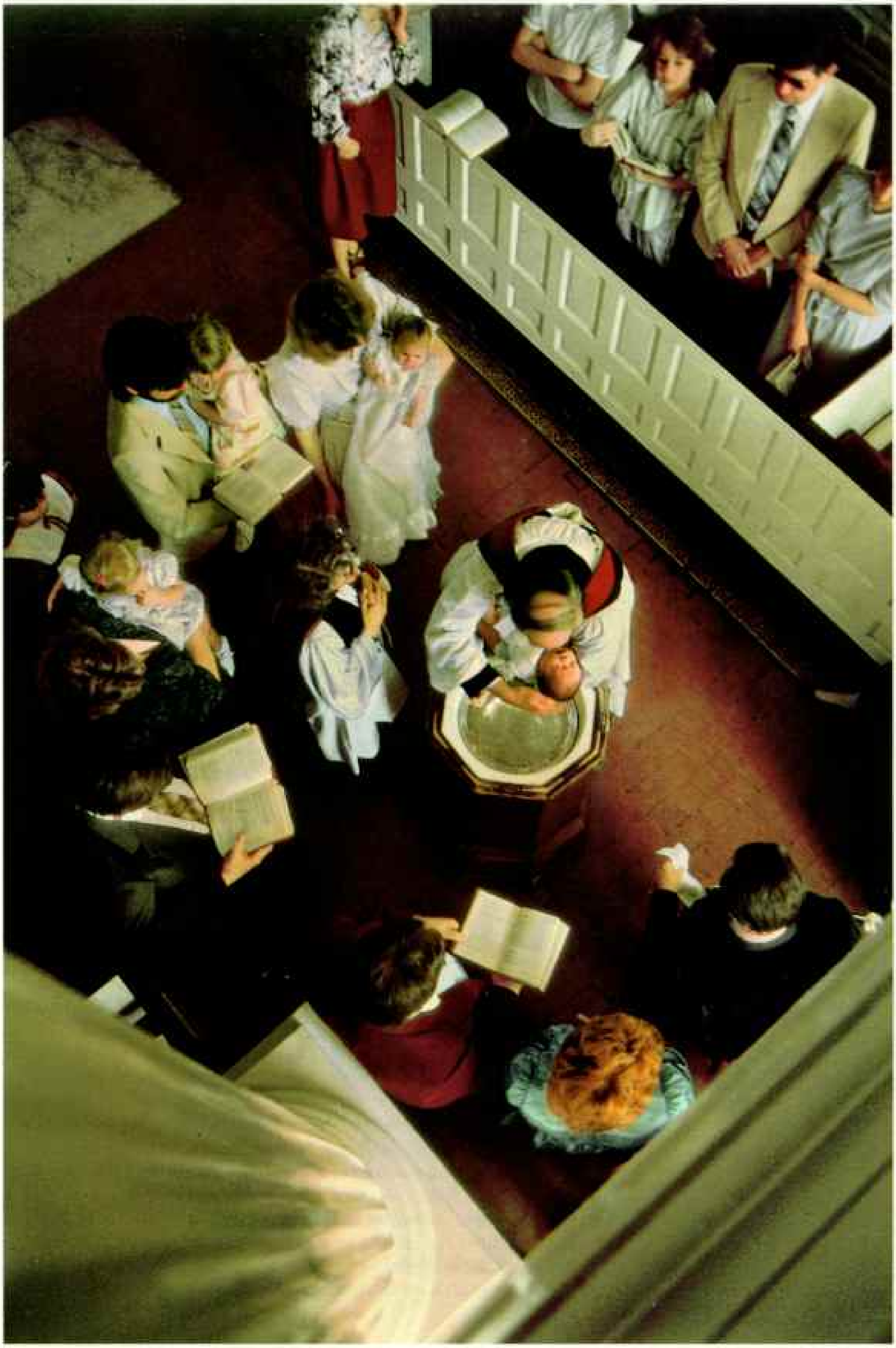
Philadelphia was the nation's cosmopolitan capital of 40,000 and its major port. From Front Street 200 wharves reached into the Delaware River; 300 ships often anchored offshore. Along Market Street open-air stalls displayed the produce and crafts of the countryside. Madison dined with the French minister Luzerne and with the other southern delegates at City Tavern, which catered to delegates. (Congress had already informally divided into North and South.)

Yet the city was on a wartime footing. From Ben Franklin's Market Street dwelling his daughter Sarah directed ladies sewing linen shirts for Pennsylvania soldiers. Madison worried over news of British depredations in Virginia. He marveled at the unexcelled appearance of French soldiers and "the exactness of their discipline" as these allies marched through Philadelphia to the final battle at Yorktown.

At Fifth and Market Streets, Madison lodged in the congenial atmosphere of a boardinghouse run by Mary House and her daughter, Eliza House Trist. Boarders shared large breakfasts and other meals, along with news from their wide-ranging correspondence. Years later a Trist grandson would marry a Jefferson granddaughter. But in 1783 boarders were gossiping about the budding romance between Madison and vivacious 16-year-old Kitty Floyd, daughter of a New York congressman. Madison wrote Jefferson that he had "ascertained her sentiments," and "most preliminary arrangements, although definitive, will be postponed until the end of the year in Congress."

FREEDOM OF RELIGION, without interference or support from government, was a cornerstone of Madison's philosophy. Raised an Anglican, he spoke for the right of dissenters to found congregations during a period when Virginia gave tax support to the Anglican faith alone. Blue Run Baptist Church (above), now a black congregation, was founded near Montpelier in 1769. Madison's support of religious freedom won him the votes of Baptists, Methodists, and some Presbyterians in his campaigns for local and national office.

During the Philadelphia Convention, delegates heard sermons at the Anglican, now Episcopal, Christ Church, here the scene of a baptism (facing page). They also attended services at the German Lutheran, Roman Catholic, and other city churches. To the end of his days Madison was reticent about his own religious beliefs.



But fickle Kitty, summering at her Long Island home, dreamed of a 19-year-old medical student, also a boarder. She broke the engagement. Madison shared the "disappointment" circumspectly with Jefferson, who sent comfort: "The world still presents the same and many other resources of happiness, and you possess many within yourself . . . of all machines ours is the most complicated and inexplicable."

IN THE EARLY 1780S, Madison, one of the youngest men in the Continental Congress, gave the appearance of being all business. He represented the largest, most populous, and wealthiest state. One out of five Americans was a Virginian. Yet Virginia's delegation had only one vote. Under the Articles of Confederation, the country's first constitution, power was shared equally by the 13 states. No enforcement power existed. No federal courts. No senate. No president. Congress could ask states for funds, but states often did not pay. Congressmen selected one of their own to be "President of these United States in Congress." A succession of forgotten men, 14 in all, were "president" before George Washington.

With single-minded determination Madison learned the ropes. He put together majorities, joining Virginia's interests with those of other states. He fought against New Englanders who, to gain a monopoly on codfish sales to Spain, were willing to give up American rights to the Mississippi River—selling Virginia settlers in the Ohio Valley down the river, as it were.

For all its weaknesses the Continental Congress had waged and won a war with the world's mightiest power. It negotiated a peace that included a vast territorial cession. But could the states in Congress work together in peace? Could they fulfill the promise of the Revolution to secure the people's right to life, liberty, and the pursuit of happiness?

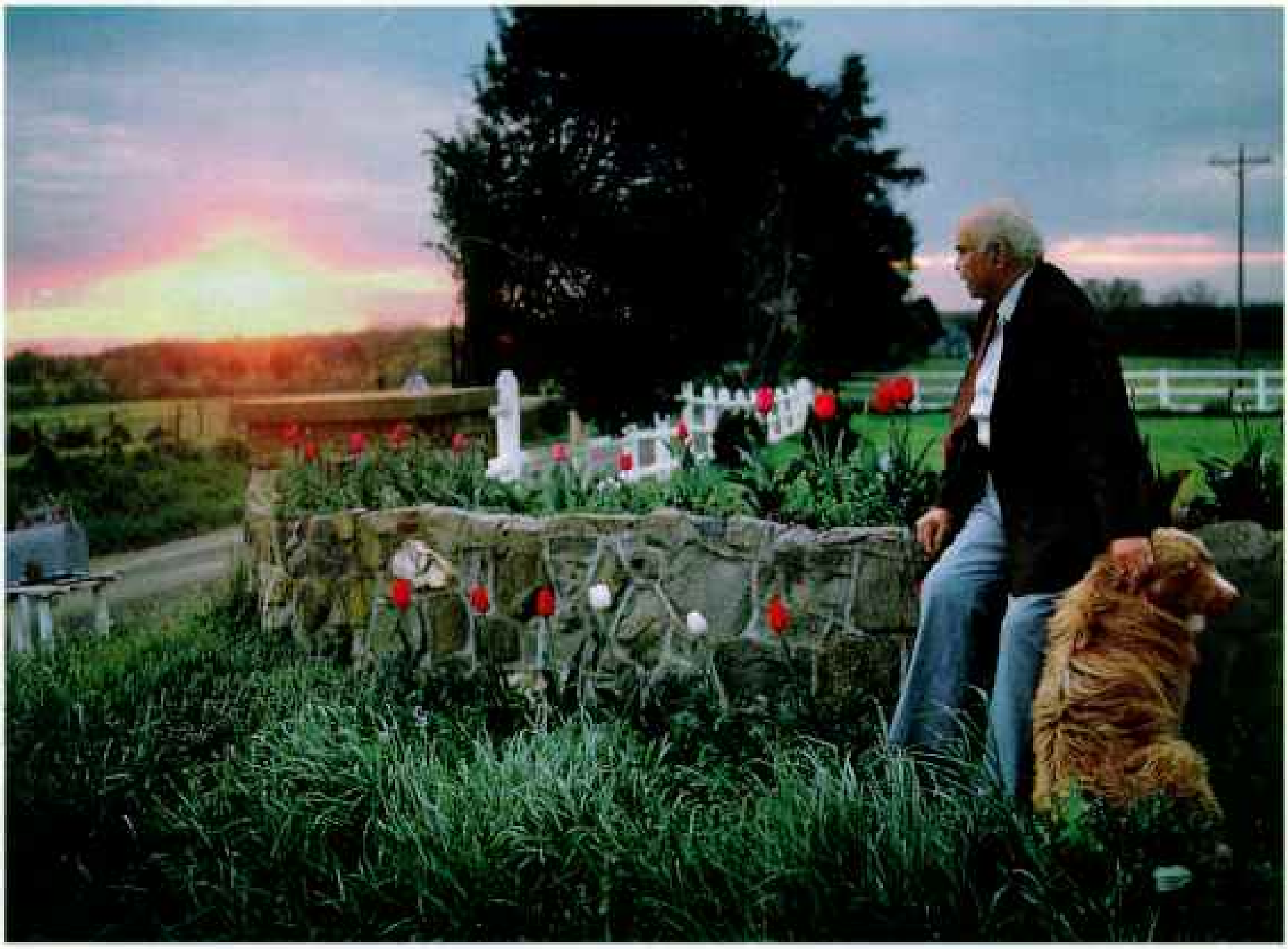
Madison could not stay to find out; congressmen could not serve more than three years in six. Scarcely had he returned to Montpelier than he was elected again to the Virginia Legislature. From this base he began to work on an all-consuming idea: The Articles of Confederation needed drastic overhaul. A national government had to be given more power to act on behalf of the Union. Making a move in this direction, he wrote and won passage of a Virginia resolution calling for a conference in Annapolis to discuss trade and commerce. Only five states sent delegates that September 1786. But these men recommended the calling of a general convention in Philadelphia the following May.

There was little enthusiasm at first. Then, as if fate conspired

INFERNAL INSTITUTION, slavery offended some Southerners and many visitors. Touring Virginia, Benjamin Henry Latrobe, later an architect of the Capitol, sketched slave women clearing cornfields near Fredericksburg in 1798. The overseer, as Latrobe sardonically captioned the work, was "doing his duty."

Madison hated slavery but could not live independent of his plantation. In 1785 he spoke eloquently for a state bill for gradual abolition, but it failed. At the Philadelphia Convention he agreed to a compromise counting only a portion of slaves for determining the number of representatives a state could have. But he supported an end to the slave trade in 20 years.

MARYLAND HISTORICAL SOCIETY, BALTIMORE



with the nationalists, events in New England pushed opinion over the edge. In 1786 Boston merchants had elected men to the Massachusetts assembly who supported their demands to raise taxes to pay off war debts. Farmers in the west couldn't afford the charges. Getting no redress, they turned to the grand tradition of earlier Boston patriots and attacked the courts with clubs. It was called Shays' Rebellion.

Such lawlessness was shattering to leaders like Madison and George Washington. Was their beloved "government by the people" turning down the road to anarchy? Now states paid attention to the call to Philadelphia; all except Rhode Island voted to send delegates. Madison wrote into Virginia's enabling law: "The crisis is arrived."

One of the first delegates in Philadelphia, Madison rode in inconspicuously sometime during the first week of May 1787, settling at Mrs. House's. Typically, he had prepared himself by seeking lessons from the past. His library had been augmented by a "literary cargo," 200 volumes in English and French, purchased for him by Jefferson in Paris. Madison had already analyzed ancient and modern confederations and penned a plan for a model republic.

When Washington arrived on Sunday, May 13, he was met by the City Light Horse, saluting artillerymen, and chiming bells. The presence of the revered general lent legitimacy to the meeting. Host of the convention as governor of Pennsylvania, 81-year-old Benjamin Franklin wrote Jefferson that the

PONDERING THE PAST, T. O. Madden, Jr., gazes toward Montpelier, where, he recently learned, his great-great-grandmother was an indentured servant of the Madisons. Sarah Madden was born to an impoverished Irish woman who had to give up her mulatto child to indenture because she could not support her. Madison's father acquired Sarah's papers in payment for a debt. Free after 30 years of service, she moved with her own children to Culpeper, where a son established a travelers tavern that thrived in the 19th century. Mr. Madden found an old trunk of papers in the attic of the tavern, now the family homestead, and hired a genealogist who discovered the Madison connection.

convention must succeed or "it will show that we have not Wisdom enough among us to govern ourselves."

Monday morning, only Virginia and Pennsylvania delegates appeared in the high-ceilinged Assembly Room of the Pennsylvania State House (now Independence Hall). Virginians began to caucus daily to draw up what would be known as the Virginia Plan. It was presented early. It became the basis for the summer's discussion; it distilled the ideals of James Madison.

But first, more delegates had to show up. By Friday, May 25, men from seven states—a quorum—had gathered. The convention could begin. Washington was selected unanimously to preside. Madison, who planned to record the proceedings for posterity, sat in front, "for hearing all that passed." At each day's end, often by candlelight, he took up quill pen, india ink, and fine British bond to write out his abbreviated notes, the most complete record we have. He did not miss a single day, a self-imposed task that, he later admitted, "nearly killed me."

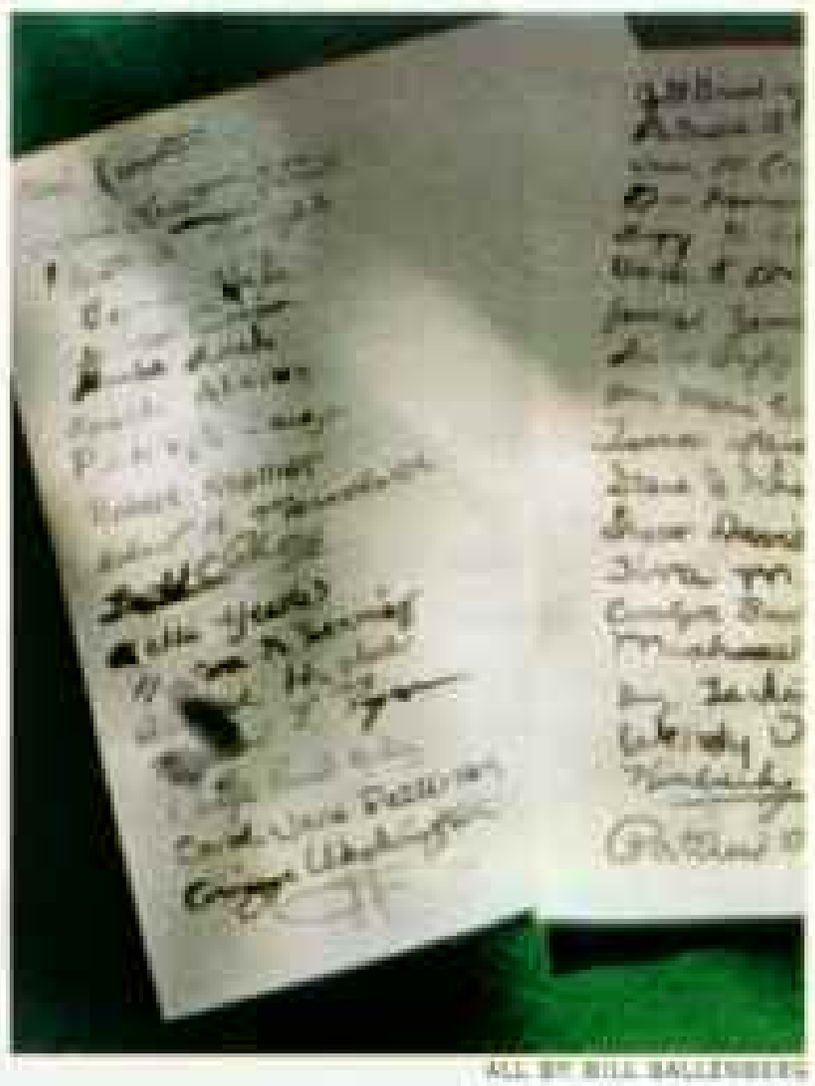
The delegates adopted rules of procedure that resulted in disjointed debate but true consensus: Each state had one vote; a simple majority passed a motion; a proposition could be debated again if the majority agreed. Delegates were to work in secrecy. Madison made the best defense ever for the people's right *not* to know: "By secret discussion no man felt himself obliged to retain his opinions any longer than he was satisfied of their propriety and truth, and was open to the force of argument."

Of the 55 delegates, 40 on average attended the five- or six-hour sessions, adjourning about 4 p.m., the Philadelphia dinner hour. At first glance they seem cast from a common mold: white, male, Protestant (only two were Roman Catholic). Average age: 42. About a quarter were Freemasons. Half had fought in the war. All but two had experience in state government or in Congress or both. Most believed in a stronger central government; those who didn't stayed home or left early. Yet to these men consensus didn't come easily; it almost didn't come at all.

As soon as Virginia's 33-year-old Governor Edmund Randolph presented the Virginia Plan, Madison had a fight on his hands. It neatly removed a great deal of power from state legislatures and transferred it to a national legislature of two branches, the lower elected by the people. This Congress could veto any state law found unconstitutional, Madison's pet check on the injustices of local lawmakers. It would select a chief executive and judges who, in combination, could veto national legislation as well as some state laws. Congress would make laws on all matters where the states were "incompetent."

Delegates took for granted the value of a separation of powers among a legislature, executive, and judiciary to prevent any one branch from becoming dictatorial. But the worth of direct election was not self-evident. A delegate from Massachusetts, merchant-politician Elbridge Gerry—witness to Shays' Rebellion—declared the people "are the dupes of pretended patriots."

Virginia's George Mason disagreed and gave voice to the small farmers, laborers, and debtors not present in the room: "We ought to attend to the rights of every class." Some delegates made their ideas graphic. Pennsylvania's astute James Wilson



ALL BY BILL BALLENBERG

MADISON'S SPIRIT suffused a mock convention held in Colonial Williamsburg last March to write an ideal constitution. Virginia high-school students studied Madison's Virginia Plan and other historical documents before drafting proposals. During heated debates, a student George Washington urged, "Use your spirit of compromise."

