SPECIAL SUPPLEMENT: WALL MAP OF THE WEST INDIES AND CENTRAL AMERICA

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COVER: Two baby gorillas share a forest stroll with author Dian Fossey, who studies the largest of the great apes in Rwanda's wilds (page 48).

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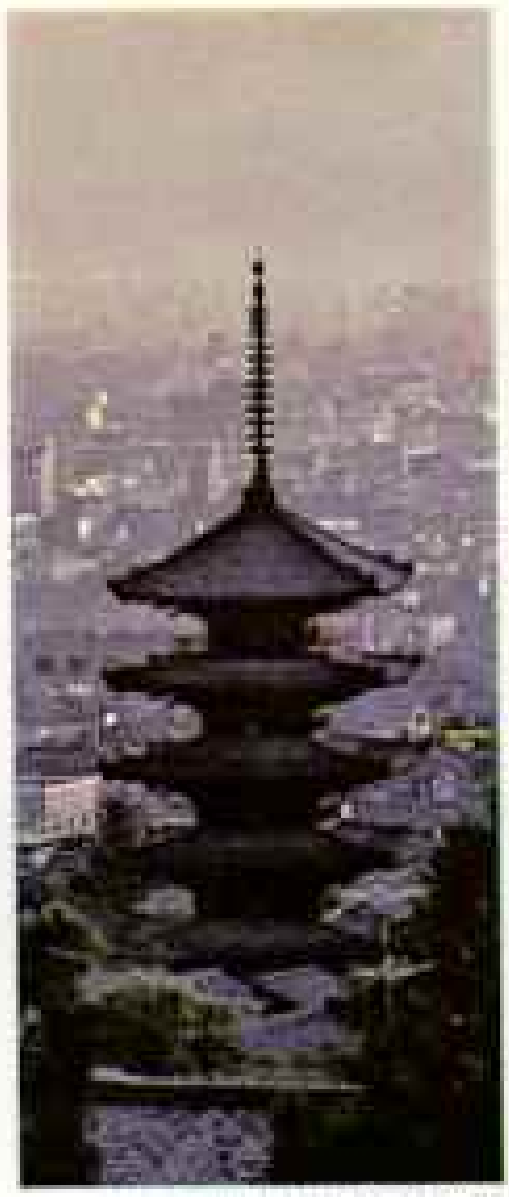

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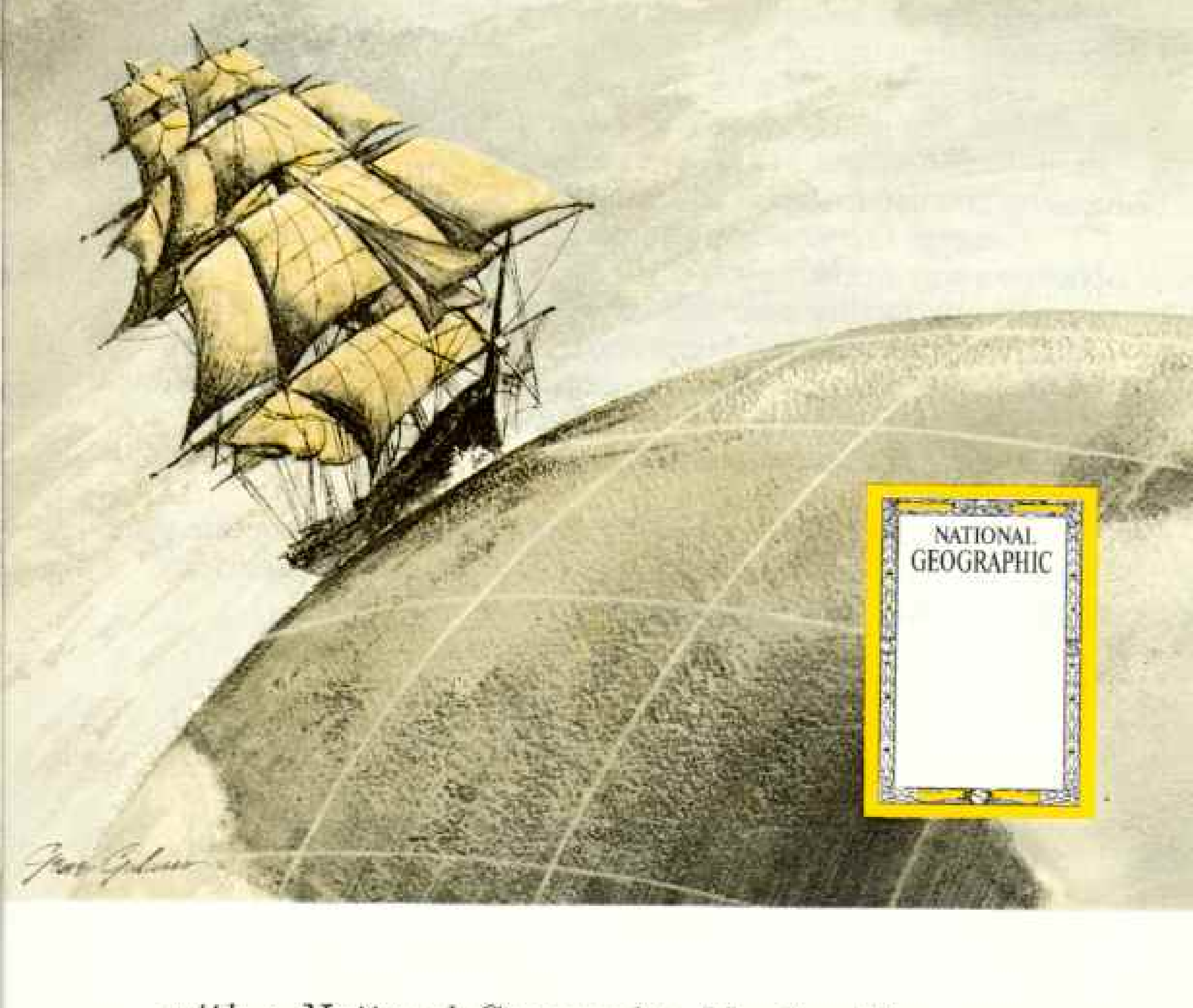

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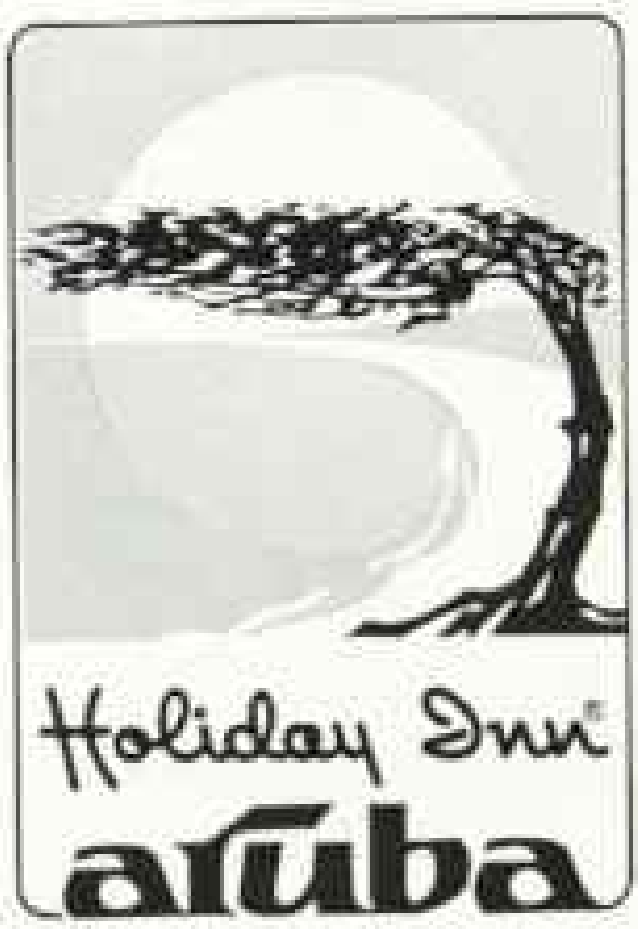

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Ann Lanclos, Operator,
Gulfport, Miss.

"My back bedroom had one wall standing. That was all. We were able to salvage a few clothes. But I don't think they'll ever come clean. I lost everything. I even had to borrow a dress to come to work."
Linda Reitzammer,
Service Representative,
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"We had to dam up around the doors of the central office to keep the water out—we used some rugs I had brought to sleep on, but we couldn't keep the water from coming in around the sides. We lost our emergency power about 11 or 12 o'clock—I don't know exactly when, because things were popping around here so fast. We lost the air compressor, lights and everything when the emergency power went out. My house? The only thing left there is a mirror that was hanging on a wall. The rest is ruined. In the town dump."
Reimer Garrett,
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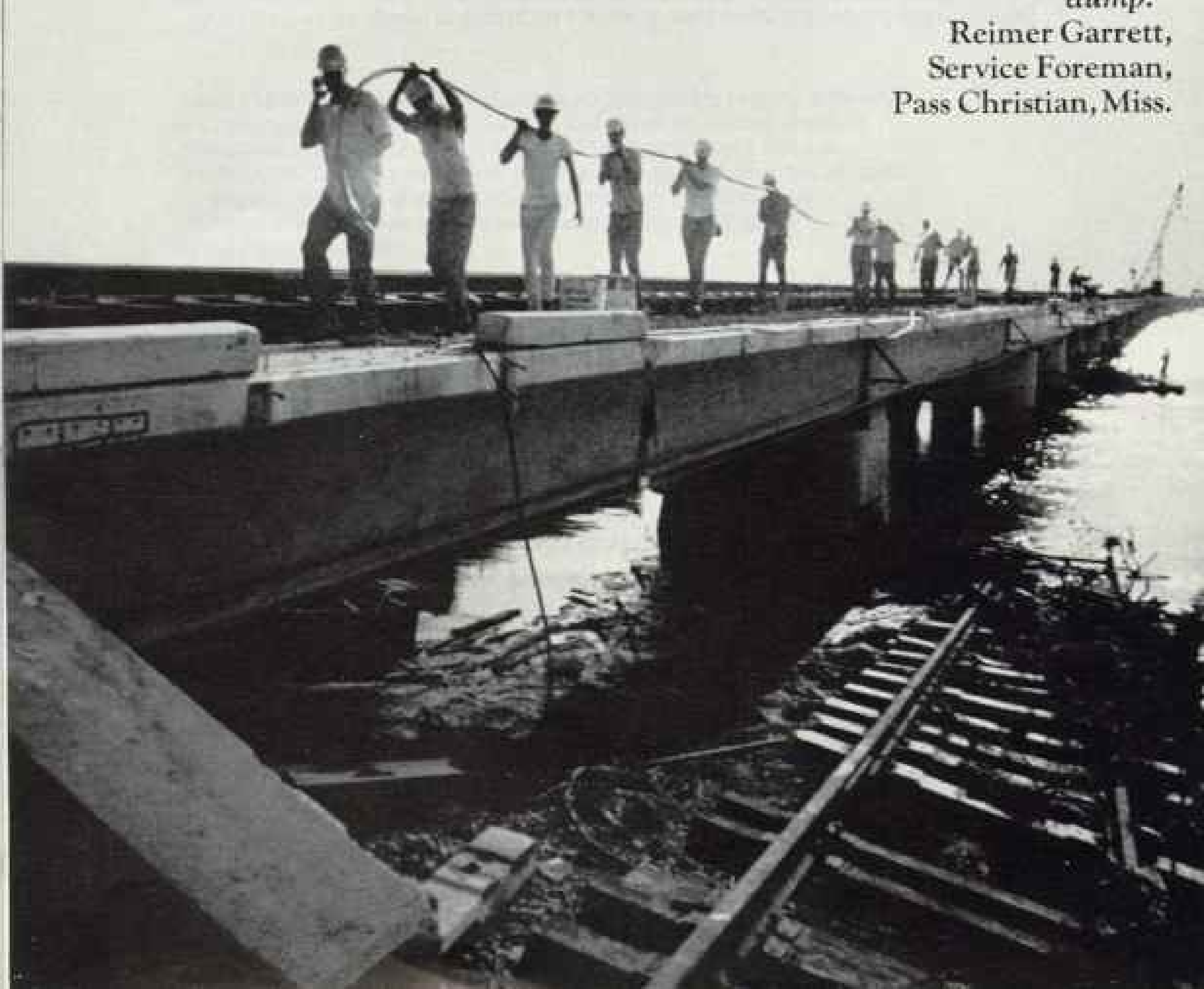

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January 1970

NATIONAL GEOGRAPHIC

Berlín

ON BOTH SIDES OF THE WALL

Article and photographs by
HOWARD SOCHUREK

JUST BELOW our hovering helicopter, the ramparts of the Berlin Wall cleft the city, separating families, a people, world powers, and, where they plowed a concrete furrow through cemeteries, even the dead from the dead.

Col. Richard H. Ferriter, Chief of Staff for the United States Commander, Berlin, pointed to a section with both inner and outer walls.

"That sandy area between them is called the 'death strip,'" he said. It was late afternoon, and East Berlin workmen under guard were carefully raking the sand and checking the trip wires. They were watched by wild-looking dogs tethered to long running lines. One of the animals lunged furiously upward at our craft, his bark drowned in the clatter of blades as we swung away.

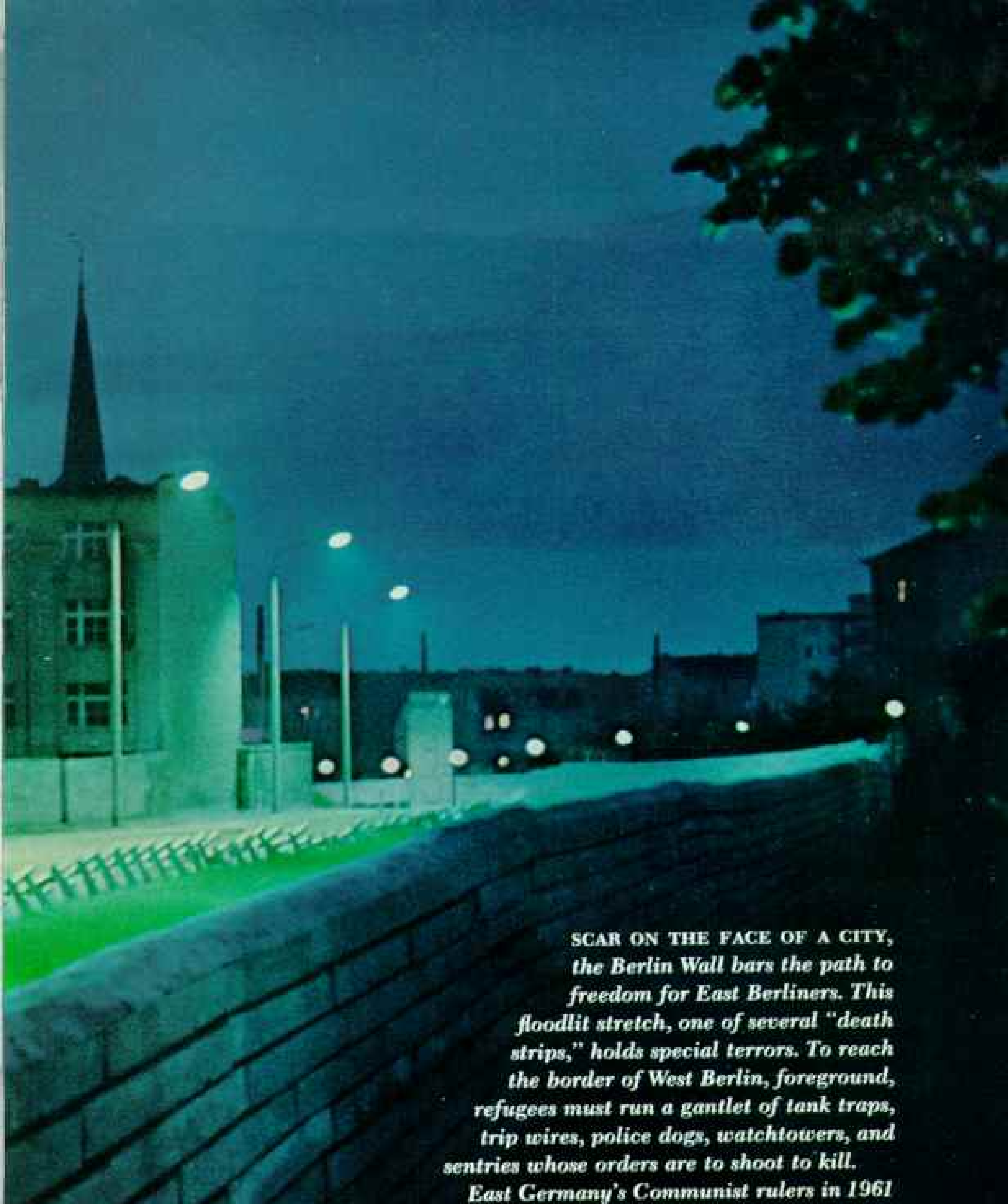
At the foot of a small street, Bushgrabenweg, an ugly new mushroom was sprouting—a 30-foot concrete watchtower. It stands next to a ramshackle wooden structure thrown up in 1961 when the German Democratic Republic, the Communist state that rules in the Soviet zone of defeated Nazi Germany, imprisoned its own people by building this wall.

As our chopper zigged and zagged along the twisting course of the barrier (next two pages), the city below unrolled a tapestry of its history. Guards idled at the grassy mound covering Hitler's bunker, the underground shelter where the Führer's dream finally ended in suicide. The Brandenburg Gate, emblem of imperial Berlin, seemed as old and worn as Stonehenge in the evening light. Just inside West Berlin, the famous Reichstag was being restored; 37 years ago the Nazis destroyed it by fire. They saddled the Communists with the blame and gained emergency powers that ended parliamentary government.

I reflected on an irony: Berlin began life some 800 years ago as a divided city—a trading town called Kölln on a sandy island in the Spree River, and a riverbank settlement named Berlin. As the settlements grew, they were connected by a bridge.

Even in this early seedtime, when the two small communities bickered with each other but shared a common meeting hall, the ancient town had a modern political outlook. It was governed by the Margrave of Brandenburg as a part of the *Mark*, one of several border regions used as buffers against the threat of Slavic incursions from the East.

For 500 years Berlin grew under the rule of the Hohenzollerns. The second of that line



SCAR ON THE FACE OF A CITY, *the Berlin Wall bars the path to freedom for East Berliners. This floodlit stretch, one of several "death strips," holds special terrors. To reach the border of West Berlin, foreground, refugees must run a gantlet of tank traps, trip wires, police dogs, watchtowers, and sentries whose orders are to shoot to kill.*

East Germany's Communist rulers in 1961 clamped West Berlin in a vise of concrete and barbed wire, claiming the need to keep "revenge-seeking politicians and agents of West German militarism" from Red territory. Actually they imprisoned their own people, stemming the flow of millions to the West.

built a fortress on the spot now known as Marx-Engels-Platz. When Berliners revolted in the 1440's, this ruler—dubbed "Iron Frederick"—abolished their governing council, curtailed their privileges, and forced them into subjugation. He also had the city's coat of arms redesigned, placing the Berlin bear on all fours, with the Hohenzollern eagle perched on its back to signify mastery. The crest still shows the bear, but it proudly stands again.

On the Marx-Engels-Platz today the East German Army parades in the long shadow of 20 Russian divisions based on German soil, and a new restraint keeps the people of East Berlin in subjugation.

"It was a Saturday night, August 12, 1961," my friend Bernd Lucht recalled. "A million people over there in East Berlin went to bed without any idea of what was going to happen. But I will bet that many of them were planning to get out of Communist Germany. More than three million people had fled the Soviet zone up to that time, and the rate was increasing to about 2,000 a day. You simply took a 20-pfennig train ride to the refugee camp at Marienfelde in West Berlin, since freedom of movement had been guaranteed by the protocols governing the city.*

"At 2 a.m. on Sunday, tanks and trucks rolled in with East German troops and People's Police. Train service to the West stopped, stations were sealed, and building of the Wall began. A million people woke up in jail.

"But don't forget that West Berlin is a kind of jail, too. We are on a political island deep inside a hostile state, isolated and surrounded

*See "Berlin, Island in a Soviet Sea," by Frederick G. Vosburgh, NATIONAL GEOGRAPHIC, November 1951.

Booted soldiers and martial music symbolize East Germany's totalitarian regime. Though the Allies agreed in 1945 to the demilitarization of Berlin, today only West Berlin complies, exempting its men from military service. East Berlin soldier (right) guards an antifascist memorial (page 22).

Marching band (below) plays at a swearing-in ceremony of the border guards, who pledge "to serve my fatherland for all time." Communists teach youth that only the East is the German homeland. Yet some 500 members of this hand-picked unit have fled over the Wall to West Berlin since 1961.

EXTACHROMES BY HOWARD SOCHUREK © N.G.S.

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Architect for tomorrow's East: Joachim Nather (left) shows the author's interpreter, Jürgen Toft, a model of Alexanderplatz, focus of urban renewal (pages 8-9). Sphere on the TV tower houses broadcast studios and revolving restaurant (page 14).

[maps, opposite]. The East Germans control the access, and they make life difficult. Nothing is easy here. Nothing is simple. When you live here for a while, you learn to throw the slogans away."

Bernd Lucht was a student who acted as my interpreter and guide in West Berlin. During the next two months of reporting on both sides of the Wall, I was to learn the truth of his statement.

It was 10 years almost to the day since I had last visited West Berlin. Flying into Tempelhof, Berlin's busiest airfield, our jet skimmed blocks of chimneyed rooftops, then let down suddenly in the center of the city. I know of few metropolitan areas with a more convenient arrangement for air travelers. The plane taxied to the terminal, one of the world's largest buildings, and we debarked under its protective overhang.

Ten years ago the city still had a bombed-out look; though the rubble had been removed, there were vacant lots, some of them covering whole blocks. Now the damage of war was hard to find except for an occasional memorial purposely left unrestored. Most visible of these, the tower of the Kaiser Wilhelm Memorial Church stood like a broken tooth at the beginning of the street called Kurfürstendamm (pages 40-41).

West Prospers Despite Isolation

As is the custom of Berliners, I strolled at night down the "Kudamm," the city's great white way. Exclusive shops lined its six traffic lanes, brightly illuminated with vapor lamps. I passed a Mercedes-Benz showroom, another for Opel, others for Fiat, for Volkswagen. Most offered immediate delivery of the model of your choice.

Restaurants with open-air tables were crowded with swinging mini-skirted students and their prosperously dressed elders—the pre-theater dinner crowd. One diner was enjoying a huge dessert topped with mounds of whipped cream. Berlin had changed into a handsome, beautifully restored, and glamorous city with a tempo not unlike that of New York and a charm that reminded me of Paris.

But there were important differences.

The familiar grit of the West Berliners, shored up by reassuring polemics and heavy economic subsidies, remains a remarkable virtue, but the young people are restive and some are leaving. The East Berliners, I was to find, are making the best of a bad situation. Ruled by a regime they dislike, under house arrest in their own country, East Germans have decided between work and despair; they have built an economy that now ranks among the world's top industrial powers despite the fact that their country is only about the size of Ohio. And it is growing stronger. East Berlin is their showcase. The hated Wall has done its work.

It is not easy for a Western journalist, especially an American, to pass through that Wall for any length of time. The United States does not recognize Walter Ulbricht's German Democratic Republic. I was fortunate, however, in that the GDR was about to celebrate

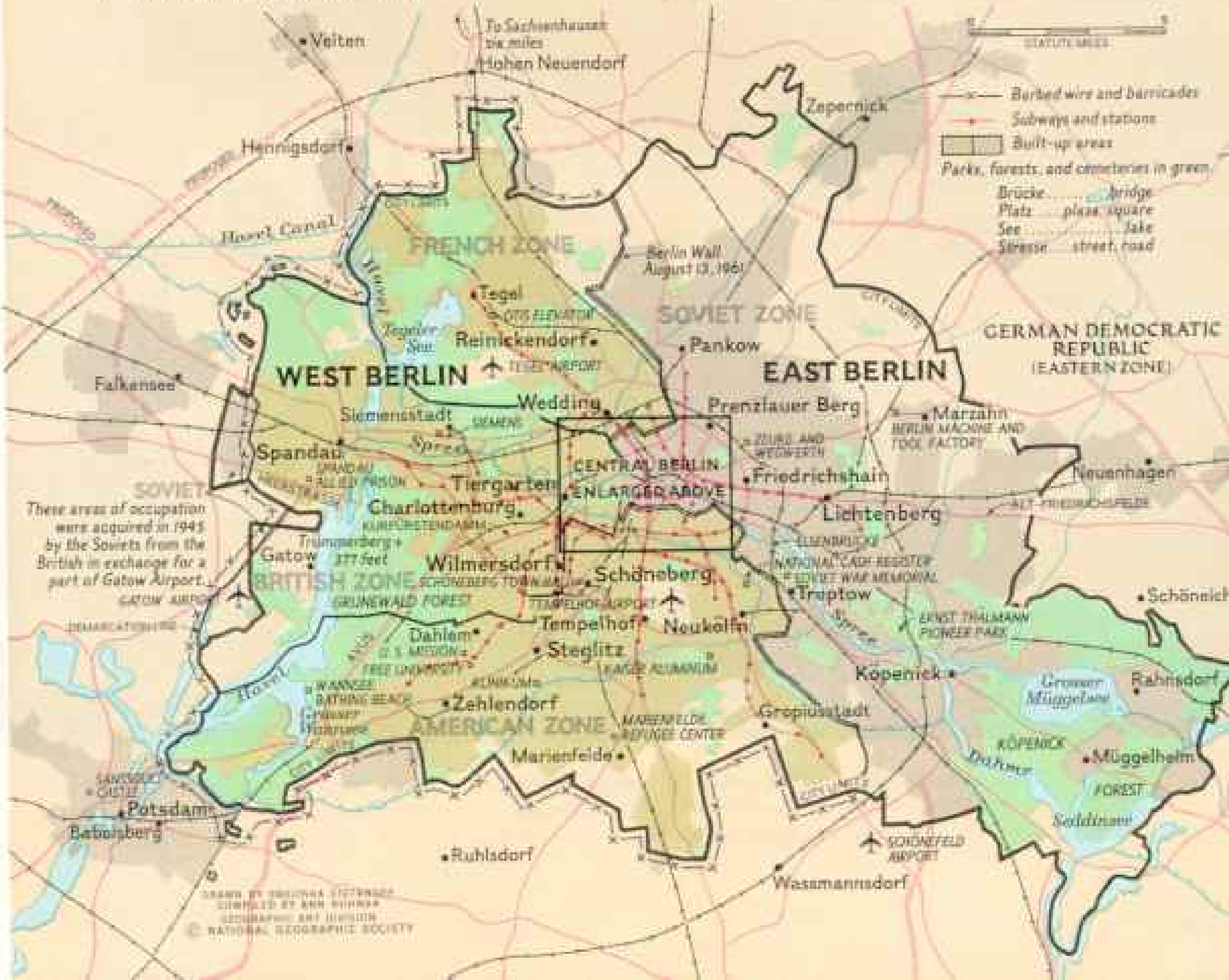
Berlin, a city divided

FROZEN CENTER of the cold war, Berlin is split by a 28-mile wall of concrete and barbed wire. Here the Iron Curtain, hard and visible, snapped shut in 1961. Life on both sides of the Wall affects a veneer of glamor and prosperity, with operas, symphonies, theaters, parks, and museums. The Wall has stabilized East Berlin's population, but West Berlin's continues to decline. To get out—for a weekend or forever—West Berliners must cross 110 miles of hostile territory by air, rail, or on autobahns closely guarded by East Germany.

A token Allied garrison of 12,750 men—French, British, American—still occupies West Berlin and guarantees its freedom. In East Berlin the East German Army and Russian troops back up the "Vopos," short for *Volkspolizei* (People's Police).

WEST BERLIN. AREA: 185 square miles. **POPULATION:** 2,163,000. **ECONOMY:** Electrical equipment, food and beverages, precision tools, machinery, clothing, and chemicals.

EAST BERLIN, capital of the German Democratic Republic (East Germany). **AREA:** 156 square miles. **POPULATION:** 1,082,000. **ECONOMY:** Food processing, electrical equipment, chemicals, machinery. **CLIMATE** (both sectors): January average 30° F.; July 64° F.; annual precipitation 23 inches.



Showcase for Communism, the 40-block city center at Alexanderplatz was being rushed to completion for the 20th anniversary of the German Democratic Republic at the time of the author's visit. During the summer, students who normally help out on farms worked here to finish office buildings, a department

KODACHROME © N.G.S.

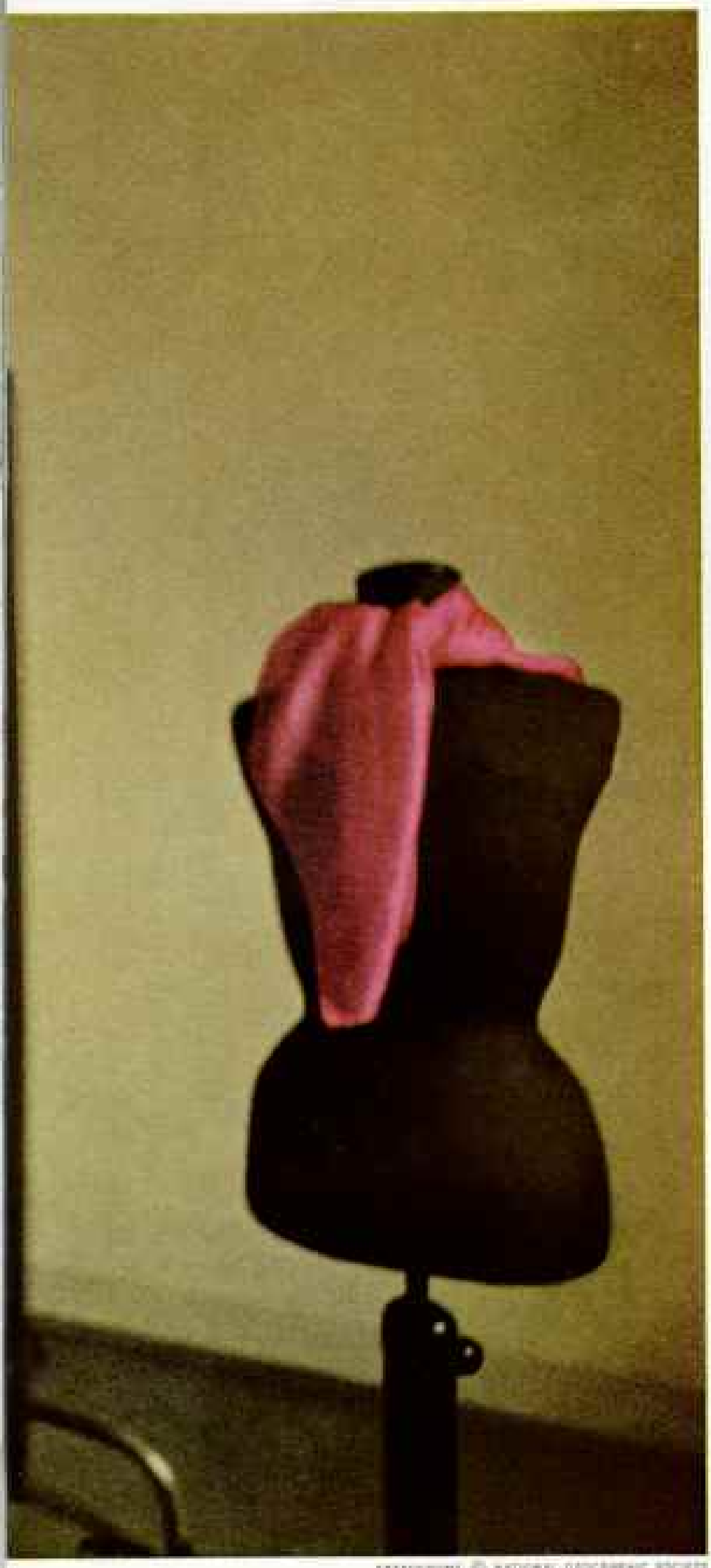
store, a hotel, and apartments. Party chairman Walter Ulbricht hoped such displays of prosperity and permanence would attract trade, tourists, and recognition for his state from Western governments. Towered Stadthaus, far left, houses East Germany's Council of Ministers; clock tower, center, crowns city hall.

its 20th birthday, and through its tourist office, the Reisebüro, it opened its doors to me.

Even so, getting there was complicated. The Reisebüro granted me a visa stamped with port of entry and departure: Schönefeld Airport, on the outskirts of East Berlin. Since there is no air traffic between West and East Germany, I went to Copenhagen—the nearest neutral airport—changed planes, and flew to Schönefeld, where my visa was waiting. To return to West Berlin, I went through the same procedure in reverse.

Mist cloaked Schönefeld as my plane whined down to a landing on a cold spring morning. Oblivious to the noise, flocks of sheep cropped the worn winter grass between the runways, gray on gray. A chill of the spirit seemed to match the mood of the season.

I was met on arrival by an attractive young couple—Jürgen Toft and his wife Traudi—



High style spices life for East Berliner Rita Pohl, a 21-year-old model at the State Fashion Institute. East Germany leads in producing quality clothes for export to Eastern Europe. But fashions made and sold locally cost more than those in the West. Privately owned garment factories count among the fraction—a mere 6 percent—of East Germany's enterprises still outside state ownership.

who had been assigned by the Reisebüro to guide me about. They helped me clear customs and, chatting about their life and times, cleared away some of the gloom I felt.

"I am a medical student at Humboldt University," Jürgen told me. "I'm helping to pay my way by interpreting. Traudi is a student at Humboldt, too—languages. She is fluent in both English and Russian."

Our car, an ancient Czech Tatra provided by the Reisebüro, coughed its way onto a new four-lane highway. As we neared Alexanderplatz (pages 8-9), the traditional center of old Berlin, I thought briefly I had failed to cross the border and was still somehow in the West. New buildings were going up on both sides of the road, among them a new hotel, the Stadt Berlin, due for completion in early 1970. Next to it, a 1,185-foot television tower supported a revolving restaurant offering views of both East and West Berlin (pages 6 and 14).

Students Paid by the State

The Berolina hotel, where I stayed, is almost new. My room was small but clean and well furnished in Danish modern. Over the built-in table radio came the familiar voice of the Armed Forces Network, broadcasting in English from West Berlin.

"That's how we practice our English," Traudi told me that evening at dinner. "We also receive three TV channels from the West."

Jürgen, born in 1943, the son of a Berlin tailor, recalls nothing of the great war. After a compulsory army tour of three years, he entered medical school. He will not graduate until he is 28, and then faces five years of specialized training before he enters practice. Meanwhile, he and Traudi, like all other students in East Germany, are being paid by the state while they attend school.

"My allowance is 325 marks a month, and Traudi's is 245. That gives us a family income of $142.50.* But our two-room apartment costs only $5.50 a month. We are saving for a used Volkswagen, which will cost between 4,000 and 5,000 marks. The waiting time for it is two years."

Jürgen and Traudi represent a new generation in East Germany; they have come to maturity since the erection of the Wall and since Walter Ulbricht, the 76-year-old leader of the socialist state, introduced economic

*All U. S. currency equivalents in this article are based on the official exchange rate that prevailed at the time of the author's visit—four marks to the dollar.

reforms in 1963 that have led to a relative prosperity. Those reforms have more than a little of the capitalist idea in them, even if the terminology differs. Jürgen expressed what seems to be the view of the new society, the post-Wall society, when he told me:

"We have learned to accommodate, to make it as pleasant as possible for ourselves. And there is a certain pride in accomplishment. When you achieve something after endless difficulty, after starting from scratch, you take pride in it. This makes living not only possible; it can make it even worthwhile."

Resilience a Key to Survival

Conversations with members of the older generation also proved enlightening.

Eric Wittum was born in Berlin in 1904 and has lived there ever since. "I'm a native Berliner, not a rucksack Berliner," he told me when we met. Mr. Wittum is obviously a man of great resilience to have survived to age 65 in a tense, troubled, demolished, and then divided Berlin.

His socialist credentials are impeccable. In 1920 he joined the Communist Youth Organization of Germany, as did so many young people in a bitter, defeated nation. Two years later he went on to become a member of the Communist Party of Germany; this was only four years after a young man named Ulbricht had helped found it. Mr. Wittum and his young wife live in a comfortable four-room apartment in the Pankow district of East Berlin. We settled ourselves around a table piled with oranges and chocolates, and sipped hot tea while we talked.

"For 44 years," he said, "I have been the chief of the print shop at the Deutsche Staatsoper, the State Opera. Hitler's friend Hermann Göring saved me from being sent to war—not because he liked me but because he liked the opera. I only saw Hitler there once. Except for a few months, the opera performed practically every night, all during the war, even during the bombings. In 1943 and 1944 we printed all programs with instructions on where to go when an air raid started.

"Each year from 1935 until 1943, Göring gave a huge party at Karinhall, his estate about 30 miles north of Berlin. It was named after the first of his two wives. There were usually 1,000 guests—plus 50 or 60 of us from the opera. We provided the atmosphere. The extras were dressed as hunters and waited on tables.

"During the last days of the war, Göring wanted to show his wealth and prestige by heaping great mounds of scarce foods on the tables. Our people came back with their pockets stuffed full—they grabbed handfuls of everything when no one was looking."

Mr. Wittum has a vivid memory of the Russian entry into the city in April 1945.

"I was walking down Dunckerstrasse," he told me, "carrying a *Schlackwurst* wrapped in a newspaper, when I saw two very grimy Russian soldiers coming toward me, their rifles slung across their bodies. *'Stoi! Stoi!'* they shouted. 'Stop! Stop!' Then they grabbed for my watch and my sausage. There was nothing I could do but hand them over.

"Being a member of the Communist Party didn't help," Mr. Wittum said. "In fact, there were a number of Communists in Germany at the time, and none of us received any particular favors from the Soviets."

