SUPPLEMENT: ATLAS MAP OF AFRICA

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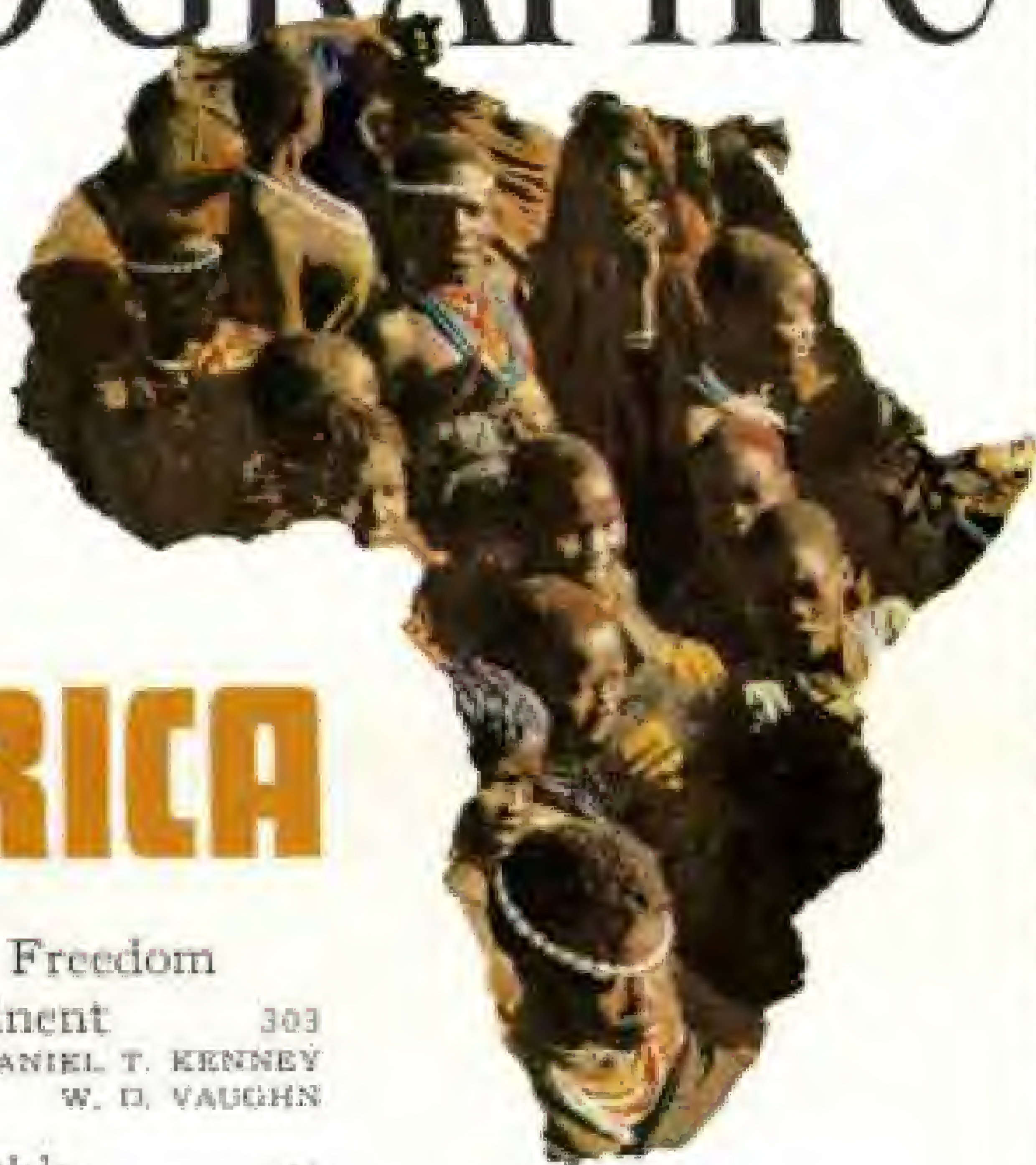

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COVER: *Women of Karamoja, Uganda, turn out to greet foreign visitors (page 386).*

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Under the care of our National Park Service, both battlefields are as they were, with only their natural beauty enhanced. The guns frown down from Missionary Ridge and Point Lookout. The field where Thomas became the "Rock of Chickamauga" is clearly marked. The "impregnable" cliffs make you wonder how ordinary men, with only muscle and courage, could fight so hard and win so much.

As America begins the Civil War Centennial, it is good to see these battlefields. It makes you proud of the men, on both sides, who fought here. Many were boys, sent to do a man's job, but they did it well. *The nation they welded together in the fires of civil war has become the envy of the world, and its last, best hope.*

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Ralph Gray, Chief of the National Geographic Society's School Service, faces each week an impossible (but delightful) job: Trying to satisfy the endless curiosity of school children about the world they live in. It is a little like trying to fill a bottomless well with a shovel.

Gray's shovel is a lively Society publication, the richly illustrated *Geographic School Bulletins*, mailed each week to thousands of school children and teachers across the country.

But Gray stays on youth's wave length by means even more direct than this sprightly weekly. He visits educational conventions (above), and speaks to visiting school groups. *(Thank you for the talk about the Congo. I didn't know a lion wouldn't attack if you went by him in a car.)*

School Service never fails to fill a request for knowledge. Well—almost never. *(I am studying the world . . . send me everything you have.)* And those questions children ask—Gray gets them by the thousands. *(I am in the sixth grade and I would like to have a National Geographic Society. Would you please send me one? . . . How do your explorers talk with New Guinea natives? . . . What do you do for a sick turtle?)*

The *School Bulletins* augment the NATIONAL GEOGRAPHIC and, thanks to a Society grant, go to students at far less than cost.

Each time you present a gift membership in The Society, or nominate someone for membership without financial obligation to yourself, you help ensure this phase of your Society's work. You also provide much-sought NATIONAL GEOGRAPHICS for grateful friends. All with the mere stroke of your pen on the blank below.

And, by the way, if you're a parent or teacher curious to know more about the *Geographic School Bulletins*, do see the appropriate page toward the back of this magazine.

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information about Little Rock for industrial site seekers

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A recent law enacted by the Arkansas legislature is proving of interest to new industry. It enables counties and municipalities to form compacts for industrial financing, and authorizes them to issue first lien obligations up to 75% of the appraised value of the lands, buildings, and heavy machinery to be financed, and second lien obligations for any remaining necessary financing.

The Rock Island has many choice industrial sites available in Little Rock and other Arkansas cities. If the following information on Little Rock interests you, get in touch with us for more specific details. We'll work with you in strictest confidence.

LABOR: Skilled stable labor force of 75,000 available in Pulaski County; increase in employment of 30% in 10 years (10% in 2 years); average education of 8.7 years.

POWER: 242,000 KW per day of electrical power; 4½ trillion cu. ft. of natural gas in reserve storage.

TRANSPORTATION: The Rock Island and 2 other railroads; 32 interstate truck lines; 27 local terminals; 5 airlines; 8 bus lines.

RAW MATERIALS: Uncommitted timber, soil, and water nearby; vast supplies of minerals; parts and sub-assembly manufacturers plentiful; reliable sources with reasonable delivery costs.

HOUSING: 2,704 new housing starts in last three years ('57-'59); 45 attractive residential subdivisions, 40 of which are relatively new, within a 10 mile radius of downtown; rentals average $14 per room per month unfurnished; Little Rock's urban development program is recognized as one of the three most aggressive and outstanding in the nation, due, in large part, to support by private enterprise.

THE COMMUNITY: Approximately 60 elementary and high schools with an average of 28 students per classroom; 8 colleges and business schools; approximately 35 public parks and community centers; 36 hospitals and rest homes staffed by 375 doctors; total tax picture in Little Rock and Arkansas is competitive with other states. (Only one neighboring state shows a more favorable total tax liability for federal, state, and local taxes for high fixed asset firms.)

COMMERCIAL SERVICES: 96 classifications of industry with 255 listed corporations, including tool and die operations; 4 local contractors are experienced in industrial construction; exceptionally wide diversification of commercial activity with modern, attractive shopping district and several shopping centers.

CLIMATE: Average mean temperature is 62.4°F; average monthly rainfall 3.94" (47.28" average annual rainfall).

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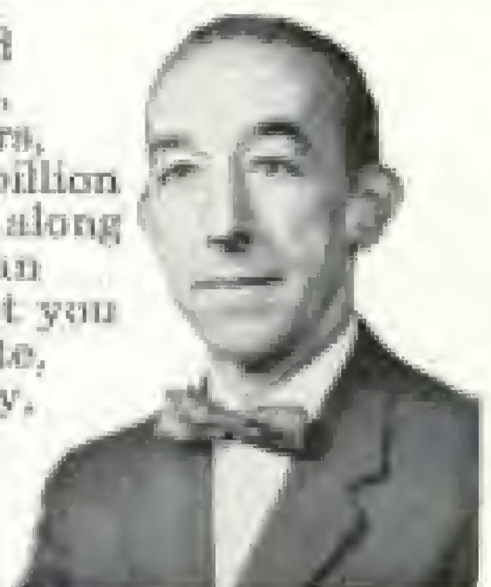

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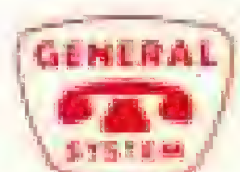

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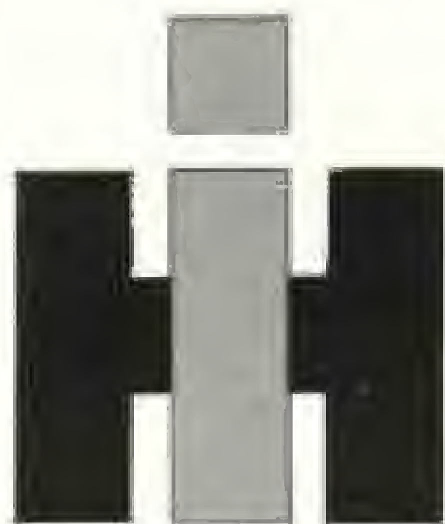

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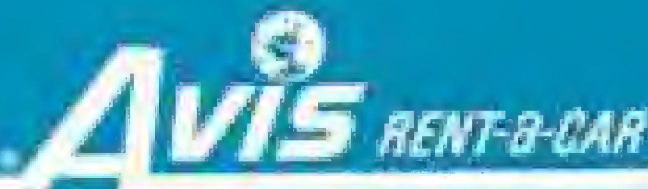

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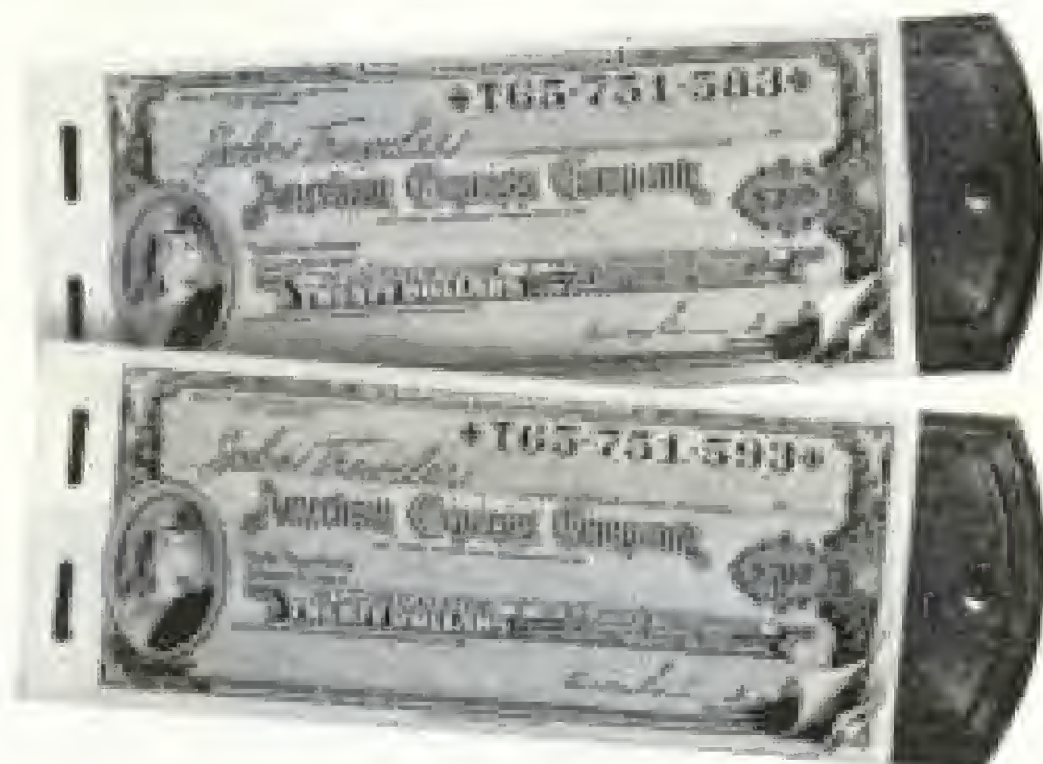

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The South's mild climate, its thousands of miles of seacoast and inland waterways and its many beautiful lakes and rivers provide ideal natural facilities for outdoor fun. The tremendous increase in recreational activity has brought about a corresponding growth in Southern businesses which make, distribute and sell items for recreational use. Many national concerns have established plants in the South and local manufacturers, too, have mushroomed with astonishing speed. Also, service organizations such as hotels, motels and fishing camps have grown spectacularly. In a ten-year period their receipts have more than doubled in the four-state area served by the operating companies of The Southern Company system.

The Southern Company group of investor-owned companies is continually anticipating the growing electric power requirements of the area for industry, agriculture, homes and other uses. In the next three years alone, these companies plan to spend over one-half billion dollars to expand their electric power facilities.

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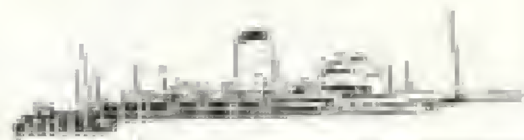

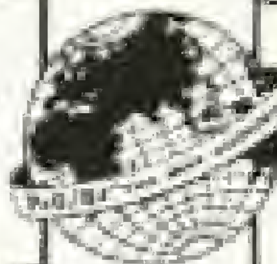

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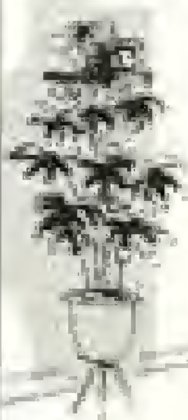

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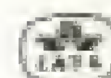

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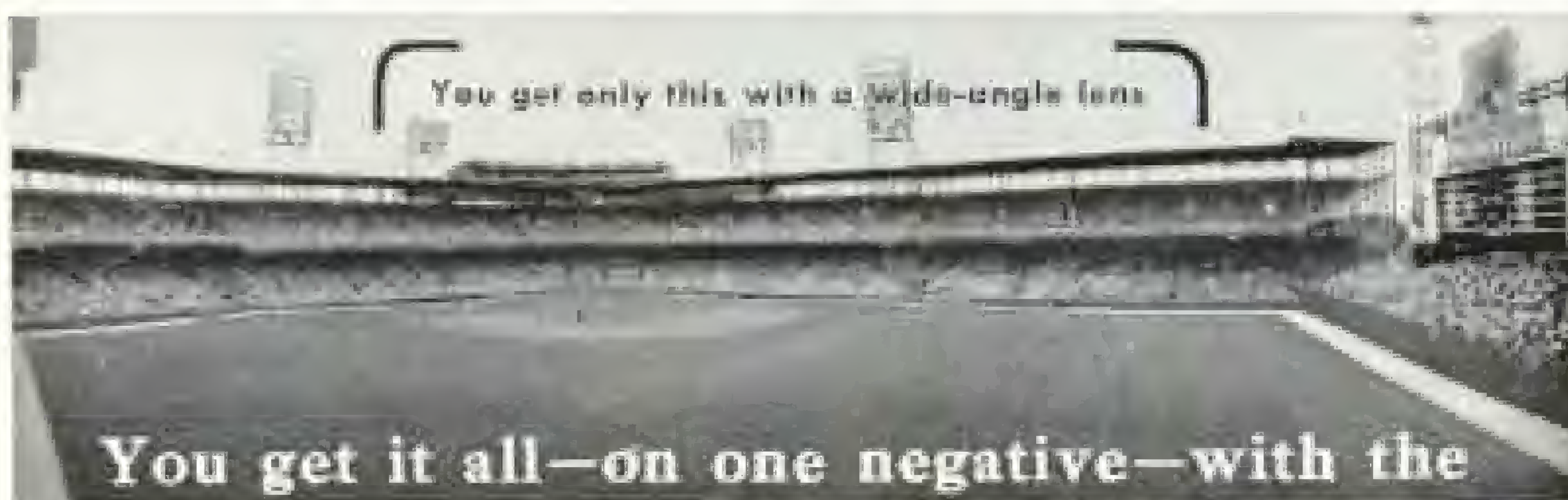

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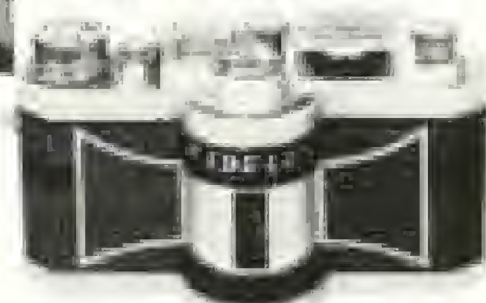

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Even if it were possible for parents to watch and caution a youngster constantly, it would be unwise to do so. This would make a child timid and dependent—and deprive him of some of the greatest delights of growing up.

But it's a mistaken belief that children are bound to have accidents—and that it's useless to try to prevent them. *In fact, studies have proved that most childhood accidents need never happen.*

For example, consider the deadly threat of accidental poisoning. Each year several hundred thousand youngsters under age five swallow some kind of poison—and as many as 300 to 400 die as a result.

These grim statistics could be drastically cut by observing these simple precautions:

Store all drugs—especially flavored or brightly colored medicines—in a locked closet or cabinet.

Destroy all left-over medicines prescribed for temporary use. Don't throw them into a wastebasket where a child might find them.

Put all household products—disinfectants, insecticides, furniture polishes, bleaches, metal cleaners, lye, ammonia and acids—out of the reach and out of the sight of children. Replace covers tightly.

Keep all potentially harmful substances in their original containers. Don't transfer them to unlabeled containers, particularly those meant to hold food or beverages.

Read all labels carefully and follow warning directions to the letter—whether it's a label on a bottle of medicine or a container of paint solvent.

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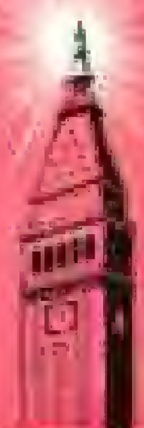
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THE NATIONAL GEOGRAPHIC MAGAZINE

Vol. 118, No. 3 September, 1960

THE WINDS OF FREEDOM STIR A CONTINENT

AFRICA

By NATHANIEL T. KENNEY

Photographs by W. D. VAUGHN

AT A TIME in the long ago, while Europe plodded forward, Mother Africa lay down to sleep in her incomparable sunshine.

She sighed in her sleep; the wind of her breath buried the works of the Pharaohs in sand. She stirred, making the earth shake, and the Roman temples of Tunisia fell.

Beyond the Bight of Benin, in the jungles of Nigeria, the artists yawned and closed their eyes and never woke again, and only the bronze heads dug from the rubble of Ife bear witness they lived at all.

Forest vines' green tongues licked at the walls of Zimbabwe, Rhodesian city of mystery.

For thousands of years ships brought slavers to her coasts. Finding Mother Africa drugged with sleep, they seized her children and hurried them away.

In 1800 Africa on maps was a narrow coastline encircling a great white blank. Intrepid explorers filled it: Mungo Park, a young Scottish surgeon; David Livingstone, medical missionary; Caillié, brilliant Frenchman; Henry M. Stanley, British journalist.

Hosts of missionaries, traders, engineers, doctors, and teachers followed them. Devoted scientists came to fight the tsetse fly that devastated half a continent.

Mother Africa awakened.

Many things had changed, she saw, while she lay sleeping. Guns mocked the spears of her sons. A thing called a wheel carried the white man's loads.

And the big-bellied drums of the forest tribes spoke new words.

"The man Livingstone defies the hunters of slaves," they boomed from along the Zambezi. "He marches boldly into their camps and cuts the bonds of their cap-

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Author and photographer: Mr. Kenney, a National Geographic Senior Staff member, fought in North Africa in World War II, serving from Tunis to Dakar. Photographer Vaughn, a former newspaperman, joined the Geographic staff in 1958. Members can follow their 50,000-mile, five-month circuit of the continent on the Atlas Map supplement, **Africa,** distributed with this issue.

B. B. VAUGHN

PETE TURNER © NATIONAL GEOGRAPHIC SOCIETY

AFRICA TODAY: Three times the size of the 50 United States, the continent wears varied and kaleidoscopic faces. Here, clockwise from lower left, are glimpses of its ancient glories and awakening lands. Battered **Colossus of Memnon** dwarfs visitors to Egypt. An **Ethiopian farmer**

PETE TURNER

tives. He speaks a word that intoxicates like palm wine. The word is 'freedom.'"

"Freedom," breathed Mother Africa, rising to her feet. "Free-DOM!"

The children of Africa took the word and made of it a litany.

"*Indépendance!*"

What matter the shape of the word? For the children only the concept counts.

"*Uhuru!*"

Two hundred million voices, chanting in unison, shake the world.

"Free-DOM!"

Speed, the incredible speed of fire on the veld. Of the leopard's pounce. And of freedom's march across Africa.

For almost half of 1960 I watched one of the great human upheavals of my time.

I saw beauty and ugliness, happiness and misery, hope and despair. Men lived and men died before my eyes. I saw meanness, nobility, comedy. And tragedy.

At first the blazing vitality and power of Africa in ferment frightened me. Amid insistent elbows I knew claustrophobia.

But faces go with elbows, and many faces smiled and spoke kind words.

These are my fellow humans, yearning for health, education, a place in the sun for

tosses his grain high into the winnowing breeze. Brightly garbed **Zulu maiden** dances at a wedding feast in Durban, South Africa; beads convey a message to the man of her choice. Dust powders the turbaned head of an Ethiopian **cattle herder.** Warmth-loving **baboon** relaxes on a steel rail in Southern Rhodesia; bands of the dog-sized marauders sometimes invade villages. African nationalist **Kwame Nkrumah,** Ghana's first President, typifies the continent's new leaders. Aerial cableway's seven-minute climb lifts sightseers up Table Mountain, overlooking **Cape Town.**

their children, the entrancing gadgets of the modern world, respect, peace, and—

"Free-DOM!"

Freedom is a many-sided thing. It can bless the strong and the wise, but it carries with it responsibility as well as privilege. New Africa has had freedom pressed shining into her eager hands. Now the world asks the question: What will she do with it?

MONROVIA, capital of Liberia, has a Water Street beside a sluggish river, a street of Lebanese stores that sell the rainbow in cheap cotton cloth.

I walked this street one night at the flood of its human tide. Percy Borde and his partner Pearl Primus walked by my side.

Percy and Pearl are professional dancers from New York. They teach arts at the University of Liberia. Pearl, seeking a doctorate of philosophy from New York University, plans to present, in support of her thesis, a recital of African dances.

"We will start you at the beginning," Percy said to me. "Hear the folk songs and the drums, the oldest human sounds in Africa."

And I heard them above the babel of the crowd—deep male voices, the thunder of the

painted drums, the chunking of strange boxlike instruments.

We turned into a side street, coursing the sound. We entered a warren of huts with roofs of corrugated iron. The drum throb ceased, and the singing died away.

Quietly the singers and the drummers watched me, 40 men with skins the purple black of midnight and the shoulders of trained athletes, side by side on rude benches.

"The Fanti men of the Ghana coast," Pearl said. "They sing to gods who were old when Ghana was a mighty empire."

The Fanti men, the roving fishermen of all the Atlantic shore from Senegal to Angola. They live on the lonely beaches beside their magnificent high-prowed canoes, and of the world beyond the breakers they ask only the cotton cloth of the Lebanese shops, which they wear like the togas of Roman statesmen to leave a shoulder bare.

"Do not stop," Pearl said to them. "This man comes from my country. He has crossed an ocean to hear you."

And that was all the Fanti asked to know, and they squeezed together on their benches to make room. The drums regained their voices. The singers picked up the song again.

"A prayer to the fish spirit, half fish and half bird," Pearl breathed in my ear as tempo and volume soared.

"Oh, fish spirit, lead the fishes to the nets. Lead only the big ones, let the little ones go away unharmed, make the nets strong so they will hold the fishes. . . ."

But already she was moving away, to the open space before the throbbing drums, and she was dancing (below) as no one can dance whose ancestral home is not Africa.

Then the Fanti families came from the dark huts, moving to the beat of the music until all the African world around me was rhythmic motion. The women glided from the shadows, and the children with them, some barely big enough to walk but all moving their small hands and shoulders and legs with untaught grace, as dark flowers move in a night breeze.

"Join them, move with them," I heard Pearl

KODACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHER W. D. VAUGHN © N.G.S.

The Eyes of Africa: a Fanti Fisherman Drums in Ecstasy

Roving canoemen from Ghana, the Fanti keep to themselves in their dim quarter of Monrovia, capital of Liberia. There, to throbbing drums, they sing their ancient songs of birth, death, food, and fertility.

"A veil mists African eyes in such moments of trance," says the author. "No alien can hope to understand it."

Pearl Primus of New York creates dances to Fanti rhythms. A serious student of her ancestral culture, she helps the Liberian Government preserve the African arts. Clannish Fanti unquestioningly accepted the author as a friend when Miss Primus and her partner introduced him.

call, and I did, trying to dance as they danced, driven in part by the thundering drums, but also by some atavistic fear of being still and alone in a world that danced.

Across the street a man in a ragged white robe paused on the sidewalk. He listened a moment to the drums, I should think. Then he collapsed to the ground. A small coin rolled from his pocket, a parcel from his hand.

The drums growled. The singers sang a song of birth. A policeman looked at the man on the sidewalk. "He is dead," the policeman said, and moved the coin and parcel close to the body, out of the way of passers-by.

The birth song went on. One or two of the Fanti came out and looked at the dead man and then went back to their benches.

"MOVE OR DIE," said William V. S. Tubman, President of Liberia, thumping the speakers' rostrum.

Liberia and its President certainly moved while I was there. Mr. Tubman broke ground for the Law Courts Building. He switched shovels and broke ground for a new executive mansion.

"Move or die," he told the audience, perspiring in their heavy Western suits.

He celebrated his 64th birthday; he staged a glittering state reception for Ahmadou Ahidjo, Prime Minister of the French Cameroons; he opened a night club called The Pepperbird; he inspected the elegant new Ducor Palace Hotel on a hill above the sea.

To help him dedicate Monrovia's new City

Hall, Lord Mayor Zewde Gabre Selassie flew in from Addis Ababa, and Mayor Rodger Ferguson came from Monrovia, California.

"We move or we die," Mr. Tubman told me in his office. "That goes for all Africa.

"I wish," he went on, "you could see my place upcountry and my pygmy hippos, a kind native to Liberia. But I don't have time to take you—I have to meet a trade delegation."

So I went on away with Reggie Hodge, one of his Information Service people, and looked at Liberia in motion. We watched the rich iron ore, 68 percent metal, ride the long conveyer belts to the holds of ships berthed in Monrovia's brisk new port.

We backtracked the heavy stuff along a new railroad to Bomi Hills. The "Hills" will disappear, for they are almost solid ore, and the Liberia Mining Company, allied with Republic Steel Corporation, already has transformed several into a vast red pit.

I slipped away to the mellow Harbel Planta-

Bulging net lands a squirming catch on the Ghana coast near Accra. Ga tribesmen, some swimming in the powerful surf, closed the net, and this chanting crew on shore hauled it in. A headman will supervise division of the fish among the women.

Two poles to a line, Ghanaian fishermen heave a massive tuna over their shoulders into the boat. A United States company is helping Ghana establish its first modern tuna industry.

tion of the Firestone Tire and Rubber Company (opposite). For years the parklike groves, almost 100,000 acres, have sparked the Liberian economy.* One day they will yield place to Bomi Hills and other iron deposits deeper in the interior.