The delegates agreed to three branches of government, including a chief executive who could serve an unlimited number of terms. But unlike their counterparts in 1787, they voted that the vice president should have foreign policy duties and English would be the official language. All delegates, including Carol Patterson (upper left), signed; some left indications of unfamiliarity with a quill pen (above). The College of William and Mary law school convened the group at the Hall of Burgesses, where Madison, at 25, began his career in 1776.

visualized the new system as a pyramid of extensive federal powers held up by the broad-based voting public. "No government," he argued, "could long subsist without the confidence of the people."

Discussion seemed to skip around, as the men postponed difficult choices. Delegates came and went; Virginia's George Wythe was called home to his fatally ill wife.

Madison wanted a senate elected by the lower house or by the people themselves, but he lost to the majority: Senators would be selected by state legislatures, a clause in the final document not preempted until 1913, when the 17th Amendment gave the selection to the people.

MOST DELEGATES TOOK AS GOSPEL the theories of French political philosopher Montesquieu, who believed in a system of separated powers. He also contended that only cities or small countries could maintain a republican government. Madison refuted that

"AN OBSCURE CORNER of the world," Madison called Montpelier. He enlarged his father's brick house and added a portico and garden temple (below, beyond the costumed riders), modeled after the Temple of Love at Versailles. Countless visitors enjoyed the hospitality of James and Dolley, who sometimes were observed running foot races on the portico. Doubled in size by 20th-century owners, Montpelier now belongs to the National Trust for Historic Preservation, which opened it to the public this year.

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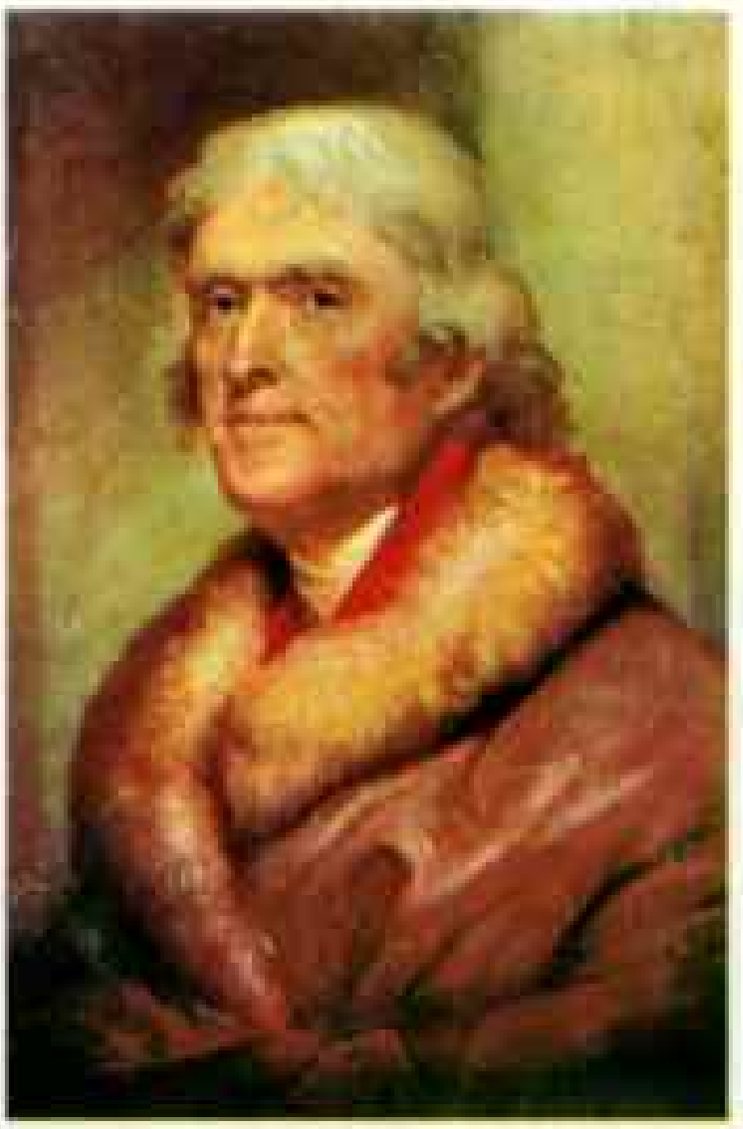
THOMAS JEFFERSON PAPERS, UNIVERSITY OF VIRGINIA LIBRARY (ABOVE); THOMAS JEFFERSON AT AGE 62, BY REMBRANDT PEALE, NEW-YORK HISTORICAL SOCIETY (UPPER RIGHT); MARIA STENZEL, NGS STAFF; COURTESY LIBRARY OF CONGRESS

intellectual giant. Representative government *would* work for a large country, he insisted. "Extend the sphere and you take in a greater variety of parties," he later wrote in the tenth *Federalist* essay. Competing, the minorities would form new majorities less likely to "invade the rights of other citizens."

At the convention, that was what the small states were doing. New Jersey produced a plan that largely rehashed the Articles of Confederation. Its delegate William Paterson recalled that Congress had told them to revise, not replace. New York's John Lansing was shocked by the Virginia Plan: "The Scheme itself is totally novel." And Paterson added in desperation, "The Expence will be enormous."

Then the brilliant former aide to General Washington, young Alexander Hamilton of New York, rose to speak against both plans. Why would men of ability "come 600 miles to a national legislature?" No one but a demagogue or middling politician would. Therefore, model your government on the British with an executive and senate for life. The convention ignored the idea. Hamilton, frustrated at the opposition of his fellow state delegates—both Anti-Federalists—departed.



Wrangling got so bad, Washington wrote Hamilton: "I almost despair. . . . The Men who oppose a strong & energetic government are, in my opinion, narrow minded politicians, or are under the influence of local views. . . . I wish you were back." Hamilton returned to join in the September finale.

Now a few delegates met in early morning caucus to review the arguments. They resolved to support a compromise passed on July 16: Let small states have their goal of equality in the senate, but in the lower house have representation based on population; let the lower house originate money bills. The Great Compromise held; the convention was saved.

KINDRED SPIRIT, Thomas Jefferson shared with Madison a friendship of nearly 50 years. They collaborated on legislation, agricultural reforms, and the founding of the University of Virginia at Charlottesville. The dynamic, rhetorical Jefferson customarily asked the more analytical Madison to review his ideas. Often apart, they employed secret code (facing page) to ensure privacy for their letters. In code Jefferson reported talks with Kitty Floyd "in your favor" (above). Close to death in 1826, Jefferson wrote his friend, "Take care of me when dead."

BY MID-JULY Madison had been defeated on favorite ideas: proportional representation in the senate and congressional veto of state laws. Now he proved a superb strategist, following different paths to reach his goals. Since the senate was not to be elected by the lower house or the people, he advocated more power for the executive and judiciary.

Much of the work was conducted in committees and in tavern caucuses. By the end of August the full convention had agreed to give Congress the power to regulate foreign trade and interstate commerce, borrow money, collect taxes, and ban the importation of slaves after 1808. Finally, a Committee on Postponed Matters, including Madison, took up the subject of the Presidency, a post unique to the United States in the 18th century.

THROUGH SNOW and sunshine, Madison trudged from his Philadelphia boardinghouse to the Pennsylvania State House, today's Independence Hall, during his three years at the Continental Congress. There he learned the weaknesses of the unicameral body, where each

state had one vote. He began politicking for a stronger union. In the summer of 1787 his dream came true when delegates (right, suggested by costumed men in this double exposure) met in the State House. Madison diligently recorded the contentious debates, while at least one delegate doodled.

On September 17, delegates signed the Constitution from the sterling inkstand. By requiring ratification "by the people" rather than by the old Congress or state legislatures, they gave the plan legitimacy as the fundamental law of the land.

SAM ABELL AND NATIONAL GEOGRAPHIC PHOTOGRAPHER VICTOR R. BOSWELL, JR.

BROWN UNIVERSITY LIBRARY, ANNE S. K. BROWN MILITARY COLLECTION (ABOVE); AMERICAN ANTIQUARIAN SOCIETY

A BOXING MATCH, or Another Bloody Nose for JOHN BULL.

WASHINGTON BURNED on August 24, 1814, even as President Madison and his First Lady were fleeing during the only foreign invasion of the nation's capital. Congress had declared war in 1812 to end Britain's interference with "Free Trade and Sailors' Rights," in the words of a popular slogan. American troops had burned York (now Toronto), the British capital of Upper Canada; in retaliation the British destroyed U. S. government buildings, including the White House and the War and Treasury Departments. Before fleeing with only a few hours to spare, Dolley—evincing normalcy—had ordered the table set for 40.

The destruction marked a low point in "Mr. Madison's War," as New England opponents called the War of 1812, saying he could win or lose it—and pay for it too. But the bantam U. S. Navy distinguished itself, both in the Great Lakes and off the Atlantic coast. When the American Enterprise defeated the British Boxer off Portland, Maine, in 1813, a cartoonist honored the victory by portraying Madison, characteristically dressed in black, punching King George III.

At the treaty table negotiators agreed to an end to battle and a return to the status quo. The treaty arrived in Washington soon after the news of Andrew Jackson's victory at New Orleans, elevating Madison to unprecedented popularity.

The office was defined with George Washington in mind.

On September 8, Madison joined the committee preparing the final draft. Four days later the polished phrases of Pennsylvania's debonair lawyer Gouverneur Morris were before each delegate. Without leaking a word, the print shop of Dunlap and Claypoole supplied copies with wide margins for corrections. Clause by clause the delegates read and voted again. Several made last-ditch attempts to insert favorite ideas. Madison wanted to give Congress the power to set up a university. Mason wished to preface the Constitution with a bill of rights. Neither idea passed. Everyone was eager to go home.

On September 17, a clear, cool Monday, 38 delegates signed the document copied on parchment by scrivener Jacob Shallus. George Read signed for the absent John Dickinson of Delaware. Mason and Randolph of Virginia and Gerry of Massachusetts abstained. Washington wrote in his diary: "The Members adjourned to the City Tavern, dined together and took a cordial leave of each other . . . [I] retired to meditate on the momentous [work] which had been executed."

I WOULD LIKE to think that, once signed, the Constitution was complete. But no. Attached to it was a resolution calling for approval "by the People" in each state. Dunlap and Claypoole immediately published the document in their daily, the *Pennsylvania Packet*. Other papers reprinted it, and debate began. Madison, Hamilton, and Foreign Secretary John Jay in a flurry of creativity wrote 85 pro-Constitution articles for New York City newspapers. The *Federalist* papers are still considered the most lucid explanation of the Constitution.

The volcano of Anti-Federalism erupted. Many were frightened of centralized power. Others believed it "impossible for one code of laws to suit Georgia and Massachusetts." But the most appealing argument was George Mason's: "There is no Declaration of Rights."

At the Virginia ratifying convention Madison defended the document as is; quietly and rationally, he actually bested his silver-tongued foe Patrick Henry. Virginia ratified by ten votes, and Madison moved to the top of Henry's enemies list. When he ran for a seat in the new Congress, he found himself facing his friend James Monroe, who had been pushed into that untenable position by the vindictive Henry.

On the portico of a Lutheran meetinghouse still standing near Culpeper, Madison and Monroe debated in the face of a keen January wind. Madison's ear became frostbitten. Later he

PEACE MEDALS bearing a President's portrait were important gifts to Indians of the old Northwest during the War of 1812, when the British were seeking their allegiance with silver medals bearing the image of George III. Madison sent out medals of his predecessor, Jefferson, until his own solid silver ones were ready late in 1814. Earlier the Madisons had entertained a delegation of Sac, Fox, and Osage at a White House dinner.

The U. S. S. Constitution*—Old Ironsides—blew apart the* Guerrière *in the open Atlantic in 1812. Today the frigate, the oldest commissioned warship afloat, is open to visitors in Boston Harbor.*

BRETON LITTLEHALES, COURTESY PRINCETON UNIVERSITY LIBRARY (TOP); NEW HAVEN COLONY HISTORICAL SOCIETY

playfully pointed to the blemish as "the honorable scars . . . borne from the battlefield." Madison won (1,308 to 972) and was pleased that his friendship with Monroe was unaffected.

Madison's dedication to the Union was to continue for the rest of his life. As he had promised, he sponsored in the first Congress amendments known as the Bill of Rights, key protection for individual liberties. And his long-standing friendship with Jefferson flowered. In an almost comic scenario they alternately sought retirement and public life. Congressman Madison rode to Monticello to convince Jefferson, retired after his stint in Paris, to take the post of secretary of state under Washington. (Later, when Jefferson was en route to the Presidency, he stopped at Montpelier to talk Madison into becoming his secretary of state.)

The men agreed about interpreting the Constitution strictly and keeping taxes and debt low and national government and defense expenditures small. Alexander Hamilton, who believed in bending the guidelines and enlarging government's scope, was so irritated he accused the Jefferson-Madison combo of heading a faction "subversive of the principles of good government and dangerous to the Union." The clashing viewpoints became the basis of the two-party system.

Madison, so circumspect in public, was revealed as a man of deep passion in his personal life after his introduction at age 43 to the lustrous 26-year-old widow Dolley Payne Todd. A friend wrote to her: "At Night he Dreames of you & Starts in his Sleep a Calling on you to relieve his Flame for he Burns to such an excess that he will be shortly consumed . . . he has Consented to every thing that I have wrote about him with Sparkling Eyes."

They were married in September 1794. Madison, "wearied with public life," retired, but in 1801 he answered Jefferson's call to service. In Washington the Madisons emerged as social leaders of a coterie of congressmen, ambassadors, townspeople, and leaders of a federal work force numbering only 130.

It was a smooth transition when Madison was elected President in 1808, and Jefferson retired for good. Dolley set about redecorating the White House and hosting Wednesday socials. There she sized up personalities, brought enemies together, drank in the news, and reported to her husband, himself off in a corner politicking. Even in the face of a British invasion during the War of 1812, she maintained the niceties to avoid the appearance of panic. Only hours before British troops broke in, she fled the White House, leaving a table set for 40, wine cooling on the sideboard, plates warming at the hearth.

The humiliation of the capital in ruins would have left Madison's reputation in ashes too, but for news of the smashing victory of Gen. Andrew Jackson at New Orleans and of a peace

"OUR HEARTS UNDERSTAND each other," 37-year-old Dolley Madison wrote her husband during a short absence. More gregarious than he, she enjoyed gathering news for him and attended congressional debates, encouraging other women to do so. As a frequent hostess at the White House of the widowed Jefferson and later as First Lady, she gained a lasting reputation for graciousness.

In 1817 the couple retired to Montpelier to live among such fine furnishings as this Virginia-crafted wild cherry Chippendale dining room chair. It is being restored by Steven Hoffman, whose German ancestors settled in Orange County before Madison was born.

PENNSYLVANIA ACADEMY OF FINE ARTS, HARRISON EARL FUND PURCHASE

THE PREAMBLE to the Constitution read, "We the people of the States of New Hampshire, Massachusetts . . . ," until a last change produced the ringing "We the People of the United States." Nothing would stand between citizens and their national government. Yet how were the people to interpret the document as new situations arose? Even the founders could not agree. Alexander Hamilton believed in loose construction, expanding on powers not specified. Madison and Jefferson preferred strict adherence. Here lay the

treaty with Britain. Overnight Madison's good name was restored and even enhanced.

At the end of his second term James and Dolley retired to their Orange County home. Madison had earlier taken an interest in agriculture from afar, as when he sent his father "a few grains of upland rice, brought from Timor by Capt. Bligh lately distinguished by an adventure which you must have seen in the Newspapers." The grains that survived the mutiny on the *Bounty* were to be started in flowerpots, but nothing was heard of them again. Now Madison could put keen concern about careful land development into practice. As president of the local agricultural society, he urged better farming practices and an end to the destruction of forests for firewood. Though crippled with old age in 1834, the former President penned these final words to his countrymen: "The advice nearest to my heart . . . is that the Union of the States be cherished and perpetuated."

When I went to the polls last November, I thought of Madison and his lifelong struggle to make the Union work. Hunched

We The People
of the Un
more domestic Tranquility, provide for the common Defence, pro
and our Posterity, do ordain and establish this Constitution for the
Article. I.
Section. 1. All legislative Powers herein granted shall be vested
of Representatives
Section. 2. The House of Representatives shall be composed of Mem
more than one Representative for every Thirty Thousand, but each
No Person shall be a Representative who shall not have attained
and who shall not, when elected, be an Inhabitant of that State in which he
Representatives and direct Taxes shall be apportioned among the several
Numbers, which shall be determined by adding to the whole Number of free
not taxed, three fifths of all other Persons. The actual Enumeration shall
and within every subsequent Term of ten Years, in such Manner as they
by Law direct. The Number of Representatives shall not exceed one for every
entitled to chuse three, Massachusetts eight, Rhode Island and Providence
eight, Delaware one, Maryland six, Virginia ten, North Carolina five,
When vacancies happen in the Representation from any State, the
The House of Representatives shall chuse their Speaker and other
Section. 3. The Senate of the United States shall be composed of two Se
Senator shall have one Vote.
Immediately after they shall be assembled in Consequence of the

over my ballot, I punched my choices and slipped the paper into its jacket and the ballot box. The secrets of my political conscience were secure. Had I been voting in Madison's Virginia (which as a woman I could not do), I would have walked a gantlet of haranguing candidates offering "treats" from whiskey barrels to reach the courthouse steps and tell the clerk my choice. He, in full earshot of all my neighbors, would proclaim: "Alice Hall votes for James Madison."

In something approaching awe, I join that parade of Americans that has—every other year since 1789—elected representatives, a sequence not interrupted by civil war, world war, or world depression. We have reaffirmed Madison's belief in the people's right to choose the government we would live by. Madison and his colleagues were no angels; neither are we. The Constitution didn't produce heaven on earth or solve all problems. It did provide a framework, both stable and flexible, within which we could, if we would, work out our own version of life, liberty, and the pursuit of happiness. □

seeds of the two-party system.

The document's adaptability springs from Congress's power to amend with the approval of three-fourths of the states. Some 10,000 amendments have been proposed; 26 have been ratified. Madison wrote, "If the will of the majority cannot be trusted where there are diversified and conflicting interests, it can be trusted nowhere."

This year a bicentennial commission headed by former Chief Justice Warren E. Burger seeks to have every American read the document so basic to the survival of our free republic.

NATIONAL ARCHIVES

d States, in Order to form a more perfect Union, establish Justice,
the general Welfare, and secure the Blessings of Liberty to ourselves
nd Posterity, do ordain and establish this Constitution for the United States of America.

Article. I.

Section. 1.

All legislative Powers herein granted shall be vested in a Congress of the United States, which shall consist of a Senate and House of Representatives.

Section. 2.

The House of Representatives shall be composed of Members chosen every second Year by the People of the several States, and the Electors in each State shall have the Qualifications requisite for Electors of the most numerous Branch of the State Legislature.

No Person shall be a Representative who shall not have attained to the Age of twenty five Years, and been seven Years a Citizen of the United States, and who shall not, when elected, be an Inhabitant of that State in which he shall be chosen.

Representatives and direct Taxes shall be apportioned among the several States which may be included within this Union, according to their respective Numbers, which shall be determined by adding to the whole Number of free Persons, including those bound to Service for a Term of Years, and excluding Indians not taxed, three fifths of all other Persons. The actual Enumeration shall be made within three Years after the first Meeting of the Congress of the United States, and within every subsequent Term of ten Years, in such Manner as they shall by Law direct. The Number of Representatives shall not exceed one for every thirty Thousand, but each State shall have at Least one Representative; and until such enumeration shall be made, the State of New Hampshire shall be entitled to chuse three, Massachusetts eight, Rhode-Island and Providence Plantations one, Connecticut five, New York six, New Jersey four, Pennsylvania eight, Delaware one, Maryland six, Virginia ten, North Carolina five, South Carolina five, and Georgia three.

When vacancies happen in the Representation from any State, the Executive Authority thereof shall issue Writs of Election to fill such Vacancies.

The House of Representatives shall chuse their Speaker and other Officers; and shall have the sole Power of Impeachment.