Memories of Bitter Days Linger On

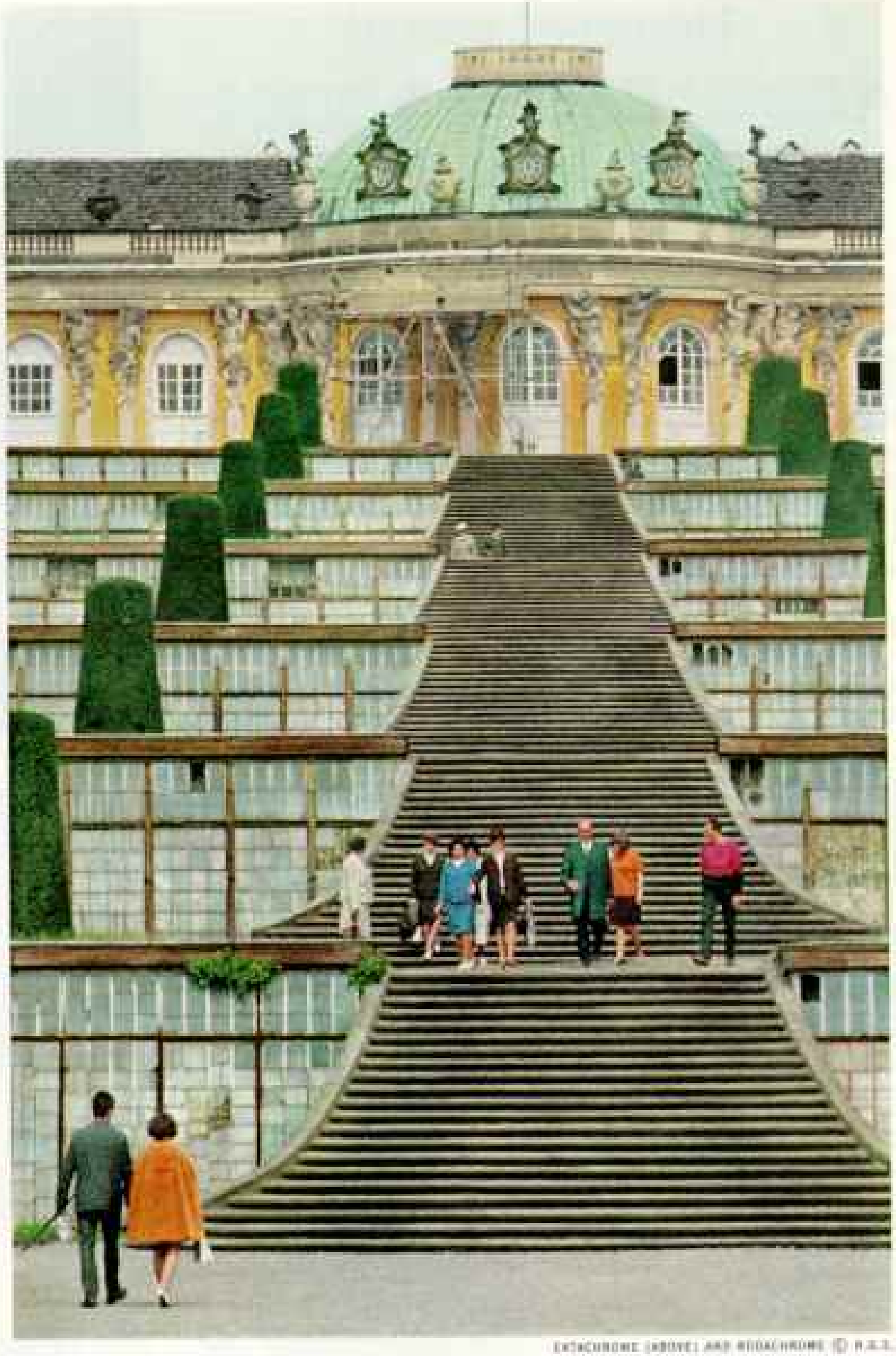
The Russians took a great deal more than watches and sausages. They carried off entire machine factories, automobile works, chemical and power plants, everything down to cattle and timber, stripping the eastern part of the shattered Reich of fully 50 percent of its industrial capacity. Some industries, such as those producing plywood, precision machinery, and optical instruments, lost more than 70 percent of their plants. The value of dismantled properties, profits, and goods diverted to Russia totaled between 10 and 12 billion dollars. In contrast, the shattered economy of West Germany soon began to receive huge infusions of American funds, part of the Marshall Plan's program to restore economic health to Western Europe.

Cathedral in the round, St. Hedwig's in East Berlin fills with worshipers for Sunday Mass. Gutted by wartime bombs, the church wears a new marble interior; a central staircase leads to lower chapels. East German churches do not speak out against the state. The government, in turn, now exempts conscientious objectors from military service and no longer jails pastors for sedition. It also sanctions some religious holidays and assists with the reconstruction of historic churches. SUBSCRIBER BY HOWARD SOCIETY © N.G.S.

Nineteenth-century sanctuary of art and learning, Museum Island in the Spree River suffered artillery hits in the last days of World War II. Now in the East, the Alte—or Old—Museum, decorated by this bronze Amazon battling a tiger, reopened only in 1966. The Dom, once the major Protestant cathedral, remains unrestored. Some see irony in the cross of reflected

The years of Nazi oppression still darken the memories of Berliners. After the war, Bertolt Brecht, the antifascist playwright, settled in East Berlin and founded one of Europe's noted theaters, the Berliner Ensemble. Today his widow runs the theater. In recent years it has played a smash hit to packed houses: *The Resistible Rise of Arturo Ui*, a powerful indictment of the Nazi era (pages 16-17). Oddly, regulations, which permitted me to photograph the play, forbade my making pictures of the audience responding to it.

A stronger indictment of the Nazis lies not far away. The Ulbricht government, as part of its propaganda, pays fastidious attention to the details of the Nazi era. The infamous concentration camp called Sachsenhausen lies a half-hour drive to the north of the city. It is maintained as a memorial. On Sundays, young East Berliners flock there, along with tourists from the Soviet Union, Hungary, Czechoslovakia, and Poland.



EKTACHROME (ABOVE) AND KODACHROME © N.G.S.

sunlight on the steel sphere of the 1,185-foot television tower, pride of the atheistic state.

Summer retreat of a Prussian ruler, Schloss Sanssouci bespeaks the French tastes of Frederick the Great. In the 1740's he designed the rococo residence with French floor plans and named it "Castle Without Care." Tourists by the thousands visit the palace in Potsdam, outside West Berlin in East Germany.

The statistics are truly appalling. Between 1936 and 1945, the Nazis herded 200,000 persons into the camp—political undesirables, Jews, and captured Russian soldiers; 100,000 of them were killed by shooting or hanging. Of 20,000 Russian prisoners brought here, 18,000 were murdered.

Jürgen Toft and I drove to Sachsenhausen early one rainy Sunday afternoon. A gray mist hung over the camp as we arrived. Built in the form of a huge walled triangle about 2,000 feet long on each side, it sits in a piney forest. On each corner of the triangle and at regular intervals along the wall are watchtowers that once housed Hitler's elite guard, the Schutzstaffel. On all sides today I saw Russian soldiers, members of the occupation army, now living in the former SS barracks.

Prisoners were quartered communally in one-story frame barracks 100 feet long and 30 feet wide. Around a roll-call square, 86 such barracks were arranged in the shape of a fan.

Theater of politics

AT THE EAST'S FAMED Berliner Ensemble, the curtain rises on four wax figures, recalling Nazi Germany: Paul von Hindenburg, who named Adolf Hitler chancellor; the Führer himself, Minister of Propaganda Josef Goebbels; and Reichsmarschall Hermann Göring. The revolving stage turns; the play begins—Bertolt Brecht's *The Resistible Rise of Arturo Ui.*

Arturo, a Chicago gangster of the Depression era, extorts, blackmails, and murders his way to power, aided by corrupt capitalists. In the finale he announces plans for new conquests, and citizens vote their approval, raising both hands in total allegiance (below). Thus the German playwright recorded the rise of Hitler, using parody to destroy "the usual disastrous respect which we feel for great murderers." So serious was the audience at the performance Mr. Sochurek attended that they complained vehemently about the click of his camera. Long popular in East Berlin, the play ran in New York in 1963 and in West Berlin in 1967.

Self-exiled in 1933 to avoid the Nazis, Brecht returned to East Germany in 1949 and founded the ensemble known popularly by his name. Since his death in 1956, his widow has directed the heavily subsidized theater; its repertoire includes Brecht's well-known work *The Threepenny Opera.*

In addition, the triangle also contained a gas chamber, execution pits, a crematorium, and hospital barracks.

Today at the entrance to the camp stands a museum that recalls its grim history. In one display are hundreds of gold teeth removed from victims of the Nazis; in another, a simple tin plate with a small pile of hardened beans from a last uneaten meal.

In my travels, I couldn't find a single Berliner who had not been affected in some way by Hitler's policies of mass murder (page 24).

That night I went to dine at the Volga, one of East Berlin's limited number of good restaurants. I was about to partake of one of my favorite dishes—cucumbers in cream and vinegar—when I thought of that plate of beans at Sachsenhausen and lost my appetite.

At that moment, the head waiter steered two Japanese businessmen toward me. They introduced themselves as Shoho Nagahara of Osaka and Takao Yamaguchi of Tokyo.

Throughout Eastern Europe, hotel restaurant facilities are limited and thus constantly overcrowded. It is the custom to seat strangers together. My uninvited guests almost always proved to be valuable sources of information.

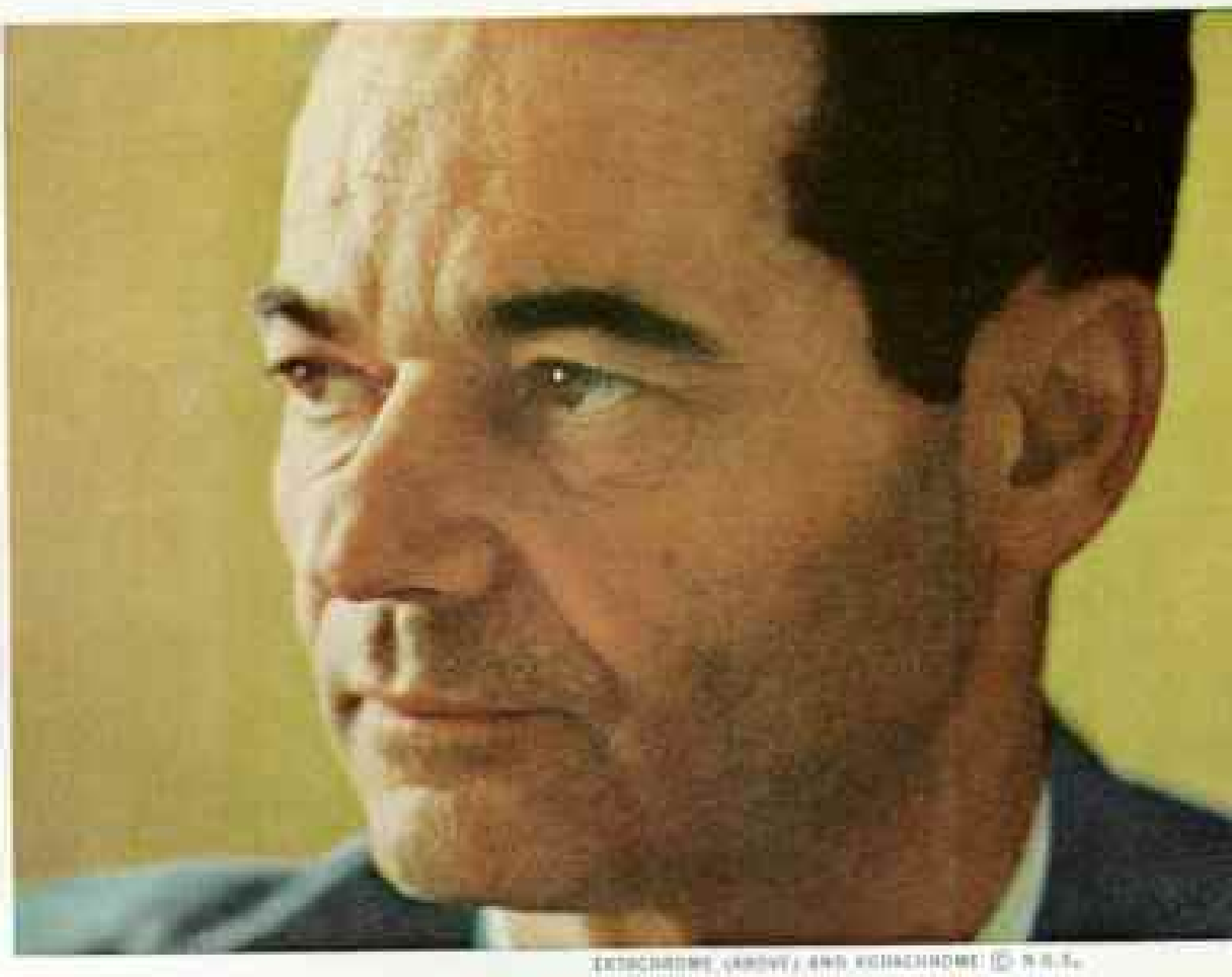
Mr. Yamaguchi had been in the United States, West Germany, and England, looking at textile machinery for a plant in Japan.

Mr. Nagahara was also interested in textile machinery.

"Our Japanese machines are good, but not very imaginative," he said in perfect English. "East German machines are imaginative, but they must use Russian steel, which is inferior to West Germany's. I may buy their machines.

Dynamic young Alfred Dellheim rose from mechanic to manager, exhibiting the energy typical of today's young German executives. A member of the Communist elite, he directs the Berlin Machine and Tool Company, largest in East Germany, and earns $625 a month.

In per capita production, East Germany ranks second only to the Soviet Union in the Red bloc.



EKTACHROME (ABOVE) AND KODACHROME (C) N.G.S.

On his last day before retirement, a 65-year-old lathe technician at the factory works diligently until quitting time. Then his friends toast him with cognac and present gifts of fruit and flowers. His state pension of $37.50 monthly will cover most expenses; rent, for example, runs as low as $5 a month.

If I do, I shall probably modify them and add good steel where needed. I would then end up with excellent machines."

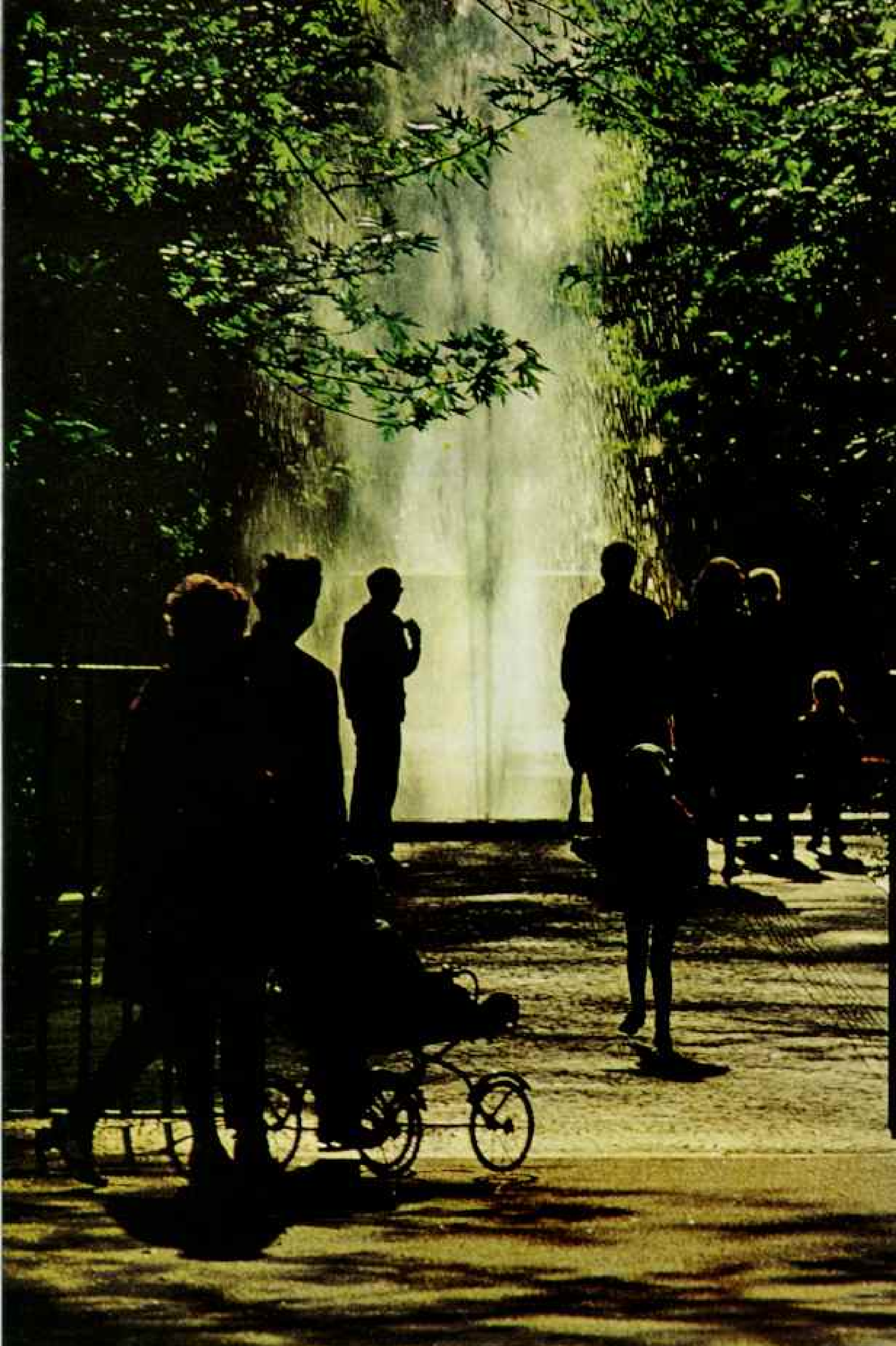
He told me of other Japanese businessmen in East Germany, selling computers.

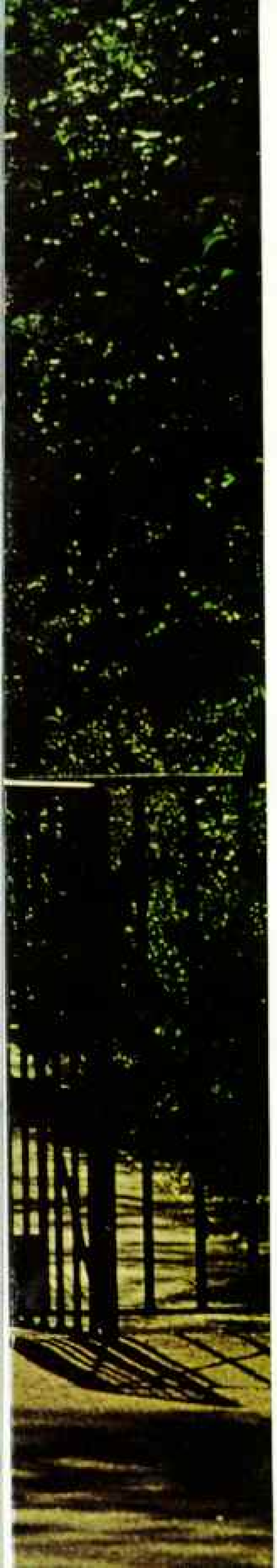
"Make no mistake about it, the East Germans, whatever the political price, are managing a very rational economy. To run it, they need sophisticated calculating and automated machinery invented, built, and sold by the West. The Russians cannot help them much; they are busy trying to help themselves. But Sweden and Japan and other countries can help them. Whether this will lead eventually to a political change, a mere businessman cannot know."

Casual Companions a la Carte

My dinner table kept providing such fare. I was joined once by a young chemist from Magdeburg, on his way to Moscow to negotiate a trade agreement for his employer, the state-owned Magdeburg Plastics Factory.

"Almost 90 percent of what my plant makes goes to Russia," he said. "And in return we receive credits. With the credits we buy Volga automobiles, crude oil, tungsten, iron, coal, other raw materials. You realize that when East Germany was formed, it had nothing but manpower. With no Ruhr or Saar to give us coal or steel, we had to rely on the skills of our people. We had to build our economy from the ground up, and that gives a person pride, whatever his political beliefs. Are you on your way to Moscow, too?"





Fantasies of youth find form in the shimmering Fairy-tale Fountain in Volkspark Friedrichshain. Hänsel and Gretel and other characters from German lore decorate the water basin. Nearby, above-ground air-raid shelters have been covered with rubble to create two hills. East Berlin residents enjoy some twenty city parks as well as free access to their entire Ohio-size land.

Wedding-day smiles spread over the faces of Barbara and Frank Weber after a city-hall ceremony. Like most East German women, she will probably be a working wife. Wartime losses, a low birth rate, and defections before 1961 severely cut into the labor supply. Some 70 percent of the population is still too young or too old for jobs. Women, who outnumber men four to three, fill in as trolley drivers, traffic police, factory workers, and farm laborers.

KODACHROMES BY HOWARD SOCHUREK © N.G.S.

Even a dog show promotes the state. This one at the Ernst Thälmann Pioneer Park advertises that it "is organized for the forming and perfecting of socialism." But one pet and its napping owner appear unconcerned.

"No," I said, extending my card, "I'm an American journalist. I am reporting on East Berlin. Might I have your card?"

His expression changed noticeably.

"Surely my name and what I say are not important." And with that he left abruptly.

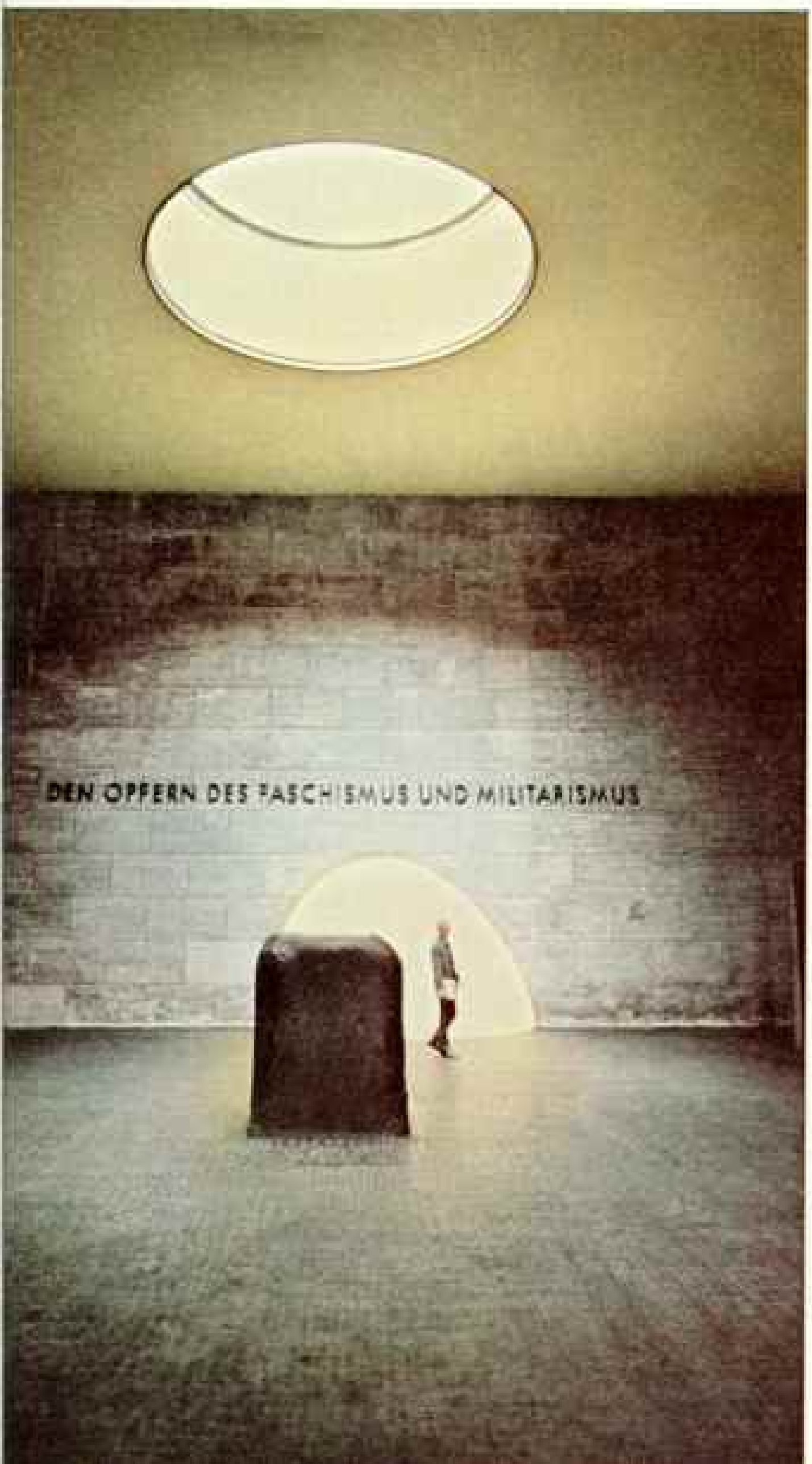
One evening I called on John Peet, an English journalist who edits the *Democratic German Report*, a government bulletin, in East Berlin. A former Reuters correspondent, Mr. Peet—for personal and political reasons—left the West 20 years ago.

Even though I was well aware of John's political orientation, I welcomed the opportunity to exchange views with him and his wife Georgia. We met in their spacious book-lined apartment at 129 Friedrichstrasse.

"It's an address with a history," John said. "Look here. Out there in the garden is where, some say, Hitler's deputy, Martin Bormann, was last seen alive. No one really knows what became of him; he may be buried among those mulberry trees."

John and Georgia are strongly antifascist,

"To the victims of fascism and militarism," East Berlin dedicates the memorial at the New Guard House. Both East and West remember those persecuted by Hitler: the Jews, Communists, dissenters, and prisoners of war.



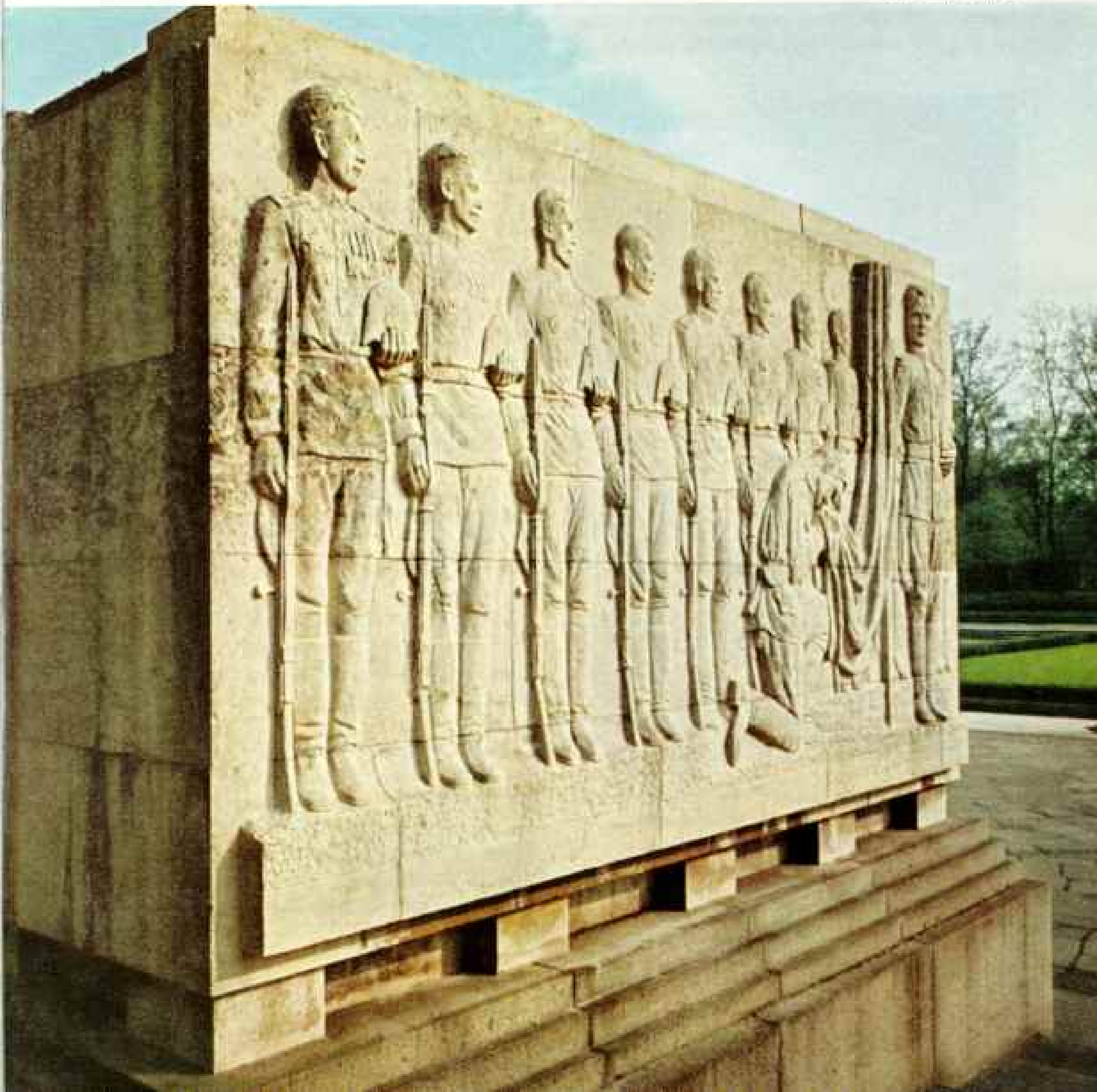
Homage to the Russians, the Soviet War Memorial in East Berlin marks the mass graves of 5,000 of the 20,000 Soviet soldiers who died during the Battle of

and with good reason. A Rumanian, she was arrested by the Nazis during the war and imprisoned in the Ravensbrück concentration camp.

"My crime was political activism," she said. "More than anything else, I am still struck by the way power changes people. It absolutely corrupts them when they have total control over their fellow beings, as in that camp. And it's the sweet, pretty blonde who lives next door who turns out to be the vicious animal. I still cringe if I hear someone scream."

John interrupted. "I remember an interview I had with Rudolf Franz Höss, commandant of the Auschwitz concentration camp. He was very upset about the charge that he had killed 5,000 people a day. How could he have, he asked, when the railroad siding that unloaded the cars could handle only 2,000 people a day? I will never forget that. The interview was in a cell on death row, where he was awaiting execution. I offered him a cigarette, and he refused because there was a 'No Smoking' sign on the wall."

Berlin in 1945. Old Berliners find the tribute ironic: The Russians, first of the Allies to reach the German capital, ravaged the people and the land, as the Nazis had done earlier in Russia. The U.S.S.R. dismantled and shipped home hundreds of factories and extracted heavy reparations. Today more than 200,000 Russian troops camp in East Germany, and youngsters study Russian from the fifth grade on.



John poured red wine, and we watched West Berlin television while talking about the East as it is today.

"We have the highest standard of living in socialist Eastern Europe," John said. "Hungarians come in by the busload just to buy chicken wire, which they can't get at home. We have had so many Poles coming for consumer goods that we have had to impose a tax on tourist exports. There is no question that the Wall has stabilized the population and prevented the loss of manpower to the West. Without the Wall, East Germany could not have existed as a country.

"Since 1961 we have started to go forward for several reasons. The high standard of living in the West challenges us. Second, a small degree of flexibility is tolerated in the matter of private ownership. Factories employing fewer than 200 people, for example, can continue in private hands. We have kept our skilled managers this way."

When I suggested that this sounded suspiciously like a capitalist idea, John replied, "Unlike those in a capitalist nation, our professors are among the highest paid people in this country." He smiled and summed up his interview by saying, "The main story here is that everything is going well."

EKTACHROME © N.G.S.

Inhumanity recalled: This metal stretcher once lifted bodies into a crematorium at Sachsenhausen, outside East Berlin, one of a thousand concentration camps set up by the Nazis. Here SS troops learned techniques that terrorized victims of the Third Reich. A visitor left the bouquet at the site, now a memorial to 100,000 who died at the camp.

Anxious Hours in a People's Jail

Not long afterward, at about five o'clock one evening, while Jürgen and I were standing on the Elsenbrücke—a bridge across the Spree River—we were both arrested.

I had been photographing the sunset on the river and the ducks paddling furiously to avoid a large coal barge that was passing by. I had just packed my cameras into their cases and was walking off the bridge when a member of the *Volkspolizei*—People's Police—stepped from a half-concealed guard post under the bridge and called, "*Halt.*"

The uniformed "Vopo" approached and said, "Give me your credentials!"

Jürgen handed over the identity card which every citizen of the GDR must carry, and a letter from the Reisebüro explaining my purpose in East Berlin. I presented my United States passport, complete with the East German visa and the police registration stamp recorded on the day of my arrival.

"You have violated the people's law," the Vopo said. "It is forbidden to photograph this port. It is forbidden to photograph the border. It is forbidden to photograph the railroad yard."

Across the street, faces began to appear in the windows of an old six-story apartment building. They stared down at us—impassive and impersonal. Two sergeants in a dark-green Volga police car drove up; our Vopo had obviously summoned them before he had even halted us.

"This document from the Reisebüro," he now said coldly, "is forged." Jürgen tensed visibly. His face paled. He turned to me and remarked in English, "This is getting serious."

One of the sergeants took our credentials and carried them to a call box across the street. We waited there for an hour until a call was returned.

"You will come with us."

Jürgen and I were instructed to sit in

the back of the police car, and we were then driven away.

The police headquarters and the offices of the Staatssicherheitsdienst—State Security Service—of the "antifascist, democratic people's society of the GDR" occupy the same grim building once used by Hitler's SS operatives. Nothing much seemed to have changed as a guard unchained the entrance gate and we disappeared into the central courtyard.

Even before World War II, author Franz Kafka had described in his books the terror of totalitarian societies. With one sergeant in front and another behind, we climbed a wide creaking staircase to the third-floor offices of the SSD. On each floor hung a huge portrait of Walter Ulbricht, and under each of them hung a huge red banner containing a simplistic quote. One was "Progress Through Work Builds Socialism."

They took Jürgen away and left me standing in front of Room 3620B. Its door was secured in an extraordinary manner—with two loose chains joined by a red wax seal. I still have not learned the reason why.

A Bad Time of Day to Get Arrested

That fortresslike building must be the most locked place anywhere on earth. As I waited, plainclothesmen came and went through the many doors along the corridor; they unlocked each one they entered, and faithfully locked it again behind them. The hallway was weirdly lit by alternate yellow and green fluorescent tubes.

After an hour, a worried Jürgen reappeared with a bushy-haired bespectacled man who led us into a small room and left us there.

"They claim that the seal on the Reisebüro document is a forgery," Jürgen said. "They are checking with the Foreign Ministry."

A typewriter in an adjacent room began to clack furiously.

"What a long confession they are typing for us," I commented. "I wonder who's going to get my traveler's checks and credit cards in the hotel."

It occurred to me, almost from the first moment of my arrest, that it could be many weeks before anyone began wondering where I was. And it might take many more weeks to clear up the confusion.

"Jürgen," I said, "for the first time in my life I feel like a non-person."

About four hours after our arrest, we were suddenly freed by the bushy-haired jailer, who very politely informed us that had this happened during regular hours, we would have been released, of course, in an hour. But since it was after the normal working day, it took additional time to contact the concerned persons. He hoped we understood.

We did.

Refugee From Nazis Prefers the East

Many Western observers, citing history, believed that suppression in the East might serve as a pressure seal and bring about an explosion. It almost happened once, on June 17, 1953: A protest by 80 construction workmen turned into a nationwide blood bath and left 18 Soviet soldiers, 116 People's Policemen, and 267 demonstrators dead. Afterward, 92 people were shot and some 1,200 others jailed. The playwright Brecht wrote an ironic poem which included the lines:

. . . the people
Had lost the Government's confidence
Which it could only regain
By redoubled efforts. Would it in
that case
Not be simpler if the Government
Dissolved the people
And elected another?

In effect, the Wall has tried to do just that, and not without success.

"Some believe you can't change people, but I know you can. Here in the GDR we have had good response to our efforts to do so."

I was sitting in the office of Alfred Dellheim, managing director of the Berlin Machine and Tool Company (page 19). The largest of some fifty such plants in the GDR, it employs 2,000 men and occupies a complex of new concrete buildings sprawled over five acres in the Marzahn section of East Berlin.

"My own career can be considered a case in point," Mr. Dellheim continued. He is a short, thin man with receding hair flecked with gray. Over his neat desk hung a framed portrait of Karl Marx, but Mr. Dellheim had turned to the West in selecting a Swedish-made intercom system.

"In 1939 I went to England to escape the Fascists. I fought in the British Army as a sergeant—in France, Belgium, all over. After the war, in 1947, I came back to Germany thinking that things might be different. I searched for my parents. They had been in a

concentration camp and were murdered. I went to Düsseldorf for a while and worked in the youth movement there, but I soon decided that, for someone with my convictions, the GDR was the best place.

"I worked as a mechanic in a factory. At the age of 36, I was sent by the state to the Technical University of Dresden. In 1963 I came here as managing director. I am now 45. This is what I mean by changing people. Here I truly believe that any man has an opportunity to develop. We need well-qualified people. Our goal is that every fourth person have a university degree."

Mr. Dellheim draws a salary of 2,500 marks ($625) a month, and he and all his workers may receive an annual bonus of an extra month's pay as a production incentive.

"I am completely responsible for the development of this plant and the sale of our machines," he said as I was leaving. "We give the state a 20-percent return annually on its invested capital. Our production is sold out for 1969, 1970, and 1971. We used to compare ourselves to the Soviet Union. Now we are striving to be the best in Europe. And after that we will look to the United States, and be better than you are."

PHOTOCHROME (ABOVE) AND X-RAY © K.G.S.

Maze of color in a glass woman illustrates circulatory and nervous systems at a hygiene exhibit in East Berlin.

Early-morning conference in East Berlin brings together Humboldt University students and the gynecology faculty.

Many professors fled to West Berlin, where they created the Free University in 1949; those remaining belong to a favored profession. The state pays professors $1,000 a month, five times a worker's wage. Students receive a minimum monthly stipend of $42.50. A larger percentage of young people take university courses in East Germany than anywhere else in Europe.

My final visit in East Berlin was with one of the last of its capitalists, Helmuth Wegwerth. He is the distinguished, impeccably tailored managing director of the firm of Zeuke and Wegwerth, which sells scale-model railroads to hobbyists, under the brand name of Zeuke. The plant annually markets four million dollars' worth and realizes a $200,000 profit. Its 1969 production is completely sold out. It employs 700 people and uses Austrian machines in its factory.

"I began this plant in 1945, right after the war, very modestly," Mr. Wegwerth told me. "We prospered, and in 1955 a deal for half ownership was made with the state. An investment of three million dollars was contributed, half by the state and half by myself. That enabled us to build the new plant which you see here, finished in 1964. There are about thirty plants in the GDR of this size with a private-public mix, but it is an interim solution. In four or five years, everything will be entirely state owned.

"We handle non-Communist markets ourselves, but the state buys for any markets in socialist countries."

I asked Mr. Wegwerth to account for the boom in the GDR.

Rainy-day view from the West looks along Unter den Linden, principal avenue of the prewar capital and now of Communist East Berlin. The Berlin Wall, foreground, halts traffic through the Brandenburg Gate, the city's triumphal 18th-century entryway.