Reggie and I had dinner in a fine hotel on the outskirts of Monrovia.

"The cash register was robbed," said Reggie. "The manager called the police. They could not find the thief.

"So the manager called the *sassywood*, the medicine man. He set palm oil to boiling in an iron kettle and dropped in a pin.

"'Take the pin out,' said the old sassywood to the suspects.

"The innocent ones felt only a cool, damp sensation as they reached in their arms. The guilty one did not dare try. He would have been badly burned. The manager got his money back."

"Reg, do you truly believe that?" I asked.

"Nat," he said quietly, "you forget that I am an African."

Sometimes a veil descends over the eyes of Africa, and behind it I cannot go. It is not that I am forbidden, it is only that I do not know the way.

The man behind the veil can die of an enemy's curse, if he knows he is cursed. He can find his path across the trackless desert in time of blowing sand, when even the radar fails ships in the Suez. He cannot see, smell, or hear the leopard in the thornbush, but he knows it is there.

But he comes to me with his new camera in his hand and asks me what makes it take pictures. I will tell him how his camera works, and he will teach me how to find the leopard, if we will both be patient.

ED MADRUGA of Los Angeles will teach the man of Ghana how best to catch the saucer-eyed tuna, which he needs for protein.

Porpoises arched from the sea. Silvery mar-

*See "Rubber-cushioned Liberia," by Henry S. Villard, NATIONAL GEOGRAPHIC, February, 1948.

Maggie the Chimpanzee Swings Above an Oil Camp Mess Table

Jungle-tough seismographic experts allow their spoiled pet to share their coffee but not their beer. Maggie responds to kind treatment with bruising hugs and enthusiastic kisses. The men map oil strata in Cabinda, a Portuguese enclave north of the Congo River's mouth. Author Kenney sits on the left.

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EKTACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHER W. D. VAUGHN © N.G.S.

Spongy sheets of crepe rubber undergo grading at Firestone's Harbel Plantation in Liberia. Workman at left cuts a sheet for baling. Others spread rubber on light tables to spot impurities.

Weeping milky tears, a rubber tree fills a cup with latex. A mature tree yields 11 pounds of rubber a year. Burdened by full pails, tappers trot single file toward a collection station.

Umbrella Bearers and Plume Shakers Welcome Dr. Nkrumah to Berekum, Ghana

Pageantry marks a durbar honoring the President, who strides in scarf and white suit at center. A gathering of native chiefs and followers to greet a paramount chief, the durbar takes its name from India; it predates British days on the Gold Coast, as Ghana was called before it gained independence in 1957. Ceremonial umbrellas in background glorify Ashanti chieftains.

Gilded beasts tip the staffs carried by court linguists of Nana Akuamoah Boateng II, a paramount chief of Western Ashanti. Adorned with gold-encrusted diadem and shaded by a red umbrella, the chief rides a palanquin borne about the durbar field by his retainers. He speaks to lesser people only through his linguists. Designs representing clans are woven into his silk-and-cotton robe.

lin stood on their tails. Whales spouted. Ed steered the tuna clipper *Columbia*, flying United States colors, along the Ghana coast.

"A new fishing ground," said the ship's fishery biologist, Gil Bane. "Here the incoming sea strikes the continental shelf and rises, bringing countless small bait fishes to the surface.

"Ghana fishermen knew tuna came here, but it took them hours fighting the fish from a canoe to catch a single big one. Their government asked our employer, Star-Kist Foods of Terminal Island, California, to teach new methods. So we are here, and everything is half and half, profits and expenses.

"The fishermen too. Half of ours are Ghanaians."

BY [illegible] © NATIONAL GEOGRAPHIC SOCIETY

The tuna boiled in *Columbia*'s wake, following the chum line of little fishes the men dipped from the live wells and threw into the ocean. In their fishing harness and hard aluminum hats, the men climbed over the rail into the metal racks hung over the stern and sides close to the sea (page 509).

Ghanaians Learn to Hook Tuna

The Americans had been doing this all their lives. Teamed two men to a fish—these are "two-pole" tuna of 50, 60, or 75 pounds—they swing the blue-and-silver torpedoes out of the sea in a steady stream, into the fish boxes, and the ship vibrates to the frantic poundings of the smooth, powerful bodies.

The Ghanaians do not work as expertly. They catch too many sharks—they do not pull the baits away in time. They do not always pull together, so that the tuna wins, and slips the barbless hook.

"But," Ed said, "they are the best beginners I've ever seen. Soon they will know the business. The government is ordering boats from Europe and the United States for them. They will have a fine fishery here."

This is the pattern of progress in Ghana. The country won its freedom three years ago, but remained within the British Commonwealth. Key British administrators and technicians keep their posts, and Ghana welcomes people like Ed Madruga who can teach her the skills she must have for survival in the complex world she chose to enter.

With our load of tuna, we put in to Tema, the nation's nearly completed port of dreams. Already the cacao, economic mainstay of the nation, sails out of Tema to the world. And one day, when the roaring Volta River is harnessed and the power plants hum, aluminum ingots will pass through Tema, for in the Volta region lie some of the world's greatest deposits of bauxite, the aluminum ore.

Beside the deep-sea wharves and warehouses is a section built especially for fishermen. Gay in their bright prints, empty

KODACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHER W. D. VAUGHN © N.G.S.

baskets on their heads, the women of Ghana came in swarms to meet us.

They stared at the great tuna. Then they begged to buy—not the tuna, but the little bait fishes in the live wells.

"They'd rather have the little fish that are easy to smoke," said the Englishman Geof Harrison, Chief of the Ghana Fisheries Division. "We are now teaching these women to eat tuna."

English With a Ghana Flavor

I took the hard road to Accra, the capital. Traffic fairly flew, symbol of Ghana's hurry.

Pixies, I think, paint the names on the buses. The words are English, the national language, but the flavor is pure Gold Coast.

"All Is Well," reads the ornate sign on one battered conveyance—but I doubt that the women inside would agree, for they are jammed together in desperate discomfort.

"Love Is Nice" likes the middle of the road; so "Life Is War" meekly takes the ditch. "The Life—What You Have Done" blows its horn, but "All Shall Pass" suffers nothing to pass.

In Accra there is a night club called "Kalamazoo Shake Your Head."

Kwame Nkrumah's secretaries shook *their* heads.

"The Prime Minister has been shying away from interviews lately," they told me. "But why don't you take a look at the interior of the country? You could meet some extremely interesting people."

Maybe it was a test of the strength of my

Three-fingered Oars Propel Surfboats Toward Accra Beach

Because Ghana's capital lacks an adequate natural harbor, seagoing vessels anchor offshore and deliver their freight in two-ton lots to boatmen, who paddle a mile to shore through heavy swells.

Safe transit depends on the whim of wind and wave; cargoes have been lost when lighters overturned in the surf. To stroke in rhythm, the men sing folk songs.

In 1961 a deep harbor at Tema, 16 miles to the east, will replace Accra's open roadstead. Tema's breakwaters will shelter one of Africa's largest artificial anchorages.

Wading to shore, a cargo carrier steadies parcels on his head. Thirteen men—bosun, mate, ten paddlers, and a boat boy—form a large surfboat's crew.

wish to meet Dr. Nkrumah, indisputably one of the most powerful of Africa's home-grown leaders. I went inland, and one of the first "interesting people" I met was the Prime Minister, who has since been elected President (page 505).

"One of those small-world things," I said. "You went to college in Pennsylvania and I in New Jersey, only 50 miles away."

"And I know your NATIONAL GEOGRAPHIC," he grinned.*

"Come along with me to the durbar, if you want something colorful to write about. You'll see the chiefs of Western Ashanti in all their ancient splendor."

The Ashanti. Yesterday's fierce warriors of the voodoo-ridden jungle, men who dared pit spears against firearms. Today they are prosperous cacao growers, but still proud and not too happy about the new form of democracy.

The Ashanti chiefs came to the durbar field in blazing robes of state. Bearers carried their carved wooden stools, symbols of their power. The soft yellow gold of Ghana, for which the Portuguese came to the Gold Coast before Columbus sailed for America, gleamed in their headdresses and in the warp of the robes.

Huge umbrellas bounced and swayed as

*Over the years the GEOGRAPHIC has published many articles on Africa's awakening; two, by Elsie May Bell Grosvenor, were "Safari Through Changing Africa," August, 1953, and "Safari From Congo to Cairo," December, 1954.

their followers milled about. Hard hands pounded giant drums. From long trumpets came shattering blasts. Women shrilled ululating calls that made my scalp tingle.

Each in his turn, the chiefs swept down the durbar field in the midst of their retinues to greet the Prime Minister, who had arrived in a large automobile preceded by the sirens of a police escort.

The Omanhene (paramount chief) Nana Akuamoah Boateng II jiggled by in a palanquin carried by his people (page 312). This powerfully big man looked familiar. Where had I seen him before?

Then I remembered. The night before, at a dance in the open courtyard of a hotel at Sunyani, a big man in a tuxedo had been the master of ceremonies who announced the music the saxophones would play. He had danced the "High Life," a sort of cakewalk, none too sedate.

"I go for this jazz," he had told me.

It was the Omanhene.

DARK ROCK from the heart of Africa helped to end World War II. The Belgian Congo was the birthplace of the Hiroshima atom bomb.

Even today, 15 years later, few people know the story. And NATIONAL GEOGRAPHIC photographer Bill Vaughn and I were the first outside writer and photographer ever to go into the mine of Shinkolobwe.*

A prospector stumbled upon the Shinkolobwe pitchblende in 1915. Union Minière du Haut-Katanga, a Belgian company that has played a leading part in bringing industry to the Congo, picked up the property and mined the ore quietly until the 1930's.

But nobody wanted large quantities of pitchblende in those days, and the Union Minière's main preoccupation then as now was copper (page 319). The company closed the deep diggings. Water filled the gloomy galleries.

In 1938, a year before World War II began, a British scientist warned the Union's then president, Edgar Edouard Sengier, against the danger of an atomic bomb possessed exclusively by a possible enemy.

M. Sengier, who is now Sir Edgar Sengier, K.B.E., made a fateful, lonely

* See "White Magic in the Belgian Congo," by W. Robert Moore, NATIONAL GEOGRAPHIC, March, 1952.

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Ghana Peddlers Wear Enormous Hats of Bread

As the government opens a new regional office at Sunyani, dignitaries gather at the entrance and flags flutter overhead. Spectators arrive in Ghana's off-the-shoulder garb of cotton prints. A mother carries her child on her back.

Doughnuts of twisted cloth cushion the peddlers' heads. In event of rain, the green plastic covers will protect the loaves.

Kolwezi Copper Mine Works Around the Clock

Long before the coming of the white man, central African tribesmen cast copper into bulky crosses for use as money. Europeans in 1906 formed the Union Minière du Haut-Katanga to tap the Belgian Congo's rich veins.

Open pits in the Kolwezi area yield cobalt as well as copper. Miners strip the overburden and break the ore with explosives. Huge shovels load trucks and trains with 10-ton bites.

Headlamps of trucks streak this time exposure made at dusk. Glittering plant in the distance processes the ore. Pool at right reflects the glare.

Unique photograph shows radioactive pitchblende, the ore from which atomic bombs are made, rolling toward an elevator deep in Union Minière's mine at Shinkolobwe, in the Congo. The NATIONAL GEOGRAPHIC team that produced this article were the first journalists ever allowed to go into the mine.

Miners push the carts by hand. Union Minière produces most of the world's radium, as well as uranium, cadmium, germanium, and other scarce metals.

NATIONAL GEOGRAPHIC PHOTOGRAPHER W. R. YATES © N.G.S.

decision. He ordered Shinkolobwe pumped out. Quietly he sent more than 1,000 tons of uranium ore to a New York warehouse.

In 1941 the United States began its frantic race for the atom bomb. An Army colonel called upon M. Sengier in New York.

"The fate of the world may depend upon your uranium ore," he said. "How soon can you get it here?"

"Would tomorrow do?" asked M. Sengier.

Descent to a Dark Inferno

The Brussels office of Union Minière authorized our unprecedented visit. Astonished officials met us at Elisabethville and drove us to Shinkolobwe. The Belgian captain of a police unit guarding the mine stared at our military passes.

"*Incroyable!* I had better keep my eye on you," he said, donning hard hat and coveralls to accompany us into the depths.

André Noël, director of the mine, came too. The mine cage dropped us to a gallery where ore cars rumbled on slippery rails (opposite). Heavy dark rock filled the cars. I recoiled from the sinister stuff.

"It is not strong enough to harm you," said André. "Switch on your lights, and we shall go to the place it came from."

Sloshing through cold black water, crouching to pass beneath low jagged ceilings, we stumbled ever downward. Sometimes we half climbed, half fell down wooden ladders. Once I coasted, as on a sled, atop a slithery mass of loose rock.

Everywhere were the shadowy figures of the

EKTACHROME BY LUNAT

miners, ebony men whose eyes and teeth alone reflected the light of our electric lamps. We came to the working face. In the din of jackhammers, conversation became impossible.

They handed me one of the chattering monsters. I drove it at the cold rock. Air hoses writhed about my legs like Stygian serpents. Vibrating bodies of miners on either side squeezed me into my appointed niche.

I lasted perhaps a minute. "*Pas op!*" said a voice behind me, and a grinning African took the tool from my nerveless hands.

"Pas op" is "watch out!" in both Afrikaans and Flemish. You will hear it in many isolated places south of the Equator, carried home by the roving African miner from the diamond mines at Kimberley or the gold diggings of Johannesburg.

Before we struggled back to the waiting cage, I saw the pitchblende vein. Such an

AERIAL PHOTO SERVICE © NATIONAL GEOGRAPHIC SOCIETY

Léopoldville Women Throng a Sunny Mart

Here, as in all Negro Africa, women hold a market monopoly. Barefoot bandannaed wives draped in flashy calico prints squat behind ground-level "counters" of raffia, banana leaves, skins, sheets, and wrapping paper.

From 6 a.m. opening until noon closing, the women gossip with one another and haggle with customers over a cup of manioc flour, a handful of peanuts, a few hot peppers, rice, spinach, lettuce leaves, dried grasshoppers, fish, or a soft drink.

Before the Belgians granted independence to their central African colony, they built other market places with sanitary covered stalls and redeveloped the African market section.

insignificant thing—a black streak barely two inches wide, slanting ever downward.

A miner said something to me in a tribal language. I asked a supervisor to translate.

"He says it comes up from hell."

I was in the Belgian Congo before, during, and after the sessions in Brussels that resulted in Belgium's surprise decision to grant immediate independence to the colony.

Emotions boiled, and overwhelmed reason. African groups fell upon each other, struggling for leadership in the new government.

A few days later I happened to ride a plane into a smaller Congo town where a crowd awaited another chief. I joined the crowd, and, next thing I knew, an African in feathers and leopardskin had shoved a drum at me.

"Spell me while I light the cigarette you are about to present me," he grinned. "I am *fatigué*."

So I beat the drum, and a young African in a drip-dry suit came up to me.

"Please put the chief's name in the NATIONAL GEOGRAPHIC," he said.

"Write it in my notebook," I said. "I have to beat this drum."

The drum was shaking the very earth, and the handwriting came up wobbly. I make it out as "Ndjoku Eugene." If that is not right, I apologize to the young man. I think he was the chief's secretary.

But what had seemed merely animal spirits while I was in the Congo turned suddenly to violence and tragedy.

Back in Washington, as I write this, newspapers tell of Congolese troops turning on the terrified European community, murdering and pillaging in excesses that threatened the precious new democracy. The government of Premier Patrice Lumumba, but a few days old, faces civil war.

What of my smiling friend with the drum and leopardskin? Will he and his people find the way of free men?

I TRIED to stay apart from the human strife in the Union of South Africa; and sometimes I was successful. I watched the brave new buildings rising in bustling Johannesburg, and sampled its sophisticated restaurants,

and joined friends in their homes in peaceful city suburbs.

On a Sunday morning I went to the compounds of the City Deep Mine, which is a city-beneath-a-city, a gold-strewn catacomb a mile below the downtown streets. I went to watch the dancing of the miners (page 338).

I saw the rippling dance of the Xosa men; the step dance of the Bacas, who wore gum boots; and the fierce stamping of the Zulus, which made the earth of the stadium thunder.

The Shangaans made humorously derogatory speeches about their compound managers. Another tribe performed a hilarious parody of the white man's ballroom dancing. From the European sections of the stands came genuine laughter and applause.

As each dancing group finished its turn it snaked out of the arena, but the beat of its drums did not falter, and would rock the compound all night. These men danced not for an audience, but for sheer pleasure.

Baboons Prowl the Cape

In luxurious comfort I took the Blue Train to Cape Town. In one of the world's most beautiful cities I saw Table Mountain under its racing, swirling clouds, and I rode the cable car to the top (page 305) and watched the moon rise beyond the sparkling city.

Then I drove to the Cape of Good Hope, locking the car against prowling

EKTACHROMES BY LOWRY AERIAL PHOTO SERVICE © NATIONAL GEOGRAPHIC SOCIETY

Stilt houses stand knee-deep in the Congo River amid mangrove islets. Villagers fish from dugouts, which they park beneath their homes. This primitive settlement stands a few miles from modern Léopoldville (above), which owes its progress to geography. Rapids downriver halt navigation for 200 miles. Upstream Congo and tributaries offer 8,000 miles of deep water.

Heart of a troubled new nation, Léopoldville juts into the river near where explorer Henry M. Stanley camped in 1877. Riots, troop mutinies, and intertribal warfare rack the Congo Republic as this is written. Frenzied mobs turned the former colony into a death trap for non-Africans; crack Belgian paratroops were flown in in an attempt to restore order and save European lives.

baboons before climbing to the lighthouse that overlooks the famed promontory. The sun shone warmly; a breeze rippled grassy fields; everywhere was beauty.

On the Garden Route that skirts the coast from Cape Town to Port Elizabeth I twisted through gorgeous mountain passes, watched graceful springbok peacefully grazing beside the road, dipped to golden beaches washed by the warm Indian Ocean.

I went into the diamond mines of Kimberley. Not the Big Hole—that is only a tourist attraction now, a vast pit with a lake at the bottom. Between 1888 and 1914, 25 million tons of blue ground came out of this volcanic pipe—containing three tons of diamonds.

From the Big Hole, and other Kimberley mines owned by Cecil John Rhodes's De Beers Consolidated Mines, Ltd., came the fortune with which Rhodes opened the gold fields of the Witwatersrand and the farmlands of the Rhodesias.*

I went into two of the three active De Beers Kimberley mines, the Bultfontein and the Dutoitspan, which connect underground. The galleries are big and clean and well lighted. It is like walking around in the Holland Tunnel.

In a building in Kimberley they sort and grade the diamonds from all three mines. A beautiful girl smiled at me from the head of a staircase and held open a grillwork door. Just like that I walked into a suite of rooms where $7,500,000 worth of diamonds lay scattered about (page 340).

Fred Borgstrom, De Beers public relations man, told me they had sold $260,000,000 worth last year, and that this would likely be a good year too. One month's South African production, he said, lay on the tables before a score of sorters or were around the place somewhere.

I heard a steely click behind me and turned. The grill was closed, and the girl was pocketing a key. She smiled sweetly at me.

We wandered around taking pictures, moving mounds of diamonds as we chose. I was tempted to flip one twice the size of my thumb up my sleeve in a trick I knew as a boy. Just as a joke, of course.

I caught a whiff of perfume.

"They do dazzle one, don't they?" the girl said, smiling at me.

We packed our cameras and left. She opened the door and smiled goodbye. And as far as I ever discovered, only the

Dr. Albert Schweitzer and the author watch playful chimpanzee (right), baby gorilla, and dog wrestle at the philosopher's jungle hospital at Lambaréné, Gabon. Grateful patients presented the animals to the doctor as fees. "I admire gorillas above most animals," says Dr. Schweitzer. "They are completely amiable until their families are threatened. Then they become noble in their strength and purpose."

NATIONAL GEOGRAPHIC PHOTOGRAPHER W. E. VAUGHN © N.G.S.

* See "The Many-sided Diamond," by George S. Switzer, NATIONAL GEOGRAPHIC, April, 1958.

"Wasp-nest" globes surmount sculptured headdresses of Cameroun independence dancers; crocodiles support the globes. The leader (right), who wears a European belt, blows a traffic whistle to set the tempo. He and his fellow tribesmen gathered in their capital, Yaoundé, last January to celebrate Cameroun's birth as a nation.

beautiful girl had given us more than a casual glance the entire time.

Unrest Haunts South African Veld

Diamonds, gold, beauty—and doubt. Three conversations came back to memory when, after my return to Washington, I read newspaper accounts of violence in the suburbs of Johannesburg and Durban.

"I do not understand why you can sit where you like in the pretty park, you who are not even of this country, and I cannot," said the Zulu porter at the airport, his face a study in perplexity.

"One day, when the policeman tells me to go away, I will find a stone in my hand, and I will throw it at him. Then I will be in trouble."

Over the dark eyes the veil began to descend. The announcer called my plane. I went away.

"My grandfather made this farm on empty

veld," said the Boer in the Transvaal. "It is my home now, the only one I have.

"The house is strong. If the time comes, I shall take my wife and my children and my rifle inside. The last of us to live will burn our home, so they cannot have it."

I spoke of the Zulu and the Afrikaner to a warm friend in Cape Town, a cultured man, a quiet man who knows every corner of his native land, and loves it.

"God help us," he said. "They are two decent men, two men who would like and respect each other if they could sit together in the pretty park and talk.

"There is no solution to our problem."

But I think he was wrong, for I have been to Lambaréné and seen what human wisdom and understanding can do in Africa.

DR. ALBERT SCHWEITZER, philosopher, musician, physician, winner of a Nobel Peace Prize, has been running a jungle hospital at Lambaréné, in what is now Gabon, for more than 45 years (page 324).

You have to poke around a bit before you are really sure this is a hospital. It looks like an African village—cooking fires smoking in the bare earth runways between the buildings, dogs and sheep and goats and chickens and ducks everywhere underfoot.

But doctors and nurses in white gowns walk through the chattering throngs of African men, women, and children, and in the throngs you see the hideous swollen limbs of elephantiasis and the clubbed hands of leprosy.

"This is understanding," said Dr. Rolf Adler of the small Schweitzer staff. "Suppose Dr. Schweitzer had built a hospital of marble and glass and shiny metal.

"The people of the forest would not come to such a place. Carried there, they would die. Always they must have their families about them, cooking at the doors, living all together in the huge wooden bunks.

"Do not judge by your standards, but by theirs. That is understanding."

"But sanitation?"

"Again, understand. They have immunities we do not have. The operating rooms, of course, are sterile, and the drugs are the latest. The staff knows its business."

The sluggish Ogooué River is the bathroom. It is best to bathe in daylight hours. Crocodiles pay nocturnal visits sometimes, or perhaps a roaming hippo. And electric eels.

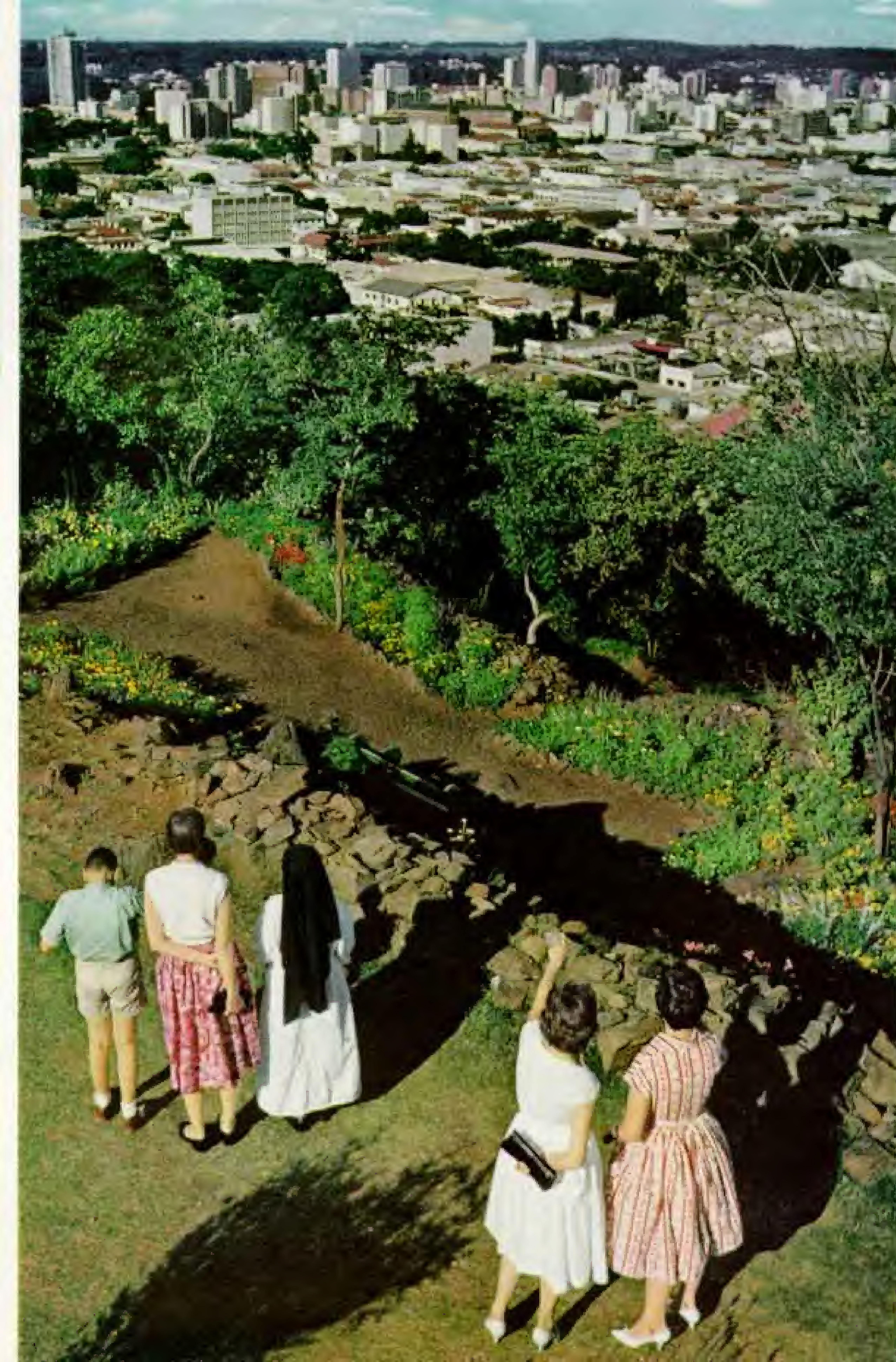
A woman walked by with a load of firewood on her head. She wore only a loincloth, and that was unusual: These days more African women than ever wear dresses, with necklines rounded and low so that one brown shoulder shows.

Salisbury, Rhodesia, Reaches for the Sky

In 1890 Salisbury's first homes clustered around the Kopje, highest point in the city. Today the hill presents a panorama of skyscrapers rising from the former veld.

Rock python coils around the neck of Donald G. Broadley in the pit of the Salisbury Snake Park. Mr. Broadley, a former Londoner, entertains visitors with daily shows and extracts venom for serums. A few days after this picture was taken, a viper's bite cost him a finger. Later a tree snake's venom all but killed him.

[illegible] © NATIONAL GEOGRAPHIC SOCIETY



"Who on earth is she?" I asked.

"We don't know," said Dr. Adler. "She wandered in from Lord knows where a year or two ago. Nobody here can speak her language. She is a marvelous wood gatherer."

Dr. Schweitzer, although he bustles about like a youngster, is 85. The roof leaks, and the rain drips on heaps of letters he has not time to answer. The jungle mold dulls the voice of his piano.

He must know that what he does is little, when measured against the need. Cured, his patients go back to their villages, but soon they return to Lambaréné, reinfected; the maladies live in the villages of this nation newly carved from French Equatorial Africa, and Dr. Schweitzer cannot reach them there.

I am sure the man of Lambaréné knows despair, and yet he does not give in to it, or to age or the slimy things that lurk in the jungle. He goes on saving lives and alleviating pain, and he weighs his results only against his own capabilities.