Section. 3.

The Senate of the United States shall be composed of two Senators from each State, chosen by the Legislature thereof, for six Years; and each Senator shall have one Vote.

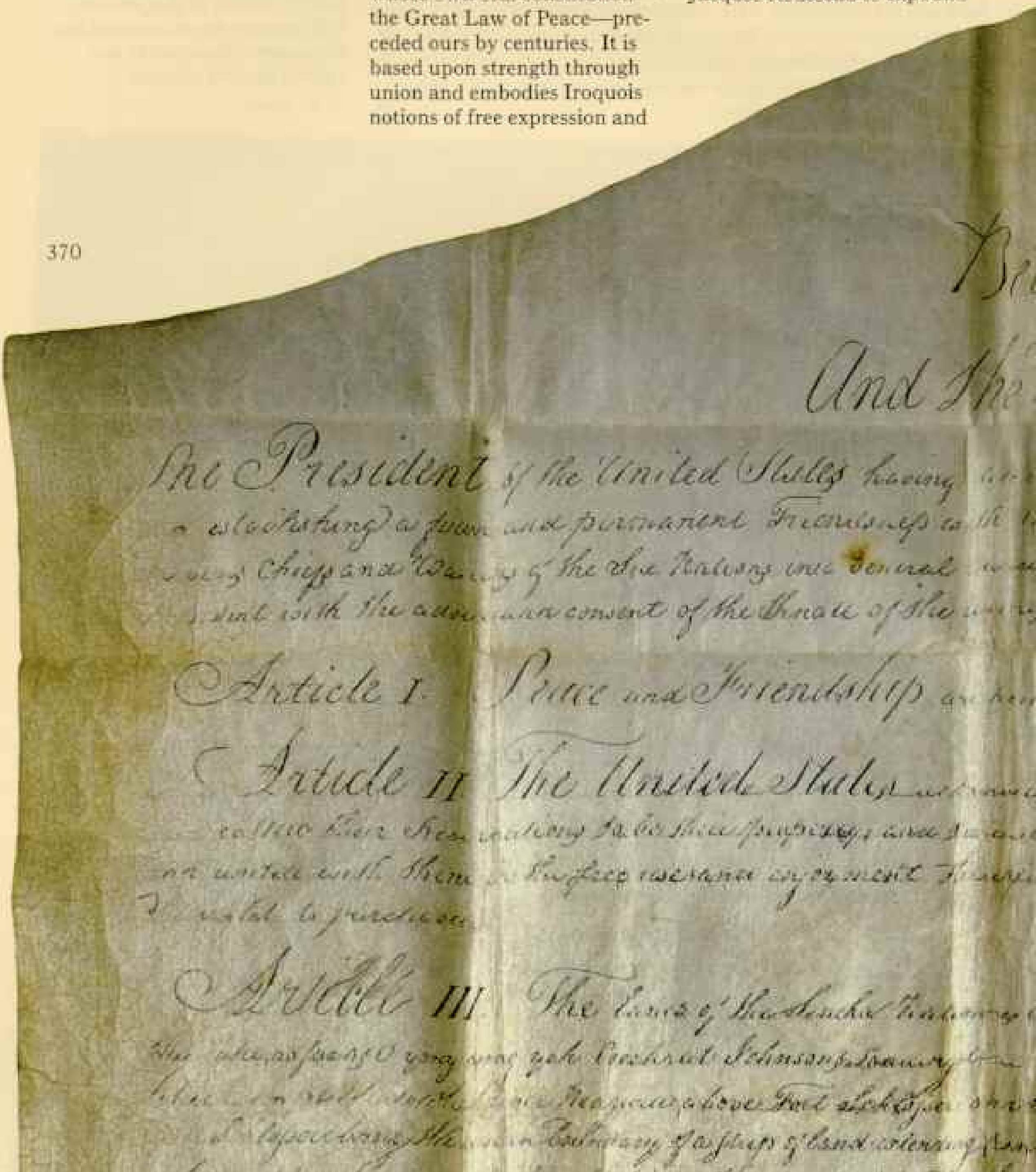
Immediately after they shall be assembled in Consequence of the first Election, they shall be divided as equally as may be into three Classes. The Seats of the Senators of the first Class shall be vacated at the Expiration of the second Year, of the second Class at the Expiration of the fourth Year, and of the third

From One Sovereign People to Another

WHILE OUT on a "ramble" with the Marquis de Lafayette in 1784—three years before the Constitutional Convention—James Madison attended the preliminaries for a treaty ceremony at Fort Stanwix, New York, between the fledgling United States and the Six Nations Iroquois Confederacy.

There he witnessed the Iroquois "forest diplomats," whose own oral constitution—the Great Law of Peace—preceded ours by centuries. It is based upon strength through union and embodies Iroquois notions of free expression and representative government with checks and balances.

Could it be that the U. S. Constitution owes a debt to the Iroquois? Benjamin Franklin cited their powerful confederacy as an example for a successful union of sovereign states, and contemporary accounts of the American "noble savage"—living in "natural freedom"—inspired European theorists such as John Locke and Jean-Jacques Rousseau to expound



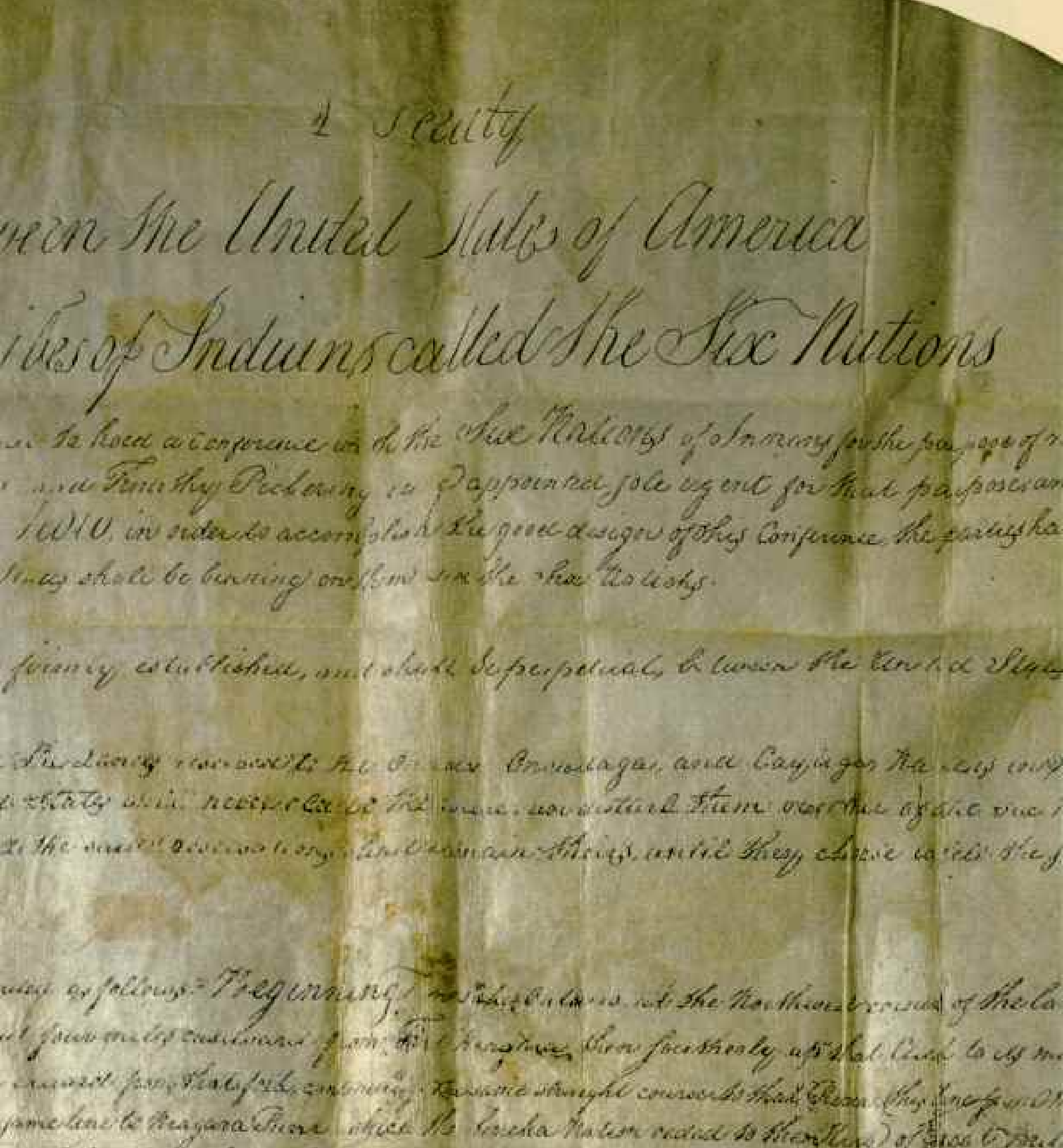
the philosophical principles that helped ignite the Revolution and shape the Constitution.

Ten years after Fort Stanwix another U. S.-Six Nations treaty realigned Iroquois boundaries, guaranteeing that the United States would "never claim" the Indians' remaining territories in western and central New York State.

An original copy of that Canandaigua Treaty of 1794 (below), signed by President Washington's agent Col. Timothy Pickering, was recently found in a long-forgotten safe-deposit box by confederacy chiefs who see it as physical proof of a sovereignty they say was never surrendered.

In 1810, after becoming President, Madison received a delegation of Six Nations chiefs who complained that their lands were being taken despite the treaty.

"On our part," the chiefs told the President, "we have to this day complied with the



A Treaty

between The United States of America

and the Tribes of Indians called the Six Nations

treaty, and still wish to hold fast to it. But Brother, let us remind you, that your part has become rusty."

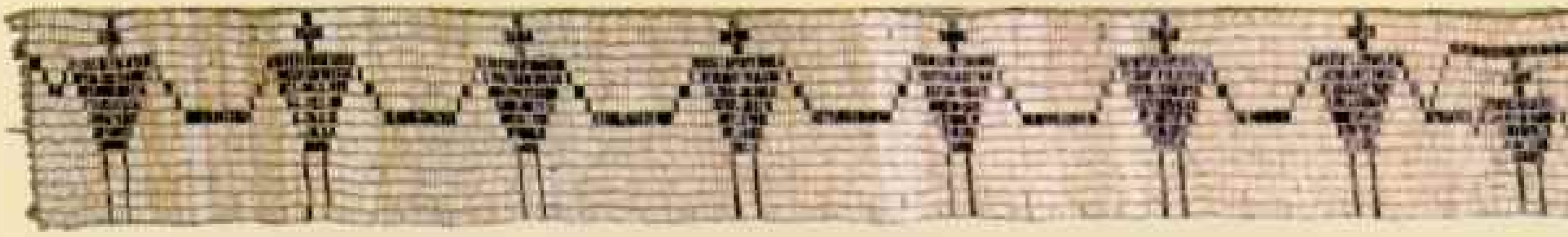
The historic Washington Covenant wampum belt (below) memorializes the same U. S.-Iroquois compact. Thirteen figures, representing the states, flank two smaller figures, representing Iroquois chiefs, who stand on either side of a stylized longhouse—symbol of the Six Nations Confederacy.

During the confederacy's heyday—through the colonial period—the Iroquois held political and military sway over much of northeastern North America (map, pages 380-81). Early Europeans, failing to appreciate the democratic principles on which the confederacy was founded, called the chiefs "kings."

One such "king," the Mohawk chief Hendrick (right), was lionized during a visit to England in 1710, when he posed for this formal portrait.

Hendrick would become a strong ally of the British in their long-standing contest with the French for control of North America.

Iroquois animosity for the French dated at least as far back as 1615, when explorer Samuel de Champlain, supported by French troops and Indian allies, laid siege to an Iroquois settlement, or "castle," near Onondaga Lake. A contemporary engraving (below right) shows the attack. Neatly arranged longhouses cluster within a log stockade from whose heights defenders could rain arrows, spears, and rocks on attackers. Although



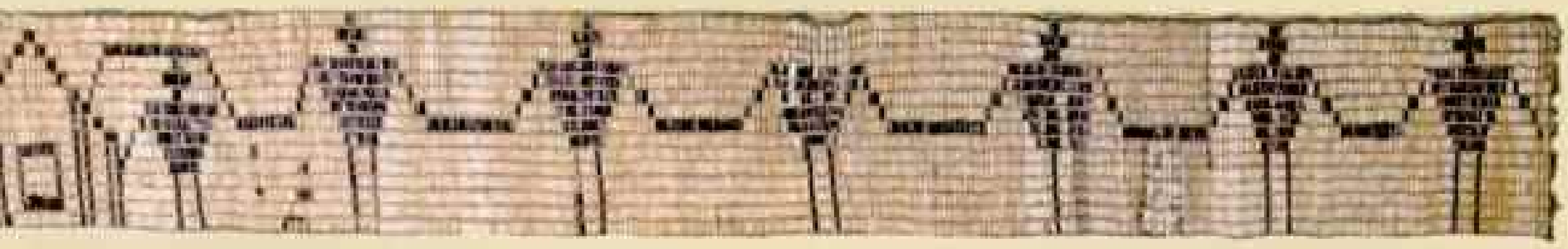
ENGRAVING FROM CHAMPLAIN'S "VOYAGES AND DISCOVERIES, 1615-1618." NEW YORK PUBLIC LIBRARY (RIGHT). ENGRAVING FROM "MOEURS DES SAUVAGES AMERIQUAINS," BY JOSEPH LAFITAU, NEW YORK PUBLIC LIBRARY (ABOVE). NEW YORK STATE MUSEUM, ALBANY (TOP). PUBLIC ARCHIVES OF CANADA (CENTER)

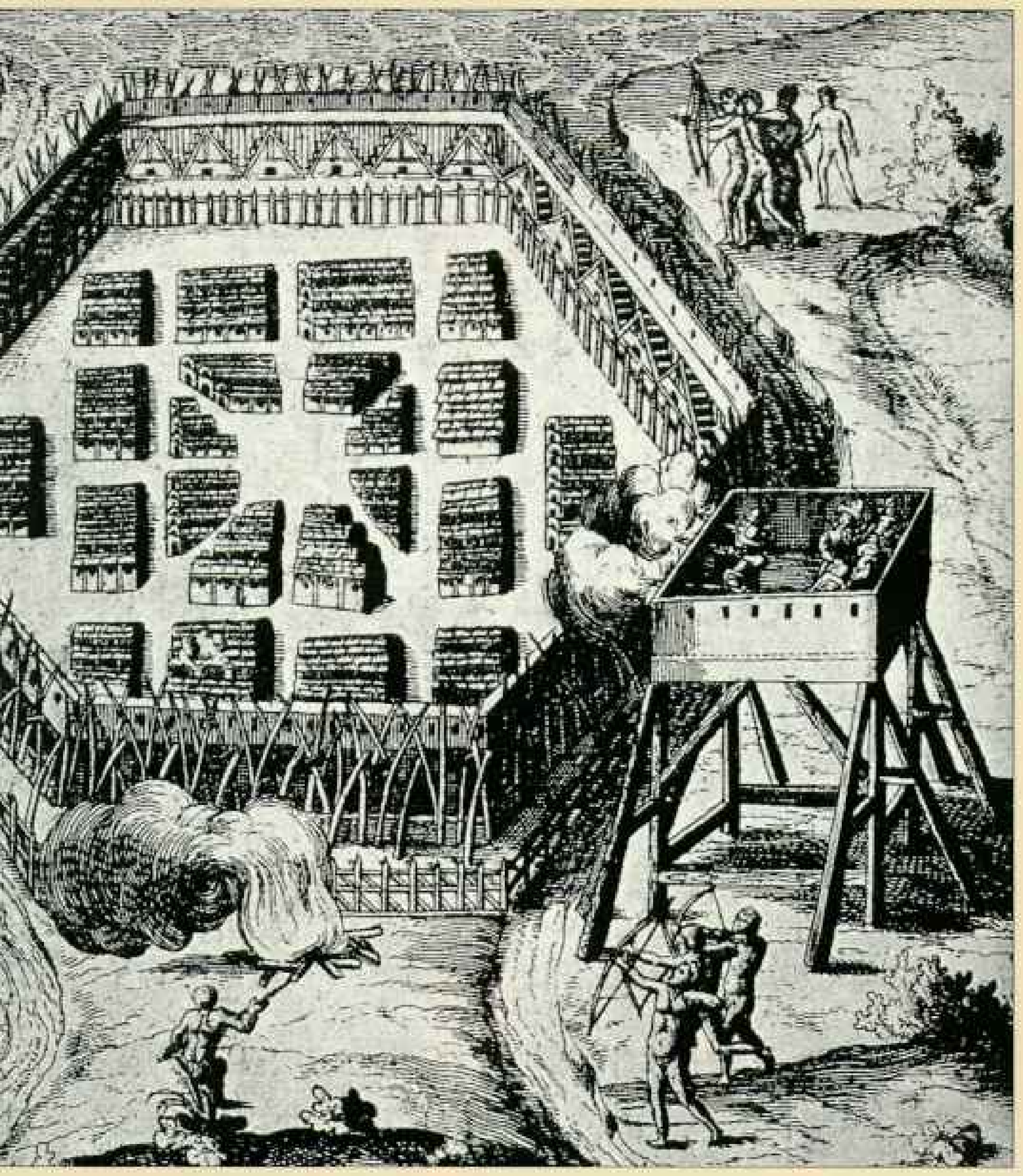
the Iroquois withstood this siege, European firepower and military strategy eventually rendered such once effective defensive works obsolete.

To make peace with the confederacy, European diplomats had to master the complexities of Iroquois protocol. A 1724 engraving (bottom left) depicts a council of sachems, or peace chiefs. The chief at center appears to be "reading" a wampum belt (the same belt is shown close up, lower foreground).

Though seemingly eclipsed by history, the confederacy and its form of government continue to function to this day, maintained by fervent Iroquois traditionalists who adhere to the same Great Law of Peace that sustained their ancestors.

In the pages that follow, NATIONAL GEOGRAPHIC senior writer Harvey Arden and photographer Steve Wall portray today's Six Nations Iroquois Confederacy. * * *





"Think not forever of yourselves, O Chiefs, nor of your own generation. Think of continuing generations of our families, think of our grandchildren and of those yet unborn, whose faces are coming from beneath the ground."

"The Fire That Never Dies"

By HARVEY ARDEN Photographs by STEVE WALL

NATIONAL GEOGRAPHIC SENIOR WRITER

FIRST AMONG EQUALS, Onondaga Chief Leon Shenandoah bears the title Tadodaho—a kind of speaker of the house for the Grand Council of today's Six Nations Iroquois Confederacy. In his hands he holds his ceremonial staff of office, an eagle-headed cane (right) with inset peg or pictograph for each of the original peace chiefs of the centuries-old confederacy.

As custodian of "the fire that never dies," he bears witness to an unquenchable tradition—summed up in the moving words (top) spoken long ago by the founder of the confederacy, called the Peacemaker.

THE ELDER from Great Turtle Island—some call it North America—stood alone at the center of a rain-swept greensward in England. Around him a crowd of spectators, gathered to watch a world-class lacrosse game between Team England and the Iroquois Nationals, formed a large circle for the pregame ceremony, black umbrellas raised against the bleak, spitting sky.

With hushed disbelief they looked on as the lone figure—Chief Leon Shenandoah of the Six Nations Iroquois Confederacy—struck a single match in the gusting wind and set it on the pile of dry twigs he'd just put down at his moccasined feet.

Watching from the edge of the crowd, I felt my heart sink. No way the thing would light in that drenching English rain. And yet, as he cupped his hands over it, a tendril of smoke curled out, then a spurt of flame. The fire took hold. Then he sprinkled over it some sacred green Indian tobacco, whose smoke—the Iroquois believe—carries prayers up to the Creator. While the wind and rain tore unsuccessfully at the little fire, he intoned a prayer in his native Onondaga language, asking the Creator's blessing on the players. Only at prayer's end did the fire give out. The Creator, indeed, seemed to be listening.

