VOL. 163, NO. 1 JANUARY 1983

NATIONAL GEOGRAPHIC

RAIN FORESTS

NATURE'S DWINDLING TREASURES 2
TEEMING LIFE OF A RAIN FOREST 49

WHAT FUTURE FOR THE WAYANA INDIANS? 66

HOMETOWN WASHINGTON, D. C. 84

INDONESIA RESCUES ANCIENT BOROBUDUR 126

SEE "RAIN FOREST" WEDNESDAY, JANUARY 12, ON PBS TV

ALMOST 200 YEARS AGO Congress invented Washington, D. C., to serve as the nation's capital, even though there were perfectly good cities willing to take on the job. The location resulted from a compromise, a famous deal swung by Thomas Jefferson and Alexander Hamilton: southern votes on a money bill in exchange for a southern capital city.

But living conditions in the then swampy site made it a hardship post and the butt of criticism by resident and visitor alike. In 1842 Charles Dickens described it as "the City of Magnificent Intentions . . . Spacious avenues, that begin in nothing, and lead nowhere." The Irish poet Thomas Moore derided those who saw "obelisks in trees."

Today Washington is indeed a magnificent city, a true world capital. Yet with more written and televised from it and about it than any other place in the country, the real city lies hidden under the media fog. Politicians seeking office decry it as the nation's crime capital, but of our 30 largest cities Washington ranks ninth in overall crime, well below Atlanta, Boston, and St. Louis.

Millions of tourists pack Washington's wide, tree-ranked boulevards and malls, its galleries and museums each year, yet few see the living city. In this issue Washington newspaperman and writer Henry Mitchell, a Southerner by birth, and English photographer Adam Woolfitt bring us a new image of the city behind the rotundas and the rhetoric.

For visitors to the ceremonial city, we include a two-sided, six-page foldout map (pages 93-98) with a new binding concept, which permits its easy removal intact from the magazine.

With this first issue of our 1983 membership year we welcome something else new and very important: more than a million new members to the Society. Whether you're a new or long-standing member, we urge you to bring your map and come visit us. The permanent and special exhibits in our Explorers Hall make it one of Washington's most popular attractions.

Wherever your map or your wanderings lead you, you'll find that Washington's spacious avenues, which Dickens scorned, now do lead somewhere.

Wilbur E. Garrett

EDITOR

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THE NATIONAL GEOGRAPHIC MAGAZINE VOL. 163, NO. 1

January 1983

TROPICAL RAIN FORESTS:

Nature's Dwindling Treasures 2

Peter T. White follows the Equator to assess mounting losses within the world's most complex ecosystems. Political and economic pressures cast doubt on the forests' fate, even as scientists begin to comprehend their global significance. Photographs by James P. Blair.

Teeming Life of a Rain Forest 49

Lizards that sprint across water, toads gleaming like jewels, ant-repelling wasps, and other survival specialists are found at home in a Costa Rican rain forest by Carol and David Hughes.

What Future for the Wayanas? 66

Movable markers in a border dispute, tempted by spirits of the modern world, the Wayana Indians of South America search for a future with tradition and dignity. Article and photographs by Carole Devillers.

Hometown Washington, D. C. 84

Skirting pomp and politics, Henry Mitchell leads an easy-gaited ramble through the city he calls home, introducing a mélange of humanity with viewpoints both on and off the standard curve. With photographs by Adam Woolfitt.

Indonesia Rescues Ancient Borobudur 126

On the island of Java, a team of architects and engineers has successfully restored a 1,200-year-old celebration in stone—the world's largest Buddhist temple. Text by W. Brown Morton III, with photographs by Dean Conger.

COVER: *No bigger than a fingertip, a poison-arrow frog perches in a mushroom within Costa Rica's Corcovado National Park. Photograph by Carol and David Hughes.*

Ripping through *a virgin stand of tropical rain forest in Papua New Guinea, a lumberman's chain saw destroys another part of earth's most complex natural habitat.*

Nature's Dwindling Treasures

By PETER T. WHITE

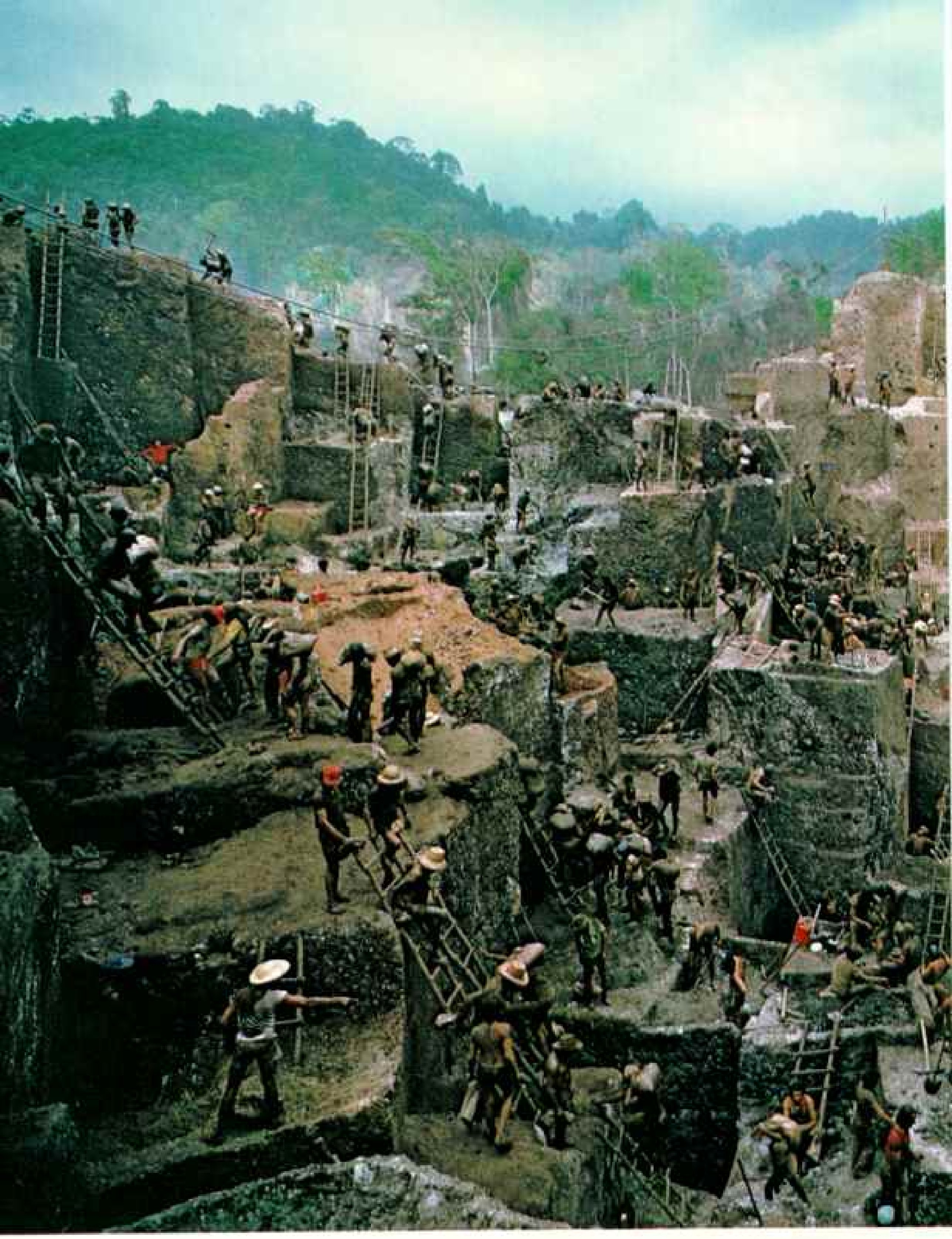
RAIN FORESTS

Photographs by JAMES P. BLAIR BOTH NATIONAL GEOGRAPHIC STAFF

Advancing on the wilderness, *convoluted rows of oil palms march across a plantation in Malaysia's Jengka Triangle. Colossal farming projects sponsored by the federal government have claimed hundreds of thousands of acres of the nation's rain forests since a drive to settle the jungle and reduce*

National Geographic, January 1983

unemployment began in the 1950s. Agricultural villages in these projects now harvest more than a fourth of the nation's palm oil, which is sold mostly for cooking but may someday make detergents, plastics, paint, even motor fuel. Current land-use plans envision a third of the country's original rain forests eventually becoming farmland.



A booming, makeshift gold mine *spills down the mountainside at Serra Pelada, in the Amazon forest of Brazil. Nuggets as hefty as 15 pounds have been unearthed here by the luckiest of some 20,000 prospectors and laborers, who*

National Geographic, January 1983

work by hand their tiny claims of only four square meters. All gold is sold to the government, which is counting on the region's mineral wealth—iron ore, bauxite, and manganese, as well as gold—to offset a ponderous foreign debt.

ALWYN GENTRY from the Missouri Botanical Garden in St. Louis moves swiftly among the tall trees of the tropical rain forest in the Chocó region of Colombia, constantly excited, speaking rapidly in English, Kansas-accented Spanish, and Latin. *Iryanthera porcata! Psychotria cooperi!*

Those are the names of plants whose branches he snips off with his garden shears and with a cutter at the end of an aluminum pole extendable up to 45 feet. Sometimes he'll climb higher than that, snipping as he goes. What he does has worldwide implications, as I can attest after many months of far-flung investigation. Gentry is cutting, one might say, into one of the most controversial issues of our day.

His concern is nothing less than the survival of the world's tropical rain forests. If they don't survive, he tells me, there may one day be dire consequences for much of humanity. But for the moment he focuses on botanical marvels.

"Just look at what's on that tree!" He counts off 50 species that grow on it. Ferns, vines, bromeliads, orchids. There are a lot more, but the exciting thing about this tree as tall as a ten-story building, first spotted by Gentry the previous year, is that it is a species never described before. Ghillean Prance of the New York Botanical Garden, the specialist for the plant family Caryocaraceae to which it belongs, has named it *Anthodiscus chocoensis*.

We swelter in the humidity of the rain forest just south of Quibdó, the capital of Chocó province, about 40 miles east across a range of hills from the Pacific coast. This is one of the wettest spots on earth. Recorded annual precipitation averages 10,000 millimeters. That's 400 inches, or 33 feet. Usually it rains every day, or every other day, heavily. I squeeze some moss on a tree trunk. It squirts like a wet sponge.

HIGH and relatively steady levels of heat and moisture are characteristic of tropical rain forests, as is the enormous variety of organisms. What fascinates me is that Gentry, along with other botanists, has of late collected data to show that this wettest region of South America may well be the most species-rich rain forest of them all. On sample plots adding up to a quarter of an acre he has counted 208 different tree species. In a forest of the temperate zone, say in the Missouri Ozarks, you might find 25. In New Hampshire, fewer still. To put it another way, the British Isles are said to have about 1,450 species of vascular plants—trees, shrubs, and herbs; Gentry has reported 1,100 on less than a square mile farther south in the Chocó region.

To be sure, this species business is a tricky thing, and experts often disagree. Estimates of how many species of living things exist on earth vary widely, from four to ten million or even more, by far the most numerous being insects. Biologists believe that at least two-thirds of all species exist only in the tropics, and half of those only in tropical rain forests. Of the latter, the great majority have not yet been described by scientists.

And so Gentry's find is not an isolated case. There's even a chance that today's snippings, stashed in a big black plastic bag and to be pressed tonight between newspapers and doused in formaldehyde, will turn out to contain a new species or two.

I stand under Gentry's tree and look up. How beautiful, those waterdrops at the end of pointed leaves. The sun makes them glow like pearls. It hasn't rained in the past 24 hours, but drops keep dripping from one of the bromeliads up there. It's an arm-size clump containing its own little pool of water and a bit of soil with tiny, mainly microscopic plants and animals—a little world of its own. Splash, a pearl just hit my eyeglasses.

A dark man with a grizzled beard comes walking along. What does he think of this tree? "It's a *chagualo*," he says in Spanish. He appreciates it too: Its wood is strong and floats well; he could make it into a good dugout canoe and get a good price for it.

For once, Gentry has been silent. Earlier he had told me that a lot of equally impressive trees he saw the previous year are no longer around. A road is being built nearby, and that's what happens when access becomes easier, people come and get the big trees. He was so angry he cursed. "Dammit, my forest's gone!"

But wasn't there a lot of forest around us still? That set him off again. Couldn't I get it into my head that when the big trees go an awful lot of other species go too, which

means this patch of forest can never be the same? "It's an irretrievable loss!"

By then I did know what he meant. So great is the diversity of organisms in the tropical rain forest that this patch is—or was—not quite like any other elsewhere in Chocó, or anywhere in the world.

This diversity sets the stage for remarkable biological interactions, for endless varieties of the symbiosis of the pollinators and the pollinated, of the drama of attack and defense. Plants develop poisonous alkaloids that protect them against insects; insects develop digestive chemistry to overcome these poisons. Some of those alkaloids, by the way, give to rain forest aborigines some of the fiercest of poisons for their arrows and blowgun darts, and to cancer researchers hope for curative medicines.

Nowhere else, except possibly in the oceans, in tropical coral reefs, is this dialectic of nature as varied and complex. And so relatively little known.

And just as we begin to learn a bit of all this, frets Gentry, they're destroying it! The coastal portions of Brazil and Ecuador are gone, the Philippines are going fast, and Malaysia and the Ivory Coast. . . .

GENTRY'S EMOTIONS are shared by a lot of other scientists concerned with tropical forests. Some say that this humid, evergreen realm, still roughly the area of continental Europe, is reduced each year by a piece half the size of Great Britain. If this is so, and if it continues, will there really be worldwide ecological disasters? Startling predictions abound.

That virtually all tropical rain forests may vanish by the end of this century, or soon after, and with them irreplaceable sources of medicines and germ plasm important to agriculture; also much of the world's most remarkable wildlife, all the way up to the orangutan.

Moreover, that large-scale burning of tropical forests for the sake of agriculture and urbanization *(Continued on page 20)*

Surrounded by mysteries *in one of earth's least studied rain forests—the Chocó region of Colombia—Dr. Alwyn Gentry holds an unknown species of flowering plant he has just found. Because of forest disruption, here and around the world, millions of plant and animal species could become extinct before being described.*

Tropical rain forests: earth's green belt

LEFT IN PEACE, rain forests would ring the Equator with vegetation wherever days are hot and precipitation is high (map, dark green). But farming, ranching, logging, mining, and roads have greatly reduced their actual range.

In central Africa and Amazonia huge tracts remain largely untouched, but rain forests have been virtually eliminated from most parts of West Africa, southern Asia, and the Caribbean.

In 1980 the U. S. National Academy of Sciences estimated annual loss at 20 million hectares (50 million acres). The World Wildlife Fund speaks of 25 to 50 acres a minute. A 1982 study by two United Nations agencies reported 7.5 million hectares lost each year.

Estimates vary so widely largely because of different criteria. To biologists, loss means either conversion of primary forest — say, to agriculture, pasture, or tree plantations — or modification, implying biological impoverishment through selective logging or shifting cultivation. To foresters, loss means deforestation — the removal of all trees.

A world survey of rain forest status appears below.

South America

BRAZIL Earth's largest rain forest little disturbed except for fringes of southern Amazonia and areas in the east. Small chance of major losses in the west for the near future.

PERU Vast area covered by undisturbed Amazon forest. Farm settlement expected to become more extensive in next decade or two.

COLOMBIA About one-third forested, mostly in Amazon region, some along Pacific coast. Efforts to colonize have been slowed.

VENEZUELA Large tract in south barely touched. Smaller areas in north heavily cut, converted to ranches and farms.

GUYANA Most of population lives along coast. Little threat to forest.

SURINAME Virgin rain forest covers most of country, much protected by parks and reserves.

ECUADOR Large forests along Pacific already gone; oil exploration and agriculture encroach on Ecuadorian Amazonia.

FRENCH GUIANA Population lives along coast. Little pressure on undisturbed forest of interior.

BOLIVIA Not much exploitation of forests yet. But government has begun roads, farming, and ranching.

Caribbean

Most island forests long ago reduced to remnants after heavy exploitation by dense populations. Small tracts survive, for example, in the **DOMINICAN REPUBLIC**, **TRINIDAD AND TOBAGO**, and **PUERTO RICO**, where a U. S. national forest protects 104 square kilometers.

MEXICO Shifting cultivators, timber harvesters, and cattle ranchers encroach on the country's last rain forest area on the southern border with Guatemala.

Central America

A strong trend toward cattle ranching on this highly populated isthmus has greatly reduced primary forests, now believed to be two-thirds removed. Small areas found in the Petén region of northeastern **GUATEMALA**, the Mosquitia Forest of eastern **HONDURAS**, parts of eastern **NICARAGUA**, southern **BELIZE**, the national parks of **COSTA RICA**, and much of **PANAMA**.

Africa

ZAIRE Holds Africa's largest rain forest (nearly one-tenth world total), parts of it now secondary growth. Some clearing by slash-and-burn farmers in south, but vast areas still undamaged by mainly rural population.

GABON Almost entirely forested, with exploitation just beginning.

VEGETATION FROM DR. A. W. KUCHLER, UNIVERSITY OF KANSAS; NOTES BASED ON DATA FROM DR. N. MYERS AND U.N. FOOD AND AGRICULTURE ORGANIZATION.

MILLER OBLIQUE CYLINDRICAL PROJECTION
DRAWN BY ISKANDAR BADAT
COMPILED BY ABRAHAM J. TAUSCOTT
NATIONAL GEOGRAPHIC CARTOGRAPHIC DIVISION

CAMEROON Extensive disruption of large forest areas—especially in the southwest—by timber companies and slash-and-burn farmers.

CONGO Forests in remote northern and central regions still undisturbed. Some logging in south.

IVORY COAST More than 70 percent of primary forest at turn of century now cleared. Rest may be gone within a decade. Timber harvesting intense. Forest farming increasing rapidly.

LIBERIA Very little primary rain forest left due to shifting cultivation.

CENTRAL AFRICAN REPUBLIC Rain forests in south. Little pressure from small population.

NIGERIA Most forest disrupted by dense population and a century of logging. Small areas remaining in south expected to be exploited soon.

SIERRA LEONE Very few forested areas undisturbed by cultivators.

EQUATORIAL GUINEA Almost totally forested. Little loss expected.

GHANA Little or no virgin forest remains. About half removed during last 25 years by forest farmers. Remnants found in the southwest.

GUINEA Small area still covered with rain forest in the southwest.

BENIN About three-fourths of original forests left, but heavily disrupted due to strong pressure of growing population.

ANGOLA (Cabinda) Small rain forest concentrated in north.

MADAGASCAR Much slash-and-burn farming. Only fragment of eastern rain forest still survives.

South Asia

INDIA Patches of forest along the western Ghats and on Andaman Islands, disrupted by landless poor, forest farmers, and logging.

BANGLADESH Narrow belt of rain forest in Chittagong region heavily exploited by hill tribes.

SRI LANKA Small tract on southwestern and central parts, largely disrupted by logging and slash-and-burn farmers.

Southeast Asia

CHINA Rain forests along southern coast largely disturbed, though a few areas are protected.

INDONESIA Contains largest rain forest in Asia (nearly one-tenth world total), but much harvested already. Log production multiplied sixfold during 1960s and 1970s. Farmers and transmigrant settlers also eliminating large forest areas.

MALAYSIA About two-thirds of lowland forests on peninsula heavily logged, converted to oil palm, rubber plantations. Large forests on Borneo also being harvested.

PAPUA NEW GUINEA Largely covered by undisturbed rain forest, much inaccessible to logging companies. Full-forest harvesting under way in small areas on north coast. Half of population forest farmers.

PHILIPPINES Large timber companies harvesting remaining rain forests, less than a third of what existed 30 years ago. Clearing by rural poor also severe.

BRUNEI Mostly covered by rain forest, much undisturbed. Revenues from oil taxes take pressure off timber cutting as source of foreign exchange.

Only pockets of forest survive in Indochina, mainly in southernmost **THAILAND**, lower **BURMA**, southern **KAMPUCHEA**, and parts of the Mekong Plain in **VIETNAM**.

Australia

Fragments of primary forest remain along east coast of Queensland. Other lowland forests heavily cut for timber, sugar plantations, mining interests, and dairy farms.

Pacific Islands

Rain forests found on southeastern side of **FIJI**. Major areas allocated to timber companies. About three-fourths of **SOLOMON ISLANDS** also forested, most in terrain too steep to harvest.

Layers of life in the African rain forest

PAINTING BY BARRON STOREY

CREATURES of the rain forest—here assembled and visible by virtue of artistic license—occupy specific niches in a kingdom of layers, each with its own climate. At the top of the giant tree, the wind buffets a small monkey; butterflies glide effortlessly through the still darkness of the forest floor. Only 135 feet apart, they live in strikingly different worlds.

The lofty crowns of the tallest trees take the most light, the most heat, the most rain, and the most punishment from the winds. Woodpeckers hunt insects in this "emergent" layer, while the black-and-white Colobus monkey prepares to launch into space, using his plumed tail as a rudder.

Beneath the giants spreads a second layer of trees, whose wide crowns often interlock to form a forest "canopy." Rain filters through this canopy, and the top sides of the wettest branches below turn into hanging gardens of orchids, bromeliads, ferns, and other plants whose roots will never touch the soil. Tree frogs and chimpanzees live here, making highways and hideouts amid the vegetation.

A third layer, the "understory," grows beneath the canopy; its top stretches as if in search of scarce sunlight. The gorilla sometimes climbs here to find tasty food, while the python waits patiently for food to come to it.

On the forest floor a gloomy green twilight prevails. Here the elephant passes among the so-called plank buttresses of giant tree trunks. Termites feed on the thin layer of leaves decomposing on the ground. The air is still, humidity high, and butterflies move silently by.

ANIMALS AND PLANTS ARE KEYED IN A TINT. PLANTS ARE LISTED IN ITALICS.

EMERGENT LAYER
1 *Liana*
2 Woodpecker
3 Colobus monkey

CANOPY
4 Eagle
5 Sunbirds
6 Yellow-casqued hornbill
7 Mandrill
8 Skipper butterfly
9 Blue fairy flycatcher
10 African giant swallowtail
11 Moustached monkey
12 Red Colobus monkey
13 Charaxes butterflies
14 African gray parrot
15 Scaly-tailed flying squirrel
16 Diana monkey
17 Chimpanzee
18 Owl
19 *Epiphyte*

UNDERSTORY
20 Epauleted fruit bat
21 Touraco
22 Leopard
23 Bee-eater
24 Mantid
25 Frog
26 Striped squirrel
27 Viper
28 Tropical moth
29 *Second-growth tree*
30 Python
31 Tree frog
32 Civet
33 Potto
34 Rhinoceros beetle
35 Hairstreak butterflies
36 *Strangler*

FLOOR
37 Okapi
38 Banded duiker
39 Bongo
40 Gorilla
41 Goliath beetle
42 Mantid
43 Congo peafowl
44 *Stilt-roots*
45 Pangolin
46 Net-winged beetle
47 Termite mound
48 Forest hog
49 Checkered elephant shrew
50 Crocodile
51 Snail
52 Tiger moth
53 Wood-boring beetle
54 Water chevrotain
55 Elephant
56 Human

DIAGRAM BY NATIONAL GEOGRAPHIC ART DIVISION. RESEARCH BY ALICE MAXINE ROWLEY

South America's abundant rain forest

PAINTING BY BARRON STOREY

THE MORNING CHORUS of screaming piha birds starts just before first light, their "wolf whistles" filling the still air like a reveille. Then a burst of brilliant emerald green flashes as a tiny hummingbird appears and vanishes.

The rain forest contains an enormous variety of plants and animals. At least a third of all earth's species are believed to live within this complex habitat, only a fraction of which have yet been given scientific names. On a single acre may be found roughly ten times as many tree species as in most temperate forests. The number of plant species in Amazonia has been put at more than 40,000.

In the midst of such diversity, the creatures of the rain forest have adapted, over the ages, to special circumstances. The Euglossine bee has developed just the right frequency in vibrating its flight muscle to trigger a burst of pollen from a flowering plant of the family Melastomataceae. The spider monkey has acquired a "fifth hand" for swinging from branch to branch through its development of an agile prehensile tail. And the three-toed sloth has adjusted so well to life in the lofty canopy that it can barely walk on the ground. Hanging upside down by their strong claws most of their lives, female sloths even give birth among the leafy branches.

Scientists call the rain forest the world's largest reservoir of genetic traits, now largely unexploited. Farmers may someday need to fall back on wild strains of food crops like coffee to resist epidemics of disease or insect infestations. Industries may come to the rain forest to exploit such biochemical marvels as the copaiba tree, which naturally produces a liquid with qualities like diesel fuel's.

Yet the price of diversity for the rain forests is their relative vulnerability. Since no two are the same—not even parts of the same forest—the destruction of even a small area can result in the extinction of uncounted species.

ANIMALS AND PLANTS ARE KEYED IN A TINT. PLANTS ARE LISTED IN ITALICS

DIAGRAM BY NATIONAL GEOGRAPHIC ART DIVISION; RESEARCH BY ALICE MARINE ROWLEY

1 Mealy parrot
2 Amazon parrot
3 Sicklebill hummingbird
4 *Epiphyte*
5 Morpho butterfly
6 Scarlet macaws
7 Owl-faced monkey
8 Howler monkey
9 Spider monkeys
10 Hummingbird
11 Two-toed sloth
12 Toucan
13 *Drip tips*
14 Geometrid moth
15 Harpy eagle
16 *Epiphyte*
17 *Liana*
18 Tamandua anteater
19 *Aerial roots*
20 Kinkajou
21 White-faced saki
22 Termite carton nest
23 *Strangler*
24 Three-toed sloth
25 Heliconiid butterfly
26 Sword-billed hummingbird
27 Boa constrictor
28 Puma
29 Prehensile-tailed porcupine
30 *Palm*
31 Margay
32 Jacamar
33 Jaguar
34 Anaconda
35 *Second-growth tree*
36 Iguana
37 Giant anteater
38 Tapir
39 "88" butterfly
40 Brocket deer
41 Termite water-diverting ridges
42 *Buttresses*
43 *Stilt-roots*
44 White-lipped peccary
45 Curassow
46 *Skirt roots*
47 Forest iguana
48 Tree frog
49 Bushmaster
50 Giant armadillo
51 Capybara
52 *Giant water lily leaves*
53 Otter
54 *Leaf lichens*
55 *Leaf epiphytes*
56 Poison-arrow frog
57 Nine-banded armadillo
58 Coatimundi
59 Cicada tunnel
60 Agouti
61 Snail
62 Matamata turtle
63 Sun bittern
64 *Flooded forest*

(Continued from page 9) will add to the so-called greenhouse effect—meaning the heating of the lower atmosphere that occurs when carbon dioxide traps heat that would otherwise escape into space. At this time, the combustion of coal, oil, and natural gas produces much of it, but additional burning of millions of trees might make a difference in the future.

Scientists generally agree that the greenhouse effect is causing a global warming that sometime in the next century may bring considerable changes in climate. But will the grain belt of the United States become drier and crop yield drop? Might a breakup of the West Antarctic ice sheet, as a few glaciologists aver, make the oceans rise enough to drown the coastal cities of the world?

In any case, to Gentry—and to a lot of other ecology-minded people, from Peter Nolan, a concerned ninth grader I know, to Prince Philip, the Duke of Edinburgh—deforestation in the tropics spells calamity. Gentry himself calls it either thoughtless, nearsighted, or misguided, a giant step toward a tragic impoverishment of our planet, a derailing of evolution, a crime against nature and all mankind. No wonder he's excited.

Back at my desk I can't help being excited myself, having traveled over a span of two and a half years to far-flung lowlands around the Equator where those incessantly hot and humid jungles are at their lushest and most threatened, in central Africa, on the big islands of Southeast Asia, in the basin of the Amazon. . . .

My wife asks, well, what have you learned?

I tell her I cannot disagree with Gentry, or with Ashton at Harvard, with Richards in Cambridge and Whitmore at Oxford, with Gómez-Pompa in Mexico and Sioli in West Germany. The wondrous tropical rain forest—epitome of luxuriance, symbol of paradise—is shrinking, and that certainly is bad. But I have seen something more.

What I found is worldwide disagreement. Not only about the extent and pace of deforestation but also about what, if anything, should or could be done about it. The problem reaches beyond biology into matters economic, sociological, and political, to the ways human minds work.

And so I can see that it isn't enough to consider only the views of botanists, zoologists, and ecologists, not after quite different perspectives have been presented to me by Malaysian timber tycoons and newly contacted aborigines in Papua New Guinea, by Peruvian jungle colonists, African politicians, and geopolitically minded Brazilian generals. They all are involved, and they all seem to believe what they say, but whom can you believe when even what you see for yourself can be so deceiving?

I TOOK MY FIRST close look around the inside of an undisturbed primary rain forest in the Cuvette Centrale in Zaire, formerly the central Congo basin. It made me wonder. This hodgepodge of ferns and trees; of vines thick and thin, straight, bent, contorted; of plants growing high on other plants, with no plant looking quite like another; this jumbled mess—is this the scene that enthralled the fathers of modern natural history, Humboldt, Wallace, Darwin?

Yes, said Jacques Poirier, a forester. This is what nature produces when the climate enables photosynthesis and decomposition to stay high the year round. Everything grows all the time.

And this makes the soil so rich?

No, said Poirier. The soil, heavily leached, tends to be poor. But the shallow and extremely dense root system is adapted to catch the nutrients released from decaying organic matter quickly and almost completely.

Poirier, a Canadian from Quebec, was helping the Zaire government make a forest inventory. Walking straight lines about 60 kilometers long and 10 kilometers apart, a crew systematically samples 20-meter-wide stretches: Every tree more than 20 centimeters in diameter is identified and measured at breast height. Commercially valuable ones may be noted by total height and local name—*bofili*, 30 meters; *manga*, 45; *ngombe*, 50. "The idea is to profile the forest and estimate the commercial possibilities."

It's shady here, under these soaring trees whose leafy crowns interlock high up. And so the undergrowth is not dense. You can walk in any direction without much difficulty; the main obstacles are fallen trees. But

where a tree fell recently, brilliant sunlight streams in and tangly vegetation abounds. That's what fostered the myth of the impenetrable rain forest: If you explore by canoe, you'll see sunlit greenery along the river's edge so dense you'd have to cut your way in.

I walk gingerly at first, but after a while I relax. The expected vipers and pythons are around, I'm told, probably a leopard too. And forest elephants—more compact than their savanna cousins; their tusks don't point forward, but down. These animals sense you before you can see them, and usually hide or go away. What you see are ants, scurrying singly or in columns, some with cutlery on their heads, so watch where you step and tuck your trousers into your boots.

What you hear is a whirring of cicadas. And a twittering noise. A bird? No, a monkey. Chuck, chuck, croak, croak—a frog? No, a bird. Flies make sounds like mosquitoes, but they don't bite; they want your sweat. There's plenty of that; despite the shade it's moist and hot, and totally wind still. If you're thirsty, you can cut a *singoya-mai*, a liana. Out comes clear water.

Ah, there's the monkey! A man climbs a neighboring tree so quietly the monkey doesn't hear him until the shotgun blast. Monkey can be tasty if stewed long enough.

The Zaire inventory suggests that the greater part of the forest has long been disturbed by human occupation, a finding confirmed by the traditional chief of the Befale zone, whose inhabitants, the Mongos, call themselves *bonto oa bokonda*, men of the forest. "This was Pygmy country until our people came from the east 200 years ago."

Then the Belgians came, ordered the people out of the forest, and settled them along the roads they had been made to build. They still live there, in mud-brick villages, and step into the forest to fell trees and make fields for manioc and yams. After two or three years, weeds proliferate and the fertility is much lowered, so new fields are made. If the abandoned ones are left alone, so-called secondary forest will eventually arise.

"It will be poorer in commercial species," says the forester. "You won't find much primary forest within ten kilometers of a road."

What are the chances of large-scale commercial exploitation of the central Zaire basin? The computer-aided inventory suggests vast timber resources: in an area four and a half times the size of Belgium and still 97 percent forested, at least 55 salable species, hundreds of millions of cubic meters. But how to get that timber out?

A high Zaire administrator decries his infrastructure—roads, transport, fuel supply, all inadequate. He is putting it mildly. The gasoline we needed had to be borrowed from a rubber plantation, with a promise to send back twice as much by barge from the capital—to arrive, with luck, in two months. Before crossing those innumerable little streams, better check the log bridges—you might have to cut new logs for repairs.