I think I puzzled him because I did not ask him questions and write his answers in a notebook. "Aren't you going to interview me?" he said in his accented French. "All the writers who come up here work that way."

But I stood humble before this magnificent man and could think of nothing I needed to ask him. His hospital, founded on compassion and understanding, spoke for itself. It was enough to see a man give his best.

MANY PEOPLE go to Lambaréné. But Cabinda has no Dr. Schweitzer, and few go there.

I flew in via Luanda, capital of Angola. This is Portuguese country. Cabinda is a part of Angola, although separated from it by the mouth of the Congo River and a thin slice of Congo territory.

Customs officials and police greeted me like an old and trusted friend.

"*Bemvindo*," they said. "You are Hopalong Cassidy?" This with a glance at my Texas hat.

"Flattery will get you nowhere," I said.

"Oho," they said, winking at each other, "no matter, welcome anyway."

And they waved me on, scarcely glancing at passport and baggage, leaning back in their chairs and smiling dazzling smiles.

Grace, charm, and a pace that suits the climate may be partial answer, at least, to the enigma of the Portuguese African holdings, in which the freedom cry is not heard.

But the pace is changing. I was no pioneer; the oilmen, restless geographers of the modern world, had beaten me to Cabinda.

Pete Keck of Nocona, Texas, met me at the airport on behalf of Gulf Oil Company. From my hotel balcony I could see a flame tree so violently crimson it left a red mist before my eyes when I turned away. In the evenings, fruit bats darkened the western sky as they poured silently from the baobab trees beside the sea and headed jungleward for dinner.

We headed jungleward ourselves. Pete drove a cross-country car with four-wheel drive. We stopped often to chat with his friends.

"Every one a rascal, too," growled Pete. "This one sells gold."

The African had a matchbox full of it. "Sample," he grinned. "More in my hut."

Another offered to produce a baby gorilla.

"Likely a chimp," Pete said. "Gorillas defend their families to the death. This fellow's old smoothbore gun might just kill a chicken, if he could hit it."

Land of Monkeys and Talking Drums

Portuguese laws, of course, forbid all this informal traffic in minerals and animals. But the drillers and the geologists and the seismographic crews had young chimpanzees in their camps (page 310), wonderful animals that clung affectionately around my neck.

"We *have* to buy these," complained Pete. "They bring them in so thin and weak we must take them to save their lives. The police come. We say, 'Look, they're not chained up, they just hang around.' And that's so, too."

Cabinda's roads are jungle trails widened by the wheels of jeeps and loggers' ramshackle trucks. Village houses are framed with saplings, clapboarded with palm fronds.

Every village has its talking drum, a great slotted hollow log, but many are tired now. Trash fills them. Struck with the thick drumsticks, they say "clunk" without enthusiasm.

The animals are peaceful in Cabinda. The buffalo is small and hides in the forest. The elephant, also small as elephants go, leaves tracks in the roads by night, but you rarely see him. Monkeys cross the road, and sometimes a pangolin, a scaly anteater.

A six-foot snake lay in the dust, its head severed from the body. This was a spitting

(*Continued on page 336*)

KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER W. D. VAUGHN © N.G.S.

A sight for "angels in their flight," discoverer David Livingstone termed Victoria Falls, where the Zambezi River cascades 354 feet

EKTACHROMES BY PAUL A. ZAHL (CENTER), W. D. VAUGHN (RIGHT) NATIONAL GEOGRAPHIC STAFF, AND BYRON S. CRADER © N.G.S.

Faces of Africa

As diverse as their cultures, the continent's peoples provide fascinating portraits. Here, clockwise from lower left:

As if in a python's coils, a Ndebele woman of South Africa wreaths her neck in rings of dyed grass, which she dots with beads. As she grew out of childhood, the coils became thicker. Acquiring a husband, she put on the married woman's blanket.

Wooden disk in the upper lip distorts the wrinkled face of a woman who clings to a dying style in the Congo. Her disfiguring plate may have originated as a way of discouraging Arab slave traders, or possibly as a primitive engagement ring; later it became high fashion.

Bright kerchief decks a young woman of the Congo. She accents her beads with a shiny safety pin and sharpens her teeth to points in the age-old tribal way.

Wire frames and metal pendants adorn the ear of a Masai. Tall

and proud, he plaits his hair, reddens it with ocher, and pastes it down with an animal fat that draws flies. Son of a warrior clan, he peacefully follows his cattle from water hole to water hole along the Kenya-Tanganyika border (page 344).

Beaded bangs say an Angola girl is preparing to celebrate her coming of age. Other beads circle the collar; tribal scars dot midriff.

Painted horns and beads glitter in a headdress; feathers form epaulets on a resplendent greatcoat. These ornaments advertise the services not of a glowering witch doctor but of a hard-working ricksha man in Durban, Union of South Africa. Beads and seed pods ajingle on his legs, he pulls his two-wheeled cart and passengers in lively competition with taxis on traffic-clogged streets. A Zulu, he descends from fierce fighting men who battled the Boers and lost.

Cradled in mother's robe, a Congo child peeks at the world.

Giant Kariba Dam, a concrete wall almost as high as Grand Coulee, backs up the Zambezi between Northern and Southern Rhodesia and supports a four-lane highway. The barrier will check summer's raging floods, provide irrigation water, and send electrical energy to mines and factories. Transmission began last January.

Kariba Lake, when full several years hence, will stretch 175 miles and flood 2,000 square miles. Bulldozers have shaved the shoreline so that drowned treetops will not tangle the nets of fishermen.

Operation Noah: Conservationists and Rhodesian game officers run a rescue service as Kariba Lake's rising waters maroon wildlife on dwindling islands. Here rangers and scouts ferry a sharp-horned sable antelope to the mainland. Netted by beaters and tightly bound, the angry, frightened buck was drenched with water during the boat trip to hold down his temperature.

Released, the sable springs into the bush as cameras click. He might have attacked when untied, but a ranger put him to flight with a perfectly timed swat.

cobra, a deadly thing that can kill, or, from eight feet away, destroy sight. Who had courage to kill him with a jungle knife?

We saw the drilling rig towering higher even than the mighty, fluted kapok trees. We watched the seismographic crews probing for the oil strata with small blasts of dynamite. We followed the road until it ended in a savage erosion gully on a hillside. We left the jeep and went on afoot, careful not to tread on maneuvering columns of army ants.

At the bottom of this dreadful hill ran a swampy stream. A small African boy played in the water. He smiled, but we had spoiled his solitude, and soon he slipped away.

"We'll bring the rig through here in a couple of weeks," Pete said. And they would too, and likely the small boy would get a proud job carrying a water bucket, and would wear a tattered undershirt and somebody's castoff khaki trousers.

ACROSS THE CONTINENT in Kenya and Tanganyika the "old Masai," as the British settlers call him with mingled admiration and exasperation, wears nobody's trousers, although he paints stockings on his long legs. Around him the safari wagons race about and the tourist cameras click, and he could have this new civilization if he wanted it.

But he wants none of it, except maybe the shillings he condescends to accept for posing for his picture.

"The old Masai has it made," a settler said. "He doesn't hunt, he doesn't grow mealies; he lives on the blood and milk of his cattle. He's tough, and he's independent, and he's so much a man he dares wear his hair in ringlets, like a woman."

"Also he doesn't believe a thing you tell him," said Warden Stephen Ellis, whose famous "unfenced zoo," Nairobi Royal National Park, depends for migratory range upon Masai land that may soon be denied to wildlife by the ever-increasing herds of tribal cattle (page 344).

"I bring their chiefs to the park gates and show them the streams of visitors paying their admissions. 'Forget the cattle, keep the wild animals, and you can have this kind of business yourselves,' I tell them.

"But they think there's a trick in it somewhere, and I guess one day they'll bring in their cattle and ruin the park."

I was on safari when I met the Masai for myself. East Africa overworks the word "safari." It can mean anything from an hour's drive to six months in the bush with a white hunter, 15 African "boys," and a fleet of cross-country safari cars.

My safari lay somewhere in between. It had an oversized Land-Rover with empty gun racks, Harry Reeves of Arusha, Tanganyika,

KODACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHER W. D. VAUGHN © N.G.S.

Living Periscopes Rise Above a Sea of Feathers

Highgate Ostrich Farm near Oudtshoorn, South Africa, harvests wing and tail feathers for hats and dusters. Aging birds are killed, their skins turned into handbags and wallets, and their flesh cured into biltong, South African for dried meat.

Ostrich chick in hand, an attendant at Highgate gives a lecture to some of the farm's ten thousand annual visitors. In a year the bird will look down on its keeper from a height of seven feet. If a cock, he may weigh 300 pounds when fully grown.

Frightened ostriches may lie flat, but never bury their heads in the sand. Instead, they sometimes meet trouble head on with a powerful forward kick of feet armed with slashing three-inch toenails.

Johannesburg Miners Dance in a Frenzy; Whoops, Whistles, and Music Spur Them On

Nearly every Sunday the Johannesburg gold mines allow their contract laborers, recruited from distant villages, to blow off steam accumulated during a week's work deep underground. Intertribal dances, the African's equivalent of the Westerner's athletic rivalries, ease tensions and bring the breath of home to homesick workmen.

Here Xosa tribesmen decked in their feathered best stamp in the stadium of the City Deep Mine. Chopi xylophonists at left await their turn to accompany another troupe. Uniformed policeman in the center keeps order and shepherds emotion-fired dancers off stage when time is up. On this occasion he lost his decorum and briefly pranced with fellow tribesmen. Non-

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

performers, grouped according to tribe, form enthusiastic cheering sections.

Europeans, who customarily sit apart in shaded stands (not shown), overflow into African seats in this view.

Visitors and their cameras are welcome to these affairs, but those who hope to see war dances go away disappointed, and most performances lack ceremonial significance. Listening to the white man's records, the miner quickly picks up rock and roll, calypso, and swing, and sometimes blends them with native rhythms.

A man-made mountain of tailings from the mines overhangs the stadium. Since 1886 Johannesburg, center of South Africa's mining industry, has grown from a dusty mining camp to a metropolis of skyscrapers, luxury hotels, and apartment houses—the home of more than a million people.

to drive, and Xaver Njovu Xaver to make me ashamed of my helplessness with a can and no opener.

As we crossed the yellow plain, togalike crimson robes appeared. Burnished steel flashed in the sun.

"Masai *morani*—warriors," said Njovu. "Wild boys, not civilized. Keep going, *bwana*."

But we stopped, and the six young morani came gravely to meet us. They had been watching bush pilots landing on a near-by airstrip. They watched without envy. Flying was for the birds, not Masai.

Tight necklaces of multicolored beads encircled their throats. Red ocher colored their girlish ringlets (page 332). Each youth had a spear, a beautiful thing with a four-foot blade, sharp as a razor, on a perfect shaft of polished hardwood.

Once the Masai scourged East Africa with these weapons. Even today, when the game warden is looking the other way, they will tackle a lion with them, and win.*

The young men shook hands with us. One said "*jambo*," and that was unusual. Masai rarely bother to learn Swahili, the one language East Africa has in common. They shook hands firmly, they looked us straight in the eye, they were quietly friendly. I felt that they liked me, and I know that I liked them.

But when they took polite leave and walked away side by side toward their long bachelor house in the distance, they did not look back. Curiosity is for white men, not the Masai.

Climber Dies on Kilimanjaro

We circumnavigated Kilimanjaro, whose base alone covers 1,300 square miles and whose tallest peak, Kibo, thrusts a snow-covered head more than three miles into the African sky.

"Ma" Bruehl, who emigrated years ago from Berlin, runs the Kibo Hotel, high on the mountain's cool and misty flank. She easily talked me out of attempting the summit climb.

"*Ach*, look what the people write," she said, handing me a musty book in which Kilimanjaro climbers, even the successful ones, have been cursing the wet and the cold of the long summit trail for many years.

"Also, a man much younger than you died a week ago on the mountain, of only fatigue and despair. The Africans say the spirit of Kibo killed him."

* See "Spearing Lions With Africa's Masai," by Edgar Monsanto Queeny, NATIONAL GEOGRAPHIC, October, 1954.

Fortunes in Uncut Diamonds Cross a Sorting Table at Kimberley

Because diamonds take on surrounding color, appraisers examine them only in natural light. Working before windows that face south, away from the Southern Hemisphere's sun, these De Beers employees use magnifying lenses worn like eyeglasses.

EKTACHROME © NATIONAL GEOGRAPHIC SOCIETY

So we went up only as far as the Land-Rover could go, through the verdant coffee plantations that march up the mountainside.

Africans own most of these thriving *shambas*, selling their crops through a cooperative.

In the late afternoon, as we passed through the Amboseli National Reserve, a leopard flashed across the road. Harry jerked the wheel sharply, and we bounced into the bush. The leopard vanished into a tangle of acacias and thorny scrub.

We went on, but the radiator now leaked badly. We stopped to fetch water from jungle streams in utter darkness. Hyena eyes gleamed like fireflies from the roadside. Njovu sensed my uneasiness and spoke words of comfort.

"*Fisi* is harmless," he said. "Nothing here will harm us."

A few years ago this was Mau Mau country. It occurred to me suddenly that I didn't know a thing about Njovu, with whom I had huddled beneath a single blanket in the chilly back of the open car. But he didn't know anything about me either.

I had a letter from Njovu a few days ago.

"I am very much worried with your journey," he said, "but I think that you arrived in America safely; if so, I thank God. . . . Grateful send me your photograph, and in turn I will bring you mine."

Lion Prowls the Suburbs

We entered Nairobi. I took a shower in the New Stanley Hotel, then drifted over to the Equator Club, which is frequented by air hostesses and white hunters.

"My vacation's almost over, and I haven't shot my lion yet," said an American.

"You know the big apartments toward the edge of town, on the airport road?" I asked.

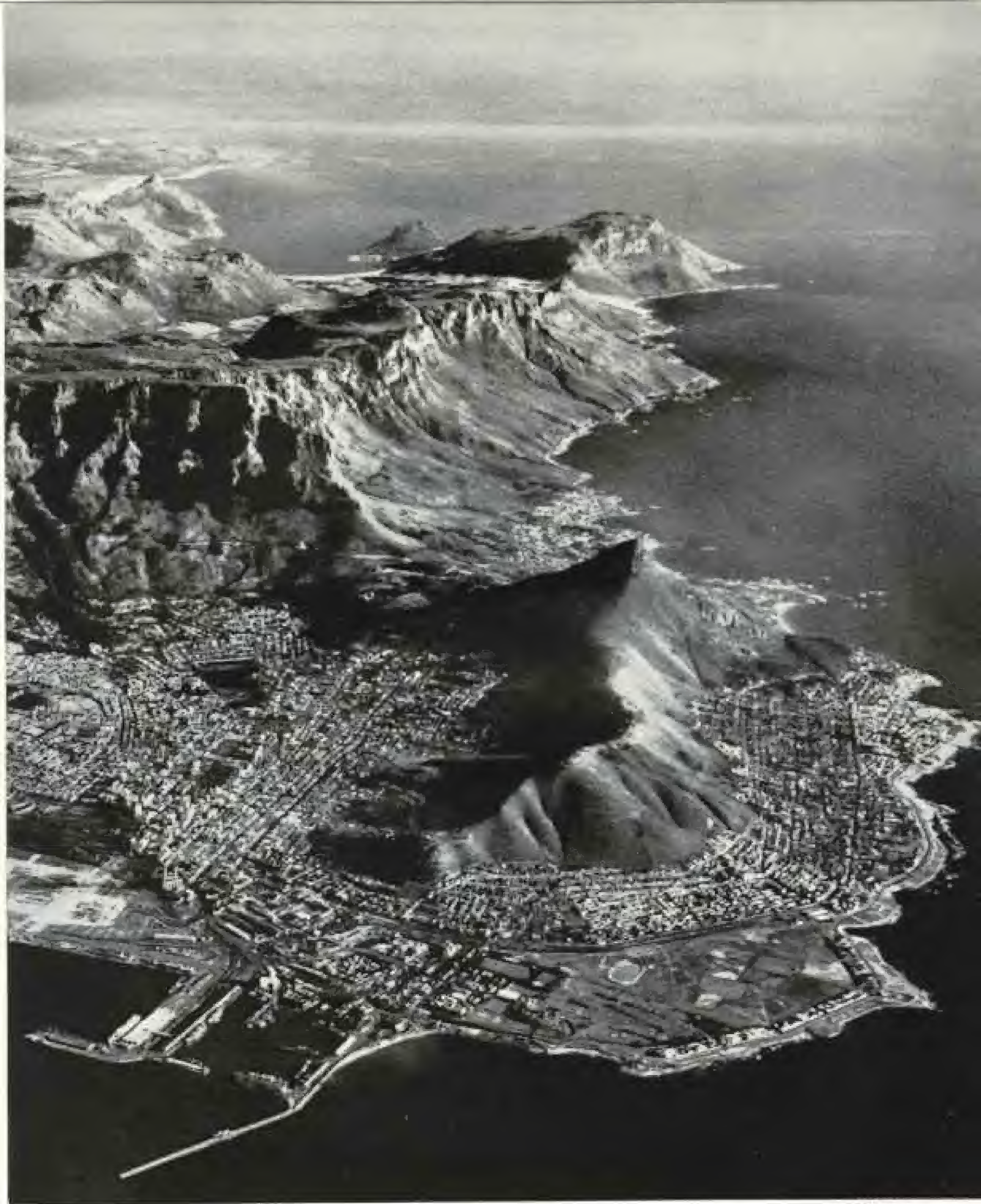
He nodded.

Bathers bask in the sun at Clifton, a Cape Town suburb on the western shore of the Cape Peninsula. Here breakers from the cold South Atlantic spout clouds of chill spray. Only 12 miles away, warm waters of the Indian Ocean wash the eastern shore. Some 730,000 persons living on the 32-mile-long peninsula enjoy a climate as mild as Bermuda's.

Cape Town, at Africa's Tip, Rims Table Bay and Hugs the Feet of Guardian Peaks

Portuguese explorer Bartholomeu Dias discovered the Cape of Good Hope in 1488 and called it the Cape of Storms. Today visitors debate whether Cape Town's charms excel San Francisco's and Rio de Janeiro's. In 240 square miles the peninsula holds streets, mountains, streams, grasslands, and hideaway coves.

To this delightful world in miniature, Dutch East India Company traders in 1652 sent a colony of ship provisioners under Johan van Riebeeck. The settlement became Cape Town, thriving funnel through which Boers, Britons, French Huguenots, and assorted adventurers trekked into



the veld to give birth to the Cape Colony, nucleus of a new nation, the Union of South Africa.

Modern Cape Town rings an artificial harbor (center) through which much of the interior's abundant gold and diamonds flows out.

Sandstone ramparts shelter the city: jagged Devil's Peak on the left, flat-topped Table Mountain in the center, and Lion's Head on the right. In spring 3,500-foot Table Mountain muffles the wail of the Devil's Whistle, a nickname for fierce southeasters off the Indian Ocean. Starting in August, gale-blown clouds tumble over the crest and dissolve above the streets, a phenomenon known as the Tablecloth.

This aerial view looks south; the Cape of Good Hope lies at the upper left.

"Well, get your gun and poke around between the buildings. There's a lion there now."

It was true. Njovu had pointed him out under the street lights as we came into town.

ETHIOPIA is the Tibet of Africa, an inertial land of ancient mystery only recently come to realize there is a world worth knowing beyond its jagged mountains.

You sense the moon-world quality of Haile Selassie's 3,000-year-old kingdom before ever you cross its borders. Your Ethiopian Airlines plane waiting on the Nairobi airport runway is of familiar American make, but the fuselage is a striking orange and green, and marked in the age-old Amharic script. The Lion of Judah, rampant and dragonlike, is drawn large upon its nose.

Chances are five to one that no ordinary business takes your seatmate to Addis Ababa.

"I'm going up for black leopard pelts," said the man next to me. "One of the few places

in the world you can still hope to find more than an occasional one."

Black leopard! They are very rare.

"Where do you hunt them?" I asked, my imagination on fire.

"Hunting's not for me, old boy," my friend said. "I deal with a German in Addis. He makes safaris into wild places the government doesn't even know it owns, and he trades for the skins with people who'd likely spear you or me on sight.

"My daughter Louise runs the fur shop in the New Stanley at Nairobi. I buy the furs, and she makes them into coats that sell for large prices."

The plane crossed over the Kenya frontier and climbed steadily toward the mile-high Abyssinian plateau. Beneath the wings passed the Great Rift Valley, the high blue Ethiopian lakes, and mountain country so savage the thought of engine trouble caused chills.

What giants men were in days of old! Ethiop kings led entire armies over this bitter

KODACHROME BY EDWARD S. ROSS © NATIONAL GEOGRAPHIC SOCIETY

Unchanging Africa: a Masai and His Herd Plod Kenya's Plain

Fierce Masai crushed rival tribes in battle, enjoyed the wary respect of Arab slavers, and proved their bravery by slaying lions with spears and short swords.

When the Mau Mau terror arose among the neighboring Kikuyu, the Masai tribe volunteered to fight them, but Kenya declined the offer.

Roaming bush country 1,000 to 3,000 feet in elevation, the now peaceful Masai seek pasture for their cattle. Because prestige hinges on the size of a man's herds, the nomads value any breed or mixture, no matter how mean or bony. A million of their cattle browse the plains, contributing to the diet of marauding lions, but often ruining the grazing for wild game.

A Masai need not kill a cow to enjoy a repast. Using bow and arrow, he punctures the jugular vein and catches a gourdful of blood to drink. Then he slaps mud on the wound, and the animal rejoins the herd, apparently none the worse.

land to ravage what is now Sudan. Portuguese adventurers in heavy armor passed this way in the 15th century, seeking the legendary Christian ruler, Prester John.

There are not many more roads today than there were in those stirring times. The tax collector rides Ethiopian Airlines, but from the isolated airstrips he takes a mule, if he can get one; if not, he walks.

We touched down smoothly on the Addis airport. A cab took me through the hilly streets to my hotel.

Donkeys and horses complicate Addis traffic. Squatty shops built of corrugated iron sheets dwell in the shadows of concrete office buildings. Mansions share cool hillsides with thatched huts. Hyenas prowl the city at night. They scavenge well; they will eat anything that was ever alive.

Of all cities I know, I like best the smell of Addis Ababa. It is the haunting smell of burning eucalyptus. The Emperor Menelik II, who united the nation, everywhere planted eucalyptus. Now there are so many the people may cut them, as Menelik intended, for firewood.

The phone shrilled at midnight. "Come down at once," said an anxious voice. "I am commanded to produce you."

"But Vaughn is in the bathtub," I protested.

"He must only put on his clothes; the night is warm. I beg you to come at once."

We tumbled into a shining

Thatched village not far from Nairobi houses families of Kenya's biggest tribe, the Kikuyu, hotbed of Mau Mau terror in the 1950's. Today many Kikuyu live in such resettlement towns, work on farms, and send their children to school.

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car and rushed through the streets. In a small steep street jammed with other shining cars, we stopped. Imperial Guardsmen flung open the car doors. Servants in snowy white jodhpur breeches helped us descend.

A cabinet minister in dinner jacket met us. "The Princess Tenagne Worq Haile Selassie, daughter of the Emperor, is your hostess," he said.

Still tying my necktie, I walked through a heavy gate into the world of King Solomon and the Queen of Sheba, from whom the King of Kings traces his descent.

A vast tent of striped canvas covered an entire garden. Beneath it a thousand guests or more sat at tables set out among the flower beds, or strolled garden paths hidden beneath priceless carpets from the East.

"I cannot see the stage through this bush," remarked an Ethiopian nobleman, and instantly servants came rushing with hatchets to trim it.

Ethiop music, strange to Western ears, wailed above the hubbub of voices. Dancers in relays did the traditional steps of the proud tribes, the men costumed as warriors, with round shields and long spears, the women in long white robes.

Don C. Bliss, then United States Ambassador to Haile Selassie's court, beckoned me.

"I feel like Cinderella," I said. "What is this party?"

"A wedding reception for His Imperial Majesty's two granddaughters. Last week the Prin-

New homes replace slums at Vlakfontein, 80 miles northwest of Pretoria. Bantu housing developments stretch for miles around South African cities. In five years the government has built 100,000 four-room, low-rent dwellings.

EKTACHROMES BY LOWRY AERIAL PHOTO SERVICE © N.G.S.

The monarch of Ethiopia, in a rare informal photograph, relaxes in his garden with a flower-loving pet lion. Usually gentle, shaggy Tojo (above) once took a swat at a visiting diplomat. Emperor Haile Selassie's blazing ribbons betoken the world's admiration for his lionhearted courage.

Coptic Christians worship in Holy Trinity Cathedral, Addis Ababa. Christianity became Ethiopia's official faith in the fourth century, when St. Frumentius converted the royal family. Liturgy is chanted in Geez, an ancient Semitic tongue.

cess Seble Desta married Lij Kassa Woldemariam, and her sister Princess Sophia Desta married Lt. Derege Hailemariam of the Imperial Guard. There they go now."

Two dark lissome girls, chic in Paris gowns, swept by on their husbands' arms, headed for the stage where a fresh orchestra in tuxedos now played for ballroom dancing.

The orchestra had changed, but not the music. The young Ethiopians jitterbugged to it with success and refinement. I talked the wife of a European diplomat into giving it a whirl with me, but I couldn't fit my creaking foxtrot to the Queen of Sheba's music, and I gave the lady her freedom.

I tried the *wat*, the meat-and-pepper dish of the land, and thought it mostly pepper. I put out the fire with *tej*, the golden liquor made of honey, like the ancient mead. I joined a maelstrom of chauffeurs and maids and soldiers and cooks dancing the dances of the countryside in a smaller adjoining tent. Contrasted with them, the jitterbugs looked like statues.

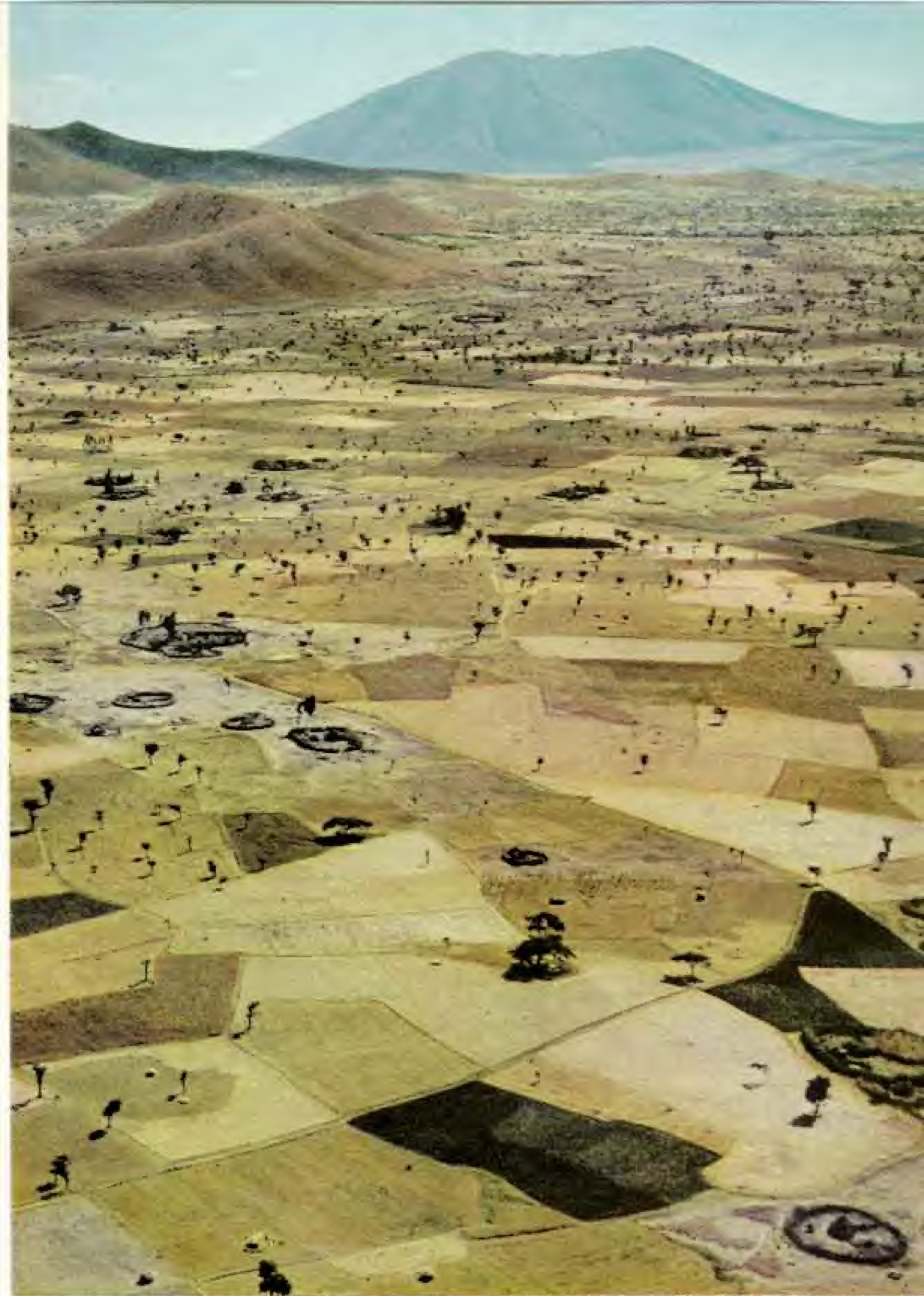
When I left, it was almost dawn, and the hyenas had skulked back to the hills. In leaving I committed a social error, I found out later, because I left before the royal party, which included the Crown Prince.