But who were they anyway, these Iroquois Nationals? Almost exactly a century had passed since an Iroquois lacrosse team had last played on English soil. At that time, in 1886, a visiting Iroquois team had been banned from further international play because of alleged "professionalism"—they had, it seemed, accepted a modest payment to defray expenses of their overseas trip. They had also shown the poor taste of soundly beating the competition in this, their native American sport.

Yet here they were a century later, back again—and

winning again. Hotly battling England's best, they would return to Great Turtle Island from this 1985 exhibition tour with a proud record of three wins, one tie, and one narrow loss. They were also requesting full membership in the International Lacrosse Federation to compete against the likes of Team England, Team Canada, and Team U.S.A. in the 1990 world games. "We want to play them *nation against nation!*" Chief Shenandoah insisted.

What's more, they had come to England this time on their own Iroquois passports, demanding recognition as representatives not of the United States or Canada—within whose boundaries they reside—but of the Six Nations Iroquois Confederacy.

There was, as well, an especially poignant symbolism in the lighting of that little ceremonial fire. For among the Six Nations the Onondaga are the Keepers of the Central Fire—"the fire that never dies." Chief Shenandoah, as custodian of that symbolic fire, serves as Tadodaho—a kind of moderator or speaker of the house—for the 50 co-equal peace chiefs, or sachems, of the confederacy's Grand Council.

ONCE, the ancestors of these onlooking British lacrosse fans had allied themselves with that powerful confederacy to wrest control of eastern North America from France (if they hadn't done so, these words might well be written in French).

Based in what is now upstate New York

Photographer **Steve Wall** is a frequent contributor to NATIONAL GEOGRAPHIC. He lives in North Carolina.

(map, pages 380-81), the confederacy created a network of alliances with other Indian nations—sometimes called an empire—that stretched from the Atlantic to the Mississippi, from Canada to the Carolinas.

To the French, who encountered them during early explorations of the St. Lawrence River and the Great Lakes region, they were *les Iroquois*—probably a corruption of some Algonquian epithet. To the British they were the Five Nations—the Mohawk, Oneida, Onondaga, Cayuga, Seneca—and, later, the Six Nations, after the Tuscarora, driven out of North Carolina by white settlers, joined the confederacy about 1722.

To themselves they were—and are—the Haudenosaunee (pronounced, roughly, hoo-dee-noh-SHAW-nee), or the People of the Longhouse.

After France's withdrawal from the continent in 1763, Iroquois political leverage virtually disappeared. Then the American Revolution all but tore the confederacy apart. Most of the Mohawk, Onondaga, Cayuga, and Seneca ultimately joined their old ally, the British, while most Oneida and Tuscarora sided with the rebels.

The 1783 Treaty of Paris that ended the war didn't even mention the Iroquois. Despite the subsequent 1784 Treaty of Fort Stanwix between the Iroquois and the fledgling United States—guaranteeing the Six Nations much of central and western New York State—they were soon dispersed to a scattering of ever dwindling reservations on both sides of the U. S.-Canadian border. They faded not only from the political spotlight but also, seemingly, from history itself. The central fire, it would appear, had gone out.

But not so. As Chief Shenandoah and the Iroquois Nationals were here in England to demonstrate more than two centuries later, the central fire still burns. The Six Nations Iroquois Confederacy *lives*.

TO REACH the capital of that still functioning if vastly transformed confederacy, you drive a few miles south of Syracuse, New York, on Interstate 81. The exit sign reads "Nedrow"; nothing about Onondaga. Only after you swing onto State Highway 11 does a sign show the way to the Onondaga Indian Reservation, down 11A, a two-lane blacktop.

"The United States ends here!" Chief Shenandoah announced to state authorities during a 1971 confrontation over the widening of Interstate 81, which passes right through the reservation. Refusing to give up "one more inch" of Indian land, Onondaga traditionalists, joined by other members of the confederacy, staged a two-month sit-down on the construction site, staring down the same state troopers who would shortly depart to put down the bloody riot at Attica

PAINTING BY CHARLES DEAS, GILCREASE INSTITUTE, TULSA

NATION AGAINST NATION: The Iroquois Nationals, with players from each of the Six Nations, take on Team England in a lacrosse exhibition game (facing page), held in Urmston, England. A mid-1800s painting (above) depicts a no-holds-barred game of lacrosse, a native American sport given its name by early French settlers for the shape of the stick, which resembles a bishop's staff, or crosier.

Clan chiefs and faith keepers of the Mohawk Nation Council convene in the longhouse at Akwesasne, or St. Regis – a reservation straddling the U. S.-Canadian border near Massena, New York. Their form of government was laid down centuries ago by the Peacemaker, whose original "instructions" became the oral constitution still adhered to by the Six Nations.

prison. Negotiators finally reached a compromise—the highway was widened, but only slightly—avoiding a showdown.

Another crisis loomed in 1983 when American Indian Movement activist Dennis Banks, an Ojibwa fleeing a federal arrest warrant, took refuge at Onondaga. Once again the line of sovereignty was drawn at the reservation's border. Federal authorities elected not to cross the line.

"But what would happen if the FBI *did* come in?" I asked Chief Oren Lyons at the time, knowing that the confederacy's Grand Council had to reach a unanimous agreement on all major decisions. "Would the Grand Council have time to meet and reach a consensus on what to do?"

"The decision is already made," he said. "If they cross the line, it's out of our hands. The warriors take over."

NEAR THE CENTER of the reservation stands the Onondaga longhouse—the central reality of daily life for followers of the Longhouse religion. A handsome new one-story log building, it serves as a combination religious and social hall and legislative chamber. Here, the chiefs of the nations of the confederacy periodically gather for a Grand Council, facing each other across the "fire" (today a cast-iron stove suffices). Theoretically there are 50 such peace chiefs, each representing a lineage within his own nation and bearing the name of one of the confederacy's founders.

You can still walk down to the shore of nearby Onondaga Lake, where, tradition says, the confederacy was established by the man they call the Peacemaker. Most historians put that founding sometime between A.D. 1350 and 1600. Many Iroquois insist it occurred a thousand years or more ago.

A luminous figure, the Peacemaker traveled in a white stone canoe as a sign the Creator had sent him. Born on Lake Ontario's northwest shore, he journeyed among the Iroquois at a time when endless wars and blood feuds had reduced the Five Nations to near anarchy and despair.

Among the Mohawk he met an Onondaga exile named Ayawentha, or Hiawatha (an Iroquois name mistakenly used by the poet Henry Wadsworth Longfellow for an Ojibwa hero in his *Song of Hiawatha*). Together

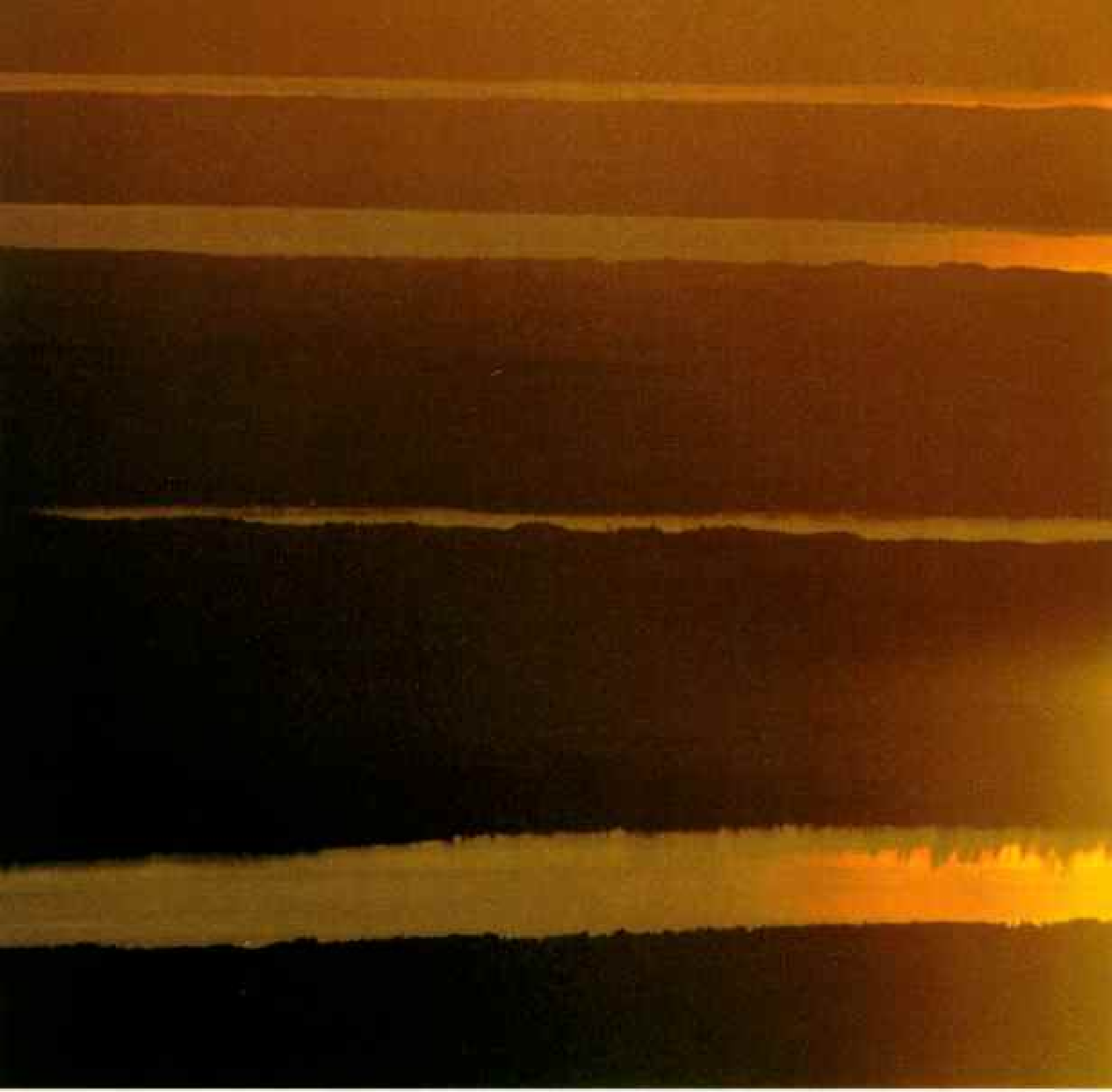
The Living Iroquois Confederacy

HAUDENOSAUNEE, or People of the Longhouse, they call themselves—traditionalists who carry on the still living heritage of the Six Nations Iroquois Confederacy. Once, from their base in what is now upstate New York, their influence extended from the Atlantic to the Mississippi River (inset).

The Mohawk were Keepers of the Eastern Door and the Seneca Keepers of the Western Door. In the middle were the Onondaga, Keepers of the Central Fire. Three "younger brothers"—the Oneida, Cayuga, and Tuscarora—completed the confederacy.

The historic "two-row" wampum belt (above right) commemorates early treaties between the Iroquois and white men—

such as a mid-1600s pact between the Mohawk and the Dutch at Fort Orange. The two rows symbolize two vessels traveling down the same river: a canoe and a ship, representing Indians and whites. They travel side by side, neither interfering with the other. Today's Haudenosaunee argue that the agreement still holds.



THE CREATOR, according to Iroquois legend, raked his fingers through the landscape to fashion

the Peacemaker and Hiawatha persuaded the warring Five Nations to join in a "Great Peace" based on a "great binding law."

Only one fearsome Onondaga stood in their way: the original Tadodaho—a wizard with snakes in his hair who was ultimately won over by Hiawatha and the Peacemaker. Then, with all 50 chiefs of the first Grand Council assembled on Onondaga Lake's shore, the Peacemaker planted the original Tree of Peace—a magnificent white pine—beneath which the Five Nations buried their weapons of war. Four long roots, called the "white roots of peace," stretched out from the tree in the four sacred directions.

The Peacemaker proclaimed: "If any man or any nation outside of the Five Nations shall show a desire to obey the laws of the Great Peace . . . they may trace the roots to their source . . . and they shall be welcomed to take shelter beneath the Tree. . . ."

IT'S ONE of the little-remembered footnotes of the Revolutionary War that during the momentous winter of 1776-77, while the Iroquois were being subjected to the most ferocious blandishments of both the British and Americans for their

the long, slender Finger Lakes, center of the Iroquois homeland in upstate New York.

allegiance, an epidemic raged through Onondaga. Some 90 people died, including three confederacy chiefs. Until new chiefs could be raised, or "condoled"—a process often taking months—the confederacy was all but paralyzed.

A spectacular cache of Revolutionary-era papers and journals of American Indian agent George Morgan recently came to light. Historian Gregory Schaaf found the documents in an attic trunk belonging to 94-year-old family heir Susannah Morgan. They show how the Iroquois Grand Council was subverted in its desperate efforts to strike a balance of peace and neutrality between the two contending powers. One letter, written by John Hancock—then President of the Continental Congress—instructed Morgan to take the Iroquois and their allies a great peace belt with 2,500 wampum beads as an inducement to remain neutral—even while other American agents were secretly parleying with individual Indian nations to win their military support.

Torn from within and without, the Grand Council—in truth, an instrument for governing in peace, not war—gave way to the charismatic war chiefs: in particular the

Hawyawjeh/Avawjeh
Name: JO AGQUISHO - OREN RAYMOND LYONS
Nom:

Neegawaya deh
Clan HOTAH YONHNE
Clan (WOLF)

Ioe nonkhonsa gaaieh
nonhgonawaaadeh
Born at ONONDAGA NATION
Né à MARCH 5, 1930

Heeh nayh.
Minor children.
Enfants mineurs.

JO AGQUISHO
Oren R Lyons

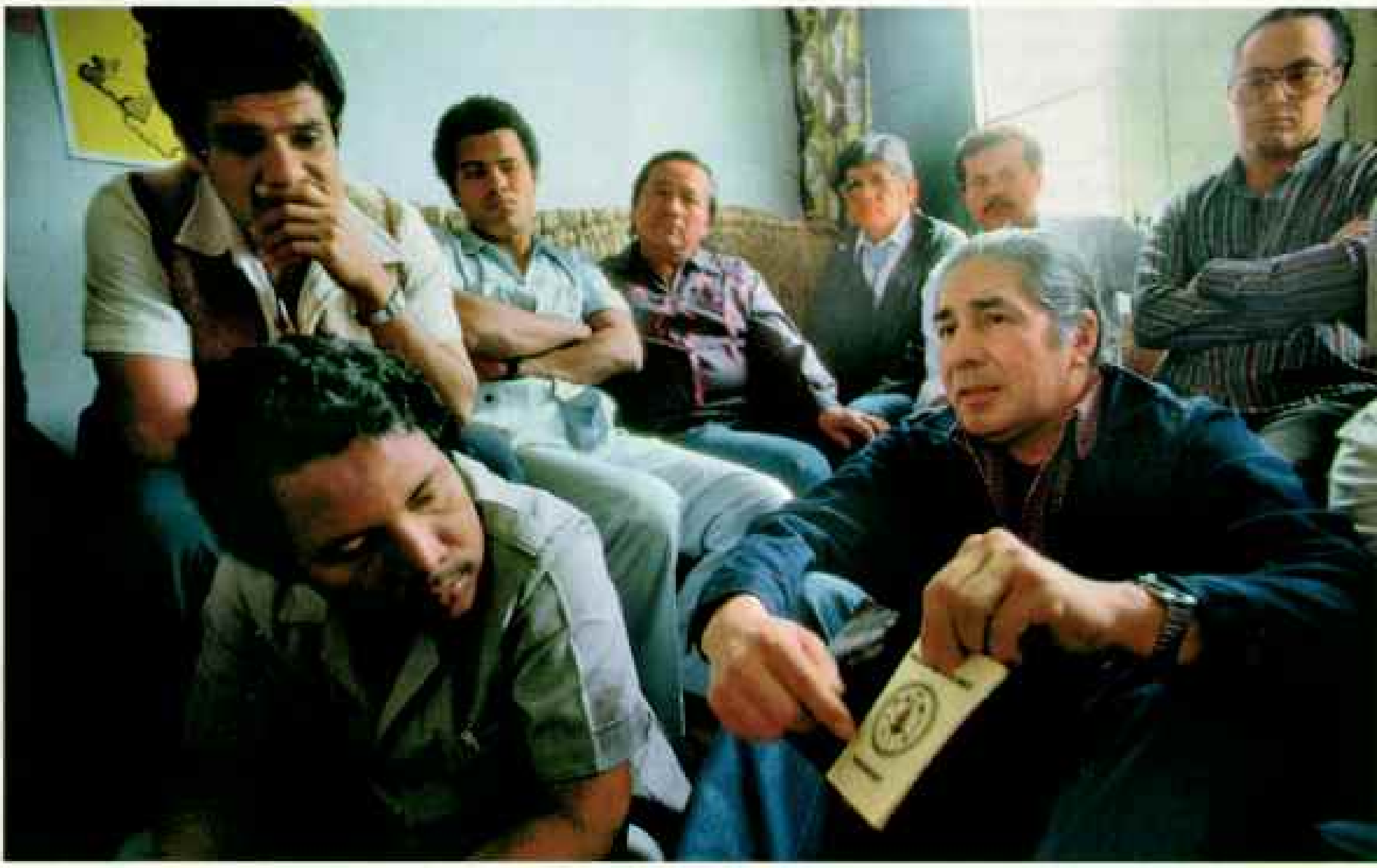
Haw yaw dawh/A yaw dawh
Photograph of bearer
Photographie du titulaire

Nawyeh nonh gonh nahyawk nee hoe nonh hwenh jaw gaih. Naw yay nay honh naw hanh dinh nonh wee denh. Denh hoe yaw daw doe gonh dawh. Nenh aw hoe dwenh day dawh aw haw day gih dawh. Naw toe nonh hawk/yaw dawh nayh hoe doe nonh shenh neh. Nenh haw send. Naw awh gwih aw hay yaw yoe dawh. Naw yayh gee shenh daw hay nway nee gonh hay enh. Doe gawt denh naw dae hwenh jork. Denh hayi shay yenh myaw donh. Nenh chaw nee ehw nenh say denh.

The Hau de no sau nee nenh ne ngent all whom it may concern to permit the citizen of the Hau de no sau nee named herein to pass without delay or hindrance and in case of need to give said citizen all lawful aid and protection

Secretary of the Six Nations

SOVEREIGNTY IN ACTION: Using Iroquois, or Haudenosaunee, passports (left), "runners" from the Six Nations traveled in 1985 to Bogotá, Colombia, where they were sped through customs by Colombian officials (bottom right). They came as official observers to a peace parley between Nicaragua's Sandinista government and rebel Miskito Indians. Unallied with the contra guerrillas, the Miskito seek autonomy for their people on Nicaragua's Caribbean coast —a cause Iroquois traditionalists see as an extension of their own.



Chiefs Oren Lyons and Bernie Parker (top right) propound their political philosophy to a Sandinista official in Colombia's Presidential Palace, where the talks were held.

At a meeting with other Indian delegates from North, South, and Central America, Chief Lyons (above) explains how his Haudenosaunee passport underscores the notion of Native American sovereignty.

Mohawk Thayendanegea, or Joseph Brant, a protégé of British Superintendent of Indian Affairs Sir William Johnson.

Winning many of the Six Nations warriors to the British side, Brant and other Iroquois war chiefs soon sent shock waves of terror through outlying American settlements. Finally, in devastating response, Gen. George Washington, in 1779, sent an expedition of 4,500 men under Gen. John Sullivan to strike the heartland of the Iroquois.

Although most of the Iroquois melted away at the Army's approach, the destruction of more than forty villages with their orchards, croplands, and granaries—especially those of the Seneca—forever changed the face of Iroquoia.