Under such conditions the investment necessary would be vast, says an international banker; it might not pay. In any case, given Zaire's recent history of economic problems, can the required foreign investors be expected to step forward in the foreseeable future?

And so an estimated two-thirds of Africa's remaining tropical lowland rain forests—one-fifteenth of the world's—seem most likely to survive without drastic change into the 21st century. But much could change in unexpected ways. . . .

I BEGAN to really appreciate the rain forest one muggy morning in Singapore, in the Bukit Timah Nature Reserve. It's less than 190 acres, and just half a mile from a new 30-story apartment and shopping complex, but nevertheless a representative microcosm: visible monkeys, invisible pythons, a hundred sorts of ants. The flora is dominated by the Dipterocarpaceae family, among the tallest of rain forest trees, rising to 200 feet and found primarily in Southeast Asia.

D. H. Murphy, a university lecturer in zoology, was telling his class about animals active at various levels. In the high canopy: caterpillars, millipedes, spiders. Different species of these at 30 feet or so, plus frogs, shrews, rats, snakes. After dark, crickets and assorted beetles ascend tree trunks to feed high up—it's a regular rush hour. Scorpions, lizards, and carnivorous cockroaches lie in wait.

I said, too bad I can't see these goings on; to me it all still looks a mess.

Murphy replied eloquently: This mess of

FRANK JOYCE

Pumping oxygen *into the atmosphere, the canopies of vast rain forests such as this one in Borneo (***right***) were once popularly thought to improve the air we breathe. But scientists believe the forests' effect is neutral—that they consume about as much oxygen through the decay of organic material as they produce through photosynthesis.*

Their effect on rainfall may be more important. In Amazonia, for example, about half the water that falls may come from the forests themselves.

*How much the burning of timber (***above***) in clearing of forests adds to carbon dioxide in the atmosphere—and a rise in global temperatures—is still unknown, though its impact is less than that caused by fossil fuels.*

plants, insects, fungi, and bacteria is the main repository of the earth's gene pool, the most important resource we have—information. It's a memory bank evolved over billions of years.

"The language is shape, the shapes of molecules, of chemical structures, each doing something useful for a living organism, serving a purpose, solving a problem. And it's all there for us to unlock, bit by bit."

Example: "A protein was found in the wing base of insects so resilient it'll tolerate bending much longer than any other material we know. Someone may say, 'This is just what I want for paint—wouldn't it be nice to have a paint you can stick over a door and it can bend with the hinge?' Once we know its structural properties, we may build those insights into a plastic, or whatever structure breaks down with continual flexing. There could be thousands of applications."

I was beginning to understand. That the tropical rain forest may well be nature's chief library of experience from which humanity can learn, not only how to do things but also what vast variety of things may be possible. And why the environmental crusader Norman Myers was moved to say that doing away with it would be like burning the ancient library of Alexandria—that if present patterns of converting tropical rain forest persist, it may be the worst biological debacle "since life's first emergence on the planet 3.6 billion years ago."

I GET A GLIMPSE of rain forest conversion at its most proficient in the southeast corner of mainland Malaysia, on the road from Kota Tinggi to Mersing. Every minute a trailer truck whooshes past, piled high with 40-foot logs as thick as five feet, cut from dipterocarp giants. Along the road, vast blocks of slender rubber trees in rows. Then blocks of 30-footers looking like upside-down feather dusters—oil palms!

"More profitable than rubber," says an agricultural engineer. He counts off the timetable for another 6,000 acres of the latest project in Johore state directed by FELDA, the Federal Land Development Authority. Felling of virgin forest started in January 1980. "After three months, burn. At seven months, clear and burn again, then plant, spray, and fertilize; at 28 months, pollinate the palms by hand. All done by special crews."

After another six months 600 settler families will arrive for the first harvest. Roads and waterlines will be built by then, financed by the World Bank; also a village with school and clinic. Each family gets a house and ten acres of palms to harvest and maintain from then on, all theirs. They'll pay a monthly amount out of their earnings. Thousands of families anxiously await their turn for similar projects.

Palm kernels are pressed at local mills; refineries rid the oil of impurities. FELDA trucks roar south to storage tanks at the new

Illegally cut logs *from the Taï National Park in the Ivory Coast are spotted by two botanists (**left**), who question the truck's driver. Some 20 loads a day, he tells them, are being taken out along a road surreptitiously built by a timber company, pointing up the kind of difficulty encountered in preserving West Africa's few remaining virgin tropical rain forests.*

*In Zaire, where timber exploitation is much slower, Lokuli Bonianga (**right**) helps cut a mahogany log with a saw imported from Belgium two generations ago.*

"Stop the destruction," *demands a group of environmentalists in northeastern Australia as they block the removal of logs from one of the continent's last intact rain forests. The protesters, from Cairns, Queensland, said the logging would wipe out primitive species of flowering trees and disturb such rare animal species as tree kangaroos and green possums. Most of Australia's rain forests have already been eliminated through timber, mining, and sugarcane exploitation.*

port of Pasir Gudang, where pipelines fill tankers offshore for India and Pakistan. The end products are chiefly cooking fats and soap, but enthusiastic researchers envision a great palm-oil refining industry. Detergents, cosmetics, pharmaceuticals, rayon, substitutes for gasoline, "whatever you can make out of petroleum—but palm-oil plantations can produce indefinitely."

In 1980 the primary rain forest left in Peninsular Malaysia was much less than half of what there had been a generation before. Will virtually all be gone in another generation, as Malaysian environmentalists fear?

WITH Peninsular Malaysian and Philippine log exports tapering off, exports rose dramatically from Indonesia: in the years 1969-79, 475 percent in volume, 800 percent in price. Emil Salim, Indonesia's minister for control of development and the environment, told me conservation is more necessary than ever. "We have good rules. Selective cutting only, and mandatory replanting." He looked straight at me. "The problem is enforcement."

Timber concessions cluster in Kalimantan, as Indonesians call their part of the island of Borneo. I took a boat ride up the Karangan River from the east coast port of Sangkulirang to visit an Indonesian-Philippine company, logging selectively. They say it's dangerous. Many a big tree is rotten inside—you cut the buttresses and there's nothing to hold it, and when the canopy is interlocked with vines and heavy limbs, you can't always be certain which way the tree will fall.

In the dim primary forest a chain saw roars like an incessantly gunned motorcycle. It slices into a buttress of a red meranti. Another buttress, then another—and run! Cracking, whining, whoosh, crash. Silence. The 120-footer brought down nine other sizable trees.

More giants crash and are sawed into logs that must be pulled to the road. So a bulldozer makes a skidding trail. Whining, grinding, push, back up, push again—uprooted trees hit others right, left, and ahead; trees split, snap, fall by the score.

The manager said he takes only about four trees per acre, but the canopy is gone. Roughly a sixth of the timber cut is rotted or split; it's left behind. Bulldozers, according to one study, usually damage a third of the area of operations.

DAVID ALLISON

THE AMERICAN MANAGER of an Indonesian-American timber company thought the tropical rain forest wasn't being used anywhere near its potential. We were in a helicopter over his 1.5-million-acre concession. Many a giant below spread foliage over an entire acre.

"This jungle is in equilibrium," he said, "just replacing itself, so the natural regeneration is only about three harvestable cubic meters per hectare per year. Grow eucalyptus and you get 35 cubic meters." Cubic meters is the name of the game. How many at what cost? That determines your profit.

But he loved those dipterocarps. "They come in big hunks, and they peel well. That's what makes them so merchantable." Meaning they have a good market. Especially in Japan. Also in Korea and Taiwan, for peeling into plywood; some of that went to the United States: "Glue on paper with an embossed printed pattern, and it'll look like birch or walnut or pine, for paneling in mobile homes. Or a thin overlay of American hardwood, for kitchen cabinets—looks like solid maple or cherry, but underneath it's meranti." Now demand for plywood was down, and logging was too.

Will selective logging let the dipterocarp forest survive? He shook his head. "The first cycle takes the merchantable timber. For the second, say 35 years later, the trees won't be as big, and a higher percentage will be by today's standards undesirable species. By the third cycle you've radically changed the ecosystem, the birds, the animals, even if no settlers come in."

Ah, settlers. Along the Karangan River I'd stopped in a little town that grew up to support a lumber camp—a hundred families, two billiard halls, a tailor, a school. Several square miles had been cleared and farmed and then abandoned when the fertility petered out after a couple of years. What moved in was *alang alang* grass. Ecologists say this sort of concentrated slash-and-burn agriculture degrades and destroys even more of the world's tropical forest than logging. What does this gold-toothed old farmer say to that? He's paddling his rice to a lumber camp and he's happy—he'll get more money than last time.

Carving big settlements out of the forest is part of Indonesia's latest five-year plan: Half a million families from overcrowded Java and Madura are to go to sparsely populated islands such as Borneo—that's transmigration, also funded by the World Bank.

After one year 35,000 have gone instead of 100,000, a deputy minister told me. "We have difficulties with this program."

I heard about those. Between the Sepaku and Semoi Rivers, 2,500 families arrived after 1975 to clear land and make plantations, but they haven't harvested much. "Even if we could grow a lot, we couldn't get it out to sell." And that terrible malaria. . . .

I relaxed in the Kutai Game Reserve—1,200 square miles amid logged patches along the Equator, noted for primates. Here John Mitani, a doctoral candidate from California, lived alone in a little hut to study *Hylobates muelleri*, the Bornean gibbon.

Two nearby fig trees had fruited the week before, so there had been hornbills and leaf monkeys, gibbons, giant squirrels. And an orangutan female with her baby; they nest in notches high up, but keep moving.

We sat on a path, sweating in the steamy shade, looking up and listening for gibbons. Leaves fell quietly. A pheasant whistled. No gibbons. I watched the leeches: green miniature earthworms, one end braced on a fallen leaf, the other waving in the air, waiting for some warm-blooded mammal to latch on to. I couldn't help being impressed with these little symbols of patience and optimism, so persistently did they inch up my canvas boots no matter how often I flicked them off.

John once had a dream of a lifetime of research in the Kutai Reserve, but he no longer held much hope for the place. There has been illegal logging. Substantial oil deposits have been found. "In ten years, maybe five, there'll be roads all over. That'll alter the whole primate population. . . ."

Plonk. A rock-hard half-pound ironwood fruit had almost hit John. He said, "Let's get out of here. Hey, your back's a bloody mess." One of those little leeches had inched up under my shirt. I washed off the sweat and the blood in the Sengata River and stayed up to my eyes in the brown water, coolly reflecting on the dynamics of this ecosystem. Heat and moisture, proliferation of biomass, lots of money to be made. . . .

IN THE NORTH of Borneo—at Kota Kinabalu, capital of Sabah, a state in the Federation of Malaysia—rises the headquarters of the Sabah Foundation, a 30-story glass tower silvery at sunrise,

Like a waterfall, *wood chips cascade into the storage yard of the Jant mill in Madang, Papua New Guinea* **(above)**, *for export to Japan. In a single year the giant blades of this plant's chipper consumed trees from a 7.5-square-mile clear-cut portion of rain forest. A new process makes it possible to mix wood chips from 200 species in the manufacture of kraft linerboard. At the Honshu Container Company in Totsuka, Japan* **(right)**, *workers inspect some of the 500 kinds of boxes made from chips for firms such as Sony and Hitachi. Japan imports more wood than any other commodity except oil.*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symbolizing wealth from the rain forest.

The foundation gets the equivalent of 150 million dollars a year in timber revenues, I was told by an executive, and provides doctors by helicopter to remote areas, university scholarships, and an annual cash distribution: "Last year $50 to every resident citizen over 21, rich or poor."

I flew to Sandakan, Sabah's main port, and wondered—can there really be hundreds of millionaires here? Why not, said Datuk Lai Fook Kim. A million would be the price of six pieces of heavy logging equipment. He had 64. And oceangoing timber ships, a plywood mill in Taipei, a housing development in Toronto.

The Sandakan district is nearly exhausted, but an American lumberman told me Sabah remains rich in merchantable trees. "All those mountains you flew across can be logged. Bulldozers can skid logs on slopes as steep as 30 degrees, but if we want to invest enough, we can log practically anywhere." He showed me how. A cable running to a tall post drags logs up from a 1,500-foot semicircle—leaving vistas of devastation.

THE LATEST MARVEL of technology bearing down on the tropical rain forest operates noisily on the north coast of Papua New Guinea, at Madang. It's an eight-foot disk with eight blades—15 tons of steel revolving 320 times a minute to reduce trees to little chips half the size of a matchbox. More than 200 tree species growing here can be utilized—100 percent! Just about everything is to be cut from a 320-square-mile concession. The chips go to Japan to make cardboard packaging for industrial goods such as hi-fi equipment.

The Japanese manager said his market was up because housing starts in the U. S. were down; when American sawmills have less waste to sell to Japan, more chips are ordered from Madang.

The clear-cut areas are supposed to be reforested; two dozen fast-growing trees have been tried, all good for pulp, but the research manager had a problem. "In primary forest there may be half a mile between two trees of the same species—this minimizes damage from insects; they can't concentrate. But when you plant completely new trees in blocks, you may get attacks in epidemic proportions." Just now a bark-boring worm had been into his *Gmelina arborea* from India, leaving pulpy messes.

THE PEOPLE of the primary forest also live in dispersion. Flying west between the mountains and the Bismarck Sea, through clouds and rain and brightest sunlight, I saw a valley of mist and snaking rivers amid seemingly endless lowland forest. Now and then a hut or two. But even where nothing man-made is seen, there will be people. Some 500 people may range over a hundred square miles, hunting and harvesting the marrow of the sago palm in little family groups as the Nikseks do.

At an airstrip freshly carved along the April River, a missionary from Austria had concentrated a couple hundred of them. Four years before they had been known only to neighboring clans who traded them steel axes and shell ornaments for precious pigs. They showed me necessities of life derived from their forest world.

For a spoon, a hornbill's bill. To make fire, a liana to pull rapidly back and forth around a stick to ignite a bunch of dried leaves. How did they keep those dry on the trail? In a string bag of wood fiber with hawk feathers worked in to keep out the rain. For defense they built communal houses on 20-foot stilts with a covered gallery for shooting arrows down.

But most important to rain forest aborigines are the spirits. The Niksek people wear a snake rib through the nose, pointing forward, to keep bad spirits out. The missionary said these people tremble in daily fear of death by sorcery; Christianity is taking away those fears.

The laws of Papua New Guinea provide that their forests can't simply be taken away too. Back in the capital, Port Moresby, the director of forestry told me the government owns only 5 percent of the land. The rest belongs to the people who live on it. The government buys timber rights from them and licenses commercial companies.

"Two men were here from Sabah this morning; they want things cheap." Americans, Koreans were coming too—the rush was on. The director said, "We want to advance with the rest of the world. I don't want my people to be kept in a zoo."

The director's strong feelings reminded me of things I had heard when UNEP, the environment-watching agency of the United Nations, called a meeting in Nairobi to discuss "the conservation and wise utilization of tropical forests."

The Ivory Coast, along with France and Japan, stressed exploitation and production to get the most out of the forests—foreign exchange, more jobs. Norway, Sweden, and the Netherlands deplored the destruction; the world's decision makers should be made aware of the values being lost!

The United States urged definite goals: By 1985 a commitment by all countries to preserve representative forests. By 1992 significant reduction of forest loss, strong laws for sound management. For 2000 and beyond, a stable situation with some forests producing, some left alone. The State Department man called these reasonable goals.

The diplomat from Brazil said remember, you can recommend but you cannot tell governments what to do.

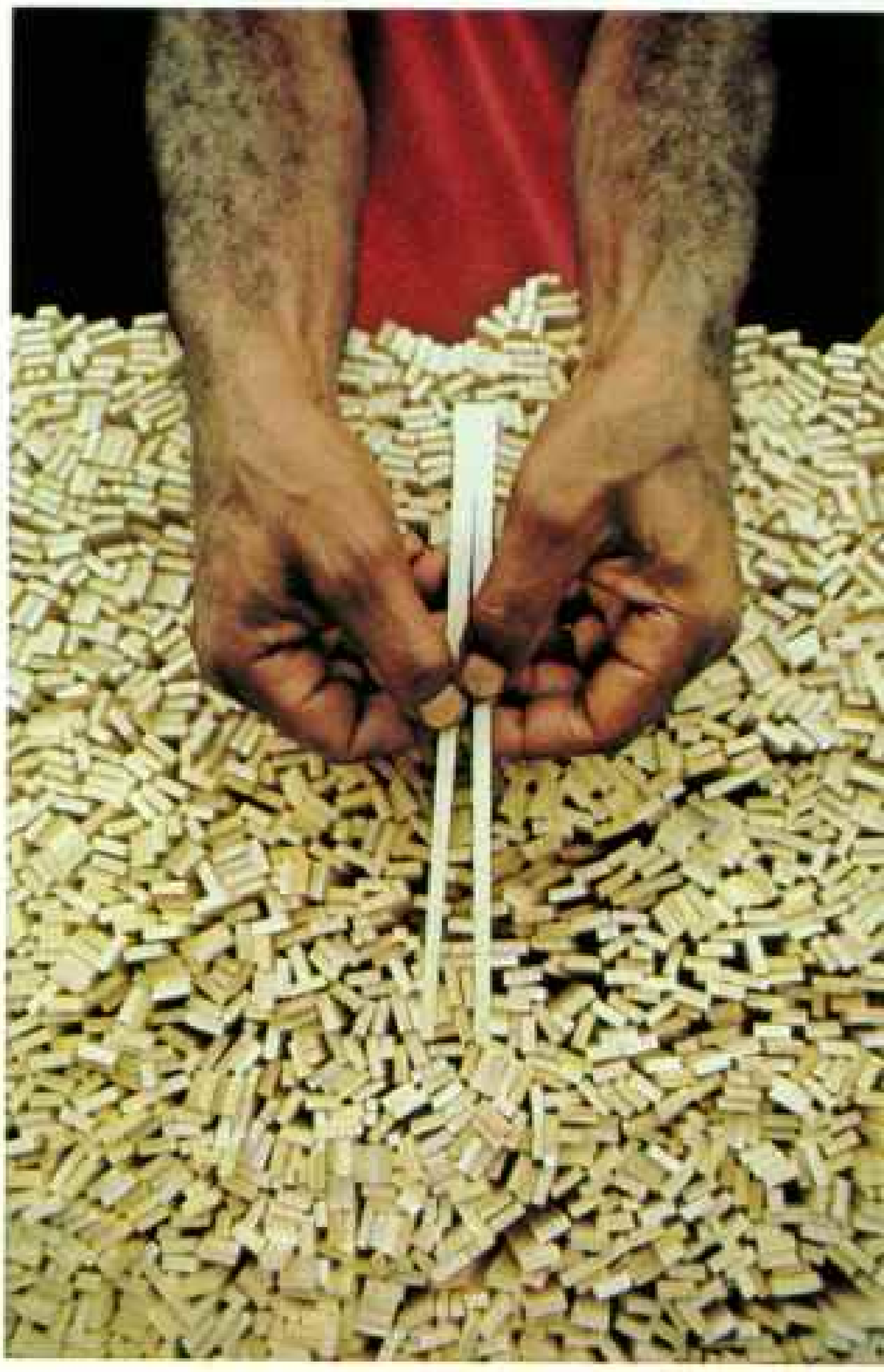
IN SOUTH AMERICA the sparsely populated basin of the Amazon—more than half of it forested—tends to make the governments that share it nervous. There has long been a propensity to acquire territory loosely held by neighbors. In 1903 Brazil incorporated Acre, previously claimed by Bolivia. Since 1942 Peru has held 70,000 square miles many Ecuadorians still say are theirs. That's just one reason why several countries have been pushing development at almost any cost, why pressure is increasing on the world's largest rain forest region—ten times the size of Texas.

Ecuador pumps enough oil from its share of Amazonia—the Oriente region covering half the country—to make it a member of OPEC. Since Texaco and Gulf pushed the first road to Puerto Francisco de Orellana on the Napo River in 1972, 100,000 landless farmers came from the slopes of the Andes to wrest a new life from the forest. Ramshackle buses bring thousands more every month.

Foreign tourists fly in for sight-seeing forays from a floating hotel downstream. "I thought there'd be more wild animals," said a lady from Brussels.

In Peru President Fernando Belaúnde Terry has proclaimed his country's future to lie in the *selva*, the jungle, and in Alto Amazonas Province, in Yurimaguas, optimistic government-sponsored colonists are crowding the *banco agrario*. The banker said loan money comes from the Inter-American Development Bank. A hardware store was selling 14-inch chain saws for the equivalent of $564.

In the agricultural ministry office, men fresh from the slums of Lima extolled their projected cooperative—50,000 acres four hours away by boat. "The possibilities are tremendous," said one. "We'll sell wood,



Mass-produced *from fast-growing hoop pines planted in burned-off rain forest, 45 million disposable chopsticks a month are shipped to fast-food restaurants in Japan from a forest-products manufacturer in the town of Bulolo, Papua New Guinea.*

Like money along the banks, *miles of prime hardwood timber surround the Ramu River* **(above)** *near Madang in Papua New Guinea, where a concession has been granted for future logging operations. Many leaders of developing nations view their rain forests mainly as a ready source of cash.*

This shimmering tower **(right)** *in Kota Kinabalu, Malaysia, reflects the wealth of the Sabah Foundation, a state-government development agency that uses income from the forest-products industry on northern Borneo to finance scholarships, medical services, and even direct cash payments to citizens of Sabah.*

we'll have lots of rice, pineapples, coffee."

The agricultural official said the soil isn't that good.

"Then we'll get tourists. We'll sell little monkeys to them."

The official said that would be illegal.

"All right, we'll let them take pictures."

In Brazil, at INPA, the National Institute for Amazonian Studies in Manaus, the man then in charge, Eneas Salati, had reported that half the region's precipitation comes in from the Atlantic. It goes out again in the river. But the other half derives from moisture radiated back into the air by the canopy of the forest itself. If much forest is removed, will rainfall diminish and the rest of the forest deteriorate? Possibly. We'll have to see.

I learned about the "minimum-critical-size project." What is the smallest piece of forest area that must be left intact if all the

species there are to survive? Researchers at INPA, financed by the World Wildlife Fund–U. S., are monitoring flora and fauna on plots of 1, 10, 100, 1,000, and 10,000 hectares left untouched amid large areas where the trees have been cut and burned to establish cattle ranches (pages 40-41). They hope for answers in 10 or 20 years.

BRAZILIAN AMAZONIA, encompassing half of all the world's tropical rain forest, has been a focus of controversy, especially since the generals who have been the country's presidents since 1964 decreed some 15,000 miles of highway building into the forest, for the sake of "national integration." A Brazilian congressman reportedly said it should all be cut down because it paralyzes development. Now a newspaper warned: "For Amazonia, only a little time before the desert."

How much forest is being cut in Brazil? An American at INPA remembered his professor saying if Amazonian deforestation were to continue as it was then proceeding, all forest would be gone in ten years. That was in 1974.

In Manaus in 1978 a Brazilian scientist declared 20 percent was gone. But the Brazilian Forest Cover Monitoring Program, interpreting satellite imagery, announced that the loss by 1980 was 1.2 percent of "dense forest." Environmentalists challenge this. Who really knows?

In Belém I met Clara Pandolfo, a director of the government agency sponsoring development in Amazonia, SUDAM. She said those stories of Amazon forest disappearing rapidly "come from a lot of people making *sensacionalismo*."

Taking life from death *of an Amazon forest, a family of slash-and-burn farmers winnows dry-land rice from a plot in western Brazil. Driven deep into forestlands by severe poverty in other regions, such families are often disappointed. For despite the lush appearance of the forest's vegetation, the soil in most places is*

poor. Nutrients released by burning cleared wood are normally exhausted after only a few crops, forcing families to repeat the destructive cycle elsewhere. The growing numbers of such farmers have made slash-and-burn agriculture the single largest cause of tropical forest loss around the world.

Lucio Flavio Pinto, a respected local journalist, said certainly we make sensationalism, as a preventive, so that what happened in southern Pará won't happen all over.

I chartered a small plane and flew south in the state of Pará along B-010, the paved highway from Belém toward Brasília. Here's what I saw:

A few settlements with lumber mills, and side roads to ranches, but what struck me most, mile after mile, were the big clearings, for pasture, with very few cattle. Some cleared patches reached to the horizon. Many were scrubby, others heavily eroded.

This was the aftermath of SUDAM's cattle-raising program—a bonanza, I'd been told. Maybe the cattle didn't pay, but you got big tax credits, and you could get government loans far below the triple-digit inflation rates and lend some of that money out again at still higher percentages. When a pasture was spoiled, usually after three years, your men would cut more forest. You were pioneering. This program had now been ended.

I flew west along the Tocantins River. About 60 roadless miles from Marabá, a ridge, a busy airstrip, crude shelters roofed with black plastic—the fabled shantytown of Serra Pelada, 20,000 men, no women, lots of gold! Diggers swarmed like ants. The first nuggets had been found in January 1980. One crew in one day reportedly got 700 pounds, then worth 4.75 million dollars.

Another empty-looking 100 miles, another ridge with clearings: the Carajás project, mining what may be possibly the largest iron deposit anywhere, an estimated 18 billion tons of 66 percent ore. The first mine is to produce in 1984; there's to be a railway and a town of 25,000.

At the Xingu River I turned north.

His patience running out, *a Surui Indian* ***(above)*** *shows resentment over the growing pressure of land-hungry peasants on the forest park set aside for his tribe in Brazil's state of Rondônia. Arriving by the thousands each year, settlers pour in along roads* ***(facing page)*** *built during the 1970s to open up the Amazonian frontier. "The squatter destroys the forest, takes the land," one Surui told a government worker. "Where are we going to find the meat of the armadillo, of the nambu bird, of the peccary?"*

FOR HOURS NOW I've been looking down at endless greenery; a few empty airstrips, a ranch on the Xingu, a modest cassiterite mine—not much for 250 miles. The pilot says there are a few prospectors scattered around.

And Indians, fearful of encroaching outsiders. Most of those airstrips belong to FUNAI, the government agency seeking contact with the tribes. We're over the hunting grounds of the Asurinís, between the

Xingu and the Ipiaçava Rivers. Intruders are destroying the Indians. According to the anthropologist Berta Ribeiro, there are 53 left. "They want no more children; they know they are finished."

Up ahead stretches BR-230, the Trans-Amazon Highway—thrusting 3,400 miles from east to west, the most ambitious Brazilian intrusion into virgin forest. Its construction, finished in 1975, was hailed as a veritable war between man and nature, waged for the sake of progress. Some called it rape. I land in Altamira and drive on the pitted laterite road.

I see clusters of little houses and hear of shifting crops—bananas, rice, pepper. Rain sometimes makes the road impassable for a week. Tiny flies bite so badly one doesn't want to work outside. Does that last long? "No. Three or four months."

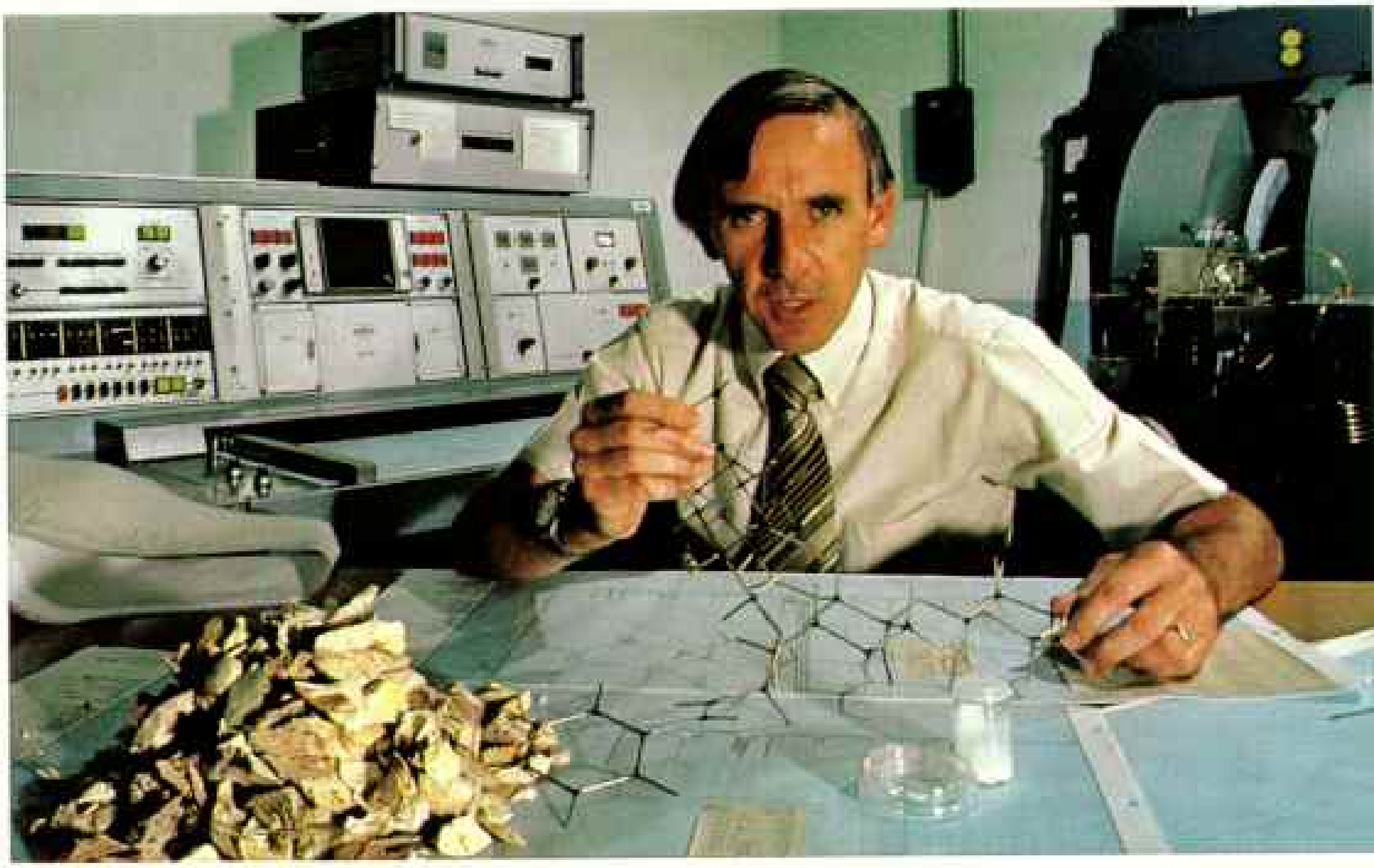
Many smallholders' plots have passed to companies; the absentee owners put on cattle. As an inducement to large-scale settlement, so it's widely acknowledged, the Trans-Amazon Highway is a failure, largely due to poor soils.

Airborne again, en route back to Belém, I realize that this entire low-level flight reinforces my impressions of previous flights across Brazilian Amazonia at higher altitudes: that extensive conversion so far has been confined to the eastern and southern fringes, chiefly in the states of Pará and Rondônia.

Indeed, except for the Manaus area and some relatively fertile stretches along the rivers, the state of Amazonas—bigger than Alaska—has hardly been touched. To sum up, the cutting has been great, but the forest is so much greater that all in all it seems like a drop in the bucket.

I mentioned this to Philip Fearnside, an Amazon-oriented American ecologist. He bristled. "What matters most is the *rate* at which the cutting is increasing. It's rising rapidly." Fearnside has projected that if Rondônia should keep going at the rate he discerns from 1973-78 data, that state would be completely deforested within the present decade. He warns of this happening across Amazonia within 35 years, "if the same pattern holds through the coming decades."

Gary Hartshorn, a no-less-distinguished American ecologist, told me such notions regarding Amazonia are fundamentally wrong and biased. "You fly over vast areas and there's absolutely no access. Where will the access come from to permit the slash-



and-burn agriculture to get in there, and do it by the end of this century?"

Hartshorn said such "environmental advocacy" perturbs him. "We see it more and more, and I think it hurts conservation when people make grandiose or wild predictions that are subjective and not based on fact." But because they come out of the mouths of scientists, he adds, they tend to be believed.

At least both Fearnside and Hartshorn agree that the dangers of Amazonian deforestation, whatever they may be, are becoming more widely appreciated by decision makers throughout the world.