The Emperor Obeys a Photographer

But I also fumbled my bows to the Emperor a day or two later, and I was not fed to the palace's forty lions.

The fortieth lion is an old maned fellow named Tojo, and he has the run of the palace grounds. He wears a heavy chain, I think to slow him down a bit and give his attendant

Trees and shadows freckle a mosaic of fertile fields south of Addis Ababa;



EKTACHROME BY LOWRY AERIAL PHOTO SERVICE © NATIONAL GEOGRAPHIC SOCIETY

Ethiopia's highlands enjoy a balmy climate, though they lie next door to the Equator

a handhold in case of emergency. Because the chain trips him on staircases, he often backs down steps, which gets him credit for good manners in the presence of the Emperor.

There is nothing incongruous about a lion in the garden of the Conquering Lion of Judah. He belongs there, along with the swans and peacocks and the tiny royal dogs and the white stallions with flaring nostrils paraded daily for the Emperor's expert inspection and to be given sugar from the imperial hands.

I forgot to bow as I walked through the audience hall to meet Haile Selassie. He just smiled and got up and shook hands and handed me a bound volume of NATIONAL GEOGRAPHIC.

"Mine," he said. "I've been reading the magazine for 38 years."

The monarch is small, graceful, dignified, and friendly. He has the erect bearing of a warrior and the fine chiseled features of a Pharaoh. He paid me a great compliment: As we discussed articles the GEOGRAPHIC has published on Ethiopia, he dispensed with the interpreter who had been translating from the Amharic, and talked to me directly in French and English. He does not often do this.

He came outside and put himself under photographer's orders (page 349). He fed Tojo for the cameras, although he said Tojo was hungry and the thing might wind up in a scramble. It did. I told His Imperial Majesty we wouldn't publish an undignified picture of a friend. He thanked me, smiling.

New Industries Come to Ethiopia

Haile Selassie, who lived in England during the years the Italians occupied his country, wants the things of the mechanized West for Ethiopia. There is a modern sugar refinery, and the Italians are working on a new power plant for Addis Ababa as part of wartime reparations. The Emperor welcomes outside businessmen, and aid from the United States.

Yet I had a feeling he does not want to

Cairo's Broad Boulevards and Gleaming Buildings Contrast With Aswan's Brick-paved Lanes

Nile Hilton Hotel (right, above), one of Cairo's newest, overlooks the river from a site beside the dual-lane Corniche El Nile. Bronze lions guard the Kasr El Nile Bridge.

Oriental prints and awnings flutter above a bazaar in Aswan (left), on the Nile 400 miles south of Cairo.

Emancipated Cairo girl reddens her lips. Egyptian women may vote, attend college, and hold jobs.

extend his influence over all of new Africa. He looks without envy beyond his mountains. That was not always true of Ethiop kings, for once they ruled Egypt.

HIGH ABOVE the Blue Nile, which rises in Ethiopia, I followed the Ethiop path of conquest to Khartoum in the Sudan, and on northward to Wadi Halfa in the blazing desert.

There beside the Nile I stood where an Egyptian archer had stood when Cushite soldiers from the south advanced to the attack. He failed and likely died, this archer; the enemy tumbled the walls of Buhen and burned the rubble and broke the wine jars, and I saw the ashes and stood on the shards myself 3,500 years later.

Senusret I built the frontier fortress of Buhen about 2000 B.C. It had thick ramparts and high square towers for the sling platoons.

Below them, just above the dry moat, the archers stood on their fire steps, and each man guarded an embrasure in the wall into which his bow fitted.

"See how cleverly this was planned," said Walter B. Emery, Edwards Professor of Egyptology at the University of London, who has been excavating Buhen for several years.

"Stand on the fire step. Pretend you hold your bow in the embrasure, which opens into a little chamber inside the wall. Aim your arrow through any of the six holes in the wall from the chamber to the outside.

"Using the top holes, you deliver frontal or crossfire against the enemy as he comes across the plain to the moat. Some of them escape and scramble into the moat. Switch to the lower holes. You can pick off the men in the ditch at your leisure—or at least that's the way it was supposed to work."

I looked through the lower middle hole, and there was a Cushite looking up at me, but he turned out to be the Sudanese felucca skipper who had ferried me across the Nile, warning me to hurry before the wind died out.

The Cushites burned Buhen. The Egyptians did not rebuild it for 200 years. After their return, Queen Hatshepshut built a temple there. Thutmose III later took her name off its inscriptions and put his own there instead.

A later wave of Ethiopian conquerors apparently pulled the walls of Buhen down, never to be rebuilt, but they spared the temple. It is still there, its paintings of Pharaohs and deities as fresh as ever.

"They've fought a few battles in this place," I remarked, stooping to pick up a smooth stone, a missile from a sling that may have felled an Ethiopian so many years ago.

"Yes," said Dr. Emery, "but the Nile will win the last one. After the Aswan High Dam is built, the water will cover Buhen and that will be the end, because Buhen was built of mud brick."

SADD EL-AALI, the Aswan High Dam, will be the mightiest work of man in Africa when it is finished in about ten years. It will cost a billion dollars. It will contain sixteen times as much material as there is in the Great Pyramid of Khufu, and it will create a lake 300 miles long from a point on the Nile 400 miles south of Cairo to somewhere near the Third Cataract, 100 miles inside Sudan.

These waters will irrigate two million desert acres, adding 30 percent to the cultivable land of Egypt. They will manufacture 10 billion kilowatt-hours of electricity a year, or about ten times as much as Egypt produces now.

But they will also destroy Buhen and a hundred other sites of ancient civilizations beneath the Nubian sands. Worse, they may cover the sacred island of Philae, and the Great Temple of Abu Simbil with its colossal rock-hewn statues (page 359). The United Nations, with Egyptian cooperation, now wages a campaign for funds with which to dike these marvels of antiquity against the flood.

President Gamal Nasser began work on the High Dam in January, 1960, by setting off 11 tons of dynamite. There is not yet much to see, however; I had to look elsewhere for the marks of progress in Egypt.

Pyramids Visible From Luxury Hotels

In Cairo, tall hotels and deluxe apartment houses look down on tall-masted feluccas and the straining men who pull them with long ropes when the Nile wind dies. You can still see the timeless Pyramids from the city, but now you must look past a striking masonry tower that houses a television enterprise.

Colored lights etch the minarets of the bustling capital's mosques on religious holidays. Some muezzins chant with metal throats, their call to prayer tape-recorded. Traffic is a swarm of bees, growing denser daily with

Triple Arch in Tunisia Frames the Ruins of a Roman Temple to Juno

Romans, Vandals, and Byzantines ruled Sufetula before Arabs conquered the city in the seventh century. The ruins lie outside modern Sbeitla, heavily mined in World War II. German tanks gave American forces a setback at near-by Qasserine Pass.

the output of Egypt's one automobile factory.

Meandering through the palm-dotted oasis the Nile makes of its mighty delta, I came to the heavily guarded Suez Canal and watched the ships march past.

"How does it go?" I asked the skipper of a British tanker awaiting her canal convoy at Port Said.

"Never better," the skipper said. "They are putting more tonnage through than ever before."

IF THEY FIND enough oil in Libya, the British skipper likely will make fewer trips through the Suez and on into the Persian Gulf for the oil of Arabia; Libya is much closer to Europe and America. I went to Tripoli, and I asked H. W. Brown, manager of Esso Libya, how he was making out.

"We'll fly you down to Zelten," he said. "It's a full day by Land-Rover across the desert south of Benghazi, an hour from the Mediterranean by Beaver aircraft."

The Beaver winged across the narrow coastal strip of Libya, with its scattered villages and its rudely shaped, vaguely outlined fields of grain.

After a while only sparse scrub greened an earth on which rain seldom falls, and the dry camps of the Bedouin, where water comes in sheepskins tied to camel saddles, appeared more and more rarely below.

And then even the rectangular nomad tents were no more, and the land was the face of the moon (opposite), across which the Bedouin moves only when he has to, but fast, and driving hard for the next oasis.

"A couple of hundred miles southeast of here the American bomber *Lady Be Good* went down during World War II," the pilot said.

"You know the story—they found her recently, with most of her equipment still in working order, and later, bodies of crewmen who perished in the desert. I helped in the search."

The Zelten airstrip was a patch of crusted desert marked by a dozen metal fuel drums. A Land-Rover shot over a dune in a shower of sand to give us a lift to the drillers' camp.

Rows of aluminum trailers gleamed in the sun. Each had an air conditioner and a heating plant. The thermometer can hit 120° in summer, and on a winter night water set out beneath the pale stars may freeze.

Huge motors roar day and night at Zelten, furnishing electricity and the power for the drills. Always the sand buggies move about like beetles on a yellow table, and sometimes a howling Texan amuses himself on "sand skis" behind one. But this is a bone-breaking sport, and the camp supervisor would rather his men hunt the fossil shells and sand dollars, ten million years old, that lie in wind-cleared heaps on this ancient sea floor.

I went off to see the discovery well, Zelten No. 1, that came in at 17,500 barrels a day. It is shut in now, awaiting the building of a pipeline to the coast. I saw the rig drilling yet another well; it was almost into the oil pool a mile below.

Libya's Lunar Landscape Conceals an Ocean of Oil

Distant derrick marks a drilling site near the oasis of Zelten, some 100 miles from the Mediterranean. The first strike, a mile deep, produced 17,500 barrels a day. New holes being drilled by Standard Oil (New Jersey) will measure the size of the pool.

Prehistoric seas drowned this wasteland. Today drifting sands clog dry washes, and scorching winds scour the rock.

"By day in Zelten you can almost fry an egg on the back of your hand," says the author, "but at night you freeze."

Nomads quit their tents for oil field jobs. Some Esso Libya crews consist almost entirely of Africans.

Because desert armies swept through the coastal area in World War II, the oil companies must spend thousands of dollars a month to clear leftover land mines.

Some oilmen predict Libya will rank one day with the world's largest petroleum producers. A firm supply piped to the Mediterranean would ease Western Europe's dependence on Arabian and Iranian wells and lessen the importance of the Suez Canal.

I had a wonderful meal and a hot shower and a comfortable bed, all of which was better than I found in Benghazi, where the damage of World War II has not all been repaired.

Among my maps I had brought a chart of Africa such as the one from my school days; as much as I hate to admit it, the map was 50 years old. I looked for Zelten and found the place all right, but it was in the middle of a dark spot marked "unexplored."

Times, it seems, had changed.

THEY have changed as well in Tunisia, and for me this was a nostalgic thing. I soldiered in Tunisia, you see, and of a war, a man remembers best the few pleasurable things—his hours of strength, the times of release from responsibilities, above all the comradeships with other men who bore arms, one true good that comes of the holocaust.

A man goes back, but he goes alone; his friends are not there. The land is the same, but sleek cattle and not weary riflemen cross the flaming fields of poppies. The road still runs to Qasserine from holy Qairouan, only it is smoothly paved now, and the dot in the sky is a soaring bird and not a fighter plane.

The bridge across the wadi at Feriana still lies in ruins. But why the sudden chill of fear? That is the voice of a child at play, not my own voice crying in terror as the wind devil dances the dust away and reveals the lethal mines all naked on the sand.

I went upstream a hundred yards and took the new bridge of steel and concrete that leads away from the past. I was not alone now. All Africa was crossing the bridge.

Pyramids of Giza, which entombed three Pharaohs, reflect the skill of ancient Egypt's engineers. Great Pyramid of Khufu (right), built about 2600 B.C., towers higher than a 40-story building; each of its four sides exceeds the length of two football fields. Next door, the pyramid built by Khufu's son Khafre retains part of the original limestone sheathing near the apex. Menkure's pyramid, the smallest, overshadows three lesser monuments.

Impounded Waters of the Nile Menace the Temple of Abu Simbil

Rameses II, one of ancient Egypt's master builders, had the Great Temple hewn from a sandstone cliff high above the river. Water backed up by a 58-year-old dam at Aswan washes its feet today. Construction of a new and higher dam at Aswan may engulf the monument. A proposed dike to hold back the flood might cost $60,000,000.

Drifting sand half buried the temple for more than a thousand years before its discovery and excavation in the 19th century. Today a wall atop the cliff holds back the desert.

The temple honors the gods Horus, Amon, and Ptah, as well as the deified Rameses himself. Rooms within burrow 180 feet into the rock. Stone Pharaohs on the façade measure 13 feet from ear to ear.

NEW PORTRAIT OF AFRICA'S CHANGING FACE

SELDOM in history, even in the wake of cataclysmic wars, has the world seen such a spawning of independent nations as has occurred in Africa during the past decade. Yet newly won freedom is only one of the forces that in recent years have rocked this second largest continent.

In this issue NATIONAL GEOGRAPHIC has gone to unusual lengths to bring its 2,500,000 members a vivid picture of a continent in ferment. Four illustrated articles tell Africa's story—from the exciting discovery of *Zinjanthropus*, which its finders believe is the world's earliest known man (page 420), to the rise of Africa's newest countries and the continent's surge toward economic development.

Africa, the accompanying 10-color Atlas Map,* fills in the details: new names, new capitals, new boundaries, newly important places—symbols of freedom gained.

On The Society's last complete map of Africa, published 10 years ago, there appeared only four sovereign nations—Ethiopia, Liberia, the Union of South Africa, and Egypt—among the continent's sixty-odd territorial units. This new map lists 19 newcomers, an average of nearly two new nations a year.

To keep pace with this rapid face lifting, the map shows nations not even in existence when the plates were made. For instance, the states of Chad, Ubangi-Shari, and Middle Congo—all former parts of French Equatorial Africa—appear as the Union of Central African Republics, a federation due to take shape some time this summer or fall.

With its attainment of freedom, Belgian Congo created confusion by choosing the same name as its neighbor state across the river. To distinguish between the two, the new map shows the troubled former Belgian colony as the Republic of the Congo.

Some of the new states—Libya, Morocco, and Tunisia—retain their familiar names. Others merely dropped portions of their titles: Anglo-Egyptian Sudan becomes Sudan, French Guinea simply Guinea.

Though still under the British Crown, Northern and Southern Rhodesia and Nyasaland have merged. And through Gamal Abdel Nasser's efforts to federate the Arab world, ancient Egypt has acquired new ties and a new title (with Syria)—the United Arab Republic.

Aswan Dam Will Dwarf the Pyramids

Africa's transition is by no means entirely political. Red road lines lacing the new map trace highways greatly improved over those of a decade ago. Black railway lines have lengthened, notably in Nigeria and Sudan. More than 120 new red stars—making a total of 390—spot airports in the ever-expanding aerial communications that serve the continent's 225,000,000 people.

Staff writer Nathaniel Kenney visited Egypt shortly after work had begun on the Aswan High Dam. He reports that the structure—whose name appears on the map beside the Nile above Aswan—will create a lake 300 miles long to irrigate 2,000,000 acres of desert land.

Farther south, in the triangle between the Blue and White Nile above Khartoum, Sudan has built the new 75-mile Manaqil Canal to bring agricultural life to 600,000 barren acres. To dig it, engineers tackled a strip of ground three-fourths the length of the Suez Canal. But against the 10 years' labor of tens of thousands of workers cutting Suez, 750 men, with modern machinery and financial aid from United States and international banks, finished Manaqil Canal in 20 months.

Africa, a rich source of gold, diamonds, copper, chrome, cobalt, and uranium, now has uncovered a wealth of iron. One of the richest strikes on the map lies in western Liberia—the Bomi Hills, some of which are virtually solid iron ore.

There is the magic of oil: In 1956 the French struck a pool 11,000 feet under Hassi Messaoud in the Sahara. Two pipelines to the Mediterranean, from Hassi Messaoud and the Edjeleh fields, now tap a 650-million-ton reserve, enough to supply France for perhaps 20 years.

The Africa Map portrays the continent on a scale of 250 miles to the inch; handy reference insets show outlying islands in much larger scale. One inset outlines in red the Great Rift Valley, the vast land crack that extends from Jordan through Africa to Mozambique. It was in this same crack, at Olduvai Gorge in northern Tanganyika, that Dr. and Mrs. L. S. B. Leakey found the skull of earth's earliest tool-maker.

For The Society's skilled Cartographic Staff, the transformation of Africa posed a ceaseless problem right up to printing deadline.

"Not even when Hitler was trying to reshape Europe," says Chief Cartographer James M. Darley, "were we forced to make so many last-minute changes. But we made them all. There is no more up-to-date map of Africa anywhere."

UNITED PRESS INTERNATIONAL

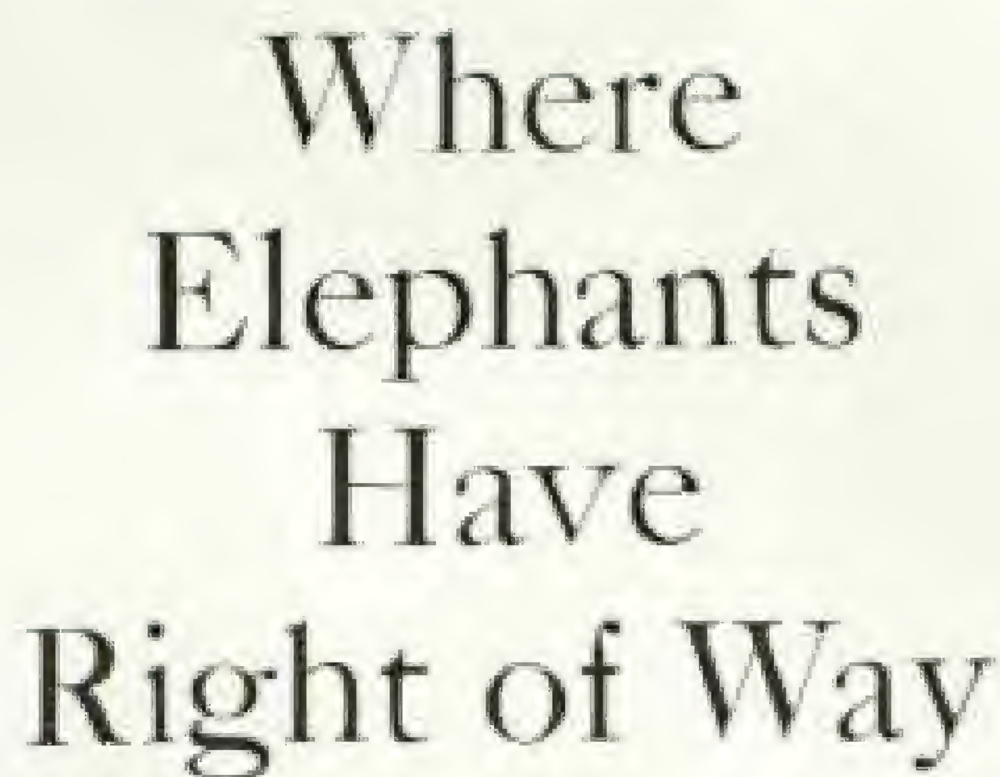
Voter's registration in her kerchief, a southern Nigerian casts her ballot for a government to guide her new country. Women of Nigeria's Moslem north have not yet won suffrage.

Big three of West Africa, Presidents Sékou Touré (left) of Guinea, Kwame Nkrumah of Ghana (center), and William V. S. Tubman of Liberia meet in Sanokole, Liberia, where they weighed plans for a community of free African nations.

ALMASY, PICTORIAL PARADE

* This new Africa Map, Plate 34 in The Society's Atlas Series, is the 19th uniform-sized chart issued since publication began in January, 1958.

To bind their maps, more than 235,000 members have ordered the convenient Atlas Folio, at $4.85. Single maps, at 50¢ each—or a packet of the 14 maps issued in 1958 and 1959, at $5.50—may be ordered from the National Geographic Society, Dept. 51, Washington 6, D. C. A combination of 14 maps and folio is available at $9.95.



Where Elephants Have Right of Way

By GEORGE and JINX RODGER

ABOUT THREE O'CLOCK in the morning something woke me, and I lay listening. Lizards rustled in the thatch of our hut, but it wasn't that. A strange rumbling came from somewhere out in the night.

"Are you awake?" Jinx whispered softly. I whispered back that I was. "There's something outside," she said.

The southern Uganda night was stifling. Beneath our mosquito nets we had gone to sleep in the coolest possible costumes—nothing at all.

Now I slipped from under my net and tiptoed two paces to the open window between our beds. Gently I pulled the cotton curtains an inch apart and peered out. It was pitch black, and I could see nothing.

It struck me that, being a moonlit night, it shouldn't have been black at all. But I hadn't quite put this thought together before something hit the window frame with a bang.

I parted the curtains a bit more. There, not a foot from my stomach, was the point of a huge tusk. Of course it was dark. An elephant had his whole face in the window.

By now Jinx was out of bed. We stood there, hand in hand, biting our stiff upper lips and awaiting, like Adam and Eve, the wrath of God.

The rumbling continued. It came from the

Ears flapping like sails, startled tuskers swing toward the camera in Kenya's Amboseli National Reserve. Behind them, ice-crowned Kilimanjaro rises to 19,340 feet in neighboring Tanganyika.

KODACHROME (OPPOSITE) © NATIONAL GEOGRAPHIC SOCIETY

Giant metal tusks, their painted curves gleaming in the tropic sun, dwarf the authors' Land-Rover on Kilindini Road in Mombasa, Kenya. On a wildlife survey, George and Jinx Rodger drove 7,000 miles through Kenya and Uganda in British East Africa.

Portrait of the new Uganda: Mechanic's clothes and tools reflect the quickening pace of industrial progress. Plagued by lack of skilled labor, Uganda has initiated many apprenticeship schemes. This man maintains bulldozers and scrapers on a road project.

elephant's stomach. He tore up grass that grew around our cabin, chewing with a crunching sound. Slowly he worked his way right around the hut, ripping off vines that grew up the walls. It took him an hour to complete the circuit. Then he ambled away and stood for a while silhouetted against the sky, immense, his ivory gleaming in the moonlight.

Finally he left, and as we went back to bed, I recalled a sign we had seen along the roadside earlier in the day. It warned motorists succinctly: "Elephants Have Right of Way."

Civilization Threatens Big Game

Jinx and I were camped in Uganda's Queen Elizabeth National Park, near the Congo border. It was one of several game sanctuaries we had visited in past weeks, and we would go on to still others.

We had come to British East Africa to see and photograph the wildlife of forest and plain, and to learn how it was faring. For we had read ominous reports of the animals' losing battle against encroaching civilization. In another decade or two, we feared, a safari like ours might be impossible.

The old Africa—the continent of slaves and ivory, of colonization and big-game safaris—is giving way to a new Africa. New settlements and development schemes, men and machines, are thrusting farther and farther into the wild. They cannot help destroying the Africa of bygone days, driving wildlife deeper and deeper into more and more confined areas.

After an 18-month survey for the New York Zoological Society, ecologist George Treichel of the International Union for Conservation of Nature reports that no less than half the original wildlife areas of Africa are now eliminated, and more than 75 percent of the animals in the remaining areas have been killed. Zululand, for instance, is now devoid of big game except in the preserves.

Land needs of an ever-increasing native population reduce the game herds by destroying their habitat. Poachers take a tremendous toll with their pits and nets and wire snares.

The authors: To British photographer George Rodger and his wife Jinx, Africa has long been a second home. Roving with their cameras, they reach places seldom if ever visited by outsiders. Their 4,000-mile trip across the Sahara resulted in May, 1958, in a memorable GEOGRAPHIC article, "Sand in My Eyes."

Photographs by GEORGE RODGER, MAGNUM

Even more devastating has been the wholesale slaughter of game in government-sponsored schemes to control cattle disease, notably in Natal, Southern Rhodesia, and Uganda.

Unless a strong effort is made to save the wildlife that remains, the elephants and rhinos, the kudus and the apes will be just as dead in only a few decades as the antlered giraffes and buffalo-sized sheep of half a million years ago, whose fossil remains are found today in Tanganyika's Olduvai Gorge.*

Roaming in Search of Wildlife

In this new Africa the cards are stacked against wildlife all the way from Senegal to the Cape of Good Hope. Obviously Jinx and I could not travel this entire span. We chose East Africa which, with adjacent parts of the Congo and Sudan, is the foremost big-game region left in the world.†

We landed in Mombasa, Kenya's port of entry, equipped with cameras and a Land-Rover that was to be our home for three months. Fitted with beds and stocked with food and water, it was also our freedom and independence. We had no fixed itinerary, no strict time schedule.

We wanted to see the herds of game migrating with the rains across the high equatorial plains; the swarms of hippopotamuses basking in Uganda's Kazinga Channel like fat and happy sausages; elephants roaming the Uganda-Congo border country, and the black rhinos of Kilimanjaro (see new Atlas Map of Africa with this issue).

In East Africa there are three mountain masses topped by eternal snow—Mount Kenya, the Ruwenzori range, and Kilimanjaro—and of these, Kilimanjaro, the highest mountain in all Africa, is the most beautiful to me. It rises 19,340 feet straight out of the plain, unencumbered by foothills or lesser peaks. Its great white dome is visible for more than a hundred miles in all directions (page 362).

At the mountain's foot, and on its northern slopes, lies Kenya's 1,259-square-mile Amboseli National Reserve. It is one of the finest game areas of East Africa, and we decided to detour from the main road and visit it on our way to Nairobi, Kenya's capital.

When we reached Ol Tukai Safari Lodge in the Amboseli Reserve, it was evening. The setting sun had turned Kilimanjaro to gold.

We unpacked and settled into a one-room

* Olduvai's prehistoric inhabitants, both animal and human, are described in the article beginning on page 420, "Finding the World's Earliest Man."

† Other NATIONAL GEOGRAPHIC accounts of African wildlife and its protection include: "Stalking Central Africa's Wildlife," by T. Donald Carter, August, 1956; "Africa's Uncaged Elephants," by Quentin Keynes, March, 1951; and "Roaming Africa's Unfenced Zoos," by W. Robert Moore, March, 1950.

KODACHROMES BY [illegible] © NATIONAL GEOGRAPHIC SOCIETY

banda, a thatched hut that looked out on the mountain. Darkness crept over the plain, but the high dome of Kilimanjaro still held the last rays of the sun. It shed its cap of gold and glowed a ruby red. We found ourselves turning constantly toward the mountain. It seemed omnipotent. It was the last to dismiss the sunset and first to greet the dawn.

Footprints of Night Visitors

Early next morning, when there was not yet light enough to see our way along the winding tracks that cut into the bush, the top was already pink. Twisting through the thorn scrub, we drove down by a swamp where reeds were growing and footprints in the soft mud, bordering clear water, told the story of all the animals that had drunk during the night.

As we got out of the Land-Rover, two crowned cranes strutted by the water (page 409), and egrets flew up with a flurry of white wings. We saw the heavy four-toed imprint of a hippopotamus and many three-toed skidding marks of rhi-

GEORGE RODGER

First driving lesson thrills a girl of the Madi tribe in Uganda. Jinx Rodger instructs the beginner behind the wheel of the English Land-Rover.