TODAY that scattered and schismatized world consists not of six but of seventeen separate, distinct, and bewilderingly complex communities flung across New York State, Ontario, Quebec, Wisconsin, and Oklahoma. Hardly any generality applies to all of them.

Some are governed by traditionalists allied to the Grand Council at Onondaga. Others have elected tribal councils not affiliated with the confederacy. The independent "progressive" Seneca nation at Cattaraugus and Allegany, for instance, has one of the country's oldest elected councils, established in 1848. But confederacy adherents—the focus of these pages—are active throughout the Iroquois diaspora. They include mostly Longhouse religion followers, but also some Christians.

There's also the Six Nations Reserve near Hamilton, Ontario, where Joseph Brant and other Iroquois Loyalists settled after the Revolution. A microcosm of the Iroquois world, it has its own Grand Council—separate from, yet ceremonially associated with, the one at Onondaga. The reserve's administrative government, however—by Canadian law—is an elected council.

But, for sheer complexity, consider the Mohawk community of Akwesasne, or St. Regis—one of the most fractionated six square miles on this or any continent.

Straddling the U. S.-Canadian border along the St. Lawrence River, Akwesasne must contend with the U. S. and Canadian federal governments, the state government

SALT OF THE EARTH: Each year New York State sends nine tons of salt to the Onondaga Reservation—payment, in part, for lands taken around Syracuse, including Onondaga Creek (right) and salt-rich Onondaga Lake. Indians say the treaties that took the land were never confirmed by the federal government—and hence are invalid. State officials dispute the claim.

of New York, and the provincial governments of Ontario and Quebec. What's more, it has three governments of its own: a Canadian-side elected band council, a U. S.-side elected tribal council, and a traditional council of confederacy chiefs. Neither the U. S. nor the Canadian government recognizes the traditional council, nor, for that matter, does the latter recognize the federal, state, or provincial governments' jurisdiction, or that of either of the elected councils, on Akwesasne territory.

"Toss in the fact that we have half a dozen Christian denominations plus the Longhouse religion," traditionalist chief Jake Swamp told me, "and you can see that right here all the elements that create war in the world are present every day."

ROADSIDE ENTREPRENEURS hawk refreshments to passersby heading to a Six Nations Grand Council meeting at Onondaga, capital of the Iroquois Confederacy. Substandard housing reflects the fact that reservation residents almost never

obtain commercial home loans; banks cannot repossess property on Indian lands. Though the tarpaper-and-plywood exterior may seem poor, the life lived within is typically rich in love, mutual respect, and traditional values.

War, indeed, almost broke out at Akwesasne in 1979, when a minor incident over a confiscated chain saw escalated into a major confrontation that had armed traditionalists barricading themselves against armed tribal council supporters, with state and federal authorities poised tensely between. For nearly two years the siege went on. At one point, confederacy chiefs at Onondaga and Tuscarora threatened to sever gas and power lines crossing their reservations if police stormed the barricades at Akwesasne. Ultimately indictments were dismissed against the traditionalists and the barricades came down, but the hurts and hatreds still fester.

EVEN AS I VISIT, more problems erupt at Akwesasne. Over a period of a few weeks seven deaths have been attributed to drunk driving, and the clan mothers are up in arms. They demand that local speakeasies be closed. A crowd of demonstrators gathers in front of one. As they march, a youth on a motorcycle roars away from the speakeasy, right past the demonstrators, and minutes later dies in a collision up the road. It's too much. That night flames suddenly shoot from the building. The local fire department, not wanting to interfere, stands by as the wooden structure burns to the ground.

The next issue of *Indian Time*, a reservation newspaper, shows the conflagration on its front page. Children are the first to notice: "Look!" they tell their parents. "See the flames—they look like horns! It's the devil—we chased him out of Akwesasne!"

And there are border problems—always border problems. The 1794 Jay's Treaty between the United States and Britain guaranteed Indians the right to unimpeded passage across the U. S.-Canadian border—a right underscored by a peaceful mass border crossing each July at an international bridge near Niagara Falls. But every few months there is a confrontation over the issue somewhere along the border. Should Akwesasne residents, for example, have to pay customs on merchandise bought on the U. S. side and taken to the Canadian side? And what about smuggling? Can customs officers single out cars of Akwesasne residents to search for contraband or drugs?

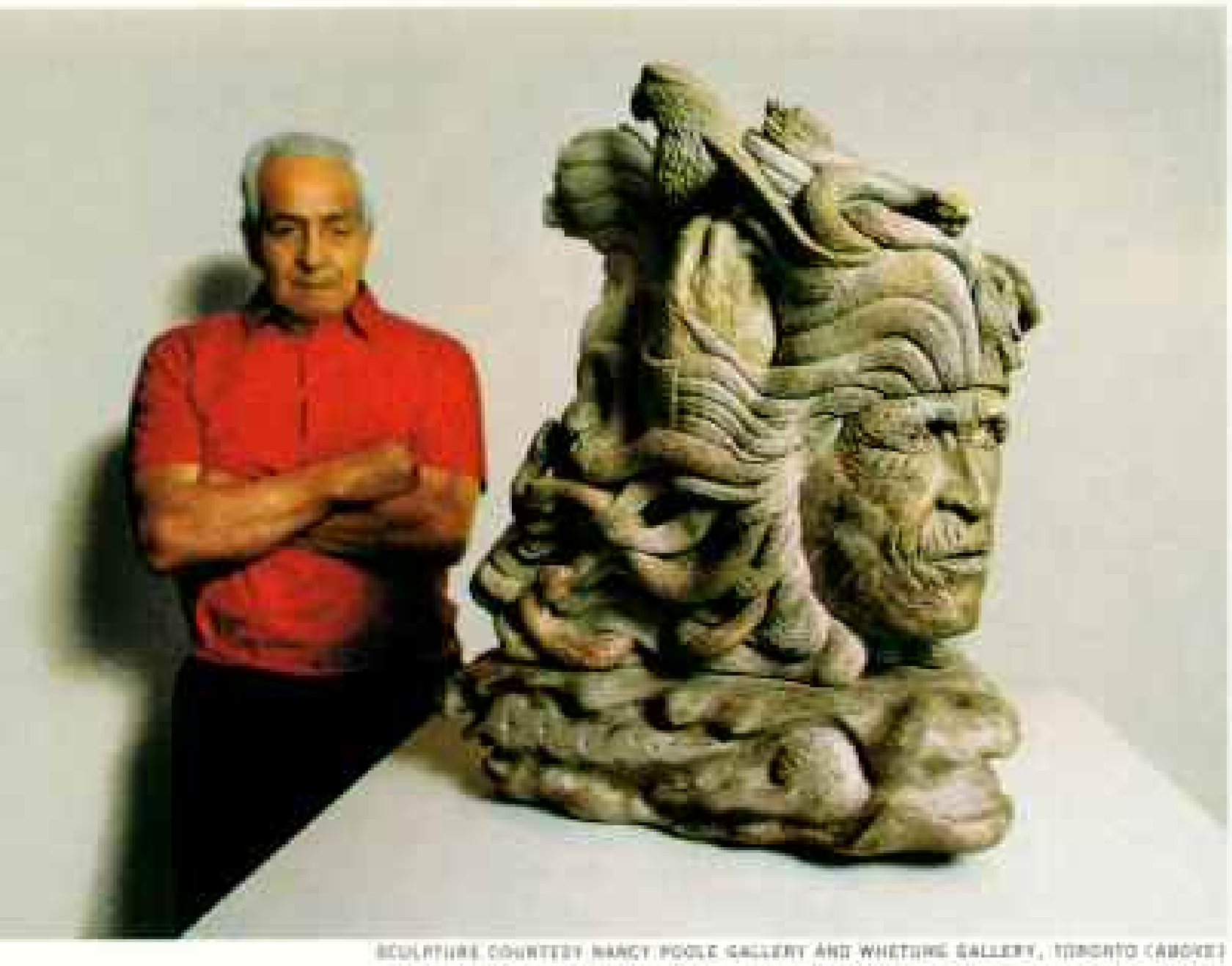
And then there's the specter of pollution. The reservation abuts on one of the United States' worst toxic-waste dumps, and the air hangs murky yellow-gray with the emissions from nearby industries crowding the shores of the St. Lawrence River.

I get a call from Chief Tom Porter, whose usually buoyant optimism is temporarily

NICE WORK—IF YOU CAN GET IT. Commanding wages of $25 an hour and more, highly skilled Mohawk ironworkers from reservations in upstate New York and Canada spend the workweek in northeastern urban centers. In New York City the subway (above) whisks men between their jobsite and the apartment they share in Brooklyn (facing page).

A Mohawk crew (left) ties reinforcing rods at the Owls Head sewage treatment plant in Brooklyn. Such work supplements the "high iron" steel and girder work for which they have long been famed.

EAGLES EMERGE from moose antlers at the hands of Mohawk carver Stanley Hill (facing page), one of today's outstanding Iroquois artists. Tadodaho Leon Shenandoah (below) poses beside Cayuga Joseph Jacobs's sculpture of the original Tadodaho—a snake-haired wizard who helped found the confederacy centuries ago. A silver turtle by Mohawk Julius Cook (right) features the "three sisters"—corn, beans, and squash—age-old staples of Iroquois diet.



SCULPTURE COURTESY NANCY POOLE GALLERY AND WHETUNG GALLERY, TORONTO (ABOVE)

clouded by Akwesasne's seemingly endless woes. "Sometimes," he says, "I think of getting together all those who really want the old way and leading them off this poor poisoned piece of land."

Back in 1974 a group of Mohawks staged such an exodus—seizing a disused summer camp on state parkland in the central Adirondacks and "repossessing" it from the state of New York. Three years later they agreed to exchange this site for another piece of state land in the northern Adirondacks—and there the community survives to this day, calling itself Ganienkeh (the original Mohawk name for their homeland, meaning "land of flint").

"Here we live according to the original constitution of the Five Nations," spokesman Tekarontake told me. "That's the only law we recognize. We don't accept any government money, and we don't want any. We ask only to be left alone, to develop according to our own principles.

"We needed fighters to establish Ganienkeh, but now we need builders, teachers, farmers. That's where the challenge is today. And, who knows, if we can succeed—and I believe we can—you may be seeing more Ganienkehs in the future. . . ."

Hammers ring out over the 32-acre Oneida Territory, west of Utica, where a new longhouse is going up in a field behind the large bingo hall and adjacent trailer-home community—remnant of some six million

acres once owned by these People of the Standing Stone.

"It's the first longhouse on original Oneida Territory for more than 150 years," traditionalist spokeswoman Maisie Shenandoah tells me. "This and another piece of land nearby were never sold."

Buses from as far away as New York City crowd the parking lot, chartered by luck seekers hoping for the $10,000 top bingo prize. "We built the bingo hall in 1985," Maisie says. "Lots of people here were against it, afraid the profits would go to outsiders—as has happened on other reservations. But we've proved we can run a business successfully and keep the profits for the community—more than five million dollars in the first year. We've gone from 80 percent unemployment down to 5 percent. And we're using the profits to recover other property nearby. We're saying to our fellow Oneidas: 'Come home!' "

She speaks proudly of the Oneida role in the American Revolution. "Our Chief Skenendore brought 300 bushels of white Indian corn to George Washington and his troops at Valley Forge. We even sent along a woman to show them how to cook it. After the war Martha Washington gave the woman, Polly Cooper, a black lace shawl. One of her descendants still has it in a vault."

She shows me a large rock standing across the road from the bingo hall.

"That's how we got our name, People of

the Standing Stone," she explains. "In the old days it would give us directions. It would appear wherever we moved. But, when the people went their own ways, the stone stopped helping. They say it won't direct us again until we're reunited."

That, however, remains an elusive ideal for the far-flung Oneida. In addition to the 32-acre territory, there are major Oneida communities—wholly separate administratively—near London, Ontario, and Green Bay, Wisconsin, plus a contingent at Onondaga and a rival group who vigorously contest control of the 32-acre site.

THE CAYUGA, like the Oneida, have major land claims pending. Entirely dispossessed of their original territory in west-central New York, they have communities on the Seneca-Cayuga Reservation in Oklahoma, the Six Nations Reserve in Canada, and the Cattaraugus Reservation south of Buffalo.

"We live here as guests of the Seneca, as *tenants*," Chief Frank Patterson tells me at the Cayuga Indian nation's one-room storefront headquarters in Gowanda, New York. "We're desperate for a land base so we can come together as a people again. We've kept up the ceremonies, and we're loyal to the confederacy. But until we get some land back, people will just think of us as curiosities—the 'landless' Cayuga."

Though their current claim against New York State calls for the return of some 64,000 acres they say were wrongfully taken, plus 350 million dollars in damages, the Cayuga, in truth, seek a negotiated settlement like one that was very nearly reached in 1980, giving them some 7,000 acres of state parkland and national forest plus about eight million dollars in trust.

"Look," Chief Patterson says, "we don't want to be bad neighbors, and we don't want to see a single white family evicted. But we can't just be ignored out of existence.

"*To survive* . . . that's all we ask."

On the outskirts of Montreal, I stroll the weed-grown perimeter of the Kahnawake Mohawk Reserve with spokeswoman Selma Delisle.

"First they took the land," she says. "But that wasn't enough for them. . . .

"Then they took the river." She waves an arm at the concrete embankment of the St. Lawrence Seaway, which virtually walls off the reserve from the river's main course.

"Then," she continues, "they took away the sky." She points to the bridges, railway trestles, and highways that arch over the reserve—humming with the traffic of more than 50,000 commuters a day.

"And," she goes on, "they proposed taking even the rapids away," referring to the Province of Quebec's plans—shelved for now—to harness the nearby Lachine Rapids, the last major rapids on the St. Lawrence, with a series of dams and a massive hydroelectric power plant.

"Kahnawake means 'at the rapids,'" Selma says. "We get our power from the white water—our spiritual power. They wanted to turn it into electricity so people could have more microwave ovens. . . ."

She recalls: "My mother had a great-great-uncle. He prophesied that one day there would be monsters at Kahnawake. She never understood what he meant until they opened the seaway in 1959. Then she saw the huge ships passing through. They were the monsters."

IN WESTERN NEW YORK STATE both the Allegany Seneca Reservation and the Tuscarora Reservation have lost large acreages to public works reservoirs in recent decades.

At Tuscarora, not far from Niagara Falls, I climb a ridge overlooking the reservation with Chief Edison Mt. Pleasant and his wife, Eliza. "That's where I grew up," Eliza says, pointing toward the reservoir and her now submerged childhood home. "We try not to think about it any more. There's still a life to be lived. At least they haven't taken everything."

Edison shows me a site, now a plowed field, where the British burned the main Tuscarora settlement in the War of 1812.

"They were still mad we'd fought with the Americans during the Revolution," he says.

He tells me how the Tuscarora had been driven out of North Carolina in the early 1700s and become the confederacy's sixth member. Later, he goes on, they were mostly Christianized, yet they still retained their affiliation with the Grand Council at Onondaga—as they do to this day.

"They call us Christian chiefs," he says.

Before a thunderstorm douses our stroll, I retrieve a few rusty nails from the ground—corroded remnants of a proud past. Back at his house Edison shows me his collection of old coins, buttons, arrowheads, and other artifacts—a collection he takes to schools and fairs to demonstrate the oft forgotten Tuscarora role in U. S. history.

WOMEN'S VOICES ring loud in the world of the Iroquois, where clan mothers select—and sometimes depose—chiefs. Membership in both clan and nation is carried through the female line. Onondaga women (facing page) find time for laughter while practicing for an upcoming sing. Clan mother Dewasenta (above) shuttles between home and her duties at the Onondaga longhouse.

AT HOME IN TWO WORLDS, members of an Akwesasne Mohawk family (above) while away a lantern-lit evening playing an ancient Iroquois game in which wooden pieces are tossed like dice. A similar hours-long game, which must be concluded once begun, is played for religious purposes in the longhouse during the sacred annual midwinter ceremony—part of a cycle of sacred festivals marking the Iroquois calendar.

Equally at home with the latest fads of the modern world, a Mohawk girl at Akwesasne (right) turns the family living room into a stage as she practices her rock-star routine for a look-alike and lip-sync contest to be held at the local elementary school.

When the rain stops, I get up to go. But he looks at me quizzically.

"Harvey," he says gently, "are you sure there isn't something else?"

I look at him. He looks at me. Then I understand. Sheepishly I dig my hand into my pocket and pull out the rusty nails.

"You mean these?"

He smiles, and accepts my apology—along with the nails.

"Everything that was ours is important to us," he says. "Even these."

I drive off—one more message from the Iroquois burned indelibly into this white man's conscience.

And here's another: They want their wampum belts back, and their ceremonial false-faces, and, yes—the bones of their ancestors. With Seneca faith keeper Hazel Dean-John, a state education official, I descend into a basement vault where the New York State Museum at Albany stores a priceless collection of Iroquois wampum belts in several Plexiglas cases. Though available for viewing on special request, the belts have been removed from public display largely out of respect for the belief of Iroquois traditionalists that they should not be shown as objects of mere curiosity.

This and another collection at the Museum of the American Indian in New York City, argue the traditionalists, are the historic property of their confederacy and should be returned to the appropriate wampum keepers. Recent negotiations, in fact, point to the likelihood that some of the belts

will soon be restored to Iroquois custody—once details can be worked out to assure their safekeeping.

When and if that happens, confederacy spokesmen say, the belts will be restored for use in longhouse ceremonies.

"They're *powerful*," Hazel tells me as we remove the covers from the cases so Steve Wall can photograph the belts—white-and-purple-beaded mnemonic records of great historic events and the quintessential symbols of Iroquois sovereignty.

"Just being in their presence makes me feel alive," Hazel says. "Can you feel the power coming from them?" With palpable reverence she gazes at the Washington Covenant belt, the Hiawatha belt, the Tadodaho belt. "They reach out to me," she says.

"Can you imagine the scenes these belts have witnessed . . . the hands that have touched them? The voices of my people call to me through them."

What to do? It's a yet-to-be-resolved issue faced by museums, collectors, and dealers who find themselves the uneasy custodians of Indian belts, masks, and other ceremonial regalia. One person's artifact, alas, is another person's sacrament.

The Iroquois also strenuously object to the looting of Indian burial grounds by artifact hunters. "Do we dig up *your* cemeteries?" asks Chief Shenandoah.

Since 1972 a moratorium has existed in New York State under which no professional archaeologist may excavate native burial sites. When Indian remains are unearthed

by accident, Native Americans are generally called in to oversee a proper reburial.

"We have the right to bury our own," Chief Shenandoah asserts.

LAUGHTER is the sound of Tonawanda at strawberry time. It wafts like birdsong across the wildflowered meadows, mingling with the woodsmoke from a hundred chimneys. Out in the fields the families gather the strawberries—the year's first-ripening fruit—for use at the upcoming Strawberry Thanksgiving. The children romp and squeal, their lips glistening strawberry red with the sacred juice.

It was at strawberry time in 1799 that the Seneca prophet Handsome Lake revealed the compelling visions that led to a major reformation of Longhouse religious and social practices. His message called for abstention from hard drink, the abandonment of witchcraft and magic, and the prohibition of abortion—along with other "instructions" that became the basis, along with the Peacemaker's teachings, of today's Longhouse religion.

At Strawberry Thanksgiving in June, I join the congregation in the longhouse for the hours-long recitation of the prophet's words in the native Seneca language. After the speeches the ceremonial dances begin. Lines of dancers circle a central bench on which musicians pound turtle-shell rattles while chanting out crescendoing choruses of "Yo-ha, yo-ha, yo-o-o-o. . . ." The dancers stomp on the floorboards until the whole longhouse thunders.

Then girls ladle out cupfuls of a deliciously sweet strawberry drink—reputedly rich in medicinal powers. An abundant lunch is then topped off with whopping portions of strawberry shortcake piled high with cumulus clouds of whipped cream.