SO IS THE IDEA of a possible compromise. Gren Lucas, secretary of the Threatened Plants Committee of IUCN, the International Union for Conservation of Nature and Natural Resources, says that to save the tropical rain forest it must be integrated into sensible development plans. Large chunks of tropical rain forest should be left entirely alone, provided other substantial chunks can be put into sustained and profitable production.

Can such production be achieved, without great expense for fertilizer? It hasn't yet been conclusively demonstrated anywhere in the world, not even in the Jari project.

This was the big dream of a big man, Daniel K. Ludwig. He'd made himself a billionaire through oil tankers. He bought a forest in northeastern Amazonia as big as Connecticut. He built a pulp mill in Japan and floated it around the world to the Jari River, where he cut huge areas of forest and planted fast-growing *Gmelina arborea*.

Ecologists said pests would move in massively. A dry spell and an insecticide killed pests, but much of the soil wasn't right for gmelina, so he planted Caribbean pine and eucalyptus. Ecologists said when you harvest those trees you take nutrients out of the ecosystem, so the next generation will be puny and the one after that no good at all.

The mill turned out salable pulp, 40,000 people lived where before there had been a handful. But to make the project pay, a second pulp mill would have to be brought in.

By then the world's money market had changed. The additional hundreds of millions couldn't be borrowed for a still unproved project, especially when it seemed in political trouble; and the political climate had changed in authoritarian Brazil. Environmentalism was now fashionable among

Tomorrow's cure for leukemia *and melanomas may come from a tree that grows in the rain forest, if research by Dr. Gordon Cragg (**left**) of Arizona State University at Tempe bears fruit. From wood found in the Costa Rican jungle, Dr. Cragg and Dr. George R. Pettit isolated a compound called phyllanthostatin, which will soon be clinically tested at the National Cancer Institute. Other drugs derived from plants native to rain forests have been successfully used in the treatment of Hodgkin's disease, hypertension, and rheumatoid arthritis, as an aid in surgery, and for the production of sex hormones and the birth-control pill.*

*Shavings from the Garcinia punctata tree (**right**) go into a traditional prescription for diarrhea among local tribes in Zaire, whose knowledge of medicinal plants is a priceless resource of the rain forest.*

Tropical Rain Forests

Tenuous trade-off: *In Central America and Amazonia many expanses of undisturbed forests have been cleared for cattle ranches, such as this one in Brazil* ***(above)****, where livestock graze amid the skeletons of the old forest. Too often, however, pastures lose productivity after only a few years, prompting more forest destruction.*

One alternative has been developed by North Carolina State University scientists, who believe that even rain forest soils can grow year-round food crops if scientifically managed. Using soil analysis, modern fertilizers, and crop rotation at a project near Yurimaguas, Peru, they have raised rice ***(left)****, corn, soybeans, and peanuts. Here field supervisor Ruben Mesia surveys a successful farm in the project.*

newly vocal groups. Politicians, still powerless but less restrained than before, ceaselessly attacked Ludwig as an imperialist American exploiting Brazil. And so the Jari project lost many millions of dollars. Eventually Daniel Ludwig sold it to Brazilians.

Will they make a go of it? This may depend on how well the eucalyptus does. To a visiting American forester much of it seemed to stagnate after initial spurts. If the eucalyptus plantations fail, he says, the Jari pulp mill probably will shut down for good.

WHAT CAN WE CONCLUDE? A wise German ecologist, Harald Sioli, tells me that supposedly hard-headed economic decisions affecting tropical rain forests often have deeper roots than the desire to make money; there are profound emotional reasons, a desire for power, the romantic yearning of the human species to impose itself on the world of nature. If this is so, yet another element of complexity is added to the economics and politics that affect that world's most complex ecosystem.

How can we chart its future? We can only detect trends.

John Spears, the forestry adviser of the World Bank, says that since 1900 the wet tropical forest area has declined by more than half. Of about one billion hectares (40,000 square miles) left in 1980—that's the latest estimate from FAO, the UN's Food and Agriculture Organization—about 12 percent will go by the year 2000, leaving

about 900 million hectares. "If nothing is done to check world population growth and to control tropical deforestation," there may only be 500 million by the middle of the next century; by 2100, nothing.

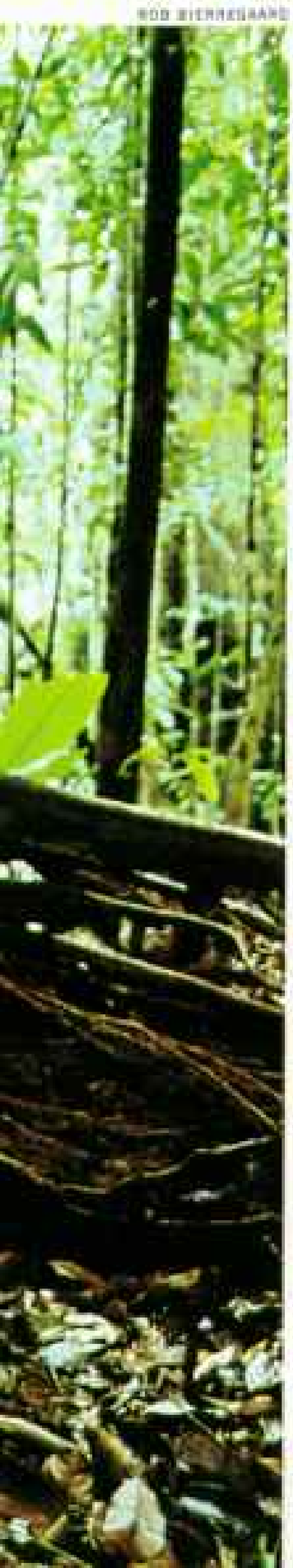
He adds that if a significant part of the remaining tropical forest is to be preserved, there will have to be a shift in the emphasis of forestry aid to developing countries—to focus on how to improve the income and quality of life of 200 million small farmers living in the forest.

Whether and how such improvements will be achieved is impossible to tell. As a Colombian ecologist points out, sound ecology also means solving social problems. In Colombia, he says, that would involve nothing less than revolution. Another says, "Remember, the worst enemy of nature is poverty."

BEFORE SIGNING OFF on my rain forest survey, I make a last-minute check in the countries where I've been to learn what's happened since I was there.

In Malaysia the 2.5-million-acre Pahang Tenggara project reports 400,000 forest acres converted—150,000 people settled in 18 townships where there had been only subsistence farmers and aborigines. But progress isn't quite as swift as envisioned back in 1972. Now it'll take until the year 2000 to reach the target, not 1990.

In Indonesia the big U. S. lumber firm whose concession I saw, Weyerhaeuser, has



BOB BIERREGAARD

Octopus-like roots *from the base of a living tree* ***(left)*** *reach out to cover a fallen one in a forest near Manaus, Brazil. Rain forest root systems are so efficient that nearly all the nutrients held in decaying plants are recycled to living ones, creating the seeming paradox of a lush forest on poor soils.*

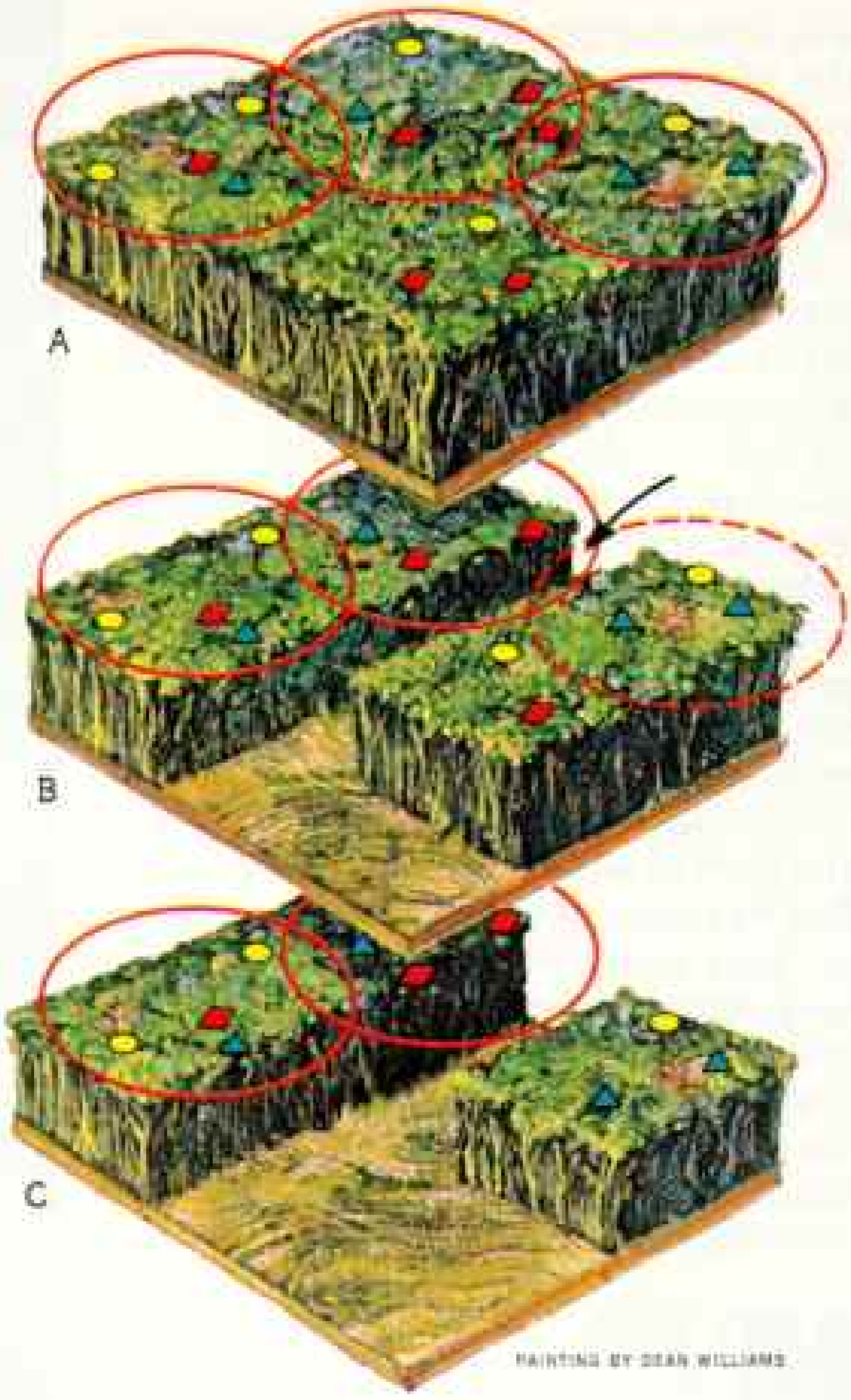
Most fine roots are found within three inches of the surface in heavy clays ***(diagram,*** *at right) or at the surface in sandy soils, at left. Tiny rootlets, growing up through the soil into the litter on the forest floor, attach themselves to leaves (circle at center). Then mycorrhizal fungi on the roots take over (magnified view at bottom), sending threadlike hyphae into the rotting leaf. The roots receive phosphorus and other minerals from the fungi, which in turn take sugars from the tree.*

Workmen of the soil, termites and ants also break down forest litter.

PAINTING BY BARRON STOREY

***The big question** among ecologists who hope to preserve rain forests, such as Dr. Rob Bierregaard (**left**), is "How much is enough?" What portion of an undisturbed area must be saved if it is to keep its full diversity as a rain forest? Near Manaus, Brazil, Bierregaard and other scientists are taking samples of plants and animals in forest areas of various sizes before and after they become isolated patches. These white-plumed antbirds (**below**) were among the 130 species so far caught in the researchers' nets.*

*What makes rain forests so sensitive to disturbance is the complex interrelationship that exists among their plants and animals. For example, a number of trees of different species (**right**), indicated by dots, squares, and triangles, may depend for pollination on individual hummingbirds that rely on the trees for nectar; their undisturbed ranges (A) are shown as rings. If clearing (B) removes from one bird's range (dotted ring) the last tree of the only species that flowers during certain months (arrow), then the bird must leave the area (C), and the remaining trees will not reproduce.*



BRAD WINN

been squeezed out by the Indonesian bigwigs who were its partners. The worldwide economic doldrums have taken the wind out of plywood sales, and pressure on Indonesia's dipterocarps, for the moment, is down.

In Nairobi, at UNEP's tenth anniversary meeting last May, the diminishment of rain forests was seen as one of the world's largest environmental problems for the 1980s.

Finally, in Brazil, where environmental sentiment has been said to be rising, the governors of the Amazonian states invited the ambassadors of Colombia, Ecuador, and Peru to a conference to explain that the development of Brazilian Amazonia—they called it "occupation"—will energetically proceed, no matter what anyone says.

This points up what more than one Latin American social scientist emphasized to me: That in many tropical countries where the few have a lot and the many hardly anything, the rain forest is a political asset. The wealthy and powerful abhor land reform—so why not shunt the land-hungry poor into that great green realm, especially if expenses will be underwritten by some international nonprofit lending institution?

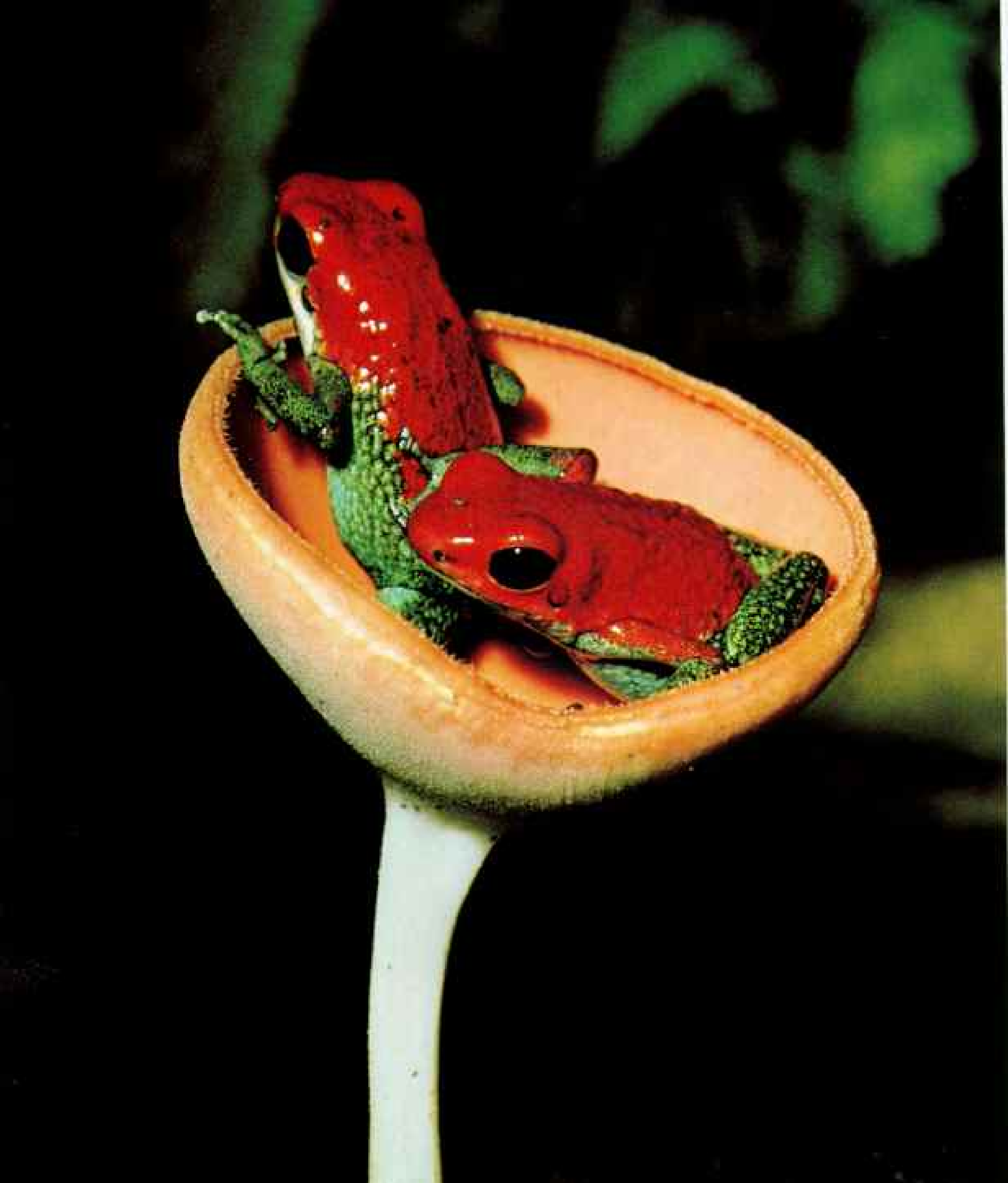
MY WIFE SAYS, can't you put something more cheerful at the end?

I can. On the edge of a clear-cut plot in Papua New Guinea I saw a clump of tall trees left standing because the local people said these were the home of birds of paradise. While the chain saws and tractors did their work, the birds were gone, but now they had been back for months.

At dawn four males whistled to attract females. The females came and the males preened, hopped on high branches, and made great fans of their golden plumes—symbols of nature most magnificent.

And in my eyes at least, symbols of survival. Surely some tropical rain forest will survive, with its treasures intact. That's what *I* want to believe. □

At home in the wild, *a couple stops along a rain forest trail in Zaire. The destruction of rain forests alters the lives of all their inhabitants, in some cases threatening the existence of peoples totally reliant on what they provide.*



Teeming Life of a Rain Forest

By CAROL and DAVID HUGHES

DAWN. A sudden rain drums on our tent. As the shower subsides, a dim light gradually filters through the forest in Costa Rica's Corcovado National Park. Then it begins: "zeet, zeet, zeet," an insistent, monotonous buzzing, like the sound of tiny saws rasping wood.

The droning signals courtship among poison-arrow frogs, such as this pair posed in a mushroom—a perfect "toadstool" (*left*). Males often seek out such high perches for broadcasting their calls to females. Poison-arrow frogs number many dozens of species. They are named for the toxic secretions of certain varieties, used by Indians to coat blowgun darts for potent hunting weapons.

We lived with such creatures for 18 months in several of Costa Rica's wildlife sanctuaries while we filmed our National Geographic Special "Rain Forest." The film will air January 12 on Public Television.

A tenacious competition for life dominates these habitats, from the Corcovado lowlands to the misty slopes of the Monteverde Cloud Forest Reserve. There an explosion of vines and epiphytes—plants such as ferns, mosses, and orchids that grow piggyback on other plants—chokes every available tree limb and trunk (**below**).

The darkness beneath the canopy often frustrated our efforts as filmmakers. But once we penetrated the gloom, we witnessed miniature scenes of intense drama. Here were fearsome predators, cunning escape artists, intriguing alliances for survival, and awesome battles for mates.

Sometimes we didn't have to go far to find them. We had been delighting in a daily chorus of calls from a pair of wrens and their nestlings, until one evening a large snake appeared in camp. The next morning we awoke to an ominous silence.

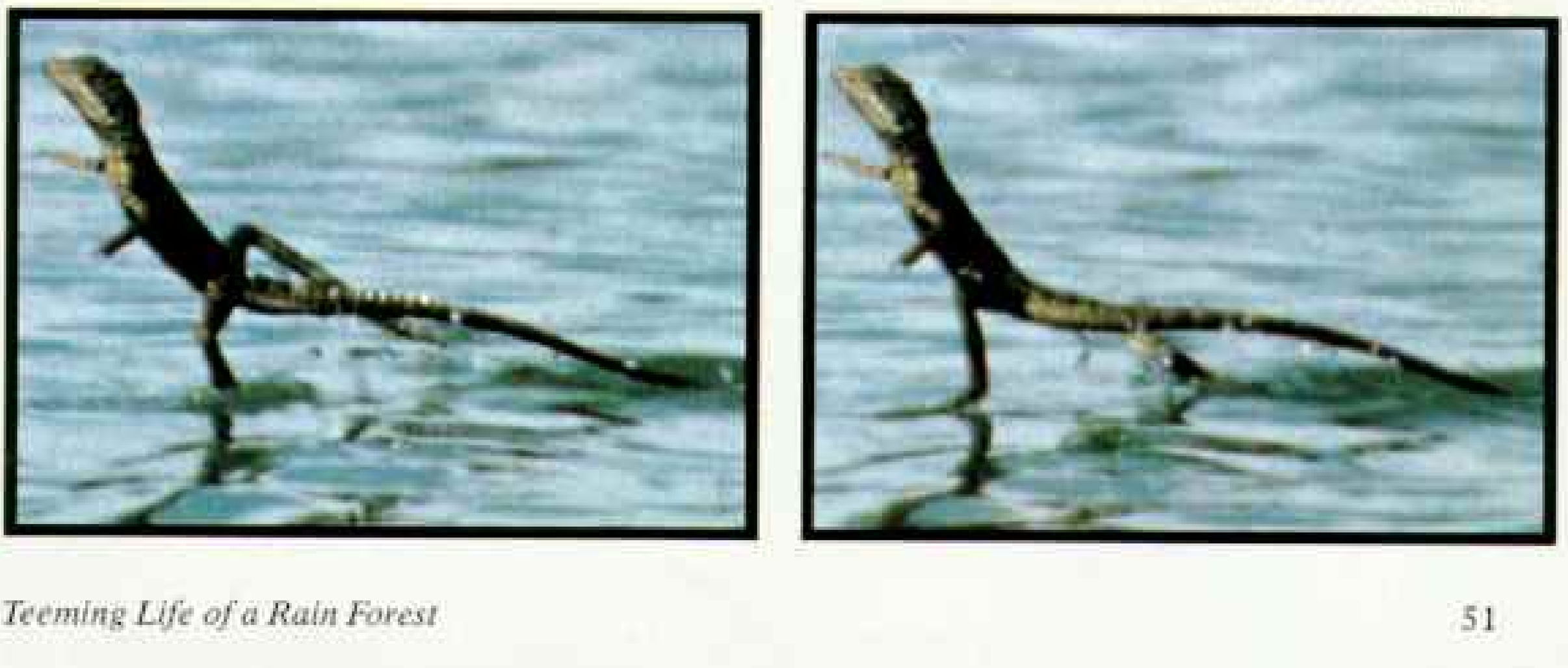
FROGS: DENDROBATES GRANULIFERUS, 2 CM (0.8 IN); MUSHROOM: CORNEIRA SULCIPES (BOTH FACING PAGE)

Water-skimming lizard

"JESUS CHRIST LIZARD," as the basilisk is often called in Central America, gets its name for its ability to dash across the surface of a stream (***above*** and ***right***). Rearing up on its hind legs, the basilisk stays on the surface by sheer blinding speed, using its long tail for balance. The lizard thus flees some of its rain forest predators—and takes its own prey by surprise.

National Geographic, January 1983

LIZARD: BASILISCUS BASILISCUS, 12 IN (3.5 FT); ABOVE BY JON GORDON FULLER, JR.



Partnership between ant and plant

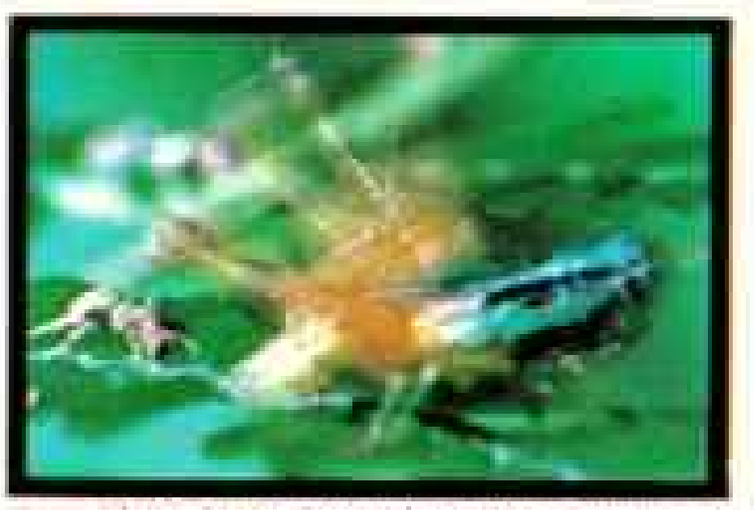
IN A WORLD of aggressors, specialized ants and swollen-thorn acacias have evolved an ingenious mutualism that assures the survival of both insect and tree. The acacia provides budlike leaflet tips called Beltian bodies (***right***), which the ants harvest as food for their young. The insects hollow out the tree's thorns when soft and green and thereafter raise their broods within. A worker carries a Beltian body into the nest (***left***), where it will be fed to the larvae (***below***).

The acacia lacks strong chemical defenses to repel damaging insects and demands unshaded sunlight for growth.

TREE: GENUS ACACIA, 6 M (20 FT); BY CAROL HUGHES, BRUCE COLEMAN, INC.

In exchange for food and lodging, the ants patrol the tree day and night. They put up an instantaneous, ferocious defense, biting and stinging invaders like this short-horned grasshopper (***bottom right***). They also attack encroaching plants, such as a vine (***center right***), that touch their host's foliage, clearing a circular swath for the tree to grow unfettered.

ANTS: PSEUDOMYRMEX FERRUGINEA, 1 CM (0.4 IN)



GRASSHOPPER: FAMILY ACRIDIDAE 2 CM (0.8 IN)

ANTS: ATTA CEPHALOTES, 14 MM (0.6 IN)

Leaf-cutting ants farm fungus gardens

RIDING SHOTGUN, a small leaf-cutting ant may be standing guard against enemies as another worker hauls away both it and a leaf (***above***). After slicing a fragment with scissorlike mandibles, an ant readies its load (***left***) for transport to the nest. There, a wide variety of leaves are cut up, chewed to a pulp, and laced with drops of body fluid. On this mulch grows the sole food of the colony—a fungus of only one species. Mysteriously, any spores that could contaminate the garden fail to develop.

ANT, PARAPONERA CLAVATA, 2 CM (0.8 IN), BY DONALD R. PERRY

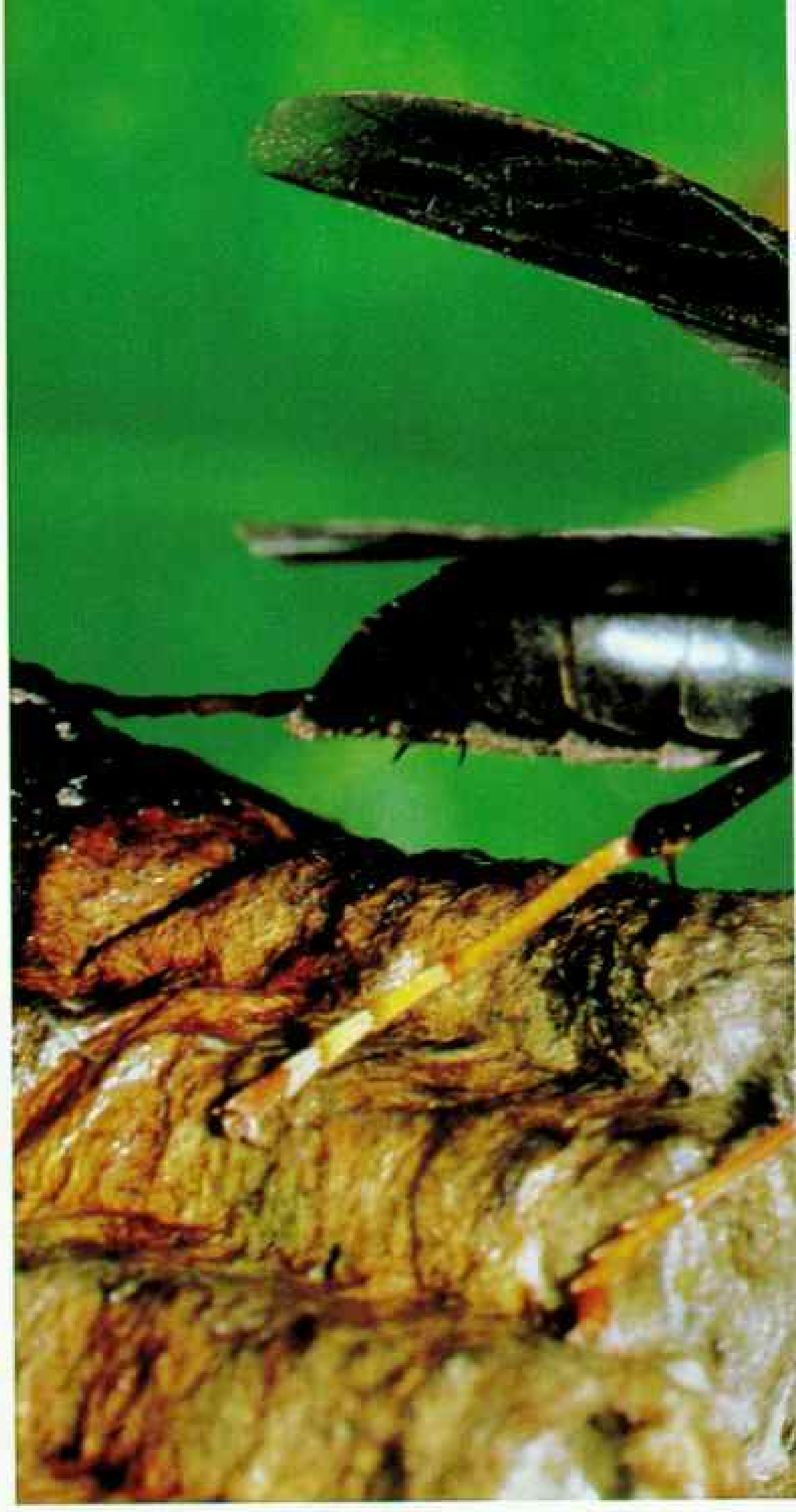
Quick death, and slow...

TERRIBLE curved fangs of a tarantula doom a katydid (***right***). The spider lunges forward and down, impaling its victim. It ejects first venom, then an enzyme to soften the meal.

An insidious fungus killed this stinging ant, still clutching a leaf in death (***above***). As the fungus invaded its body, the ant, unable to fight its invisible tormentor, appeared to lash out at the nearest target—the leaf. Afterward the victorious fungus sprouted from its neck. A lichen has also overgrown its mandible, as the jungle draws a green curtain over the macabre scene.

TARANTULA: FAMILY THERAPHOSIDAE, 9 CM (3.7 IN)

WASPS: POLISTES CANADENSIS, 2.5 CM (1 IN); KATYDID: FAMILY TETTIGONIIDAE, 3 CM



Wasps drink their nest dry

AFTER a rain shower, a paper wasp laps up water from the colony's nest and spits it away (**above**), thus preventing the nest from

disintegrating. Built of wood pulp, the nest hangs from a tree and attracts some prudent katydids (***above left***). They stay close during the day, probably to gain refuge from foes that shun the wasps. Over the stalk that attaches the nest to the branch, the wasps have smeared a black secretion (***left***) that repels some ants. Other species, however, stand ready to attack the nest and devour the developing wasps within.

Rare toads seek mates amid the clouds

LIKE NEON SIGNALS that flash from the dark floor of Monteverde, male golden toads await mates at a tiny pool. Since the species is nearly voiceless, it pays to advertise: The males' unmistakable color seems as effective as romantic croaking in luring females, who are attired in more demure green to black with scarlet spots.

Only in a small niche of this cloud forest does the golden toad exist. Here, when the clouds lie thick upon the heights, usually in April and May, mating takes place. Water trickles down the trees to create pools where females lay about 200 eggs. After fertilization by males, the embryos depend on a few more weeks of wet weather to maintain their aquatic nursery and allow them to mature.

The discovery of this new species in 1964 helped win government protection for Monteverde, threatened by encroaching development and land speculation. The extraordinary toads amazed biologists, including Jay M. Savage, who wrote in first describing them: "I must confess . . . my . . . disbelief and suspicion that someone had dipped the examples in enamel paint."

TOADS: BUFO PERIGLENES, 4.5 CM (1.8 IN.)

Challenging world of the frogs

STEALTHY THIEF purloins tadpoles-to-be. A cat-eyed snake greedily gulps a clutch of eggs (***below left***) that had been laid by a green leaf frog. A riot of color,

this species (***left***) usually extrudes and fertilizes its eggs on a leaf over water. Maturing young that escape the jaws of snakes drop into an aquatic world below.