Free-roaming elephant blocks traffic on a grassy plain in Uganda's Queen Elizabeth National Park. From 30 yards the nearsighted beast can distinguish little, but its sense of smell is extremely sharp.

Brief rest in one of the Land-Rover's twin bunks refreshes Mrs. Rodger, who shared the driving with her husband. In addition to four-wheel drive, oversized tires, and extra gasoline tanks, the station wagon has roof ventilators and short-wave radio. The Rodgers called their car *Mzuri*, a Swahili word meaning "very good."

noceroses. There were cloven hoofprints ranging in size from the broad and heavy mark of the buffalo to the dainty twin points of a dik-dik.

We saw where a giraffe had spread its forelegs to reach the water more easily (page 392); where a lioness and her cubs had drunk; where a small herd of zebras had trotted down to the water. And over these were the flat, padded footprints, almost two feet long, of a large bull elephant.

Although there were several herds of elephants at Amboseli, the main attraction was the rhinos, and their increase in numbers is illustrative of the value of a game sanctuary.

Maj. W. H. M. Taberer, the warden, told us that at one time poachers had hunted rhinos in the area almost to the point of extinction. Then, with the creation of the reserve, hunting was prohibited and severe steps were taken against the poachers. The rhinos bred undisturbed. Others came into the sanctuary from unprotected areas, and now there are more than 150 living permanently in the vicinity of Ol Tukai—one of the heaviest concentrations in East Africa.

The black rhinoceros—and they are all black at Amboseli—is a powerful, unpredictable beast. His eyesight is poor, but his hearing and sense of smell are acute, and he may charge blindly if provoked.

Yet the rhino is not vindictive—not like an enraged elephant, which, once he catches you, will not rest until he has torn you to pieces or pounded you deep into the ground. The rhino charges at high speed, but if he misses his mark he seldom turns for a second attack. On open ground where there is room to dodge, he is more terrifying than dangerous. But in thick bush an angry rhinoceros is a menace to anything but a tank.

Rhino Charges From Thorn Scrub

We almost ran into one in a small glade surrounded by tall thorn scrub. Blowing like a locomotive, he charged the Land-Rover, and our maximum acceleration barely kept us ahead of his pointed horn. There was no gap through which we might escape, and we went round and round like a circus act, with the rhino a few feet behind.

Finally he lost us in the dust we raised. As the dust drifted away, we saw him—apoplectic with rage and frustration—jumping up and

King of beasts, at home on the Tanganyika plains with two of his wives, casts a stern eye on a cub. The lion keeps a harem, including lionesses past breeding age that serve the young mothers as baby sitters. In the fierce competition for scraps, weaker cubs usually die of starvation. Others drown while following their mothers across rivers in flood. Only two in a litter of four may survive.

Roaring contest pits Jinx Rodger against Ambo, 9-month-old, 65-pound pet of Major W. H. M. Taberer, the warden of Amboseli National Reserve.

KODACHROMES BY DAVID LAUCH (ABOVE) AND ARCHER RODGER © NATIONAL GEOGRAPHIC SOCIETY

Bush Flies Blacken the Flanks of Gertie, Amboseli's "Tame" Rhinoceros

A nervous, fretful beast with poor sight but keen scent and hearing, the black rhino charges man or car with little provocation. But two-ton Gertie, say the authors, "has become so accustomed to cars that she no longer bothers to attack on sight. She and her mother Gladys are the showpieces of Amboseli National Reserve." Since this picture was taken, an unchivalrous male broke off Gertie's long front horn.

down, seemingly with all four feet off the ground at a time. As his back was turned, we had time to find the way we had entered and make a hurried retreat.

Early dawn was the best time to see wildlife. This was rush hour in the animal world. Those that fed during the night were slaking their thirst at the water holes or seeking a shady spot to sleep, and those that fed during the day were grazing or browsing from the trees before the sun was high.

Each morning at first light, with a young African ranger guide named Kipori, we groped our way out onto the plain. Headlights would have scared away our quarry.

Kipori spoke no English, and as our Swahili was none too fluent, we used a silent sign language: Kipori directed us with a flick of his hand to right or to left.

Lion Leaps for Car Door

He had an uncanny instinct with animals, especially with lions. He knew exactly where to find them. But one morning we almost lost him.

As Kipori stepped out of the Land-Rover, a large tawny form rose up from the thick bush beside him and stared him straight in the face. The lion sat up on his haunches like a cat begging for food, and an inch of his pink tongue protruded.

Kipori turned a pale gray color and did a somersault back into the car, just as the lion lunged at him. We would have had the lion in the Land-Rover too, except that the big cat's shoulder caught the door and slammed it shut with a crash.

With his wonderful African philosophy, Kipori laughed and laughed, until the tears rolled down his cheeks and the gray turned slowly back to brown. He thought it the funniest thing that had ever happened.

Lions, with their lack of fear of cars, are perhaps the most rewarding of all animals to watch. They are indifferent to vehicles, regarding them perhaps as they do elephants or some other large beast, and thus one can observe them at close quarters (page 390).

Late one evening we found a half-grown cub playing with a tortoise. The young lion paid no attention to us, even when we approached to within a few yards. We watched for half an hour as he tried to crack the tortoise's thick shell with his teeth.

Eventually, frustrated, he left his victim lying on its back, and I got out of the car to set it on its feet. The cub saw me and came bounding back again.

This developed into a game. Three times the cub left the tortoise on its back, and three times I turned it over. The fourth time the cub returned accompanied by a full-grown lioness, and I tactfully remained in the Land-Rover.

At the close of day it grew quiet on the plain. The mountain's snowy summit turned again from gold to ruby, and the dark shadows spread and mingled until they were all one, and night had fallen.

Then the little world of the wild things changed. It became something of sound rather than of sight. We lay back in our camp chairs, rested our eyes, and listened to the world that we had been watching. The hush that followed sundown was broken by cicadas in the trees above the banda. Their incessant whir formed a background to all other sounds coming from out on the plain, some far, some near, and whether from beast or bird, difficult to distinguish.

Many we recognized—the staccato call of a jackal and the dismal "whoo-oo, whoo-oo" of a hyena; the dull rumbling roar of a lion; the cough of a startled impala; and there was no mistaking the loud squeals of the elephants when they came to the water hole to drink. This was nature's nocturnal chorale.

Safari City Stretches and Grows

Nairobi surprised us. The city had shaken itself after its long Mau Mau crisis, when troops patrolled the streets and men with ivory-handled six-shooters strode through the New Stanley Hotel. The city had puffed itself out and expanded all over the place with an impressive urgency: new airport, new dual boulevards and parkways, overpasses, blocks of offices and apartment buildings.

Big game had become big business. Outfitters were doing a roaring trade in safari beds and boots and buses. Big-game trips were classified into "Luxury Safaris," "All-inclusive Safaris," and we even saw advertisements for "Happy Safaris."

Our concern was with the wilds of Africa, not with the towns, and we hurried through our final purchases. We never shoot for the pot, preferring to observe wildlife rather than to live off it, and therefore it was necessary to lay in a considerable stock of canned meat. We relied on finding fruit and vegetables in native markets along the way.

Before leaving Nairobi, we visited Nairobi Royal National Park, where animals still roam within four miles of the city center, in one of the greater achievements of wildlife preservation.

This 44-square-mile sanctuary, with the adjacent 455 square miles of the Ngong National Reserve, is like a vast show window for the rest of East Africa. The park handbook lists 64 different species of mammals, 452 birds, and 34 reptiles.

Constant contact with visitors' vehicles has helped the animals to lose their fear. We were particularly intrigued by one large male giraffe, led by curiosity so close to the Land-Rover that we could not see the top of him through the windshield.

I now feel that I can amplify Dr. Samuel Johnson's description of the beast. He described it as "an Abyssinian animal, taller than an elephant but not so thick."

". . . They Run Into Us!"

Our old friend Basil Duke, commissioner of the native district of Madi, had invited us to spend New Year's Eve with him at his headquarters in Moyo. Moyo lay 600 miles away, on the frontier between Uganda and Sudan.

We whipped fast through Kenya, passing down into the Great Rift Valley and up again into the increasingly cooler highlands beyond Nakuru. Then we dropped down again into the red dust of Uganda, and as the altimeter fell, the thermometer rose. There were no longer clouds in the sky. The sun burned brassily through a mist of heat haze and scorched the plains to a uniform drab gray.

Moyo, even to one familiar with Africa, could easily go unnoticed. It is identified only on large-scale maps and then only in small lettering. But Moyo is a place of importance, the administrative center of the Madi tribal territory that straddles the Albert Nile. Basil Duke, when we were there, was Moyo's one white inhabitant.

We found him standing with an African in front of his thatched bungalow, dismally regarding the battered front of a new red pick-up truck.

"Look at this," he said mournfully. "Just look at this."

"What happened?" I asked by way of greeting. "Run into something?"

Basil, whom we hadn't seen for four years, plunged straight into one of his problems.

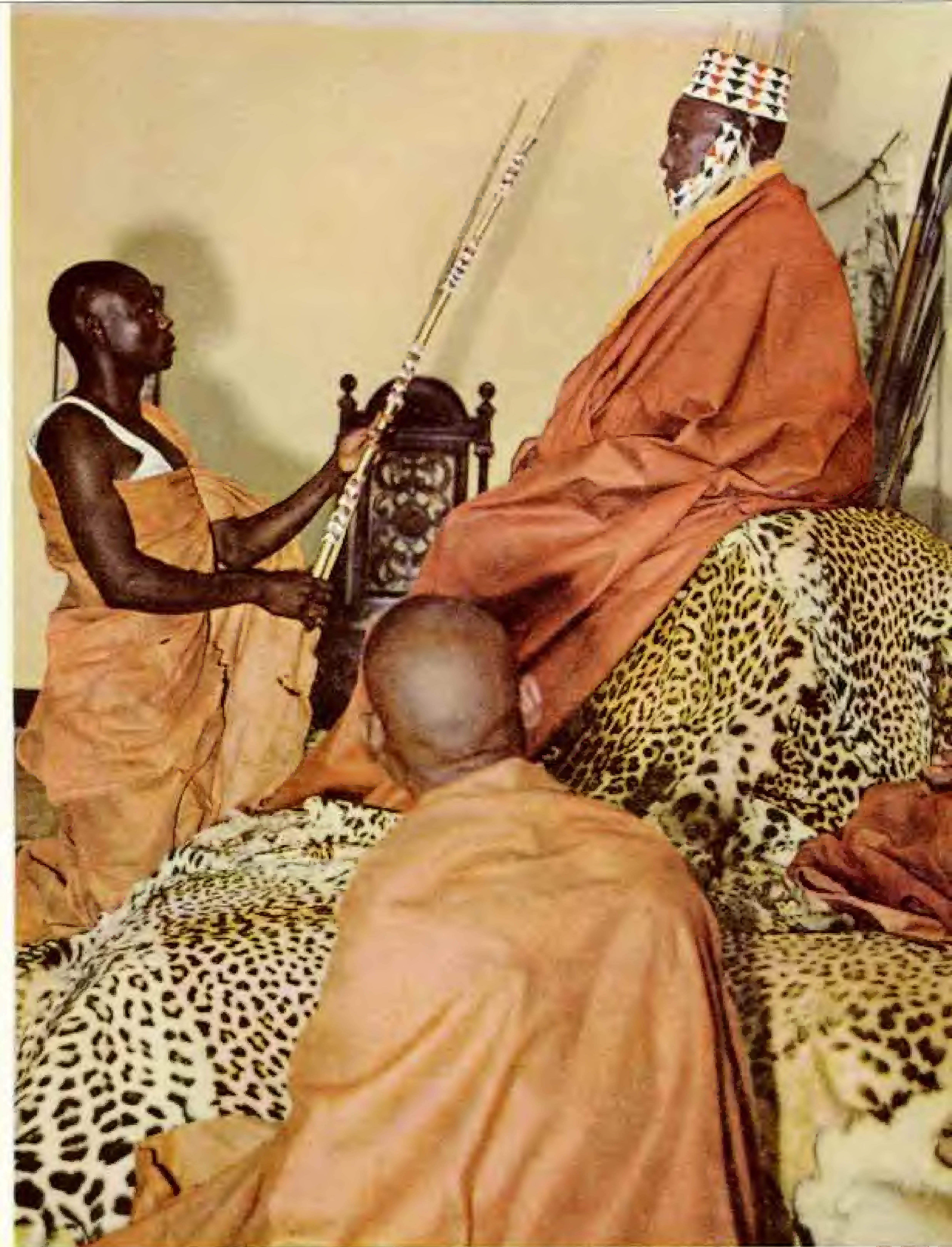
"We don't run into things. They run into us. Another of those ruddy rhinoceroses! Just a mile out of Moyo last night.

"Well, nice to see you anyway," he added as a sort of afterthought.

Basil is one of those satisfactory people to whom the passage of time means little. Our friendship was formed many years ago in Sudan and reaches back over many meetings. When we part we say, "Well, so long," undemonstratively: and when we meet again, after several years, we take up the conversation where it broke off.

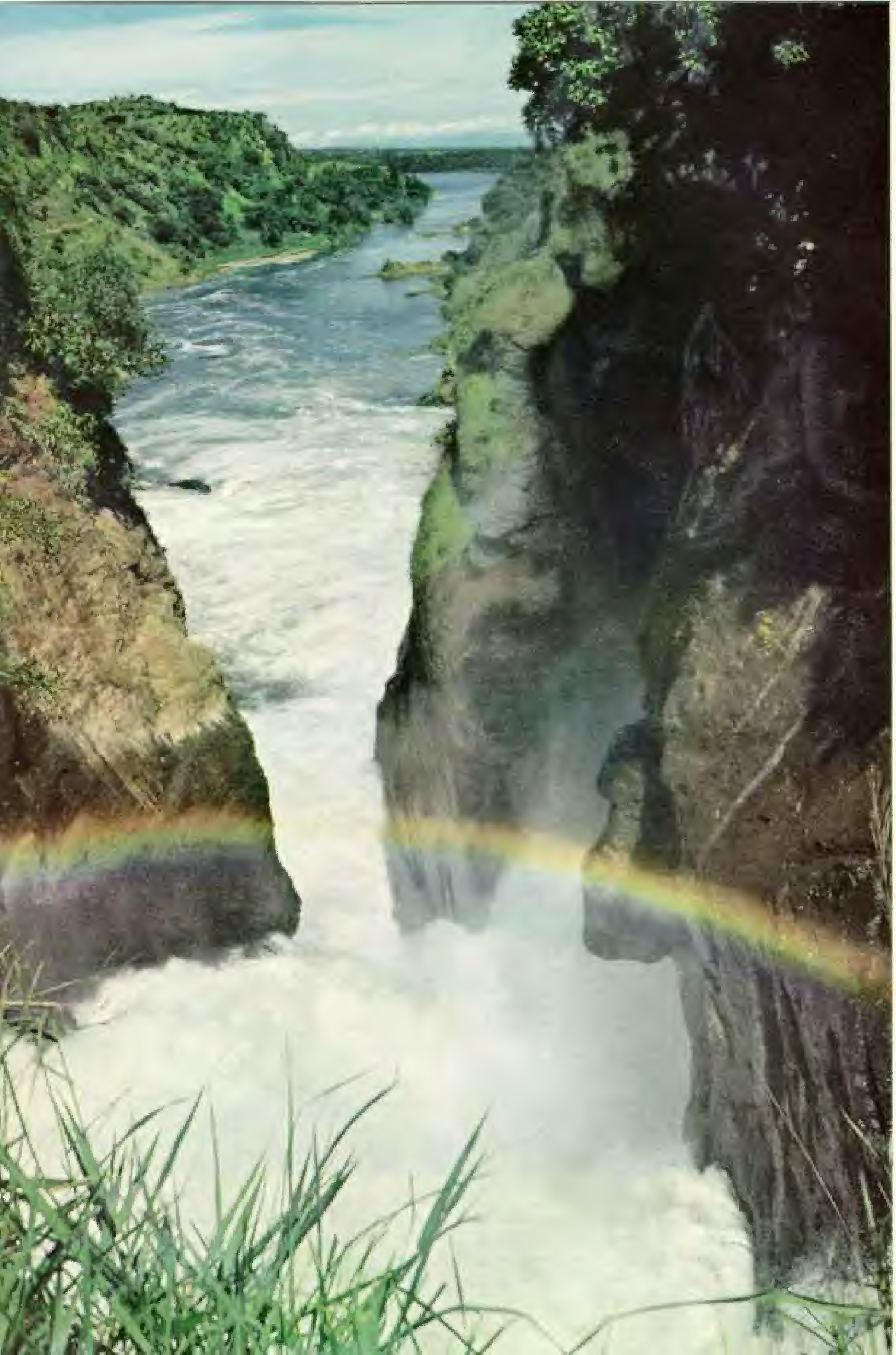
We quenched our thirst with long cool drinks served on the veranda by an African

KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY



Festive crowds strolling the palace grounds in Hoima, Uganda, await an appearance by the King of Bunyoro (above). Each year a long celebration marks the anniversary of his enthronement. Blue gowns identify the king's daughters.

Blessing sacred spears, the King of Bunyoro sits on a dais strewn with 60 leopardskins. Winyi IV, a Christian, rules some 130,000 subjects. For the enactment of his coronation, he and his courtiers wear russet robes made of pounded bark.



in shorts of pink corduroy. A flock of hornbills, roosting in a fig tree, called raucously overhead, and a red-headed lizard ran back and forth across the veranda chasing beetles. The heat was oppressive, and the air heavy with smoke haze from far-off bush fires. A drum thudded in the distance.

Basil talked with us of serious things—recent events in Sudan, across the border, and the blight that was attacking his roses. He lamented also a trend in administration that called for more and more reports.

"Paper, paper, paper," he said. "I'm stifled by it."

We could well understand his frustration. Basil is one of the few remaining old Africa hands. He knows his territory as he knows his own living room; he understands the thinking of its people, is respected by them and loved as their friend.

When we left Moyo a few days later, he was back at his desk. "Well," he said, "so long."

Country of the White Rhino

Our next port of call was to be Murchison Falls on the Victoria Nile, where a national game park had been opened to the public since our last visit. It was two days' drive from Moyo by the regular route back across the Albert Nile and through Gulu. But we chose to remain on the west bank to try to see some of Uganda's rare white rhinos. Strangely, there are no white rhinos on the east bank, no black rhinos on the west.

Even more difficult to explain is the fact that, in all Africa, the only habitat of white rhinos other than the west Nile is in Zululand, more than 2,000 miles away in South Africa. The same species, *Ceratotherium simum*, is found in both places, but there is thought not to be a single one between.

The west Nile habitat extends into the Congo's Garamba National Park and a few hundred miles to the northwest. The Garamba white rhinos, carefully protected, have increased to about 1,000. Possibly 50 or so more exist across the Sudanese border.

There is little difference in color between the black and the white rhino. But the white is the larger, heavier animal. A bull stands nearly six feet at the shoulder and weighs two and a half to three and a half tons. There is also a difference in the muzzle. The black rhino, being a browser, has a prehensile, snoutlike upper lip. The white rhino is a grazer, and his lips are flat and wide.

The horns are equally sharp in either species, but the black rhino's disposition is, for reasons best known to himself, considerably more testy than the white's.

Acrobatics Amid Elephant Grass

The route we chose through Arua and Pakwach was considerably longer and more interesting than the direct road back across the Nile to Murchison Falls Park. For the first part of the way, the west bank offered no road at all. We were fortunate in having Robbie Robson, the game ranger from Arua, with us to show the way.

Before we were two miles out of Moyo, our Land-Rover—laden with half a ton of baggage—was performing acrobatics. We drove through elephant grass higher than the car. There were also fallen logs and anthills indiscernible until run into. Gullies as deep as 20 feet ran west to east, while we traveled north to south—not without difficulty. The heat and dust in the long grass were stifling.

After taking five hours to cover 18 miles, we at last reached the limit of the grass. Dropping down toward the Albert Nile, we found Robbie's favorite camping place, a glade shaded by enormous trees, with a spring of fresh, cool water gushing from under a rock. Robbie called it Moroke.

Six of his African game guards were camped there, after patrolling the area for poachers. They were a little disgruntled, for a herd of elephants had visited them the previous evening, and they had spent the whole night perched in the trees.

While we lunched, Robbie told us of the poachers and of the difficulty he had in tracking them. White rhinos fall under an international agreement on the protection of wildlife. But local hunters pay no attention when they can get $12 a pound on the black market for horns weighing 3 to 4 pounds each, and sometimes more than 10 pounds.

Seething Nile Waters Burst Through Murchison Falls' Rock Bottleneck

Squeezed into a cleft only 19 feet wide at its narrowest point, the pent-up Victoria Nile thunders 150 feet down a series of spectacular cascades. Crashing onto the rocks, it hurls up a rainbow spray, then widens in the gorge beyond. Tribesmen, who believe in a spirit of the falls, appease the cataract with sacrifices of goats.

KODACHROME BY GEORGE RODGER, MAGNUM © NATIONAL GEOGRAPHIC SOCIETY

The eventual market for the horns is the Far East, where they are ground to powder and sold at great price as an aphrodisiac. If the Indian and Arab middlemen are willing to pay $12 a pound to the suppliers, the price of the horn when it reaches the Orient must be fantastic.*

The poachers set snares for the rhinos, dig pits to trap them, and kill them with spears. Under one of the trees at Moroke lay a collection of rhino skulls that the game guards had brought in from the bush. There were twenty-four skulls in all (page 382).

Poaching, Robbie said, was an age-old occupation. But, of course, it became "poaching" and a crime only after the game laws were drawn up. Prior to that it had been called hunting. As hunting is the natural pastime of the tribal African, he finds the change difficult to understand.

Poaching takes tremendous toll of Africa's animals. Killing for meat is widespread and certainly understandable among a protein-starved population. In the Serengeti region alone it is estimated that 150,000 large animals have been lost annually to poachers.

But most pernicious is the slaughter of animals unfortunate enough to have commercial value attached to some part of their anatomy. Giraffes are killed because the hair of their tails makes excellent fly whisks; rhinoceroses for their horns; elephants for their tusks. This is done by organized gangs, mostly with poisoned arrows or muzzle-loading guns, who operate in connivance with Asian traders on the coast.

Ivory Trade Decimated the Tuskers

Elephants in and around southern Kenya's 8,069-square-mile Tsavo Royal National Park have suffered tremendous losses. The carcasses of 1,250 were found during a campaign against poachers in 1957; since most of the country is dense bush and forest, it is probable that more than that number remained undiscovered. The total elephant population is estimated at only 4,000, so the plight of the pachyderm in that area is grave indeed.

The elephant was one of the first African animals to be exploited commercially and, judging from old records, it is amazing that any elephants at all remain alive today. In the heyday of the slave traffic, millions of tusks were transported to the coast on the shoulders of captive men and women. They came from the forests of Tanganyika via the slave route to Zanzibar; from Bunyoro to Mombasa; from the upper reaches of the Nile across Ethiopia or Sudan to Suakin on the Red Sea.

Old records of only one of the several slave traders operating from Suakin showed that more than a million tusks passed through his hands between 1853 and 1878. The trade in "black ivory" and white went side by side; in fact, on the Mombasa market, slaves and tusks were actually sold together.

Eventually the traffic in slaves was stamped

* See "Stalking the Great Indian Rhino," by Lee Merriam Talbot, NATIONAL GEOGRAPHIC, March, 1957.

Sign warns visitors that elephants, not men, rule Queen Elizabeth Park. "We met them every time we went out," the authors recall, "but soon accustomed ourselves to living among them."

Stripping foliage from a tree, an elephant browses in Amboseli Reserve, an animal sanctuary that bars ivory hunters. Though the animal's trunk contains no bone, it can lift a ton of timber or deftly pluck a clump of grass. During the heat of the day the beast dozes on its feet. At dawn or dusk it goes to water.

EMIL SCHULTHESS, BLACK STAR (OPPOSITE)

A hundred tons of tuskers head for water. Stampeding elephants can make

out, but not the traffic in ivory. The slaughter was stepped up. The traders had to make up for their loss of revenue from slaves, and the great herds west of the Albert Nile and in the northern Congo forests were practically shot out.

Although the number of elephants killed for their tusks today is only a fraction of the bygone slaughter, the herds themselves are diminished, and the toll on a percentage basis is higher. Once elephants roamed the savannas in herds hundreds strong. Now there are only a few sanctuaries in all Africa where five hundred can be seen together, as in the Congo's Garamba National Park.

Rhino Caught Between Car and Storm

At Moroke we had seen elephants, buffaloes, Uganda kobs, waterbucks, and baboons, but no rhinos. Robbie assured us he would find one for us that afternoon. While we were lunching, storm clouds gathered. Later, as we beat through the bush this way and that, the storm grew closer and we smelled rain on the wind. We were laying odds of two to one against seeing a rhino, when we noticed Robbie had stopped and was signaling us to draw up alongside.

He pointed, and we saw the dull gray back of a rhino over the top of the scrub. Working our way slowly to leeward, we got within 25 yards, when suddenly there was a flash of lightning and a great roar of thunder. Black clouds surged over us and opened a deluge.

The rhino, thoroughly frightened by the thunder, trotted in our direction, saw us, and couldn't make up his mind whether to charge or run. He stood flicking his ears and snorting at us, until another crash of thunder frightened him away.

Robbie had fulfilled his promise, but already water ran freely over the sloping ground. Black mud sprayed from our spinning wheels as they fought for a grip in the slippery soil. We had floundered for half an hour when the rain stopped suddenly, and it was another

KODACHROME BY W. P. KELLER © NATIONAL GEOGRAPHIC SOCIETY

the forest shudder. When caution dictates, they pad with eerie stillness

hour before we gained a track that led to the Obongi-Arua road.

The following day we again had trouble with storms. When we reached Pakwach—"Place of the Leopard"—and had to cross the Albert Nile back to the east bank, the water was too rough to launch the ferry. We waited for the river to calm again and watched elephants feeding in the papyrus.

When finally we did venture out onto the river, we were still unable to reach the other side. We had to wait in midstream among blowing whitecaps until four elephants that had come down the road to the landing stage moved back into the bush.

Splendor at the Place of the Hippo

After another 50 miles of mud and floodwater we reached Paraa, which means "Place of the Hippo" and is the safari lodge for Murchison Falls National Park.

It is impossible to describe Murchison Falls without sounding like a travel brochure. The full volume of the Victoria Nile, imprisoned in a chasm only 19 feet wide at its narrowest, thunders 130 feet down a series of three cascades, the last almost a sheer drop (page 374). A permanent mist of spray arches the falls in rainbows and keeps the surrounding foliage lush and green. After its last mad, reckless plunge, the Nile spreads out into a wide, froth-covered pool, where it quiets and then meanders peacefully another 20 miles to Lake Albert.

It was this 20-mile stretch from the lake that Sir Samuel Baker and his intrepid wife followed in canoes to discover the falls in 1864. He named it after the president of the Royal Geographical Society.

For 50 years after Baker first sketched his discovery, a variety of peoples roamed the region. Egyptian forts were built, manned, and abandoned. Arab ivory hunters from Khartoum and Belgians from the Congo harassed the vast herds of elephants. Explorers, missionaries, military commanders,

and traders came and went along the caravan route into the heart of Africa. Near the foot of the falls a station called Fajao was built.

But one controlling factor was overlooked—the little tsetse fly that hovered in the shade of the bush. Pestilence came, spread by the fly. When Winston Churchill passed through Fajao on his way north to Khartoum in 1907, he reported it devastated by sleeping sickness.

Within the next few years two-thirds of the people in the entire area had died, and the pathetic survivors had moved to more healthy territory. Fajao crumbled and disappeared; tracks were overgrown and left no trace. And as men moved out, wild animals came back in.

Slaughter To Fight a Fly

The tsetses of Fajao were the friends of the wild animals. They kept the human predators at bay. But that was only in Fajao. In later years, millions of animals all over Africa were slaughtered because of the tsetse fly.

It was found that the dreaded cattle disease, nagana, was present in the bloodstream of wild game. It had no effect on the animals themselves, but the tsetse fly transferred the disease from the wild hosts to domestic cattle, in which it was fatal. Efforts to wipe out the tsetse fly or to immunize the cattle proved futile. With considerable scientific support, wholesale slaughter of the wild game hosts began.