Afterward I talk to Chief Corbett Sundown, keeper of the confederacy's "spiritual fire" at Tonawanda (as distinguished from the "political fire" at Onondaga). A frail but still feisty man in his 70s, he's retired from most duties since three rapid-fire heart attacks in 1984.

He tells me: "We have a saying that when you die, you're going to 'eat strawberries'—because strawberries line the road to heaven. Well, I almost ate'm. I wouldn't have minded—I'm ready to go—but I'm glad to still be here. There's always something more to do for your people.

"You know, you white guys come down here and you don't see anything. Then you write your articles about how poor we are. Well, let me tell you, we're not poor. We're rich people without any money, that's all. You say we ought to set up industries and factories. Well, we just don't want them. How're you going to grow potatoes and sweet corn on concrete? You call that progress? To me 'progress' is a dirty word."

He stares at me hard.

"I've got a warning for you. You can't go on destroying and poisoning everything. Our prophecies say there'll be signs of the end of the world: We won't be able to drink the water, trees will die from the tops down, babies will be killed like dogs. . . . Now it's all happening—only you call it water pollution and acid rain and 'legal' abortion.

"Well, the Creator's mad. He's going to send a great wind—more terrible than any atom bomb. We've had some visions about it recently, and we're burning tobacco so it won't happen. But you guys better come to your senses. Then maybe the Creator won't send that wind. Otherwise—and you write *this* in your article—we'll all be 'eating strawberries' together!"

IN PHILADELPHIA I attend a special ceremony at the downtown Friends Meeting House. In 1736 the Iroquois and Pennsylvania signed a treaty of friendship "to be preserved firm and entire, not only between you and us but between your children and our children, to all succeeding generations. . . ."

Now, beneath a brilliant blue March sky 250 years later, I watch a delegation of Haudenosaunee—led by Mohawk chiefs Jake Swamp and Tom Porter—plant an eastern white pine on the meetinghouse grounds as part of an ongoing Tree of Peace Project, whose goal is to make similar symbolic plantings around the world, bringing the Peacemaker's message of human harmony to all nations.

Nearby, appropriately, lie the remains of Benjamin Franklin, who, as an official delegate, attended treaty ceremonies with the Six Nations and in the structure of their

A GRANDMOTHER'S LOVING HAND hovers around her granddaughter on the Tonawanda Seneca Reservation. Cherished, respected, and honored, elders play a pervasive role in Iroquois life—preserving old ceremonies, maintaining the language, and cementing the extended family with ever ready affection.

confederacy saw a partial model for his own vision of a federal union of the colonies. Enunciating his ideas in the 1754 Albany Plan of Union, he even suggested that the proposed federal legislature, like that of the Iroquois, be called the Grand Council.

He once wrote: "It would be a very strange Thing if six Nations of ignorant Savages should be capable of forming a Scheme for such a Union and be able to execute it in such a Manner, as that it has subsisted Ages, and appears indissoluble; and yet that a like Union should be impracticable for ten or a Dozen English Colonies. . . ."

(That he should call the Iroquois "ignorant Savages" while incorporating their lofty ideals into his own political philosophy is, it would seem, less a reflection on Iroquois character than on Franklin's own assumption of the prejudices of his time.)

IT NEVER OCCURRED TO ME that I might actually witness Iroquois statesmen in action on the international diplomatic stage, as Franklin, Madison, Jefferson, and Washington once did.

But one day Chief Oren Lyons called. "Harvey," he said, "the Miskito Indians of Nicaragua have invited us down to support them in their peace negotiations with the Sandinista government. The talks are being held on neutral ground in Bogotá, at Colombia's Presidential Palace. You want to come along?"

I met the Grand Council's delegation of five "runners" in Miami. Together we flew to Bogotá, and I marveled as their Haudenosaunee passports were honored with great aplomb by Colombian officials. ("We've gone to more than twenty countries on these passports," Chief Lyons told me.)

Ancient rhythms of the water drum and cow-horn rattle fill the Akwesasne Mohawk longhouse, as members enjoy an evening of social dancing after a long day of formal ceremonies. Permission for photographer Steve Wall to use his camera inside the longhouse required unanimous consent of Longhouse religion followers and took two years to obtain.

LIFE'S A CHORE—and a pleasant one—for a Mohawk youth on the family farmstead at Akwesasne. By day he pursues thoroughly modern studies at school. By night, when chores are finished, he returns home to imbibe by lantern light the lore and traditions that have sustained his people for centuries.

Not a little overwhelmed, I stood with them a few days later in the chandeliered Presidential Palace as each of us was greeted with a warm handshake by Colombian President Belisario Betancur.

"*Bienvenidos*. Thank you for coming," he said—greeting the Six Nations and other Indian delegations as well as official diplomatic "guarantors" from his own country, France, Sweden, the Netherlands, Mexico, and Canada.

Also present was Miskito rebel leader Brooklyn Rivera, whose guerrilla forces, emphatically *un*allied with the contras, had been waging a years-long "war within a war" to win autonomy for their people on Nicaragua's Caribbean coast.

AMID THE DARK-SUITED diplomatic swirl, the Six Nations delegates in their Levi's and their bright silk-ribboned Iroquois shirts moved with the easy grace of seasoned veterans, buttonholing now the Swedish ambassador, now the Colombian defense minister, now a Sandinista official.

I heard Chief Lyons gently expounding to one increasingly wide-eyed Sandinista: "You guys should understand, the Miskito aren't alone in this. However you decide to treat them, remember—you're being watched by all native American peoples, and there are tens of millions of us. We won't forget what you do here."

Seneca journalist John Mohawk, a founder of the Indigenous Press Network, a computerized news service on Indian affairs, spent much of his time collaring other Indian delegates. "What we need is communication among ourselves. We need to know about each other's struggles, what the problems are, what the solutions could be. Then we can speak with a unified voice . . . a united Fourth World of dispossessed indigenous peoples everywhere."

At a strategy meeting of the Indian delegations, Brooklyn Rivera rose to speak: "The Sandinistas say we are just another ethnic minority. Well, I tell them: Ethnic minorities run restaurants. We have a standing army! We will negotiate as nation to nation!"

Next to speak was Russell Means, fiery spokesman for the American Indian Movement, who rose and slammed a fist on the table. "You tell the Sandinistas that we're coming to Nicaragua with an army of our own. We'll have a shovel in one hand and a rifle in the other. It's up to them which one we use!"

Now, amid the rising rhetoric, Chief Lyons rose to speak. The occasion seemed ripe

for more hot words, but, to the surprise of many, he was utterly calm:

"We are the Haudenosaunee," he began, his words slow and measured, as though the angry words of a moment before had never been spoken. "We are made up of Six Nations . . . each of us equal . . . each of us sovereign . . . and we come together in a confederacy.

"Our business is peace, not war. . . ."

Voice unwavering, he told of the confederacy's origins and government. He explained how decisions must be reached by consensus, how no problem was important enough to cause disunity. "We must be of one mind," he said, echoing the Peacemaker's ancient words.

BY THE END OF THE SPEECH his audience was transformed. Anger had been replaced by calm, and turbulent emotion had changed to cool lucidity. And that, I realized, had been his intent from the beginning. I was watching a master tactician, a gifted diplomat in action, who was representing his people as a nation among nations.

Later I told him: "Oren, you'd make a hell of a secretary of state."

He laughed and shook his head. "No way. Couldn't take the job if they offered it. I'm not a U. S. citizen. I'm Haudenosaunee. But if *your* secretary of state wants to talk to *us*, nation to nation, hey . . . we've been waiting a long time for that. We're ready." □

Silent Death from Cameroon's Killer Lake

By CURT STAGER

Photographs by ANTHONY SUAU
BLACK STAR

DEAN YEOMAN, NEUMEISTER (FACING PAGE)

Without warning one summer evening in 1986, a lethal jet of carbon dioxide spewed from Lake Nyos in West Africa, snuffing out the lives of 1,700 villagers. Local myths tell of angry outbursts by lake spirits, giving clues to past geologic events. The gas burst has posed many questions for scientists, who seek to avert further disaster.

NIGHT FELL quietly on August 21, 1986, in a lull between the cloudbursts that drench the Cameroon highlands in the rainy season. Hadari, a Fulani cattle herder, had just fallen asleep with his family in their hillside home. Far down the grassy slope, Lake Nyos glistened in the dim light, one of more than 30 crater lakes set like jewels in a volcanic chain stretching across much of this beautiful African nation. About a mile below the lake, the village of Lower Nyos lay on the valley floor.

A loud rumbling noise awakened Hadari and his family. Rushing outside and peering into the darkness, the herdsman saw a ghostly column of vapor burst out of the lake and pour like a smoking river down into the valley (diagram, page 407). At that moment a great blast of wind roared up from the lake, gagging him with an overpowering stench of rotten eggs.

Hadari hurried his family to higher ground, where they huddled in the bushes. The rumbling stopped in an hour, but the family was too frightened to return home.

In the valley, meanwhile, a cloud of gas about 50 meters (150 feet) high engulfed Lower Nyos village, where many people had just finished a late supper after a busy market day. Families suffocated in their sleep. Others smelled the odor of rotten eggs, felt a warm sensation, and rapidly lost consciousness.

The silent cloud moved 16 kilometers (ten miles) down the valley, spreading death. Lower Nyos was wiped out; 1,200 people perished there and in nearby encampments. In neighboring villages, including Cha, Subum, and Fang, more than 500 died.

The next morning Hadari and others came down out of the hills to find cattle strewn like confetti in the tall grass. Human bodies lay in heaps in doorways, on beds, on kitchen floors beside unfinished meals.

"We see many persons just fall down," remembered Suleyman, a Fulani, at a refugee camp. He lost most of his family that night. "I feel just angry to see the dead people, my brothers, my family, my mother, small *pickin* [children]. I feel just angry for to see this thing, and that I have not any power."

It was as if a neutron bomb had struck, destroying the living but leaving buildings unharmed. Not a creature moved in Lower Nyos that morning, "not even small ants," said Suleyman. Carcasses of more than 3,000 cattle littered the area, bloating in the hot sun, untouched by flies or vultures; the scavengers were dead too.

The release of one billion cubic meters (1.3 billion cubic yards) of gas dropped the lake level by more than a meter. Lake Nyos was stained with a rusting iron compound—ferric hydroxide—carried up from the bottom by the escaping gas and precipitated into the surface water.

A water surge accompanied the gas burst,

PETER TURNLEY, BLACK STAR

A lake's deadly vapor

DIAGRAM BY MARY CHALLINOR

Wisps of fog *drifting off Lake Nyos* ***(left)*** *follow one of the paths taken by the gas en route to populated valleys. A violent wave that accompanied the gas burst stripped vegetation from the lake basin and littered the lake with debris. An iron compound brought up with bottom waters oxidized and stained the lake reddish brown.*

What caused the outburst? A team sponsored by the Office of U. S. Foreign Disaster Assistance theorizes that, over the years, carbon dioxide, shown by white triangles ***(above)****, escaped from hot rock into groundwater and ultimately into the lake. The carbon dioxide, held in a dissolved state by the weight of the water above it, reached highest concentrations in water at lower depths, shown in dark blue on the diagram. At the moment of expulsion, the carbon dioxide shot to the surface and was expelled as gas.*

Among possible causes of the upwelling: a landslide, an earth tremor, turbulence from a strong wind or rain, or a disruption of the stratification caused by a change in water temperature.

Offering another theory, French and Italian investigators contend that the disaster was triggered by an eruption in a volcanic pipe (red arrow) connected to a magma source.

gushing as high as 80 meters to rip vegetation from the shores and deposit it in the lake. For weeks after the explosion Lake Nyos lay like a festering and angry red eye in its crater socket.

Two months after the catastrophe I paddle out onto the glassy face of the mile-wide lake and try to imagine the violence of that terrible night. Angry red has faded to the water's normal crystal blue, but an ugly wave-scoured ring still rims the shore.

Otherwise, the lake looks much as it did in 1985, when I visited it on a survey of Cameroon's lakes with George Kling, a fellow graduate student at Duke University. In six busy months on that trip we had collected physical, chemical, and biological data from most of the crater lakes. But our equipment was too heavy to carry to Nyos, isolated in the heart of the volcanic chain. Still, the stunning lake drew our special attention.

Spectacular cliffs bordered the western shore. The crater, blasted out of the green flank of a rugged mountain ridge, cupped a liquid mirror that gleamed in the hot sun like a fallen piece of sky. Someday, we dreamed aloud, we would come back and build a cottage on Lake Nyos.

Now, on my second visit, I see painful irony in the apparent serenity of the lake. I worry too about a generous man known simply as Mr. Lucas. He had welcomed us to Lower Nyos on that first visit, had provided us with parking in front of his house, and had carefully chosen a young guide for us. If we had been able to test Lake Nyos, could we have warned of possible disaster?

I HAVE ARRIVED in the backwash of a wave of international relief that poured into Cameroon when news of the catastrophe reached the outside world. It had been a delayed reaction, since word of trouble did not leak out of the remote area for nearly two and a half days. A Roman Catholic priest from Wum, 30 kilometers to the west, and helicopter pilots from Bamenda, 55 kilometers to the south, were the first to reach the stricken villages with provisions and medical aid. Military personnel and government officials arrived later to evacuate the area and to help dispose of the bodies that had lain unburied. Most victims were buried in unmarked mass graves sprinkled with quicklime. Many survivors returning later could only guess where their loved ones lay.

Heavy rains and quagmire roads hindered relief efforts. In spite of the difficulties, tent camps sprang up to help house the 4,000 to 5,000 refugees. Relatives in surrounding villages opened their doors to the homeless to such an extent that Save the Children representatives searched in vain for orphans to rescue.

Medical teams treated the injured in overcrowded hospitals in Nkambe and Wum; some victims were unconscious for as long as 36 hours. Food was not a problem, as the year's first harvest of cassava, maize, and yams was just coming into the markets. Far worse for the refugees were feelings of despair and lingering fear. Most did not want to return to their abandoned farms.

While relief workers assisted the refugees, scientists from around the world rushed in to

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In the wake of disaster, limnologist **Curt Stager** returned to Cameroon to continue research he began while earning his doctorate at Duke University. Pulitzer Prize-winning photographer **Anthony Suau** has previously reported on Eritrea for the GEOGRAPHIC.

Valleys of death

THE GAS BURST of August 21, 1986, lasted perhaps only an hour, yet it expelled about a billion cubic meters of lethal carbon dioxide gas. Denser than air, the cloud flattened low vegetation as it rushed downward to the village of Lower Nyos (***relief map***) and claimed 1,200 lives. Before the gas dissipated, 500 more perished in the nearby villages of Subum, Cha, and Fang.

Scientists eager for knowledge of past geologic phenomena were intrigued by the myths of people living near Cameroon's volcanic lakes. One story, reported by U. S. anthropologist Eugenia Shanklin, concerns a king who hanged himself after being tricked by the ruler of a rival people. The deceased leader's body formed a lake that later exploded, killing many of the enemy. Other legends tell of the sudden death of cattle, and of fish raining down from exploding lakes.

Still young by geologic standards, Lake Nyos emerged from a volcanic birth only within the past few centuries. One of more than 30 crater lakes in Cameroon, Nyos was formed when molten rock rising from deep within the earth heated groundwater into an explosion of steam.

As safeguards against future gas bursts, investigators recommend monitoring carbon dioxide levels and installing underwater pipes for the slow release of gas. Lowering the lake level would prevent a flash flood should the lake's fragile spillway collapse.

Scale varies in this perspective view. Roads are shown in red.

NGS CARTOGRAPHIC DIVISION
RESEARCH: MAUREEN J. FLYNN, ROSS W. EMERSON
PRODUCTION: BARBARA CORRIGAN
MAP EDITOR: GUS PLATIS

AFRICA

0 600 km
0 600 mi

Niger

Lake Chad

Lake Nyos lies on the Cameroon Line, a volcanic chain stretching from the Atlantic Ocean island of Annobón to the mountainous mainland, where it forks to the north and east.

Cameroon Mt.

CAMEROON

Yaoundé

CAMEROON LINE

Annobón

ZAIRE

Lake Kivu, perhaps the world's gassiest large lake, holds huge volumes of carbon dioxide as well as highly flammable methane.

Lake Kivu

RWANDA

Mbum

Bu

Fang

Pupgam

gas cloud path

Subum

Lower Nyos

Cha

Munji

Gungbe

gas cloud path

Kam

Upper Nyos

Lake Njupi

Kumbi

Lake Nyos

Bwabwa

study Lake Nyos in search of explanations. Many were short on time and equipment; some even lacked camping gear. All found it difficult to work in the rainy season. Photographer Anthony Suau and I, our jeep mired to the doorframes in mud, spent a miserable rainy night just outside deserted Lower Nyos village. A team of American scientists was stranded at Lake Nyos for days without supplies when its helicopter failed to arrive.

As field studies got under way, attention was drawn to a similar event that had occurred two years earlier. On an August night in 1984 Lake Monoun, 95 kilometers south of Nyos, spewed a cloud of gas that smothered 37 people who walked into it. Volcanologist Haraldur Sigurdsson of the University of Rhode Island, leading an investigation into the incident, concluded that a landslide had disturbed carbon dioxide that had become trapped in the bottom water after leaking from a deep volcanic fissure.

At that time the Cameroon government was recovering from a recent coup attempt, and the episode received little public attention. At Nyos, however, the death toll was so great that officials sought immediate assistance. The Lake Nyos and Lake Monoun disasters are the only recorded events in which gas released from lakes has caused the loss of human life.

It was clear that the mechanism behind the exploding lakes must be investigated before steps could be taken to prevent future tragedies. Field research focused on two central questions: Where did all that gas come from, and why was the gas released so violently?

Samples of gas-charged lake water were analyzed by researchers sponsored by the Office of U. S. Foreign Disaster Assistance. Bubbles emerging from the samples contained 98 to 99 percent carbon dioxide (CO_2). This dense, colorless gas weighs one and a half times as much as air. It is the gas that produces the fizz in soft drinks and beer. Humans and animals exhale carbon dioxide—a product of the metabolizing of food. Green plants take carbon dioxide from the air and in sunlight combine it with water to make food.

Concentrated, the gas is also used in fire extinguishers—heavier than air, it pushes the air aside and robs the fire of the oxygen needed to burn. This is similar to what happened at Nyos.

The burst of lake gas formed a ground-hugging cloud that, as it moved, forced aside breathable air. The victims were robbed of oxygen—asphyxiated.

Claims of chemical burns on the dead and living later proved to be unsubstantiated.

Bubbling like club soda, *a water sample* ***(left)*** *taken by the author* ***(right)*** *from 200 meters below the surface shows that carbon dioxide levels in Lake Nyos are still dangerously high. Enough gas was released by the blast to lower the water level by more than a meter, but scientists believe that groundwater continues to infuse the lake with carbon dioxide. The U. S. team also found gaps in the volcanic material deposited around the lake during its creation, suggesting erosion by waves during previous gas bursts.*

At least five other lakes in Cameroon require studies to determine if they also pose a threat of gas release. Apparently triggered by a landslide, a carbon dioxide eruption from Lake Monoun, 95 kilometers south of Nyos, killed 37 persons in August 1984.

The sensations of heat and foul odors reported by survivors were ascribed by pathologists to "sensory hallucinations" induced by the high concentrations of carbon dioxide gas.

Isotopic analyses of gas-charged water from Lake Nyos suggested that the carbon dioxide had leaked slowly from deep inside the earth to the lake floor. This came as no surprise to investigators. Cameroon's crater lake district is a volcanically active region. Cameroon Mountain, which rises 4,100 meters over the steaming coastal forests, last erupted in 1982. Faults and craters shatter the face of the land. Many may still leak fumes from subterranean cracks.

EXPERTS DISAGREED on why the gas was released so violently. Last March an international scientific conference met in Yaoundé, Cameroon's capital, to compare data and theories. Two schools of thought emerged.