Mayor of free Berlin, Klaus Schütz speaks of his city as "the place where two political worlds look face to face." The 44-year-old Harvard-trained political scientist seeks to expand communications and trade with East European countries in line with the policy supported by his mentor Willy Brandt, former mayor of Berlin, who last October became chancellor of Germany.

EXTACHROME (ABOVE) AND KODACHROME BY HOWARD SOCHUREK © N.G.S.

"We are Germans," he said simply. "This boom can be attributed to the German mentality and to the indestructible optimism of the German spirit. We have had to accommodate to many kinds of government, but the only measure of merit is accomplishment."

That expressed in a general way something I felt strongly in East Berlin—and I left with an opinion, if not a conviction, that the East Berliners do not belong to Walter Ulbricht, in spite of his Wall, or to the Soviet forces that occupy their city, but more and more to themselves as part of a rising, if separate, German state.

Many Czech Tourists Decide Not to Go Home

In the West, I went first to Marienfelde, following the more than three million East Germans who had voted with their feet and fled to the West before 1961. I found the center occupied largely by elderly persons from East Germany, whom the state lets go as liabilities, and a number of Czech tourists who had defected.

"The Czechs, too, will have to build a wall if this keeps up," said a woman receptionist. "More than 40,000 have come into West Germany since the Russians marched into their country. Here's one now."*

A middle-aged man wearing a green felt jacket knocked gently at the sliding glass door of the receptionist's office.

"He left in his hunting jacket, and that's about all he has."

She went to answer his query, and I was called at the same time into

*See "Czechoslovakia, the Dream and the Reality," by Edward J. Linehan, NATIONAL GEOGRAPHIC, February 1968.

the office of the man who is in charge of liaison between the camp and the city of Berlin. He asked that his name not be used.

"Neither my name nor that of any of the refugees.

"Yes," he said in answer to my question, "people still risk their lives to come over the Wall, but not so many. Only a few score are able to make it now each year. You have seen the improved Wall—it is like Alcatraz or Devil's Island.

"In all, we get about 3,000 escapers a year from all over, and have an average of about 300 in residence here, month in and month out. We have 60 apartments in three large buildings. After a time here they go on by air to the West."

Escapers Employ Amazing Tactics

The official told me about some of the more famous escapes across the Wall.

"There was the circus performer," he reminisced, "who, with help from a relative on the western side of the Wall, simply strung a tightrope and walked over on it. Another man had a friend in West Berlin who ran one of those earth-moving shovels. This friend drove his machine up to the Wall and dropped its big bucket over on the east side. The refugee jumped in, the shovel was clamped shut, and he swung to safety as a hail of bullets pinged harmlessly off the steel sides."

"What do most refugees want when they arrive?"

"Right now, it's bananas. We had a lad who came over about a month ago. He almost did not make it—across the death strip and up the Wall, where he hit one of those cylinders that has been installed to roll at a touch. They call that route the *Todeslauf*, or death run. His brother was waiting for him and pulled him over. He wanted bananas, and when he got here, he sat down and ate seven of them."

Over the years, 64 East Germans are known to have died trying to flee over the Wall.

The rules of movement between East and West are a crazy patchwork. Any Western soldier—American, British, or French—may walk in and out of East Berlin without hindrance, search, or seizure, just as any Russian soldier may freely enter West Berlin. But an East Berlin citizen may not leave his side of the city, and except for air travel a West Berliner can leave only by passing through the territory, and the red tape, of the German Democratic Republic. When the GDR or the Soviets find it convenient, they can isolate all 2,163,000 West Berliners in a matter of minutes. That is why assurances from the West are so important.

"Right out there," said Klaus Schütz, the Mayor of West Berlin (preceding page), "is where John F. Kennedy made his famous *'Ich bin ein Berliner'* speech." He motioned toward the balcony of his second-floor office in Schöneberg Town Hall, overlooking the town-hall square.

Today, a Friday, was market day, and the area below the balcony was crowded with farmers and trucks. Their farms, surprisingly, lie within the borders of West Berlin itself, mostly on the northwestern outskirts of the city. Housewives strolled past the stands, buying fruits and flowers, fresh eggs, cheeses, and newly plucked fat chickens.

Berliners Remember J.F.K. and His Vow

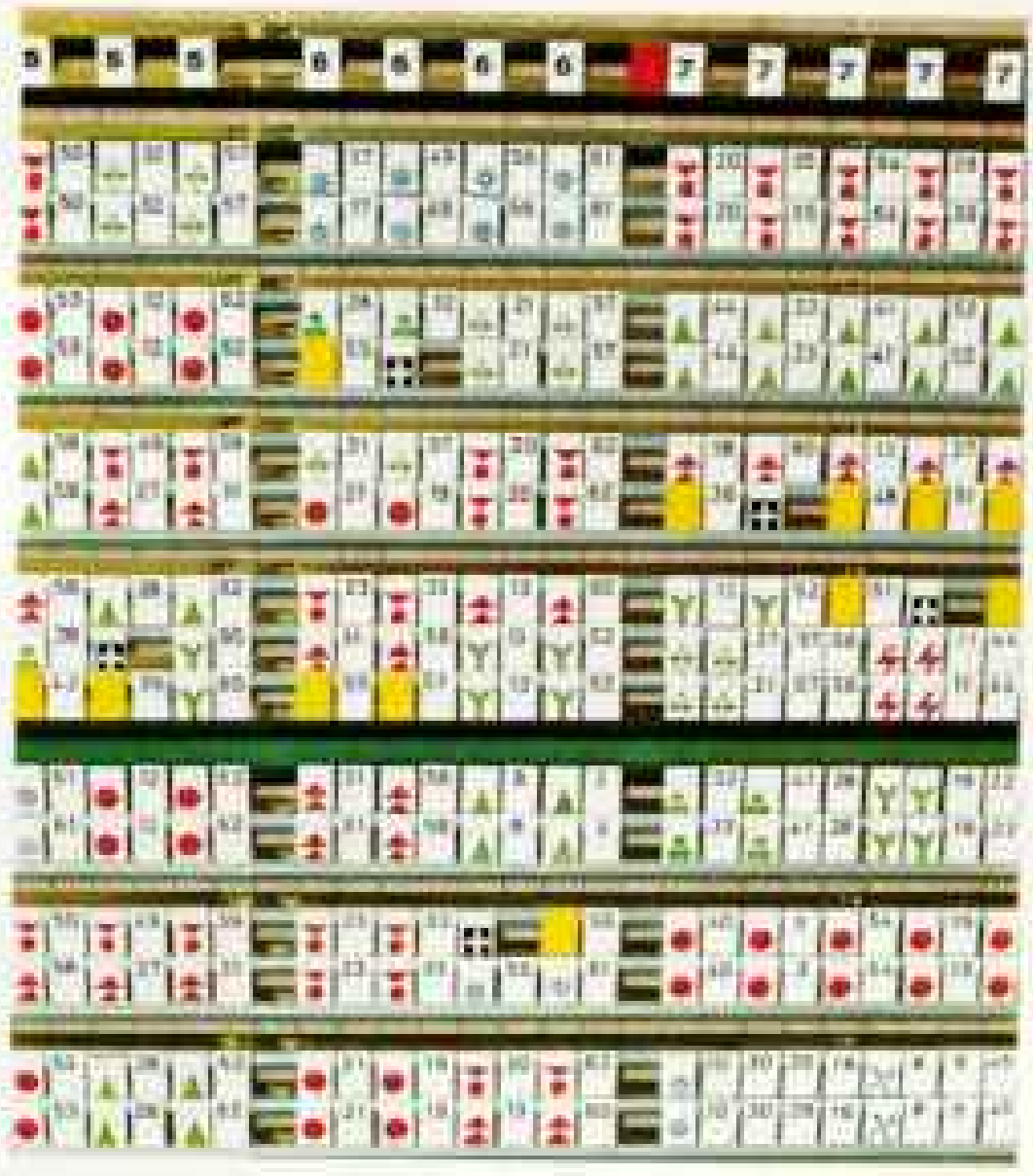
When President Kennedy made his "I am a Berliner" speech on June 26, 1963, the square was jammed with cheering West Berliners. It was a memorable and dramatic moment, a vivid reassurance that the West had not forgotten them. Nor have the Berliners forgotten the man who gave it: The square is now named the John-F.-Kennedy-Platz.

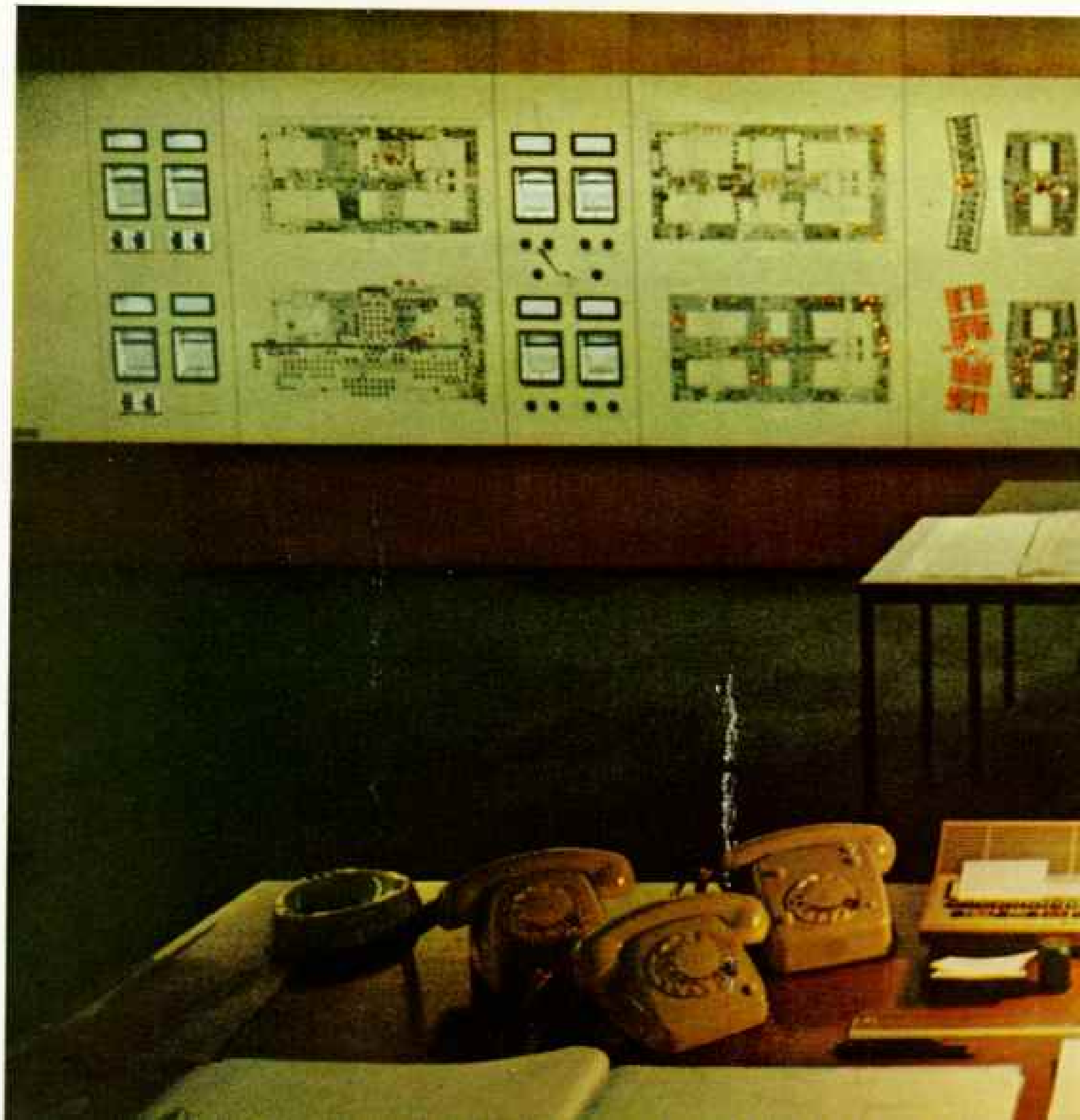
"It is natural that we sometimes feel forgotten," said Mayor Schütz. "The Wall has increased our sense of isolation. For many, the constant inconvenience and harassment connected with road travel, and the limited amount of space to move about in, make it more comfortable to leave than to stay. The young especially have been leaving, even

Welcome sight to all he passes: Touching, or even seeing, a chimney sweep assures good luck, says an old German superstition. West Berlin sweep Peter Poetzsch prefers safe, hard headgear to the traditional top hat of his trade. In his unionized and difficult job, he earns slightly more than the average wage of $200 a month. To aid his isolated city, West Germany sends in preferential government orders for goods and subsidizes industries and citizens to the equivalent of almost a billion dollars a year.

Control center (below) monitors the automated distribution system of the Free University's gigantic Klinikum, most modern medical center in Europe. Flashing lights pinpoint trouble spots in the network of conveyor belts and pneumatic tubes that whisk drugs, food, and supplies around 44 acres of rooms and corridors on five floors.

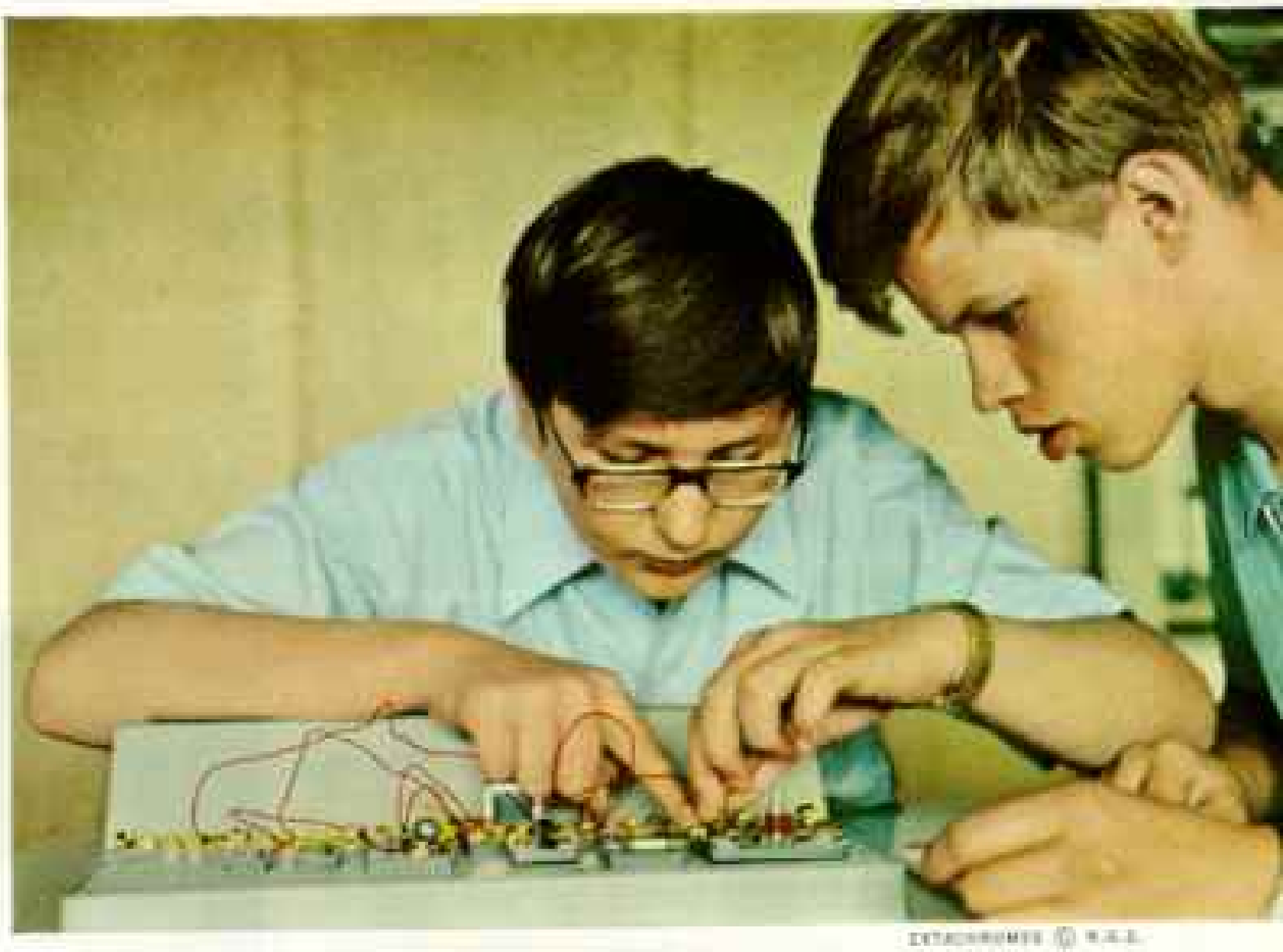
Opened in 1969, the $75,500,000 installation, funded by West Germany and the United States, provides a 1,400-bed hospital, clinics, and laboratories, as well as facilities for 1,000 medical students.





Experiment in education, a comprehensive school—*Gesamtschule* in German—places kindergartners through 13th-graders in one complex. The unique school opened in 1968 at Gropiusstadt, a housing development in West Berlin designed by the late German-American architect Walter Gropius. With symbols and numbers, the board (left) shows which classes are in session. Fascinated boys (right) assemble a computer in an elective electronics course.

In contrast, at conventional schools in West Berlin, a child's future after the fourth grade is determined by an examination leading to a general high school or a college preparatory academy.



DETACHRIMES © N.G.S.

though there are plenty of jobs here. There are, in fact, 35,000 unfilled jobs in West Berlin. We have brought in 30,000 foreign workmen—mostly from Turkey, Yugoslavia, Spain, and Greece—to ease the labor shortage, and still we are short."

West Berlin is nonetheless a busy industrial city, with a gross output of 20.7 billion marks (5.2 billion dollars) a year—4 percent of the output of the entire Federal Republic of Germany.* Its biggest employer is the electrical industry; the Siemens company alone provides work for 45,000 people (page 42). A number of American firms have plants in West Berlin, among them Kaiser Aluminum, Gillette, Otis Elevator, IBM, Pitney-Bowes, and National Cash Register.

Subsidies Bolster City's Economy

Yet despite all this industry, West Berlin is not economically self-sufficient, and must be subsidized by the Federal Republic to the tune of almost a billion dollars a year. A West German economist discussed the paradoxical situation with me, and a few of the factors that contribute to it.

For one thing, he said, West Berlin has more than its share of public lands and parks —facilities vital to citizen morale in an isolated city. As a showcase of Western prosperity, he continued, it must have more than its share of glitter.

"And if you were a businessman thinking of building a new factory," the economist said, "would you choose, say, Frankfurt, safe in the west, or Berlin, with its uncertain future? Obviously we must offer incentives, which means subsidies."

Part of the subsidy is for youth. A young couple marrying in the city may request and receive as much as 3,000 marks ($750) on their wedding day and a no-interest loan for 11 years that is reduced with the birth of every child. If a couple has three children, the loan is canceled entirely. The pair may also receive a loan of 10,000 marks for 10 years at a low rate of interest to help with housing and furniture.

Businessmen have it even better. Tax allowances are substantial, and the government will pay as much as 25 percent in cash toward the cost of purchasing certain types of industrial equipment. Tax rebates on all sales to West Germany complete the picture of a growing money tree.

I told the mayor how surprised I was at the economic health of East Germany and the unexpectedly high standard of living I had seen while I was there.

"I have just returned from East Germany and Poland," he replied, "and there is no doubt that in the Red bloc East Germany has achieved an industrial level second only to Russia's. The East Germans are pulling away from Poland, for example. We in the West

*See "Modern Miracle, Made in Germany," by Robert Leslie Conly, NATIONAL GEOGRAPHIC, June 1959.

Graceful as the birds they portray, ballerinas dance *Swan Lake* at the West's Deutsche Oper Berlin. Three major opera houses—two in the East and one in the West—help Berlin live up to the description by composer Hector Berlioz a century ago: "Music is in the air—one breathes it; it penetrates the entire being."

would like more trade with the Eastern bloc, with Poland and others.

"You are aware of the dispute about the Oder-Neisse line—the still unsettled border between Germany and Poland. Such political matters as that may be resolved in negotiations over trade."

As I left the mayor's office, I was struck by the similarities of the power positions of the two Germanys. Just as the West leads the economy of Western Europe and is a strong partner in the Common Market and in NATO, so the East is emerging as the kingpin of the satellite nations of Eastern Europe. Both use economic strength to work political changes which, in turn, provide a lever for beneficial economic negotiations.

There is even an increasing amount of direct trade between West Berlin and East Germany. It is limited by problems of politics, currency, and available goods, and is conducted almost on a barter basis. Yet coal from East Germany comes into West Berlin by barge; electronic equipment from the Siemens factory goes to East Germany in return. Thus, slowly, postwar economics are altering the traditional cold-war policies.

This new nationalism is Western and democratic on one side, and Eastern and Communistic on the other; yet it is also distinctly and uniquely German.

Hill of Rubble From Old Berlin

It is always pleasant to find an old friend unexpectedly, and I was fortunate in finding one in West Berlin. He is Hans (Tom) Tuch, Public Affairs Officer, U. S. Mission, Berlin. Ten years earlier he had introduced me to my wife-to-be, a young lady who was then working for him as an interpreter in Moscow.

Tom, Berlin born, escaped growing up under Hitler and the Nazis by emigrating to Kansas City, Missouri. He went to high school there, served in the Army, and then began a career in the U. S. Foreign Service. Now, after years of diplomatic service, he is an old Berlin hand.

Tom lives in a lovely red-brick house close to West Berlin's huge wooded park, the Grunewald Forest, near one of the strangest hills on earth, the Trümmerberg—"Hill of Ruins." Composed entirely of the debris of bombed-out Berlin, it rises 377 feet, higher than any natural elevation in the region. It is one of six such mounds in the Berlin area. The 15-square-mile woodland next to it was heavily hit during the war and has been replanted with 24 million trees.

We sat in Tom's spacious garden and reviewed some of the turbulent history behind the present partition. Tom reminded me that the Potsdam agreement of 1945 formally divided Germany into four zones (map, page 7), each controlled by an Ally. Berlin, deep in the Russian zone, had also been divided into sectors—U. S., Russian, British, and French—and was ruled by an Allied Kommandatura

EXPACHROMES (INCLUDING FOLLOWING PAGES) © N.G.S.

"A fantastic experience in sound," says the author about the Berlin Philharmonic (following pages), playing under the baton of George Szell, visiting conductor from the Cleveland Symphony. In the unique hall, listeners sit in tiers around the orchestra; curved reflectors above help the players hear themselves and each other. **OVERLEAF**

Skat amuses pensioners at a park in Moabit, an industrial district. They receive a minimum pension of $100 a month. More than 20 percent of Berlin's inhabitants, in East or West, have passed 65 years of age.

Though East Germany will not permit pensioners to move from the West through the Wall, it allows its own elder citizens to visit relatives in the West.

that reported to the highest governing body, the Allied Control Council. That ended in 1948, when the Russians blockaded Berlin.

The guns of war had hardly been stilled when Winston Churchill, in his famous speech at Fulton, Missouri, on March 5, 1946, announced that the Iron Curtain had descended in Europe. It lowered for Berliners on June 24, 1948. On that day the Soviets, in an attempt to force the Allies out, cut all land and water routes between Berlin and West Germany.

The Western response was the Berlin airlift. Between June 26, 1948, and September 30, 1949, American, British, and French planes made 277,728 flights into the blockaded city. At the peak, cargo craft were landing in West Berlin at the rate of one every 45 seconds. After they had brought in more than two million tons of food and supplies, the blockade was ended.* The following

(Continued on page 43)

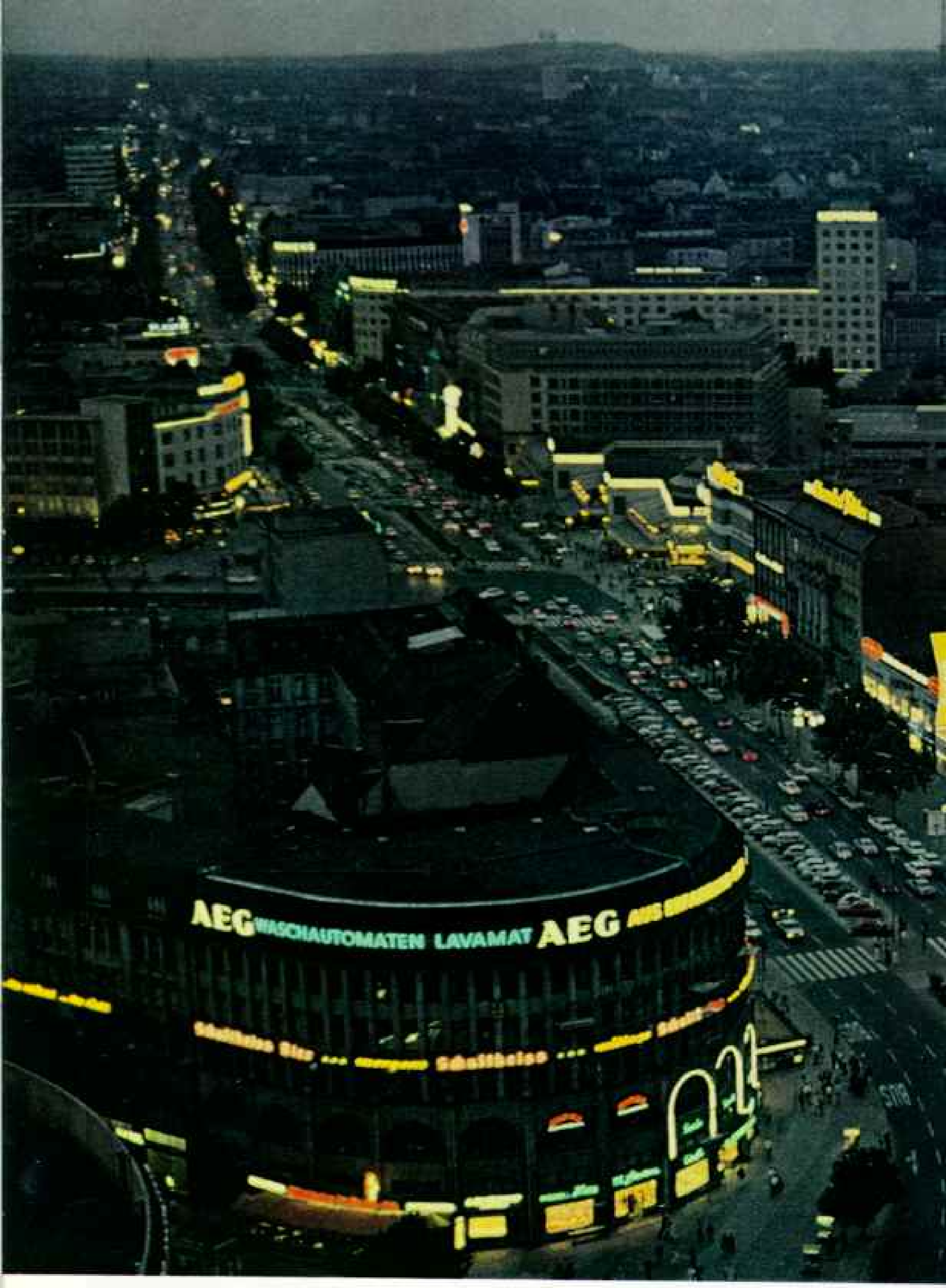
*See "Airlift to Berlin," a picture story, NATIONAL GEOGRAPHIC, May 1949.

Sailing the Grosser Wannsee, sloops taste the open spaces of the Havel River, a favored retreat in West Berlin. Nearby lies Wannsee, the largest inland bathing beach in Europe.

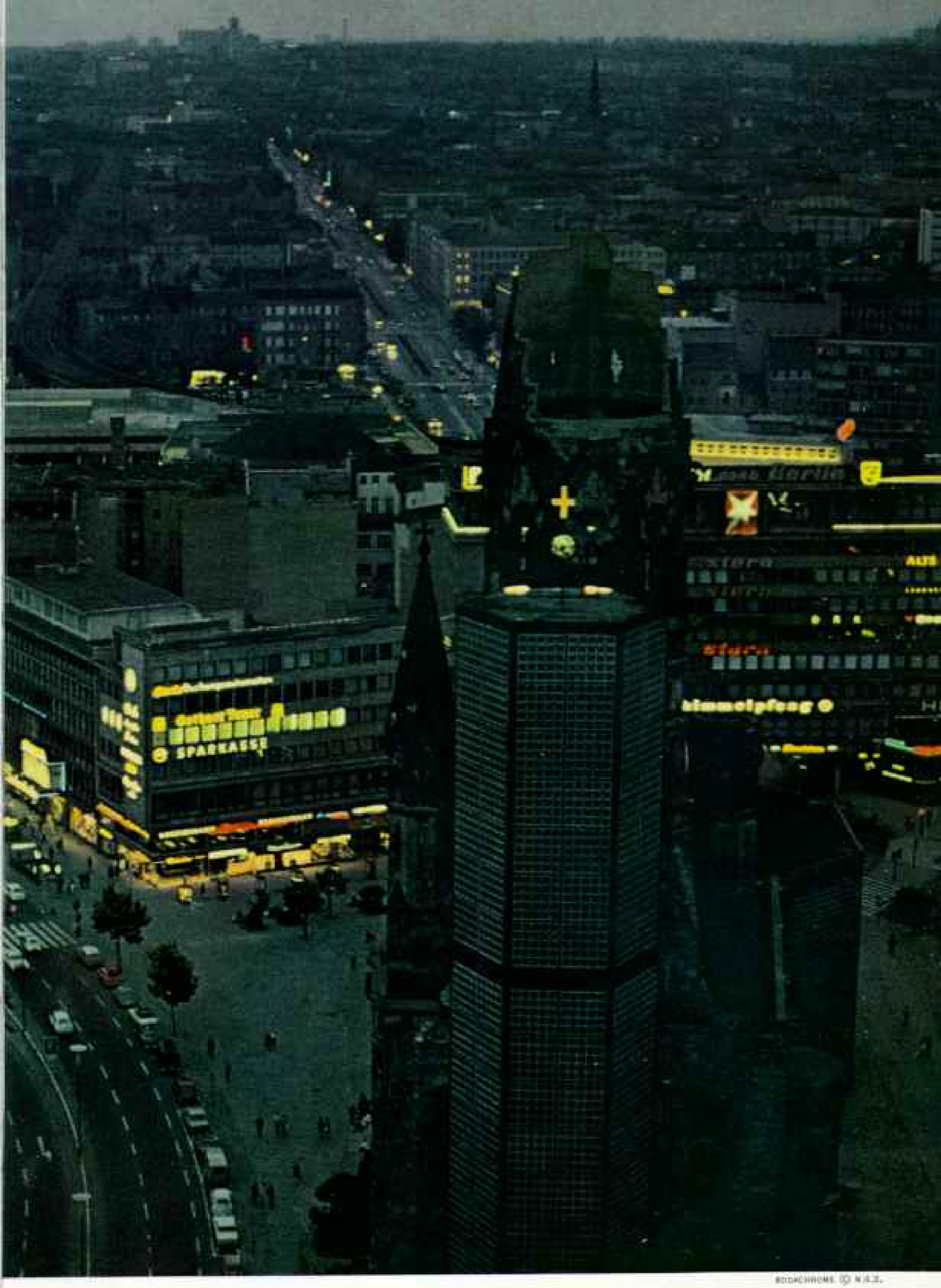
West Berliners treasure their miles of forested parks, since holidays outside the city mean boarding a crowded plane or train, or a drive through East Germany and the risk of frustrating delays at its borders.

At the church on time, top-hatted West Berliner Walter Dressler waits to drive a bridal couple to a reception. Besides the required civil ceremony, many couples cling to older traditions: a *Polterabend* (when friends smash old pottery at the bride's door for good luck), a church service, and a ride in an elegant white carriage.

EXTERIORS (ABOVE) AND INTERIORS BY HOWARD SOCHUREK © N.A.S.



"**A sparkling nucleus of light,**" wrote author Christopher Isherwood in the 1930's of the theaters, cabarets, and shops that cluster around Kurfürstendamm, a main street that reflects the lively spirit of Berliners. So



it is today, reconstructed after more than 420 Allied bombing raids. A new hexagonal-towered Kaiser Wilhelm Memorial Church, right, rises beside the jagged ruin of the old, left standing as a reminder of the war.

Tomorrow's technology emerges from the high-voltage testing hall at Siemens, West Germany's largest electrical-engineering enterprise. Here Gerd Müller checks a 3.6-million-volt impulse generator used to test various products. The company, founded in 1847 by Werner Siemens, inventor of the dynamo, develops turbines, nuclear-power stations, automatic controls, computers, and radio equipment.

Bubbling brew passes from copper fermenting tanks on its way to becoming Schultheiss beer. Brewmaster Gerhard Wiecha, with 30 years of experience, rules at the West Berlin brewery.

month, in October 1949, the German Democratic Republic was declared a separate state.

"The Allied Kommandatura is still functioning," Tom told me, "but without the Russians. It must approve the actions of the mayor and his 10-man cabinet. The Russians are active in the West only in the Air Safety Center, which maintains the air corridors into the city, and in Spandau Allied Prison."

Lone Prisoner's Board Proves High

At war's end the Allies arrested hundreds of Germans for trial as major war criminals. Twenty-one leading Nazis among the accused came before the International Military Tribunal at Nürnberg, which condemned 11 of them to the gallows, acquitted three, and sent seven to cells within the grim walls of Spandau, a huge red fortress in the western part of Berlin. Releases and paroles have long since emptied the prison of all its inmates except one—and his continued confinement is costing $300,000 a year.

The solitary prisoner is Rudolf Hess, the last of the top Nazi chieftains, who startled the world in 1941 by flying alone to Scotland and trying to negotiate a peace.

One rainy Sunday I drove to Spandau, a complex of old brick buildings surrounded by a high brick wall. Small towers like minarets spring from its rooftops. As I arrived, I saw a French platoon march smartly out through a big iron gate, newly painted green.

One of the four Allied wardens, a colonel who has seen Hess weekly since 1961, told me about the famous prisoner.

"Hess is now 75 years old," he said. "He's mentally alert and in good health, but lives in a world of his own. He talks only when spoken to, and reads about ten books a week. He may order any book he wishes, as long as it doesn't deal with the Nazi period of Germany. He shuns politics in discussions but receives four newspapers each day, three from the West and one from the East.

"For almost twenty years he refused to have any visitors at all. Except for wardens, only his lawyer has seen him in the past three years, and then only five times."

"How does he look?" I asked.

"His eyes strike you first," the colonel said, "those sunken, bushy-browed eyes. He's six feet tall and a little bent and weighs only 158 pounds. When spoken to, he fixes his eyes on you and concentrates on you."

"What kind of strength sustains a man without human companionship," I asked.

"He doesn't consider himself guilty of any crimes," the colonel said. "At 75 he still holds to his innocence."

The United States, Britain, and France have asked repeatedly for the release of the aging Hess. But four-power unanimity is required, and the Soviets have been able to block a pardon with their veto.

Lawyers Handle East-West Exchanges

My arrest in East Berlin made me anxious to discover what possible recourse my wife would have had to obtain my release. Since the United States does not recognize the German Democratic Republic, there are no direct official channels with the East Germans. The U. S. Mission in Berlin must work through the representatives of another power, the Russian Embassy in East Berlin, to help

any Americans experiencing difficulties within the territory of the GDR.

But I found that a curious informal channel has been set up for dealings that involve both East and West. The channel consists of the personal good offices of a few lawyers who have been able to establish useful though unofficial contacts with authorities. For the future, I have instructed my wife to lose no time in trying to get in touch with one of these attorneys.

On my last night in Berlin I called on a young lady, Beate Lindemann, a recent political-science graduate of West Berlin's Free University. She had invited me to a student party at the basement apartment of a friend, a young law student. In a wonderfully relaxed atmosphere of wine and wurst we talked about students from both East and West.

Ring Provided Passports to Freedom

One guest at the party was a pretty young airline stewardess who, I learned later, had helped almost 1,000 East Berliners escape. She was part of a ring of twenty students who obtained Swiss and French passports,

Reassurance for West Berlin, American soldiers of the Berlin Brigade muster for review last June by Gen. Jacques Massu, retiring commander in chief of the French forces in Germany, and the U. S. commander in Berlin, Maj. Gen. R. G. Ferguson. France, Britain, and the United States maintain a combined force of only 12,750 troops, but guarantee West Berlin's security. President Richard Nixon, repeating the pledge during a visit to the city last February, declared, "Your will to remain free strengthens the will to freedom of all men. . . ."

including visas valid for entering Sweden and Denmark. They even provided foreign clothing labels to sew into the garments of the refugees to help support their passports.

The students would go to East Berlin and drop the passports into the mails, addressed to the refugees in care of general delivery at one of the post offices. The refugees would pick up the passports and depart for Scandinavia the very same day, via train and ferry to Malmö in southern Sweden.

For almost six months, six people a day left in this way. But the Vopos at last discovered the hoax. A man carrying a French passport was heard speaking a perfect German Saxon dialect. When interrogated, he could not speak a word of French. The counterfeit passport ring was broken.

Another guest at the party was an economics student who had escaped from the East (where his mother and father remain) by crawling through an old sewer pipe. He told of the frenzied flight. Guided only by a street map, he crawled for hours—only to find, each time he surfaced, that he was still in the East. Finally he got to an outlet that he thought was in the West—but he could not lift the huge sewer cover. He shouted, but no one heard him. His only solution, he thought, was to attract attention by smoke. So he burned his large map. Firemen came to investigate the source of the smoke, pried loose the manhole cover, and he was pulled up to safety.

Encirclement Inhibits Travel

Adventures such as this serve to highlight the lack of mobility in a city enclosed on all sides by an unfriendly state.

"The students feel that West Berlin is in trouble," said Beate. "Everywhere they go they bump into the Wall. And the frustrations of travel! On weekends all planes are often booked for weeks in advance, so that you must take your car or go by train. The East Germans charge you 5 marks each time you cross their borders, though the West German Government will reimburse you later. I once took along a dog whose health certificate lacked an official veterinarian's signature, and it cost me an extra 20 marks and two hours to get out.

"It is a risk to take political books out by road. You might find yourself waiting three or four hours at the border, while the Volkspolizei inspect your baggage, before you are permitted to leave. It's like living on an island,

CATACOMBES © N.G.S.

Halted at Checkpoint Charlie, an American motorist undergoes questioning by a Communist border guard. East Germany annually collects $5,000,000 in taxes on traffic to and from West Berlin.

Tragic symbol of division, the Wall reminds East Berliners of lost freedom. Dogs barked fiercely as the author at midnight photographed the "death strip" from a ladder on the Wall's western side.

overcrowded and without freedom to move."