A rage for destruction swept Africa. Zululand started the campaign soon after World War I; in even so small a region, 150,000 head of game outside the reserves were shot. In Southern Rhodesia the slaughter still goes on today, and one and a quarter million head of game have been killed in disease control campaigns since 1924.

Northern Rhodesia and Uganda still have their control programs in operation. But in the Murchison Falls tsetse belt the animals have been allowed to live. Today, 50 years after the area was first cleared of human habitation, it is still uninhabited by law. In 1952 it was proclaimed a national park, barred to permanent residence.

Later a lodge was completed, and today Murchison Falls Park attracts the greatest number of visitors of all East African parks other than Nairobi.

Jinx and I glided over the calm, unruffled water below the falls in a little white launch piloted by an African. Families of hippos basked in the shallows or on sandbanks, waddling into deeper water as we approached.

Often, close to the launch, they rose for air with a great snort and then submerged again. The high jungle-covered banks were thick with crocodiles that slithered in quick rushes into the water ahead of us. On sand spits they slept in the sun, crisscrossed like so many logs. Where there was flat ground down to the river, we saw elephants, buffaloes, waterbucks, kobs, bushbucks, reedbucks, and duikers. Monkeys played in overhanging trees.

Bird life was prodigious, varying in size from the tiny brilliantly plumaged malachite sunbirds to the goliath herons and marabou storks. We thrust the bow of the launch into the bank beneath a small sandy cliff where bee-eaters were nesting. The cliff face was peppered with the burrows they scratched out with beak and claw; as we watched, the

KODACHROMES BY PETE TURNER © NATIONAL GEOGRAPHIC SOCIETY

Huge jaws spread wide in mock combat, two bull hippopotamuses meet mouth-on (above). Next they draw apart and bellow defiance; then one jabs the other below the water line. Bulls do most of their serious fighting on land.

Lazing in the shallows, torpid onlookers gently submerge and rise again, only their ears and protruding eyes breaking the surface. Occasionally they yawn, grunt, or blow bubbles. When dusk falls they will quit the lake and browse the banks for grass. In a night an adult may eat hundreds of pounds. The Queen Elizabeth Park region contains the world's largest hippo population.

Bleached skulls, the remains of 24 rare white rhinoceroses killed illegally, point up one of the main reasons for the decline in African wildlife. Poachers slew the beasts for their horns, using spears or muzzle-loading muskets (page 376). Jinx Rodger inspects this boneyard in the West Madi region of Uganda.

brilliantly colored birds, deep red, olive green, and yellow, flew in and out of the holes. Sometimes they rested on overhanging branches and were joined by kingfishers equally brilliant in iridescent blue. Overhead, yellow and orange weaver birds chattered around their pendent nests. A black cormorant floated downstream on a piece of driftwood. It held its wings out wide to dry, looking like the black eagle on the imperial flags of the Hohenzollerns.

We floated across the great pool below the falls and were awed by the rush of water. We had known what to expect beyond the last bend of the river. But to Sir Samuel Baker this same scene had come as a surprise.

We pictured him listening to the roar and wondering what lay ahead. His account tells of the excitement and confusion when he shot at a crocodile. Boatmen dropped their paddles and cowered in the bottom of the canoe. A hippo rammed the craft, and the Africans "positively yelled with terror."

We left Murchison Falls Park by the new southern track that leads across Bunyoro District to Masindi. We were now well into the old Kingdom of Bunyoro in central Africa. Two centuries before the proclamation of the British Uganda Protectorate, Bunyoro reached from what is now Kenya to the Congo. To the south it stretched to the frontiers of Tanganyika. But today, because of tribal wars and treaties with foreign powers, the old kingdom has been cropped to only 4,847 square miles of western Uganda territory, as one of four native kingdoms existing within the protectorate. The others are Buganda, Toro, and Ankole.

Beneath the Mountains of the Moon

As we sped southwest, through the rest of Bunyoro and into the Kingdom of Toro, we saw the great range of the Ruwenzori spread out before us—the Mountains of the Moon. When we reached Queen Elizabeth National Park, it was late afternoon; the long shadows of candelabra trees groped over the ground and spread their fingers across the road.

Four miles of track led to Mweya Safari Lodge. When we first saw it, the late sun-

light added to the incredible beauty of its setting. It stands on a promontory, and the track approaching it totters on a razor's edge between Lake Edward on one side and the Kazinga Channel flowing in from Lake George on the other.

It was here that we had our visit from a night-feeding elephant, which happily decided not to eat us out of thatched hut and home.

Queen Elizabeth Park was opened at the same time as Murchison Falls Park, but in a previously more remote area. Its inaccessibility made it an impractical area of operation for the early ivory hunters, and thus the big game went unmolested.

100 Tons of Hippos Rise From Mud

Kazinga Channel shares with the Semliki River the honor of having the heaviest hippo population in the world. In the 24 miles between Lake Edward and Lake George live an estimated 9,000 of them (page 380).

They wallow in the water during the day and come out to graze after dark. Since each hippo consumes hundreds of pounds of grass a night, the problem of pasture for such a weighty population presents the park director with a considerable headache. There is plainly not enough grass to go around.

The hippos have taken up residence in outlying pools and wallows, thus widening their nightly grazing range. To save the grass for other wild game, an attempt was made to drive the hippos from the wallows back into the Kazinga Channel. We happened to arrive at the height of the campaign.

In early morning we accompanied the park director, the local game warden, and several African rangers to a wallow two miles from the channel. It was only 25 yards across, but in it were 60 hippopotamuses. The mud was churned to a thick green slime, and the big brutes belched and snorted and sloshed in it with loud sucking noises. When they lay still, it was almost impossible to distinguish them from the mud, but for their protruding eyes.

To scare them out of the wallow was no easy matter. The Africans shouted and threw clods of clay. The great mass of hippos, each weighing at least one and a half tons, heaved and seethed. But it was half an hour before the first one ventured out and stood dripping mud.

Then the others followed. A hundred tons of hippos rose in a giant upheaval and scuttled across the plain, each one looking like a huge swollen grub, its wet, muddy flanks shining in the sun.

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Lyre-horned Ankoles blockade a road in Uganda's Masaka District. Long-horned animals pictured on Egyptian tombs and monuments suggest these cattle may descend from an ancient breed.

Only one old bull remained in the wallow. Nothing would move him. He charged repeatedly but refused to evacuate permanently, and we finally left him, an old gentleman of great courage, king of his muddy castle.

That same evening we found a baby buffalo. With an African ranger, we were taking a short cut across the open plain when we saw a baby calf running with six old bulls. She was not more than three or four days old.

"*Hapana mama,*" the ranger said in surprise—no mother.

We spent an hour looking for the cow that had lost her calf, but every buffalo in the area was a bull. Maybe the mother had been killed by a lion or a poacher. At any rate there was no sign of her.

The ranger said the calf would surely die in the night of thirst, if the hyenas didn't kill her first; so we decided to catch her.

Hoping the six big bulls would run rather than charge, we chased them in the Land-Rover over the rough, uneven grassland. The little calf followed them, and we covered half a mile before she dropped far enough behind for me to maneuver between her and the bulls.

The ranger leaped out and grabbed the calf in his arms. She struggled and bellowed so furiously that the six bulls stopped and faced us with heads raised, hoofs pawing the ground. I shouted to the ranger to jump in the back. But I had forgotten something: The door was locked.

I had to stop the engine and go around to the back of the Land-Rover with the keys, while the buffaloes glared at us from 25 yards away. Jinx kept up a running commentary on their behavior.

"Quick, quick!" she yelled. "They're coming!"

We threw the calf in, the ranger leaped on top of her, and a racing car could not have made a faster getaway. The little calf bellowed and fought all the way back to Mweya.

Mrs. Bere, the park director's wife, made a small pen in her house, and she fed the calf every four hours with milk from a bottle. In only two days the calf lost all trace of fear and chased us around the garden, playing happily. Her awful experience out on the plains was forgotten.

In honor of the occasion, she was christened "Jinx."

From Queen Elizabeth Park we had to reach Karamoja District, back across the length of Uganda, before the rains broke and the rivers rose too high to be forded. Time was short; we covered the 600 miles to the main town of Moroto without pause, except to sleep three nights by the wayside.

Karamoja has somehow escaped the impact of civilization. Whenever we stopped near a village, tribesmen armed with spears gathered around the Land-Rover—not to beg, as in more civilized areas, but to look and to pass the time of day. Naked spearmen shook us by the hand and grinned broadly. To them a white woman was a curiosity.

We passed first through the tribal territory of the Karamojong, then of the Labwor. The Labwor are craftsmen, skilled in the making of spears, which they supply to neighboring tribes (below). Spears are always in demand, as are knives, cowbells, and metal ornaments from their smithies.

Burnished in Dawn's Glow, Napore Hunters Gather for a Blessing of the Spears

In the isolated Karamoja District of northeastern Uganda, the authors stepped back in time. Here 175,000 pastoral herdsmen dwell all but untouched by civilization. Napore spearmen perform this ceremony before each hunt. Then, having placated the spirits, they fan out through the bush for antelopes.

Stone hammers, beating against stone anvils, shape red-hot metal into thin spearheads. Spears made by Labwor tribesmen, the smiths and traders of Karamoja, find a ready market.

GEORGE RODGER, KODACHROME (OPPOSITE) © NATIONAL GEOGRAPHIC SOCIETY

Cowrie-shell diadems gleam like halos as
Karamoja women swarm around the authors' Land-Rover

From the green hilly land of the Labwor, we went to the flat, hot, dusty country of the Jie, where herds of pale dun cattle found precarious grazing among the thorns.

A cattle sale was in progress as we arrived in the village of Kotido, and naked Jie tribesmen urged their herds with wild cries toward a *boma*, the stockade where the beasts were weighed and bought by the government.

Women and children came to watch the sale, and bare-breasted girls to flirt with the herdsmen. The air was filled with the bawling of cattle and the cries of their owners, the strong, earthy smell of sweat and dung, and the singe of the branding. Over it all blew a hot, searing wind that whipped up the dust and sent it swirling through the throng.

Warriors Charge in Mock Attack

When we reached Kaabong, home of the Dodoth tribe, wild warriors charged the Land-Rover with spears raised and roared their war cries. As we ventured out of the car, they pretended to attack us with their clubs. It was unnerving but in the best of Dodoth taste, and there were as many smiles as grimaces (opposite).

The women insisted that Jinx dance with them. The men also danced. They formed a tight circle, chanting a deep vocal rhythm, and those in the center jumped vertically, keeping their bodies rigid and propelling themselves with only a flick of the feet.

North of Kaabong the land became wild indeed. This was game country again, and we saw kongonis and oribis and herds of giraffes. Three hundred Napore spearmen on a tribal hunt gathered around the Land-Rover and performed the ceremony of the blessing of the spears (page 384). Then, with the spirits placated, they fanned out across the valley, driving the game before them.

We camped in the hills, and after an early supper we sat by the fire, the two of us, to talk and watch the shrinking of the world as darkness deepened. First the night erased the distant hills, then, one by one, the trees merged into shadow and were gone. Soon the whole of our little world was contained within the periphery of our firelight.

As our trip was coming to an end, we thought over what we had learned of the diminishing herds and the future of the wild game we had come out to see.

We knew certain statistical facts:

1. In the Union of South Africa, destruction of big game outside reserves and private game lands is virtually complete.

2. Within the past century most large herds of big game have disappeared from the rest of Africa.

3. In some regions poachers take more game in a week than big-game hunters under license take in a year.

4. In areas where disease control measures are in operation, deliberate slaughter takes as large a toll as poaching.

We wondered if these facts meant anything to the Africans themselves. To the average tribesman a game sanctuary seems no more than a European invention planned to deprive him of his meat and to give other Europeans something to shoot at and to photograph.

But, sooner or later, every game park and reserve will come under African control. The lives of all animals will be in African hands. And what then? Will they realize the great value of their matchless museums on the hoof in time?

Visitors to East Africa spend $20,000,000 annually, quite a sum in a limited economy. They don't go all that way to see factories and housing schemes. They go to see the lions.

There are, happily, indications that more and more educated Africans—those who are now in power or who one day will lead their people—are aware of this and sympathetic to the concept of conservation.

We felt a certain sadness for the wildlife outside the reserves. Its chance of survival seems so small. But, as long as the parks and reserves are maintained, and we judged them all, from the Cape to the Sahara, by what we had seen in Kenya and Uganda, the wildlife will not be allowed to pass into extinction.

Though tribal lands may disappear and new roads open the country wide, with African cooperation there will always be places where elephants still have right of way.

Hair Matted With Clay and Daubed With Paint Forms a Warrior's "Helmet"

Elaborate hair styles define the age and marital status of Dodoth tribesmen in Karamoja. To preserve dyed coiffures while sleeping, the men rest their heads on stools that double as seats by day. For a festive ceremony this spearman adds an ostrich plume to his regalia. His calico toga knots at the shoulder.

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Lions on a lazy midday stroll back up traffic

A Portfolio of Africa's Vanishing Wildlife

The Last Great Animal Kingdom

in Kruger National Park. Tolerating cars, they appear oblivious to the drivers

THE LION'S ROAR—muted thunder with a rasping edge—is the sound of primeval Africa. It speaks for the host of other wondrous beasts of lesser voice that more than anything else make Africa what it is: the incredible giraffe, the blubbery hippopotamus, the wildebeest with the bearded face of a sad old man, the antelope swift as the wind and graceful as a ballet dancer.

Unlike most of the continent's disappearing wildlife, the modern lion cooperates. Give him a game preserve like the Union of South Africa's great Kruger National Park, and he will blandly ignore the automobiles that haunt his footsteps and the tourist-laden taxis that ring him as he sleeps in the long grass.

The following pages give an unforgettable panorama of the old Africa—a land where, in living memory, big game outnumbered the men who harried it. The burning question is whether any of it will remain for future generations. For all of Africa's rich heritage of animal life must rely for its survival on an uncertain element—man's compassion.

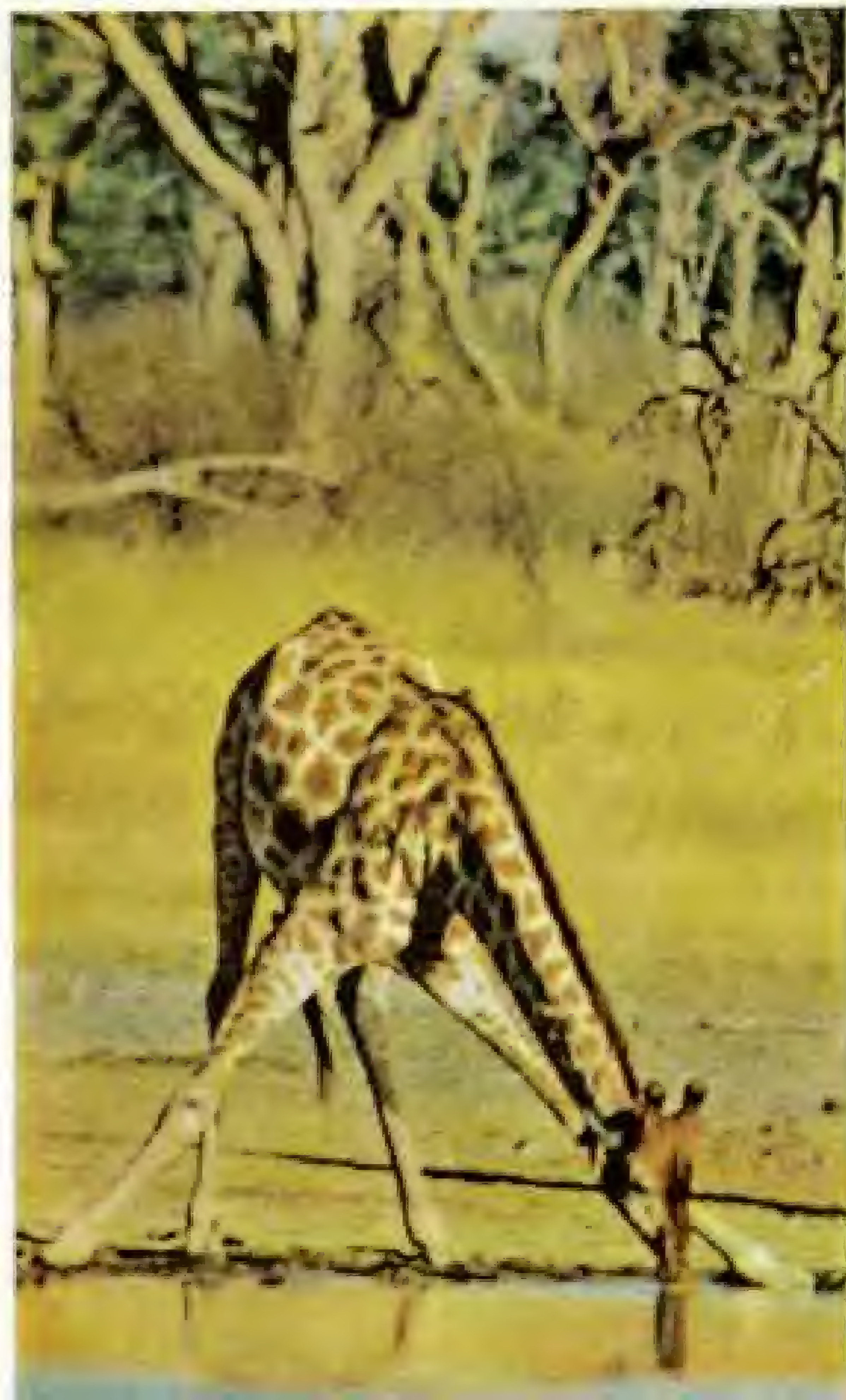
World's tallest animal, the giraffe stretches up to 20 feet. A bull may weigh 4,000 pounds; the gentle beast's bulk and strength render him safe from all enemies save man and lion. Hind legs can kick like steam pistons. Distinct white bands on this reticulated giraffe distinguish him from the common species, whose coloring is more blotched (below and opposite).

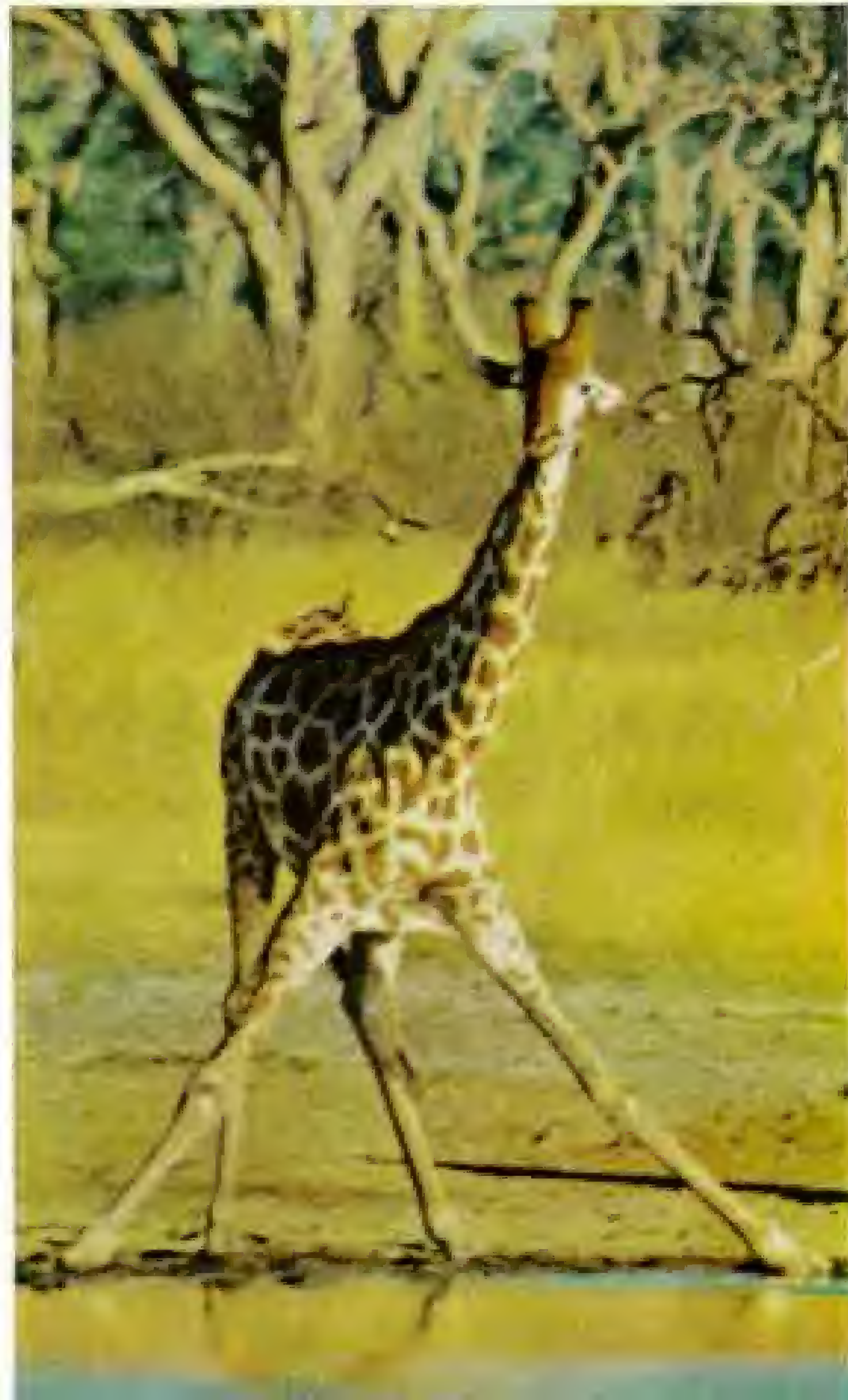
Rocking-horse motion propels the galloping giraffe at 30 miles an hour. The long neck bobs back and forth at every stride, and the tail stands erect and angled to one side, its terminal tuft streaming in the wind.

Nature's four-legged skyscraper avoids tropical forests, swamps, and soft terrain, preferring hard savannas like this flat thornbush country, where he can use his stepladder neck to advantage.

Forelegs wide, the giraffe leans down to drink. The immense heart, one of nature's most powerful pumps, sends blood 12 feet to the head. When the head is lowered, a valve checks the rush of blood, preventing rupture of the brain. As the animal stands upright, snapping his heels together like a soldier coming to attention, the valve then prevents too rapid a drainage of blood from the brain. Studies of this mechanism may throw light on the problem of curbing high blood pressure in man.

KODACHROMES BY QUENTIN KEYNES (ABOVE), EMIL SCHULTHESS, BLACK STAR (BELOW), AND EDWARD S. ROSS © NATIONAL GEOGRAPHIC SOCIETY





Siesta Time in the Mud Wallows: A Hippo Rests His Chin on a Neighbor's Broad Back

Among four-legged mammals, only bull elephants outweigh the hippopotamus, or river horse, which sometimes reaches five tons. Most Africans give

EMIL SCHULTHESS, BLACK STAR

hippo herds a wide berth, particularly in shallow water or along the banks. Vicious attacks by enraged bulls can capsize boats or stave in the hulls.

Dozing by day, these barrel-fat hulks know but one irritant—large biting flies that attack the soft skin around the eyes.

Thick as Ants, Wildebeests Dot the Plains; Thudding Hoofs Raise Clouds of Dust

Serengeti National Park in Tanganyika offers a haven to the most spectacular wild herds remaining on the African continent. A few years ago millions of large animals grazed the Connecticut-size park. Today only some 400,000 remain; poachers have taken as many as 150,000 in a year. Giraffes and wildebeests are killed not only for meat, but also because their tails make excellent fly whisks.

During the dry season wildebeests on the parched plains trek to the Crater Highlands, where they find permanent water. Sentinels posted on the herds' flanks keep an eye on an unwelcome escort—lions. After climbing 2,000 feet, the wildebeests descend to the grassy floor of Ngorongoro, the crater of an extinct volcano (map, page 422). When rains drench the plains again, the herds return, accompanied by the new calves.

It was during such a migration that a census-taking plane, flying low, stampeded this herd.

Surprised in the open, a leopard snarls in fury; usually he prowls by night. Poachers, hunting the leopard for his pelt, have all but exterminated him in many parts of Africa, but some regions now protect him to save crops from garden-raiding baboons, which flourish without a carnivore to hold them in check. Leopards consider dogs a delicacy and sometimes snatch them from suburban doorsteps. Nairobi, Kenya, traps the offenders and releases them in game parks.

Startled lechwes churn marsh waters in Northern Rhodesia. Before World War II some 250,000 red lechwes roamed the flood plain of the Kafue River; today fewer than 30,000 remain.

Aquatic as North American moose, lechwes stand belly deep in water to graze on flooded grasses. During rains the herds venture into woodlands. Ewes bear their young on river islands.

By fertilizing plant life in the shallows, lechwes encourage fish to multiply, to the benefit of river tribes.

Wary impala ram and his harem stand poised for flight in Amboseli National Reserve, Kenya. When the herd takes off single file through the bush, white-fringed tails and rump stripes will flash signals that keep its members together. If alarmed, they will leap rather than run, rising 10 feet at a bound and appearing to float in mid-air with effortless grace.

Impalas remain perpetually on guard against ambush by leopards, lions, and wild dogs. At water holes they prefer the shallows, where they can spot lurking crocodiles.

Uganda kob placidly chews his cud in the Congo's Albert National Park.

In season this bush antelope and his three or four does will join hundreds of their kind grazing the Rwindi Plain. Males often recline on crumbled termite mounds to supervise the does.

Seldom far from water, kobs often remain in the open even during midday. Excellent swimmers, they commonly take to water to escape enemies, principally the lion.

Chimpanzee and friend hold a tete-a-tete in the Congo.

At home in trees or on the ground, chimpanzees forage for fruits, nuts, and green shoots. At nightfall they build leafy nests high in the trees. Before turning in, they soothe one another with lullabies, communicating with cries and gestures.

Scientists have noted the chimpanzee's ability to reason. One captive repaired a broken stool with hammer and nails. Others have piled up boxes to grasp bananas out of reach.

White Curtains Mask Eyes of Sleeping Baby Baboons

Baboons of a dozen species roam Africa south of the Sahara. All are voracious foragers. They devour live scorpions, first tearing off the venomous stinger. On a cold morning when bees are too torpid to retaliate, baboons raid their combs and steal the honey. Newborn antelope calves also fall prey to the simian marauders.

A ruling clique of old males dominates each troop of baboons, exacting iron discipline from the females and young.

Baboons, fearing man as a mortal enemy, usually flee his approach. Hair-raising stories about massed attacks lack verification.

Vervet monkey, startled by the camera in Kruger National Park, scratches itself in a nervous reflex.

Vervets forage on tree-lined riverbanks. An old male leads a clan of a dozen or more. Scouts posted in trees warn of danger. Vervet sentinels have been known to conceal themselves in branches before a raid on crops and advise the troop when a farmer leaves his fields.

Lesser Flamingos Explode in a Pink Cloud Above Lake Manyara, Tanganyika

Some three million stilt-legged flamingos crowd the shallows of brackish lakes in East Africa's Great Rift Valley. *Phoeniconaias minor* favors water so saline that it contains no life except the blue-green algae and other minute organisms on

PHOTOGRAPHS BY KENYON [illegible] © NATIONAL GEOGRAPHIC SOCIETY

which the bird feeds. Mated flamingos build moundlike nests of mud, where the female lays a single chalky white egg. For a month both mates share the incubation duties. Hooded vultures often circle the colony, waiting a chance to raid ungnarded nests. Downy flamingo offspring swim well immediately after hatching. For a few weeks the adults give them predigested food. Grounded flyers in this view await their turn to race across the shallows and gain take-off speed.

Wildebeests trudge single file through the red haze of drought in Amboseli National Reserve. They head for a hole in an old lava flow brim-

Like Kittens With Cord, Lions Play With a Rope

In lion society, females usually serve as breadwinners. Toward sundown, ladies of the pride emerge from cover and stalk prey grazing on the plains. Creeping forward a few yards at a time, they move into striking distance, then leap to the kill. Impatient cubs sometimes alert the prey.

Meanwhile the maned males, shunning work, remain on the sidelines—until it is time to appropriate the choicest portion. Wives eat next; cubs get the scraps.