French and Italian volcanologists believed that the carbon dioxide gas accumulated in rubble in a volcanic pipe connecting a magma source with the crater above. Groundwater coming in contact with the hot rock created a burst of steam known as a phreatic explosion, blasting a jet of gas upward through the lake.

The majority of scientists, however, concluded that the gas had dissolved slowly into the lake water itself, as it had at Monoun. Nyos became a time bomb of dissolved carbon dioxide. The slightest disturbance could nudge it into a massive degassing.

What event finally triggered the release? The scientists were unable to agree on the mechanism, but many possible triggers were identified. These include a rockfall, an earth tremor, a volcanic eruption, storm winds, or simply the seasonal cooling of the lake surface—anything that could stir the supercharged waters upward.

Once the gas-charged water began to rise, the resultant decrease in pressure allowed the gas to escape from solution and form bubbles. As the bubbles rushed upward, they forced the surrounding water up with them. The process accelerated in a vicious cycle. The result: a violent, foaming eruption like that from an uncorked champagne bottle (diagram, page 407).

On December 30, 1986, French and Cameroonian geologists witnessed another disturbance at Nyos, which they described as a second eruption. Other investigators found

A fortune in cattle lies lost on a hillside above Lake Nyos. More than 3,000 head died, a severe blow to the surviving Fulani herdsmen. Dead animals were found as high as 100 meters above the lake, giving scientists a benchmark in determining the volume of the gas cloud.

PETER TURNLEY, BLACK STAR

Doomed to vanish, *Lake Bambili* ***(left)*** *awaits the fate of its swampy twin, at top. Both will ultimately dry up as sediment and vegetation fill the basins. Legend states that Bambili once overflowed its banks and wiped out a village, suggesting a gas eruption. But its water, too shallow to hold dangerous levels of carbon dioxide, now poses no threat.*

Other craters near Lake Nyos now provide rich farmland ***(below)****. Next to a family compound boxed in by hedgerows, crops grow in the volcanic soil on the crater floors.*

no conclusive evidence of an eruption. By March, when the international scientific teams met at the Yaoundé conference, many researchers had concluded that a rockfall had been mistaken for a volcanic burst.

Few lakes are as gassy as Nyos and Monoun. In order to pose a threat, a lake must be deep and sheltered enough to stratify into distinct layers. Density differences, resulting from chemicals in the water or from surface warming, keep the layers from mixing, like liqueurs in an after-dinner drink. If stratification persists, dangerous gases can accumulate in the bottom waters.

In many lakes, thermal stratification may break down naturally and allow the layers to mix—a process known as overturn. This occurs in the fall and the spring in temperate-zone lakes when cool surface waters sink and stir up bottom waters. Tropical lakes turn over from strong winds or heavy rains. Often the deep water in stratified lakes loses its oxygen supply through bacterial action. In such cases overturns can trigger massive fish kills, driving fish to gulp air at the surface in their struggle to survive.

The timing of the Nyos and Monoun events, both at the height of the rainy season, suggested to some scientists that a partial overturn may have driven the bottom waters upward, releasing some of the trapped gas.

LAKE KIVU, perhaps the world's gassiest large lake, lies in the Rift Valley of East Africa, between Rwanda and Zaire. A hundred kilometers long and 485 meters deep, it holds waters charged with more than 63 billion cubic meters of methane and five times as much carbon dioxide.

"Kivu's methane is generated by bacteria in the sediments," explained West German physicist Klaus Tietze as he recuperated in Bamenda after three strenuous weeks at Nyos. "The CO_2 seeps slowly into the lake from volcanic hot springs. Kivu seems to be more stable than Nyos. But there are plans for commercial exploitation of its methane, and these must be carefully designed to avoid setting off a catastrophic gas burst."

I shudder to think of what might happen if Kivu ever spews its vast reservoir of cooking gas onto the countless hearths surrounding its shores!

Dancing for the dead, members of a spiritual society step to the sound of drums during a massive "cry-die" memorial service for disaster victims. Flanked by dancers wearing buffalo masks, which symbolize strength, the leader accepts a donation from one of 3,000 onlookers as others record the ceremony on tape.

I found a great deal of gas still trapped in the waters of Lake Nyos after the disaster. Warning of potential danger, my deepwater samples fizzed like club soda when I hauled them to the surface (pages 410-11). Lake Monoun maintains a similar gas reservoir in a deep pocket on its eastern end. Our 1985 survey had failed to turn up other gassy lakes, but several of the most remote ones remain to be tested. All of Cameroon's crater lakes will have to be monitored closely to avoid future tragedies.

The Yaoundé conference pointed out that the possibility of a new disaster exists at Nyos. The natural dam on the lake's north shore is weak and may soon collapse. If it does, the collapse would release a catastrophic flood into the valley. The resultant drop in lake level could also trigger another gas burst. Some experts feel that the dam should be reduced in height before evacuated residents return. The remaining carbon dioxide could be removed by piping deep water to the surface and letting the gas escape slowly and harmlessly.

THE LAKE NYOS EXPLOSION sent pyschological shock waves rippling through the two dominant ethnic groups in the Cameroon highlands. The Fulani are Muslim cattle herders who began to move into the region from the north early in this century. The more numerous Bantu have made the highlands a prosperous and densely populated center of agriculture, trade, and ironworking for thousands of years. The myths of exploding lakes come from the Bantu and reflect a deep spiritual link with these waters. For the Bantu the Lake Nyos disaster had more than physical repercussions.

"All the lakes here are worshiped," explained the Fon of Bafut, regal protector of social order and traditions for the region just west of Bamenda. This extraordinary man seems equally at home discussing lake chemistry or spirit worship. He told me that fons and other distinguished people are believed to live inside these lakes after death. He himself expects to do the same.

Numerous explanations for the disaster circulated around the highlands. One involved "Mammy Water," a spirit woman who inhabits lakes and rivers. Some fishermen refuse to swim in an open lake because they fear the resident Mammy Water will lure them to watery deaths. Some Cameroonians suspect that there was an angry Mammy behind the Nyos explosion.

I learned about traditions surrounding Lake Wum from Tem Linus Kum, a young man I met during Mass at the Catholic mission in Wum. "If fish begin running out of the lake," said Kum, "that means the ancestors are giving you those fish."

To me, it also means that Lake Wum turns over from time to time, to the dismay of the fish. According to Kum, the spirits have so much control over the lake that a villager who falls into it cannot drown without their approval. Even a stone tossed into the water will be tossed out again. "Sometimes, if you go at midday," Kum continued, "the lake is gone and only houses remain, the homes of the dead. But if you shout, the lake suddenly reappears."

I thought back on my visit to neighboring Lake Elum earlier that morning. I had marveled at how mirrorlike the surface appeared as I gazed down from the grassy rim. It was as though the crater were a hole in a field of grass-carpeted stone, and I could look down through the hole into an eternity of clouds and blue space. At moments like that, I think, even an American "blinded with science" can see a lake disappear.

Indeed, shades of science and mysticism ripple and shift like reflections on the surfaces of these lakes. What you see in them is a reflection of who you are. Nowhere is this more apparent than at Lake Barombi Mbo, a 110-meter-deep bowl of sky-clear water in a forested crater near Cameroon Mountain, 55 kilometers southwest of Nyos.

With hopes of mercy, *members of a secret society sacrifice a chicken on Lake Barombi Mbo, a 110-meter-deep crater lake in western Cameroon. At a spot believed to be invested with special powers, they will pour the animal's blood, mixed with herbal medicines, into the water. With this offering the people seek to keep peace with ancestral spirits living in the lake.*

Barombi Mbo is the home of a dozen species of cichlids—a family of tropical, spiny-finned fish—found nowhere else on earth. It is renowned among biologists as a showcase of evolution. Also, fossil pollen grains trapped in the lake's colorfully laminated sediments hold the key to important questions about the age and stability of West Africa's endangered rain forests.

To the hundred or so Barombi people who occupy a cluster of thatched homes at its northern end, the lake is a highway, a laundry, and a supermarket. For a fisherman here, a rare cichlid's value depends on how plump it is and how easy it is to catch.

But the lake is also a spiritual home to the Barombi. A ritual society, called Ndengo, offers sacrifices to the resident ancestor spirits at sacred spots while chanting songs in a secret language. I learned about this firsthand. Before gaining permission to study the lake in 1985, our research team had to provide Ndengo with a sacrificial fowl for the spirits whose homes we would disturb with our outlandish scientific gadgets.

THREE MONTHS after the Lake Nyos disaster the highlanders gather for a "cry-die," or memorial celebration, sponsored by the Catholic mission at Wum on behalf of the victims. It is to be an inter-religious affair. Tall Fulani men in flowing white robes ride prancing horses among Bantu elders in richly embroidered gowns. Young men tote drums on their shoulders, and women march with sleeping babies strapped to their backs with brightly colored cloths.

In this area of northwest Cameroon a bereaved family mourns a member's death by hosting a festival in honor of the dead person. Because so many people died in the Lake Nyos disaster, tribal leaders and the Catholic mission have instigated a single, communal cry-die in hopes that survivors will not overspend on dozens of personal ceremonies.

A crowd of 3,000 gathers on the gently sloping mission lawns, facing a tin-roofed shelter draped with wreaths and pennants in Cameroon's national colors of red, green, and yellow. In four separate booths are seated Fulani leaders, government officials, Catholic clergy, and three Bantu fons with their entourages. Gendarmes in red berets push the crowd back to make room for guests, primarily Peace Corps volunteers, missionaries, and relief workers. Everyone, it seems, is here today.

A Muslim prayer opens the event, followed by a Catholic Mass. During the Mass, a white priest addresses the crowd in pidgin English. "Dear God, our Papa, we pray for the Muslim and Christian people of Nyos, where them done die in that disaster. For the people of Fang, Isu, and Bafmeng who done go for enjoy dat market, sleep for Nyos, die for there. Excuse the bad they done do, and tell them we go never forget them."

FEASTING and traditional dancing fill the rest of the afternoon. Masked juju dancers leap and stamp their rattle-draped feet to the rhythm of drums and gongs. One of them, ironically, wears an army-issue gas mask. In the midst of the noise and excitement I am drawn to a billboard hung with wreaths. On it are tacked 27 sheets of paper on which 1,092 names, ages, and home villages have been typed. Not all the victims were identified before burial. My eyes run down each page, stopping at random.

"Zuh Sih Seh, age 70, from Cha, died at Cha. . . . Ali Muhammed, age unknown, from Nyos, died at Nyos. . . . Ngonga Ma-ah, age 1 year, from Isu, died at Nyos." How could Ngonga Ma-ah's mother have known that she would never carry her child back up to Isu from that last trip to the market at Lower Nyos?

I think too of Mr. Lucas, the man who had helped me on my first visit in 1985. Peace Corps volunteer Steve Tebor confirmed my fears for him and his family. "I walked down to their compound two days after the disaster," Steve told me. "I found Mr. Lucas lying dead on his bed. I helped bury him and his family in two mass graves."

The words of the priest come back to me: "We be ask God plenty question. Why this bad thing be? Why for market day? Why for night? Why for rainy season, with bad roads? The answer . . . that so God he want." The rippling colors before my eyes blur and flow together. Fighting back unexpected tears, I find that answer to be as good as any. □

Nuclear energy helped America achieve its energy balance. Is it a balance we can keep?

The 1973 Arab oil embargo forced America to turn to alternatives to foreign oil. Reliable alternatives. America increased its use of electricity from nuclear energy and coal and began to make important strides toward energy independence.

We have since let our guard down. Oil imports are rising steadily and now rival 1973's. The implications of this foreign dependence are clear. So are the solutions.

A dangerous rise in oil imports

America imported four million barrels of oil a day in 1985. In 1986, that figure jumped to over five million barrels a day. By 1990, we will most likely rely on imports for nearly half our needs. Some say as much as 75%. Compare that to 35% in 1973.

What happens when we become too dependent on foreign sources? We lose our balance. It's the first misstep toward losing our energy security. In 1973, that meant short supplies, long gas lines, expensive fuels and critical damage to our economy.

A reliable supply of nuclear electricity

America has over one-fourth of the world's uranium. We have over 100 plants to convert it to electricity. According to Science Concepts, Inc., U.S. nuclear plants saved over two billion barrels of oil between 1973 and 1986. That's roughly one-fourth of the total amount of oil imported from Arab OPEC countries during the same period.

And, while our use of oil and natural gas is down from 1973 levels, we now use about 45% more coal and almost 400% more nuclear energy than we did then.

Nuclear energy for a secure future

Obviously, nuclear energy can't completely replace oil here. And our own limited oil resources will force us to continue to rely on foreign suppliers. The good news is nuclear energy and coal, America's two leading sources of electricity, have helped us establish a more secure energy mix. They can help us build a more secure energy future.

For a free booklet on energy independence, write to the U.S. Committee for Energy Awareness, P.O. Box 1537 (US14), Ridgely, MD 21681. Please allow 4-6 weeks for delivery.

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The first 100 years: an outsider's view

A CENTURY of memories is about to descend on us. Within the next few weeks, an independently written history, *The National Geographic Society: 100 Years of Adventure and Discovery*, will become available.

We opened our archives and offices to author C.D.B. Bryan, who spent more than a year and a half sifting through our files and interviewing the staff. The result, published by Harry N. Abrams, Inc., is his candid portrait of the people who made the Society what it is today.

"When I began this project, I had the typical, naive outsider's view of the Geographic," says Bryan, the distinguished author of *Friendly Fire* and other award-winning books. "I imagined it as a small, somewhat quixotic organization whose staff appeared for work in khakis and pith helmets. I was surprised to find a vast, complex, white-collar organization, one of the world's most successful publishing and educational institutions. I hadn't realized its breadth."

Needless to say, his digging into our past turned up plenty of pith-helmeted adventurers, men such as Joseph F. Rock, the botanist-explorer who wrote ten articles on China for us from 1922 to 1935.

"Here was this fellow, fluent in close to a dozen languages, who would disappear for years at a time into remote Tibetan borderlands. There he collected thousands of plant and animal specimens, bathed in an Abercrombie & Fitch folding bathtub, played Enrico Caruso records to mountain tribes, dined on Viennese cooking, and—when he wasn't fending off Chinese bandits—sent back reports and photographs to NATIONAL GEOGRAPHIC."

C. D. B. BRYAN AT HIS HOME IN GUILFORD, CONNECTICUT; PHOTOGRAPH BY BOB SACHA

Bryan also discovered a few things in our past that even I didn't know, not all of them attractive. I found his to be the most objective, frank, complete, and honest outside history of the Society ever done, as one would expect from a C.D.B. Bryan.

As we look back on our first 100 years, we are already building for the next 100. Not only will we continue to cover the world through our magazines, books, and television programs, but we will also explore new ways to disseminate information through computers, compact discs, and videodiscs. We will reach even deeper into classrooms across the United States through our educational programs. We will stimulate new research and exploration worldwide through our scientific grants.

During the past century our accounts of historic exploits by men and women such as Robert E. Peary, Jacques-Yves Cousteau, Jane Goodall, and Robert D. Ballard have sparked the imagination. We intend to keep that flame alive for generations to come.

Gilbert M. Grosvenor

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Members Forum

Arctic Wolf

I have utilized Dr. David Mech's reports in my research; his knowledge, experience, and interest serve as an excellent base for his writings. Congratulations to Mech and Jim Brandenburg for a most successful encounter of the wolfish kind (May 1987). To be accepted by a species such as the wolf must be considered the opportunity of a lifetime.

MARLENE E. HARRIS
Zoological Society of Montreal

How can NATIONAL GEOGRAPHIC print such a stunning piece on wolves when the author has supported the killing of wolves in the United States? Dr. Mech has in the past taken a pro-wolf-control position, which means that the wolves he writes so eloquently about will die an agonizing death from the air or by trapping.

NORMAN KANER
Philadelphia, Pennsylvania

Dr. Mech has supported limited wolf-control and sport-trapping proposals, hoping they would reduce livestock depredation and illegal killing.

When I worked on the Alaska pipeline on the North Slope, I saw moose, grizzly, and caribou every day. The wolf was the most amazing of all. One day as I was driving down the haul road, a pair was standing in the road. I tossed my lunch out, and the male ran up and stood over the sandwiches. When the shy female finally came up, the he-wolf stepped aside and allowed her to have the lunch. With all the animal's long-standing reputation for evil, I feel the human species could learn a great deal from the wolf.

LLOYD ROY INGRAM
Rodessa, Louisiana

You earn praise for keeping the wolves' location undisclosed, protected from human invasion.

R. MACKEY
Sandown, New Hampshire

Ukraine

Mike Edwards's critical eye and balanced reporting have added to the GEOGRAPHIC's fine tradition of letting people and places speak for themselves. What Ukraine has to say about its turbulent past, lethargic present, and precarious future is compelling and deserves a hearing.

GEORGE W. KRYWOLAP
Catonsville, Maryland

The article gives a needed break to us Ukrainian Americans who have started to develop a siege mentality. Throughout the news media, as a backlash of the renewed manhunt for war criminals, the word Ukrainian has become synonymous with beasts unloading their sadistic instincts in Hitler's service. Those of us who lived through the events of 1941–45 know that there were many more Ukrainian inmates than Ukrainian guards in Hitler's camps. Less than half a dozen of those guards have been convicted of crimes against humanity. All others performed the same duty as countless Jewish guards, also forced into service. Mr. Edwards's article gives us hope that one day an impartial historian might decide to dig into the history of the complex Jewish-Ukrainian symbiosis.

ROMAN TRESNIOWSKY
Ann Arbor, Michigan

For its Jewish residents, Ukraine was not the picture postcard represented. The Cossack massacres, the pogroms, and the Babi Yar slaughter are all part of Ukrainian history left unmentioned. Many American Jews including myself are descendants of Jews who fled widespread Ukrainian anti-Semitism.

HARRY DRASIN
Ventura, California

Observing cultural genocide of one's own people has to be the most painful of experiences. The Ukrainians in Ukraine should be placed on the endangered-species list with whales and giant pandas. It is up to Ukrainians in the free world to preserve their traditions and history. The program in Ukrainian studies at Harvard University is a good way. Your thoughtful article and photographs are another.

JULIE KOCHANOWSKY
Boca Raton, Florida

Ukrainians are now preparing to celebrate their millennium of Christianity. As the maps on pages 604-605 show, it was Ukraine that was Christianized in 988, not Russia. No wonder Mr. Gorbachev is debating how to mark the millennium of Christianity in Russia. Moreover, how do you celebrate something that is forbidden?

STANLEY SZCZEPANIUK
YAROSLAW MARKIZA
Ukrainian National Federation of Canada, Montreal

The caption on page 603 misleadingly describes Lvov as the "most Ukrainian of cities." It was indeed a focus of Ukrainian national aspirations before World War II, but the city was a bastion of Polish culture for six centuries and had a Polish majority (65 percent) until 1945.

PETER GALEZOWSKI
Luxembourg, Luxembourg

The Western press has often failed to cast a critical eye on the nations composing the U.S.S.R. Those reporting on Soviet matters show scant knowledge of the peoples conquered by the Communist regime. Your articles on Ukraine as far back as the 1930s have been a wellspring of information for those interested in the doings behind the iron curtain.

MOST REV. STEPHEN SULYK
Ukrainian Catholic Archbishop of Philadelphia

Chernobyl

Having taught Soviet politics for 20 years, I was impressed by Mike Edwards's excellent essay on Ukraine (May 1987). His handling of the religious and ethnic politics of the region was both informed and scrupulously fair. I was startled to find the same writer go on to the Chernobyl story and present that with equal lucidity. What did he major in during his college days?

WILLIAM J. PARENTE
University of Scranton
Scranton, Pennsylvania

Journalism at the University of Georgia.

Let me correct your insinuation that we in the U. S. have a choice in having a nuclear power plant. Neither the people of the U. S. nor the Tennessee Valley had a vote in the building of the TVA's nuclear plants, yet they must pay off the 30-billion-dollar debt for their construction. The plants have been shut down for two years due to concerns expressed by myself and four other nuclear managers who testified in June 1986 before a congressional hearing about unsafe features.