In an amphibian wrestling match, poison-arrow frog males battle for dominance and mates (***below***). One challenger suddenly jumps another, and the pair grapples for hours before one croaks "uncle" and hops away. Poison-arrow frogs' vivid coloration warns predators of acute gastric distress should they make a meal of the toxic midgets.

SNAKE: LEPTODEIRA SEPTENTRIONALIS, 8.8 M (29 IN.); GREEN LEAF FROG: AGALYCHNIS CALLIDRYAS, 5 CM; POISON-ARROW FROG: DENDROBATES PUMILIO, 2.2 CM

Lofty haven among the trees

AQUATIC CRADLE in the sky awaits two poison-arrow tadpoles clinging to their mother's back (*left*). She will transport them up a tree that hosts a bromeliad plant, its leaves centrally cupped to hold rainwater. In it she immerses herself until her young release their grip to develop in the bromeliad's embrace.

A sunbeam spotlights the breathtaking elegance of a male quetzal in Monteverde (*right*). Long tail coverts, grown only by males, adorned royalty of many pre-Columbian Indians, who held the birds sacred. Aztecs depicted their god Quetzalcoatl, the Feathered Serpent, with a headdress of such plumes.

Quetzals carve nests in decaying tree trunks and feed on fruits and insects in mountain forests. The birds demand this high habitat for breeding. Where it has disappeared in Central America, so have they. But quetzals seem to be holding their own in Monteverde and some of Costa Rica's other 34 wildlife sanctuaries.

Perhaps the birds' example will spur other nations to spare more of their own rain forests, and to look more closely at the rich life within them. □

FROG: DENDROBATES GRANULIFERUS, 2 CM (0.8 IN); QUETZAL: PHAROMACHRUS MOCINNO COSTARICENSIS, 90 CM

What Future for the Wayana Indians?

Article and photographs by CAROLE DEVILLERS

SPOTTING the silvery gleam of a fish, Koyoweman slowly bends his bow and takes careful aim. Motionless, he awaits the proper moment. Suddenly his arrow comes to life, impales the prey, and drives it struggling to the bottom of the river. Dropping his bow, the young boy dives and returns seconds later with the fish in his hand and a victorious grin on his face.

As I watch, impressed by Koyoweman's skill, I wonder what future lies in store for him. By such means his people, the Wayana Indians, have survived for centuries in the remote rain forest of the Amazon region. Now, however, the Wayanas' distinctive culture is threatened with change and possible destruction by increasing pressure from the outside world. Very likely Koyoweman is practicing a dying art.

The Wayanas are a group of Indians of Carib stock numbering fewer than 1,000. Most of them live in scattered communities along the Maroni and Itany Rivers, between Suriname and the French overseas department of Guiana on the northern coast of South America (map, page 70). The Indians share the region peacefully with a tribe of Bush Negroes known as the Bonis, descendants of runaway African slaves from Suriname in the days when that country was a Dutch colony.

The Wayanas inhabit a shadowy world so dominated by rain forest that little of it is ever touched by sunlight. Canoes are virtually the only means of transportation in the network of rivers. To record the Wayanas' colorful way of life while it still survives, I have made my way to their home.

My introduction to the Wayanas came about through their adopted son, a 44-year-old Frenchman named André Cognat. In 1961, at the age of 23, Cognat quit his job as a steelworker in Lyon and set off to explore South America on foot and by canoe. He got as far as the Maroni River, where he capsized in treacherous rapids. He pulled himself half-drowned from the river and was later adopted by a Wayana couple.

From that moment Cognat devoted himself to the Indians. He was given a Wayana name—Antecume—and eventually married a Wayana woman and had a son named Lanaki. He established a small settlement known as Antecume Pata, or "Antecume's village," and began studying basic medical and dental techniques for the benefit of his adopted people. Over the years Cognat has served the Wayanas as housebuilder, nurse, medical adviser, tooth extractor, and

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Free-lance photographer and writer **Carole Devillers** was born and raised in France. She has made her home since in the United States, the Ivory Coast, Upper Volta, and, most recently, French Guiana.

Plastic brainteaser *joins the invasion of machine-age products into the rain forest home of South America's Wayana Indians. Here on the border of the nation of Suriname and French Guiana, a department of France, these Carib-speaking people cling to traditional ways, even as the 20th century brings change and threatens the survival of their culture.*

unofficial spokesman to the outside world.

In my research on the Wayanas I came across Cognat's name and wrote to ask his help in visiting them. Then I flew to Cayenne, the capital of French Guiana. There, after presenting a medical certificate saying I had no communicable diseases, I applied for government permission to visit the Wayanas. During the week it took me to obtain permission, I had to listen to dire predictions about what lay ahead for me.

"You're going alone? You're out of your mind! First thing you know, you'll be raped. You'll have to pay for every picture you take of the Indians. They'll shoot arrows at you, they'll steal your belongings, they'll. . . ."

I paid no attention. I had heard the same sort of warnings before, when I set out to visit a remote village in the Sahara.* Such predictions nearly always prove to be unfounded, and the ones in Cayenne were no exception.

Adopted Son Is True Wayana

After receiving permission to visit the Wayanas, I flew from Cayenne to Maripasoula, the last French administrative outpost on the Maroni River. There André Cognat met me, accompanied by two other Wayana men in a dugout canoe with an outboard motor.

Except for somewhat lighter hair and skin and a narrow beard, Cognat was indistinguishable from his companions. He was short and muscular, with shoulder-length hair and a kindly face that conveyed a sense of calm. Like his companions, Cognat wore only the traditional Wayana *kalimbe*—a red loincloth drawn between the legs and fastened by a cord around the waist.

Stowing my cameras and gear aboard the dugout, we cast off and headed upriver between lush green walls of forest on either bank. On the four-hour trip to Antecume

*See "Oursi, Magnet in the Desert," by Carole E. Devillers, in the April 1980 NATIONAL GEOGRAPHIC.

Foaming rapids *test the helmsman during a trip on the Maroni River, the Indians' main highway. Putting the Wayanas in closer touch with one another, outboard motors also increase their exposure to the outside world.*

Pata, Cognat spoke of his people with both affection and concern.

"Basically we are immigrants," he said with a faint smile. "The Wayanas once lived in northern Brazil and numbered about 3,000. In the 18th century another group called the Wayapis drove the Wayanas out, and they migrated here to Guiana. Only a few Wayanas still remain in Brazil.

"By 1950," Cognat continued, "diseases such as measles and tuberculosis had reduced the Wayanas here to fewer than 500. It looked as if they might simply disappear. In 1961 the French government established a medical program for the Wayanas and later restricted visits by tourists to reduce the risk of epidemics.

"Today we number about 770. Medical conditions have improved, but we face other serious problems, such as alcoholism and the breakdown of traditional life under increasing influence from outside, mainly on our young people."

When I mentioned the warnings I had received in Cayenne about the Wayanas, Cognat merely shrugged. "I have heard such things," he said. "They are ridiculous rumors, spread by ignorant people. But even those who visit the Wayanas rarely stay long enough to learn the truth about us. Several years ago two foreign reporters came for what was to be an extended visit. They did not last a month. I hope you will do better."

When we arrived at Antecume Pata, a number of villagers came down to the water's edge to meet us. Like their men, the Wayana women go naked above the waist, wearing only the *weyu*, an apron that leaves the buttocks exposed, or the *kamisa*, a short wraparound tied at the hip. Young Wayana women often wear both, and some have recently taken to adding Western-style underpants beneath their kamisas, obtained through mail-order houses or from local Boni merchants. As for Wayana children, until about the age of six most of them wear nothing at all.

Antecume Pata is a typical Wayana settlement. The village occupies a small clearing beside the Itany River, laboriously claimed from the forest by primitive means—handsaw, ax, and brush fire. Cognat explained that although the Wayanas are an agricultural people as well as hunters and fishermen, the soil is so poor that they have no permanent fields. Instead, they grow their

NATIONAL GEOGRAPHIC CARTOGRAPHIC DIVISION

***Conflict with a rival people** pushed the Wayanas from their ancestral home in the Tumuc-Humac region two centuries ago. Now most of their descendants cluster along the Maroni and Itany Rivers. Attempting to solidify claims to disputed territory occupied by the Wayanas (**map**), officials of French Guiana and Suriname compete for the Indians' allegiance by showering them with attention and gifts.*

*Once totaling in the thousands, the Wayanas here dwindled to fewer than 500 after contracting tuberculosis, measles, pneumonia, and other diseases from outsiders. Today, with dispensaries in three villages, their numbers are slowly rising. In Antecume Pata the village shaman is treated for a cut (**right**) by André Cognat, a Frenchman adopted by the Wayanas after his canoe capsized in 1961. Cognat stayed on and now acts as medical adviser, unofficial spokesman, and advocate for his people.*

crops—manioc, bananas, sugarcane, and yams—in temporary forest plots cleared by the slash-and-burn method.

Antecume Pata consists of eight families and as many houses, the latter raised on stout posts above the ground to protect them from rats and crawling insects. Furniture consists mainly of hammocks made of webbed cotton, which are slung inside the houses at night and in the space underneath during daytime for shade.

Guests in Wayana villages normally stay in the *tukusipan*, a communal hut used for special gatherings and ceremonies. But since I planned to stay several months, Cognat offered me a spare room in the small dispensary that he built and runs for the village at his own expense. Once I was settled in, he left me alone to become acquainted with Antecume Pata.

Indians Slow to Welcome Guest

It took some time. Although the whole village must have been curious about the new *palasisi*, as Wayanas call a Caucasian, even the children did not come to inspect me for several days.

Cognat had warned me not to become impatient. "The Wayanas are difficult for Westerners to deal with," he had said on the voyage upriver. "To outsiders we seem selfish and unpredictable, and we have a habit of mocking everything—ourselves, our friends, and especially strangers. It's our form of humor, and it takes some getting used to. Few outsiders ever manage it."

Gradually Antecume Pata's reserve seemed to thaw, and one memorable morning I was invited to go swimming in the rapids of the river.

"*Yepe, yepe, mehke!*—Comrade, comrade, come!" called a six-year-old named Ayupan from midstream as I strolled along the bank. He suddenly arched his naked bronze body against a moss-covered rock, letting the current sweep over him and crown him with a halo of flying droplets (pages 82-3).

Both the scene and the invitation were irresistible, and I slipped into the water some distance upriver from Ayupan. But I misjudged the current and suddenly found myself sucked away from the bank and launched downriver, bobbing like a cork.

Help! As I hurtled past Ayupan, I caught the flash of a puckish smile, and then I

Times of leisure *often call for rounds of kasili* ***(above)****, a mild brew made from manioc root. One imbiber, in foreground, displays perfect Wayana table manners by drinking to capacity, then intentionally vomiting to enable him to repeat the process. The Indians now battle alcoholism, blamed not on kasili but on a cheap, strong rum sold by river traders.*

Youths in T-shirts and jeans ***(left)*** *turn out for a New Year's dance that throbs with taped rock music. With cigarettes from Europe and the United States now widely available, smoking has increased at all age levels. A child puffs away* ***(right)****, his parents unconcerned. To protect the Wayanas from such corrupting influences, the government of French Guiana now restricts visiting tourists to two of the Indian villages.*

collided with a large rock and was pinned to it by the current. Glancing ashore, I discovered that nearly all Antecume Pata, adults as well as children, was enjoying my impromptu performance.

Finally I made it back to the bank amid the smiles and laughter of the gallery of spectators. There was nothing to do but join in the laughter, and I did so until we were all nearly out of breath. After a time we trooped back to the village together. Antecume Pata, it seemed, had accepted me.

From Poison Root to Cakes and Ale

In the days that followed, I began to take part in village life. From the women I learned such basic tasks as the preparation of manioc into food and drink.

In its natural state the manioc root contains a poison, hydrocyanic acid, which must be removed. The Wayanas extract the poison by peeling and grating the root into mush, then squeezing the mush in a tubular wicker press hung from an overhead beam. Once the poisonous juice has been extracted, the mush is turned into flour known as cassava and usually served as pancakes.

In addition to cassava, manioc supplies the Wayanas with their favorite beverage, a drink known as *kasili*. Kasili is made from fermented manioc root and is drunk by nearly everyone, children as well as adults. Women brew kasili, boiling the manioc in river water to remove the poison by evaporation. As the mash boils, the women chew cassava cakes and spit them into the pot so as to aid the fermentation process with saliva.

Kasili is allowed to "work" for several days—or for as long as the prospective drinkers can wait. The Wayanas are so fond of kasili that they deliberately drink to capacity, absorb the alcohol, then throw up and begin drinking again. Although kasili is not my favorite beverage, I learned to drink it politely whenever it was offered, which was frequently.

As I made friends among the villagers, I noticed that none ever called me by my name, Carole. To the younger ones I was either *yepe* (comrade) or *tasi* (sister) and to the older ones, *kami* (child).

In time I discovered the reason: To call me by name would be to single me out for notice by the *yolok*, evil spirits that lurk unseen among the Wayanas and to whom a spoken name conveys power over the owner. As a result, I too learned to use nicknames and indirect titles, such as "Ayupan's mother" or "the one who is with me."

Gradually my knowledge of Wayana life extended beyond the village, as I accompanied families on hunting expeditions and trips to harvest their fields some distance upriver. Through such trips I learned a great deal about living off the forest. My Wayana friends taught me how to find and collect iguana eggs by poking with a stick into the river's sandy beaches. I learned what insects produce the fattest, juiciest grubs and savored the crunchy texture of large ants eaten live. There was the delicate taste of wild honey fresh from the comb, the rich flavor of smoked iguana meat, and the sweetness of wild nuts and berries gathered in the cool of early morning in the forest.

Such knowledge and skills remain an integral part of Wayana life. Most men between the ages of 18 and 40 are employed as guides by French teams exploring Guiana's interior for minerals and other natural resources.

Such jobs pay well, enabling the Wayanas to buy outboard motors, guns, transistor radios, Western-style clothes, toys, expensive kitchenware—all the modern "conveniences" that are slowly infiltrating and changing their traditional way of life.

A quieter type of change is being carried on among the Wayanas by a young Frenchman named Jean-Paul Klingelhofer, who teaches primary school at a village near Antecume Pata. The school, the only one in French Guiana for Wayana children, is located in the village of Twanke, named for its headman.

During a visit to Twanke I spent several days with Jean-Paul and his 20 pupils, who come either from Twanke or by canoe from two neighboring settlements.

According to Jean-Paul, Wayana parents are well aware of the handicap that illiteracy represents in their growing contacts with the outside world. On the other hand instruction in French and other foreign subjects may weaken the children's sense of traditional values.

"That is why I teach the children to read and write phonetically in Wayana," Jean-Paul told me. "Of course I also teach them to

read and write French, which is the official school language. They are bright and eager to learn new things, but some subjects contradict what they have been taught at home. Arithmetic is a good example. In the Wayana language, numbers run only from one to ten, and anything above that is simply 'many.' Saving and planning ahead are also strange concepts to the Wayanas—who knows if there will be a tomorrow?"

A Yolok Keeps Husband Home

In addition to his teaching duties Jean-Paul occasionally serves as the local doctor.

On my second morning at the school a teenage boy named Tuwa rushed in and exclaimed: "Jean-Paul, my mother is about to die—she even stopped breathing!"

Grabbing his small medical kit, Jean-Paul called his wife, Francoise, and we followed Tuwa to his house. There indeed we found his mother, lying pale and motionless in her hammock, while her weeping husband held her hand.

All was confusion, with neighbors shouting, children crying, and headman Twanke adding to the din by firing off a shotgun into the air.

After a brief examination Jean-Paul assured everyone that Tuwa's mother would be all right. Turning to me, he said quietly: "She has only a little fever, and her pulse is normal. It's really psychosomatic. Her husband has been running around with other women too much lately, and she's making a scene to get his attention."

In their usual state of undress, *young boys kick a ball in a downpour. Playtime still includes practice with bows and arrows, but adults now hunt mostly with shotguns obtained from the governments or bought with wages earned as guides on scientific expeditions into the bush.*

Despite Jean-Paul's diagnosis a shaman was called to exorcise the yolok that had obviously taken possession of Tuwa's mother. A small shelter of palm leaves was erected outside Tuwa's house. That night, on the shaman's orders, the patient was rubbed on the stomach, palms, and feet with gratings from a small tuber, and cotton thread was tied around her elbows, wrists, ankles, and toes. Then she was carried into the shelter to join the shaman.

There followed a wild rustling of the palm leaves, accompanied by loud sucking and roaring sounds, proof of the violent struggle between the shaman and the yolok. Eventually the shaman emerged carrying what appeared to be a small black pebble, which he said had caused the patient's illness and which he had exorcised from her body.

The husband's misbehavior was never mentioned.

The Wayanas take such matters casually and even tease one another about supposed infidelities. During my time in Antecume Pata, I stayed awhile with an older couple and helped the wife with daily chores. Then I visited another village and was given a ride back by two young Wayana men in their dugout. Later the wife teased me.

"Tasi, your coming and going all the time is just not right," she said, trying to hide a smile. "You are my husband's second wife, and now I see you coming home with two young men. What is that all about? Either you stay where you belong or you leave, that's all there is to it!"

Families Suffer Effects of Rum

One very serious family problem among the Wayanas is drinking. One afternoon I saw headman Twanke on his return from a trip to Maripasoula. He was staggering across the village toward his house with the help of a neighbor. When they reached the stairs, Twanke had to be half-carried up them and led inside to be deposited in his hammock.

My first thought was that Twanke was sick, but a village woman knew better. "He is drunk!" she said with disgust. "Our village headman, drunk! But he is not the only one—other village leaders do the same."

The problem, I learned, was not kasili but tafia, a cheap rum sold in Maripasoula and

Fabric of everyday life *finds domestic chores widely shared. A woman* ***(facing page)*** *spins cotton, which she will weave into hammocks, chief furniture of the home. Men construct baskets and other straw goods. A man toting a youngster* ***(above)*** *is a common sight since males help with child care. Authority is also shared; the village headman functions mainly as a mediator and seeks a consensus for major decisions.*

Soothing grief, *a woman uses a cake of dye called roucou* ***(above)*** *to anoint Indians of Twanke, marking the end of the mourning period for the deceased wife of the village headman. Made of crushed seeds in a nut oil base, roucou takes days to wear off. Later, ritual bathing in the river* ***(left)*** *begins a celebration enlivened by prodigious drafts of kasili.*

The manioc plant used for making the traditional drink also supplies a staple of the Wayana diet—cassava cakes. Besides manioc, the Indians grow sugarcane, bananas, and yams on fields cleared by the slash-and-burn method. The plots are used until the thin rain forest soil is exhausted, then abandoned for new ones. The forest offers nuts, eggs, and insect larvae for the taking.

Crucible of pain *called marake ushers a girl into adulthood* (**right**). *As her husband holds her hands, her grandmother administers the sting of black ants embedded in a frame. After the ritual, the hair of another initiate is shorn* (**above**), *signaling a time of seclusion and fasting. Males also endure the rite, designed to test the ability to withstand the rigors of life. Some submit to marake several times during their lives.*

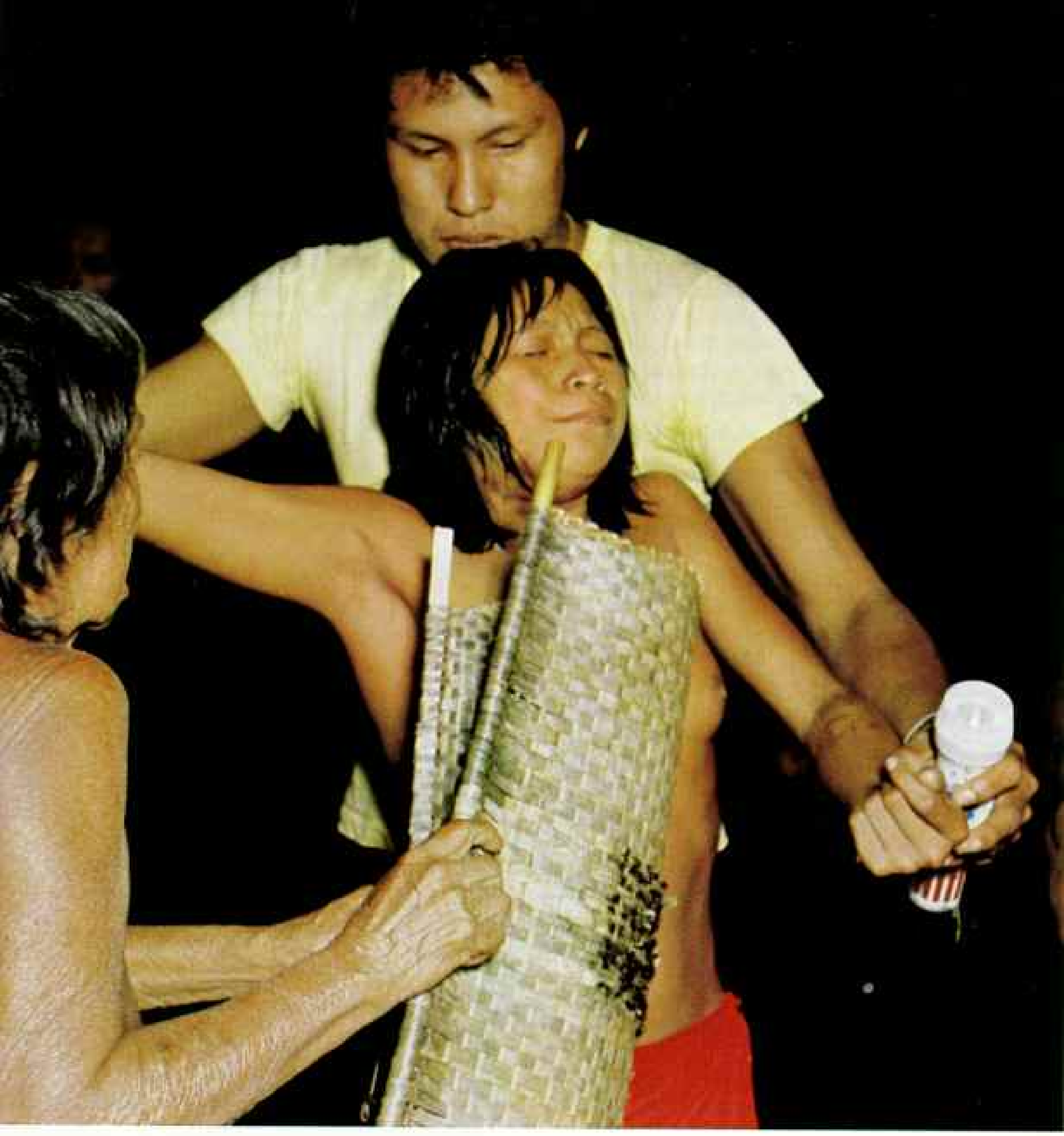
other places along the river. Wayana men, accustomed to the relatively mild effects of fermented kasili, cannot cope with the distilled power of tafia.

One father, a normally gentle man, has been known to beat his whole family after a few drinks. "Kasili makes you happy," declares the man's son grimly. "Tafia makes you mean."

Other problems besides alcoholism darken the future of the Wayanas, among them the growing influx of tourists. Since 1971 foreigners have been allowed to visit two villages near Maripasoula—Aloike and Elahe.

A Traditional Culture Demeaned

Here increasing numbers of tourists regularly descend on the villages' few families and behave like visitors in a zoo. They bribe the bare-breasted women to pose for pictures with them and pay men to do the same brandishing hunting bows and arrows that they long ago abandoned in favor of shotguns. The effect on the Wayanas is one of



degradation, not merely in their own eyes but in those of their children, on whom the future of their culture depends.

Probably the worst display of outside influence on the traditional Wayana way of life occurred on New Year's Day at Anapaike, a village on the Suriname side of the Maroni River. I joined some 200 Wayanas there, gathered from other villages for a three-day celebration that seemed to borrow the very worst from the outside world.

Absolute bedlam greeted me at Anapaike. The newest hard-rock hits blared at ear-splitting level from three entertainment booths filled with young Wayana men and women swaying and gesticulating like puppets in T-shirts, jeans, dark glasses, and Afro wigs (page 72).

Most of the young people smoked and drank, but I was not prepared for the sight of one five-year-old I knew. He stood calmly puffing on a cigarette beneath his parents' seemingly unconcerned gaze.

It is hard to assess the long-range effects of

such developments, but the signs are ominous. Several days after the New Year's celebration an 18-year-old from Anapaike named Yoiwet tried to hang himself. He was discovered in time by a fellow villager and saved. He remarked later that his life seemed so beset by problems that he could no longer cope with them. The news was deeply distressing to Cognat, not only because Cognat had helped to raise Yoiwet as a child, but also because three other youths from Anapaike had succeeded in killing themselves during the previous year.

Ant Test Binds Wayanas Together

At least one custom here remains unchanged and constitutes a powerful force for preserving the group's cultural identity. Known as *marake*, or the "ant test," the ceremony is administered for the first time to children at the age of puberty.

Marake begins with dancing and the recounting of myths. The child is given kasili to drink to lighten the ordeal that follows. A *kunana*, a wicker frame with as many as a hundred stinging ants inserted in it, is applied to all parts of his or her body. The recipient is expected to remain both silent and still—the ultimate test of a true Wayana.

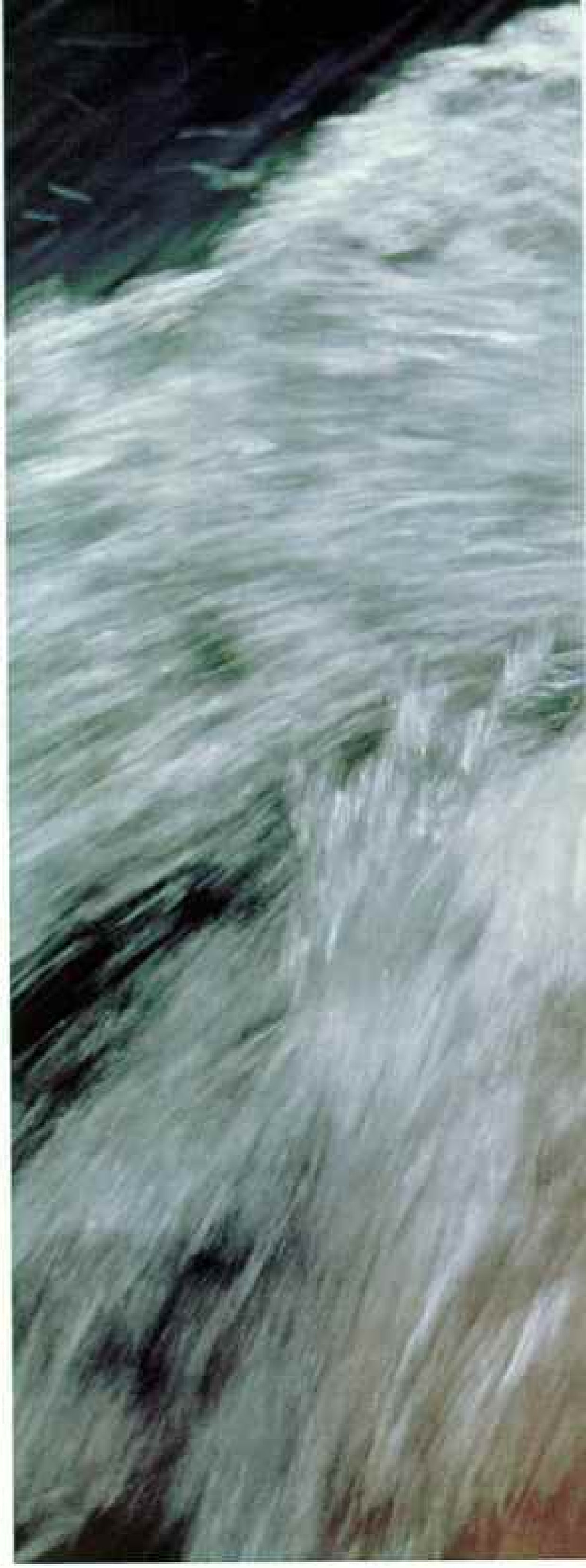
While such customs prepare young Wayana men and women for physical hardship, the question remains whether they can survive the moral and psychological pressures increasingly thrust on them by the outside world.

Cognat is concerned but hopeful. "So long as we continue traditions like marake," he told me, "we will keep our identity and our spiritual strength. The day marake goes, that day will be the end of the Wayanas."

My four months among the Wayanas came to an end, and I said good-bye to Cognat and my other friends. Tuwa, the young boy from Twanke, was one of the last to say good-bye. Although as a teenager Tuwa is particularly exposed to pressures from the outside world, he remains among the most devoted to his people's traditions.

"Tasi," he said, "how many seasons before you come back to us? No matter when you return, we will still have marake and we will still be Wayanas—you can always count on that."

I wish I could be as certain. □



As if lost in a daydream, *a six-year-old boy luxuriates in the cascading Itany. Though the future of his people is in doubt, anthropologists are impressed*

by the Wayanas' ability to absorb the ways of civilization while keeping a strong cultural identity. At the school in Twanke, children are taught to read and write in French as well as Wayana. But they take pride in using their native language when writing to express their deepest feelings.

WASHING
HOMETOWN BEHIND

WASHINGTON is the dreaming capital of America, stuffed with exiles who are always saying it's about time to go home but never go. The years turn into decades, and those who came for an extra year or two of school, or for some temporary job, tend at the last to be carried out feet first with, I am obliged to report, a grin on the face.

Let's poke about the capital, you and I, with the understanding that I am no efficient guide, to insist that the only place you may eat is Old Keggut's and the only place to stay is Dandydown's Inn; the truth is, I have no idea the best places to eat or to stay. Newspaperfolk seldom do.

But I have indeed come to believe that the best place (as Eudora Welty said in a novel, through the character of a Mississippi schoolteacher herding kids about in a tornado) is here; we're in the best place right here.

Assuming you arrive in Washington at National Airport, the first thing to do, once one has thanked God the plane landed, is to admire the banks all fringed with willows like some sweet domesticated Babylon. The airport illustrates, by the way, the shortcomings of official high-priced wisdom and analysis.

Franklin Roosevelt, a forward-looking sort of man, immediately wanted five new hangars built. For that matter, back in 1937, he asked some of the powerful brains of the capital to prepare a forecast of technology, and after suitable pondering they announced to him that people did not wish to fly any faster than they were doing in the 1930s, but people would indeed require far greater refinements of service and luxury.

So much for the common crystal ball of Washington: After the airport opened in 1941, people said it was vastly too large, except for temporary war traffic. For decades, however, the same people have complained it is far too small. And it has turned out that we insist on going three times as fast and the only luxury we require in flying now is to get out of the plane without being permanently pressed into the shape of a sardine.

SINCE we should start somewhere, let's start with Mr. Ernest Kroll, a typical Washington citizen to end all typical citizens, partly because he's a trifle off the standard curve. Let's catch him as he exits from the Western Market, a neighborhood grocery, with two pears that he spent too much money for.

"Good pears," he will greet us. "Cost too much, but they're the kind they wrap in paper. I like to go in that grocery and buy some little thing to encourage them. I hate to see the city taken over by the giants. You ever deal with the Foggy Bottom grocery?

TON, D.C.
THE MONUMENTS

By
HENRY
MITCHELL

Photographs by
ADAM
WOOLFITT

Down by the State Department, I used to buy cigars there, when my doctor let me buy cigars. It's a mid-19th-century building. Again, you have to keep the big chains from running absolutely everything.

"Me? I'm one of those native New Yorkers who doesn't prefer New York. New York was a place for immigrants to land. They should have fanned out from there, but instead they just built straight up. I had never thought of Washington till the Navy called me in 1941, and here I came. Five years later I joined the State Department and worked there a quarter century.

"I'm like most people around here. I got Potomac fever. Washington is an atypical city. An inch or two of snow can bring traffic to a virtual halt, but winter is mild with a spoiled sky. You should be honest and tell everybody about *(Continued on page 92)*

***The city of Washington's** business is power, and its industry is government; it lives on floodlights and newsprint. But behind the public facade is a private town of family events, like a gala wedding at Mount Moriah Baptist Church **(left)**, of third generation friendships, and a firm feeling of patria for those who call it home.*

Henry Mitchell, a native, brings wry and witty perceptions of the city's life to readers of the "Washington Post." British photographer Adam Woolfitt, all but a stranger, was asked to view the city as he would any other—his panorama is humane, warm, and sometimes whimsical.