The photographer used this rope to drag a bait carcass to an open spot in the Masai country of Kenya.

ming with water that seeps down from the forest belt on Kilimanjaro (page 362). Throughout much of Africa the cutting of woodlands and overgrazing by livestock diminish water and pasturage. As fast as man "improves" the land, wildlife disappears.

Horse and zebra blend in a bizarre zebroid. Though related, the two animals produce sterile offspring when crossed. Stripes once may have emblazoned all horses; most primitive species still retain them.

Ancient Romans in their amphitheaters exhibited the North African zebra, which they called *hippotigris*. As late as 1914, European colonists tried to domesticate the Burchell's zebra; the South African mail service used mixed teams of zebras and mules to draw its coaches.

Although easily broken to harness, zebras lack the stamina bred into generations of their domesticated brethren.

Like a horse in a Kentucky pasture, a Burchell's zebra nuzzles its companion.

Three species of the "tiger horse" once ranged Africa from Ethiopia to the Cape of Good Hope. Most horselike of the group, the Grévy's zebra still inhabits desert country north of Mount Kenya. A few mountain zebras in South Africa survive under protection. The widespread Burchell's zebra, or bontequagga, grazes the savannas of eastern and central Africa. The quagga, a southern race of this species, once blackened the plains of Cape Colony. But Dutch settlers discovered that its skin, striped only on the head and neck, made an excellent grain bag. A Boer rifle felled the last quagga about 1880.

Burchell's bold gridiron pattern offers no protective coloration on the open grasslands.

Tiger horses thunder across an acacia parkland on the East African savanna. Burchell's zebras, exclusively grass eaters, band together in leaderless troops of a dozen to a hundred and separate only when mating or foaling. Herds sometimes associate with ostriches, whose long necks make them effective lookouts against approaching enemies.

Given the slightest cause for suspicion, members of the herd stampede, calling one another with petulant barks, "Qua-hah, qua-hah."

When nearing a water hole at sundown, the troop sends out scouts to warn against ambush by lions, the zebra's archenemy. Lions, however, recoil from the massed herd's flailing hoofs and bared teeth. Zebras delight in chasing wild dogs, scourge of the smaller antelopes.

KODACHROMES BY [illegible] (ABOVE), EMIL SCHULTHESS, [illegible] © N.G.S.

Brown-hooded kingfisher contemplates a scaly meal. After battering the hapless lizard against a branch, the bird will swallow it head first. *Halcyon albiventris* ambushes victims from a lookout perch in dry bush country; its menu includes insects, small reptiles, and land-ranging crabs.

Crowned cranes acourting kiss on the doorstep of a Kenya farmhouse. Often tamed, the ornate birds protect country gardens against locusts and other insect pests. Wild cranes frequent marshes and riverbanks across most of Africa south of the Sahara.

Across the Ridgepole of the Alps

Text and photographs by

WALTER MEAYERS EDWARDS

National Geographic Foreign Editorial Staff

FANTASTIC! Here am I, an earth-bound creature who never held an ice ax, floating over an immense amphitheater of rock and ice and silence—seeing what formerly only the eagles saw, and hardy mountaineers.

I swing in a four-place aluminum *télécabine* high above the Glacier du Géant, the Giant's Glacier. Below falls the shadow of peaks on the flank of mighty Mont Blanc, the very summit of western Europe, rising to 15,771 feet only three miles away.

This passage through the heart of the French Alps has been called the scariest ride in Europe, and the most exhilarating. One look at the crevasses gaping below, both frightening and stirring, tells me why. I glance upward and have another disquieting moment. Where, I wonder, are the supports for the cables holding *me* up?

For nearly two miles there are none. One can't build pylons on an ever-shifting glacier. Nevertheless, the car will climb over the saddle of ice ahead, as if lifted by "sky hooks." From the opposite direction, three other cars swing down from the hump. How?

Suddenly I see other cables strung crosswise between two 11,000-foot peaks ahead: the Petit Flambeau, the Little Torch, on the left, and the Grand Flambeau, the Big Torch, on the right. These lift the main carrying cables up and over the hump.

This triumph of engineering imagination is characteristic of the new Alpine cableway portrayed in its entirety on the following pages—one of the most daring accomplishments of man amid the world's mountains.

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THE six-stage trip begins at Chamonix (far right) in the valley that beguiled Goethe, Byron, Shelley, Napoleon III, and Edward VII. An aerial car with standing room for 80 rises 4,000 feet to the first station. Passengers change to 46-place cars to ascend to the Aiguille du Midi, at 12,605 feet the highest point on Europe's loftiest cableway.

Mont Blanc dominates campers and cable cars

Mountaineers dangling from ropes carved this station out of solid rock in wind and snow. Freshly poured concrete cracked and crumbled when temperatures dipped far below zero. Now travelers warm themselves in a snack bar and souvenir shop, walk a steel bridge to four-passenger cars for the longest leg of the journey: 3.16 miles out across the Vallée Blanche, the White Valley, and the Glacier du Géant to the Pointe Helbronner station astride the French-Italian border. Only the Gros Rognon peak and the ingenious Flambeaux suspension support this span.

The descent on the Italian side brings three more changes, to successively larger cars. Trip time from Chamonix to La Palud, near Courmayeur: two hours.

In deep chambers blasted into the rock, concrete blocks move slowly up and down as counterweights for the cables. The block beneath the Plan des Aiguilles station weighs 70 tons. The bulky electric motor hauling the cable for the stretch across the glaciers was hoisted bit by bit to its perch within the Aiguille du Midi.

Even these massive achievements are dwarfed by mountains near and far. The outdoorsmen at right, encamped near the Pavillon station, look up to Mont Blanc. On the following double page (414-15), cable-car riders swing across the Vallée Blanche; beyond tower saw-toothed peaks of the Grandes Jorasses.

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ITALY
FRANCE
FRANCE
Aiguille du Midi 12605
Vallée Blanche
11617 Gros Rognon
du Tacul
Plan des Aiguilles 7356
mile Mont Blanc highway tunnel
Les Pèlerins
Chamonix
Stations are underlined
Elevations in feet

Skiers' all-year paradise

FROM an icy ridge on the Aiguille du Midi, tourists aim cameras as télécabines finish their half-hour glide from Pointe Helbronner. There, a French skier (below) shows his passport to an Italian *carabiniere*. He is returning to Aiguille du Midi, start of one of the longest winter ski runs in the world: 14 miles across the Vallée Blanche and the Tacul Glacier to the Chamonix Valley, a drop of 9,000 feet.

Up here the snow is fine all year round. On an August afternoon, skiers line up for a tow on the Glacier du Géant (opposite). The crevasse reveals accumulations of snow stacked like a layer cake; the dark streaks are wind-blown rock particles. Smaller crevasses lie under the snow; guides continuously test slopes for safety.

Safety also is the watchword for the great cableway in the sky. Winds reach 125 miles per hour, forcing occasional shutdowns. Emergency motors provide standby power. The cables, sealed against corrosion, are tested by an electronic device that plots the condition of individual wire strands on a graph.

"We are still building," says Count Dino Lora Totino, the Italian who conceived and built the spectacular cableway. "The Aiguille du Midi will have a restaurant for 500. On the Glacier du Géant we're putting up more ski tows. This will be one of the biggest summer ski resorts in Europe."

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From cloud and ice, a dizzying drop to Chamonix

THE FRENCH tourists above, suspended over the Glacier du Géant, scan a panoramic photomap to identify mountains in the mist. Their cabin is chilly. But when the sun reappears, the aluminum walls of the car will absorb enough heat to make them shed their warm sweaters.

The climbers at right, just arrived at the Aiguille du Midi station, trudge through an ice tunnel to the Vallée Blanche—roped together, crampons on their boots.

On the opposite page, a 46-passenger car descends on 1.8 miles of cable without a single intermediary support to the Plan des Aiguilles station. In the distance beckons Chamonix, promising warmth, tales of adventure, and the ready conviviality that quickly breaks the ice among strangers in the thrall of the Alps.

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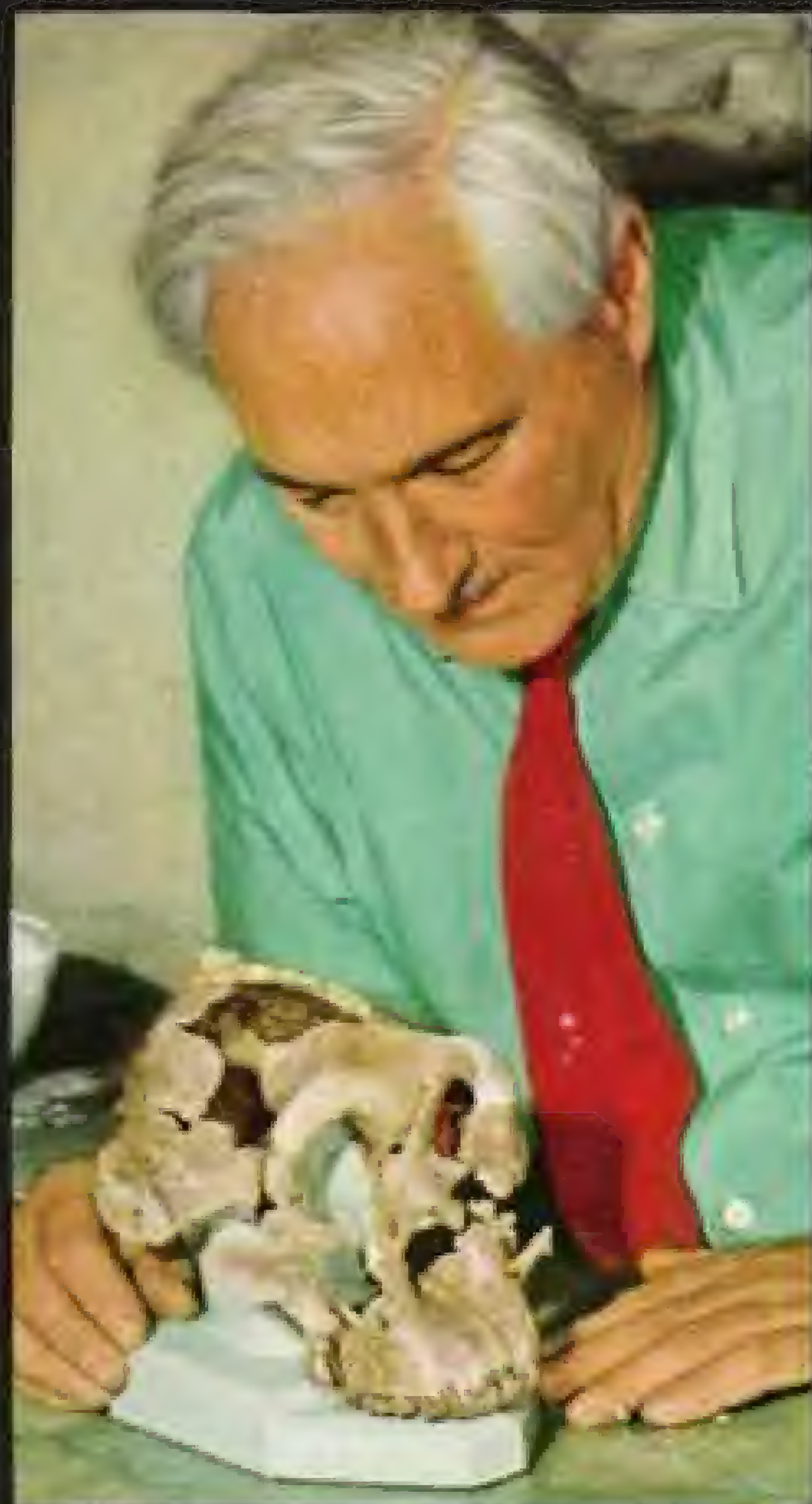
Finding the World's Earliest Man

By L. S. B. LEAKEY



Giant teeth on a fossil palate represent the first trace of the earliest known man, who lived in East Africa more than 600 thousand years ago, according to present thinking of most anthropologists. Oldest tool-maker yet discovered, *Zinjanthropus boisei* adds a link in the chain of human ancestry, the author believes. The broken palate, just as it was uncovered in Olduvai Gorge, appears here not quite life size. Molars are nearly twice the width of modern man's.

The author, a noted British archeologist, is curator of the Coryndon Museum in Nairobi, Kenya. His search for ancient remains continues under a National Geographic Society grant.

THE TEETH were projecting from the rock face, smooth and shining, and quite obviously human.

To my wife Mary and myself, who had long been looking for just such a clue, those bits of fossilized matter represented a priceless discovery, and the end of a 28-year search.

For there in the rock of that remote, sun-baked gorge in East Africa lay the remains of the earliest man ever found.

Man—what does the word really mean? To me it suggests no mere primeval apelike creature that walked erect and had hands. To be truly human, he must have had the power to reason and the ability to fashion crude tools to do his work.

There is the key, the ability to make tools, as distinct from merely using the

Olduvai Gorge Exposes Clues to the History of Early Man

A rich source of Stone Age artifacts, the ravine slices through 300 feet of sediment covering the bed of a prehistoric lake. Dr. Leakey and his Nairobi neighbors, Mr. and Mrs. Armand Denis, producers of exploration films, survey the gorge.

Twenty-five miles long, Olduvai Gorge ends at the Balbal Depression, a part of the Great Rift Valley that stretches 4,000 miles from the Jordan Valley to Mozambique.

Proconsul, a primitive ape whose skull the Leakeys found in 1948, lived in Kenya some 25 million years ago. His fossil remains, most anthropologists agree, represent the root stock of higher primates. *Australopithecus*, the South African "near-man" and Zinjanthropus's contemporary, combined physical characteristics that suggest man and ape.

pointed sticks or sharp stones that lay readily at hand. Such a being, who set about shaping the raw materials of nature in a regular pattern to suit his needs, was the one worthy to be considered the earliest human. And at last we have found him.

I call him *Zinjanthropus*, or "East Africa Man." He lived more than 600,000 years ago.

Silt Covered an Ancient Tragedy

To understand this new clue to the mystery of man's origin, let us go back those 6,000 centuries and imagine a scene by the shores of a lake that covered part of present-day Tanganyika (left).

Rain had fallen for many days, and the lake level was rising ominously. Camped by the

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shore, the little band of primitive humans realized by dawn that they would have to retreat.

Gathering their meager belongings, they went to rouse a youth of perhaps 18 who had lain ill for some time. One look told them that the flood could threaten him no more; he had died in the night. Quickly his companions covered the body with brush to protect it from the hyenas and other carnivores feeding near by. Then they fled to high ground.

Inexorably the lake crept over the campsite, engulfing the body, together with many stone tools abandoned in the flight and the bones of small animals the hunters had eaten. Higher and higher the water rose, depositing a layer of silt over all.

Again and again during what we call pluvial periods—eras of increased rainfall probably coinciding with ice ages farther toward the poles—the lake rose and fell, adding layer on layer of silt and sand on top of the campsite. Finally the water vanished, leaving the body entombed under several hundred feet of sediments that had hardened to rock.

Earthquakes Opened Door to the Past

There our story might have ended but for one of those quirks of nature that sometimes seem to do man's work for him.

Some 100,000 years ago—when the bones of our Stone Age man had lain buried for half a million years—violent earthquakes convulsed the area, fracturing and reshaping

the land on a vast scale. When the tremors had ceased, an immense new chasm had appeared as part of the Great Rift Valley, which stretches from Jordan south through Kenya and Tanganyika (map, page 422).

Rains Sliced Into the Past

For thousands of years Africa's sands drifted restlessly, filling an erosion-created side valley. Then what erosion had begun, torrential rains finished. The water, sweeping into the Great Rift, cut through the sands and deepened the channel through the cliffs. This is today's Olduvai Gorge, and it slices precisely through the beds of that long-vanished Stone Age lake (page 423).

Olduvai is a fossil-hunter's dream, for it shears 300 feet through stratum after stratum of earth's history as through a gigantic layer cake. Here, within reach, lie countless fossils and artifacts which but for the faulting and erosion would have remained sealed under thick layers of consolidated rock.

I have long believed that it would be at Olduvai that we would find evidence of human life earlier than that represented by Peking Man or Java Man. That belief has been justified, for Zinjanthropus is older than both by some 100,000 years.

Why did I first go to Olduvai Gorge, and what made me so positive it would yield new secrets concerning the development of early man? Olduvai Gorge was discovered in 1911 by a German entomologist named Kattwinkel. The discovery nearly cost him his life. Chasing a butterfly, he almost followed his quarry over a cliff. When he climbed down over the edge, he came upon fossil bones, which he took back with him to Berlin.

German scientists sent an expedition to Olduvai in 1913 under the leadership of my old friend, the late Prof. Hans Reck. World War I, however, interrupted the work, and in the postwar years Reck wrote to me in Kenya. He could not resume his initial operations in the gorge. Would I like to take over the exploration?

Early results had been promising. The shores of a vanished inland lake are always likely places to search for evidence of fossil man, since in his earlier stages he had no

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Painstaking diggers uncover a scrap of skull. Mrs. Leakey (under straw hat) spotted the first of some 400 fragments of Zinjanthropus on July 17, 1959. She and her husband (brush in hand) spent 19 days excavating the remnants. Their discoveries, they say, strongly support Charles Darwin's prophecy that Africa would prove to have been the birthplace of mankind.

vessels to carry water and invariably stayed close to an ample source.

I wrote to Reck accepting the offer and made plans for an expedition. Lack of money caused endless delays, and it was not until 1931 that Reck and I finally set out from Nairobi for Olduvai.

The present route via the town of Arusha leads past the rim of the Ngorongoro Crater, then across the part of the Great Rift Valley known as the Balbal Depression to the gorge, at the edge of the Serengeti Plain (map, page 422). Barring mishaps, the 347-mile trip takes 13 hours by Land-Rover, the British counterpart of the jeep. That first trek, by a route 150 miles longer, took seven days by truck and car.

There was no lack of wildlife along the way; we saw elephants, giraffes, rhinoceroses, zebras, wildebeests, and smaller game such as Thomson's gazelles and dik-diks, delightful little antelopes only about 14 inches tall. Most of the animals showed scant fear; we could often approach as close to them as 20 feet.

Lions Come Calling

The first night, camped at the edge of the gorge, we met neighbors who have visited us regularly ever since. After darkness fell, I went out to see what was moving around the camp and switched on a large electric torch. In the blackness I was able to pick out the green eyes of eleven lions, some near, some far.

They had come from different parts of the gorge to investigate this invasion of their territory, for these animals are the most curious of all the cat family; they just seem to have to know what is happening. To this day they always greet us on our return to Olduvai, but they have never bothered us. Needless to say, we extend the same courtesy to them.

Not all the animals that visited us over the years were as unob-

DES BARTLETT, ARMAND DENIS PRODUCTIONS

Six-foot measure in hand, the author stands with feet beside the dark layer that entombed earliest man.

Sharpened pebbles enabled Zinjanthropus to skin animals. He made the tools by chipping jagged cutting edges.

NATIONAL GEOGRAPHIC PHOTOGRAPHER KATHLEEN REVIS © N.G.S.

Fossil Hunters on Hands and Knees Comb the Dig for Stone Age Remains

Zinjanthropus lived at a time when East Africa had more rain, and glaciers overwhelmed northern Europe and North America. Apparently lacking water vessels, he camped by a lake. The man discovered by Dr. Leakey died when no more than 18 years old. Rising lake water soon sealed the site with silt. Men in foreground collect scree for sifting. Kneeling, Mrs. Leakey, a Kikuyu assistant, and the author excavate the floor inch by inch. Dalmatians Toots and Sally warn them against prowling animals.

trusive as our lion neighbors. Giraffes, hyenas, and even rhinos have wandered into our camp. The explanation is simple: water.

From the beginning, lack of water has been the great hardship at Olduvai. Because of the predominance of clay in the soil, excavation during rainy months is difficult. When the rain stops, however, water simply vanishes, and we have to haul every precious drop by trailer from a spring 35 miles away on the rim of the Ngorongoro Crater—a laborious and expensive process. Up to now the cost has limited us to a working season of about seven weeks.

We have tried several ways to overcome this water shortage, sometimes with disastrous results.

One year Mary and I decided to visit the gorge toward the end of the wet season to avoid having to carry water. It worked beautifully for a week; with runoff from the

mountains, we even had running water at the bottom of the gorge for a daily bath. But when the streams dried up, we found ourselves reduced to a single water hole.

Unfortunately for us, two rhinos discovered the hole about the same time, and not content to drink from it, they turned it into a wallow. To those who have never lived on rhino bath water, I can only offer my congratulations. The taste stayed with Mary and me for months afterward.

Another time, when we had a cloudburst, we made funnels out of the tent flaps and collected enough water for everybody to have plenty. We forgot that tent canvas is often treated with copper sulphate for protection against insects. Luckily it made us ill before we drank enough to kill us outright.

During Olduvai's dry spell, the animals often scent the camp's water supply, and this has led to some strange encounters.

One evening as our cook was preparing a meal in the kitchen—merely a fireplace of rocks surrounded by a low brushwood fence—he was interrupted by a faint growl. He glanced up, expecting to see the usual timid hyena sniffing for scraps, and found himself face to face with a leopard.

It is hard to say which bolted faster, our screaming cook or the startled leopard, but supper that evening was an understandably sketchy affair.

On another occasion a pair of rhinos ambled into camp and, unnoticed, approached one of my assistants. The nearsighted brutes practically stumbled over him before he gave out a great yell and put them to rout.

Strangely enough, the rhinos are terrified of our two Dalmatians, Sally and Toots. It is a ludicrous picture to see two tons of rhinoceros lumbering across the plain with a 50-pound dog yapping in hot pursuit.

We have discovered that Toots and Sally are our best protection against animals and snakes. They sense danger long before we do,

About the author: "I talked to many people who consider Leakey the greatest figure in East Africa today"

From Dr. Leakey's camp in the Olduvai Gorge comes this letter from the National Geographic Society's own representative on the spot, Dr. Matthew W. Stirling, former Director of the Smithsonian Institution's Bureau of American Ethnology.

Dr. Leonard Carmichael, Chairman, Committee for Research and Exploration, National Geographic Society

Dear Dr. Carmichael:

Leakey's parents were among the first missionaries to the Kikuyu tribe. Born in a wattle hut, he was the first white baby these East Africans had ever seen. They came from miles around to spit on him, to show respect. Kikuyu children were his only playmates. He learned their language, and thought himself one of them. At 16 he went to England; he wrote his thesis at Cambridge on Stone Age Kenya and eventually became a don. He also became an elder of the Kikuyu tribe. I am told that his influence largely prevented the Mau Mau terror from bursting into a truly catastrophic revolt.

Dr. Leakey says that in science he never takes anything on faith. Instead of just theorizing about what early man could do, Leakey stalked a Thomson's gazelle himself, killed it with his hands, and skinned it with a prehistoric stone tool. He tried skinning animals with his teeth, from rabbits to antelopes. It couldn't be done, hence, he surmised, the early invention of stone tools. Leakey taught himself to make a stone ax with a stone or bone hammer in less than four minutes. This indicates that men could more easily make a new ax than resharpen a blunt one—and explains the abundance of such tools at Olduvai.

Early man has been Leakey's specialty since his first East African expedition, in 1924. Two of his sites, Olorgesailie and Kariandusi, now are field museums administered by the Royal Kenya National Parks.

In matters of archeology, Dr. Leakey says he still thinks in Kikuyu. He has published many articles and several books, notably *Adam's Ancestors*. His latest work, on Kikuyu ethnology, is probably the most complete and penetrating study ever made of a primitive tribe. It would run to three fat folios, and publishers are eager to abridge it into a single volume. But Dr. Leakey won't do things by halves.

Please thank all members of The Society's Research Committee for giving me this opportunity to see Dr. and Mrs. Leakey actually at work in their dig at Olduvai.

Sincerely yours,

Matthew W. Stirling

and this saves us the bother of carrying guns, a definite handicap on an expedition.

That first season at Olduvai convinced me that the gorge was one vast storehouse of Stone Age relics, a fossil museum such as existed perhaps nowhere else in the world. The animal remains alone were staggering. Since we started digging at Olduvai, we have uncovered fossil remains of more than 100 different extinct beasts, some of them nightmarish in their size and make-up.

For example there was *Afrochoerus*, a prehistoric pig as big as a rhinoceros. This pig had tusks so gigantic that a German scientist once attributed one to an elephant!

There was *Pelorovis*, a sheep that towered six feet at the shoulder and had a horn span of four or five yards. And *Sivatherium*, a burly, short-necked giraffe with broad antlers like those of the modern moose.

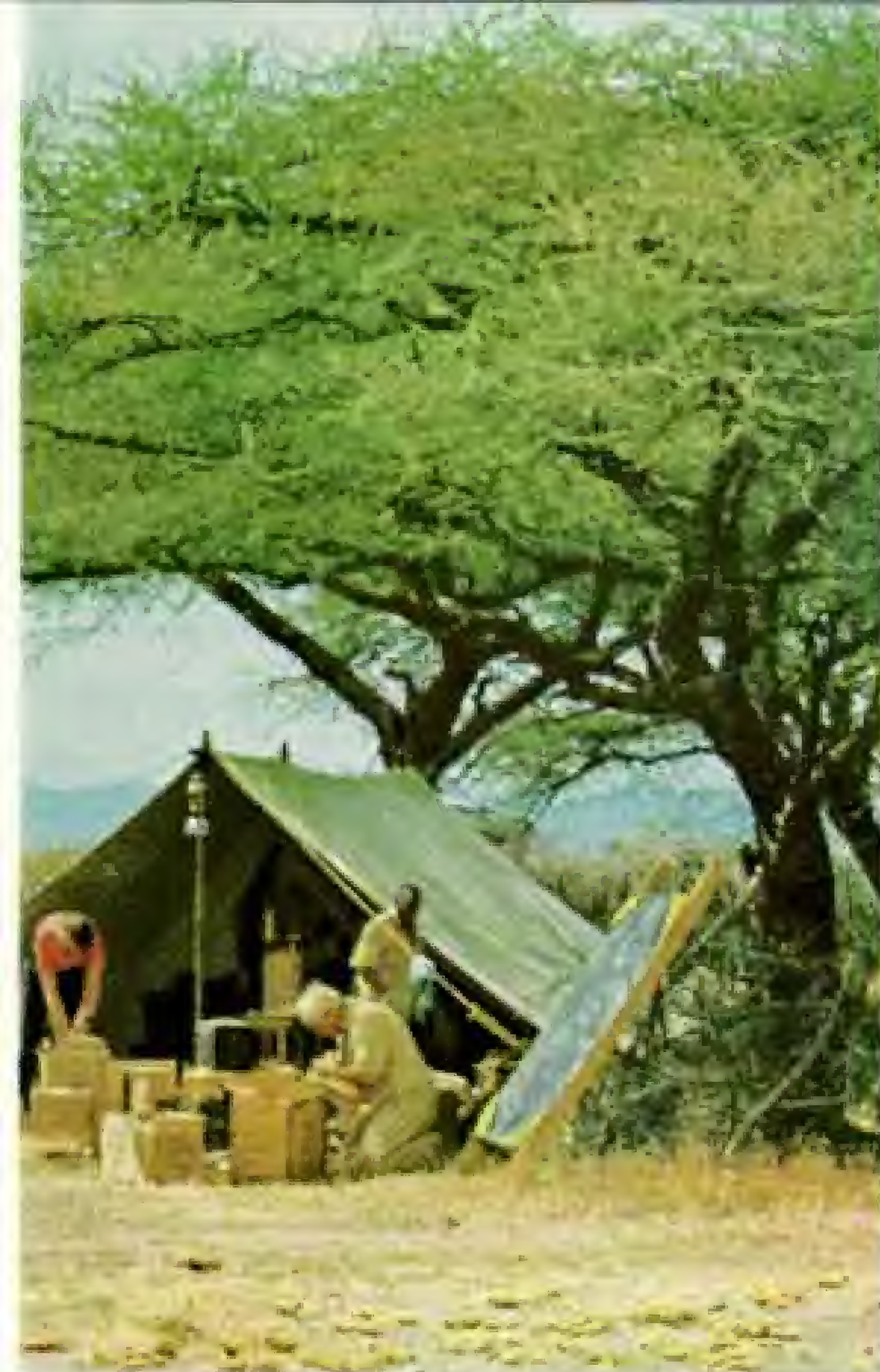
But perhaps the most fantastic and dreadful creature of all was the giant baboon, *Simopithecus jonathani*, named for my son Jonathan, now 19, who has spent several seasons with us and who discovered the beast's jaw in 1957. Jonathan's baboon dwarfs a gorilla and, indeed, any primate previously known.