Some people believe that these conditions contributed to violent student rioting that broke out at Berlin's Free University, though others note that similar protests occurred in several West German schools about the same time. One of the student leaders was Rudi Dutschke, who began to lead strikes in 1966, and in 1968 was shot and wounded seriously by a would-be assassin. I asked Beate about rioting, which has continued sporadically at the university.

"Dutschke was a real leader, but since he was shot things have been chaos," answered Beate. "Most of the student revolutionaries now are very young, with little idea of what they are fighting for. One day we had a seminar, and five dirty bearded students broke into the room. They called the professor a *'Fachidiot'*—one who knows only one subject. They threw colored eggs filled with paint; they tore up his notes and books. The professor left the class.

"These students are destroying the university in Berlin."

My feeling was that Beate was right. I had already toured the Free University and had found the Political Science Department buildings a shambles. Walls were inscribed with slogans: *"einfallslos*—no imagination" and *"relegiert Harndt*—get rid of Harndt" (rector of the university).

The Economics School, its main windows broken, was closed and barricaded by students who had sealed themselves inside. They were demanding greater participation in university government. Everywhere were the sunburst marks of paint-filled eggs, on both the inside and the outside of the buildings.

Hope Voiced for a United World

A surprise guest that last night at Beate's party was a pretty Czech girl, a visitor to West Berlin, who worked as a secretary in a Prague publishing house.

"Something must change," she said. "It cannot go on like this indefinitely. Eventually over the years there must be an agreement to settle the war, to settle student unrest, to settle divisions between people and governments. Eventually there must be an accommodation. Maybe Berlin will become the *Knotenpunkt*, the meeting place, where the knot is tied that joins East and West.

"What young people are searching for is the kind of system, call it what you like, that can solve the problems of worldwide division that Berlin symbolizes.

"Berlin, remember, could also be the place where the cold war ends." THE END

Into the spotlight of study come two mountain gorillas, whose existence is threatened by the encroachment of man. Only scattered groups remain to roam the misty forests of central Africa (map, page 50). Living and working among them, the author has won a rewarding familiarity with these powerful animals. Beneath their fierce appearance, she has discovered, lies a shy and gentle nature. These two adult males watch with keen interest as she photographs them in dense growth from 25 feet away.

MAKING FRIENDS WITH MOUNTAIN GORILLAS

In remote African highlands, a daring American woman studies some of man's closest nonhuman relatives in their age-old environment

By DIAN FOSSEY *Photographs by ROBERT M. CAMPBELL*

EXTACHROME BY DIAN FOSSEY © NATIONAL GEOGRAPHIC SOCIETY

FOR THE PAST THREE YEARS I have spent most of my days with wild mountain gorillas. Their home, and mine, has been the misty wooded slopes of the Virunga range, eight lofty volcanoes—the highest is 14,787 feet—shared by three African nations, Rwanda, Uganda, and the Democratic Republic of the Congo.

During this time I have become well acquainted with many of the gorillas, and they with me. They roam the mountain slopes and saddles in groups, and several groups now accept my presence almost as a member. I can approach to within a few feet of them, and some, especially the juveniles and young adults, have come even closer, picked up my camera strap, and examined the buckle on my knapsack. One has even played with the laces on my boots, though I have a feeling that he did not suspect that the boots were, in fact, connected with me.

I know the gorillas as individuals, each with his own traits and personality, and, mainly for identification in my hundreds of pages of notes, I have given many of them names: Rafiki, Uncle Bert, Icarus, and so on.

Seeking the life secrets of the mountain gorilla, 37-year-old Miss Dian Fossey (below) left her job as an occupational therapist in California and journeyed to Africa, gaining assistance from the National Geographic Society upon the recommendation of eminent anthropologist Dr. Louis S. B. Leakey. Here, with bearers carrying her supplies, she strikes out for a new camp on Mount Visoke, background, after political turmoil forced her from a nearby base in the Democratic Republic of the Congo. When poachers disturbed the Visoke gorillas, Miss Fossey donned a Halloween mask and frightened the intruders away.

Line of peaks bordering Rwanda, Uganda, and the Congo (pictorial map, opposite) shelters about *375 Gorilla gorilla beringei*, part of the 5,000 to 15,000 that survive in central Africa (map, right).

This familiarity was not easily won. The textbook instructions for such studies are merely to sit and observe. I wasn't satisfied with this approach; I felt that the gorillas would be doubly suspicious of any alien object that only sat and stared. Instead, I tried to elicit their confidence and curiosity by acting like a gorilla. I imitated their feeding and grooming, and later, when I was surer what they meant, I copied their vocalizations, including some startling deep belching noises.

The gorillas have responded favorably, although admittedly these methods are not always dignified. One feels a fool thumping one's chest rhythmically, or sitting about pretending to munch on a stalk of wild celery as though it were the most delectable morsel in the world (following pages and 59).

Gorillas are the largest of the great apes.* A mature male may be six feet tall and weigh 400 pounds or more; his enormous arms can span eight feet. The mountain gorilla's range is limited to a small area of lush wet forests in central Africa. There only a few thousand remain, leading a precarious existence (map, opposite). Part of the territory they occupy has been set aside as parkland, and, theoretically, gorillas are strictly protected. But in fact they are being pushed into ever-smaller ranges, chiefly by poachers and Batutsi herdsmen. Unless a better-planned and more-determined

*The more numerous and slightly smaller lowland gorilla, found mostly in western Africa, has been the subject of a recent study led by Dr. Arthur J. Riopelle of the Delta Regional Primate Research Center of Covington, Louisiana, and supported by the National Geographic Society.

Bridging the gap between man and animal, the author and a 400-pound gorilla she named Rafiki take one another's measure. Miss Fossey, with notebook and binoculars, keeps arms folded —a gorilla gesture of submission—to show she means no harm.

Inspired by the unique study of chimpanzees by Baroness Jane van Lawick-Goodall, Miss Fossey undertook her close-range research of gorillas three years ago. In the early days, the animals, upon spying her, would scream and run. But by imitating their actions, avoiding threatening gestures, and waiting for them to come to her rather than advancing on them, she has so quieted their fears that some of the younger ones have come close enough to toy with her clothing and equipment.

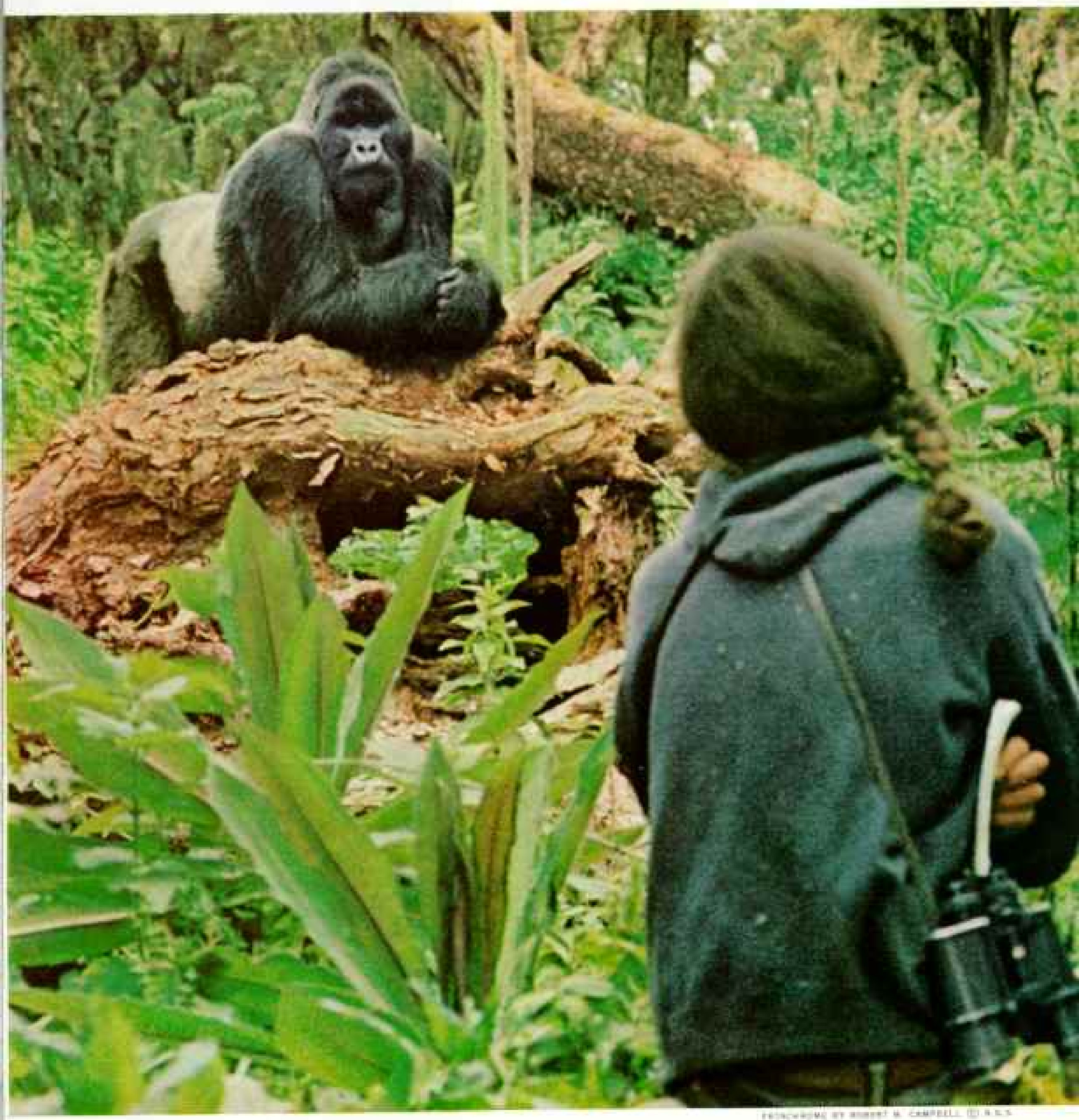
Largest of the great apes, gorillas live in groups, each recognizing the leadership of a huge silverback such as Rafiki, whose back has turned white with age. Subordinate males, called blackbacks, left, serve as sentries.

effort is made to save the mountain gorilla, it is doomed to extinction within the next two or three decades.

One of the basic steps in saving a threatened species is to learn more about it: its diet, its mating and reproductive processes, its range patterns, its social behavior. I had read of Jane Goodall's studies of chimpanzees and visited her camp in Tanzania's Gombe National Park.* In 1967, with help from Dr. Louis Leakey and grants from the National Geographic Society and the Wilkie Brothers Foundation, I began a study of the gorilla.

The study was not without interruptions, one of them quite serious. I began my work in the Congo on the slopes of Mount Mikeno. After only six months of observation, I was forced to leave the country because of political turmoil in Kivu Province. This was a substantial setback, for the gorillas there roamed

*See the Baroness van Lawick-Goodall's fascinating article, "My Life Among Wild Chimpanzees," GEOGRAPHIC, August 1963, and her "New Discoveries Among Africa's Chimpanzees," December 1965.



PAINTING BY ROBERT M. CAMPBELL © N.G.S.

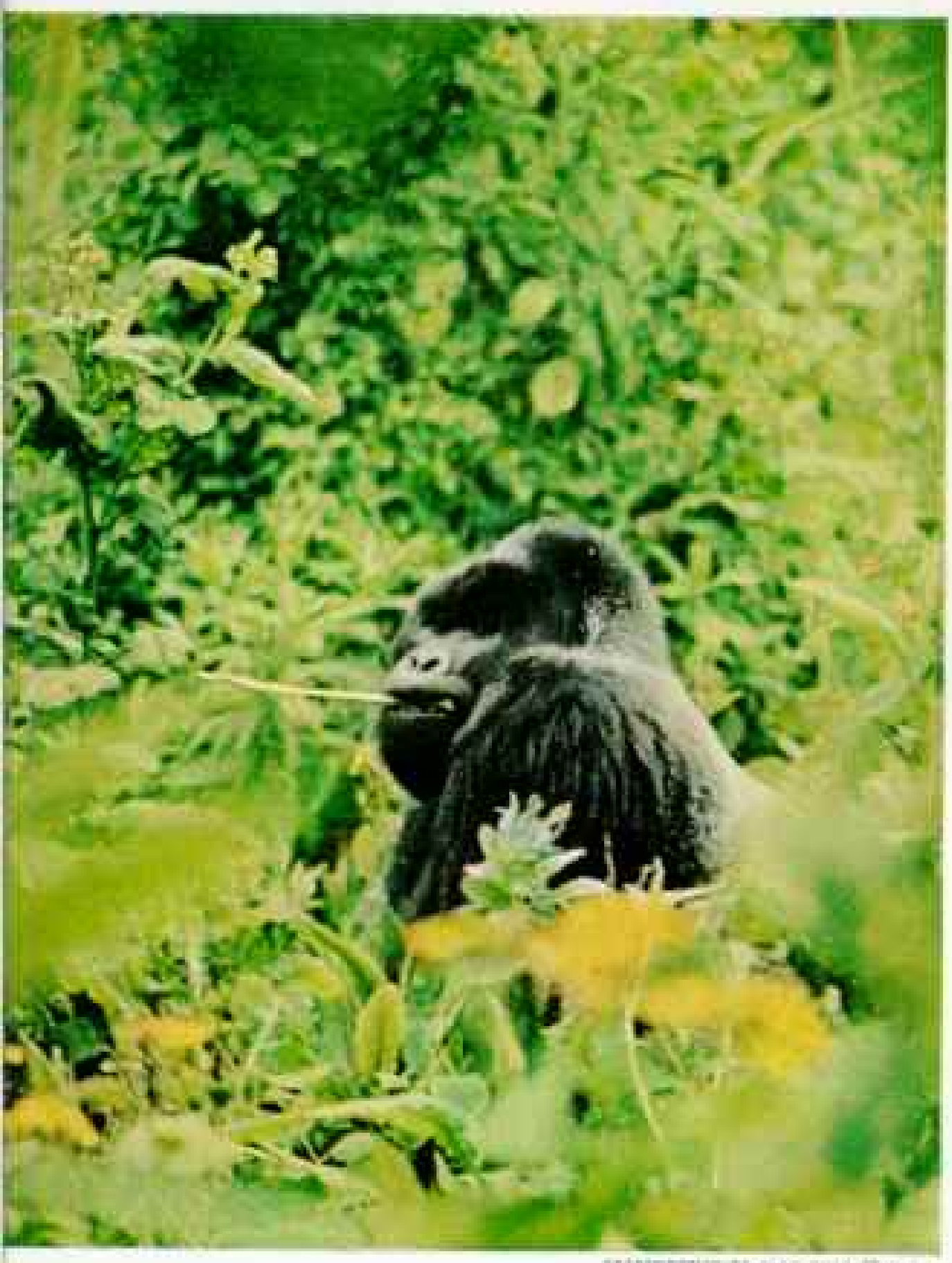
within a fairly well-protected park system without the constant threat of human intrusion. Thus they were not unduly frightened by my presence, and observations were extremely profitable.

After leaving the Congo, I started again, this time in Rwanda. My new camp is near a broad meadow that forms part of the saddle area connecting Mounts Karisimbi, Mikeno, and Visoke (pages 56-7).

Although my old camp was only five miles away, I was to find that the Rwandese gorillas had been so harassed by poachers and cattle grazers that they rejected all my initial attempts at contact. It was in Rwanda, after 19 months of work, that the second interruption came. But unlike the first, it was to prove highly valuable to my study.

Piteous Cries From a Playpen Prisoner

Its beginning is still vivid in my mind—a misty morning in February as I walk up a slippery elephant track of mud that serves as the main trail between the nearest Rwanda



PHOTOGRAPHED BY ALAN NICHT © N.G.S.

More bluff than bite

NERVOUSLY BEATING HIS CHEST to relieve tension, a young blackback in the fork of a *Hagenia* tree (right) expresses his apprehension at the presence of the author and photographer. A worried gorilla (above) mouths a stick while eyeing them, much as a man might anxiously chew on a pipe.

Fictionalized portrayals of gorilla savagery toward humans are grossly exaggerated, says Miss Fossey. Once a silverback led a roaring charge against her, coming within a yard, but the incident represented a rare moment of aggressiveness in 2,000 hours of close observation of gorillas in the wild. Alarm, she believes, prompted the action, which was meant as a bluff.

village and my gorilla observation camp at 10,000 feet on Mount Visoke (pages 50-51). Behind me, porters carry a child's playpen, its top boarded over. From the playpen comes a wailing which grows louder and more piteous with each step we take. It sounds distressingly like the cry of a human baby.

Helpers Move a Forest Indoors

The chilling fog swirls a tag game in and out of the great trees; yet the faces of the porters drip sweat after the four hours of hard climbing since leaving the Land-Rover at the base of the mountain. Camp is indeed a welcome sight, and the three Africans who comprise my staff come running out to greet us.

The previous day I had sent them a frantic SOS asking them to convert one of the two rooms of my cabin into a forest. To ruin a room by bringing in trees, vines, and other foliage had seemed to them sheer nonsense, but they were used to my strange requests.

"*Chumba tayari*," they now call, telling me the room is all ready. Then, with many screams and orders in Kinyarwanda, Rwanda's national language, they wedge the playpen through the doors of the cabin and deposit it amid the trees that sprout between the floor boards.

Now I pry off the top boards of the playpen and stand back. Two little hands appear from the inside of the box to grip the edges, and slowly the baby pulls himself up. His large brown eyes gaze about the room that is to be his home for the next 68 days. They blink at the sight of familiar mountain vegetation left behind so unwillingly when he was captured almost a month previously.

Then the small black bundle leaps into a pile of nesting material. Hands beat upon the foliage in excitement. But enough of that, there's a tree to climb! Up he goes, hand over hand, until he reaches the ceiling—certainly an unusual way for a tree to end!

Eventually he sits down to peer longingly through the window that faces the slopes of Mount Visoke just a few hundred yards away, and there he finally cries himself to sleep in pathetic body-wracking sobs. Coco, my first infant gorilla charge, is "at home."

In a week's time Coco, a male about 16 months old, was joined by Pucker Puss, a 2-year-old female full of complexes and inhibitions. However, by the time Pucker arrived at camp, Coco was beyond enjoying her company. He was as near death as an animal can be without dying.

Both gorillas had been captured by Rwandese park guards and tribesmen for a zoo in a

Two-room sheet-metal cabin on Mount Visoke shelters the author, who catches up on her notes after an eight-hour hike through damp undergrowth to observe gorillas. An African on her three-man staff chops firewood. The pit fire beside her burns day and night to dry clothes, heat water, and provide warmth in the chill air 10,000 feet up on the 12,000-foot mountain.

Two baby gorillas (pages 60-65 and cover) boarded temporarily in the cabin. To make them feel at home, Miss Fossey filled a room with foliage and installed trees. The babies played in the wire enclosure at right.

European city—despite the fact that international conservation authorities have declared the mountain gorilla a rare species, its numbers so limited that survival is a concern. Though I deplored the capture, I volunteered to take care of them until they were shipped away.

Coco had spent 26 days in a wire cage that allowed him no room to stand or sit up. His diet had consisted of alien foods and no liquids, but he had accepted bananas readily and so had managed to survive.

Pucker Puss had refused to eat at all. She was terribly thin and weak, and shared with Coco an intense fear of humans.

The following few weeks were spent in getting acquainted with the young gorillas, giving them medication around the clock, and introducing new foods and formulas. Ever so slowly, they learned to trust me.

Those were trying days, and to make matters worse, the cook quit when I asked him to help out with formula preparation and bottle sterilization. He informed me in Swahili, "I am a cook for Europeans, not animals." The other men were also on the verge of leaving—what with constant demands for fresh foods from the forest and the removal of even fresher dung from the room.

I had to give up my field work temporarily, although in the end my field studies were supplemented and speeded by what I learned from my young charges. This was true especially after they recovered their health sufficiently

RENDERING BY ROBERT W. CAMPBELL © N.G.S.

to be taken out into the surrounding forest.

These excursions provided a unique opportunity for observing feeding habits, grooming, and vocalizations at close range in their natural habitat (pages 60-61 and 64-5). It was fascinating to watch the intricate maneuverings of the animals as they searched for worms and beetles in tree trunks or groomed themselves for minute flecks of dead skin.

Then, all too soon, the infants were demanded for their trip to the zoo. Their last excursion into the forest was a maudlin one on my part, but happily the babies did not know they would never see their mountain home again.

Silverback Rules Each Forest Group

Two days after Coco and Pucker had left, I resumed my field work. But after more than a two-month absence from my wild gorilla groups, I was uncertain of my reception.

Thus far in my studies I had watched nine groups, each numbering from 5 to 19 members. The average was 13. Of these nine, I had chosen four for close-up observation.

One dominant male, or silverback (so called because the hair across the male gorilla's back turns silver with age), reigns without question within each group. The subordinate males serve as sentries and guards.

For clarity in my field notes, I refer to the groups by numbers. The gorillas I contacted on my first day back in the field were Group 8; they are headed by Rafiki, a wise old silverback (page 53).

Armed with some new vocalizations learned from Coco and Pucker, I approached the group, feeling like a stranger. Would I have to win their acceptance all over again?

"*Naoom, naoom, naoom,*" I croaked, first in the deep tones of Coco, then in the higher-pitched voice of Pucker. (This particular sound, I had learned, apparently meant, "Food is served. Come and get it!") The reaction was something to behold. Rafiki came up to me with an expression that seemed to say, "Come on, now. You can't fool me!" They had not forgotten me.

Rafiki's particular group is unique in that there are no females or infants. Since the five males have no young to protect, they give full rein to their curiosity. It would seem that the boredom of their bachelor life is relieved by the many contacts we have shared.

These contacts have been very exciting ones. Sometimes I observe the group from a tree, and Peanuts, Geezer, and Samson, the three youngest males, climb up to join me. It is they who investigate my camera equipment and my boots and clothing.

Rafiki and his friends were not a bachelor group when I first met them almost two years earlier. Living with them then was an elderly, doddering female with atrophied arms, dried-up breasts, and graying head; I estimated her age at about 50 years. If it isn't being too anthropomorphical, the five males seemed to love her, and most group activities centered about this aged matriarch. I named her Koko.

Mutual grooming—a kind of social ape behavior involving meticulous hair parting, searching, and plucking of particles—could always be induced by Koko. When she started it, the others would follow suit, and within a few minutes there would be an entire chain of intently grooming gorillas—a most unusual occupation among these particular apes. Since Koko's death some twenty-three months ago, I've noted mutual grooming within this group on only two occasions.

Koko's Final Trip Poses a Mystery

Not long before she disappeared, Koko showed signs of actual senility by wandering away in aimless circlings. On such occasions the five males would just sit down and wait for her return. Sometimes Rafiki would give a soft hoot-bark, causing Koko to head back toward him. She would then go up to Rafiki and embrace him in a most human-appearing way; invariably he would return the embrace.

Gorillas build sleeping nests—usually on the ground—of foliage, branches, and sometimes moss or loose soil. Frequently Koko and Rafiki would share the same nest, and looked for all the world like a gracefully reclining old married couple who need no words to strengthen their mutual respect.

Then, for two days, Koko and Rafiki were absent from the group, leaving the remaining

The woman who came to dinner: Crouched in a ravine, Miss Fossey picks leaves to chew, a gesture of reassurance for a curious blackback. Her gloves protect against nettles. Partial concealment heightens gorillas' interest, the author discovered. She avoids standing, since that might cause uneasiness in the animal, who leans on callused knuckles in the stance gorillas favor.

three males under the eager leadership of a silverback I've named Pugnacious. Indeed, Pugnacious was just about to be carried away by his newly assumed responsibilities when Rafiki returned—alone.

What happened to the body of Koko I shall probably never know. An immediate backtracking of the two-day-old trail showed that she had shared night nests with Rafiki, and then it seemed as if the earth had literally swallowed her up.

Uncle Bert Shows a Softer Side

I've found that the character of a group is frequently determined by the character of its leader, and I had an opportunity to observe, in one instance, what happened when the leadership changed.

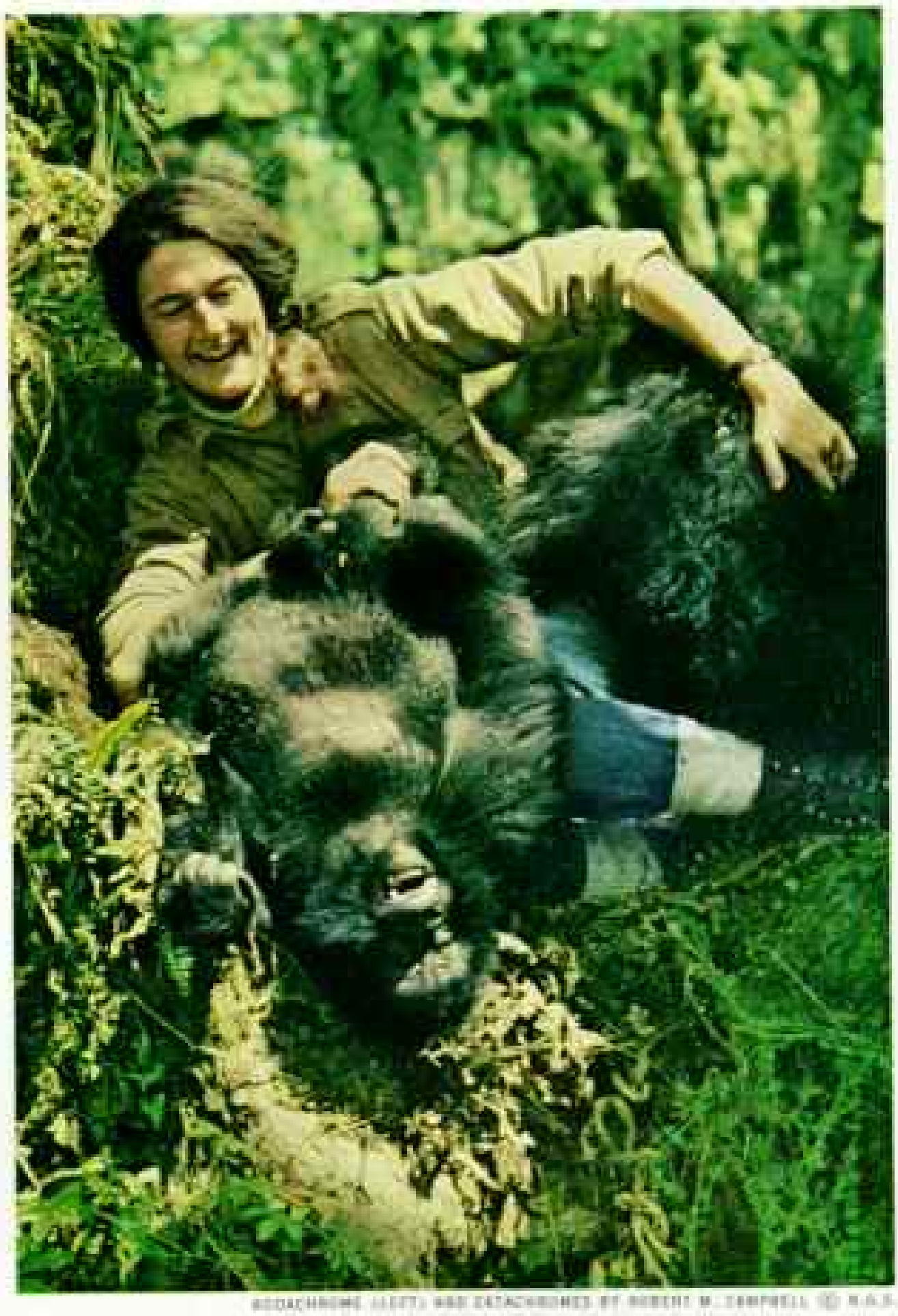
When I first encountered Group 4, it was under the calm rule of a silverback named Whinny—the name because he was unable to vocalize properly. Yet the little horselike neighs that came from him were as effective in alerting his group as were the louder roars and screams of the other silverbacks.

But after some months of sickness, Whinny died, and leadership was taken over by another silverback, Uncle Bert. He clamped down immediately on the group's activities like a gouty headmaster. The gorillas' previous calm acceptance of my presence was replaced by chest beating, foliage whacking, hiding, and similar alarm activities.

Not only their behavior but their route was also changed significantly. Instead of utilizing the lower and midsections of Visoke, Uncle

Hairy hug from Pucker repays human kindness. Miss Fossey nursed both youngsters to health after their capture and imprisonment for zoo collectors.

"Our schedule would do justice to the fussiest maternity ward," she said of their care, which included formula preparation, burping, and bottle sterilizing.



AUTOCHROME (LEFT) AND DETACHROMES BY ROBERT M. CAMPBELL © N.G.S.

Tickle time: Pucker Puss, a captive two-year-old female, and Coco, a 16-month-old male, enjoy a frolic. Watching gorillas in the wild, the author found adult males to be very protective and tolerant of the young. She once saw an old male, Uncle Bert, tickle an infant with a flower, as might a kindly grandfather.

Speak no evil: One of the babies claps a hand over the author's mouth during a romp. The male will reach maturity at about eight years, the female at seven.

Bert persisted in taking the group higher and higher toward the summit ridges.

Perhaps too quickly I labeled Uncle Bert a cantankerous old goat. One day, as their rest period was breaking up, a small infant approached him and leaned against his back. I was about to predict an unhappy fate for this baby, but Uncle Bert surprised me. He picked up a long-stemmed *Helichrysum* flower and tickled the baby with it. Soon the infant was scampering about like a puppy, and Uncle Bert was lying on the slope, tickle switch in hand and a most idiotic grin on his face.

Mother Provides a Baby's First Slide

Play seems to be one of the first activities inhibited by the presence of an observer until a group becomes well habituated. For this reason I consider it more common than previously thought.

The most popular game is sliding. Infants practice this on the mother's body, then graduate to dirt banks and tree trunks. The favorite playtime seems to be a sunny morning or after an afternoon rest period.

I watched one afternoon as a feeding group reached an open lava slope. While most of the gorillas were still eating, two young adults chased one another across the clearing. The others stopped feeding to watch.

Then, in a sequence lasting more than 20 minutes, the rest of the group joined in, tumbling and rolling across the slide area. When they reached the edge of the clearing, they grabbed branches of giant *Senecios*, swung on them until they broke, and, still holding the foliage, rolled in a jumble down to the bottom of the slope.

Brahms, Bartok, and Beethoven, the three silverbacks of Group 5, have taught me to what extent they will go to protect their young. These particular three have a very close rapport with their fellows. Often they give rein to paternal inclinations by casually plucking infants from their mothers' arms to groom them. The older infants and juveniles seem very secure in the protection of the adults; as a result, they push the silverbacks almost to the limits of their patience.

One day Icarus, a little wizened, elf-eared fellow, was trying out a new acrobatic routine in a sapling some ten feet away from me when the tree came down in a splintering crash, Icarus and all. The crashing noise had barely died away when the air vibrated with the screams and roars of the silverbacks as they charged toward me with the females bringing up the rear. Plainly they held me responsible.

They halted about five to ten feet away when they saw Icarus, none the worse for his spill, calmly climb another tree. Oblivious to the furor he had created, he was all angelic innocence. But the silverbacks remained tense, giving frequent alarm barks.

Then, to my dismay, a small infant climbed into the same broken sapling and began a

Daintily picking, Coco eats blackberry leaves while avoiding the plant's spiny stem. Gorillas also eat wild celery, thistles, nettles, and a vine called *Galium*. They have never been observed eating meat in the wild, unlike their kin the chimpanzees, who sometimes feast on baboons, monkeys, and bush pigs.

Tree-limb acrobatics delight a youngster at camp. In the wild, such antics once threatened Miss Fossey's relationship with a gorilla group; the adults tended to hold her responsible when a juvenile fell.

PAINTING BY ROBERT M. CAMPBELL, © N.G.S.

shaky series of spins, twirls, leg hangs, kicks, and chest pats—all the while exuding blasé self-importance. No high-wire artist ever had such a rapt audience. The eyes of the silverbacks darted back and forth between the infant and me. When our glances met they roared their disapproval.

Surprisingly, it was Icarus who broke the tension. He climbed playfully to the infant's tree and launched a game of tag which led both animals back to the group. Brahms gave a tension-releasing chest beat followed by a noisy run downhill through the thick foliage; Bartok and Beethoven followed suit. The crisis had passed.

"White-fanged Ape-man" a False Picture

My study of the wild gorilla is not yet finished, and even when it is complete, it will contribute only a small part toward man's understanding of his closest animal relatives, the great apes. But one conclusion is already clear: The gorilla is one of the most maligned animals in the world.

After more than 2,000 hours of direct observation, I can account for less than five minutes of what might be called "aggressive" behavior. And even this really amounted to protective action or bluff. That was the nature, I am sure, of my most dramatic encounter, in which five large males charged at me, roaring explosively. They stopped—the leader was only three feet away—when I simply spread my arms wide and shouted "Whoa!"

Naturally an animal is going to try to protect itself, and there are a number of recorded instances of gorillas attacking humans when the latter hunted them. And there are the tales of the "intrepid white hunters" who have "courageously" faced the screaming charges of the white-fanged hairy ape-man. The result is the common, and quite false, picture of the introverted, peaceful vegetarian that I have come to know.

The fact is that when man moves in, in numbers, the gorilla moves out, and therein lies the threat to his existence. The Parc des

"It was a very black day when I took Pucker and Coco into the forest for the last time," Miss Fossey recalled. Releasing the animals to a European zoo was heart rending, but there was one consolation: They had taught her much about feeding habits, grooming, and vocalizations. Later, some of the wild gorillas responded to sounds she had learned to mimic.

Family portrait: Group members huddle around a regal patriarch, at left, in the Congo's Kivu Province, where Miss Fossey began her studies. Knowledge of gorilla behavior, the author feels, can

Volcans in Rwanda, where I conduct most of my studies, is heavily infested with poachers and herdsmen, whose cattle graze right through my camp area. Park boundaries have no meaning to these tribesmen.

The poachers are of two kinds. First there are the honey gatherers living near the forest —mainly land-tilling Bahutu—whose worst crime is cutting trees that harbor bee nests.

The other poachers are usually members of the Pygmoid tribe known as Batwa. Their main prey is normally the duiker, a small red forest antelope. They set snares that may leave the animals hanging up in the air by one leg for days.

They do not, to my knowledge, hunt gorillas deliberately, though occasionally one does get caught in a snare trap. But the sounds of

BIOGRAPHIQUE BY DIAN FOSSEY © N.G.S.

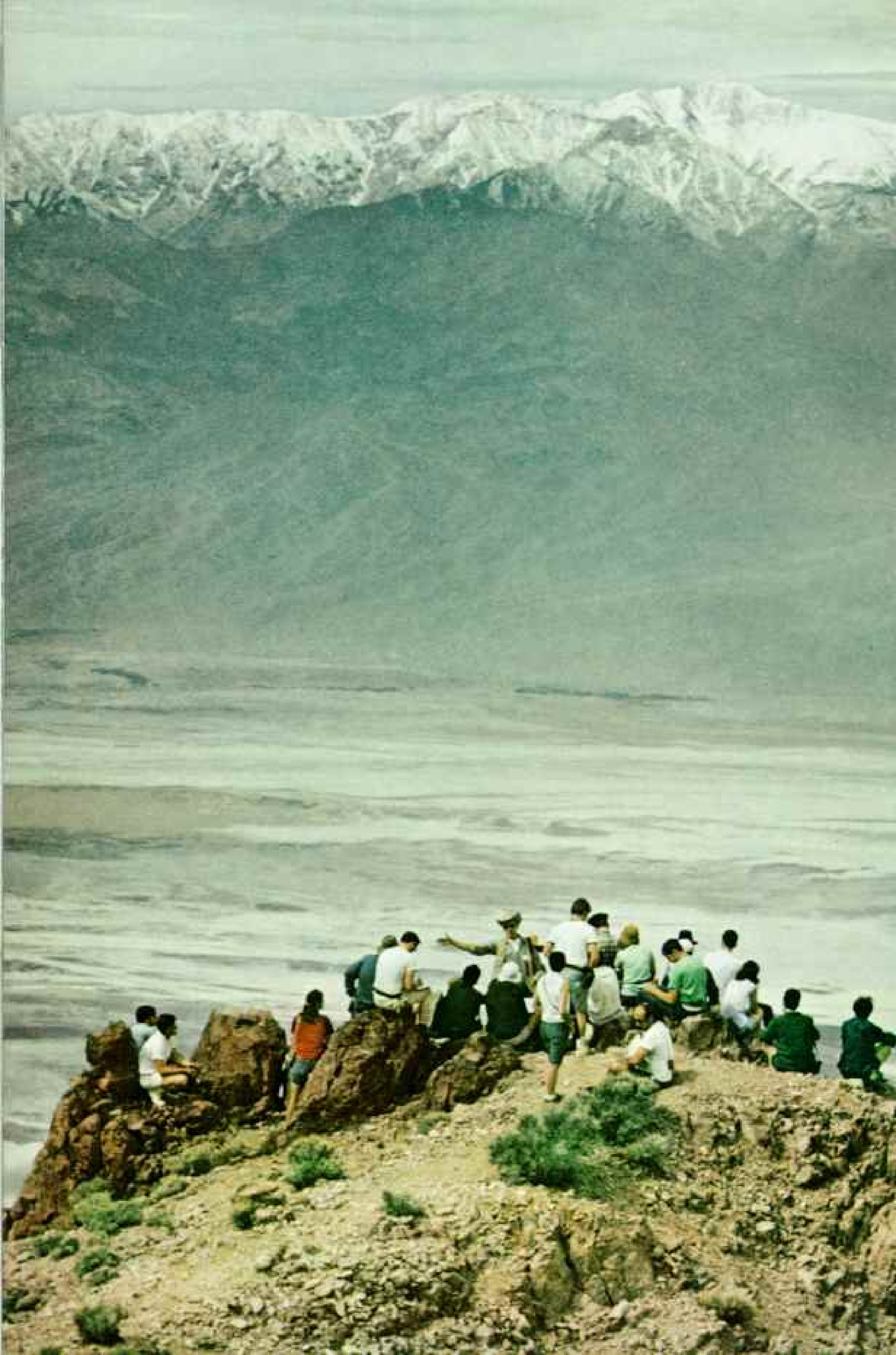
help man protect the species, and even increase his understanding of himself. Unless conservation measures come quickly, she fears that the mountain gorilla may be extinct within thirty years.

the hunt terrify the gorillas; they flee from the hunters, and in one instance that I observed, it took two days for a group to get back together.

Thus the mountain gorilla faces grave danger of extinction, primarily because of the encroachments of native man upon its habitat —and neglect by civilized man, who does not conscientiously protect even the limited areas now allotted for the gorilla's survival.

Money alone will not solve the problem. Conservation groups and political authority must join in concerted programs if this three-nation area and its wildlife are to be saved from human trespassers.