A capital moment *came in the John F. Kennedy Center for the Performing Arts in 1981 when Mstislav Rostropovich, center, cellist and music director of the National Symphony Orchestra, embraced Maxim Shostakovich, right, guest conductor, and Maxim's son, Dmitri, pianist. They performed works by Maxim's father, the late Dmitri Shostakovich, to celebrate the 75th year of his birth. All are exiles from the U.S.S.R.*

Such moments are far from rare in what was once a small town on the Potomac, now grown to a sophisticated international city. Opera, symphony, dance, and theater programs abound, as well as free classical and pop concerts, an alive-and-well jazz scene, a vigorous network of art museums and galleries, spirited repertory theater and dance, and seven universities. The city's character, rooted in quiet neighborhoods in the shadow of national monuments, transcends the veneer of a powerhouse for transitory governments. Beneath the political clatter of "dateline Washington," there lives a surprisingly divergent population of 640,000, who use and enjoy the city as a special kind of hometown.

Washington, D. C.

Skipping into summer, *children jump rope on Fourth Street Northwest. Locally called D. C. or the District, this city is 70 percent black—highest of any large city in the U. S. Although the biggest influx of blacks followed World War II, they have been resident since the early 1800s, and by 1840 free blacks outnumbered slaves by nearly three to one.*

Today's minorities in D. C. include growing numbers of Hispanics and Asians. Increasingly, as large black families move to the suburbs, white singles, couples, and small families move into town. The net result is that in the past ten years the city's population has fallen by about 16 percent, while the surrounding counties in Maryland and Virginia have increased an average of 12 percent.

Not until 1973, some 20 years after the end of legal segregation and a century after Congress assumed power over local government, did Washingtonians begin to live under majority rule, in a not quite independent entity where Congress still holds many of the purse strings.

The District is also home to more specialized minorities: diplomats, TV and print journalists, restaurateurs, lawyers, lobbyists, and international bureaucrats—an endless list.

As the capital, Washington keeps continuity with the nation's history and reflects its restless nature. While many call it home, only about a third of its residents were born here.

The outer city, *a circle of suburban counties in Virginia and Maryland, is home to nearly two and a half million people, or four out of five metropolitan Washingtonians. Near the Jefferson Memorial, highway and rail bridges cross the Potomac into*

THIS AND OTHER AERIAL PHOTOGRAPHS TAKEN FROM GOODYEAR BLIMP

Arlington County, Virginia, where a high-rise area called Crystal City fills the horizon. The second bridge from the left will soon carry office workers into the federal city aboard a new surface leg of Metro, a 101-mile subway system now 40 percent complete.

Washington, D. C.

(Continued from page 85) summer. There are nights you either stay up all night or do something about it." Such as turn on the fan.

Since he insists, it should be said that summers are Washington's best times. At 86 degrees, people stalk about close to fainting and complaining of Turkish baths, because most of the city is no longer made up of Southerners but penguins. At our own house we never turn on the air conditioning except

Number one: *Marion Barry, Jr., left, here in campaign form, is the second elected black mayor in D. C.'s history. For more than a century—until home rule in 1973—executives were appointed by the President. Although the District sends a nonvoting member to Congress, a proposed constitutional amendment calls for full representation. A stormier debate: Should D. C. become the 51st state?*

around Labor Day for two or three days. July is particularly enchanting, with white cabbage butterflies and bronze and blue and green dragonflies hovering about and the mockingbirds still singing at three in the morning and the sky blue but sometimes black with occasional downpours as in Panama or New Orleans and hollyhocks down the alleys and hounds asleep on the warm bricks. Paradise. And if you're put together all wrong, you can, of course, try air conditioning, but that way you miss everything.

Anyway, one day Kroll strolled down Pennsylvania Avenue, the city's ceremonial avenue that runs from the Capitol past the White House, in search of an inscription he'd heard about in the pink granite of Western Plaza. The quotation was familiar:

How shall you act the natural man in this
Invented city, neither Rome nor home?

The words were familiar because he'd written them himself, and sure enough there was his name carved into the stone.

"It was a surprise," he will tell you, "since they don't use inscriptions in parks or on monuments by living writers. They just assumed I was dead. I told them I was not dead and the poem was copyrighted. They said my, my, or something. Of course I was greatly honored, and gave approval to use the quote and no harm was done. Except if they'd known I was alive, they might have invited me to the party when they dedicated the plaza."

STILL, immortality in stone is something, even if they assume you're dead and you miss the party. Kroll's sentiment is flawless for the folk of this city, the three million of us in the metropolitan area, including 640,000 in the city limits.

For most, it is not strictly home. We come from somewhere else. And it's not strictly Rome either, or Jerusalem. There is nothing ancient and little holy about the city, which was designed for one great purpose—politics. It can take a long time for politics to sanctify a city with hallowed memories.

The mayor himself, Marion Barry, was a country boy, or at least grew up in Memphis, which as far as the East Coast is concerned is somewhere near the Yucatán Peninsula.

"My family still lives there," he says, and if you ask him in what ways he finds Washington more rewarding than his old home, he suggests modestly that "it has a wonderful government" and feel free to quote him. In fact, he was educated at LeMoyne-Owen College in Memphis and became involved with the Student Nonviolent Coordinating Committee, rose in that specialized hierarchy, and wound up in Washington at just the time for black mayors to be elected.

Marion Barry had an image as a radical in the sixties. Now he is concerned about such establishment things as "the mix" in redeveloping the city's old downtown with a blend of offices, hotels, theaters, apartments, and so on. A new Convention Center, leveling several blocks east of the present commercial center, is part of the old downtown revitalization plan. The new building is to be ringed with hotels and stores and wonders in general—and it (Continued on page 99)

HEART OF OUR NATION'S CAPITAL

1 AMERICAN RED CROSS C6
2 ANTHONY HOUSE A6
3 ARENA STAGE F9
4 ARLINGTON HOUSE (ROBERT E. LEE MEMORIAL) E1
5 ARLINGTON MEMORIAL AMPHITHEATRE F1
6 ARLINGTON NATIONAL CEMETERY – VISITORS CENTER F2
7 ARTS AND INDUSTRIES BLDG. D9
8 BELLEVUE HOTEL B11
9 BEST WESTERN (B'W) MID-TOWN A8
10 B'W HOSSLYN WESTPARK B1
11 B'W SKYLINE INN F11
12 BLAIR HOUSE B6
13 BOTANIC GARDEN D10
14 BUREAU OF ENGRAVING AND PRINTING E7
15 CAPITAL CHILDREN'S MUSEUM B12
16 CAPITAL HILTON HOTEL A7
17 CAPITOL HILL HOTEL D12
18 CAPITOL PARK INTERNATIONAL F10
19 CHANNEL INN F9
20 CHESAPEAKE AND OHIO CANAL A1–3
21 CITY POST OFFICE B11
22 COLUMBIA HOSPITAL FOR WOMEN A4
23 CONSTITUTION HALL (DAR) C6
24 CORCORAN GALLERY OF ART C6
25 DECATUR HOUSE B6
26 DEPT. OF AGRICULTURE D8
27 DEPT. OF COMMERCE C7
28 DEPT. OF EDUCATION D9
29 DEPT. OF ENERGY D8
30 DEPT. OF HEALTH AND HUMAN SERVICES D10
31 DEPT. OF HOUSING AND URBAN DEVELOPMENT E9
32 DEPT. OF JUSTICE C8
33 DEPT. OF LABOR C10
34 DEPT. OF STATE C6
35 DEPT. OF THE INTERIOR C6
36 DEPT. OF TRANSPORTATION E9
37 DISTRICT BUILDING C7
38 D. C. COURTHOUSE C9
39 ENVIRONMENTAL PROTECTION AGENCY F10
40 FEDERAL AVIATION ADMINISTRATION B9
41 FBI BUILDING C8
42 FEDERAL RESERVE BOARD C5
43 FEDERAL TRADE COMMISSION C9
44 FISH WHARF E8
45 FOLGER SHAKESPEARE LIBRARY D12
46 FOOD AND DRUG ADMINISTRATION B10
47 FORD'S THEATRE B8
48 FOUR SEASONS HOTEL A3
49 FREER GALLERY OF ART D8
50 GENERAL ACCOUNTING OFFICE B10
51 GENERAL SERVICES ADMINISTRATION B6
52 GEORGE WASHINGTON UNIVERSITY HOSPITAL B4
53 GWU LISNER AUDITORIUM B5
54 GWU MARVIN CENTER AND THEATRE B5
55 GWU SMITH CENTER B4
56 GEORGETOWN MARBURY HOUSE A3
57 GOVERNMENT PRINTING OFFICE B11
58 GREYHOUND BUS TERMINAL B8
59 GUEST QUARTERS – NEW HAMPSHIRE AVE. B4
60 GUEST QUARTERS – PENNSYLVANIA AVE. A4
61 HARRINGTON HOTEL C8
62 HAY-ADAMS HOTEL B6
63 HIRSHHORN MUSEUM AND SCULPTURE GARDEN D9
64 HOLIDAY INN (H'I) CAPITOL E9
65 H'I KEY BRIDGE B1
66 H'I THOMAS CIRCLE A7
67 HOUSE OFFICE BLDGS. D11
68 HOUSE WHERE LINCOLN DIED B8
69 HOWARD JOHNSON'S MOTOR LODGE B4
70 HYATT ARLINGTON C1
71 HYATT REGENCY C11
72 INTERNAL REVENUE SERVICE C8
73 INTERNATIONAL INN A8
74 INTERSTATE COMMERCE COMMISSION C8
75 INTRIGUE HOTEL B4
76 IWO JIMA MEMORIAL D1
77 JEFFERSON HOTEL A6
78 JEFFERSON MEMORIAL E7
79 JOHN F. KENNEDY CENTER C3
80 KENNEDY GRAVE SITES E1
81 LIBRARY OF CONGRESS D12
82 LINCOLN MEMORIAL D4
83 LOEWS L'ENFANT PLAZA HOTEL E9
84 LOMBARDY TOWERS HOTEL A5
85 MADISON HOTEL A7
86 MARTIN LUTHER KING MEMORIAL LIBRARY B8
87 MARRIOTT HOTEL KEY BRIDGE B1
88 MARRIOTT HOTEL WASHINGTON A5
89 MAYFLOWER HOTEL A6
90 MUNICIPAL CENTER C10
91 MUSEUM OF AFRICAN ART C12
92 NATIONAL ACADEMY OF SCIENCES C5
93 NATL. AERONAUTICS AND SPACE ADMIN. D9
94 NATIONAL AIR AND SPACE MUSEUM D8
95 NATIONAL AQUARIUM C7
96 NATIONAL ARCHIVES C9
97 NATIONAL CAPITAL PARKS – E 77
98 NATIONAL CITY CHRISTIAN CHURCH A7
99 NATL. GALLERY OF ART C8
100 NATIONAL GALLERY OF ART – EAST BLDG. C10
101 NATIONAL GEOGRAPHIC SOCIETY A6
102 NATIONAL GUARD ASSOCIATION B11
103 NATIONAL MUSEUM OF AMERICAN ART D8
104 NATIONAL MUSEUM OF AMERICAN HISTORY C8
105 NATIONAL MUSEUM OF NATURAL HISTORY D8
106 NATIONAL PORTRAIT GALLERY D8
107 NATIONAL SCIENCE FOUNDATION B6
108 NATIONAL THEATRE B8
109 NETHERLANDS CARILLON B5
110 NEW EXECUTIVE OFFICE BLDG. B6
111 OCTAGON HOUSE B6
112 OFFICE OF PERSONNEL MANAGEMENT C5
113 OLD ADAS ISRAEL SYNAGOGUE B10
114 OLD EXECUTIVE OFFICE BLDG. B6
115 OLD POST OFFICE C8
116 OLD STONE HOUSE A3
117 OLD WASHINGTON CIRCLE HOTEL A4
118 ORGANIZATION OF AMERICAN STATES (PAN AMERICAN UNION) C6
119 PAN AMERICAN HEALTH ORGANIZATION B4
120 PARK CENTRAL HOTEL B6
121 PENSION BUILDING (NATIONAL BUILDING MUSEUM) B10
122 QUALITY INN CAPITOL HILL C11
123 RAMADA RENAISSANCE HOTEL A5
124 RENWICK GALLERY B6
125 RIVER INN A4
126 ROBERT A. TAFT MEMORIAL C11
127 ST. JOHN'S CHURCH LAFAYETTE SQUARE B7
128 ST. MATTHEW'S CATHEDRAL A6
129 SMITH OFFICE BLDGS. C11–12
130 SEWALL-BELMONT HOUSE C6
131 SHERATON-CARLTON HOTEL A7
132 SHERRY TOWERS HOTEL B5
133 SIGNERS OF THE DECLARATION MEMORIAL C6
134 SMITHSONIAN INSTITUTION CASTLE D8
135 SOUTHEASTERN UNIVERSITY F9
136 SUPREME COURT D12
137 SYLVAN THEATRE D7
138 THEODORE ROOSEVELT MEMORIAL B2
139 THOMPSON BOAT CENTER B3
140 TIDAL BASIN PADDLE BOATS E7
141 TOMB OF THE UNKNOWN SOLDIER F1
142 TRAILWAYS BUS TERMINAL B8
143 TREASURY DEPT. B7
144 TRUXTUN-DECATUR NAVAL MUSEUM B6
145 UNION STATION B11
146 U. S. CAPITOL D11
147 U. S. COURT HOUSE C10
148 U. S. AND D. C. COURT BLDGS. B,C10
149 U. S. POSTAL SERVICE E8
150 U. S. VETERANS ADMIN. B7
151 VETERANS OF FOREIGN WARS MEM. BLDG. C12
152 VIETNAM VETERANS MEMORIAL C5
153 VISTA INTERNATIONAL HOTEL A7
154 WARNER THEATRE B8
155 WASHINGTON BOAT LINES F9
156 WASHINGTON CIRCLE INN A4
157 WASHINGTON CONVENTION CENTER B8
158 WASHINGTON HOTEL B7
159 WASHINGTON MARINA E8
160 WASHINGTON MONUMENT D7
161 WASHINGTON POST A7
162 WATERGATE COMPLEX 33–A
163 WATERGATE HOTEL B3
164 WHITE HOUSE B7
165 YWCA B9
166 ZERO MILESTONE C7
32 QUEST QUARTERS ALEXANDRIA F3
33 HADLEY MEMORIAL HOSPITAL D6
34 HILTON-WASHINGTON C5
35 HOLIDAY INN (H'I) BETHESDA A4
36 H'I CHEVY CHASE B4
37 H'I CENTRAL C6
38 H'I GEORGETOWN C5
39 H'I NATIONAL AIRPORT E5
40 H'I OLD TOWN F5
41 H'I SILVER SPRING A8
42 H'I TELEGRAPH RD. F5
43 H'I TYSONS CORNER C1
44 HOLY CROSS HOSPITAL A6
45 HOSPITAL FOR SICK CHILDREN C7
46 HOSPITALITY HOUSE E5
47 HOWARD JOHNSON'S – NATIONAL AIRPORT E5
48 HOWARD UNIVERSITY HOSPITAL C6
49 HYATT REGENCY CRYSTAL CITY E5
50 ISLAMIC CENTER (MOSQUE) C5
51 JEFFERSON MEMORIAL HOSPITAL B4
52 JOHN PHILIP SOUSA BIRTHPLACE D6
53 KENILWORTH AQUATIC GARDENS G8
54 LELAND MEMORIAL HOSPITAL B8
55 LINDEN HILL HOTEL A4
56 MARRIOTT BETHESDA A4
57 MARRIOTT CRYSTAL CITY E5
58 MARRIOTT CRYSTAL GATEWAY E5
59 MARRIOTT TWIN BRIDGES D5
60 MARRIOTT TYSONS CORNER C1
61 NASA GODDARD SPACE FLIGHT CENTER B10
62 NATIONAL DEFENSE UNIVERSITY B6
63 NATIONAL ORTHOPEDIC AND REHABILITATION HOSPITAL E11
64 NATIONAL PRESBYTERIAN CHURCH C4
65 NATIONAL SHRINE OF THE IMMACULATE CONCEPTION C6
66 NAVY MEMORIAL MUSEUM D6
67 NORTHERN VIRGINIA DOCTORS HOSPITAL E3
68 OLD PRESBYTERIAN MEETING HOUSE F5
69 PHILLIPS COLLECTION C5
70 PRINCE GEORGES GENERAL HOSPITAL C8
71 PROVIDENCE HOSPITAL C7
72 QUALITY INN (Q.I) CENTRAL D4
73 QI PENTAGON CITY E5
74 RAMADA HOTEL OLD TOWN F5
75 RAMADA HOTEL TYSONS C1
76 RITZ-CARLTON (FAIRFAX HOTEL) C5
77 ROBERT F. KENNEDY MEMORIAL STADIUM D7
78 ROCK CREEK NATURE CENTER B5
79 SCOTTISH RITE TEMPLE C6
80 SHERATON NATIONAL B5
81 SHERATON-NORTHEAST B10
82 SHERATON-NORTHWEST A6
83 SHERATON-WASHINGTON C5
84 SHOREHAM HOTEL C5
85 SIBLEY MEMORIAL HOSPITAL C4
86 SILVER HILL MUSEUM E8
87 STOUFFER'S NATIONAL CENTER HOTEL E5
88 SUBURBAN HOSPITAL A4
89 TITANIC MEMORIAL D6
90 TORPEDO FACTORY ART CENTER F5
91 U. S. NAVAL OBSERVATORY C5
92 U. S. NEWS & WORLD REPORT D5
93 VETERANS ADMINISTRATION HOSPITAL C6
94 VICE PRESIDENT'S HOUSE C5
95 WASHINGTON ADVENTIST HOSPITAL B6
96 WASHINGTON HOSPITAL CENTER C6
97 WASHINGTON NATIONAL CATHEDRAL C5

WASHINGTON INSIDE THE BELTWAY

1 ALEXANDRIA HOSPITAL F4
2 ARLINGTON HOUSE D3
3 BEST WESTERN (B'W) ARLINGTON E4
4 B'W EXECUTIVE HOUSE C5
5 B'W TYSONS WESTPARK C1
6 BICENTENNIAL CENTER F5
7 BOYHOOD HOME OF ROBERT E. LEE F5
8 CAPITOL HILL HOSPITAL D6
9 CARLYLE AND RAMSAY HOUSES F5
10 CARTER BARRON AMPHITHEATRE C5
11 CENTRAL INTELLIGENCE AGENCY B3
12 CHILDREN'S HOSPITAL C6
13 CHRIST CHURCH (ALEXANDRIA) F5
14 CHRIST CHURCH (CAPITOL HILL) D6
15 CIRCLE TERRACE HOSPITAL B4
16 DAYS INN F3
17 DEFENSE MAPPING AGENCY C3
18 D. C. ARMORY D7
19 D. C. GENERAL HOSPITAL D7
20 DOCTORS' HOSPITAL OF PRINCE GEORGES CO. B10
21 DUMBARTON OAKS C5
22 DUPONT PLAZA HOTEL C5
23 EMBASSY ROW HOTEL C6
24 FAIRFAX HOSPITAL E1
25 GADSBY'S TAVERN F5
26 GEORGETOWN HOTEL C5
27 GEORGETOWN UNIVERSITY HOSPITAL C5
28 GEORGE WASHINGTON MASONIC NATIONAL MEMORIAL F5
29 GLEN ECHO PARK B3
30 HAMERICA INN D5
31 GREATER SOUTHEAST COMMUNITY HOSPITAL E7

NATIONAL GEOGRAPHIC MAGAZINE
WASHINGTON, D. C. JANUARY 1983

WASHINGTON INSIDE THE BELTWAY

MARYLAND
VIRGINIA
DISTRICT OF COLUMBIA
NW
NE
SW
SE

POTOMAC
BETHESDA
CHEVY CHASE
KENSINGTON
WHEATON
BELTSVILLE
ADELPHI
GREENBELT
SILVER SPRING
TAKOMA PARK
LANGLEY PARK
COLLEGE PARK
BERWYN HEIGHTS
UNIVERSITY PARK
RIVERDALE
NEW CARROLLTON
LANHAM
CHILLUM
HYATTSVILLE
MOUNT RAINIER
BLADENSBURG
LANDOVER HILLS
LANDOVER
GLENARDEN
CHEVERLY
PALMER PARK
SEAT PLEASANT
CAPITOL HEIGHTS
ADDISON ROAD
CORAL HILLS
DISTRICT HEIGHTS
SUITLAND
FORESTVILLE
HILLCREST HEIGHTS
SILVER HILL
MARLOW HEIGHTS
MORNINGSIDE
GLASSMANOR
FOREST HEIGHTS
OXON HILL
ANACOSTIA
CABIN JOHN
GEORGETOWN
MCLEAN
PIMMIT HILLS
TYSONS CORNER
FALLS CHURCH
ARLINGTON
SEVEN CORNERS
LAKE BARCROFT
BAILEYS CROSSROADS
ANNANDALE
ALEXANDRIA
NORTH SPRINGFIELD
SPRINGFIELD

Locations of existing boundary markers used for the demarcation of the District of Columbia in 1791 and 1792

POINT OF INTEREST
HOSPITAL, HOTEL
METRORAIL LINES, BLUE, ORANGE, AND RED, WITH STATION
METRORAIL LINES, BLUE, ORANGE RED, AND YELLOW, SCHEDULED FOR COMPLETION BY 1986
GOLF COURSE
BELTWAY EXIT

0 KILOMETERS 2
0 STATUTE MILES 2

DRAWN BY JAMES E. MCCLELLAND
COMPILED BY PATRICIA A. NEALEY
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WASHINGTON, D. C.

HEART OF OUR NATION'S CAPITAL

(Continued from page 92) will clear out some pornography shops in that part of town as rents rise.

But as Mayor Barry told me, continuing tension exists among those who want more housing for ordinary people, rather than more expensive hotels, and among developers who sometimes think they have the game plan all straight, only to have new pressures put on them or to have the ground rules changed, and among the city government officials who control the valuable land and who want development to provide a sound tax base as well as the kind of charm that will draw tens of thousands of visitors, plus inexpensive housing that sounds more and more like pie in the sky.

Until World War II, really, Washington was thought of as—and was—a sleepy southern city, the pace slow and the general tone genteel. In every war, however, the city has had a spurt of growth, and in the 1940s this expected increase combined with two other phenomena to shape the city as it is today. First, it was the heyday of the suburb: There was a general rush throughout the nation—aided by Veterans Administration inexpensive mortgages—to move beyond the crowded and expensive city to a more spacious and relatively cheaper castle, with room for kids to play, room for a garden, and maybe a couple of dogs.

By the fifties there was a flood of black migration from the South. Such factors as the perfection of cotton-picking machinery made tens of thousands of farm workers superfluous. It was also a time of rising expectations. Thousands of blacks had experienced high-paying defense jobs or had felt a new freedom in the Army. Washington, as capital, led the country in nondiscriminatory pay scales for government jobs.

The result has been that the city now is 70 percent black. A substantial black middle class has developed, and many blacks hold good positions and have high incomes. The local government is largely staffed with blacks. In business, the professions, and the arts, blacks have played a part undreamed of even a generation ago.

Todd Duncan, whom George Gershwin chose to create the role of Porgy in *Porgy and Bess* in 1935, told me he sometimes can't believe the change in the city in recent decades.

"I've been here 51 years," he said, "and I've seen it all grow. Years ago I was first president of the Washington Performing Arts Society, and we had a budget of a few thousand; now it's almost three million.

"When I came, I loved opera, concerts, and the theater, as I still do, but in those days we couldn't see them. As far as that goes, Negroes couldn't take their children downtown and buy a hot dog. We couldn't try on clothes in stores, and as for hotels and restaurants, there was no such thing. This was common to the South, of course.

Chinatown, D. C., *though small compared to San Francisco's and New York's, proudly proclaims its identity on telephone booths, street signs, and in a number of popular restaurants. After 20 years of decline, as young Chinese moved to the suburbs, the community has begun to turn around, thanks to the proximity of Washington's new 98-million-dollar Convention Center—a vitalizing force for a long-decaying downtown area.*

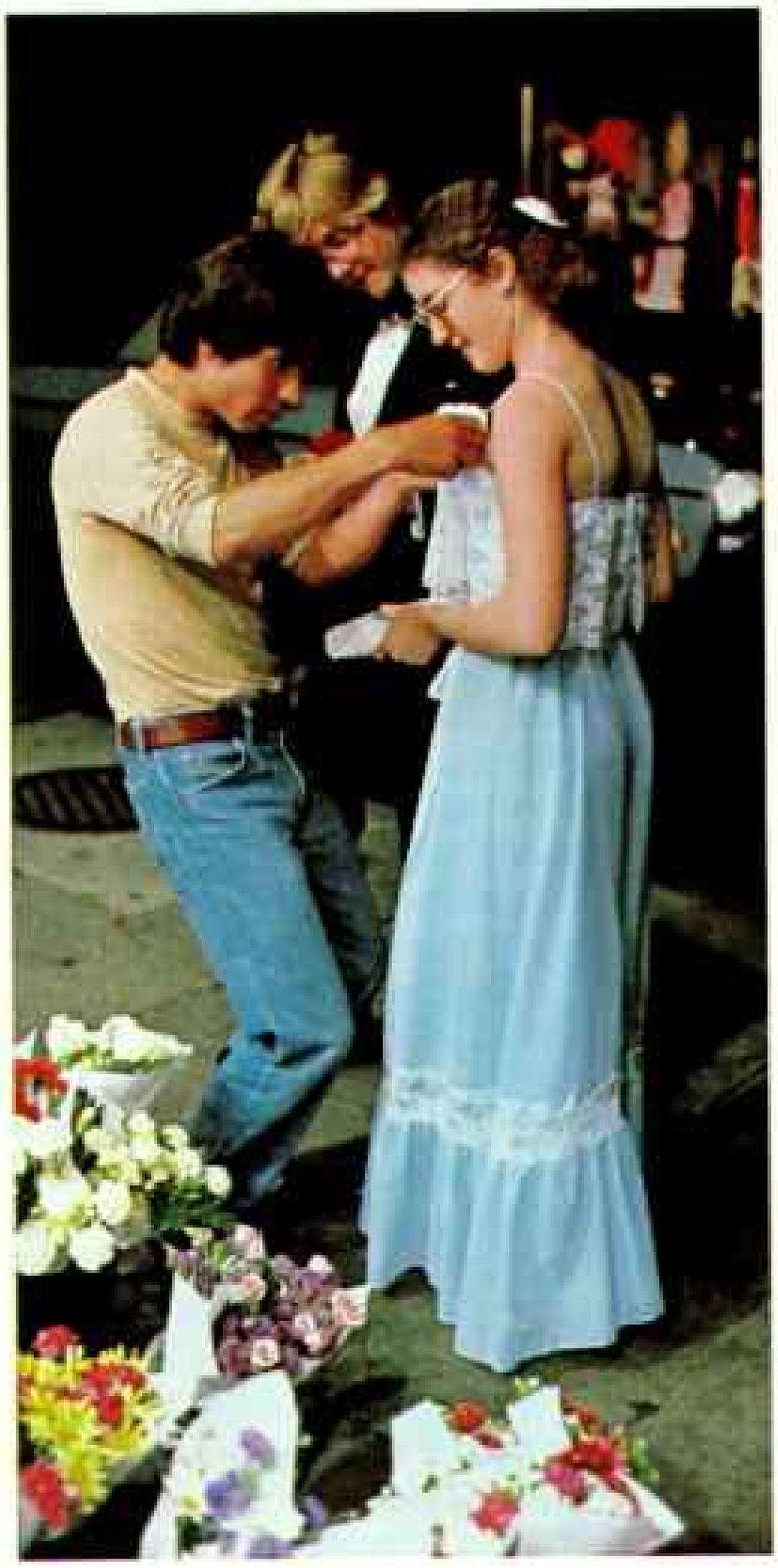
"But let me say a word about music. When I first came here to teach music at Howard University, my students were almost all Negro. Now they come from China and India, England, Germany, Spain, Czechoslovakia, Vietnam, a regular United Nations of music students.

"Every day there is music in public places. The Folger Shakespeare Library, Library of Congress, churches, as well as regular concert halls. I cannot speak glowingly enough of the quality of music here.

"For young people studying the arts, Washington is a wonderful place. I tell them now there is no need to go abroad, no need to go to New York. Even in the specialized and costly field of opera, there are companies not

The good life *gains added dimension in Spring Valley (***right***), one of several affluent enclaves west of Rock Creek Park, where youngsters grow up in homes averaging $300,000 and count as neighbors congressmen and senators, lawyers and lobbyists.*

*Daily infusion of young blood into Georgetown (***below***), largely drawn from area high schools and colleges, supports its boutiques, specialty restaurants, live-music bistros, and street vendors. A village and busy seaport before Washington existed, Georgetown prizes the Federal and Victorian houses and antique ambience of its residential streets, also the haunt of the well-to-do and famous.*



It's business doing pleasure *as Washingtonians raise millions of dollars each year rubbing elbows at charity affairs. A black-tie evening in Victorian-style Georgetown Park (***opposite***), a chic new shopping mall, gathered $60,000 for the Juvenile Diabetes Foundation. A whirl of embassy and club dinners preceded the Washington International Horse Show Gala at the Washington Club (***below***).*

Socializing is politic from galas to intimate dinners. "Parties are door openers," explains an observer. "Once you sit next to someone, you can call up on a first-name basis the next day."

*The importance of appearing important in Washington supports a multimillion-dollar limousine industry. Chauffeurs practice the art of waiting (***left***), while passengers support an honored Washington institution—the business lunch.*

just in Washington but in all the surrounding counties. To a man like me who remembers the old days, it's absolutely wonderful."

In the graphic arts Lou Stovall has made an outstanding success. He is famous for the technical perfection of his silk-screen prints, and for his organization of a workshop where many have learned new refinements, with the result that thousands who were never able to collect fine art because of the cost of good paintings now collect prints.

"I've loved it ever since I came here in 1962," he told me. He and his wife, Di, live in a big old house in fashionable Cleveland Park. He was born in Athens, Georgia, grew up in Springfield, Massachusetts, and prefers the capital to any other city, with San Francisco and Seattle ranking just below it.

"I was taking a personal-management class last night," he said, "and something struck me that I had not really thought of. The instructor said a lot of us don't know what we look like, sound like, or feel like, we are so busy getting through the day; and I believe we need more private time, so we get to know what we really want to do. The outer world can sometimes get in the way of that inner drive; even to the point it is not fully expressed."

A good example of a man who can make a difference in a lot of young lives is Morgan Wootten, coach at De Matha High, who has turned out many a good basketball player and who has turned down lavish salaries elsewhere.

To watch a little basketball practice, I dropped by the suburban Catholic high school, which draws students from throughout the city. I met varsity player Bennie Bolton, 17, whose six feet seven are certainly no handicap in the game. I asked him about Coach Wootten and the part basketball plays in his own life.

"I was lucky and made the varsity in the tenth grade," he said, "and now I'm entering my senior year. I'm happy a lot of colleges are interested in me, but I don't know yet what my life will be. I like to draw; maybe commercial art will be the thing.

"My family is not really poor, but we're not a high-class family. I see my mother come home and her feet are sore. She's a housekeeper at Howard University Hospital. I'd like to be able to make things easier for her, to raise our standard of living.

"For me, basketball is a way out of the ghetto. The ghetto is my home, whatever one thinks of it, and basketball is a way out. My grades are pretty good here, I'm kind of proud of myself, but there's always room for improvement.

"I believe in God very much. I'm a Catholic. I go to Mass every Sunday. I think a lot about my roots, being black, and Martin Luther King is an inspiration to me. He and my mother are the inspirations in my life.

"My father died when I was three. Coach Wootten has filled that place. He ranks right up there with Martin Luther King, as far as I'm concerned. He jumps on you when you're wrong. He teaches you about life.

"Sometimes it's a temptation to spend four hours or so practicing on the court, but I know I have to go home and study. Coach Wootten says basketball comes fourth, after God, my family, and school. Then basketball. I like music, especially disco, and, sure I like girls, but I'm not in any hurry about them. They'll be there, they aren't going anywhere. And I have goals to reach."

Sadly, for many poor blacks, and whites, I must add, reaching the goals can be harsh, indeed. Their lives take expression in the drug traffic and vice that curse some city streets. Washington's urban jungles change locale as police drive away drug dealers and prostitutes—but they do not disappear.