JERRY D. SMITH
Knoxville, Tennessee

The worst-case scenario has happened, and we must put together the minds of all nations never to let it happen again. To continue to rely on nuclear energy is simply to invite a repeat performance of this nightmare.

ARTHUR P. PRICE
Minneapolis, Minnesota

We wish to commend NATIONAL GEOGRAPHIC for one of the most balanced analyses of Chernobyl in layman's language. When read in conjunction with your April analysis of air pollution, an implicit set of questions is posed: Should we continue to use coal and/or nuclear energy to provide our electricity? And if so, how?

In both articles there was a remarkable absence of discussion of the positive side. We have made major improvements to lessen the burden of coal on the atmosphere and continue to improve. In the West we use an inherently safe nuclear plant design with safety enhanced by containment; as a result, Three Mile Island had only a trivial radiological impact (18 curies), and we have instituted yet more stringent design and management since then. Coal and nuclear energy can be used safely. (Since your May issue went to press, the Soviets have canceled Chernobyl units 5 and 6 because of the basic safety problems of the design.)

HANS A. BETHE
FREDERICK SEITZ
Scientists and Engineers for Secure Energy, New York

New Zealand

Thank you for a commendable treatise on New Zealand (May 1987) and for recognizing my countrymen's most distinctive characteristic, their "basic sense of social justice." My only criticism is of the representation of a Pacific island youth (page 664). The majority of such islanders in New Zealand contribute as much to enrich its culture as do the Maori and *pakeha*.

WILLIAM G. HAWKESWOOD
Columbia University
New York, New York

President's Page

You have truly enthusiastic readers. Our Rotary club has been swamped with letters about our project to send old NATIONAL GEOGRAPHICS to Korea (May 1987). But no address was given, and many letters have gone astray. Address queries to: Rotary Club of North Hawaii, P.O. Box 1997, Kamuela, Hawaii 96743.

ROBERT L. HENRICKSON
Kamuela, Hawaii

Members Forum

After reading a letter about the U. S. liberation of Czechoslovakia (May 1987), I understand why I did not receive the January issue. I come from Rokycany and was nine years old on May 5, 1945, when my parents offered a room to a sergeant from Texas. I remember he did not like hot milk for breakfast; he supplied us with peanut butter, vitamins, and chewing gum. My parents were among the initiators of a monument to an American soldier, but nowadays there is a statue of a Soviet soldier where one never set foot. The Czech people have not forgotten American soldiers; I wish I could thank them all.

JARMILA KOHNOVÁ
Žlutice, Czechoslovakia

Letters should be addressed to ***MembersForum****, National Geographic Magazine, Box 37448, Washington, D. C. 20013, and should include sender's address and telephone number. Not all letters can be used. Those that are will often be edited and excerpted.*

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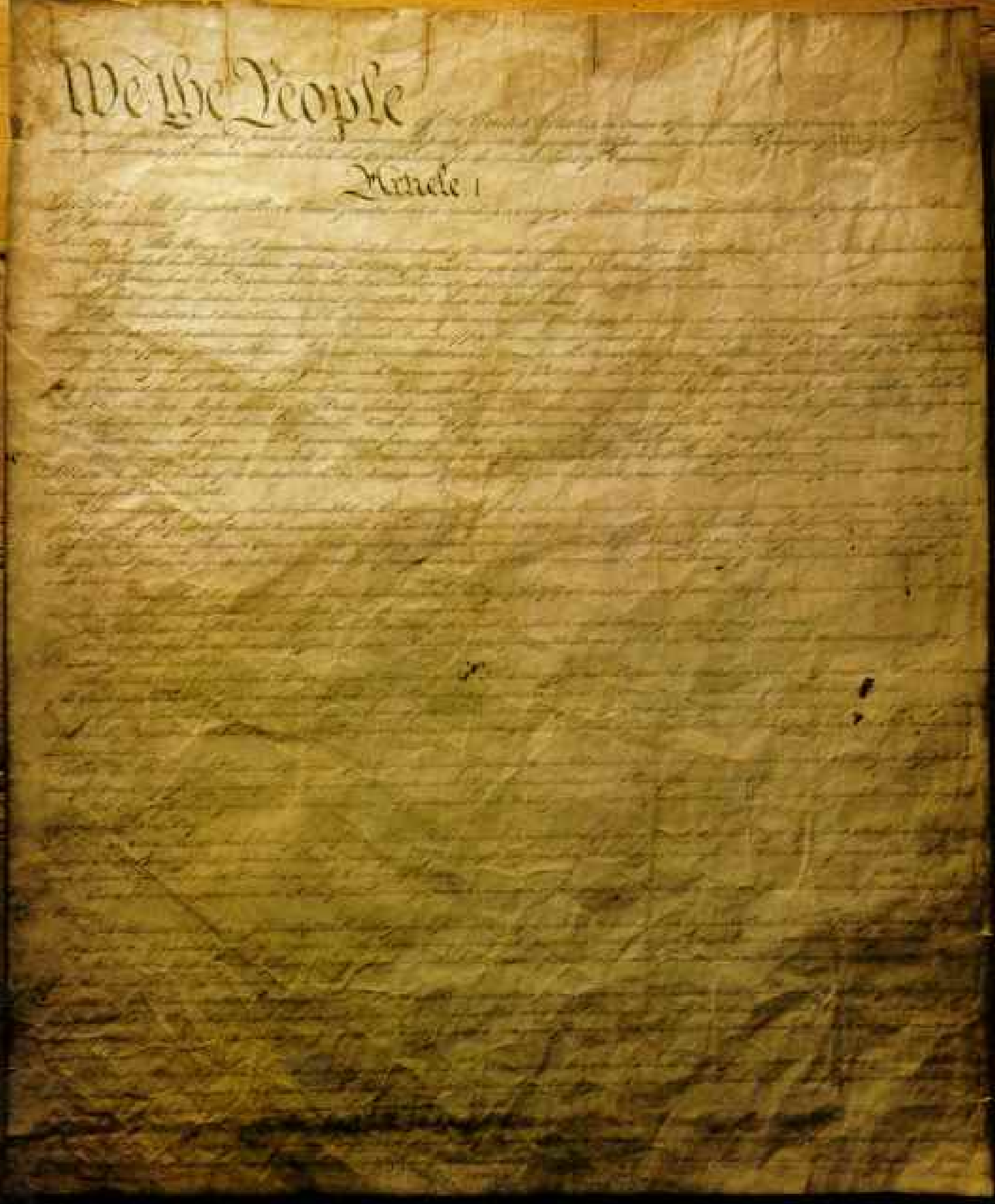

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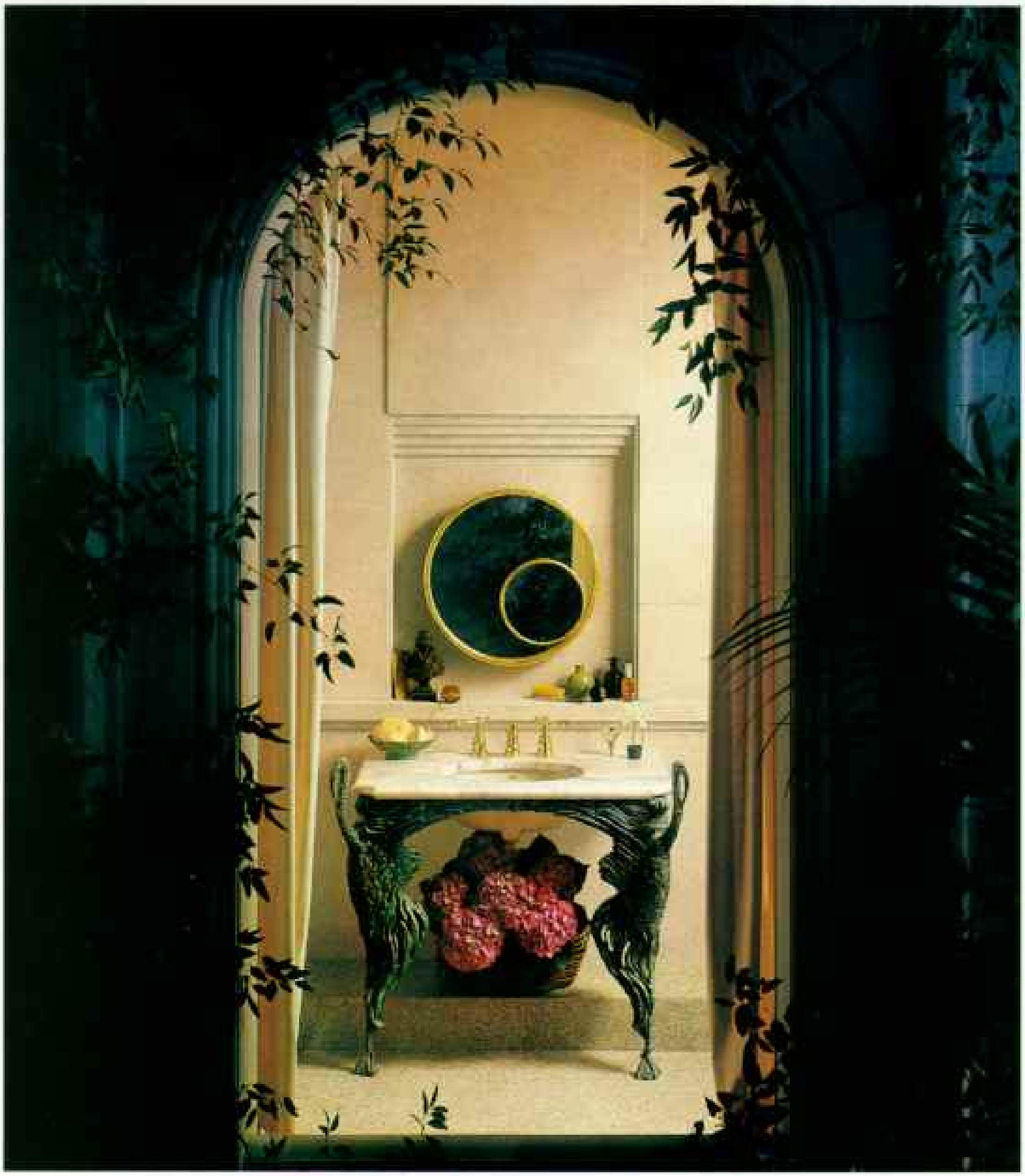

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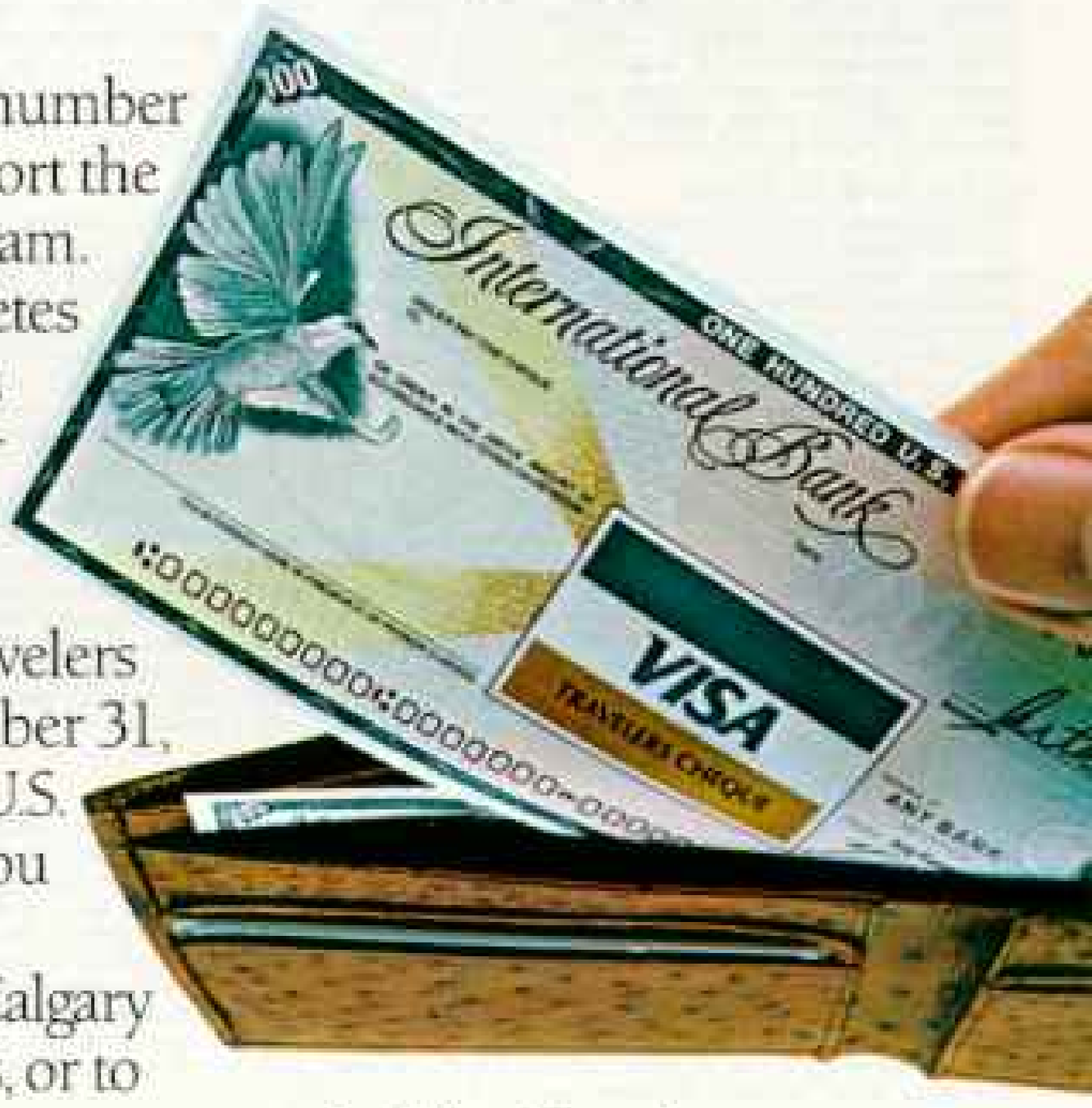

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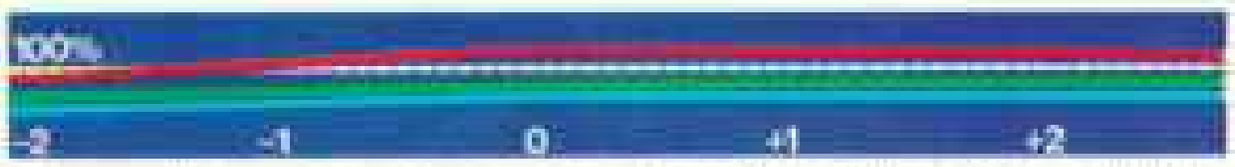

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And Beyond.

The team that taunts cobras

Tune in September 27 and discover a fascinating society of feisty foot-high meerkats in Africa's Kalahari Desert. With unflagging energy they badger and battle, forage and hunt in a remarkable display of teamwork.

And on other Sundays . . .

September 6 — Hold tight as violent seas threaten a lone oil rig and its crew off the coast of Norway.

September 20 — Join the people of Igloolik, Canada, as they celebrate Easter and the arrival of daylight after eight months of darkness.

NATIONAL GEOGRAPHIC **EXPLORER**

EVERY SUNDAY 9:00 PM ET*

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THE WAGON YOU'LL WANT TO DRIVE EVEN WHEN THERE'S NOTHING TO CARRY.

FORD TAURUS.

The first thing that strikes you about the Ford Taurus wagon is just how unlike a wagon it is. Its sleek silhouette recalls all the style of an expensive touring sedan. And its exhilarating road manners will have you glancing in the rear-view mirror just to remind yourself you're actually driving a wagon.

Designed to handle and respond like a sedan.

One important factor to Taurus' remarkable ride and drive begins with its aerodynamic shape. It enables the Taurus wagon to sit down through curves for exceptional road-holding. The Taurus wagon is also equipped with a specially-engineered independent rear suspension for superb control.

Buckle up—Together we can save lives.

It's this kind of innovative design and thinking that has put Ford Taurus on *Car and Driver's* Ten Best list two years straight.

Does what a wagon does best. Only better.
The Taurus wagon boasts an expansive load area (81.0 cubic feet), more than any other domestic wagon in its class. But what's even more impressive than how much it carries, is how well it carries it. The convenient 2-way liftgate and versatile 60/40 split fold-down second seat make carrying even difficult loads anything but difficult.

New 6-Year/60,000-Mile Powertrain Warranty.
Ford now covers all new 1987 cars with a 6-year/60,000-mile warranty on major powertrain components. Restrictions and deductible apply.

Also, participating Ford Dealers stand behind their customer paid work with a free Lifetime Service Guarantee. It's good for as long as you own your Ford car. Ask to see the limited warranty and the service guarantee when you visit your Ford Dealer.

Ford. Best-built American cars... seven years running.
"Quality is Job 1." In fact, for the past seven consecutive years, Ford quality has led all other American car companies. This is based on an average of owner-reported problems in a series of surveys of '81-'87 models designed and built in North America.

Have you driven a Ford...lately?

On Assignment

HOW TO TAKE OUR READERS to the heart of a subject? The operative rule: Be there. Artist ***T. W. Rutledge*** (right) was so intrigued by pictures of jungle-shrouded El Mirador in the December 1975 GEOGRAPHIC that he eventually traveled to the site on his own. "Climbing the pyramids, I got a sense of the city's savage magnificence," he recalls. From hundreds of sketches and photographs, he re-created the monumental city in watercolor for this issue.

Always drawn to water, ***Curt Stager*** (center) spent childhood days fishing and swimming in Maine before becoming a limnologist. "Each lake is a little universe with its own unique character," he says. Earlier study in Cameroon helped him put into context the tragedy of the exploding lakes. Now at the University of Lund, he investigates the impact of civilization on Swedish lakes.

Author-photographer ***Fred Ward*** (lower, at center) literally left no stone unturned in research for his article on jade. He suspected that a famous Maya mask was incorrectly labeled jadeite. Archaeologist Mary Lou Ridinger, right, concurred that the mosaic might instead be diopside. Then GEOGRAPHIC Editor Bill Garrett learned of a portable spectrometer (PIDAS) developed for earth-science probes. He asked: Could it be used to analyze such stones? Geologist Brian Curtiss, left, said yes. He and Fred took PIDAS to Guatemala and verified Ward's intuition.

PHOTOS BY RICK WILLMAN (TOP); ANTHONY SUAU (MIDDLE); TED ROLDAN

Suddenly, there are 250 million more computers in America.

You probably don't think of a piece of cardboard as a high-technology peripheral.

But this simple AT&T cardboard template helps release the considerable computer power latent in a common telephone.

Because behind every telephone is not just communications technology, but computer technology, as well.

In fact, the people at AT&T Bell Laboratories are merging these technologies so that voice and data can share the same networks.

One example of their success is AT&T Unified Messaging (which employs the cardboard template shown). This allows businesses to...well, unify all their data and voice communications.

And not just between AT&T phones and AT&T computers. It welcomes all denominations.

The result is that you don't have to be at the PC in your office to get your electronic mail. With AT&T Unified Messaging, you can also access your mail from any phone anywhere. A synthesized voice reads it to you.

Now that voice and data can share the same networks, information is more accessible, more usable and, therefore, more valuable than ever before.

You see, data networks not only move information instantly, they can also interpret, rearrange it and apply it in the most useful way. All automatically.

And though the benefits of data networking are still fairly new, people everywhere already take them for granted.

Automatic bank tellers, the new flexible investment accounts and just-in-time manufacturing are only a few examples. The potential is tremendous.

And as phones grow more powerful and computers grow more sociable, the benefits to all of us will grow only more abundant.

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