Such help is overdue. I only hope that Rafiki, Uncle Bert, Icarus, and my other forest friends can survive until it comes. THE END



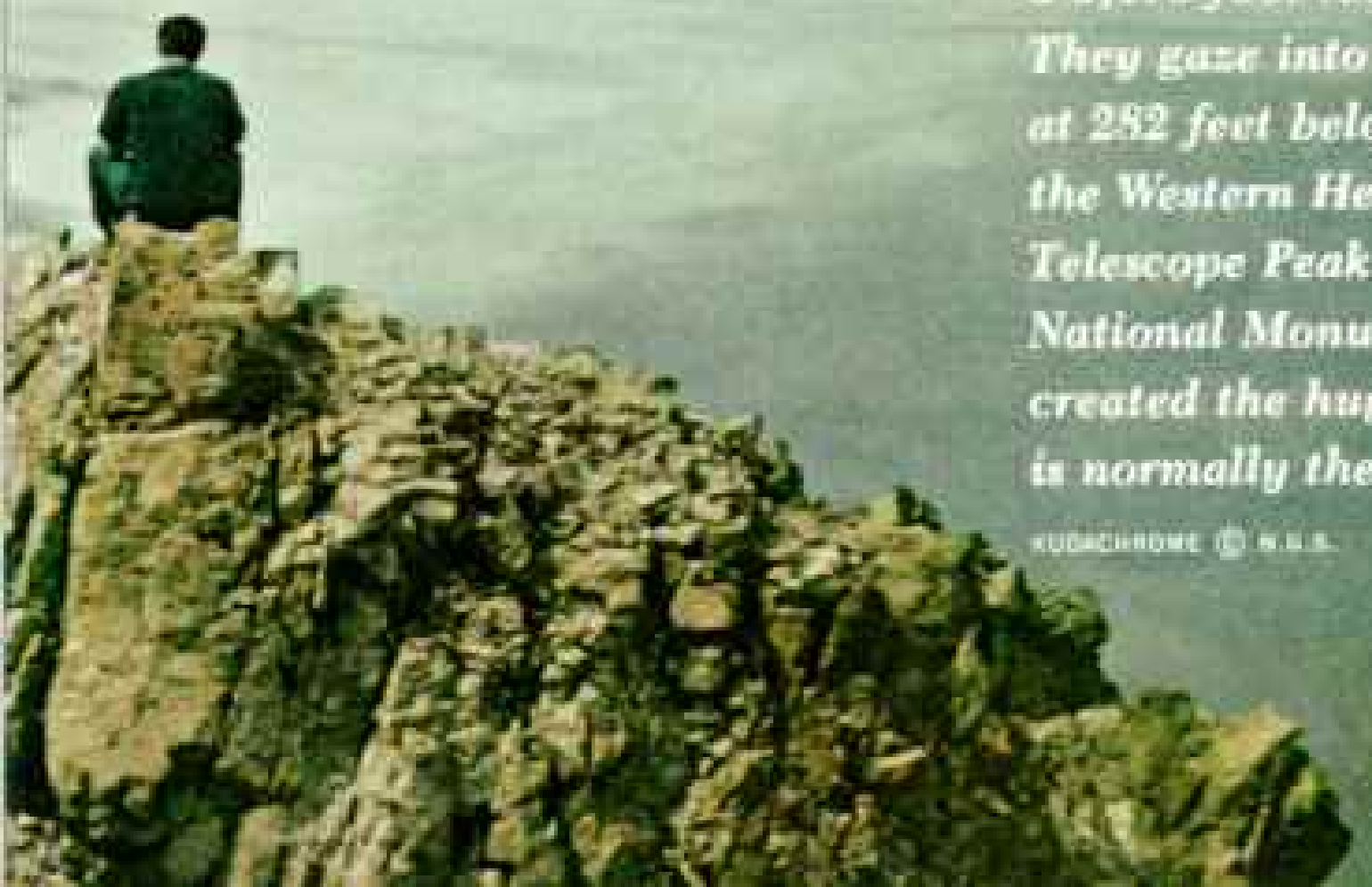
Death Valley, the Land and the Legend

By ROWE FINDLEY
National Geographic Senior Staff

Photographs by DAVID HISER

"IT SEEMED the most God-forsaken country in the world. . . . One fellow said he knew this was the Creator's dumping ground where he had left the worthless dregs after making a world, and the devil had scraped these together a little. . . ."

William Manly's book, *Death Valley in '49*, lay open on the seat of the pickup truck. My wife Virginia had been reading it aloud as we climbed up toward the long evening shadows of the Funeral Mountains. Now as we nosed down into Furnace Creek Wash, toward the deepening gloom of the valley itself, the pioneer's



STARTLING CONTRAST: *Searing trough and snow-capped range awe visitors at Dantes View, a 5,475-foot lookout in the Black Mountains. They gaze into the depths of Death Valley—at 282 feet below sea level the lowest point in the Western Hemisphere. Beyond rises 11,049-foot Telescope Peak. Both lie in Death Valley National Monument. Unusual rains last year created the huge lake, lower right, in what is normally the Nation's driest spot.*

KODACHROME © N.G.S.


APPLE
DRINK
1165
PROCESSED TO ASSURE VITAMIN "C" CONTENT

dark words returned to my mind with almost overwhelming force.

We seemed to be heading toward a hole in the world.

Next morning, in the warm March sunlight of Texas Spring Campground, such foreboding seemed silly. About a mile away the stately date palms of Furnace Creek Ranch waved mirage-like in a gentle breeze. Above them rose the sky-filling Panamints, one of the mountain ranges that seemed to encircle us completely. "There's snow on all of them," said Virginia in delight, "any way you look."

Thus in a night and a day we experienced the opposite moods of Death Valley—themes that would alternate abruptly, disconcertingly, delightfully, throughout our stay. This baffling charm in part explains why half a million people visited Death Valley National Monument last year.

But with 3,000 square miles, Death Valley has room to spare for that much humanity. Often we had the whole world to ourselves as we explored sheer-walled canyons, camped beside desert springs, tramped to long-abandoned mines, discovered gardens of wild flowers rooted in rock.

Lake Blossoms in the Driest Spot

We developed cotton-tongue thirsts trudging the 200-square-mile salt pan that contains the Western Hemisphere's lowest point—282 feet below sea level (map, page 75). In the same area, long known as the driest spot in the United States, we saw an 18-mile-long lake, the result of extraordinarily heavy rains that swept away miles of road. In all, we traveled 2,000 miles in Death Valley, afoot and by car, dune buggy, camper, motor home, and—to leap the floods—by helicopter.

Despite its vast reaches, Death Valley holds the hazard of traffic jams during two weeks of the year. Some 35,000 gather during Holy Week for desert holidays culminating in Easter sunrise services. Around Veterans Day in November, about as many converge to salute the original forty-niners with campfire programs, a trail ride, a burro race, and an old fiddler contest (pages 86-7 and 100).

A clot of traffic three miles long trapped me on my way to the burro race at Stovepipe Wells Village. And it came to me, as I inched along, that I was traveling at about the same pace as the first forty-niners, and over the same ground.

Dire circumstances blinded those pioneers to the delights of the valley, even though they crossed it in winter's mild weather. A false map had led almost a hundred gold seekers across hundreds of desolate miles and down into this uncharted sink of dread. By Christmas Day, 1849, they were spilling out of Furnace Creek Wash and splintering away in fear-haunted little bands to seek escape through the walls of mountains to the west.

Some had begun killing their scrawny oxen for food. Campfire orators cursed the land, Manly recalled, until "it seemed as if there

PHOTOGRAPHED BY DAVID HISER (ABOVE) AND CHERI HISER © N.G.S.

Tumultuous times spice the memories of 82-year-old Tommy Thompson, who lives in the "Bottle House" at Rhyolite, a Nevada ghost town just outside the monument (pages 88-9). A musician, Tommy was playing his accordion in Rhyolite bars in 1905 when saloon owner Tom Kelly built the house, using 51,000 empties from his establishment.

Donations pile up at Teakettle Junction, a response from passers-by to an intriguing place name, presumably inspired by an abandoned teakettle. Offerings include coffee pots—even an electric model.

were not bad words enough in the language to express properly their contempt and bad opinion of such a country as this. . . ."

In the mounting panic, many yielded to a philosophy of every man for himself, but not Manly and his friend John Rogers. To save their small party, which included women and children, the two undertook to push west to civilization, return with food, and then guide all to safety.

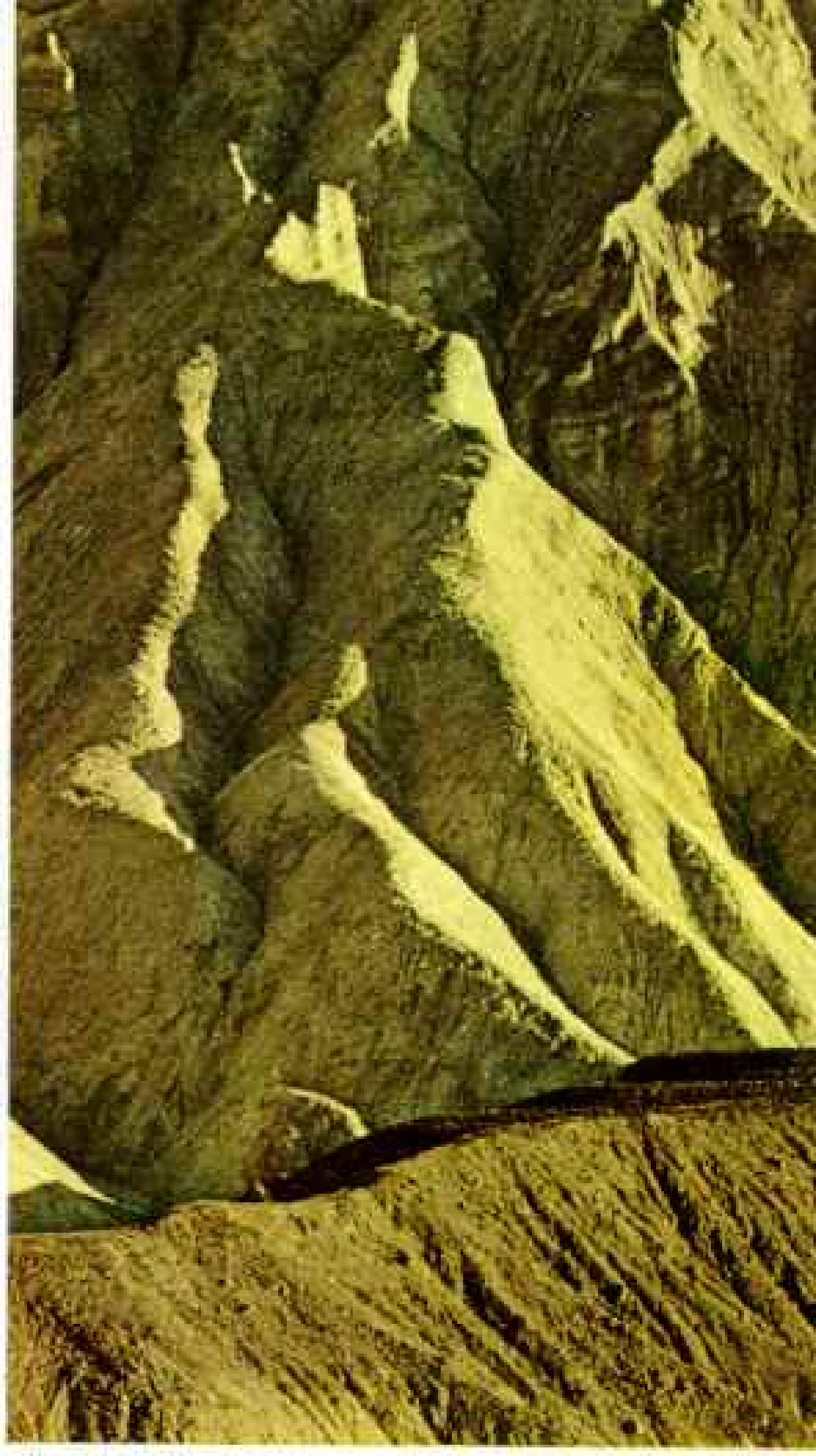
Ox Meat—and a Piece of Ice

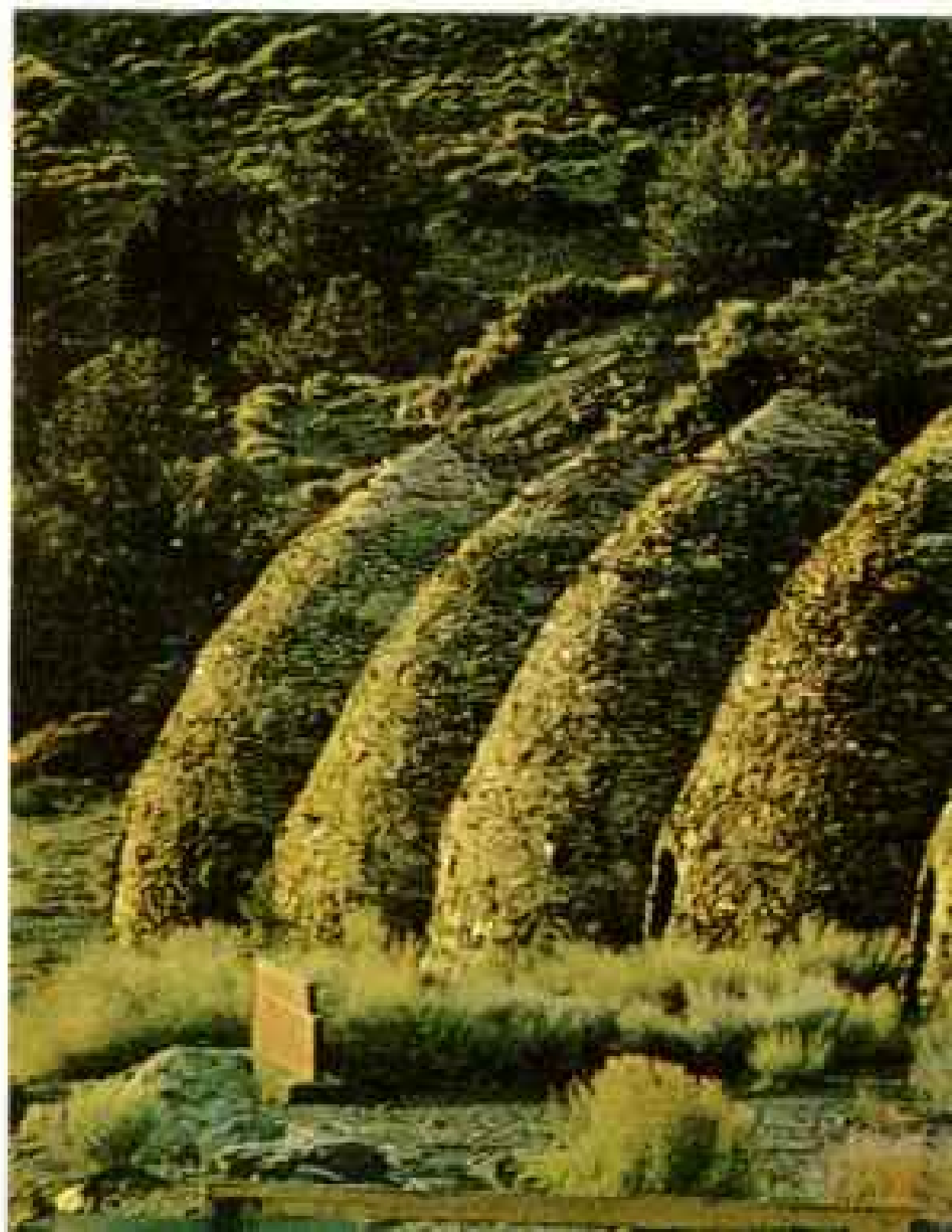
Leaving their friends camped by a trickle of spring under 11,049-foot Telescope Peak, the two young men set out on an epic trial of endurance. Their mouths became so parched that they could not swallow the dried ox meat they carried. "It seemed as if we were going to die with plenty of food in our hand," Manly wrote, "because we could not eat it." Too thirsty to sleep, they struggled on through the night, wrestling with fear, and at dawn came upon a piece of ice, "not thicker than a window glass." It was enough to save them.

They trudged on, at length crossing the Mojave Desert to populated coastal country. Hastening back with food, they passed the bodies of three less fortunate stragglers, and hopes for their friends sank. Their first sight of the camp stirred despair, for nothing moved about the wagons.

Then a head appeared, and a shout went up, "The boys have come! The boys have come!" Soon the two young rescuers were surrounded by gaunt men and women and children. Tears of joy streaked worn faces; hearts were too full for speech.

Manly counseled abandoning the wagons and all possible gear for the 250-mile march to safety. One woman donned her best finery rather than leave it, and dressed her little





Convulsed by earthquakes and clawed by desert cloudbursts, Golden Canyon glows sulphur yellow in the afternoon sun. Girl Scouts pause for a geology lesson: Death Valley exhibits evidence of virtually every major geologic era in two billion years. But the valley itself results from faulting that occurred a mere couple of million years ago.

Like abandoned teepees, charcoal kilns await fires that will never burn again. To produce fuel for smelters, mine owners hired Shoshone Indians to stoke these 30-foot-high ovens, built in upper Wildrose Canyon in the 1870's by Chinese laborers.

son in his Sunday suit. They were in rags when the party finally reached civilization.

Others were not so fortunate; conflicting accounts indicate three to eight deaths in all.

I stood one day where Manly's party probably camped, a site marked by a mesquite-guarded plaque near the salt pan, and scanned the sharp rise of the Panamints to the west. Somewhere up there on a ridge, the departing pioneers had paused and looked back at the scene of so much suffering. And someone uttered the words, "Goodbye, Death Valley!"

With such damnation in its christening, the area acquired a whole lexicon of despair: Arsenic Spring, Badwater, Coffin Canyon, Dantes View, Deadman Pass, Desolation Canyon, Devils Golf Course, Hells Gate, Last Chance Range, Lostman Spring, Lost Wagons, Poison Spring, Rattlesnake Gulch, Starvation Canyon, and Suicide Pass.

Imaginative writers embellished this somber picture. One report described Death Valley as a 30-by-30-mile basin where hundreds had died; another said there was no need to bury the victims because the dry air mummified them. Tales warned of poisonous vapors, of gnats so big and numerous that they stung coyotes to death. The legends about this land got such a fast start that they have never been overtaken by the facts—which are bad enough.

Titus Canyon Walk Turns Thirsty

The first fact is the heat. It became factual to us one glaring June midday as we hastened from shadow to shadow in lofty-walled Titus Canyon (map, opposite).

Ordinarily you can drive through Titus, a winding, 12-mile-long slash into the Grapevine Mountains, a thousand feet deep in some places and barely wide enough for a car. But those spring rains had swept the road away, and it had not been rebuilt by June, when we returned to Death Valley with our three sons. Spectacular Titus was on our must list, so we decided to hike into the lower end during the early morning hours.

"You should make it all right if you get out by late morning," said Dwight Warren, about

HIGHGRADE © N.G.S.

Testament to failure, a derelict car and shack betray someone's hard-lost dream of wealth. Many such sights dot Death Valley National Monument, where prospecting is still permitted. Ironically, these hulks lie below Nevada's Bullfrog Hills, scene of a fabulous 1904 gold strike.

Land of long shadows, Death Valley nestles between high mountains for its entire 140-mile length. Geologists believe alluvial fill has raised the floor by some 9,000 feet, yet 500 square miles remain below sea level. The 3,000-square-mile area became a national monument in 1933.

to retire as the monument's chief naturalist. His replacement, Peter Sanchez, agreed to accompany us. Pete wanted to scout the lower canyon's limestone ledges for rocklady, a rare plant known only to the canyon's upper end and one of 22 plants unique to the monument.

We had the comfort of knowing that the summer really hadn't yet turned hot. After hitting 118° F. on June 1, the temperature had not topped 112—nothing to compare with the official reading of 134.6 attained July 10, 1913. That stood as a world record until a Libyan village reported 136.4 in 1922.

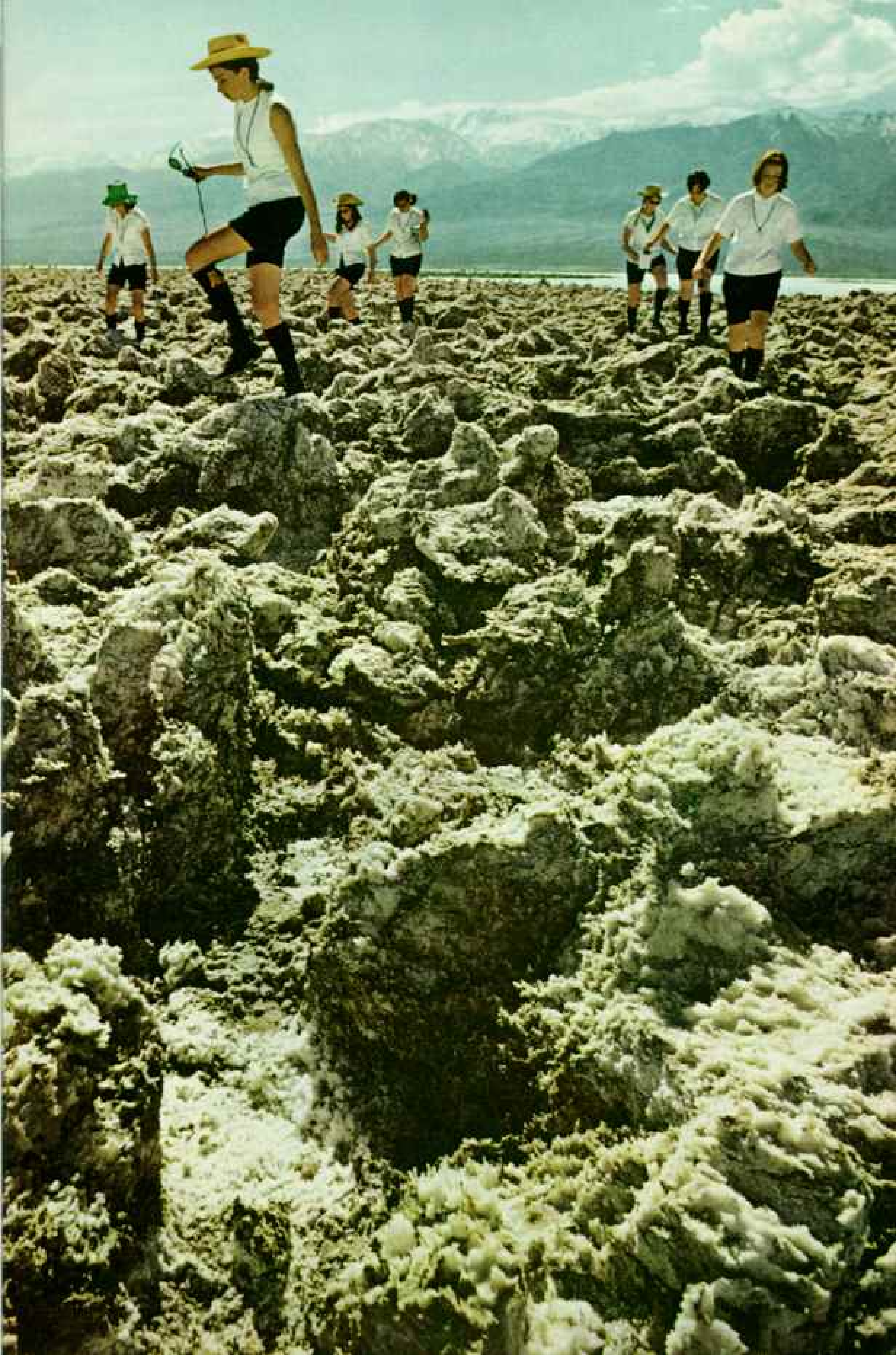
For two miles we dug our boots into the sand-and-stone canyon wash, climbing to an elevation of more than 1,000 feet, while the rock walls heated like an oven. Our dragging pace convinced Pete that he should turn his neophyte party around, though he still hadn't found his rocklady.

Going downhill now, we found the walking easier, but the heat grew steadily worse. Under such broiling, an average man sweats more than a quart an hour, and so we paused for frequent sips from our canteens to prevent dehydration. But the wetness did not kill the sensation of thirst, even though we drank as much as we needed. The craving for more water walked with us.

I began to understand the madness of desperately thirsting men. First comes irrationality, I had heard, so that one motorist died beside a car containing a case of soft drinks that might have sustained him. Next come hallucinations, and Death Valley victims have been encountered holding all their clothes overhead, convinced they were breasting a cooling neck-deep lake.

When we finally reached our big motor home three miles below the mouth of the canyon, our thermometer read only 114. I felt sure it was lying by at least ten degrees.

Two months after we left the valley, the heat of neighboring Saline Valley killed three people whose car stalled, part of a continuing toll of life from varied hazards. Since 1965 area deaths have totaled at least twenty, including two climbers on Telescope Peak and



five drowning victims—three of them motorists swept away in last winter's floods and the other two skin-divers lost in a water-filled cave called Devils Hole.

But just when the hellish face of Death Valley seems all-prevailing, some aspect of Shangri-La appears. Gazing into the briny pool at Badwater, at minus 279 feet one of the salt pan's hottest places, we were captivated by the reflection of Telescope Peak, highest point in the monument, where melting snows nourish bristlecone pines (following pages).*

Trail of a moving rock scars The Racetrack, a 3,708-foot-high dry lake near Death Valley. Some stones leave traces hundreds of feet long. Most likely explanation: fierce winds and a surface made slick by moisture. This rock weighs about twenty pounds.

Devils Golf Course, a waste of lacerating salt crystals, is all hazard and no fairway. Evaporation of a prehistoric lake left some 200 square miles of salt pan in the valley's lowest, driest, and hottest area, where surface temperatures soar to 190° F. No flowering plant can sprout in this salty sink, as near lifeless as any land on the planet.

Some 40 miles to the north, we gazed out at shimmering Sahara-like dunes while standing at chin depth in the pool at the Stovepipe Wells Hotel.

Mesquite Spring detained us with its clear rippling brook beneath a low-arching canopy of gnarled branches in the northern valley. From Dantes View, more than a mile above Badwater, the sight of the whole valley unrolling to north and south gave us a Jovian exultation of owning the world (pages 68-9).

Finally, the moonscape terrain of an extinct, cinder-heaped crater called Ubehebe (pages 98-9), and the dark Precambrian cliffs of the Black Mountains stirred a feeling of being an eyewitness to the first chapter of Genesis.

To feast on such sights, visitors converge on Death Valley in greatest numbers from November to April, when daytime highs range pleasantly in the 60's, 70's, and 80's. Like the pioneers of old, most bring their own shelter on wheels—campers, trailers, motor homes. (One resourceful resident spent a few years living in—and out of—a wheelbarrow and became known as "Wheelbarrow Tex.")

Some return year after year, like Merle and Margaret Stockman of Grants Pass, Oregon, whom we met in the shady aisles of Furnace Creek Ranch trailer park.

In a dozen years of wintering in Death Valley, Merle's knowledge of the area had become encyclopedic: "I don't envy you your task—trying to fit the whole story of this valley into a few magazine pages." A dozen notebooks later and still writing, I understood what he meant. And Margaret taught us much about desert plants, including those she had learned to call "belly flowers," so tiny that "you have to lie flat on the ground to appreciate their beauty."

Wetter Age Tries a Comeback

It was rain, rather than flowers, that held our interest on our first morning in Death Valley. At the national monument headquarters we learned from Superintendent Robert J. Murphy how recent deluges were about to hamper our plans.

"We've had two inches of rain in seven weeks," he said. "Ordinarily, we don't get that much in a year. More than eighty miles of our roads are either washed out or covered with debris."

He was right. We saw highway signs still standing where no vestige of road remained,

*Edmund Schulman wrote of these oldest known living trees in the March 1958 NATIONAL GEOGRAPHIC.

THROUGH APRIL'S DEEP SNOW, *National Park Service Ranger Gil Blinn and Park Naturalist Dorothy Shally approach the crest of Telescope Peak. Far below them the valley's salt pan stretches to the Black Mountains, site of Dantes View (page 69). Bristlecone pines, right, oldest known living trees, cling to upper slopes.*

One cowboy's Camelot: Scotty's Castle stuns the eye with opulence set amid the desolation of Grapevine Canyon. Famed Death Valley Scotty, a bronc-bustin' rider with Buffalo Bill's Wild West Show, turned prospector in 1902. He trekked out of Death Valley in 1905 and began a fabulous spending spree, apparently the discoverer of a rich mine. In a few years the three-million-dollar castle started to rise,

and an 18-mile-long lake in the lowest, hottest, driest spot in the United States.

"You're seeing Death Valley as it was about 20,000 years ago," I told Virginia.

Well, not quite. The lake of 20,000 years ago stretched 90 miles. The last great Ice Age was ending, and a cool, wet climate supported lush vegetation and plentiful game. Indian camps clustered by the lake, and hunters with atlatls—spear-throwing sticks—brought in meat for the tribe. The lake's descending levels are still visible on Shoreline Butte.

Geologists read a fascinating story in how Death Valley was born. For the record, it is not a valley at all in the usual sense.

"It's what geologists call a graben—a great trough," Dr. Thomas Clements told me. "A true valley is carved by the erosive action of water. Death Valley appears to be the result of faulting on a large scale. The mountains on the east and west were uplifted, while the area in between was dropped down below sea level."

Dr. Clements, a consulting geologist, headed

for the pleasure of Scotty and his multimillionaire partner and friend, Albert M. Johnson, who held title to the property.

EXTACHROME (ABOVE) AND KODACHROME BY DAVID MYERS © N.G.S.

In the baronial "living hall," Scotty delighted guests with tall tales. The castle, now owned by a foundation, draws 150,000 visitors a year; these marvel at a wrought-iron chandelier that hangs from a 50-foot ceiling. Water trickling down a wall panel of jasper stones cools the room.

the University of Southern California's geology department for many years. He has been studying Death Valley since 1927. I visited with him and his wife Lydia in their trailer at Furnace Creek.

Where Mastodons Once Roamed

On the geological scale of time, Death Valley is a mere infant, Dr. Clements pointed out, having been formed in the past two million years. But its mountains and canyons bear the marks of almost all the major geological eras for more than two billion years.

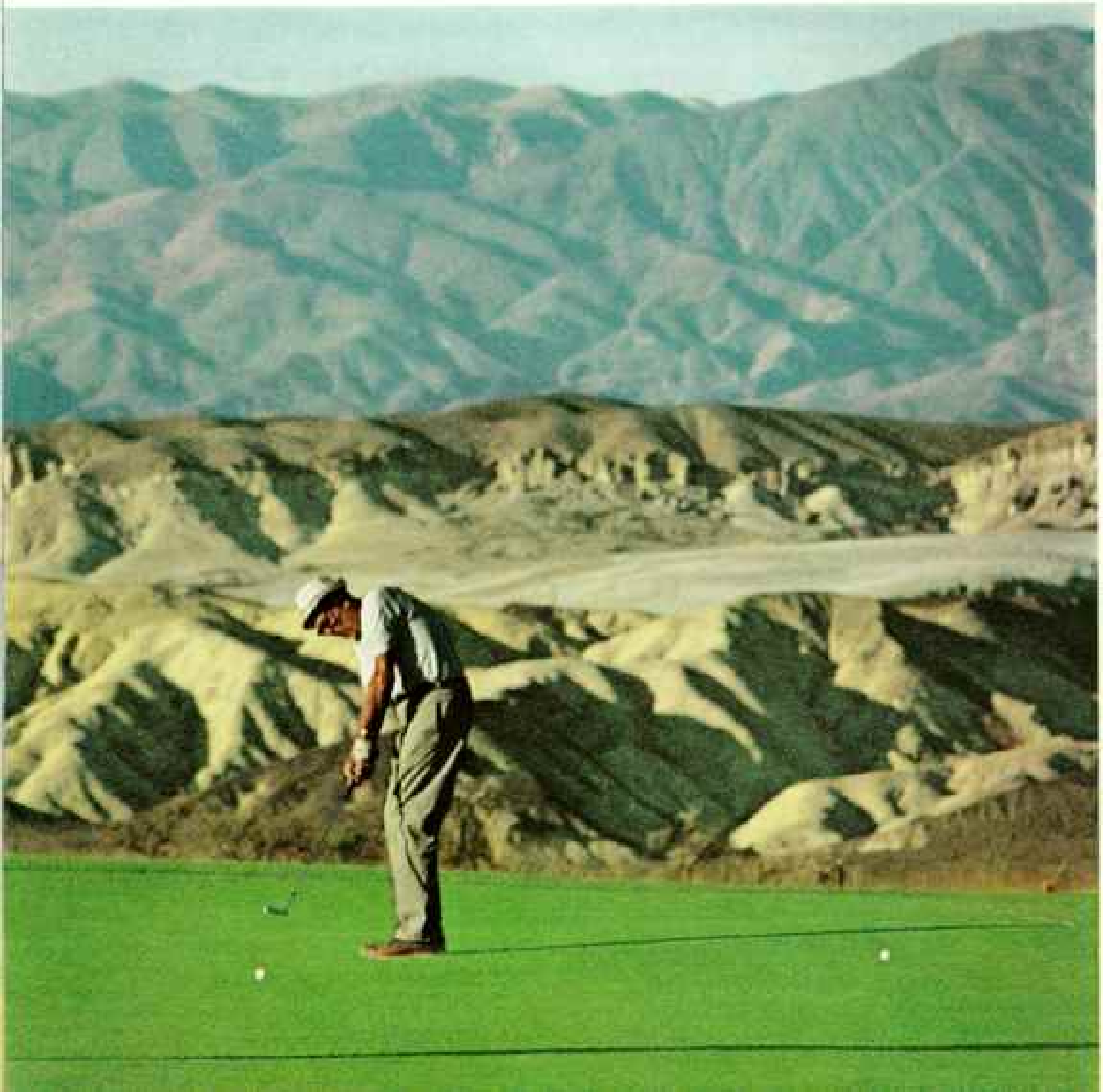
While Dr. Clements surveyed scarps and probed faults, his wife Lydia began to dig into the past of the area's Indians.

"In 1950 my husband and I discovered a site on an Ice Age lake terrace where we found many crude artifacts," she said. "Practically all were flaked scraper-type tools, worked only on one side. Comparison with similar artifacts in adjacent areas places our lake-terrace people in the latter stages of the Ice Age—at least 20,000 years ago.

Man-made oasis: Vacationists converge each winter on palm-shaded Furnace Creek Ranch and distant Furnace Creek Inn, in this aerial view a mere speck of green at the far end of an arrow-straight water channel, center. The inn stands beside the wash where gold seekers trudged into the valley in 1849. Fred Harvey, Inc., owns both resorts. Guests arriving by plane land on the runway, foreground, 220 feet below sea level.

Clear waters and clean, dry air invigorate swimmers relaxing at the inn.

Golfers must swing harder at the ranch's 18-hole course. Heavier below-sea-level air requires more club, says resident professional Albert J. Yates. Here a putt heads across velvety green for the 7th hole.



"These people found a Death Valley quite different from the one you see today," Mrs. Clements continued. "There were trees on the hills, and shrubs and willows grew by the lake. There were mastodons, deer, camels, and a cat bigger than the mountain lion."

The drying of lake and climate doomed the plentiful animal life that supported man, but not resilient man himself. Numerous petroglyphs on canyon walls and strange circles of rocks on promontories attest to human presence into the time of recorded history.

The first pioneers found a small but resourceful Shoshone tribe called Panamint. In winter the mesquite trees of the valley provided beans, flour, and fuel for their fires. In summer they fled the scorching valley, for which their word was Tomesha, or Ground Afire, and harvested the nutlike seeds of the piñon pine high in the Panamint Range.

The Indians achieved a balance with nature, but it was a balance too delicate to withstand the arrival of the white man. Today only a couple of families—fewer than thirty Indians—remain in a compound of adobe houses near Furnace Creek.

On the porch of one of these I met Mrs. Grace Watterson, a Shoshone who works at Furnace Creek Inn. She was plaiting willows into a sturdy basket. "This is my first one," she said. A few of the younger Indians are learning basket-weaving, a tribal art now known only to a few grandmothers.

I asked Mrs. Watterson if I might talk to some of the older people about earlier days.

"Don't bother," she replied. "The old ones do not want to talk about those times. They say all their troubles and sickness began with the coming of the white man. Besides, the white men never tell our stories right. They make some of them up."

Riches Underfoot Go Unnoticed

Of course Death Valley gave the 19th-century white men their share of troubles, too. Ironically, in their haste to escape this infernal place, some of the forty-niners unknowingly scuffed through dusty white deposits that could have made them rich. Since ancient times man has used borax in pottery glazes and fluxes. In 1881 large beds of a type called "cottonball" were recognized in Death Valley, a development that was to give the area its most famous symbol of adventure—the 20-mule team.

Our sons David, Steve, and John stood in some awe of the huge wagons these teams hauled. You can see the originals in a museum at Furnace Creek Ranch. Rear wheels stand seven feet high, and 16-foot-long beds each held 24,000 pounds of borax. Each team pulled two wagons, plus a 1,200-gallon water wagon —36½ tons in all! The 120-foot-long mule trains rumbled through desert and canyon to the railhead at Mojave, 165 arid miles away. From 1883 to 1889, the mule trains rolled through heat and sandstorm, summer and winter, until richer discoveries in the mountains ended borax mining in the valley.

Into the Desert for a Crucial Test

At the Harmony Borax Works, about two miles north of Furnace Creek, we saw crumbling adobe walls and rusty hulks of boilers. Here the cottonball was scraped from dry lake beds, and refined borax was loaded into the great wagons.

"Is this where Aaron Winters made his discovery?" asked Steve, 12. We had talked about the prospector whose consistently bad luck suddenly turned good. "It must have been close by," I said.

Winters had heard that borax was in demand, and a description of the mineral reminded him of a substance he had seen in Death Valley. With his wife Rosie, who shared his hard life in the desert, he journeyed to the place he remembered, equipped with chemicals for a test. Kneeling, he poured alcohol and sulphuric acid on the white powder, then set it ablaze.

"She burns green, Rosie," he cried. "We're rich!"

The uses of versatile borax have since expanded into a dazzling list: soaps, sizings, starches, adhesives, antifreeze, hydraulic fluids, fertilizers, face creams and lotions, mouth and eye washes, weed killers, flameproofing

Tree surgeon in a palm forest, Salvador Padilla Ramirez swings 40 feet up to prune the giants at Furnace Creek. Until three years ago, the dates sold commercially—as many as 300,000 pounds from the 1,600 trees. But rising labor costs have cut harvesting to only 20 trees; much of the fruit is used to make the Furnace Creek Inn's famed date-nut bread. Profitable cultivation requires hand pollenation.

compounds, rocket fuels, and nuclear reactor shields, to name a few.