YET, here we all are. We wouldn't be except for George Washington and Thomas Jefferson.

Among the capitals before 1800 had been Philadelphia and New York, and those were obvious choices for seating the national government. But the South in those days was fiery and proud. Virginia, after all, invented the idea of America, so Virginians believe, and it seemed wrong for the oldest region of the new English-speaking nation to be slighted by setting the capital near the Arctic somewhere. Besides, commercial interests in the North were in favor of the federal government's assumption of the paper issued by states to finance the Revolution. Commercial interests in the North had bought these notes at a bargain. They were worthless unless the federal government assumed obligation for the debt.

The South saw no reason the national government should do this, merely to help a bunch of speculators in the North who had acquired the notes at discount from their poor owners. Considering the wrangles of the nation since then, it seems a small argument now, but Jefferson himself is on record that it almost tore the Union apart at the very beginning. He undertook to appease the northern interests by getting the southern states to agree to federal assumption of the war-debt paper, while twisting a few arms to get the capital located in the South.

Legislation to pick a site ground along until 1790, when Congress voted to locate the capital on the Potomac. George Washington was asked to make the final choice, and he picked a spot a hoot and a holler from his countryseat of Mount Vernon.

Washington used to cross the river to negotiate with the farmers for the land that is now the capital. Originally the District of Columbia was a ten-mile square, along the wide Potomac in both Maryland and Virginia. The Virginia land was ceded back in 1846, to ease financial problems of the city of Alexandria, so the city of Washington now lies entirely in the part that was Maryland.

Some people who live in Washington think of Virginia as an exotic, possibly dangerous, and certainly confusing foreign shore. Roads wind here and there with appropriate names like Gallows, and if you go to somebody's house over there for supper, you expect to get lost and to arrive an hour and a half late.

"How can you get lost?" Virginians say, and, as one of them did to me, "You turn left at the third stoplight and continue straight. There is no way to get lost unless you just insist on getting lost." Arriving an hour late, I was met by an apologetic host:

"Terribly sorry. We had no idea they'd put up another stoplight. You should have turned left at the fourth light."

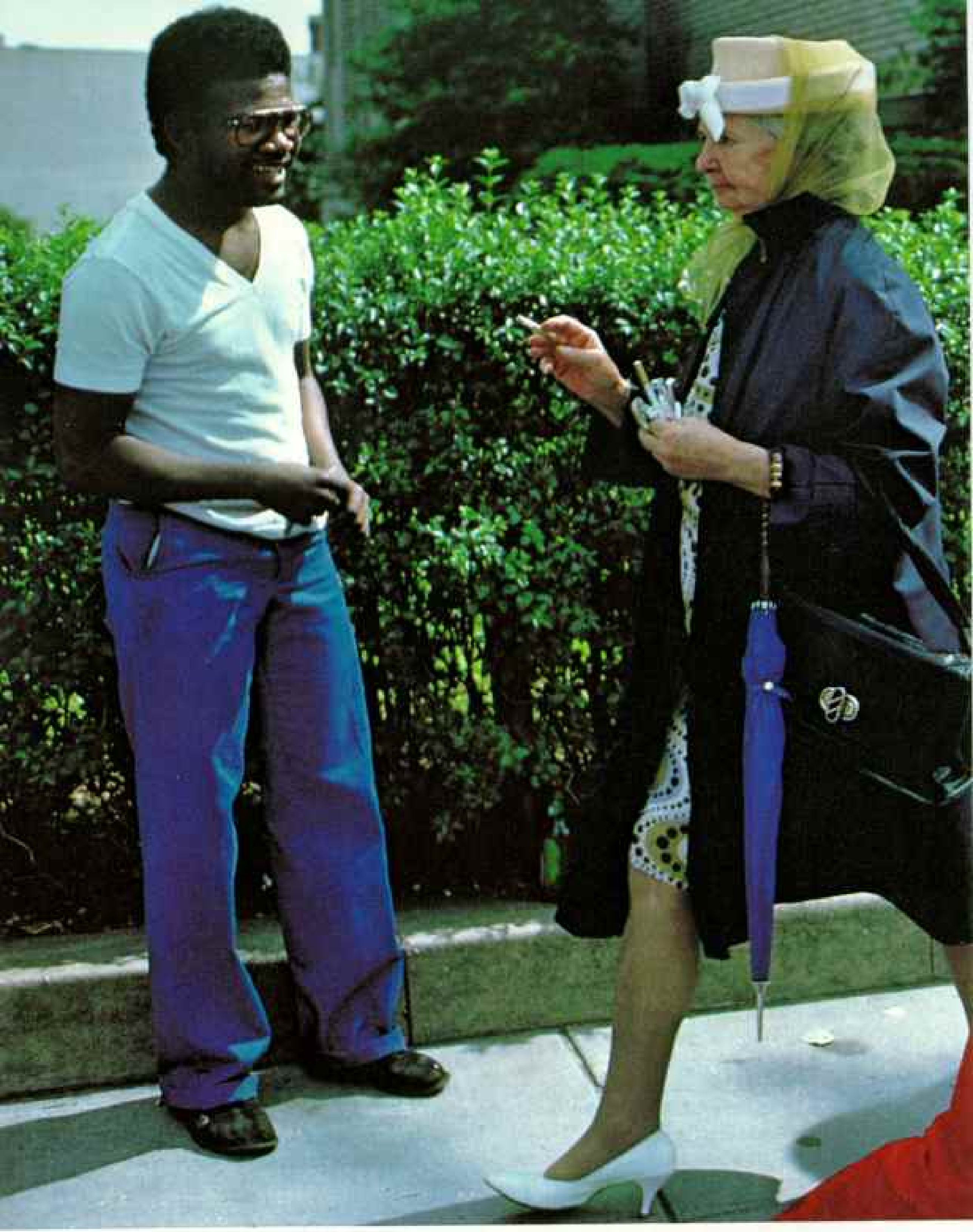
It is always that way beyond the beaten path in Virginia. We do not go there. We had as soon go to New Jersey. Of course Arlington National Cemetery does lie just across the bridge from the Lincoln Memorial, and many visitors do continue on down the Virginia side of the river to Alexandria and its restored Old Town. Once Alexandria was among the nation's greatest ports. Now it harbors fine restaurants, chic shops, and a lingering memory of antebellum days.

But assuming the visitor elects to remain in the capital itself, the first thing he will notice is the broad avenues, the grand vistas, and what we modestly, correctly, call our magnificent distances.

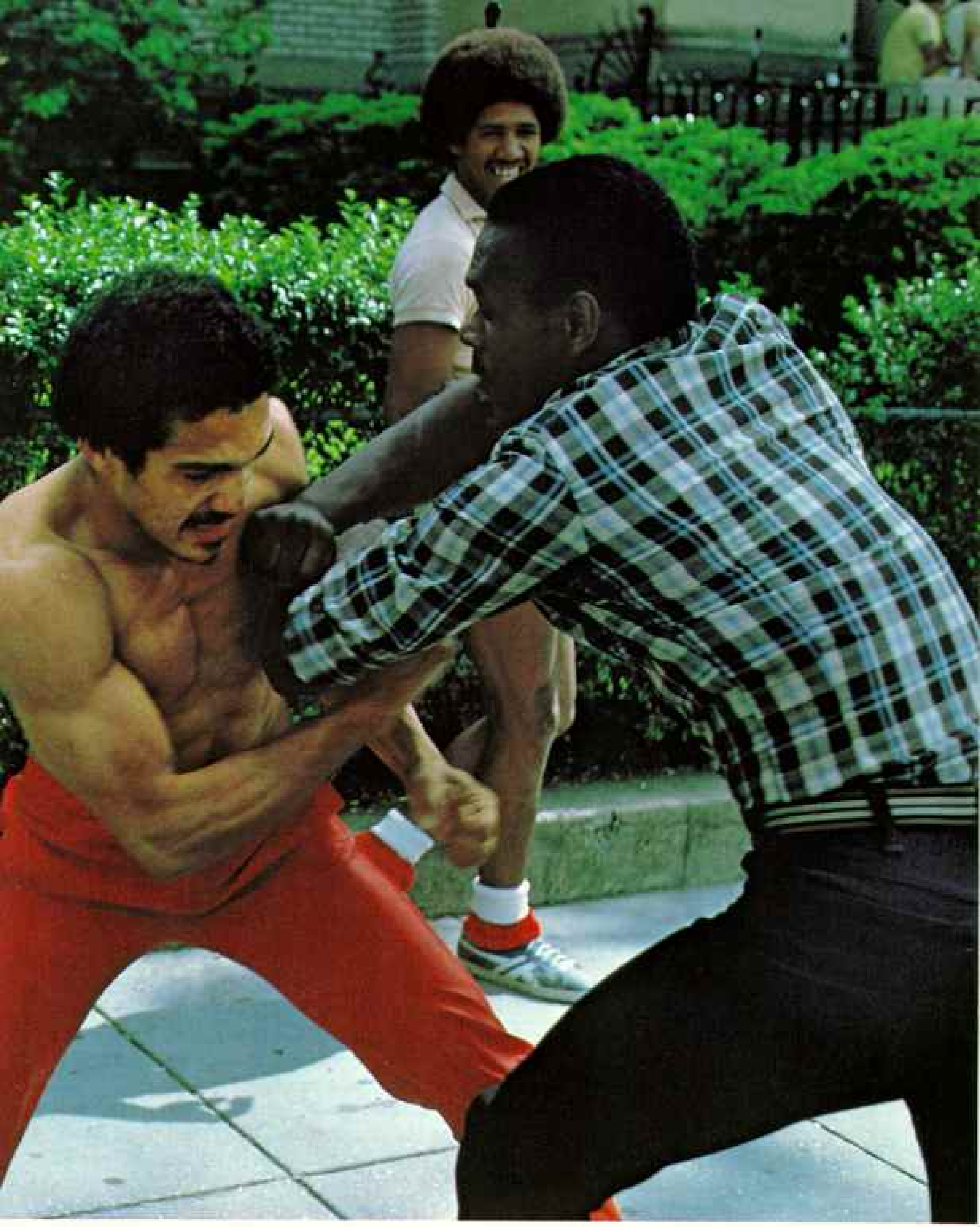
We owe all this to the designer, Pierre Charles L'Enfant, who said in a 1789 letter to George Washington that never before had a nation had the chance to lay out its great capital from scratch. He added that "the plan should be drawn on such a scale as to leave room for that aggrandizement and embellishment which the increase of the wealth of the Nation will permit it to pursue at any period however remote."

The grandeur got under way with setting 40 boundary stones in 1791-92, and 37 plus one replacement remain, saved by the Daughters of the American Revolution. There is one near me where I catch the bus, and while the stones, a mile apart, were pretty much set in variations of wilderness, still our fathers set them well and the first one with some ceremony, depositing corn, oil, and wine (the attendant dignitaries having first drunk some of the last, purely for the sake of symbolism) and saying some prayers that were certainly needed at the time.

***A refreshment** in the heart of the city, Rock Creek tumbles past an outdoor scholar on a course through a four-mile-long pastoral park that also serves as a traffic way. On weekends some park roads are closed for cyclists, joggers, skaters, and walkers. Designated a national "pleasure ground" by Congress in 1890, Rock Creek Park was a favorite spot of Theodore Roosevelt, who rode horses there.*



Mixing it up *with a bit of friendly horseplay, street boxers attract studious inattention from an elderly passerby in Adams-Morgan, a Northwest community that juxtaposes lower and middle incomes, young and old, gays and straights, blacks, whites, and Hispanics. Although pockets of poverty and racial delineation*



occur in all four quadrants of Washington, neighborhood borders are more often financial statements than ethnic barriers in a city that draws its residents from all over the world. Also within the District lie swatches of "foreign" territory, which contain the embassies of 131 nations.

Chess masters and "wood pusher" novices *congregate at pickup games in Dupont Circle, one of the numerous small tree-shaded parks and pockets of green that dot the city. Office workers and idlers find common ground here in lunchtime crowds of brown baggers, sunbathers, panhandlers, soapbox audience seekers, and street performers.*

"Prosperity within thy palaces," the clergy prayerfully petitioned at the cornerstone installation. The palaces have come to pass. Few humans in the history of the planet have ever lived in anything approaching the security and luxury of the little $150,000 Washington house on a quiet street with trees and no mud to speak of.

"The quiet. Nobody ever seems to mention it," said Karen Craft, a young woman whose husband is an officer at the State Department. "I've stayed in Rome, Boston, and Paris, all nice in their way, but noisy. We live in an apartment near Wisconsin Avenue, right in the middle of the crowded city, but there are trees, and it's as quiet as the country. In other cities you have to go miles out into the suburbs for that."

The city is not, alas, tree shaded and quiet for everybody. There are pockets of poverty, and there are thousands of people who just roam about with no real place to live. They are ignored most of the year, but when two or three of them freeze to death on a winter night, public indignation arises, soon to subside until the next reminder of the cost of being an outcast.

I dropped in on a shelter where an outfit called the Community for Creative Non-Violence feeds street people. They can get a shower and some clothes, too, though not everybody wants a shower and nobody is forced to take one.

Mitch Snyder, a leader of this group, was at the community's other and main headquarters in Columbia Heights, blighted and still scarred by the 1968 riots after the murder in Memphis of Martin Luther King, Jr. It's next door to increasingly fashionable Adams-Morgan, a district full of Spanish-speaking, black, student, and artistic folk.

"Washington is a city of profound contradictions," he said. "The President's closest neighbor, for example, sleeps on

top of a heat grate near the White House.

"I was born and raised in Brooklyn, but I like it here. Nothing is too high or too wide. I know there are people like government workers who never really see the city, since they leave it the minute their day's work is done. But we sit on our front stoop and say how can people stand to live in the suburbs. Nothing ever happens there.

"Funny thing about the street people. I know three or four thousand of them personally, but nobody knows how many there are, probably ten thousand or so. At first you assume that since they sleep on the streets or in abandoned buildings, they just float about. That is not so. They are as attached to their neighborhood as any homeowner.

"Mainly what we do that's most important, I think, is see them in the hospital or jail, or sometimes try to get them legal help, and chiefly provide a friendly face for the ones who aren't that used to friendly faces."

When you wander south from Adams-Morgan, you come to Dupont Circle. I lived there years ago in a huge old brownstone mansion, now vanished, that had been the Italian Embassy. It had a red tile roof that soaked up heat, and it was a good thing I liked it hot. In my day it was called the Russian Bible House, and I never did understand a word anybody in the building said, but sometimes old ladies would come up the steps with long trains and plumes in their hair. I had only an icebox, and the man—this was in 1949, if you please—delivered ice on Fridays, 25 pounds of it, which mainly melted by the time he rested on the vast stairs that led finally to the top. We had ice water on Friday night; it was our blowout for the week.

There are still funny people around Dupont Circle, for which the Lord be praised, as well as some of the squarest and most house-proud citizens of the capital, who spend endless thought restoring hardware to their late Victorian houses.

There is crime, of course, as there is in any society in which people are sick or poor or defiant or lazy or slothful, et cetera, and in which the government is something less than one giant police force.

Recently, I ran into Senator Ted Stevens of Alaska at a reception in the Senate Caucus Room and prodded him just a little about a comment he had made, that—thank God—his hometown was not Washington. The *Washington Post* had thoroughly enjoyed dilating on this, pointing to his salary and perquisites and the energy with which he has fought to keep getting returned to the Senate and, therefore, this terrible place.

"Took it out of context," the senator said. "My original point was that the city government seems to think of the capital as an ordinary town, not as the capital of the United States, where pretty high standards are expected. I can tell you that over the last two years there have been a disturbing number of robberies, larcenies, burglaries, and other crimes committed against my staff while they were working on the Hill or living nearby. The problem is so great that we strongly advise women staff members never to walk alone at night to Senate parking lots. Even with escorts we've had problems. This is the sort of thing that makes you mad, and that's what I was thinking of when I said what I did about Washington not being my town."

"TIMES have changed, yes," said Louise Brady, who lives in a big old house near Chevy Chase Circle, far from the so-called inner-city ghetto. "But I wouldn't want you to think I don't love this city. I came here from Pennsylvania in grade school. My father was city architect of Pittsburgh, and the federal government brought him down here as an architectural engineer. He put the fourth floor on the old Treasury Building.

"You used to walk along F Street downtown and see everybody you knew. The capital was really a small town then. Once I saw a beau on F Street and ducked around a corner because I didn't want him to see me, I was so disheveled. Lo and behold, there he was again after I circled the block. In Washington now you'd never see anybody again once you dodged them.

"I suppose the spring foliage is the most wonderful thing in the whole world. My mother used to say we never had spring, because hot days followed so soon on the winter, but my father used to say nonsense, we have spring all year long.

"And while we get so used to Washington we hardly see it, things like Constitution Avenue are pretty splendid. The grandeur of that avenue *(Continued on page 114)*

The power, the glory, *and everyday affairs mingle in the grand sweep of 16th Street, lined with office buildings and embassies, hotels and clubs—and crowned by the White House. The Washington Monument soars above the Mall's greensward; the columned Jefferson Memorial overlooks the cherry tree-ringed Tidal Basin. The nation's capital was legislated into existence by an act of Congress in 1790 and moved from Philadelphia ten years later. Maj. Pierre Charles L'Enfant planned the city as a grid slashed diagonally by avenues marked out with circles.*

Architecturally at least, Washington keeps a low profile, since building heights are limited so commercial structures won't dwarf the Capitol. And, in truth, the monumental seldom overshadows the human element. Each spring the White House opens its lawn to children for the Easter Egg Roll ***(below)****.*

WASHINGTONIANS ALL—if not by birth, by conviction—these personalities are representative of the many talented people in the private sector who make the nation's capital distinctive. Clockwise from right:

Zelda Fichandler *founded the Arena Stage 32 years ago as one of the first regional theaters in the nation. At that time Washington was virtually a cultural desert, the National Theatre being closed because of segregation and the Kennedy Center not yet built.*

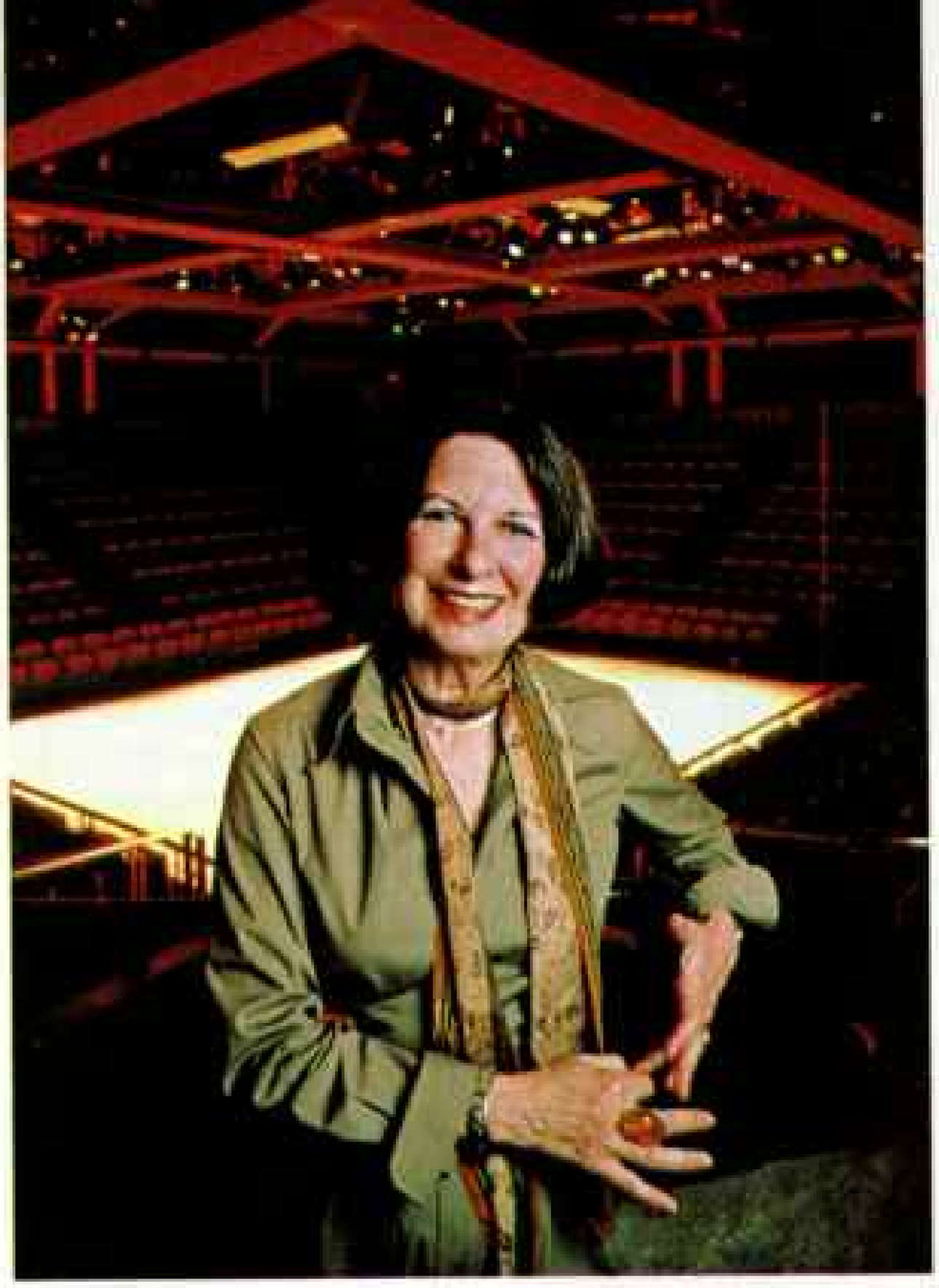
William Fitzgerald *shined shoes, installed insulation, and sold real estate before founding the first minority-controlled savings and loan association in the District in 1968. Independence Federal is now the nation's fourth largest black-controlled S&L.*

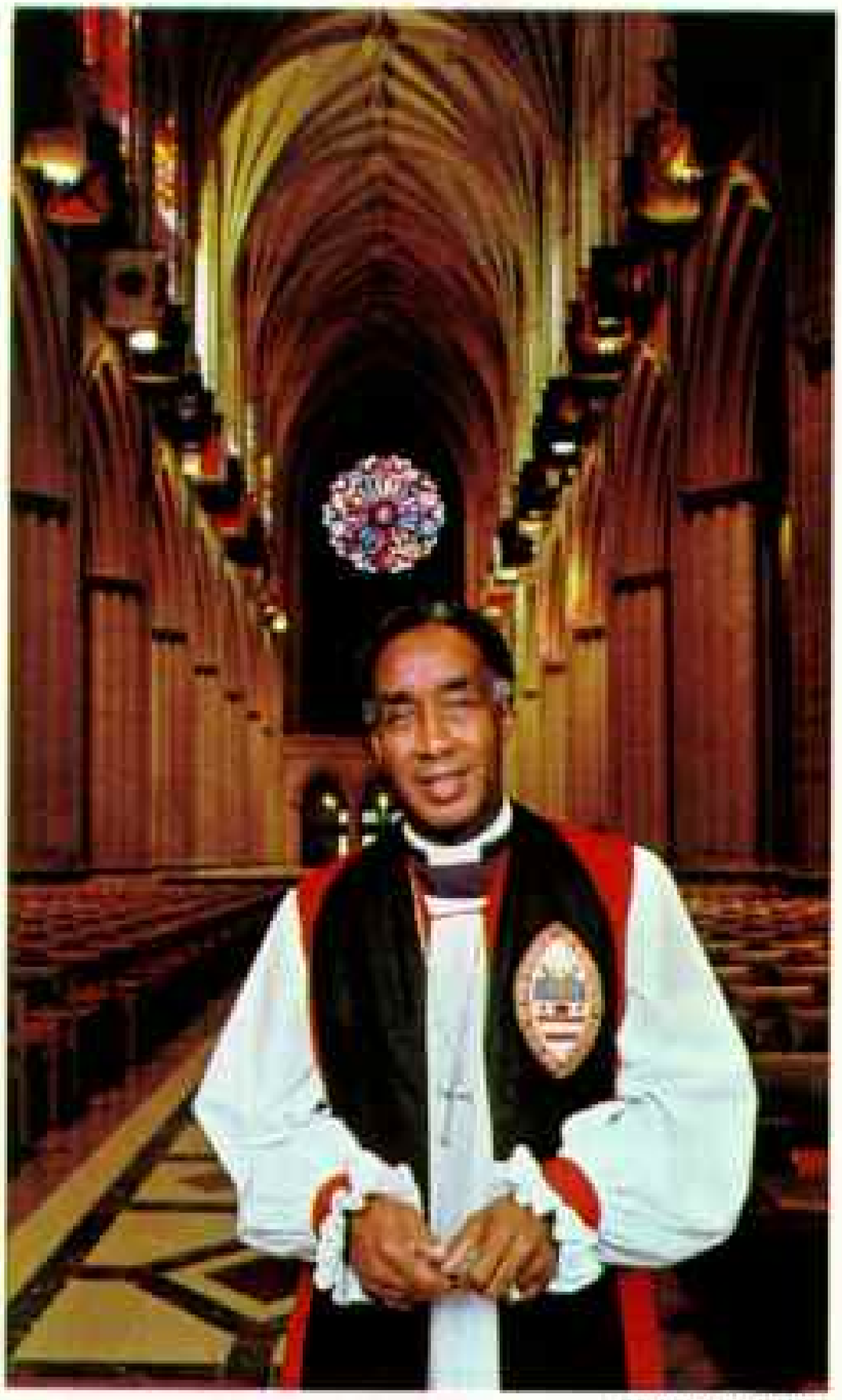
Oliver T. Carr, Jr., *had faith in the city's core after the 1968 riots that followed the assassination of Martin Luther King, Jr. When other builders raced to the suburbs, he gambled on the downtown area. Today his projects total 10 percent of private office space in the city.*

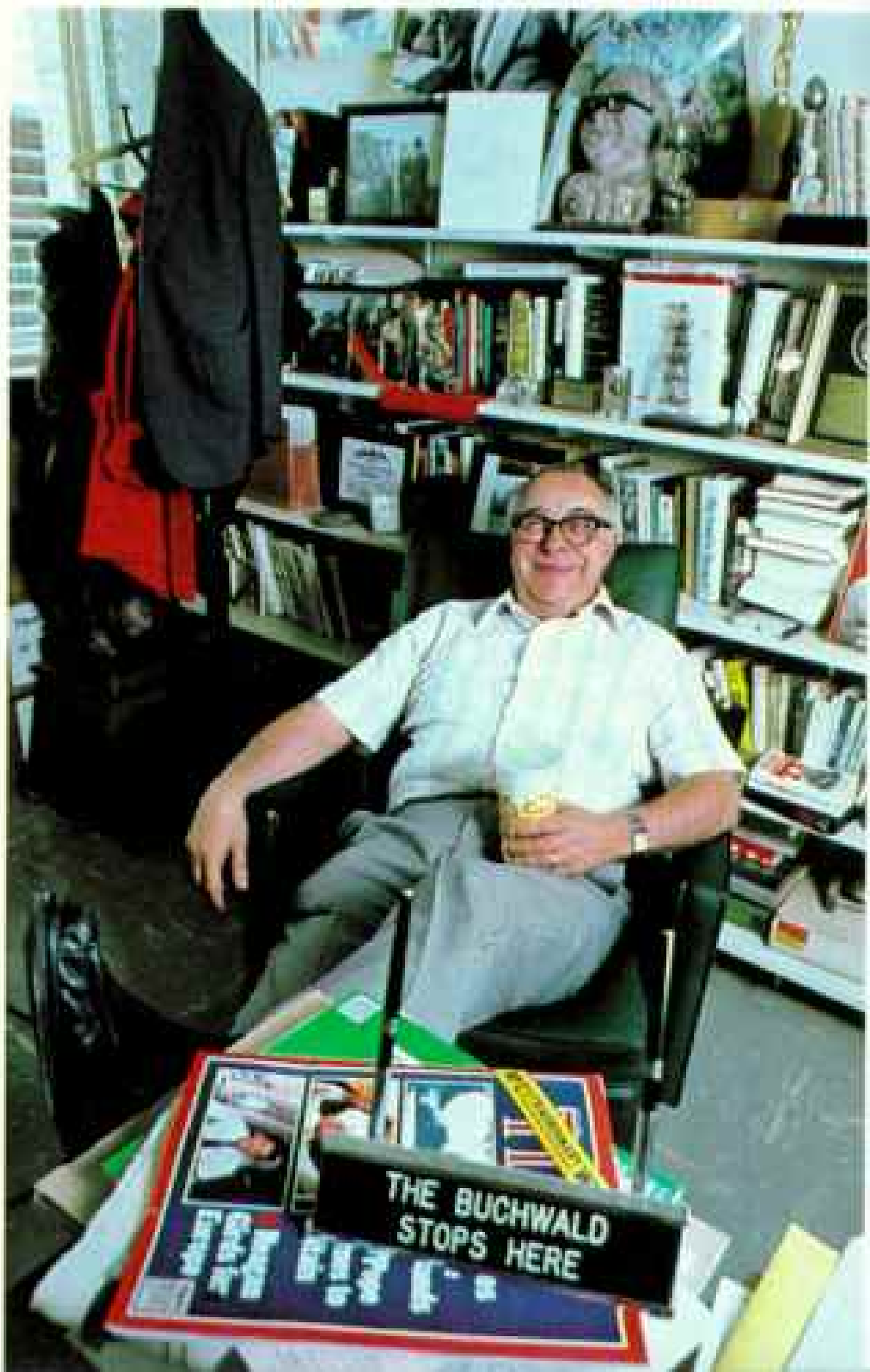
Art Buchwald, *humorist extraordinaire, claims he never allows facts to get in the way when writing on the foibles and fallacies of politicians. Buchwald's column appears thrice weekly in the "Washington Post" and 550 other newspapers across the country.*

John Thomas Walker *in 1976 became the first black Episcopal bishop of Washington and dean of the National Cathedral. Low-keyed and hardworking, Walker advises on police matters, advocates aid to the poor, assists youth in education and problem areas, and fights racial and religious bigotry.*

Edward Bennett Williams, *one of the most famous U. S. trial attorneys, has represented clients from Senator Joseph McCarthy to the "Washington Post." He also is part owner of Washington's football Redskins, whose fans stay loyal despite ups and downs and a 12-year wait for season tickets.*







BRETON LITTLEHALES

Washington, D. C.

is very real, lined with the great classical government buildings. A pity we are usually trying to stay alive in the traffic and don't get a good look at it any more.

"I've retired now, but like most people who worked in the government, I keep up with old friends there. I also go down to the Washington Club [a women's club of white marble like an Italian Renaissance villa], where there's always something going on.

***Clean sweeps** are a way of life in a city fixated on politics and protocol. At the White House, a red carpet rolls out for a visiting foreign dignitary as the Washington press corps looks on. Through the round-the-clock gaze of the all-seeing media eye, Washington is watched and interpreted for all the world. Nearly 3,000 news bureaus, with staffs of uncounted professionals, feed the voracious appetite of the media.*

I'm program chairman for the National Huguenot Society and, of course, I work in my garden. [She for years raised a hedge of sweet corn along her drive, to the general astonishment of Chevy Chase.] My lilies this year have been exceptionally beautiful.

"But I don't want to wander, and I think people should know there's a big difference between Washington the city you live in and Washington the city of power and monuments. We value the cultural offerings of the city even more than we realize, the museums and concert halls. I have a friend who puts it more succinctly than I do. He says, 'I like it around here.' So do I."

THE CULTURAL OFFERINGS are indeed amazing. The museums are world famous, starting with the National Gallery of Art, gift to the nation of Andrew Mellon, who declined to have the gallery named for him since he wanted its influence to extend far beyond the range of even the greatest private collections. (But some old Washingtonians still call it the Mellon Gallery.) Most Sunday nights there's a concert, free, and while you hear nothing of these concerts (in comparison to the National Symphony, say), I am one of those who would be crushed if anything ever happened to this series in the East Garden Court, amid the fish-scale palms and marble columns.