A prize for astonishing discoveries goes to our youngest son, Philip. From time to time in our digging at Olduvai, we had come across bits of fossilized eggshell whose thickness suggested a bird of giant proportions. We theorized that the owner had been a member of the ostrich family, but whether it actually corresponded in size to its enormous eggs we could not tell.

Philip, 12 Years Old, Finds Giant Bird

Last year Philip staked out an area for excavation which he guarded with all the pride of a 12-year-old fossil hunter. Walking across the plot one day, Mary stumbled over a bone barely sticking from the ground. Philip, as proprietor of the site, directed the digging, and together he and Mary began to unearth the specimen.

As more and more of the fossil came to light, they could scarcely believe their eyes. It was a femur – the upper bone of a leg – but what a femur! In size it matched the leg



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bone of a giraffe. Quickly the two hauled it to where I was working.

"Why, it's a bird," I exclaimed, "but what a giant!"

Now at last the riddle of the eggs was solved. Examination proved that the bird was indeed a giant, a member of the ostrich family. In size it may well have overshadowed the extinct moa of New Zealand, the largest of which stood about 12 feet high.

How to Find Fossils: Crawl

Indeed it became clear that Olduvai was a site such as none other in all the world. That is why, ever since 1931, we have gone back again and again, certain that sooner or later we would find, as we have done, evidence of the earliest men, and perhaps the remains of the men themselves.

To give a clear picture of our work, I should describe the Olduvai diggings briefly. They are scattered over the floor and slopes of the gorge, some sites separated from others by a mile or more.

The earliest fossils—those among which Zinjanthropus came to light—are in what I call Bed I, the bottommost layer (page 425).

In semidesert, the campsite lies 35 miles from water; trailer tanks must travel to a spring on the rim of Ngorongoro Crater (map, page 422). Boxes hold supplies, fossils, and Stone Age tools. The tent shelters food and dining tables.

Baking bread offers a respite from Dr. Leakey's quest for man's remote ancestors. Two metal bowls, one inverted atop the other, form his oven. With hot embers beneath and a fire on top, he says, "In 20 minutes I have beautifully baked bread for myself and my family."

Mrs. Leakey holds the fossil she found on the slope of Olduvai Gorge. Dr. Leakey points to the upper teeth and palate, which through the ages slowly turned to stone as minerals replaced bone and dentine.

Dr. Leakey considers his man a bridge between *Australopithecus*, the extinct near-man of South Africa, and *Homo sapiens*, today's universal species (skull at left). Though *Zinjanthropus* probably did not know the use of fire, he shared modern man's ability to make tools according to a predetermined pattern.

Massive molars set the discovery apart from modern man (palate below) and even the gorilla. They indicate his diet was mainly vegetarian. Small canines and incisors resemble those of present-day man. The lack of tusklike eyeteeth strongly implies that he did not rely on biting for battle or for skinning animals. In compensation, he made cutting tools.

DES BARTLETT, ARMAND DENIS PRODUCTIONS

From 40 to 100 feet above the floor of this stratum, and representing a later era, lies Bed II. Still higher layers, of course, record more recent ages.

Our method of searching is simple and, to say the least, uncomfortable. It consists of crawling up and down the slopes of the gorge with eyes barely inches from the ground, stopping at the slightest fragment of a fossil bone or stone implement and delicately investigating the clue with a fine brush or a dental pick (page 424). All this in heat that sometimes reaches 110° F.

To nonscientists the procedure seems agonizingly endless and slow, and it is true that Mary and I often feel we have spent more of our lives on our hands and knees than on our feet. Fossil hunting is an exacting business, one that demands patience and endurance above all. Still, the rewards are great; the gorge has already contributed much to man's knowledge of his beginnings. And we have made only a start.

Olduvai has always promised to bear out Charles Darwin's prophecy, made nearly a century ago, that Africa would be revealed as the cradle of mankind. In 1931 and 1932 we were already uncovering crude stone implements from the dawn of the Paleolithic Age, predating the stone hand axes of the Chellean culture.

I named this well-defined new culture Oldowan, and over the years we came to learn more and more about its primitive artisans. But the men themselves, the fossil remains by which we could reconstruct those dim figures of a distant age, continued to evade us.

The long quest ended on July 17, 1959.

Earliest Man Makes His Debut

That morning I woke with a headache and a slight fever. Mary was adamant.

"I am sorry," she said, "but you just cannot go out this morning, even though you want to. You're not fit for it, and you'd only get worse. We cannot risk having to go back to Arusha so soon."

I recalled the harrowing drive we had once taken to the hospital there, when one of our staff had suddenly developed appendicitis. Reluctantly I agreed to spend the day in camp.

With one of us out of commission, it was even more vital for the other to continue the work, for our precious seven-week season was running out. So Mary departed for the diggings with Sally and Toots in the Land-Rover, and I settled back to a restless day off.

Some time later—perhaps I dozed off—I heard the Land-Rover coming up fast to camp. I had a momentary vision of Mary stung by one of our hundreds of resident scorpions or bitten by a snake that had slipped past the dogs.

First Trace: Two Giant Teeth

The Land-Rover rattled to a stop, and I heard Mary's voice calling over and over: "I've got him! I've got him! I've got him!"

Still groggy from the headache, I couldn't make her out.

"Got what? Are you hurt?" I asked.

"Him, the man! *Our* man," Mary said. "The one we've been looking for. Come quick. I've found his teeth!"

Magically the headache departed. I somehow fumbled into my work clothes while Mary waited.

As we bounced down the trail in the car, she described the dramatic moment of discovery. She had been searching the slope where I had found the first Oldowan tools in 1931, when suddenly her eye caught a piece of bone lodged in a rock slide. Instantly she recognized it as part of a skull—almost certainly not that of an animal.

Her glance wandered higher, and there in the rock were two immense teeth, side by side. This time there was no question: They were undeniably human. Carefully, she marked the spot with a cairn of stones, rushed to the Land-Rover, and sped back to camp with the news.

The gorge trail ended half a mile from the site, and we left the car at a dead run. Mary led the way to the cairn, and we knelt to examine the treasure.

I saw at once that she was right. The teeth were premolars, and they had belonged to a human. I was sure they were larger than anything similar ever found, nearly twice the width of modern man's.

I turned to look at Mary, and we almost cried with sheer joy, each seized by that terrific emotion that comes rarely in life. After all our hoping and hardship and sacrifice, at last we had reached our goal—we had discovered the world's earliest known human.

Somehow we waited until the next day before doing anything further. Des Bartlett, a professional photographer sent by our friend and Nairobi neighbor, film producer Armand Denis, was on his way to Olduvai, and it was essential that we have proper

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Tool-maker's skull (above) is smaller than the gorilla's (below, right) and modern man's (left). Lacking only the lower jaw, the well-preserved fossil, anthropologists agree, locates Zinjanthropus in man's family tree with unusual accuracy. Zinjanthropus held his head erect. His front teeth, facial contours, and mastoids resemble modern man's. But the flat forehead is primitive, even apelike. Dr. Leakey counts at least 20 features in which his find is more like modern man than are the South African "near-men."

photographs of the teeth just as they had been found.

Then, very gingerly, we began the work of uncovering the find with delicate camel's-hair brushes and dental picks (page 420). In the end it took us 19 days.

We soon discovered that the nearly complete skull—minus only the lower jaw—was imbedded in the soft rock, although expansion and contraction of the rock had cracked the fossil into more than 400 fragments. In order not to lose a single precious scrap, we had to remove and sift tons of scree below the find.

Rebuilt Skull Tells Its Story

Once we got the skull back to camp, we faced the problem of reassembly, a feat somewhat akin to putting together a complex three-dimensional jigsaw puzzle. The task is now virtually complete, save for the missing lower jaw, and already the skull has begun to tell us a fascinating story.

First of all, how do we know we are dealing with a human being? What distinguishes Zinjanthropus from *Proconsul africanus*, the small apelike creature of at least 25 million years ago, whose skull was found by Mary and me in Kenya in 1948? Proconsul already foreshadowed man in a number of ways, but also retained some purely monkey characteristics.

What distinguishes Zinjanthropus from the ape men—or "near-men," as I prefer to call them—found in the Transvaal in South Africa by anthropologists Robert Broom, Raymond A. Dart, and J. T. Robinson?

To answer these questions, we must first define man. Once scientists used the size of the brain case or the ability to walk upright with the hands free, or even the power of speech, as characteristics that distinguish *Homo sapiens* from the anthropoid apes. Recently, however, we have tended to define man by means of the tool-making ability that I mentioned earlier.

Man Shapes Stone to His Use

None of the Transvaal near-men, such as *Australopithecus* or *Paranthropus*, made tools in a set and regular pattern, although there is evidence that they used what naturally came to hand as tools and weapons. (The stone tools which suddenly appear associated with remains of near-men are certainly later than those of Zinjanthropus.)

Zinjanthropus clearly fashioned his own tools, the Oldowan implements that we have been finding in the gorge for years. And they show a remarkable consistency of design. In this respect, then, he was human where the others were not.

But that is only part of the story. Let us turn to the skull itself and see what it tells us. Oddly enough, the most revealing feature is the one that led to the discovery—the teeth.

Zinjanthropus has the largest molars ever found in a human skull. But what is most important is that only the molars and premolars are extraordinarily large, as illustrated by the photograph on page 430. The incisors and canines—the teeth used for cutting and tearing—are relatively small compared to the huge teeth behind them. Here is the key to our man's way of life, and even to his development as a tool-maker.

When we find such enormous flat-crowned molars, we can be reasonably certain that the owner fed mainly on coarse vegetation. Yet we know from broken bones strewn on the "living floor"—that is, the actual site where Zinjanthropus made his rude home—that he ate small animals, the young of the giant beasts he perhaps could not hope to kill as adults. He also ate birds, rodents, and reptiles, including snakes, lizards, and crocodiles.

Teeth Too Small to Skin a Rabbit

How did he do it? Look again at the so-called incisors at the front of the jaw, how unusually blunt and small they are. Such teeth were never capable of tearing the skin or fur from creatures the size of rabbits or cats. I know this for a fact, for as an experiment I have tried to strip the hide from a hare with my own teeth and fingernails, and I was not able to do it.

There is only one answer. Zinjanthropus must have begun making tools about the time he added meat to his diet. And the first things he probably made were crude stone choppers with which to cut up his new-found delicacies. Why he turned to meat we cannot be sure, but it seems likely that he encountered growing competition for available vegetation from the huge herbivores of his time, and simply found a substitute food.

So much for Zinjanthropus's teeth. What about the structure of his skull? In some respects this new Stone Age skull more closely resembles that of present-day man than it does the skulls of the gorilla (opposite) or of the South African near-men.

The curvature of the cheek region shows a facial architecture comparable to that of pres-

ent-day man. It suggests a lower jaw with muscle attachments like those which in humans control movements of the tongue and are linked with speech. I shall indeed be surprised if the lower jaw, when we find it, does not exhibit the form characteristic of speaking man.

Another similarity to present-day man is to be found in the mastoid processes, part of the temporal bones behind the ear holes. In our Olduvai fossil man these have a shape and size often seen in present-day man but quite unlike those of the gorilla and near-man.

The base of the skull also shows us that this man held his head erect, possibly even more erect than in man's carriage today. To some extent this fact may be linked with a very large and deep lower jaw, which he must have had in harmony with his long face.

With the help of National Geographic artist Peter Bianchi, I have fitted these clues together in a portrait that I believe gives a good picture of Zinjanthropus (opposite). He is odd-looking indeed by our standards, and yet there is an unmistakably human quality that to my mind supports the designation "man."

Teeth Help Determine Age

Human that he is, Zinjanthropus clearly stands a long way from the state of development seen in Homo sapiens of the present day. For example, the portrait shows a very flat cranium, which probably housed a brain little more than half the size of ours. Our man also had a sagittal crest, a bony ridge crowning the skull, that is seen in certain of the lower primates and some near-men. The same crest appears in carnivores like the lion and hyena. In Zinjanthropus it must have developed independently and served as an anchor for his powerful jaw muscles.

I have put the age of our particular specimen at 18 because his wisdom teeth, the third molars, show no signs of wear, while on the other hand the basioccipital suture—a seam between two bones of the skull—is closed, showing that the individual was more than 16 years old. I think that he died naturally rather than violently, since death occurred "at home" beside the tools and bones his family had used and discarded.

There is no riddle to the dating of our new discovery. We know fairly surely the era of the giant beasts whose fossil bones we have found at Olduvai: *Afrochoerus*, the rhino-sized pig; *Pelorovis*, the gigantic sheep.

These animals and many others roamed the earth during the Lower and Middle Pleistocene periods, roughly between 600,000 and 200,000 years ago. Others found in the levels that yield Zinjanthropus, but not higher up, help prove that our fossil man belonged to the Lower Pleistocene and not to the more recent Middle Pleistocene.

Dawn of Man in the Dim Past

To sum up, then, Zinjanthropus represents a stage of evolution nearer to man as we know him today than to the near-man of South Africa. The dividing line between man and near-man in that dim past is certainly a hard one to draw, but arbitrarily we set it when man began to make regular tools for his own use, and so to reshape the course of his own evolution.

It is precisely by his manufacture of the first known pattern of implements that I believe Zinjanthropus can claim the title of earliest man—at least until other, more distant tool-makers are found.

As to our new man's name, the full title is *Zinjanthropus boisei*, *Zinj* being the ancient Arabic word for eastern Africa, where he was discovered, and *anthropus* of course from the Greek term for man. *Boisei* honors Charles Boise of London, who since 1948 has shown steadfast faith in our work by helping to finance the expeditions to Olduvai. (Our work there, ever since 1931, has been aided by a number of institutions and individual sponsors.)

Earlier I mentioned Bed II at Olduvai, and here in time we shall uncover a sequel to the story of Zinjanthropus. For lying somewhere, a mere 20 feet higher in the wall of the gorge than our earliest human, must be a more advanced man, whose slightly improved stone tools enabled him to hunt the giant animals with which his predecessor could not cope.

Hunters Hurled Bolas at Prey

Already we know this later man used the bola, a weapon consisting of triple stones connected by a thong or vine to be hurled at a quarry with the hope of entangling and disabling it. Primitive Eskimos and Patagonians use modified bolas to this day. The size and weight of the stones at Olduvai indicate their owners were extraordinarily strong, even by present standards.

But that is in the future, and for the moment Zinjanthropus occupies our attention. Work is in full swing again at Olduvai. My wife and eldest son are in charge of the preliminary excavations, and I go down when-

PAINTING BY NATIONAL GEOGRAPHIC ARTIST PETER BIANCHI © N.G.S.

Low-browed and long-faced. Dr. Leakey's discovery possessed a relatively small brain. Basing his reconstruction on a drawing by Neave Parker in the *Illustrated London News*, artist Bianchi clothes the skull with flesh to fit the scientist's conception of Zinjanthropus. This earliest man yet found lived beside the shore of a long-vanished lake.

ever I can take time off from the museum. Later I shall join them for the detailed work.

Our working season is lengthened now, thanks to a generous grant from the National Geographic Society's Committee for Research and Exploration. This time we hope to spend seven months at the site and, with the help of an enlarged staff, to uncover nearly 1,200 square feet of new ground. In such an area we may find still further clues to the riddle of Zinjanthropus.

Perhaps we may come across other parts of the skeleton that will enable us to paint a full-length portrait. With luck we may discover that missing jaw and learn whether our man might have had the power of speech. And with great luck we may even unearth a female skeleton, a mate to our Stone Age man.

The possibilities are vast, and Olduvai is just beginning to reveal its secrets and unfold a history sealed for 600,000 years.

There is much to be done, and thanks again to the National Geographic, it will be done at last in some comfort. For among our recent purchases is a second and larger water trailer that will keep us well supplied.

The day we got it, Mary and I deeded all our water-hole rights to the rhinos.

INDEX FOR JANUARY-JUNE, 1960, VOLUME READY

Index for Volume 117 (January-June, 1960) of the NATIONAL GEOGRAPHIC will be mailed upon request to members who bind their copies as works of reference.

One mother's recipe for small-boy bliss: Take generous portions of beach sand, wriggling shore life, and ooze; blend thoroughly with the tides, the winds, and the sun. The dish is called ....

Seashore Summer

Photographs and story by
ARLINE STRONG

MUD, as every mother knows, rates high in the esteem of small boys. So do starfish, clam shells, snails, and periwinkles. So does a sun-warmed shore where tongues of the tide bear an invitation to a foot race. New York City apartments do not offer these delights, but Maine's seacoast does.

With this thought in mind, my husband George loaded our car one August day with old clothes and my cameras. As we headed for Boothbay Harbor, our sons Ricky and Jonathan bounced like jumping beans in the back seat.

Once on the beach, three-year-old Jonny toddled after Ricky, seven, marveling at the strange creatures that he met. The picture of gooey contentment, Jonny plopped down to play in the abundant mud. When he tired, he rested beside our trophy pail, exclaiming, "I'm keeping the starfish company, so they won't get lonely."

Ricky dashed across the sands in explosions of pure exhilaration. He was bitten by a crab, became fascinated with the teeming populations of tidal pools, and turned into an animated question mark of whats, hows, and whys.

At seaside, tides took the place of clocks. Our boys stalked the receding waters out to the low-water line to look for barnacles

and dog whelks. When the waves rolled in again, they retreated without protest, realizing that nature cannot be swayed, as mothers sometimes are.

Today, when the boys look at our Maine coast pictures, I note their comments. Here and on the following pages you will find their observations, not too grammatical and not too scientific, I fear.

Ricky: Sometimes the waves came rushing up the little valleys between the rocks and broke against my legs. The things we found all smelled like the ocean, a mixed sea-water and sea-plant smell. Seaweed there is called rockweed. It has little pockets of air that are fun to pop. When the tide is out and the sun shines on it, it lies down like it was dead. But in the sea it stands up like steel poles.

Ricky: The starfish gripped my finger with his little suction cups. When he catches a clam, he wraps his arms around and pushes out his stomach. The stomach digests the clam outside the starfish's body.

Jonny: I put a starfish into our pail. He felt like many little feet in my hand.

Jonny: I found a snail and showed it to Ricky. He thought it was a good one.

I made the snail's feelers come out. I held him very still, and those two little things came out. That's how he tells what's going on.

To draw a picture of a snail,

Ricky: This is a dog whelk. Dog whelks and periwinkles belong to the snail family, only dog whelks have thicker shells. Hermit crabs live in snail shells. They back into the empty shells to keep the tender back part of their body from being bitten. They drag the shells along like trailers. Jonny called them "Herman crabs."

Ricky: I picked up this crab from the rocks. A crab about half this size tried to bite my finger off, but he just bit the tough outer skin. Once I saw one that was full of eggs. Its whole belly was bulging.

Jonny: Ricky called me over to see the big crab. It squiggled and tried to snap Ricky. But it couldn't because Ricky was careful.

first you make his house, then you make his tail. Then you make his mouth. Sometimes I make the tail too small.

Once I drew one coming up a cliff. I think they can do that. He climbs with a thing in back. It's the thing he holds on with.

Ricky: Irish moss comes in three colors: red, green, and white. The white shows when it is dead and bleached out.

The moss grows near the low-tide line on rocks. It feels spongy but it's really hard to pull off. I think it's used in making ice cream but I'm not sure. [It is.]

Ricky: That's me racing with the tide. It was late afternoon. I leaped the little rivers as the tide came in among the rocks. I saw little fish darting in fast. When the tide began to fall, they darted back out again.

Jonny: Here I am getting on my horse. When I was feeding the sea gulls, I found this piece of wood. It was my hobbyhorse, a white horse with black spots. I just called it Horse.

Jonny: These are jolly fish. I called jellyfish jolly fish.

Ricky: They aren't very jolly when they get mad and sting you.

Jonny: In the water, they glooped all over the place. That's how they swim. I didn't touch these jellyfish on the sand. I didn't want to. They just stayed there. They didn't move.

Ricky: I could find clams by spotting little holes in the sand. They make the holes with their siphons. They take in sea water and strain it for food and then squirt it out again. Sometimes I dug and dug and then found the shell empty.

Jonny: I was glad when Ricky dug those clams because we had them for dinner. I tried to dig all over but I couldn't find any. Then I sat down and made some shell soup. I mixed shells and mud, but my pants straps came down. I didn't know I had the mud on until Mommy told me. The mud made me heavy, so I had to walk slow.

Ricky: You have to pry hard to open a clam. If it comes apart easily, you know it's dead.

When I found a clam that wasn't quite closed, I tickled its mantle, and it shot out water. Once a clam squirted me and got my clothes all wet.

People and animals move around to get their food, but clams lie on the bottom and let the water bring their food to them. Oysters do, too.

Jonny: I liked to dig, but I was glad when we got through. Mommy didn't mind because she said it was clean mud. I worked hard out there.

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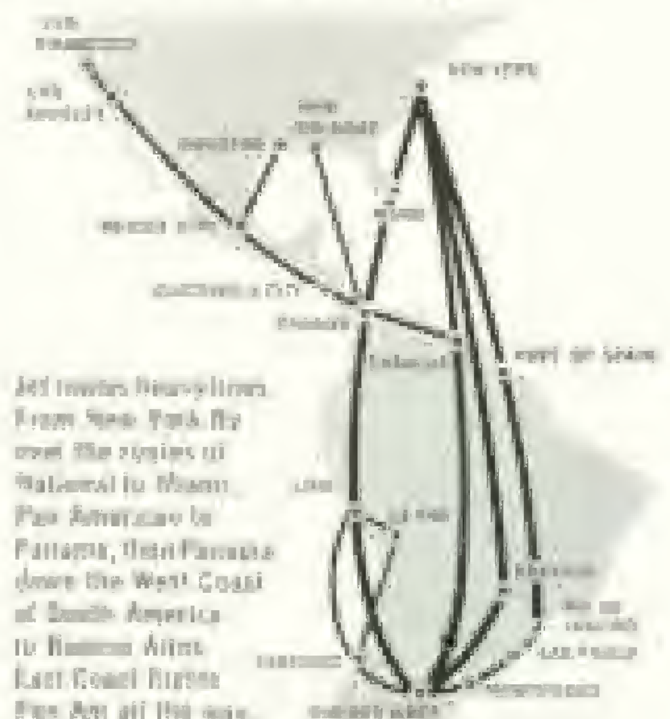

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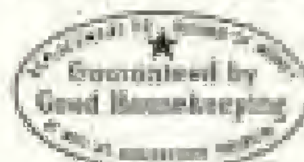

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Why is Defensive Driving important? Because more people have been killed on the highways in the past ten years than in all the wars since America began—and more cars are joining the traffic jam all the time.

Does Defensive Driving work? Bell System folks have always been taught to drive carefully. But since Defensive Driving was introduced about ten years ago, a number of telephone companies have reduced accidents more than 40%. Repair trucks roll up hundreds of thousands of miles without accidents. Employees have organized Defensive Driving clubs for themselves and trained their neighbors, too.

All this is more than self-protection. It makes the highways safer for *everybody*. And it's part of the Bell System's effort to be good citizens.

BELL TELEPHONE SYSTEM

(Answers to test on next page)

ANSWERS

to the Bell System Defensive Driving test on preceding page

1 FALSE. The most important factor is attitude—the courtesy, consideration and alert responsibility of the driver. Authorities say safe driving is made up of: 10% safe vehicle, 10% good physical condition of driver, 80% good attitude.

2 FALSE. Turn signals are courteous and helpful. But being in the correct position on the highway to make the turn is far more important. Your car or truck is a better, bigger signal than your tail light.

3 TRUE. It takes about one second to realize the driver ahead has jammed on his brakes. In that time, you travel about 30 feet (two car lengths) at 20 miles per hour, 45 feet at 30 miles, etc. A minimum of one car length per 10 miles per hour of speed is a good rule.

4 FALSE. Careful drivers turn on their headlights, low beam—and they turn them on twenty minutes early, rather than twenty minutes late. Parking lights are for parking. They don't provide enough protection for a fast-moving car on the highway.

5 FALSE. You should never pass at intersections. It's forbidden by law in most states. The car you pass may hide a pedestrian or another vehicle approaching on the right.

6 FALSE. Most cities forbid parking within 25 feet of a corner. You not only block the view of the intersection for other vehicles but in pulling away from the curb you invite collision with another car trying to turn right.

7 TRUE. In dry weather, a film of dust and oil from passing cars accumulates on highways. A few drops of rain or a heavy fog may make this oil slick as slippery as snow. Continued rain will wash it away.

8 FALSE. You will almost inevitably lock the brakes and go into a helpless skid. It is far better to pump the brakes—on and off quickly—to keep steering control while slowing down.

9 TRUE. Rain or sleet will freeze faster, last longer, on a bridge because it's exposed to cold from below as well as above. You can drive over wet but safe streets, turn onto a bridge, and instantly skid on ice.

10 FALSE. Modern tire chains, with sharp V-bar cleats, give excellent traction on slick, icy surfaces. They'll start and stop much faster than conventional tires and have twice the resistance to side skid.

Be sure you read the rest of the advertisement on the preceding page—so you know what Defensive Driving is and how it can protect you on the highway.

BELL TELEPHONE SYSTEM

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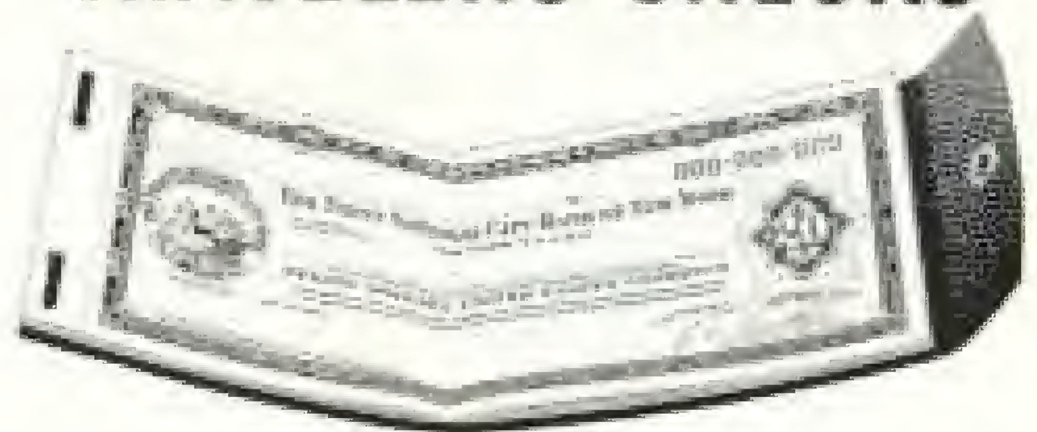

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"Having lunch in a dome car was a new and delightful experience for both Bill and me when we took the 'City of Los Angeles.' While we were intrigued by the picture-window views of the romantic West, we couldn't fail to appreciate the wonderful food."

"For a change, we had dinner 'downstairs.' The Steward again received us with 'western hospitality' which we enjoyed throughout our trip. As at lunch, the food was delicious and prices less than expected."

"The lounge car was a thing of beauty with attractive furnishings. Cooling beverages and current magazines were available. A private cardroom completed the picture. It was like being in our own club at home."

"Sometimes we like to be by ourselves for 'family talk.' Our bedroom was a restful retreat. I admired the vanity mirror and handy cosmetic tray. For room service we just touched a button. We really got attentive, courteous service."

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"CITY OF PORTLAND" between Chicago-Denver and Portland (Tacoma-Seattle).

"CITY OF ST. LOUIS" between St. Louis-Kansas City and Denver-Salt Lake City-Las Vegas-Los Angeles, with connecting service to the Pacific Northwest.

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Sheaffer's new PFM Pen For Men, travels in the smartest circles! Men like its new large capacity, exclusive Snorkel Pen clean filling action, choice of 8 individualized point styles. The bold, broad-shouldered design of the PFM pen gives it a solid, comfortable grip. The unique point is *inlaid* so it can take man-sized pressure... *hand-ground* so it always writes smoothly and effortlessly. Handsomely gift-boxed pens $10 to $25. Matching pen and pencil sets $14.95 to $25. Just say "PFM, Pen For Men."

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