The United States Borax and Chemical Corporation today scoops the mineral from a quarter-mile-wide open pit in the Mojave Desert at Boron, California, and provides most of the free world's supply. Death Valley itself has become a major producer of another soft, powdery substance—talc, useful in making toilet powders, ceramics, lubricants, and a variety of other items. Shafts of one mine in Warm Spring Canyon bore almost a quarter of a mile into the mountain.

More-glamorous minerals—gold and silver, lead and tungsten—pepper Death Valley's mountains with tantalizing traces, but little substance. Few prospectors ever make more than they spend, but the long odds stop virtually nobody from trying. Just take a poll in any little desert settlement, from the mayor to the bartender. Mining is permitted inside the vast monument, a fact which does nothing to allay the fever.

"Someone Will Strike the Mother Lode"

In Ballarat, a near-abandoned town at the western foot of the Panamints, Virginia and I got an inkling last March of how it feels to look for an El Dorado. We met a red-bearded six-foot ex-Marine named George Richmond,

Rounding up a stray car, trail riders leave the Devils Golf Course heading for Furnace Creek and the 19th Annual Encampment of the Death Valley 49'ers. Some 30,000 peo-

just down from three weeks of seeking silver in the snowy mountains.

In Ballarat's only store, Richmond was in earnest conversation on mining with George Fox, a heavy-equipment operator. Fox, who was developing some mineral claims of his own, agreed with Richmond that prospecting in the Panamints was a hard proposition.

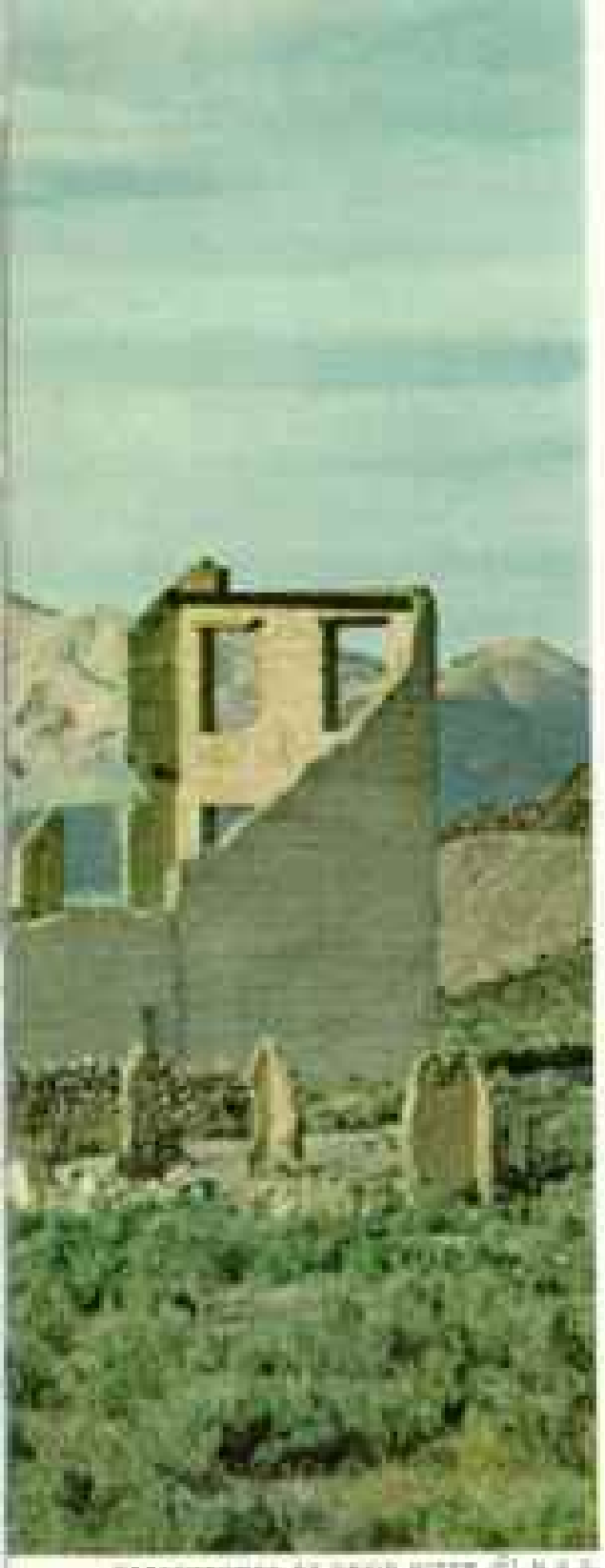
"Heartbreak Ridge they call that range," Fox said. "Those mountains are full of faults. You usually hit one before you can follow a vein very far, and then you spend every nickel you've got trying to find out which way the vein slipped.

"But someday, someone will strike the mother lode, and when they do, it'll go deep."

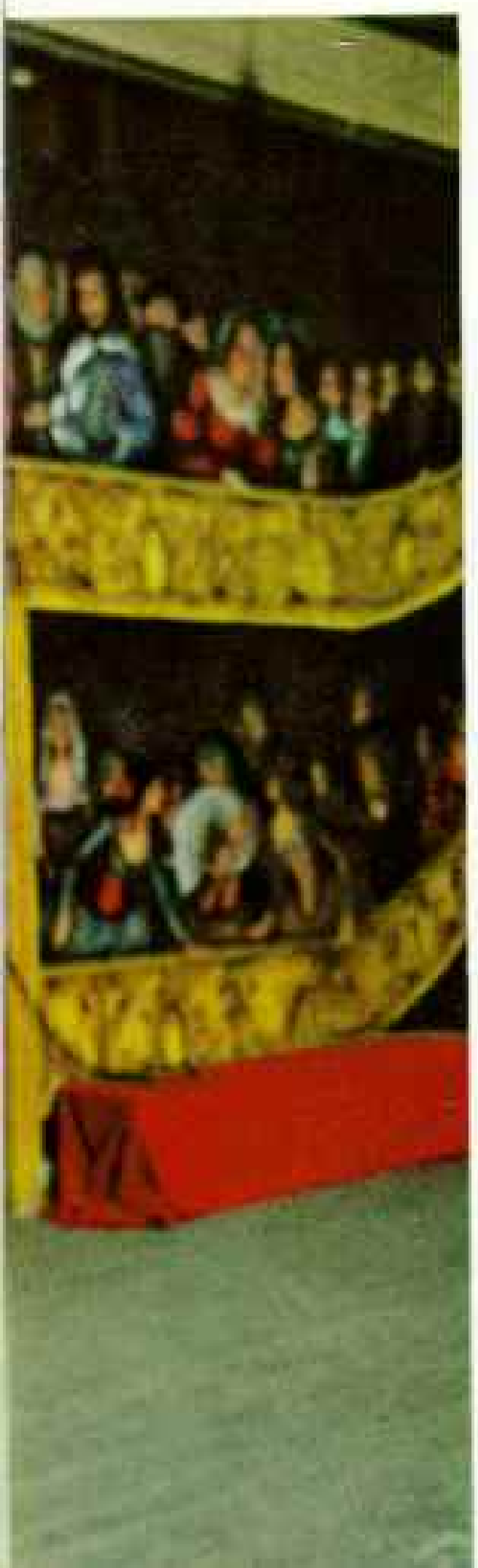
I could understand the fever that has been pulling men into these mountains since forty-niner days. It was a forty-niner, in fact, who set off the first rush. While struggling through Death Valley, he had wedged a handy flake of rock into a slot on his rifle barrel, to replace a lost sight. Later he discovered the little flake to be almost pure silver. Despite a stampede of searchers, no one ever found the "Lost Gunsight Mine."

Legends of lost mines continue to this day; one has even added a new word to the language. In 1863 Charles Breyfogle found rich gold ore, but he was fleeing for his life at the

ple throng the valley on a November weekend to cheer burro races, wolf down hearty breakfasts, sing around campfires, and learn the human and natural history of Death Valley.



BOOKCRESCENTS BY DAVID ROSSI © N.G.S.



time, pursued by Indians. He spent years trying to relocate his strike, and others joined the quest. They became known as "breyfoglers."

But enough mines paid off handsomely to keep the fever going, and some of them spawned rip-roaring towns that mushroomed and withered in the familiar boom-and-bust pattern.

Boomtown of Skidoo Wins Grisly Fame

In a mile-high valley of the Panamints, we had to look closely to find the remains of one such town—Skidoo. It got its name, one story goes, because its water supply came from near Telescope Peak, 23 miles away. The year was 1905, when "23" was to "Skidoo" what a sneeze is to Gesundheit.

But Skidoo's fame rests mainly on a macabre episode, for this is the town that hanged a man twice. The victim, "Hooch" Simpson, had killed banker Jim Arnold one Sunday while in a drunken fury, and by Wednesday night a mob had decided to dispense justice without troubling a court. Hooch was in his grave when a *Los Angeles Herald* reporter arrived Friday morning to cover the hanging. In most towns, that would have been that, but not in Skidoo. The sympathetic citizenry obligingly dug Hooch up and hanged him again.

Only one sun-baked old mill remained when we visited the ghost town last summer. Rusted cans and broken glass littered the several blocks of the once-thriving community. We scanned the slopes in vain for the cemetery, where Hooch Simpson and Jim Arnold might rest at peace with each other.

Of all the area's ghost towns, the most ambitious—and meteoric—was Rhyolite, Nevada, just outside the monument's northeastern boundary. Named for a silica-rich rock found nearby, the town was spawned by a major gold strike in the neighboring Bullfrog Hills in 1904. By 1906 it numbered perhaps 10,000 people. By 1911 it was dead.

"In its heyday," Mrs. Frederica Heisler told us, "Rhyolite had 3 railroads, 3 newspapers, 2 hospitals, a swimming pool, 2 city parks, 10 hotels, an opera house, and 56 saloons."

We met Mrs. Heisler, an ex-teacher from Georgia, in the former railroad station. The rails are long gone, but the two-story station, with foot-thick walls of stone, stands by the empty track bed as if expecting trains that cannot come. The old depot is Mrs. Heisler's home; she uses its waiting rooms as a museum and a curio shop.

"The station cost $130,000 when it was built," she said. "It's hard to believe now, but five thousand people welcomed the first train."

The panic of 1907 had lingering, disastrous effects on the market for precious metals, a key factor in the demise of Rhyolite. Once the mines began closing, the town emptied quickly. Piece by piece, scavengers

Ruins from a rollicking era, concrete façades front an empty street in Rhyolite. After a gold strike in 1904 the town boomed, and 10,000 people vied to share the new-found riches. The three-story structure, with marble stairs, mahogany railings, and a stained-glass window, housed the John S. Cook Bank. With an electric-power plant, a waterworks, telephone system, and churches, Rhyolite was built to last. But a financial panic left it dead by 1911.

Brush conjures up a captive audience for Marta Becket, an artist and ballet dancer who decided to perform her self-created dances in Death Valley Junction—whether people come to see her or not. She and her husband leased an unused movie theater in the former borax town, where she stages a program three times a week, sometimes with only her painted people to applaud her (page 94).

Haven for birds, Furnace Creek Ranch offers year-round water, shade, and food. A date palm is home to a great horned owl and its nestling. The trees also shelter wintering robins and bluebirds. Death Valley lies on a flyway for waterfowl, which set down on lakes of the resort's golf course and, to the southeast, Saratoga Spring.

Returning to wild ways, burros graze the steep hills above Wildrose Canyon. Some 1,300 thrive in the monument, multiplying from animals lost or set loose by prospectors.

"**A victim of the elements,**" reads the epitaph on the isolated grave of Val Nolan, whose life and lonely death in 1931 remain a mystery. The Park Service made this marker to replace the original, which was stolen. Death Valley has many remote gravesites.

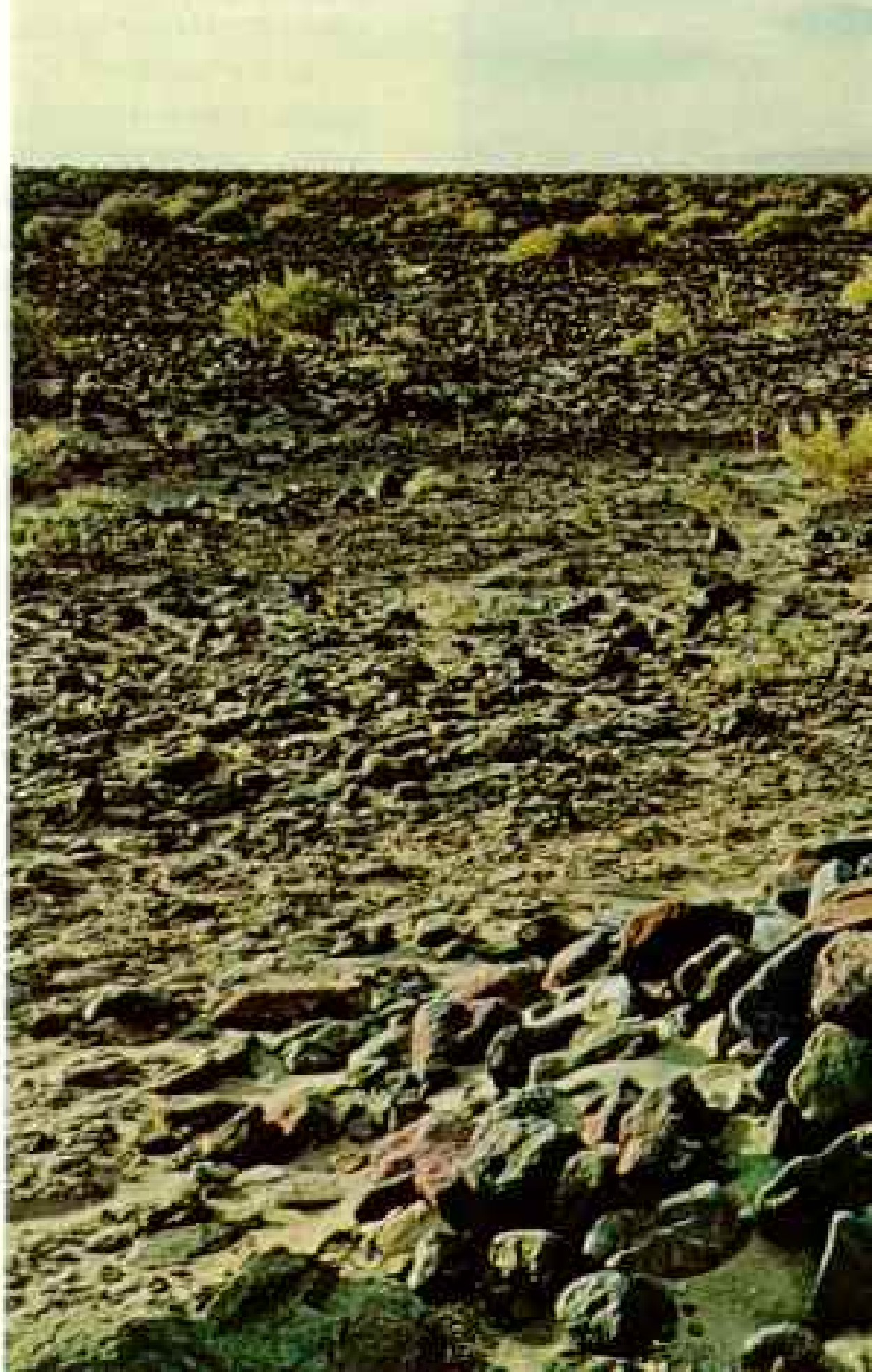
carried Rhyolite away, mostly to build other boomtowns, targets for looting in their turn.

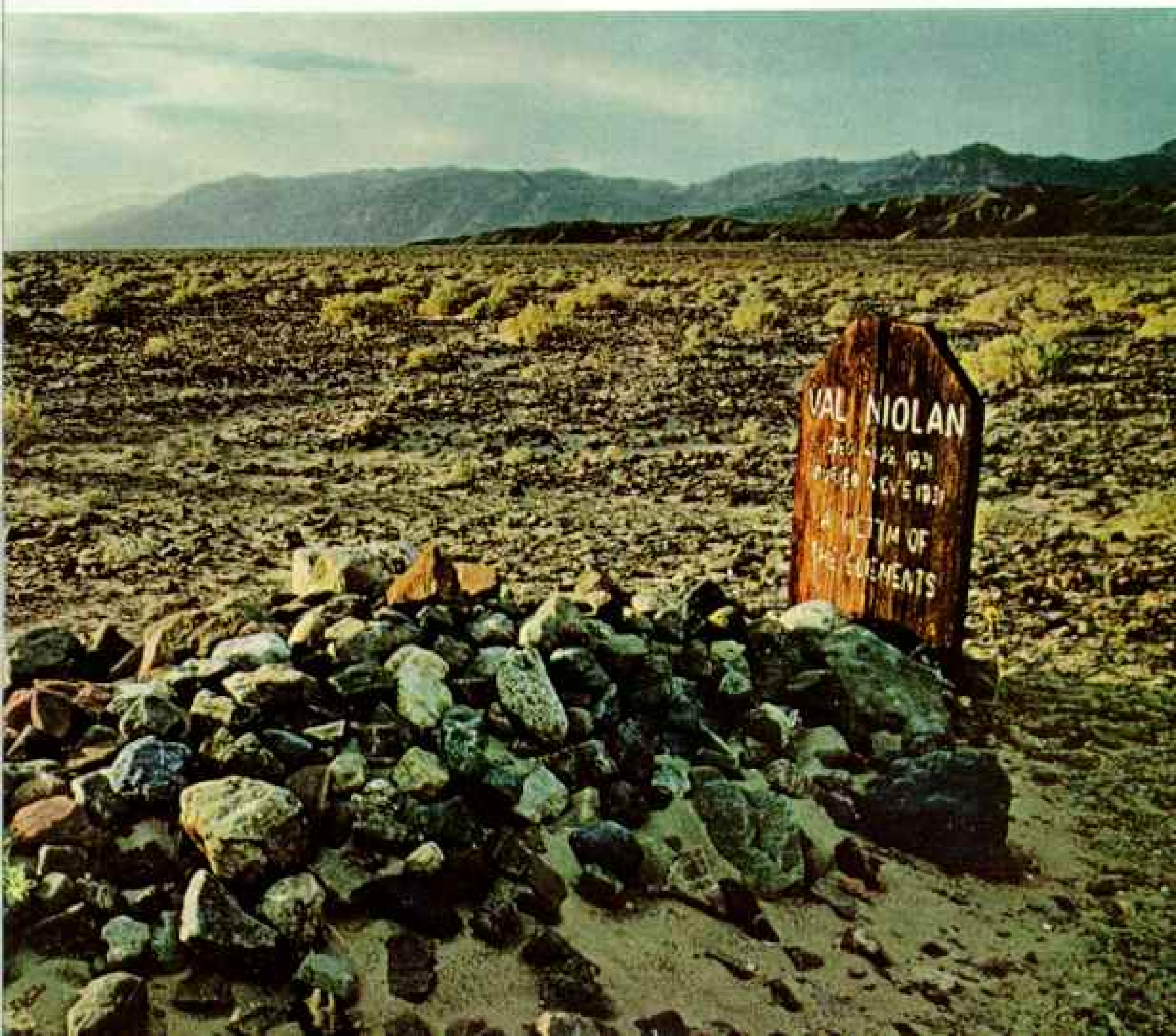
In Mrs. Heisler's museum we saw the prospector's pick carried by Ed Cross when he and partner "Shorty" Harris made the fabulous Bullfrog strike that gave birth to Rhyolite. Ed sold his share of the claim for $40,000, bought a ranch, and raised a family. Shorty somehow let his share slip away.

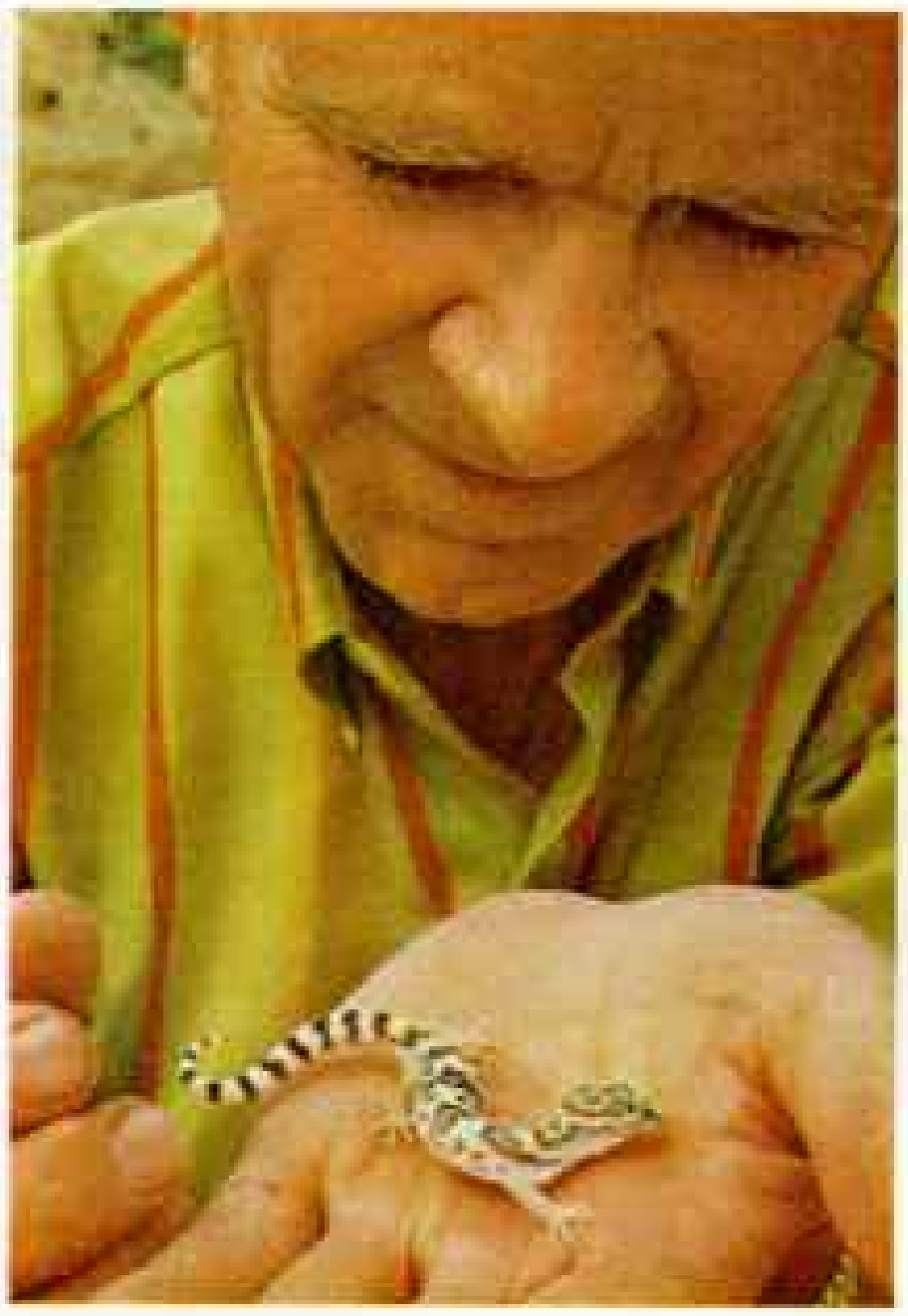
Shorty never found another rich strike, but he continued to plod the hills and canyons, usually with a single little burro. He died in 1934 and rests in a mesquite-shaded grave near the lowest part of Death Valley, beside a friend who had perished there years earlier. Though riches had eluded him, Shorty left the world a memorable epitaph: "Bury me beside Jim Dayton in the valley we loved. Above me write: 'Here lies Shorty Harris, a single blanket jackass prospector.'"

Death Valley gravesites carry a special loneliness. Many are isolated, like Shorty's and Jim's, and several hold unknowns. Even boomtown cemeteries never got big or fancy. People never stayed around long enough to die in respectable numbers.

At Panamint City, a rollicking silver camp of the 1870's, longevity suffered from a volume of violence regarded as impressive even for a violent land. Tortuous Surprise Canyon, the only route out to the broad Panamint Valley, had resident bandits, who did not hesitate to kill. Weary of holdups, mine owners







Lesson in hand, Dr. Arnold G. Applegarth of California's San Jose State College leads a discussion of the gecko. This species, *Coleonyx variegatus*, emits a faint squeak—one of the few lizards with a "voice." The college sends students to the valley for natural-history field studies.

Borax "haystacks" form mute monuments to the era of the celebrated 20-mule teams that hauled the multipurpose mineral 165 miles to the railhead at Mojave. Chinese laborers scraped the crusty mineral into mounds in the 1880's to speed loading.

waited until they had more than a ton of metal, then cast it into five 450-pound "cannonballs" and sent them out by wagon. The frustrated bandits let the shipment pass.

Death Valley Scotty Builds a Castle

Panamint City lived only three or four years before floods and financial panic spelled its doom. But at the northern end of Death Valley we pulled up in awe before an edifice that promises to survive for centuries: a great curious castle with battlemented towers and buttressed walls, Spanish tile roofs and latticed Moorish windows (pages 80-81). It is named for Death Valley Scotty, who made himself the most famous legend of these parts.

A trick rider with Buffalo Bill's Wild West Show, Walter P. Scott turned prospector in 1902 at the age of 30 and vanished into Death Valley. Soon he re-emerged, mysteriously wealthy, a trick he was to repeat from time to time over the years.

In 1905 he appeared in Los Angeles, declaring he had to get to Chicago in a hurry. He hired a whole Santa Fe train and made a record run—44 hours, 54 minutes. "On one curve the cookstove almost flew out the window," he said.

With the train ride, Walter P. Scott became Death Valley Scotty, a role he relished for the next half century. A born showman, he flashed thousand-dollar bills, engaged the most expensive hotel suites, tossed gold coins to crowds. Word spread that he was building a fabulous castle in Death Valley.

Where did the money come from? A secret mine, Scotty might tell one questioner; a killing in mining stocks, he would tell another. His friend and partner, Chicago multimillionaire Albert M. Johnson, said nothing. But the

AUTOCHROME © NATIONAL GEOGRAPHIC SOCIETY

name that appeared on the deeds to the castle was Johnson's.

After hearing a number of people declare that Scotty never had wealth—and as many swear he did—we let the question drop. Those at the castle who remember the two men recalled Mr. Johnson's view of the matter: "Scotty and I are partners." And that was that.

Unlikely partners they were! Johnson's background was all Eastern propriety: iron deer on the lawn, starched high collar, and pink lemonade on Sundays under the veranda awnings. Scotty's was open range, bucking bronco, and come-as-you-are to the nearest bar.

The fact is that Johnson relished Scotty's wild stunts and tall tales; moreover, he felt he owed his friend for about thirty-five years of life. Critically injured in a train wreck, Johnson had been given a virtual death sentence by doctors when he first met Scotty.

"Come out West with me and I'll make a new man of you," Scotty urged. Johnson accepted, and found himself living at first in a crude board shack. Gradually he regained much of his health.

Scotty insisted that the shack was a castle. "You call this a castle?" Johnson joked. "Let's build a *real* one!" They did—to the delight, nowadays, of some 150,000 visitors a year.

Johnson died in 1948, Scotty in 1954. Today the Gospel Foundation, a service organization founded by Johnson, owns the castle and conducts guided tours.

Pulling cloth coverings over our shoes to spare irreplaceable handwoven rugs from Majorca, we joined a file of visitors in the great "living hall"—with a 50-foot ceiling, it seemed a bit large to be called a living room. There we saw Scotty's and Johnson's favorite leather chairs, facing a fireplace of baronial

proportions. (Evenings can be cool at the castle's 3,000-foot elevation, and Scotty and Johnson laid in a lifetime supply of firewood by buying up 75,000 ties when the Tonopah and Tidewater Railroad liquidated.) Looking at Scotty's chair—scaled to his considerable girth—we could almost see him settling for an evening of yarns. With Stetson pushed back on his shock of white hair, he often told guests how he had survived the fangs of six rattlers, or how he had entertained Will Rogers at the castle. Once, he said, he entered a Bowery alley cat named Irene Watkins in a Madison Square Garden pedigreed cat show and won first place. Irene later turned out to be a tomcat.

The castle has a comfortable, lived-in look despite its large scale and lavish furnishings. Metal workers came from Germany and Austria to make massive wrought-iron chandeliers and door fittings. Ornamental tiles from Spain and Italy cover floors. Huge oil paintings and tapestries hang everywhere. A palatial upstairs music room houses a 1,600-pipe organ behind an Old World cathedral grille. A special device causes the organ to play duets automatically with a grand piano.

Despite such opulence, Scotty's favorite place was a modest hideaway ranch about eight miles from the castle. There he had piped water from nearby springs to run night and day through a kitchen faucet. Veteran of many a parched trek of the desert, he loved the sound of running water. We saw a big porcelain bathtub set under a willow in the front yard; in it Scotty spent hot afternoons while hoses played cooling fountains of water over him.

The 8:15 Curtain Waits For No One

Scotty's Castle is not the valley's only cultural showpiece. One day our friend Dwight Warren asked us: "How would you like to go to the ballet?"

"In Death Valley?" Virginia couldn't believe it.

That evening we stepped from the twilit desert into the Amargosa Opera House in Death Valley Junction. The performance had already begun. In the spotlight a lithe brunette wearing a pink tutu turned from statue to flowing grace as we groped for chairs. I looked around. Until our party of five arrived, she had been dancing to an empty house.

Marta Becket used to dance where the crowds were, in halls all across the Nation for concert associations. For a dozen years she and husband Tom Williams traveled, until a tire went flat in Death Valley Junction. While Tom changed it, Marta poked around the near-abandoned former borax town and found a deserted movie theater.

"To me it was an opera house," Marta told us. Over coffee after the show, we visited with her and Tom, who serves as manager, emcee, and stagehand. "It was a place where I could dance as I've always wanted to. We decided we had to have that theater."

KODACHROMES © N.G.S.

Triumph of the fragile

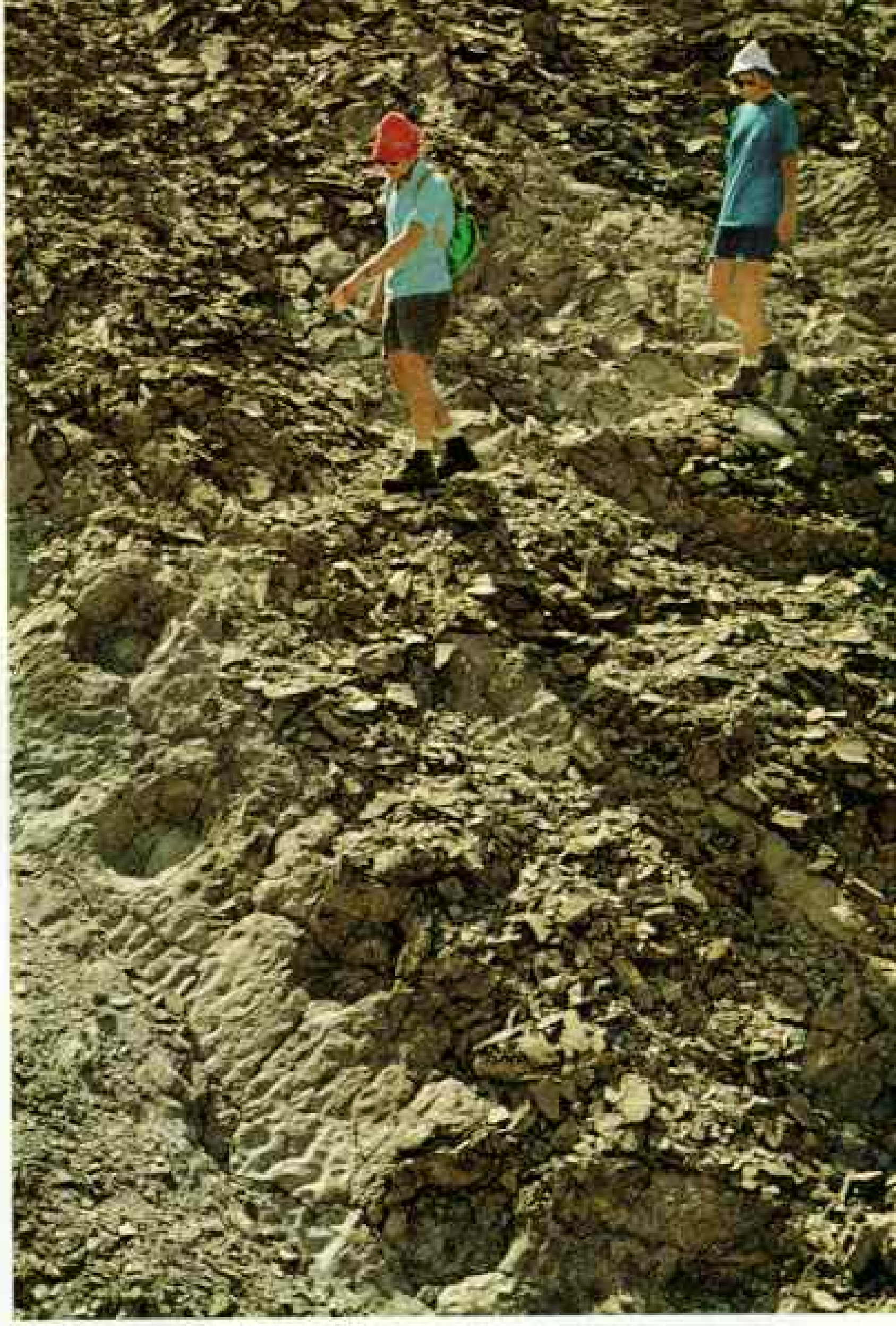
MIGHTY MASTODONS have vanished, leaving only fossil tracks like these in Copper Canyon (right), but tiny pupfish (below) survive from the same Ice Age that produced the great mammals.

Adaptation to wide temperature ranges and high salinity explains the success of these fish of the desert, *Cyprinodon salinus*, shown 1½-times life-size. They live in shallow Salt Creek, only year-round stream in the valley. Two other species and several subspecies inhabit other pockets of water, mostly saline, in and near the monument.

Only the Wildrose Canyon area in the monument's rugged uplands produces the Panamint daisy (top left), a flower so scarce that park rangers hesitate to reveal its location.

Seeds of the spicy gravel ghost (center) and other annuals awaken to rains in November and December for blooming in March. This survival mechanism enables flower seeds to mature ahead of summer's blistering heat.

Rock mimulus (bottom), another of the 22 plants found in the valley region and nowhere else, clings to life in narrow crevices of limestone cliffs.



They leased and remodeled the place, and in February 1968 the curtain went up. Since then Marta has given three performances a week, except in the hotter months. Admission is whatever you care to drop into a collection jar at the door, and the tape-recorded overture swells promptly at 8:15, whether there is an audience or not.

"A violinist can replace a poor instrument, but a dancer cannot," she explained. "I must dance to be ready to dance."

The show is dance-mime, all Marta's creation, and requires her to play tragedienne one minute, comedienne the next—21 different characters in an average evening, and 12 to 15 costume changes. Viewers get the impression of a whole company of captivating dancers. Marta, who is also an accomplished artist, painted an audience on the theater's rear wall, which gives her a sense of having an audience on the nights no one comes to see her dance (pages 88-9).

"Some people think we're crazy, and some people think we're great," Tom said. "We don't care."

Death Valley attracts such determined individualists. In the Panamints we followed a five-mile-long winding road that a Basque miner named Pete Aguereberry had built by hand in the 1920's. It led not to a gold or a

Mysterious thunderbird guards a wall of Marble Canyon. Puzzles to anthropologists, such petroglyphs more commonly take the form of lizards, sheep, men, or simply crosshatching and wavy lines. Authorities differ as to their age, which Indians made them, and whether they are maps, messages, or mere doodles to pass the time.

Layer-cake walls, sculptured and polished by nature, intrigue visitors in Mosaic Canyon. Naturalist Shally, left, points out layers of marble. She leads nature walks in Death Valley during the winter and in Grand Canyon in summer.

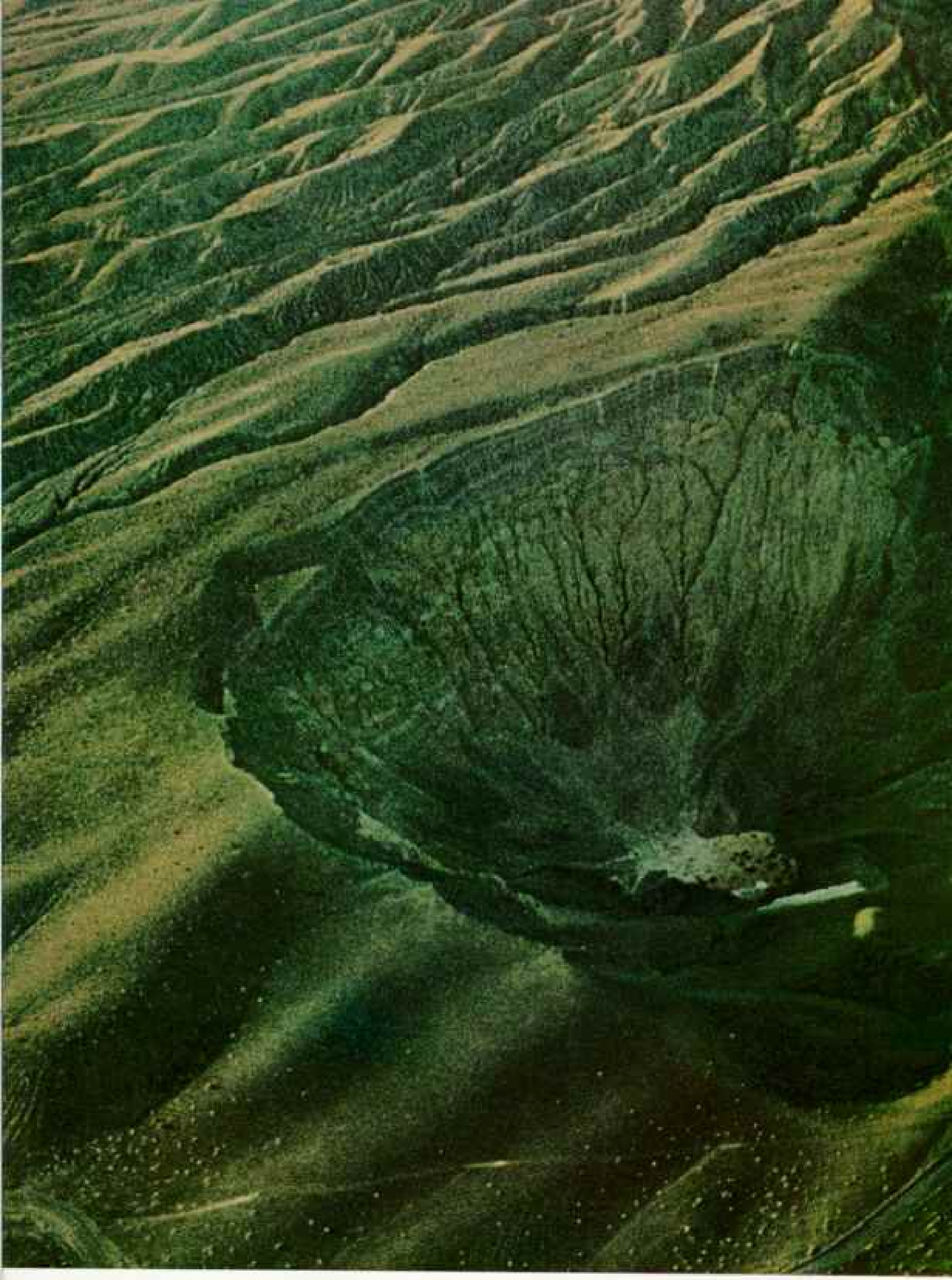
silver mine, but to a breathtaking 6,433-foot valley overlook that Pete had discovered and wished to share with the world. Today the rocky eminence is called Aguereberry Point.