The most wonderful gallery in town, for my money (it too charges no admission), is the Freer down on the Mall. It is stuffed with Oriental art. Tourists dash through art museums, for some reason. At the Freer, they often pop their heads into the Peacock Room, decide there's nothing there they have to see, and pop out; so often you have the room all to yourself. It's a London dining room, a whimsy of James A. McNeill Whistler, full of gilded wooden bracket work and walls painted in blues and greens on Spanish leather that was 350 years old when Whistler started daubing about on it, and some said since it was brought to London by Catherine of Aragon, he should have left it alone, but then artists can never leave anything alone. Like so many things, it grows on you over the years, and you find yourself not all that keen to urge crowds to go see it.

When we were poor, drinking ice water once a week under our hot roof on Dupont Circle, we used to walk two or three blocks to the Phillips Collection—the o'dest museum of modern art in the nation. It was, and still is, housed in a turn-of-the-century town mansion near the circle. In those days, when sin was so rampant, we'd settle down on a sofa and spend an hour or so smoking cigarettes in the company of a superb Manet or the fine Daumiers or the Goya or the El Greco.

In a hideaway spot at the back of the music room was a tiny Delacroix of the violinist Paganini. It would fit under an overcoat. Many a day I have been alone with it. Nowadays the gallery is full of visitors. The day for swiping the little Delacroix is long past. How often we regret the boldnesses we never allowed our hearts to lead us into.

Mrs. Duncan Phillips, widow of the gallery founder and first director and herself an

indispensable force in its establishment, has a very low voice, so you pay unusual attention when she speaks. One night at dinner she told me how they got the huge and celebrated Renoir, "The Luncheon of the Boating Party." She was a bride, in her 20s, when they lunched at the Paris home of Joseph Durand-Ruel, the art dealer.

She hardly remembers what was served, since the table was set opposite the huge Renoir. The dealer had thought it might tempt them, and it did. She still remembers the excitement of seeing one of the most famous Impressionist paintings, having it offered to them, and being able to buy it on the spot.

FINE MUSEUMS, open without charge, abound in this city. The Smithsonian's National Museum of American History is big on musical instruments, trains, weathercocks, clocks, apothecary jars, and mysterious things including the shed skin of the serpent of the Garden of Eden, though the last is down in the basement and they refuse to display it. There is doubt it is genuine.

The director, Roger Kennedy, sometimes asks you for lunch at noon and then at two you finally get a dried pork chop if you're lucky, but the thing to know about him is that he has a little leaded-glass window that came from an ordinary commercial building in Topeka, Kansas. The building was being wrecked, and he dashed up and bought the window. Or acquired it. It is very beautiful, though not unusual. He keeps it in his office. It reminds him, he says, of the beauty and sensitivity you may find in the boondocks (not his exact words), and it reminds everybody else who sees it how easily we take beauty for granted. We expect to like a Goya, but usually we don't even look carefully at a window from Topeka, even though it may be a little masterpiece in itself.

Incredibly learned in hundreds of unexpected directions, like other museumfolk of the capital, Kennedy is passionately convinced that one good 1880 weathercock is worth at least five generals.

The Smithsonian, mother institution of a whole crop of museums, is a wonderland in itself. Curator Herbert Collins, for example, can tell you what make of car every President had who owned a car, and what sort of carriage a President had in pre-gas days. In the Smithsonian Libraries I love to visit Silvio Bedini, keeper of rare books. He once mounted a Columbus exhibit featuring the explorer's books on navigation and his correspondence with Ferdinand and Isabella. Even had the little iron pulpit of the Spanish church from which announcement was made that his ships had at last been sighted, home from the New World.

Steward of the past, *Roger Kennedy, director of the Smithsonian Institution's National Museum of American History, appears with John Bull during a 1981 run of this oldest operable steam locomotive in the world, built in 1831.*

Most popular among Washington's 70 museums, the Smithsonian's National Air and Space Museum has drawn more than 55 million people since it opened in 1976.

And so on and on it could go through all the museums of Washington, as remarkable for their curators and staffs as for their displayed contents. J. Carter Brown, director of the National Gallery of Art, is equally at home talking with a tourist or the Prince of Wales. Brown had a small luncheon last July at the gallery to brainstorm a show to end all shows on "The English Country House." It won't be seen until 1985, but he was laying groundwork early.

When Brown mounts a major show, it's an event in town and may well involve not just the display at the gallery but related musical events or fireworks on the Mall (for one show they even re-created the fireworks viewed by Jefferson in France in the 18th century), since the director naturally assumes the entire capital will hop to it when the gallery *(Continued on page 120)*

The streets come alive *with the sound of music when the setting is inner city, and Memorial Day ushers in another steamy Washington summer. A DJ spins records for neighbors in the Shaw area* ***(above)****, while Joyce Johnson's front-yard barbecue lures family and friends* ***(left)****. The summer climate—which resembles conditions in a Turkish bath—once prompted the British government to designate this capital a tropical post; even today much of officialdom manages to get away. But everyday Washingtonians enjoy their city—with a fishing line thrown in the Potomac, a golf club swung at a riverside course, a dip in a community pool, and that seasonal highlight, Fourth of July fireworks on the Mall.*

Beyond congested downtown, outlying neighborhoods cast an air of serenity. Many residents of 50-year-old row houses in Kingman Park ***(opposite)*** *have paid off their mortgages, raised their children, and now face problems of senior citizens everywhere—transportation, rising property taxes, and fear of crime. As many young people have left, the number of black senior citizens in the District has risen 43 percent, to 42,800, since 1970.*

On the mean streets, *where rising crime reflects a national urban trend, a guard dog receives attack training in a Southwest ghetto (***left***), only ten blocks from the U. S. Capitol. Posh high rises close by provide a strong lure for robbers and burglars. But within the ghetto, drug sales and assaults are more common than theft. "Poor people have nothing to steal," explains veteran policeman George Dodson. He reports that most residents grew up in the area or moved from another D. C. slum, "trying to find something better, to feel a little more secure. But for most there's no escape."*

*Oases of help do exist. In the dining room of SOME—So Others Might Eat—volunteers serve free breakfast and lunch to the needy (***above***). The ecumenical group also provides free health and dental care, counseling, and other services. Activist Edward Guinan, founder of the Community for Creative Non-Violence, estimates more than 10,000 homeless in the city, but adds, "While private resources for the needy have increased dramatically, their numbers seem to grow geometrically. The soup's getting thinner."*

Washington, D. C.

does something. Odd thing is, sometimes he talks everybody into it.

His dining room and office are atop the East Building, a new addition by I. M. Pei that some people (of steady views and sound taste) consider the capital's finest building, while old crocodiles deplore its acute angles.

The city's architecture itself constitutes a museum of sorts that you see without even going inside, though often familiarity breeds indifference even to wonderful buildings. When I first came to the *Washington Post*, I remember the shock of hearing a reporter grumble that he had to go to a White House reception. I thought gee, what I'd give to go.

It is, I now know, rather a pain in the neck for the press. The first time I went to some evening function and realized I could sit on a chair bought for the room by James Madison and shake hands with the famous, I was so impressed and unhinged that I misspelled a name, Crowninshield, which, it turned out, was the name of one of my numerous bosses at the paper, so it did not go unnoticed.

With so many crazies running around the nation at large, it's a marvel they let anybody at all in the White House now (though the free public tours are informative and excellent). An uncle of mine grew up here in the days of President Theodore Roosevelt. The kids would play ball in Rock Creek Park and wind up the afternoon at the White House, where Mrs. Roosevelt had cocoa ready. I said that's because you were a fancy person perhaps, but he said no, all the kids went, it was no big deal.

Then I had an aunt who dropped cards on Mrs. Franklin Roosevelt on certain days. It was the custom then for wives of military people to do this. Formerly they called, but by Eleanor Roosevelt's day it was just a formality (and now they don't leave cards at all). So one day my aunt was feeling rather shot out of a gun and thought well, it makes no difference, I'll be driving through anyway, and a footman will take the card at the portico, so I'll wrap a rag around my hair and go. To her horror, just as she arrived, Mrs. Roosevelt walked into the portico and asked her in for tea. It worked out well, and Mrs. Roosevelt laughed when she quickly saw my poor old aunt had expected to sail in and out without saying a word to anybody.

"Never, under any circumstances, ever set foot out the door in this capital without being dressed to the nines," she always said after that. It shows you how things change. Now you can look like a ragamuffin and for all people know, you have spent hours making yourself look that way.

STILL, as things go nowadays, Washington is a dressy town. Women spend fortunes on clothes, whether they look like anything or not, and until a couple of years ago they wore long dresses when they went to supper at a friend's house. President Kennedy put an end to white tie and tails (except for extraordinary White House receptions), but even grubby reporters soon learn it is cheaper to buy dinner jackets and black ties than to rent them.

Once I saw Henry Kissinger, who was secretary of state at the time, at a great bash at the Organization of American States, in his neat little tuxedo, which was even neater since he had proudly lost a lot of weight. As he waxed ever more eloquent beneath the glittering crystals of one of the noblest rooms in America, his pants started sliding down. He tugged once or twice and then, in a grand gesture, his hands raised and the pants slid down some inches. Photographers, though the city seems to me solid with them, never get these occasional shots that do so much to make life here worth living.

I am not sure about other towns, but I suspect Washington is the only city in captivity in which finger bowls are trotted out at suppers without everybody's bursting into laughter. It is common knowledge (and maybe even true) that a senator new to town once ate a small doily with his chocolate mousse, the waiter having neglected to remove it along with the finger bowl.

When I was new up here, I did see the wife of a chief of protocol catch a lobster in midair when it slid off a serving salver presented to her. Everyone felt like clapping, but pretended nothing unusual had happened.

Embassies are forever entertaining, sometimes at great charity events to which anybody can come who forks out the admission price, and sometimes at small luncheons and suppers. A good bit of business is done, and when Arthur Burns was chairman of the Federal Reserve, I once asked him if he didn't get tired of going out so much

to dinners and cocktail parties. He was indefatigable. He said it was no chore to him, he found plenty to amuse him wherever he went, and besides, he sometimes thought he accomplished as much at Washington parties as he did in his office.

The city is too big for all Washington to be at anybody's parties and besides that, there is a certain floating anxiety in the city since nobody has any idea who is going to be terribly important within a year. It makes for civility. People learn not to brush off some yokel who may be of national consequence without the slightest warning.

Once I asked a beautiful Persian woman whose husband had finished a term of duty in the capital what she would miss most:

"Nothing," she said. "I loved being here and I love leaving. You should always leave a city the minute you notice you no longer are aware of the buildings you pass on the streets. When you no longer notice, you are getting set in your ways and not effective. Besides, if I ever see one more damned cherry blossom, I think I'll go mad."

THOSE FAMED CHERRIES all about the Tidal Basin bloom April 3, by the way, and miss it by weeks in some years. When the first trees arrived with great fanfare from Japan in the regime of President Taft, an awkward little thing happened. The Department of Agriculture met the trees, after weeks of excited anticipation for this magnificent gift of the Orient, and ordered them all burned. They were infested with insects and diseases. Mrs. Taft was quite put out (she was going to plant the first one), but no lasting harm was done, despite some nervousness among diplomats that the Japanese would react poorly. Another set of trees was sent, Mrs. Taft planted the first one, and all was well.

In 1981 a delegation of Japanese horticulturists arrived to get propagating wood from the Tidal Basin trees to take back to Japan, to help replace dwindling native stands.

When the trees bloom, I sometimes walk among them, taking care not to get trampled by visiting thousands. Washington is, after all, a city of spectacles and demonstrations.

Thousands, often not very cheerful, worry about the Washington sports scene, in particular football. The town's Redskins are the pride and joy of the place, but tickets are scarcer than diamonds at a peasants' revolt. People mutter constantly that they will never have a chance to buy a season ticket.

Even gloomier are the baseball fans, who ask what kind of capital America has got, that lost its old baseball team, the Senators, and if the Baltimore Orioles have a great season, flaming madmen arise in Washington to demand that the Baltimore team be moved to the capital, which permits citizens of Baltimore to gloat and make disparaging remarks about Cowtown on the Potomac.

In truth, there is grief in Mudville much of the time, a certain amount of it devoted to other continuing crises, such as Pennsylvania Avenue, the subway system, potholes in the streets, and similar homey concerns.

WHEN I first visited Washington 45 years ago, my father walked me along Pennsylvania Avenue and said someday it would be totally magnificent, as it had always been planned to be, from the Capitol to the White House. You can walk down the avenue today and hear the same thing. Much has been done, but parts of it are still seedy enough.

On the avenue is a monument to temperance with a water fountain, and its backyard for many years was one of the city's largest liquor stores, where in the old days, if you watched the specials, you could get excellent Chilean wine for a dime a fifth. The building, with little twin turrets, is not a shrine of history, but perhaps half the city would riot if they tore it down. It's empty now, and, providentially, has been scheduled for repair and preservation. It contrasts absurdly and wonderfully with the ponderous Roman splendor of government buildings on the avenue, with columns so big that if they were hollow you could rent them for apartments.

An exceptionally successful developer of downtown property is Oliver T. Carr, Jr., whom I visited in his posh office with its commanding view of the White House and the cranes moving along for some of his multi-million-dollar complexes. Inside the city itself his developments account for more than half a billion dollars of invested capital. He lives modestly near American University in a house a minor bureaucrat could afford.

A private cause enjoys public space. *The Vassar College Book Sale, to raise scholarship funds, spreads volumes amid the colonnaded opulence of the Pension Building, now designated the National Building Museum. In 1885 dancers here swirled at Cleveland's Inaugural Ball, even before completion of the imposing Italian Renaissance structure that encloses the largest column-supported space in the capital. Like other local landmarks, it often plays a role for worthwhile causes.*

Another venerable landmark, Constitution Hall, is part of the headquarters complex of the Daughters of the American Revolution, whose annual convention draws nearly 4,000 out of a membership of 208,000. Here at the Capital Hilton Hotel, delegates pledge allegiance to the U. S. flag (**below**).

He told me he grew up about a mile from where he lives now, though it was pretty countrified in those days. He is grateful to his father, the late builder-developer Oliver T. Carr, Sr., a no-nonsense man who drilled it into young Carr's very bones that he was responsible for himself and was expected to make it on his own.

His big boost came, he said, following the 1968 riots. Fires broke out in a "riot corridor" in the older and more decrepit part of downtown Washington. The damage, however superficial, was devastating psychologically. Some of the burned-out buildings still stand gaunt. People got the idea downtown fringes were dangerous places to be, and Carr said developers moved out by the drove. He moved in.

Until recently, a demand for office space had been growing in Washington at the rate of two million square feet a year. Carr had no trouble whatever getting investment money, acquiring landrights, preparing complexes of mixed land usage. A staff of 55 shepherds the Carr dreams through zoning, tax, license, and land-acquisition mazes.

NOT LONG AGO, as I walked out again on Pennsylvania Avenue on a lovely day, I thought of Jefferson riding his horse down to supervise the planting of Lombardy poplars (a singularly beautiful and singularly poor choice of tree for a ceremonial avenue, since the roots get into everything and the trees are short-lived and break in storms) when the capital was being built.

The trees are different now, lindens and oaks and ginkgos, but the avenue, like the great wheeling circles and bold diagonal avenues of the original plan, remains essentially as designed by L'Enfant. (I once visited the spectacular Victorian house of the Columbia Historical Society to see a special showing of, among other things, the little brandy glass from which the city planner drank on his deathbed; things have a way of hovering in the memory here.)

On another day I wandered into the zone of restaurants on 17th Street and cut down pretty old Church Street, where Patricia Gussin, a secretary, was airing her cat at her condominium window. Like most longtime secretaries, and the capital is solid with them, she can pick up the most difficult bucket, as you might say, by the right handle. If you spoke with her, you would assume that she was a typical product of the East Coast:

"I'm from Kansas City, of course," she said. "Sometimes I try to think just what it is that keeps me in love with this town. Listen, don't tell anybody to move here for the weather. But I walk to work easily every day. I like living in the middle of the city. I like all the little neighborhoods. You never lose sight of the sky.

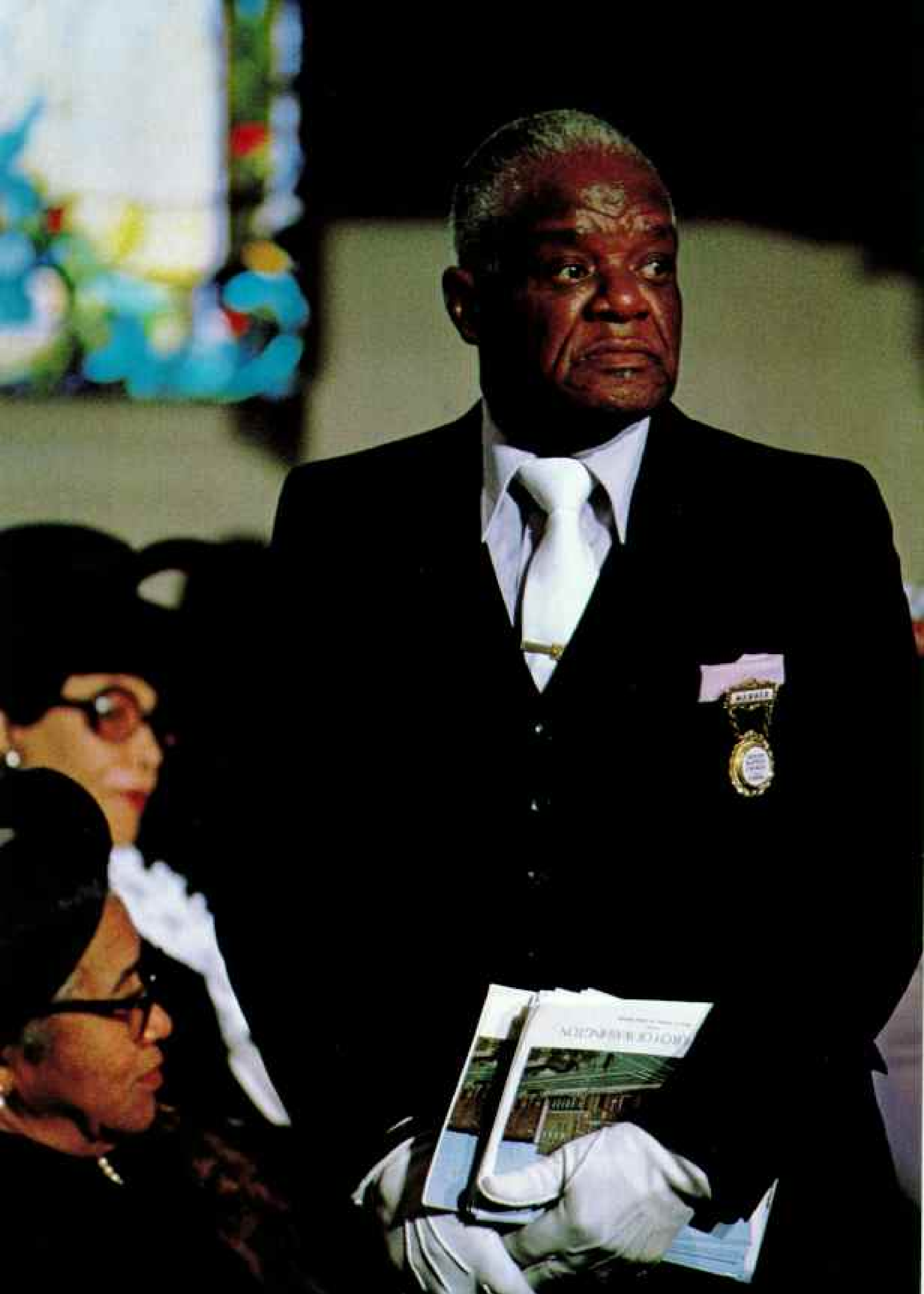
"Besides, it's an extroverted city. You're never far from a little pocket park with trees and benches, and you can always see people sitting there and in the little sidewalk cafés just watching other people.

"People who just visit here miss the community sense. The number of people you nod to on the sidewalks every day is quite amazing in a large city, really. I think of it as a living-in city. Tourists think of it as a working-in city, and that's a difference.

"One thing that drew me here years ago was that the university I attended was only four blocks from the White House. Of course, I never intended to stay here after college. A professor got me a job, and rather than hurt his feelings I just took it. Things went on from there. Glad they did."

Walking westward into the sunset (as the old travel films used to put it), I was struck once more by the slanting late light. I have seen this town when its domes and spires all turned to gold. It can often look like some golden city. Most of the time it just looks like home. □

***Standing tall,** as usher Roland Burgess does, is a tradition at Shiloh Baptist Church, founded in 1863 by freed slaves. With contributions from $1 to $100,000, the congregation raised two million dollars toward a new five-story Family Life Center. "Here," says pastor Henry C. Gregory III, "we can offer the community exercise for the body, enrichment for the mind, and elevation for the spirit." The goal is one the whole city of Washington often attains.*



Indonesia Rescues Ancient Borobudur

Architecture of the infinite. A Buddha sits in the silence of dawn amid 1,200-year-old stupas of the world's largest Buddhist monument, secure for now from the scythe of time.

By W. BROWN MORTON III Photographs by DEAN CONGER
NATIONAL GEOGRAPHIC PHOTOGRAPHER

AS CHARLEMAGNE was being crowned emperor of the West in Rome in A.D. 800, people on the other side of the earth, on the East Indies island of Java, were building the stupendous Borobudur, often translated "temple on the hill."

Cradled in the lush landscape of the Kedu Plain (***below***) and framed by four majestic volcanoes, Borobudur is a stepped pyramid of unmortared andesite and basalt volcanic stones, standing 403 feet square (123 meters) and 105 feet high. It rose during the Sailendra Dynasty, whose kings built it in about 80 years.

Borobudur has been called by the eminent Dutch archaeologist A. J. Bernet Kempers "a Buddhist mystery in stone. An actual meeting of Mankind and the Holy. A shining tower of the law."

For me to understand his words took more than a visit to Borobudur. It took time and a journey of the spirit as well.

Although we know little about its earliest history or the individuals who first used it, Borobudur must surely have been a profound inspiration, with its hundreds of carved stone panels vividly depicting the life of Buddha and other sacred Buddhist stories. Like the stained-glass windows in the great cathedrals of Europe, the stones of Borobudur spoke their truth to all who came to see and to understand.

Then in 1006 disaster struck with a devastating earthquake and the eruption of the volcano Merapi. The population fled, probably to eastern Java, to escape the lava, ash, and landslides that scourged the land. And a shroud of oblivion covered Borobudur. The holy place lay abandoned and forgotten for more than 800 years. Earthquake, torrential rain, dense tropical vegetation, and time all took their toll.

In 1814 Thomas Stamford Raffles, then lieutenant governor of Java, learned of the ruins. At first sight he recognized them as "remarkable for grandeur in design, peculiarity of style, and exquisite workmanship." During his stay in Java, Raffles ordered minor cleaning, work that continued on a small scale when Dutch colonial rule replaced British for the rest of the 19th century.

The first major restoration work at Borobudur was carried out between 1907 and 1911 by a young Dutch second lieutenant and engineer, Theodoor van Erp, who stabilized and restored the base, the topmost terraces, and the crowning stupa. With the smothering arms of the jungle torn away, the monument still lay victim to continued earth tremors and stood open to drenching tropical rains. A heroic effort would be required to assure its survival.

An appeal went out from Indonesia in the 1960s, and the world responded. Today this jewel of man's cultural heritage has been rescued from collapse by the government of Indonesia, with strong international support organized by UNESCO.

Since 1975, I have served as a member of the International Consultative Committee for the Safeguarding of Borobudur, succeeding J.E.N. Jensen, the first American on the committee. The other members are Professor Roosseno of Indonesia, who is chairman, Dr. Daigoro Chihara, Japan, Professor Raymond Lemaire, Belgium, and Dr. Karl Siegler, West Germany. The

committee has met annually at Borobudur since 1972 to provide technical advice and guidance on the work being carried out by the government with the assistance of NEDECO, the Dutch consulting engineers.

My work as a historic-preservation consultant, coupled with my vocation as an Episcopal priest, has brought me into contact with many religious traditions around the world. My keen interest is to search for the spiritual secrets of other times and other places. Borobudur did not disappoint me.

When I saw the great edifice for the first time seven years ago, the decade-long, 20-million-dollar project to dismantle, stabilize, and reassemble the mass of stones between its base and crown was well under way. With the bright yellow cranes of the working crews hovering over it like huge birds of prey, the monument to my American eyes looked much like a broken Humpty Dumpty, all bits and pieces. But first impressions can truly deceive.

Borobudur's art and architecture have long been acclaimed, but its spiritual mystery provides for me the greatest fascination. Interpretations differ, but I believe it is above all an expression of ultimate truth as understood by its Javanese builders 1,200 years ago.

The temple is a three-dimensional model of the Mahayana Buddhist cosmos and the path a person must take through it to achieve enlightenment. Like the traveler Christian who finally attains the Celestial City in *The Pilgrim's Progress*, one literally climbs the mountain of Borobudur to find at its top the ideal of Buddhist perfection.

During my first inspection of Borobudur I was shown the traditional way of visiting it. I approached from the east and stood at the foot of the steep steps that rise to the summit.

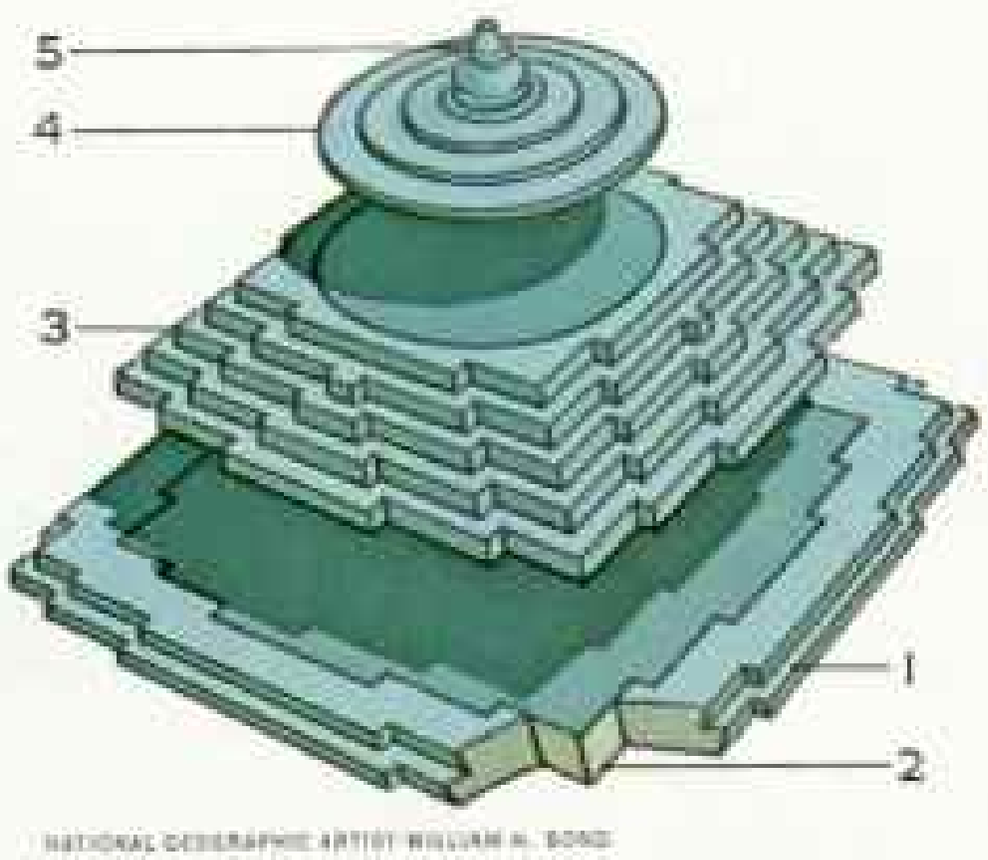
Looking up, I could not see the top of the monument. It was lost from view. I believe this was deliberately done by the builders to illustrate dramatically the universal truth that you cannot see the end of your spiritual journey from its beginning. You must start out with faith alone.

The ground-level terrace covers the original base or "hidden foot" that the builders first left exposed to view, then enclosed to strengthen the monument's foundation. Its 160 bas-relief sculptured panels, now partly uncovered, represent the World of Desire and depict a state of spiritual development in which a person is still the prisoner of earthly yearnings and the law of cause and effect.

Walking around the monument clockwise and moving up to each of the next five levels, a method in Buddhism called *pradaksina*, I studied another 1,300 panels of carvings that represent the World of Form. They depict scenes and teachings from the life of Buddha and from other Buddhist texts. Here, it is hoped, a person has achieved some mastery over worldly desire although still bound by the law of cause and effect.

As I traced the long corridors of the World of Form, with their high walls and balustrades on either side, I realized that I was moving through an intentionally designed environment. Except for the sky over my head, no natural scenery was visible. I was in a place for special learning.

The most dramatic moment of that first visit struck me like a thunderclap as I stepped through the stone gateway that



NATIONAL GEOGRAPHIC ARTIST WILLIAM N. BOND

TRIUMPH of historic preservation through international cooperation, Borobudur stands renewed. The temple encases a natural hill that had been given a pyramidal shape with artificial fill. From the beginning the structure's stones proved too heavy for its earthen core. Even before the completion at ground level of the 160 carved panels depicting the World of Desire, Borobudur was in danger of breaking apart.

National Geographic, January 1983

and a broad band of stabilizing stones (1) was installed against the "hidden foot." The encasement was temporarily removed in the early 1900s and the panels photographed; today's restorers have left one corner of the foot open to view (2). Square galleries (3), containing 1,300 bas-reliefs on both sides of balustraded corridors, illustrate the World of Form. Three circular terraces (4) with 72 stupas sheltering figures of Buddha and the large, crowning stupa (5) compose the World of Formlessness. While leaving the World of Desire and the World of Formlessness intact, restorers dismantled the World of Form, stabilized the foundations, and cleaned, repaired, and reset the stones atop a modern drainage system. The operation was like taking out the middle layer of a three-layer cake and putting it back without having the cake collapse.

leads from the fifth to the sixth terrace: From the World of Form, I moved up to the World of Formlessness, wherein a person is freed of all earthly ties.

The monument suddenly changed from being square to being round, from being heavily ornamented to being plain, except for 72 small perforated stone stupas on three circular terraces, each containing a statue of Buddha in mysterious and silent contemplation (page 142). And at the center and highest point, a large unadorned bell-shaped stupa pointed a stubby finger to the sky: to Nothingness and to All.

The balustrades and high walls that had earlier so rigidly controlled both my path and my view had vanished, and I could look from horizon to horizon and see everything around me. I could even look down to the foot of the monument and see the beginning of my journey.

For a few moments the taste of enlightenment was mine.

Indonesia will soon celebrate the rescue of Borobudur with the grand opening of the restored monument. The village that crowds the base of the monument's hill (***below***) is being moved to permit the creation of the

Borobudur Archaeological Park, and a new museum will rise to tell the history of the region and the restoration.