In Beatty, Nevada, we visited "Panamint Annie," more formally called Mary Elizabeth Madison. Born in the genteel East, she went west as a girl of 19 to try to survive tuberculosis, and has remained for 40 robust years as a prospector, ranch cook, truck driver, and exponent of the vigorous life.

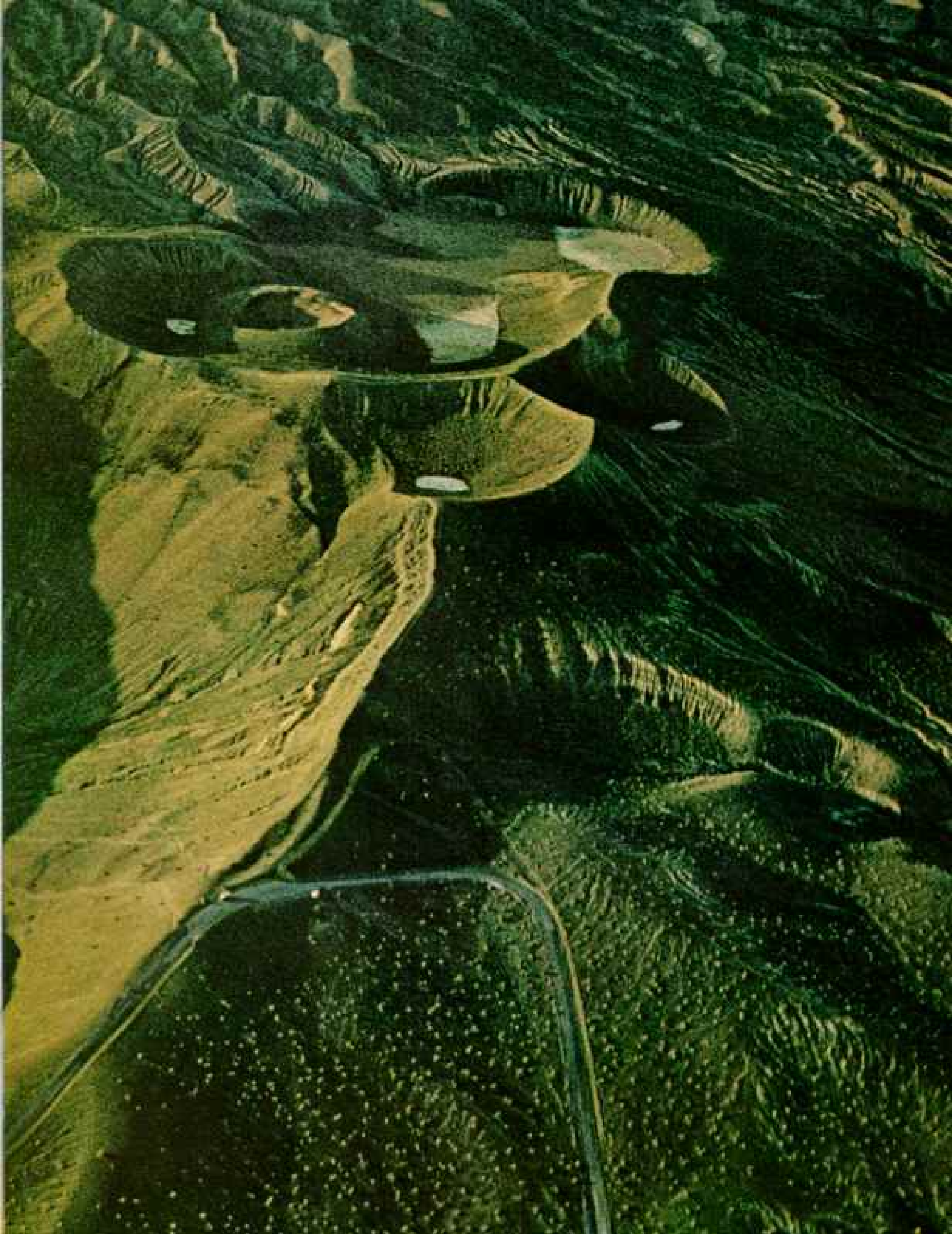
At Furnace Creek Ranch we met Capt. R. A. Gibson, a spry octogenarian who has managed to combine two unlikely careers: officer in the Navy and Merchant Marine, and Death Valley-area prospector and rail-station agent. In 1905 he became the first postmaster of Beatty, after the embarrassing discovery that the original appointee could not sign his name.

Tiny Fish Outlast Mighty Beasts

Death Valley's human story becomes so all-absorbing that it threatens to eclipse a fascinating array of plant and animal life. Contrary to a report in the 1870's that "the shadow of a bird or wild beast never darkens its . . . sands," the land supports more than 230 species of birds, 17 lizards, 19 snakes, and numerous spiders and insects. Plant life spans an interesting variety, from the salt-tolerant



Roadside moonscape: Ashes and cinders spewed over northern Death Valley, perhaps as recently as 1,000 years ago, when a mountain blew its top and created half-mile-wide, 500-foot-deep Ubehebe Crater. Little Hebe on its shoulder may have formed even



EXCHANGE BY DAVID HIBER © N.G.S.

later. Shoshone Indians supplied the name Ubehebe which, according to the most popular translation, means "basket in the earth." Rain water carried sand and silt to the bottoms of the explosion-carved pits, leaving white circles like the ring in a bathtub.

iodine bush to the snow-loving limber pine.

Most majestic of Death Valley's animals is the desert bighorn sheep. Rams weigh 170 pounds and more, and grow thick three-quarter-curl horns as much as 30 inches long. Their huge almond eyes can spot a man a mile away, and they generally keep to the steep ridges and rocky flanks of mountains. We sought in vain for a glimpse of one.

We had no trouble, however, finding one of Death Valley's smallest creatures—the curious pupfish—which in its way is equally impressive. This stubby fish, rarely exceeding two inches in length, lives in tepid streams and salty pools (page 95). Biologists agree that it probably survived from the Ice Age lake, when mastodons roamed the valley.

Pupfish by the hundreds darted past our bare feet as we waded the lukewarm waters of Salt Creek, the only year-round stream that rises in Death Valley.

"The secret of the pupfish's survival," Dr. James E. Deacon had told me, "is that it can tolerate extreme ranges of temperature and salinity." Dr. Deacon, Professor of Biology at the University of Nevada, Las Vegas, has studied *Cyprinodon salinus* extensively.

"In a marsh area at Saratoga Spring, we've recorded water temperatures from 111° F. down to 39°, and the pupfish show no ill effects. From our laboratory work we know they can survive readings as low as 33°, and we suspect that this fish may be able to tolerate water as much as five times saltier than the sea."

Mystery of the Roving Stones

After the pupfish, I was ready to believe anything about Death Valley's natural wonders. Except maybe the mysterious rocks that move.

Chief Naturalist Dwight Warren took me to see for myself, up through a 4,900-foot pass forested with Joshua trees to a mountain-cupped 2¾-mile-long *playa*, or dry lake, called The Racetrack.

The rocks that move, from pebble size to several hundred pounds, lie at random on the playa, mostly near the south end, where they have tumbled down from a steep hill. They rest at the ends of long shallow tracks on the clay surface (page 77). Some tracks run straight; some curve, zigzag, or even double back on themselves.

For an explanation, Dwight advised me to contact Dr. Robert Sharp, Professor of Geology at California Institute of Technology in Pasadena. Dr. Sharp had keyed the location of 25 of the rocks, he explained, in order to chart movements. The keying to numbered stakes was done in May 1968, and since it was assumed that the rocks seldom move, the professor was prepared to wait for years.

Then examination last spring revealed that movement had taken place, and Dwight phoned Dr.

EKTACHROME © N.G.S.

Whiskers stay clear of the action as "Fiddlin' Charlie" Waer saws out "Turkey in the Straw" to the accompaniment of foot stompers. Other fiddlers at the 49'ers' Encampment render such favorites as "Flop-eared Mule," "Boil Them Cabbage Down," and "Tomahawk." Some 5,000 people cheered the program held under the stars. "Looking out across the dark valley, I could almost see the flicker of long-ago campfires and hear the echo of long-silent fiddles," said the author.

Sharp: "Hey, Doc, your rocks have moved!"

"Boy! That's fast service!" replied Bob Sharp.

The largest stone that moved, he subsequently found, was a 39¼-pounder that traveled 71 feet on a curving track. The record distance was 212 feet, by a 15-pound rock.

"The evidence all points strongly toward the wind as the motive force," Dr. Sharp said, consulting his notes in his Caltech office. "A very special set of conditions apparently is required. The top layer of the playa must be saturated with moisture, but the sublayer must remain firm. And the wind must be just right."

Being "just right" includes being strong, but no one knows how strong because measurements have yet to be made. Winds in this lofty area at times become gales, however, blowing out car windows and forcing hikers to proceed on hands and knees.

Flowers Blaze in the Desert

But the ultimate wonder of Death Valley for Virginia and me is the incredible beauty and fragility of spring flowers shooting up from barren rock and sand (page 94).

"The seeds may lie dormant for dozens of years," Dwight Warren explained, "and then sprout when they get the right conditions—rain in November and December, and just the right temperatures."

Scientists speculate that the insects that pollenate the flowers somehow have fallen into the same cycle, because they are always on the job when the flowers bloom, no matter how long the wait.

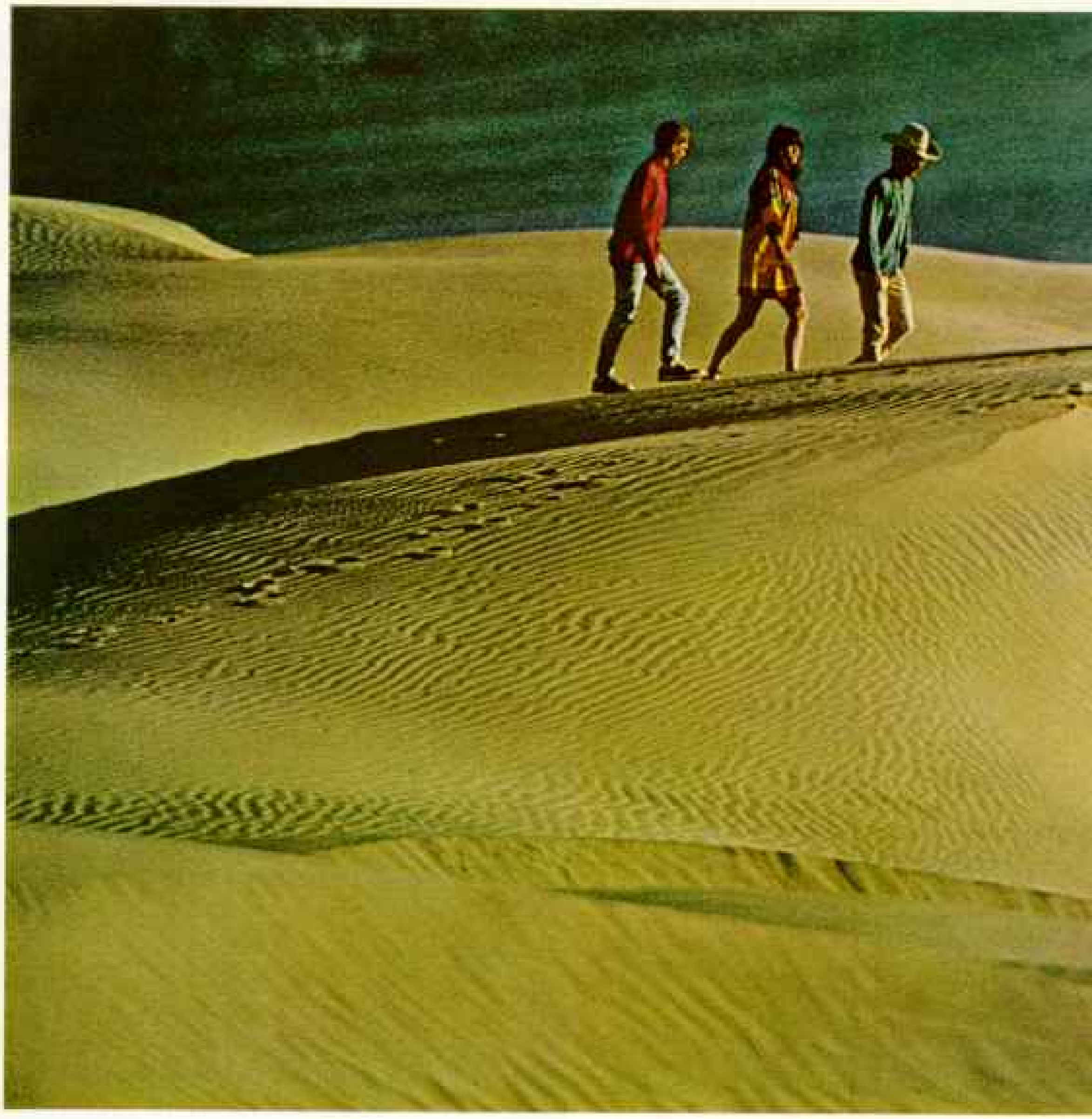
As we drove the winding road south of Badwater, Dwight's sharp eye spotted a bit of color on an alluvial fan. We stopped to investigate.

"Oh! It's a whole garden of flowers!" Virginia exclaimed. "They look like they've just been set out from a greenhouse." She led the way among begonia-like purple phacelias and buttery-yellow mohavea. There were fragrant evening primroses and desert lace, a ground-hugging, mosslike plant speckled with red. Above the lower blooms, spiky clusters of blue lupine and spicy white flowers called gravel ghosts swayed in the gentle wind.

While Virginia and I marveled, Dwight did some rough surveying. "The whole area of blooming plants is only 75 yards wide," he said. "There must have been an isolated cloudburst up in the mountains that sent the water down over this fan at just the right time."

From many Death Valley campsites, white-crested Telescope Peak had delighted our

Boon of solitude relaxes campers overnighting beside the mesquite-fringed sand dunes (following pages), in the northern part of the valley. Most of the half million visitors a year arrive in trailers or camping rigs, and the monument's vastness accommodates them with ease.



"Walking Hills"—dunes nine miles long and a third as wide—move one way and then another, the playthings of whimsical winds. Forty-niners stumbled over these wastes in their desperate

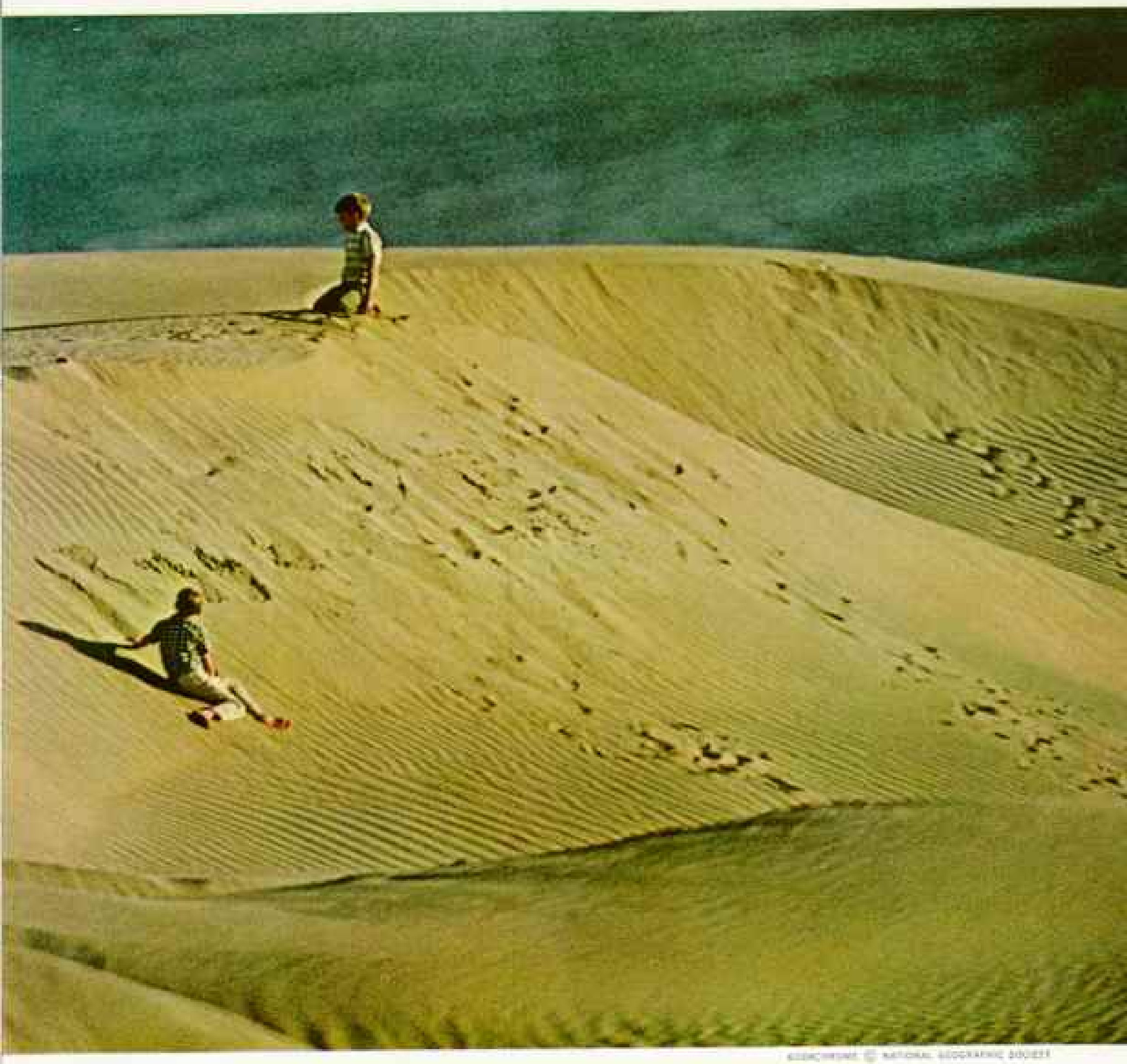
eyes, and we felt at last that we had to see how the world looked from up there. The first leg led us past Stovepipe Wells Village and up the same steep slopes trudged by some of the forty-niners to a solitary campsite in Wildrose Canyon. We unrolled our vehicle's big striped awning to give ourselves a "front porch" on a mountain-girt world.

Wild Burros Stage a Musicale

Virginia pointed out hummingbirds flitting past, and spotted a pair of Bewick's wrens. Five-year-old John began a census of horned toads and lizards but got diverted by a galloping jack rabbit. David and Steve tried to make friends with a pair of wild burros (page 91), who kept their distance but returned in the night with reinforcements to render a disrespectful serenade.

Next morning we headed for Telescope. Spike Cottonwood, a Panamint Indian who helps maintain the mountain roads, gave us a lift in his pickup truck to the top of 9,994-foot Rogers Peak, where we set out on foot.

Five miles of trekking a winding saddle, past creamy-white evening primroses and fiery paintbrushes, brought us to the shoulder of Telescope. There young John took a nap



flight from the valley. In pioneer days the sand repeatedly buried a vital pool at the dunes' eastern edge, until a wagoner marked it with a stovepipe—and gave the spot a name, Stovepipe Wells.

by the trail, watched by his mother, while Dave, Steve, and I pushed up a switchback trail through the bristlecones to the snow-ribboned top.

Death Valley's entire extent unfolded to north and south like a relief map. Mountainous on every hand, the terrain tamed down a bit to the southwest. There lay the Mojave Desert, last hurdle on the way to survival for the ill-starred forty-niners.

Seventy-five miles northwest, the horizon was scalloped by the jagged crest of Mount Whitney in the Sierras, at 14,494 feet the highest point in the Nation outside Alaska. Eastward we could look down on Badwater—and the lowest, hottest, driest point in the country.

Though we knew that roads and other works of man marked the vast trough of rock and salt and sand below us, from our lordly distance it looked untouched—much as it must have appeared centuries ago.

From force of habit I glanced at my watch, and saw that it had stopped. I thought of winding it, and thought again. What did minutes or hours matter? Some centuries in the future other men would stand here gazing down at this great valley, and it would look the same. At least I hoped so. THE END

Snowflakes to Keep

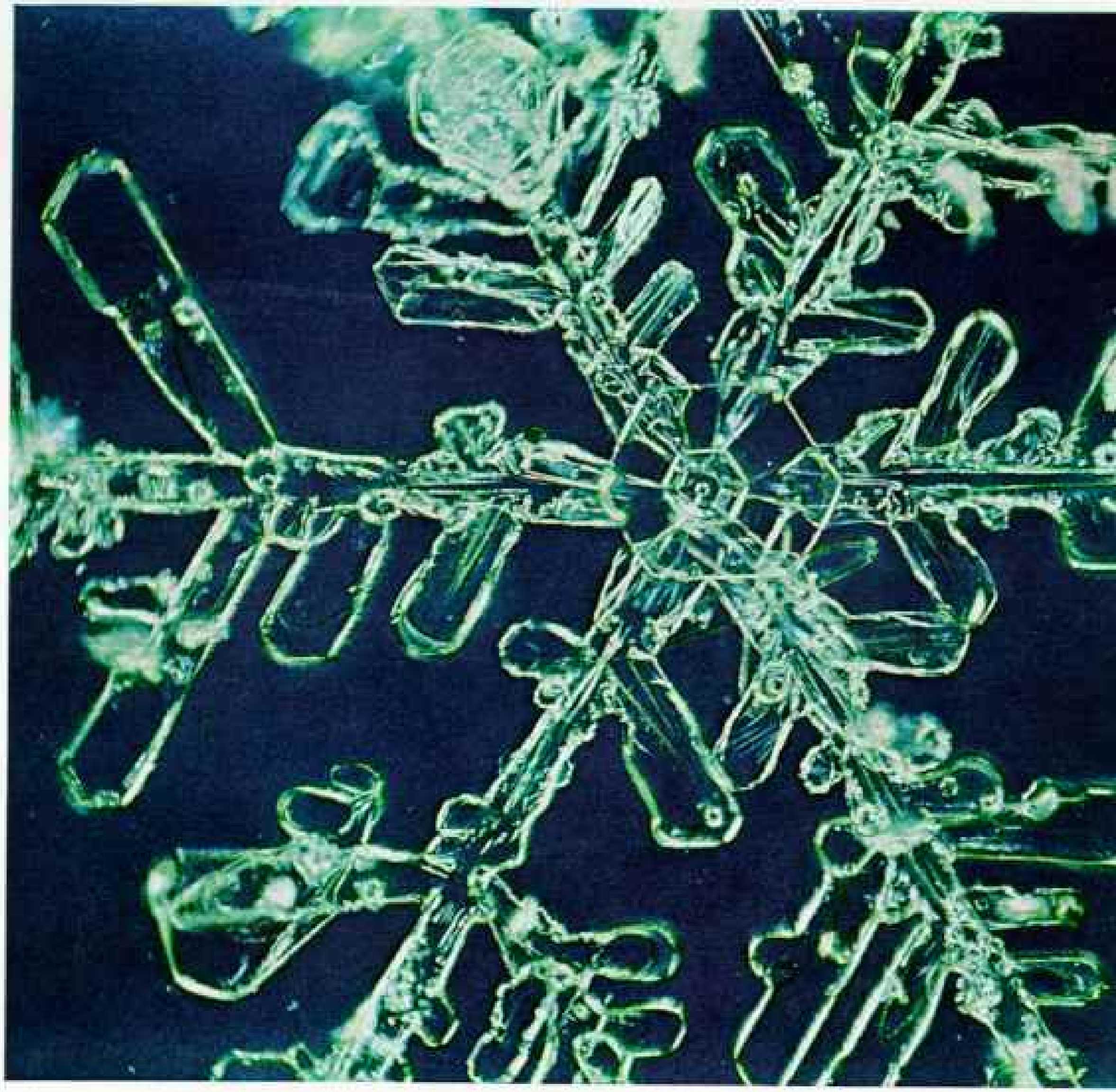
Article and photographs
by ROBERT F. SISSON
National Geographic Staff

SOME TWENTY THOUSAND FEET it fell, twirling lazily out of the wintry night sky over my farm near Front Royal, Virginia. It landed at last on a piece of black velvet in my hand—a perfect crystal of snow. But there was no time for watching. Unless I acted quickly, it would melt before my eyes.

With my free hand I dipped the pointed end of a small metal rod into a liquid plastic. Carefully I touched this to the crystal and gently transferred it to the cold surface of a pane of glass lightly coated with the same solution. Sandwiched between thin layers of plastic, the crystal melted, then evaporated entirely, leaving me with a permanent cast of my prize. Now it was mine forever.

As I stood muffled in the silence of the whirling flakes, I began to wonder how many other men in centuries past must have ventured out into the storm to take

DEATH OF A SNOWFLAKE: *Melting edges mirror the intricate pattern, then engulf the crystal, leaving the author to lament, "In less than two seconds all I had left was a drop of water." To save such beauty, he began to preserve the fragile shapes, using a method (page 107) devised by snow expert Vincent J. Schaefer. Photomicrographs on the following pages illustrate Mr. Sisson's success.*



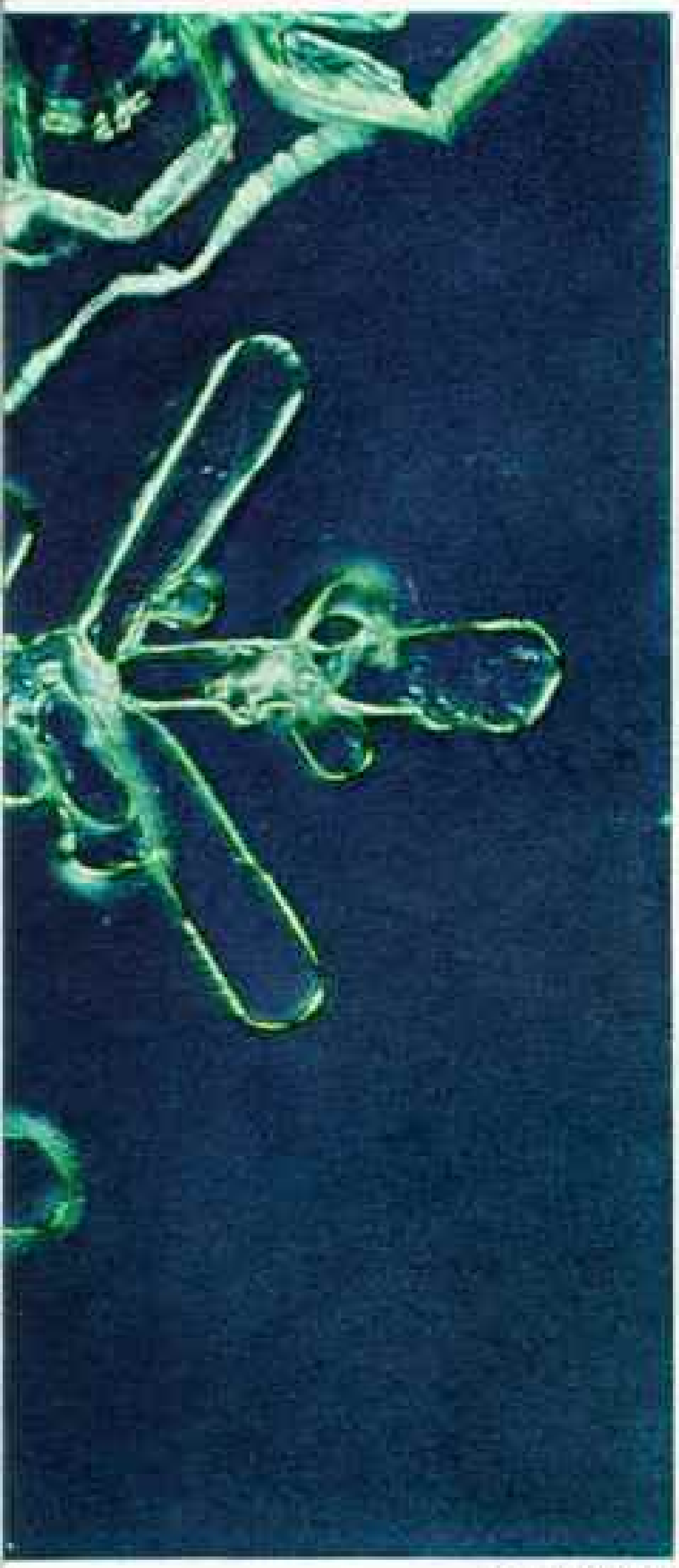
up the Lord's challenge (Job 38:22): "Hast thou entered into the treasures of the snow?" Back inside the house, and warmed by a crackling fire, I started digging into my books to find out.

Aristotle, in the fourth century B.C., was perhaps the first to observe that "when cloud freezes there is snow. . . ." But another two thousand years were to pass before man's study of snow would take the next significant step. By the 17th century the development of the microscope enabled men to see in detail the fascinating precision of snow crystals. In his book, *Micrographia*, published in 1665, Robert Hooke of England presented drawings of the gossamer forms.

Toward the end of the 19th century, the camera gave new stimulus to snowflake fanciers; in 1885, Mr. Wilson A. (Snowflake) Bentley of Jericho, Vermont, pioneered snow-crystal photography. For nearly fifty winters he worked alone on his hillside farm in a small shed. There, bundled against the piercing cold of northern blizzards and temperatures that frequently fell below zero, he recorded with his clumsy studio camera a myriad and marvelous assortment of snow shapes.* More than two thousand of his remarkable photomicrographs illustrate a reference work published in 1931, and still used by meteorologists the world over.

After many hours of fighting fatigue and

*NATIONAL GEOGRAPHIC published "Snow Crystals," January 1904, and "The Magic Beauty of Snow and Dew," January 1923, both illustrated with extraordinary photographs by Wilson A. Bentley.



10 TIMES ACTUAL SIZE

PHOTOMICROGRAPHS BY NATIONAL GEOGRAPHIC PHOTOGRAPHER JOHN E. FLETCHER (ABOVE) AND ROBERT F. SISSOM

Adjusting microscope and camera, the author photographs a snow crystal. To make casts like the one at left, he coats a pane of glass with polyvinyl formal resin dissolved in ethylene dichloride, in a strength of either 1 or 2 percent. He may place a single crystal on the coated pane or collect many specimens by exposing the glass to the storm. The crystals are engulfed by the solution, which quickly hardens; then the crystals melt and evaporate through the film, leaving permanent casts.

All the photographs show casts except for the real crystal on pages 104–105.

bitter weather while photographing snow, I can appreciate the problems Bentley must have faced. As camera subjects, the crystals proved quite a challenge. How to keep them from melting before I could photograph them was a constant dilemma.

My answer came from Vincent J. Schaefer, Director of the Atmospheric Sciences Research Center of the State University of New York at Albany, long an eminent authority on the phenomenon of snow and the developer of cloud-seeding methods.

While with the General Electric Company, Dr. Schaefer became proficient in making casts of other types of crystals. Early in 1941, he decided to try his technique on snow and frost. His first—and almost immediate—success came with frost from the family refrigerator. It was from an article detailing his procedure* that I gained the technical information necessary for my own efforts.

The process is basically a simple one. The necessary ingredients include polyvinyl formal resin, ethylene dichloride, several small pieces of clean glass, a pointed rod of glass or metal, and a swatch of black cloth. I procured the resin directly from the manufacturer, the Monsanto Company; my local druggist supplied the ethylene dichloride, a volatile solvent that must be handled carefully. The chemicals were mixed in two strengths—one gram of polyvinyl formal resin in 100 cubic centimeters of ethylene dichloride, and a double-strength solution using two grams.

*See "How to Fingerprint a Snowstorm," by Vincent J. Schaefer, *Natural History*, January 1943.

GLITTERING BLOSSOM
grows outward in precise six-sided symmetry, as do many snow crystals.

20 TIMES ACTUAL SIZE

FERNLIKE FINGERS
radiate from a snow crystal under mild, moist conditions.

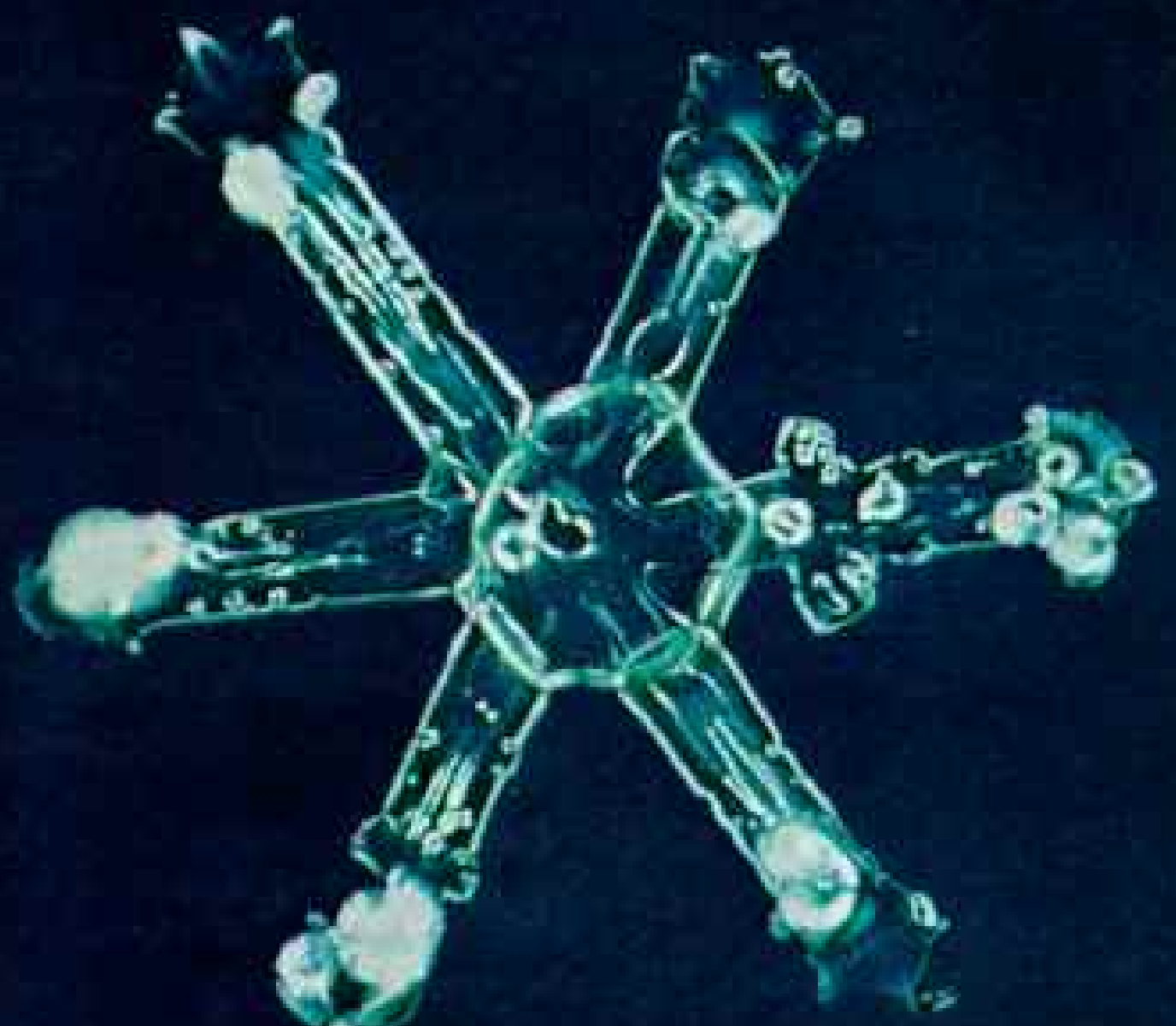
15 TIMES ACTUAL SIZE

ICY EXCLAMATION POINT
combines two fragments which might have broken from a snow crystal such as the one at right.

70 TIMES ACTUAL SIZE

SNOWY STAR BURST
forms a slim crystal which adds to its shape, size, and design by attracting more water molecules.