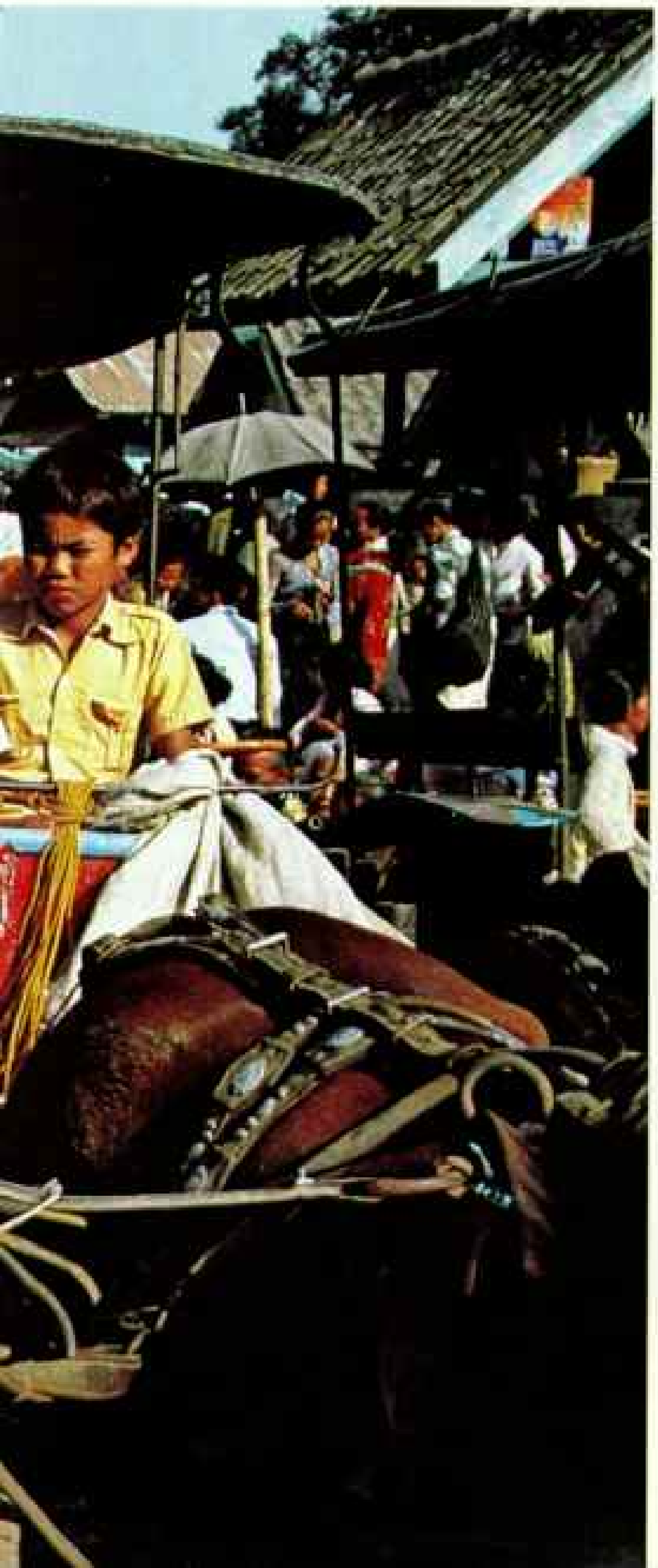
And why, one might wonder, has the country with the largest Muslim population on earth cared so much for the restoration of a Buddhist structure? Because all Indonesians, whatever their religion, consider Borobudur an outstanding expression of their own national cultural heritage.

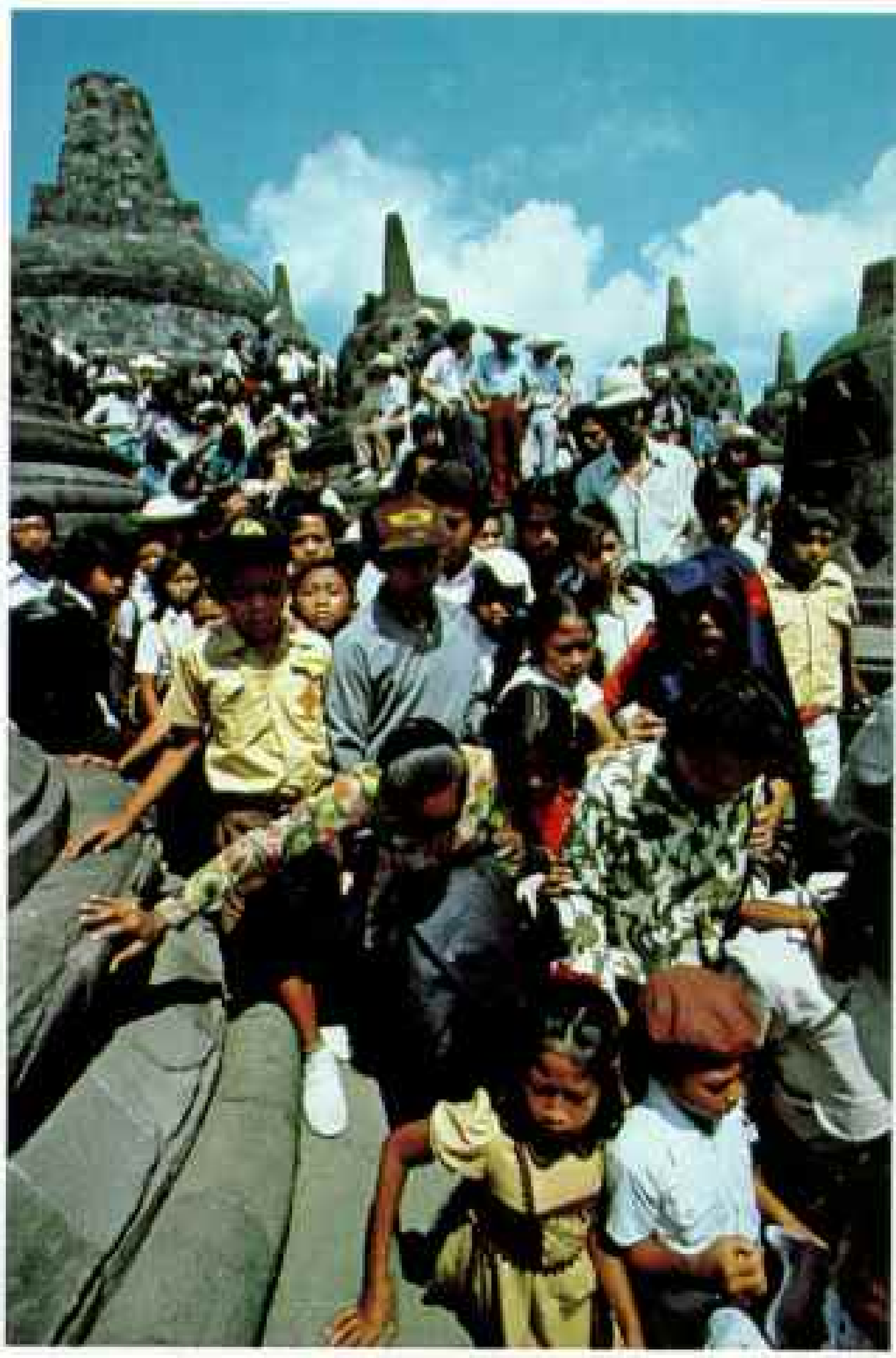
That pride recently found expression in words of Professor Roosseno: "I have dedicated my life to the service of my country, and no task has given me greater satisfaction than my work to ensure that Borobudur will last another thousand years."

I returned to Borobudur in 1982 for the last meeting of the consultative committee, mindful of the high risk always taken in dismantling and reassembling a historic monument, lest its spirit be lost and its soul die. At Borobudur, this has not happened.

The people of Indonesia, with some help from friends around the world, have done for their greatest monument what all the king's horses and all the king's men could not do for Humpty Dumpty.

They have put Borobudur together again.





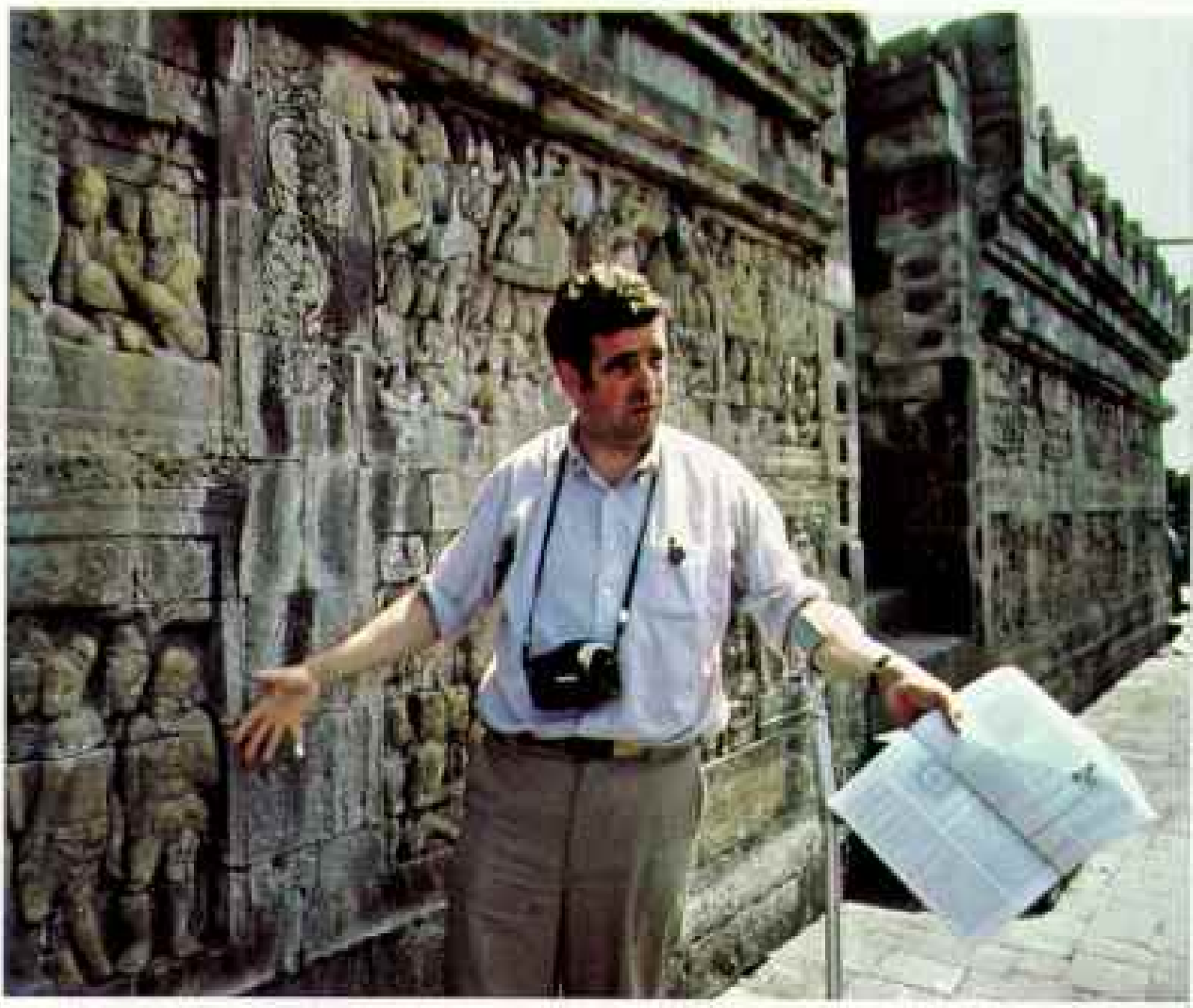
*SIGHTSEEING their nation's past, schoolchildren, among 850,000 visitors last year, swarm across upper terraces. With the relocation of Borobudur village (**left**) to make way for an archaeological park, some two million sightseers are expected annually in the future.*

PANOPLY OF POMP AND CIRCUMSTANCE: Exquisite carvings on the walls of Borobudur relate sagas of the Buddha and others in search of enlightenment.

Here a pilgrim, shaded by an attendant, appears to decline a ride on an elephant, as angels look down from clouds overhead and birds keep watch in a tree.

LOST IN THE DREAM of greatness to come, Queen Maya sleeps as ladies-in-waiting minister to her comfort ***(left)****. The queen dreams that a white elephant has entered her womb, presaging that the child she would later bear, Prince Siddhartha, would become Buddha. In another story* ***(below left)*** *a man called Bhiru escapes from a city destined for destruction; he follows the advice of a revered Buddhist monk and sets sail across the sea in a ship loaded with treasure.*

On an incredible 1,460 carved panels, the sculptors of Borobudur illustrated texts from several different Buddhist books as well as a host of folktales given Buddhist interpretations. The illustrated stories recount the life of Gautama Buddha, his earlier incarnations as a bodhisattva, or seeker of enlightenment, and the lives of other bodhisattvas. Those panels in the hidden foot dramatize the awful consequences of evil deeds, ranging from gossip to murder, while extolling the meritorious life and its rewards.



Studying the panels with camera and textbook ***(above)****, I found that many of the scenes show ships, temples, houses, musical instruments, dress, and customs that provide a rare glimpse into the culture of Indonesia a thousand years ago—an unexpected bonanza of historical documentation.*

Restoration

NATIONAL GEOGRAPHIC ARTIST WILLIAM H. BOND

W. BROWN MORTON III (FACING PAGE); BOROBUDUR RESTORATION PROJECT (ABOVE)

*THE STRUGGLE to save Borobudur has been one of the most complex and technically advanced historic-preservation projects ever undertaken. At its start restorers found the walls and balustrades cracked and leaning over at alarming angles (**diagram** and **upper right**). Indonesia and UNESCO called in international experts in architecture, engineering, soil mechanics, and stone conservation. Upon their recommendation, the project set three goals: to install a new drainage system (**right**) incorporating layers of tar and epoxy to keep rainwater from the temple's core, to set new reinforced-concrete slabs under the balustrades and walls, and to conserve the original stones.*

*The last task was immense. Using cranes (**left**), workmen took out more than 800,000 stones to be marked, moved to sheds, cleaned, repaired, treated with herbicides, stored, and finally replaced. Added complications: In the building of Borobudur, each stone was cut to key into neighboring stones; hence, each had to be returned to its original position. And, to keep the monument from becoming unbalanced and perhaps toppling, the stones had to be taken out and put back in a sequence that would keep the weight equal on opposite sides.*

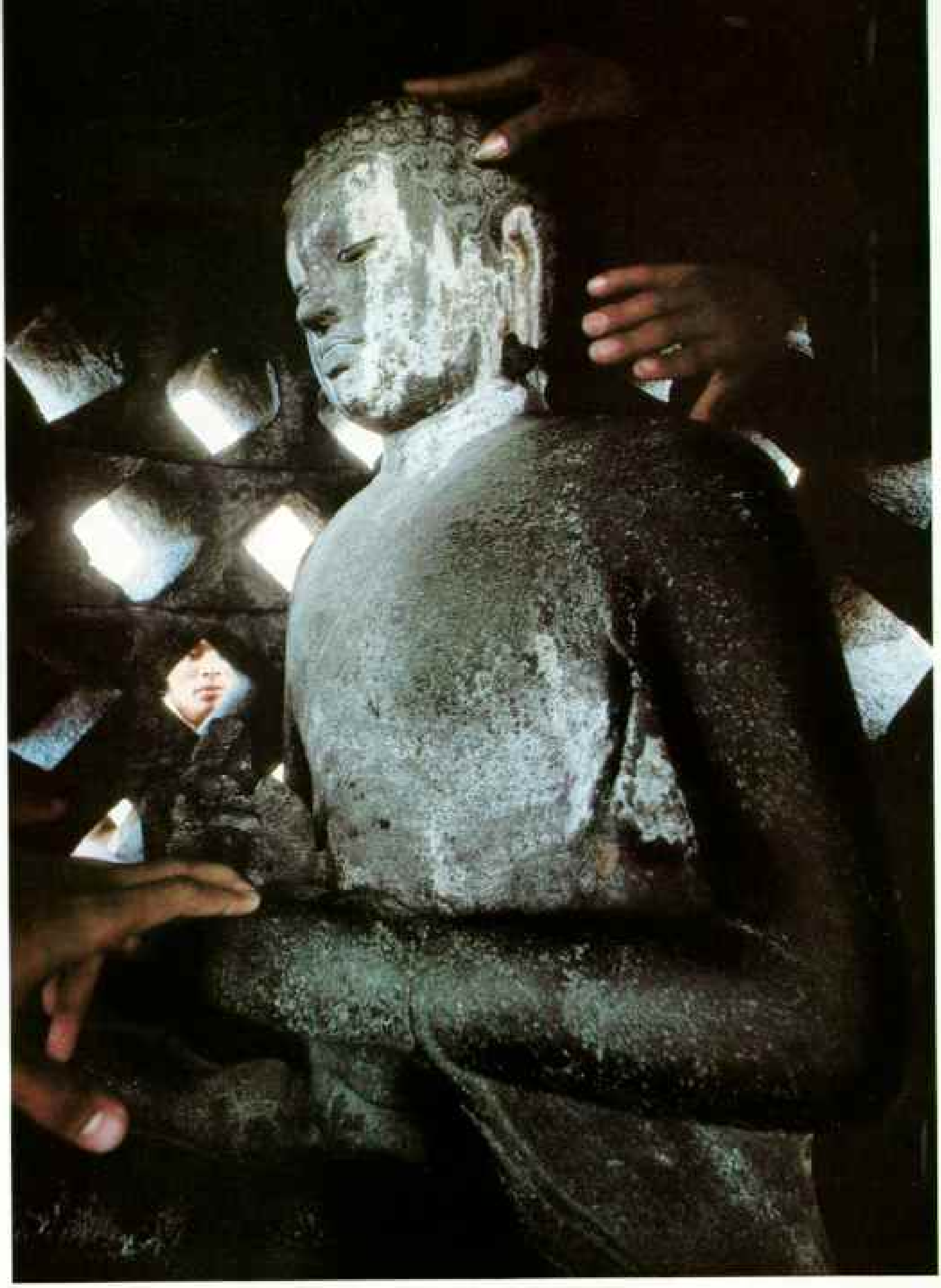
*ONE BY ONE the stones of Borobudur were returned to their proper location (**above**) in what turned out to be a miracle of order. How was it possible? The secret lay in the use of a computer.*

In 1975, IBM Indonesia developed a system for the registration of each of the temple's stones, enabling us to do the work of a lifetime in less than a decade. First, we numbered each stone. Then, into the computer went the stone's number, its description—width, depth, weight, extent of damage—and its position on the monument. Broken stones that had tumbled to the ground were put into the system so that we could piece together the fragments. Also, we were able to put back together broken Buddhas, matching shorn-off heads to the proper torsos.

The computer also kept up with the movement of a stone from the time it left the structure to its return. Thus the project's progress could be monitored. If stones scheduled for resetting were taking longer than expected to repair, for example, a red alert went up and we would bring on more workmen.

*When Dutch engineer Theodoor van Erp first saw Borobudur, its topmost stupas looked as though they were sitting on stony waves (**right**). Two of the Buddhas, having lost their covering stupas, were left open to the visitor's view (**above**).*

BOROBUDUR RESTORATION PROJECT



HOLY PLACE of compelling power, Borobudur draws admirers of all ages. Here in the World of Formlessness, visitors thrust their hands through a stupa's stone latticework to touch the figure of Buddha, hoping that good fortune will follow. They remind me of the role of other hands—those that took Borobudur apart and reassembled it. More than 600 skilled Indonesian laborers and technicians, many recruited from nearby villages, have poured their dedication and genius into the exacting work. As a result, they have made it possible for all mankind to take nourishment from an ageless expression of human yearning for the eternal. □

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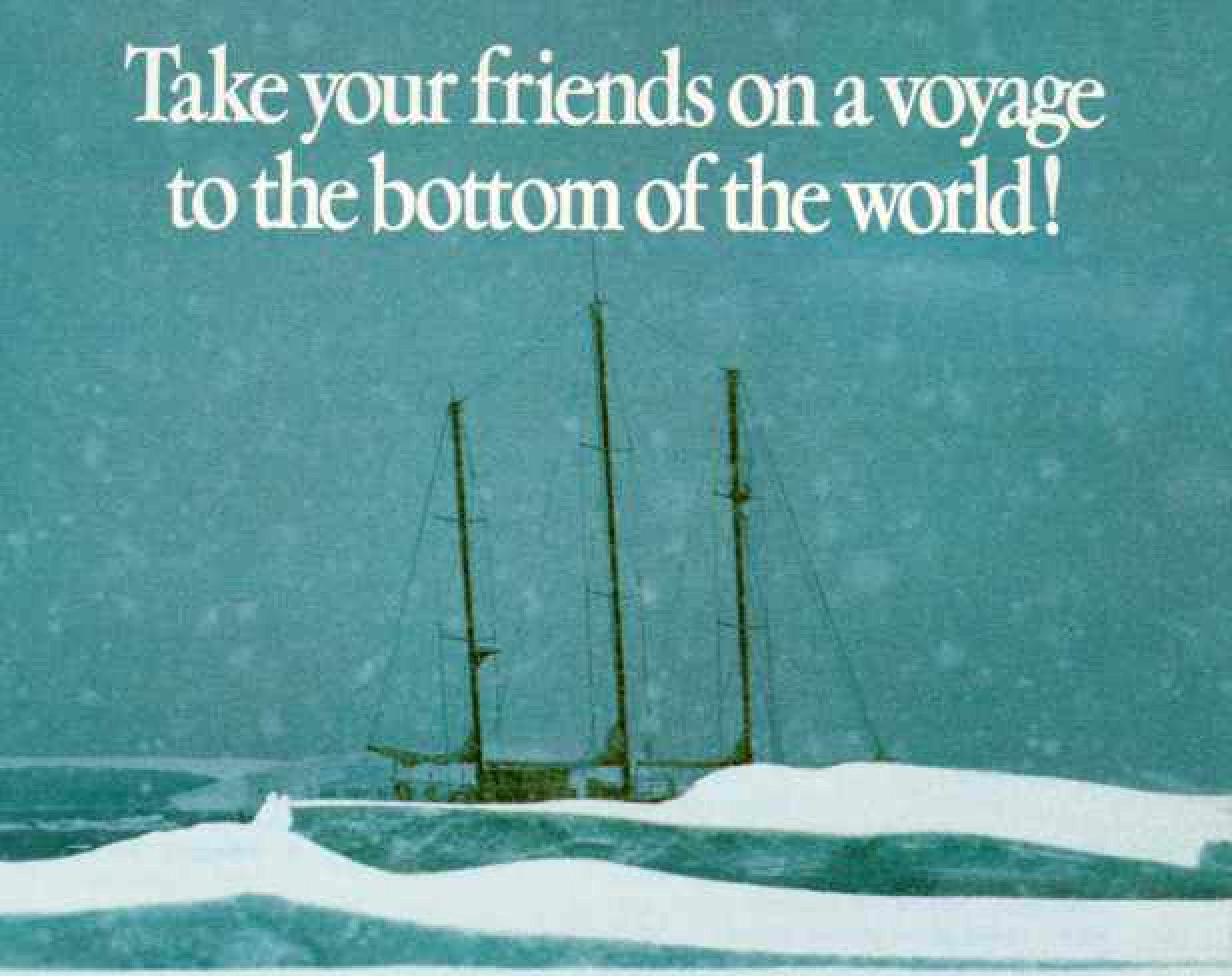

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Members Forum

THE CHIP

Re October 1982: Allen Boraiko asserts that the computer chip's "ability to embody logic and memory . . . gives it the essence of human intellect." Only when a computer ponders a sapling, frolics in a rainstorm, marvels at the idea of infinity, and then prints out the question "Why am I here?" will I share the thinking role with the incredible chip.

Brian A. Sims
Seattle, Washington

The picture of the ant with the chip worries me. What if some mad scientist breeds a race of super ants programmed by these devices? Remember, some ants farm, some enslave other ants. . . .

R. D. Hood
Bristolville, Ohio

Rarely has a metaphor been mangled so malappropriately as in the quote attributed by writer Boraiko to Dr. Lewis Branscomb: "The Japanese . . . have given intense interest . . . while Americans were asleep at the wheel." Not the wheel, the switch! The silicon-substrated, oxide-insulated, large-scale integrated *switch!*

David Graham
Mercer Island, Washington

One K is 1,024 bytes, not bits. Since a byte equals 8 bits, that's quite a difference.

Jules Elfenbein
Bayside, New York

The capacity of single memory chips is measured in bits, whereas a computer's entire memory is measured in bytes. In computer jargon, K simply stands for the number 1,024.

Your article starts off with a common error, the observation that ENIAC was the world's first electronic digital computer. The first such computer, a special-purpose machine, was conceived and built at Iowa State College (now University) between 1937 and 1942 by John Vincent Atanasoff. ENIAC, which I helped design, was the first general-purpose (programmable) electronic digital computer.

Professor Arthur W. Burks
University of Michigan, Ann Arbor

Listening to background music from my General Electric radio (made in Japan), after finishing a report using my Hewlett-Packard calculator (made in Singapore), I can't help wondering as I write this letter (that I will print on my Radio Shack Daisy Wheel Printer II, made in Japan), why you didn't mention Radio Shack in your microcomputer article? I saw my first Radio Shack micro when the only apples I had ever seen came out of my lunch brown bag.

In this competitive market I have also become confused on which product I should buy to help keep Americans working. I'll ponder that some more as I take this letter to the post office in my wife's Dodge Dart (made in Canada), or should I take it in my VW Rabbit (made in USA)?

William E. Sharp
Ocean City, New Jersey

We did not intend to slight any computers nor to name them all—domestic, foreign, or mixed.

The more than 13,000 employees of IBM Japan may express some surprise at the caption on page 432 in which you identify Fujitsu Ltd. as "the IBM of Japan." I am sure the reference was meant as an indirect compliment to both firms. However, after more than 50 years of successful operations in Japan, we want your readers to know that IBM Japan Ltd. is *the* IBM of Japan.

James C. Reilly
IBM Corporation
Mount Pleasant, New York

SILICON VALLEY

With all the engineering genius and super brainpower in the country (October 1982), and with all the vacant land in these United States, how terribly thoughtless, selfish, and *stupid* to destroy nearly 100,000 acres of lush orchards! Humans can't eat chips.

Elizabeth L. McCutcheon
Newton, New Jersey

I was struck by the predilection of Silicon Valley entrepreneurs for foreign cars (Mercedes-Benz, Rolls-Royce, and Bentley) while at the same time lobbying in Washington for a national industrial policy (i.e., a subsidy of some sort) that would protect them from the sale in this country of foreign chips.

John D. Turrel
Mount Vernon, Illinois

NATIONAL FORESTS

Rowe Findley's article "Our National Forests: Problems in Paradise" (September 1982) is very timely, but one controversial aspect of U. S. Forest Service timber sales was omitted: for many sales, the revenue obtained from the sale is *exceeded* by the costs of making the sale. The forest is logged at a cost to the taxpayer.

Across the fields of yesterday
he sometimes comes to me
a little child just back from play
the child I used to be.

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The dumping of such federally subsidized timber on the log market depresses log prices, year in and year out; depressed prices in turn discourage both sound logging practices and proper reforestation on private forest lands.

Robert E. Sholars
Mendocino, California

Whether or not such sales yield real net revenue is debated; it depends upon whose accounting procedure is accepted.

Trees are great in proper ecological balance. Interspersing pastureland with forestland can utilize the nitrogen and sulfur (free fertilizer) in acid rainfall, improve runoff water quality, increase streamflow, and improve wildlife habitat.

Donald T. Torell
Ukiah, California

T.R.'S WILDERNESS LEGACY

Your articles about Teddy Roosevelt and our national forests were timely, considering the U. S. Department of Agriculture has just recently issued a policy statement revealing that part of its legislative program for the 98th Congress will be to consider the selling of 140 million of our nation's 191 million acres of national forests.

I can't help but wonder what Teddy Roosevelt, our great conservation President, would think of this complete reversal of our nation's land policy.

Pamela R. Edens
Columbia, South Dakota

The 140 million is the acreage to be reviewed. It is expected that less than 15 to 18 million acres will be recommended for sale. Any such sales would require congressional approval.

AVALANCHE

Regarding the interesting material on avalanches in the September 1982 issue: It's one thing to use avalanche-control measures to protect communities, highways, et cetera. It's quite another thing to use them for the protection of skiing places. There should be no public sector involvement in the latter. Why subsidize exotic playgrounds for the affluent?

Dale P. Bell
New Orleans, Louisiana

Many citizens use avalanche-prone federal backcountry for winter sports. Most ski-resort acreage is leased federal land; private operators provide their own control measures, if any.

Living just below the Sierra Nevada and within an hour's drive of most of the major ski resorts, I can't describe what the rescue of Anna Conrad meant to this town.

On the morning after her rescue, everyone's step was a little gayer, minor irritations were forgotten, and strangers smiled at each other for no apparent reason. Everyone wants to believe in fairy tales, and for one day we were allowed to do just that.

Thank you, Anna Conrad, for reminding me that I should always look for (and expect to find) a miracle—every day!

Ruth E. Wheeler
Reno, Nevada

BAHAMAS

Having spent much of my Navy career driving R5Ds (DC-4s) and R6Ds (DC-6s) around the globe, I'll wager a few coins of the realm that the burned-out old clunker on pages 372-3 of your September 1982 issue is a DC-4, not a DC-6.

Capt. R. K. Culbertson, USN (Ret.)
Blacksburg, Virginia

You'd win, as would all the other pilots, mechanics, and plane buffs who spotted the difference.

PROGRESS, SLOW, BUT PROGRESS

My collection of GEOGRAPHICS goes back to 1913. In looking over the magazines, especially from the 1910s and 1920s, I am struck by the condescending tone used for the peoples of almost any place outside Western Europe and the eastern United States.

I realize that this reflects the world as it was then. However, I would like to think that the increasingly respectful and appreciative attitude apparent toward other people and life forms also reflects the world as it is becoming.

Progress is painfully slow, but the long view provided by my collection shows that in some ways we are improving.

Dorothy McCurry
New York, New York

BEHIND THE SCENES

I work in advertising and appreciate what is involved in actually producing a magazine of this quality and in this quantity, every month. In the 11 years in which I have read the magazine, I have never seen a typesetting error, a mechanical error, or a piece of printing that is not close to perfect. Well done to all those people behind the scenes.

Richard J. Slater
London, England

Letters should be addressed to **Members Forum,** *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.*

On Assignment

DAVID AND CAROL HUGHES

THE RAINS FELL every day during most of the 18 months that ***David*** and ***Carol Hughes*** spent in Costa Rica filming "Rain Forest," a new National Geographic TV Special to be shown January 12 on Public Television. Yet sometimes shelter was as close as the nearest giant leaf.

The moisture that attacked their equipment and morale was only one of their many problems. At one point, Carol was poisoned by a potent caterpillar. "It was red and white and covered with long hairs," she said. "It fell off a branch as I was photographing it and gently brushed my arm. I felt a slight sting right away that slowly built into intense pain, spreading up my arm and into my chest. I really wondered whether this was it." However, the pain gradually ebbed away, leaving Carol unharmed but more wary.

To film some of their most remarkable scenes—like the ants inside the thorn of an acacia tree—the couple used fiber-optic probes to control tiny beams of light. More often, they captured images through sheer determination and patience. A collection of their photographs appears in this issue.

"Rain Forest" is the third special the award-winning filmmakers have produced for the Society and WQED/Pittsburgh with support from the Gulf Oil Corporation. The others were "Etosha: Place of Dry Water" and "The Living Sands of Namib." A new film on African animals of the night is in the works.

For photographer ***James P. Blair*** (***below,*** left), who covered the story of earth's dwindling rain forests for two years, sharing a dugout with fellow traveler Bob Langenwalter on the Tapanahoni River in Suriname was a welcome break. After visiting so many areas where the forests were being destroyed, it was a joy, he said, to glide down an unspoiled waterway through an untouched forest. "Even the rain was refreshing."

Jim's travels during 20 years on the GEOGRAPHIC staff have taken him from the quiet islands of Tristan da Cunha in the South Atlantic to the riot-torn black townships of South Africa, coverage that won the Overseas Press Club Award in 1977. For the rain forest story, he visited 11 nations on four continents, demonstrating the magazine's commitment, he said, to do comprehensive reporting. "To a photographer, that's one of the greatest gifts."

WILBUR E. GARRETT

FIND OUT HOW EXCITING ROOM FOR SIX CAN BE

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This is a car that was designed and engineered to civilize rough roads, as well as pamper you and your friends.

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The most beautiful beaches in Hawaii aren't necessarily the most famous ones.

United flight attendant
Christine Nishihira

Christine Nishihira

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Lumahai Beach, Kauai

Photographed by Gary L. Nuechterlein.
Hooded Grebe: Genus: Podiceps Species: gallardoi
Adult size: 34cm from tip of bill to tail Adult weight: Approximately 570g Habitat: Known to breed only on several small lakes in the foothills of the Andes in southern Patagonia, Argentina
Surviving number: An estimated 250

Wildlife as Canon sees it: A photographic heritage for all generations.

In 1974, on an isolated, windswept plateau in the foothills of the Andes, a bird unknown to modern science was discovered. Unusually beautiful with eyes as vividly scarlet as rubies, this was the hooded grebe, one of the rarest birds today.

The hooded grebe could never be brought back should it vanish from the face of the earth. And while photography can record it for posterity, more importantly photography can help save it and the rest of wildlife.

Aided by photography, scientists and researchers can observe the hooded grebe without disturbing or disrupting the bird's fragile existence, and in fact a great deal of information has already been compiled that way in only a short time. Also through photography, it is now possible for people throughout the world to see, appreciate and understand this regally elegant bird that was totally unknown and unrecorded nine years ago.

And understanding is perhaps the single most important factor in saving the hooded grebe and all of wildlife.

Canon
Images for all time