110 TIMES ACTUAL SIZE



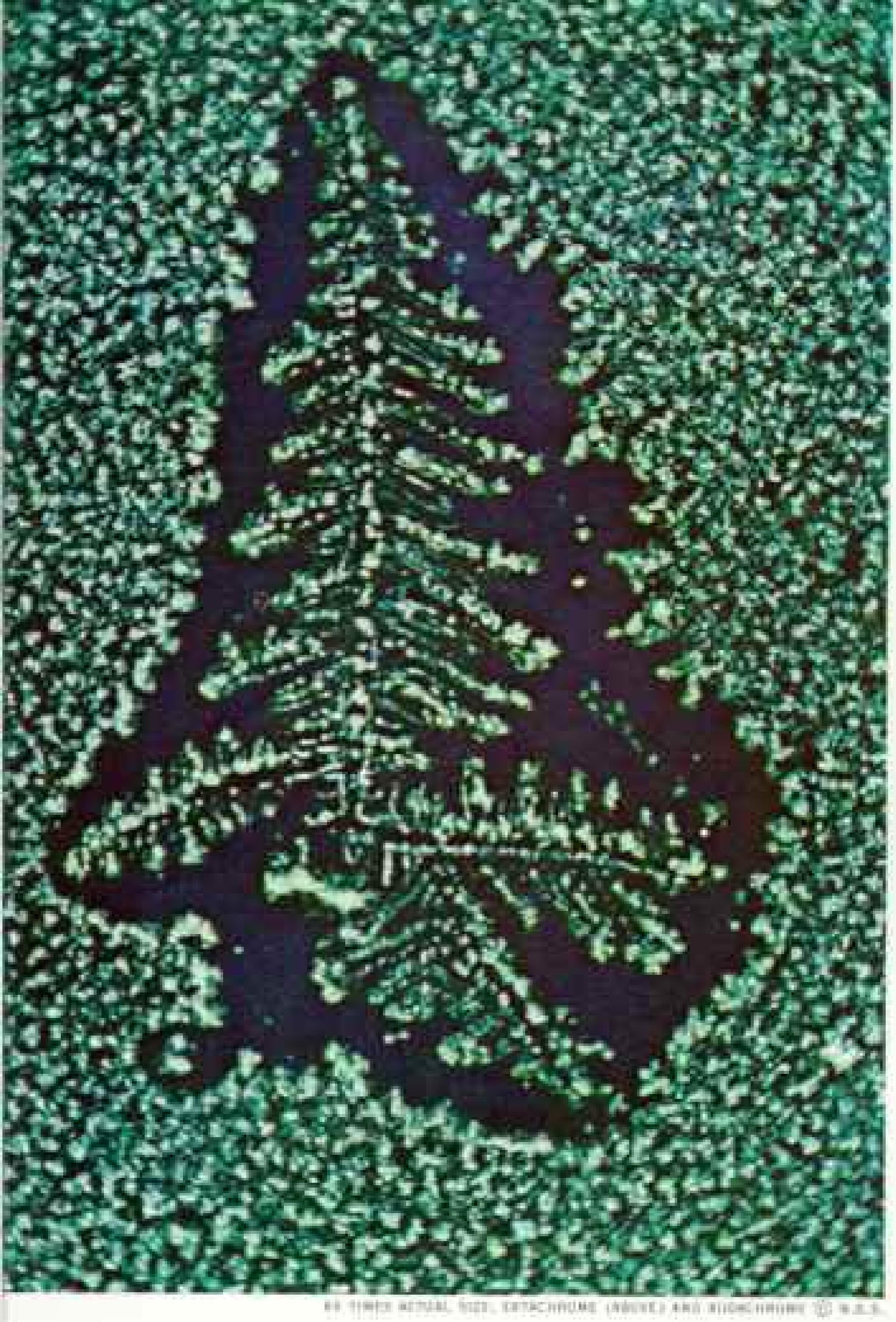
FROSTY FILIGREE
etches a sturdy hexagonal crystal, a type that falls in cold, dry weather.

55 TIMES ACTUAL SIZE

FROZEN BRANCHES *sprout within this snow crystal. The design may differ on a crystal's two faces.*

75 TIMES ACTUAL SIZE

EKTACHROMES AND KODACHROMES
BY ROBERT F. SISSON © N.G.S.



Christmas tree, one of a frosty forest, grew when water vapor condensed on glass and froze. The form Jack Frost's artistry takes depends largely upon microscopic impurities and invisible cracks in the surface of the pane.

Captured in mid-melt by the casting process, this snow crystal appears to lie awash within a bubble of water. Passing through a variety of air temperatures on their long journey earthward, crystals may warm and cool many times, gradually altering their original shapes.

10 TIMES ACTUAL SIZE

44 TIMES ACTUAL SIZE. DITACHROME (ABOVE) AND KODACHROME © N.G.S.

When snow begins to fall, I coat a chilled pane with the weaker solution. I expose it directly to the snow to catch many flakes; or, by using the black cloth, I can choose a single flake that interests me. I transfer it to the glass with the rod, dipped into the same solution. The flake will adhere to the pane and be engulfed immediately by the plastic there. (For larger flakes the stronger 2 percent solution may give better results.)

Trapped within its thin plastic shell—less than 1/10,000th of an inch thick—each crystal melts, and the water vaporizes through the film, leaving behind an exact mold of the original crystal. This mold, or cast, can then be photographed. It reflects light much as would the original snow or ice crystal.

Mastering Dr. Schaefer's basic technique of capturing snow crystals only increased my curiosity to learn more about the secrets of snow. Fortunately, science has been busy replacing mystery with facts.

We now know that ice crystals form high in the atmosphere, where the water vapor of clouds freezes around microscopic particles—such as dust motes—afloat in the air. As more water vapor condenses on these crystals, they gradually become heavy enough to fall out of their clouds. Tossed about in churning air currents, the crystals bump against each other, breaking off tiny chips of ice. Then each chip in turn may start a new crystal.

As long as the temperature remains frigid, the crystals usually fall individually. However, as they pass through layers of warmer air, they may collide in gigantic "traffic jams," clumping together as they flutter down. Thus a thousand or more crystals may adhere to make a single flake.

What intricate form a snowflake will take, and how large it will be when it finally comes to rest, depends upon the range of temperature and moisture in the air through which it passes.

On a very cold day, filmy dry cirrus clouds float high in the sky. Snow crystals that develop inside such clouds generally assume the

10 TIMES ACTUAL SIZE

Splatter of sleet (above) forms a chainlike cluster of ice globules. A sidelight used by the photographer to heighten relief gives this pattern its yellow color. Sleet forms when raindrops fall through a layer of air well below the freezing point.

Glacial fireworks explode into a permanent design when a pellet of cold, hard sleet strikes a pane of solution-coated glass, causing the formation of ice needles.

Winter's wizardry creates wonders in miniature

ACTUAL SIZE; ENLARGEMENT © NATIONAL GEOGRAPHIC SOCIETY

sturdy shape of small hexagonal plates or columns. In warmer weather, with clouds low and plump with moisture, the snow crystals formed within grow rapidly, branching out in delicate fernlike arms and stellar rays. Still other crystals begin in an orderly fashion but, battered by wild winter winds, they finally land ragged and asymmetrical.

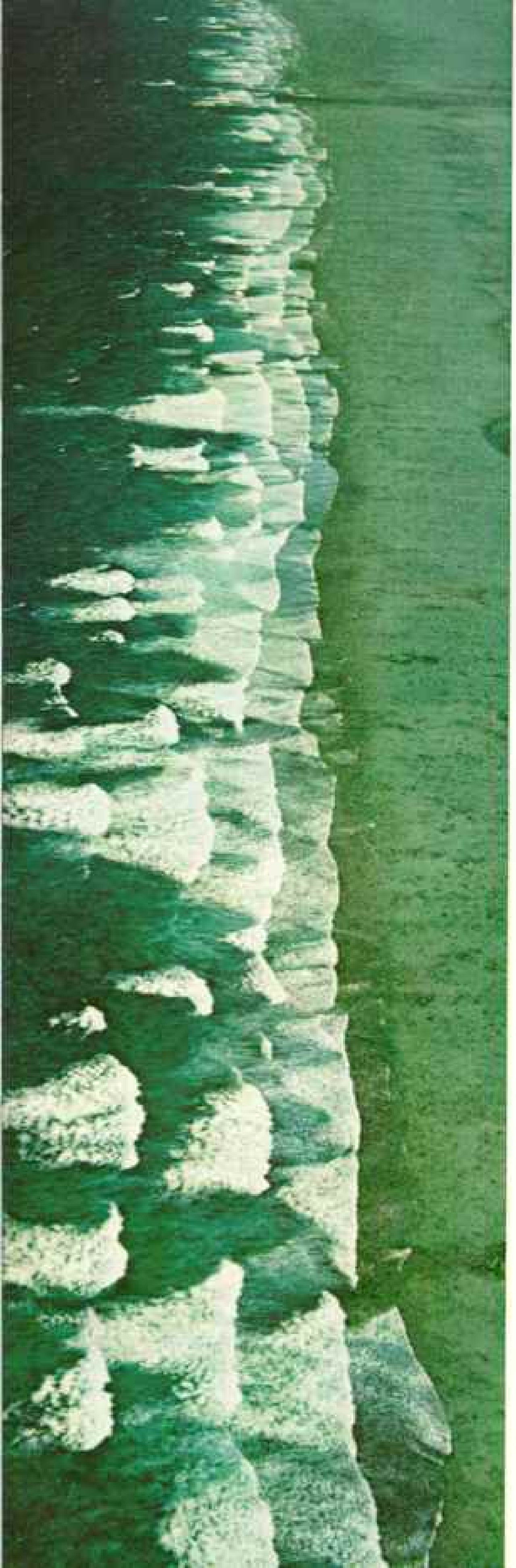
Surprisingly, snow forms within most storm clouds all year round, and in all climes, even the most torrid. Summer thunderstorms often produce snow, but on the journey earthward, the warming air takes its toll, and the flakes melt into raindrops.

Is it true that no two snow crystals are exactly alike? Dr. Schaefer estimates that "... during a single 10-inch fall of snow more than a million flakes may gather on a 2-foot square ..." Given this magnitude of possibilities, it is easy to find crystals which may appear similar. Yet, like human fingerprints, no two are identical. Among all the countless hosts that fall from heaven, no two with exactly the same size, pattern, and number of water molecules have ever been found.

If photographing the endless designs of snow crystals has been a source of both professional and personal satisfaction, collecting casts of them provides an additional bonus. I don't think I realized just how valuable they were until one sultry night in mid-July.

"Let's get the snowflakes out, Dad," suggested my 11-year-old son Robert. We went into the study and from a drawer drew out the panes of glass I'd stored away last winter. On them lay a dazzling collection of crystal images, perfect in every detail.

Outside in the warm dark, fireflies darted through the night, but inside the house a colder season held us. Time spun backward to the moment I first caught the falling flakes. Now here they remained, wonders from the sky that were always mine to share, ours to enjoy. Examining them we became, for a while anyway, two wintry explorers lost in the snows of yesteryear. THE END



Map Weaves

SEVEN SQUARE FEET of tropic geography, with notes interweaving rich threads of the New World's earliest history—this is your Society's latest map, **West Indies and Central America,** a special supplement to the January GEOGRAPHIC.

To meet the needs of the Society's mounting membership, 7,224,000 copies have been produced—the largest print order for a map in National Geographic history.

For those who can set out to roam "the American Mediterranean" in person, this up-to-date and colorful chart will become a prized traveling companion. Others will find it a magic carpet to waft them to the Caribbean on imagination's wings.

The sun-drenched world unfolded here encompasses all the nations of Central America and a generous slice of South America, as well as the entire Caribbean with its storied isles and newly independent island countries.

Cruise Ships Replace Bygone Galleons

Although the gleam of Spanish gold is gone —much of it to the bottom of these seas in sunken galleons—millions of dollars pour into this region from the pockets of eager tourists pursuing sunshine and tranquillity. By jet and cruise ship more than 3,500,000 travelers visited the islands and countries of the Caribbean last year, nearly triple the number of visitors a decade ago.

Framing the new map, 38 insets enlarge popular vacation goals—Puerto Rico, the Virgin Islands, Jamaica, the Bahamas, and many others. Detailed maps of the cities of Nassau, Charlotte Amalie, San Juan, and Kingston anchor the four corners in scales as large as 1.43 inches to the mile.

Fifty-six notes in red span the full range of Western Hemisphere history. Near the top of the map, midway down the steppingstone Bahamas, a note points out the sandy cay of

Shingled by surf, the world's second longest coral reef—after Australia's Great Barrier—fringes British Honduras for 130 miles. Dark seaward side plunges steeply to great depths; pale waters to landward lie only 3 to 15 feet deep.

History With Geography

San Salvador, believed to be the isle where Columbus first waded ashore in 1492. Close by appear symbols of today's great era of exploration—tiny red parachutes marking splashdown points of Mercury, Gemini, and Apollo astronauts who scouted the way through space for man's first landing on another world.

The symbol for ruins—three dots stacked pyramid-style—speckles the Yucatán Peninsula and Guatemala, where archeologists slowly expose a Maya empire swallowed by jungle for centuries. The map pinpoints historic cataclysms: Jamaica's Port Royal, where a 17th-century earthquake slid a city into the sea; Mont Pelée, on Martinique, whose eruption in 1902 killed all but one man in a city of 30,000.

Along the great arc of the old Spanish Main and the island necklace of the West Indies, one hears mostly the speech of Spain, interspersed with English. Here and there are accents of France and the Netherlands, and, in the southern Netherlands Antilles, a unique mélange known as Papyamentu (page 115).

The political spectrum of the region ranges from Western democracy to despotic rule, as in Haiti, and the New World's only Communist regime, in Castro's Cuba.

Here at the midriff of the Americas begins a benevolent 6,000-mile voyage: The Gulf Stream system, born in the Yucatan Channel west of Cuba, lavishes warmth and greenery on shores as distant as Norway. Here, too, in waters around the Lesser Antilles, breed black killer tempests like Hurricane Camille; last August it slammed 190-mile-an-hour winds into the U.S. Gulf Coast to earn dubious fame as a billion-dollar disaster.

Among scores of soundings, the map depicts the profundity of the Puerto Rico Trench—at 28,374 feet the Atlantic's greatest known depth—as well as the cay-dotted shallows of the hemisphere's longest barrier reef (opposite).

Additional copies of the map **West Indies and Central America,** and other wall maps of the Society, may be ordered by mail from Dept. 61, National Geographic Society, Washington, D. C. 20036. Prices, including postage and handling: $2.15 on paper, $3.30 on plastic (unfolded). A booklet index to place names is available for $1.10, postage paid.

Greenstone burial mask, more than 2,000 years old, was unearthed at Monte Alto, Guatemala, last year by a National Geographic Society-Peabody Museum, Harvard, expedition.

Home, sweet home—50 feet under, off the Virgin Islands. Four aquanauts of Tektite I—sponsored by the U. S. Navy, NASA, the Department of the Interior, and General Electric Company—lived continuously on the sea floor for a record 60 days in 1969. One aquanaut removes a shield from a window of the habitat. Another approaches the sharkproof main entrance.


SHELL NAIGUATA
1708
PENHA

THE NETHERLANDS ANTILLES

Holland in the Caribbean

By JAMES CERRUTI
Assistant Editor

Illustrations by National Geographic Photographer EMORY KRISTOF

Touch of the Dutch transplanted to the tropics, Curaçao flaunts architectural gingerbread painted in storybook colors. In the capital, Willemstad, low-duty prices lure tourists to arcaded shops—some in buildings of the early 1700's. Beyond, a Venezuelan tanker glides outward bound from Curaçao's great oil refinery.

From Willemstad the Netherlands Antilles government administers two island trios—the Dutch Leewards and Windwards—flung catercorner from each other in the Caribbean.

SIX DOTS IN A WIDE SEA—three off Venezuela's coast in a near-desert clime, low lying, cactus covered; three others, 500 miles northeastward across the Caribbean, bold with volcanic peaks or rolling hills, lush with tropical forests and emerald meadows—surely this far-flung constellation of contrasts known as the Netherlands Antilles is one of history's most curious countries. (See maps, page 123 and the wall map supplement, **West Indies and Central America.**)

The people of the two island clusters, once known collectively as the Dutch West Indies, do not even speak the same language. In the southern group—Aruba, Bonaire, and Curaçao (called the ABC's, or the Dutch Leewards)—the native tongue is Papyamentu, an intriguing medley of many different languages. In the northern triad—Sint Maarten, Saba, and Sint Eustatius (the 3 S's, or Dutch Windwards)—the dialect is a lilting, archaic English.

The official language, however, is Dutch, and only because these disparate islands were all once Dutch colonies are they now one country under the crown of the Netherlands. Dynamic and largely self-governing, the Netherlands Antilles has gone its own way since 1954, and Antilleans reminded me often that they are the equals of the Dutch. In the tripartite union called the Kingdom of the Netherlands, which consists of the Netherlands itself, the Antilles, and Surinam (formerly Dutch Guiana), all are full partners.

In the union of the six Antillean isles, however, some weigh heavier than others, and Curaçao, largest and most populous of the islands, weighs heaviest—but in a delightfully lighthearted manner. The first time I saw Willemstad, capital both of Curaçao and of the country, I knew I had come among a gay and high-spirited people. The architecture is joyous. Bright colors splash homes, shops, government buildings—blue beside

pink, yellow beside green, with red tile roofs everywhere.

How did this chromatic explosion come about? It was all due to one Vice Adm. Albert Kikkert, an early governor general of the islands. The glare of the tropical sun on white walls hurt his eyes, so in 1817 he simply decreed no more white houses. Ever since, Willemstad has kept the look and feel that inspired eccentric gave it.

Few Caribbean cities can touch it as a living architectural museum. Almost fifty beautiful buildings survive from the 18th century (page 114), hundreds from the early 19th, and even a rare few from the 17th—all still lived in or worked in. Everywhere arcades, bulging columns, and curved rococo gables evoke the curious spirit of the old colonial Dutch burghers—solidity and jollity cheek by jowl.

Rioters Looted—Then Returned Their Booty

Not so jolly, however, were the burned-out gaps I saw in some streets the last time I visited Willemstad.

I was strolling with my old friend, Curaçao Councilor Papy Jesurun, a young minority-party leader, through the main downtown area called Punda (the Point). Papy shook his head sadly at the destruction we were passing and gave me a cryptic explanation: "The Thirtieth of May," he said, enunciating the date in capitals, as if it were Black Friday or a bad Fourth of July.

On May 30, 1969, traditionally law-abiding Curaçao experienced a serious civil disturbance. Strikers against an oil subcontractor, and their sympathizers, marched on the government buildings in downtown Willemstad, and the march turned to riot. Two persons were killed, shops looted, and 33 buildings burned down.

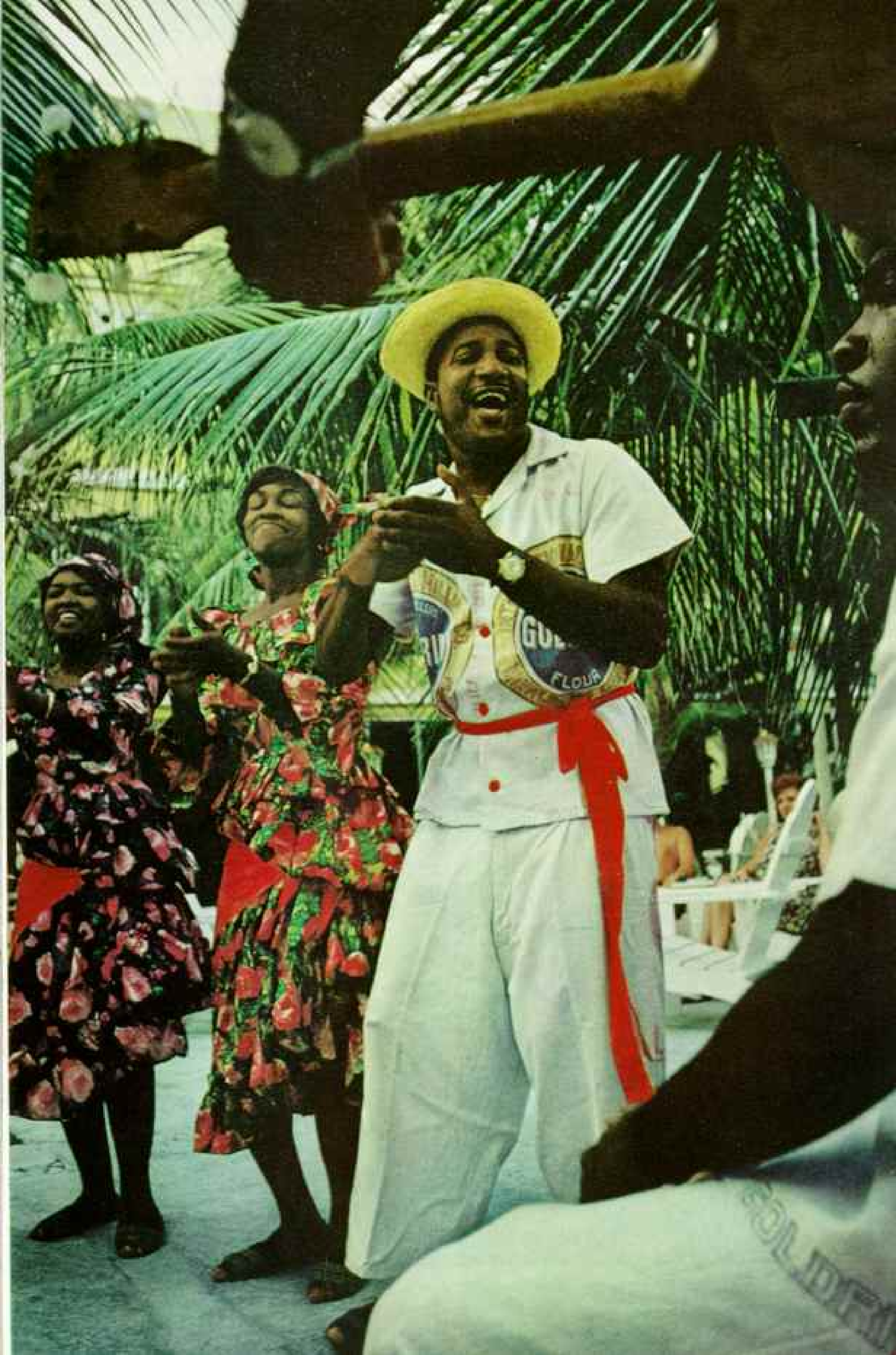
Quiet since, Curaçao vows it can never happen again. Chastened marchers and ministers alike agree that riot is not the Curaçaoan way. A leading merchant told me:

"The morning after the riot, these girls kept coming in. When our windows were smashed, they had grabbed merchandise by the fistful. Next day they came to give it back."

The inbred respect for law and order that is so characteristically Dutch does not die easily.

On one thing the great majority of Curaçaoans of every shade of skin and politics seem to agree: The Thirtieth of May was a labor uprising—*not* a race riot. Though the island's population is, like the Netherlands Antilles as a whole, 90 percent black or *krioyo* (mixed), more than fifty national strains contribute to the "Curaçao cocktail." For three centuries Curaçao has been a great international port and trading center, and races from around the world have met and mingled there.

A taste of *tambú*—the throbbing, bittersweet music of Curaçao—entertains guests at an island hotel. A four-string guitar strums accompaniment to improvised lyrics in Papyamentu—the hybrid tongue of the Dutch Leewards. Music, language, and the custom of making clothes from flour sacks date from the late 1600's, when Curaçao flourished as the Caribbean's biggest slave market. KODACHROME © N.G.S.



"**Queen Emma**" ties Willemstad together—when not tying up traffic as it swings open for ships (pages 120-21). The floating bridge was originally designed by a United States consul in 1888. Two diesel-driven propellers open and close Emma.

Area at the far end has been cleared of buildings burned in labor riots that marred the city's tranquillity last May.

Sidewalk cafes (lower left) attract a steady clientele in the Punda shopping district.

Willemstad's schooner market

Where everyone is "foreign," nothing is more foreign than the idea of racial distinctions—or, for that matter, religious or national prejudices. In Curaçao, blacks, whites, and Orientals, Catholics, Jews, and Protestants, Dutchmen, Latinos, and Africans intermingle and intermarry without causing comment.

Yet, marvelous to say, the culture of the African majority has survived all amalgamation. Festivals, funeral customs, songs, and stories perpetuate folkways brought to Curaçao in the 17th and 18th centuries, when for a time it was the busiest slave depot in the Caribbean. On a winter visit to Willemstad, my wife Hannah and I unexpectedly found ourselves joining in a famous ritual.

We were taxiing home from dinner when the driver snapped on his radio. A weird cacophony thumped out—a wavering chant that slid from elation to ululation and back again, while behind it a jungle drum fought a duel to the death with what sounded like a tire iron, a file, and a cowbell.

"What in the world is that?" Hannah asked.

"That is the *tambú*, madame," the driver replied, "an old festival from slave days—our way of celebrating the New Year. Would you like to go?"

We surely would. We had heard much about tambú. Originally a keg drum, tambú also

offers a dockside cornucopia of fruits and vegetables brought by Venezuelan sailboats.

KODACHROME (ABOVE) BY JAMES L. AMOS; EKTACHROME (LOWER LEFT) AND KODACHROME BY WINFIELD PARKS © N.G.S.

OIL AND WATER MIX IN CURAÇAO, *where a mammoth Shell refinery puffs prosperously in the embrace of Willemstad's superb harbor. The floating bridge, restless "Queen Emma," opens for ships as many as 20 times a day. Massive concrete abutments of a new bridge rise on both sides of the channel at upper right. The districts of Punda (the Point), right, and Otrabanda (the Other Side) flank the busy waterway.*

came to mean a song and a dance to the drum's beat, then a festival that put all these together in an African courtship rite.

The cab swung around to head for the Hato district, where the tambú was "happening" at a private home. As we rolled along, the driver translated the radio proceedings for us.

"They are singing, 'Let us drown the bad luck and sadness of the past year in the stream of the tambú joy,'" he explained. "So first they tell of the bad luck: 'Elenita, we are sad your fridge was repossessed. Next year, Tom, we hope you will not smash your car or lose so much at craps.'"

"Rolls Like Thunder . . . Hot Like Fire"

We heard the tambú before we saw it. A blast wave of primitive music engulfed us. Truly, as Curaçaoan folk poet Elis Juliana has written, it "rolls like thunder and is hot like fire." Then the tambú site lay ahead—a blaze of lights strung round a rambling house, with a six-pointed star of electric bulbs on a hillock beyond.

A hundred sparkling late-model cars stood along the road—not tourists' but the celebrators'. The 300 singing, dancing blacks in the patio and yard looked as prosperous as their vehicles. No quaint folk costume for them, but neat sports attire and shining, soap-scrubbed faces. The poor of these islands somehow manage to have cars (there is one for every six persons), and all take pride in their dress. Though unemployment is a problem, the country knows little of the grinding poverty, ragged garb, and grime that beset some other Caribbean isles. I have never seen a beggar in the Netherlands Antilles.

As we joined the crowd, an ancient couple, cheered on as Mamacita and Papacito, were hugging the microphone. They led the singing because they alone remembered the old classic Papyamentu verses—songs from slave days like: *Di ki manera éééh . . . Di ki manera nos lo biba den e mundu aki. . . .*

The words mean, "How, oh how, are we to live in this world?" The song goes on to lament that the "sinners," the white overseers, "treat us bad. When we do wrong, the sinners say we are wrong. When we do good, the sinners say it is also wrong."

The band tightly ringed Mamacita and Papacito with its instruments: the tambú (drummed with the hands), the *chapi* (a hoe struck with a bar), the *wiri* (a rasp), the one-string banjo, and the cowbell. Suddenly a frenetic rhythm erupted, and couples "jumped," as they say—stomping, chanting, clapping hands above heads, gyrating and wriggling.

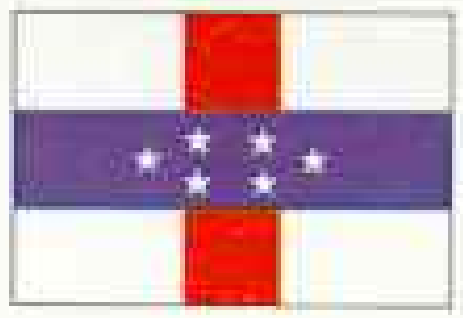
Our driver apologized. "With this radio business, they all play to the microphone, so they haven't really let go yet."

A young couple, who seemed to me to be letting themselves go pretty well, took Hannah and me in hand and taught us how to jump. We jumped, we stomped, we clapped, and after an hour, exhausted but closer together than we'd been before, we drifted back to the cab. Around us other couples, who had also lost themselves and found each other in the tambú joy, made for their cars, like us, arm in arm.

As we returned to our hotel, we passed the Governor's Palace overlooking Sint Anna Baai, Willemstad's harbor entrance. Though it was past midnight, windows were ablaze. The governor is largely a ceremonial ruler,

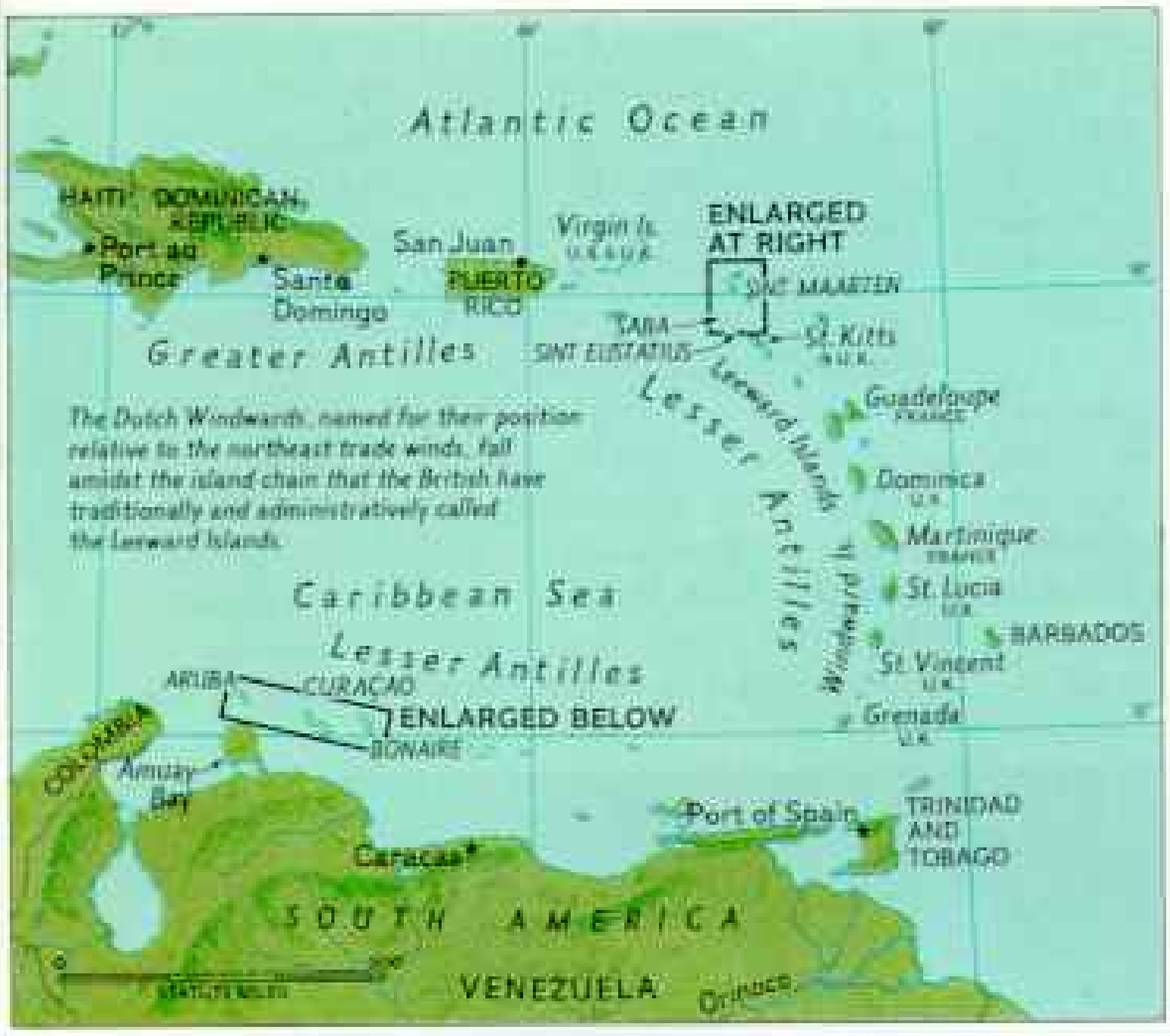
Netherlands Antilles

SELF-GOVERNING since 1954, the group consists of Aruba, Bonaire, and Curaçao, semi-arid low-lying isles off Venezuela; and, 500 miles northeast, Sint Maarten, Sint Eustatius, and Saba, lush and lofty. Once known as the Dutch West Indies, the country now forms part of the Kingdom of the Netherlands, in which it has equal political status with the Netherlands and Surinam. The Antilles flew many flags before the Dutch secured final control in 1816. Sint Eustatius alone changed hands no fewer than 22 times.



The coral-studded "ABC" islands—Aruba, Bonaire, and Curaçao—crouch near sea level. The "3 S's"—Sint Eustatius, Sint Maarten, and Saba—soar to balmy heights. (See the map supplement **West Indies and Central America,** especially insets 11, 26, 28, and 29.)

AREA: 390 square miles (largest, Curaçao, 182 sq. mi.; smallest, Saba, 5 sq. mi.). **POPULATION:** 216,000, 90 percent Negroid, with remainder chiefly of Dutch, Latin-American, Arawak, and British extraction. **LANGUAGE:** Officially Dutch. Local languages: Papyamentu in the ABC's, English in the 3 S's. **RELIGION:** Predominantly Roman Catholic in ABC's and Saba, Protestant elsewhere. **ECONOMY:** ABC's—oil refining, tourism, chemicals, phosphate, salt. 3 S's—tourism, fishing. **MAJOR CITIES:** Willemstad, Curaçao (43,500), capital and chief port; Oranjestad, Aruba (16,300), inland capital and port; Philipsburg, Sint Maarten (3,700), capital of 3 S's.



appointed by the Queen as her representative, but sometimes a crisis can keep him up late. If the government resigns, as it did after the May riot, he may have to appoint a caretaker government and arrange a special election.

Islands Ruled by 22 Deputies

Basic political power resides in the Staten, which meets a short distance away. The country's parliament, it consists of 22 deputies elected by universal suffrage and allotted according to the islands' populations. Curaçao, with a population of 141,400, gets 12 deputies; Aruba, with 59,000, eight; Bonaire, with 7,800, one; and the three Windwards, with a total population about equal to Bonaire's, also one. The deputies confirm the naming of ministers, and the ministers elect the minister-president, leader of the government.

The islands are jealous sisters (Curaçao and Aruba compete fiercely for tourists and oil business) and therefore they insist strongly on "states' rights." Each of the Leewards, and the Windwards as a group, has an elected island council to oversee local affairs. A *gezaghebber* (power holder), appointed by the Queen, presides over each council.

I have always felt, however, that in the capital city the real ruler is neither minister-president nor governor nor gezaghebber but the 19th-century Dutch Queen Emma. She lives on through her namesake, the "Queen Emma" bridge, and Emma can bring Willemstad to a halt twenty times a day if she has a mind to—and she often does.

Floating on pontoons, 500-foot-long Emma is a quaint, attractive nuisance. She spans Sint Anna Baai, connecting (and disconnecting) the Punda and Otrabanda (Other Side). When

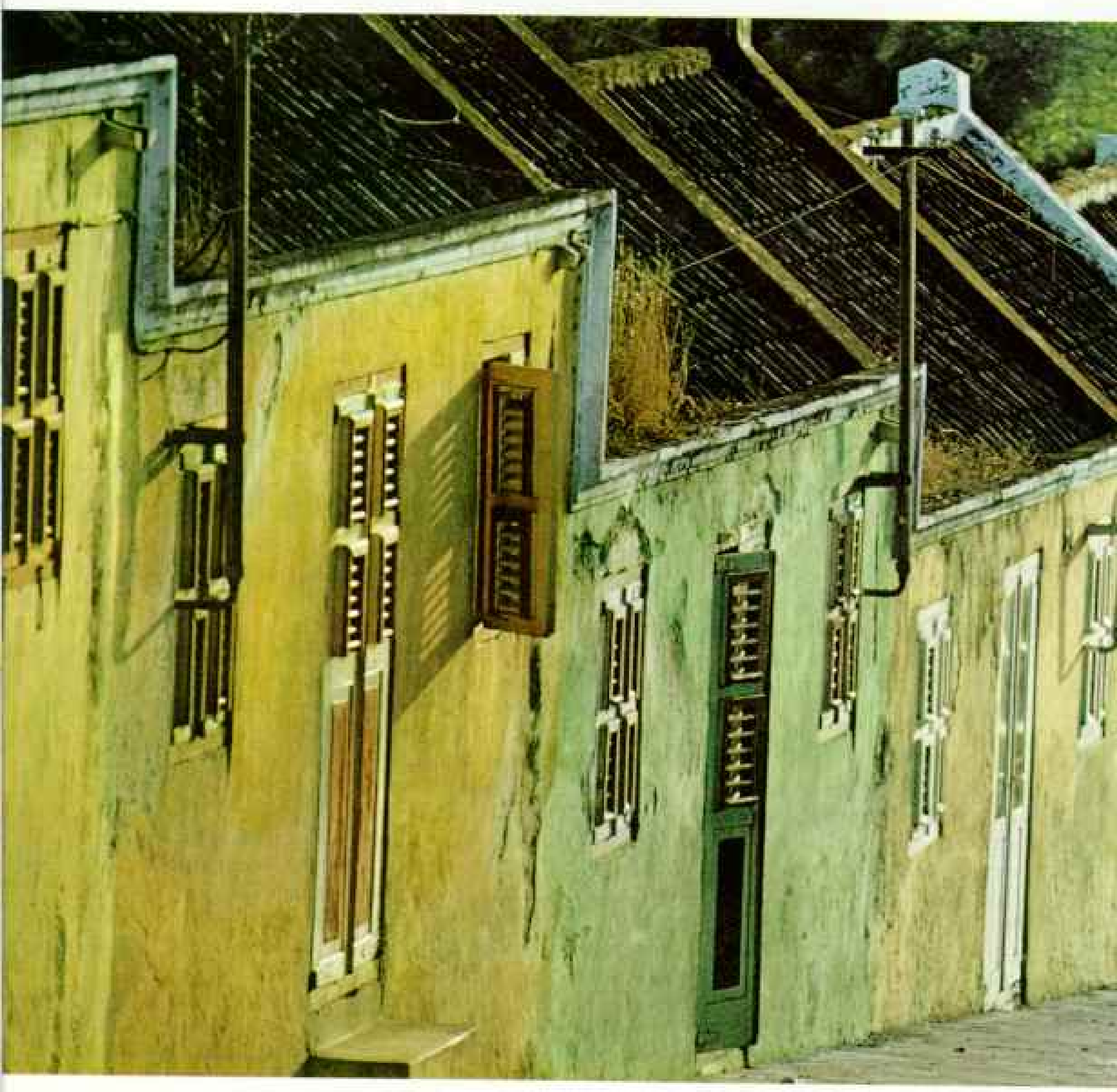
an oil tanker, cruise ship, or local craft moves in or out of the Schottegat, the main part of the harbor, Emma swings wide, gliding over the bay all in one stately piece (pages 120-21). Each time, she ties up Willemstad traffic for a minimum of half an hour. Pedestrians are luckier than autoists; a free ferry carries them across the bay when Emma won't.

This free pedestrian transport has become a tradition, but it wasn't always so. In the old days pedestrians had to pay to cross via Emma, unless they were so poor that they walked barefoot. Thrifty Dutch burghers, so the story goes, often took off their shoes on approaching Emma. Finally she was made free to all.

A new 1,640-foot bridge that will arch 180 feet high is a-building north of Emma. Ships will be able to steam under it, while auto traffic keeps moving. But Emma, beloved of the natives, delight of tourists, will remain, though with the new bridge to take the flow when she shuts it off, she will no longer be Willemstad's imperious traffic cop.

At present, however, there is just one way to get by car from the Point to the Other Side when Emma won't cooperate. It is a 10-mile detour around the Schottegat. Hannah and I took this route the day we set out to explore the 36-mile-long domain that is Curaçao.

Five miles from downtown we passed the



vast Shell oil refinery, a Curaçao landmark and economic mainstay for half a century (pages 120-21). With its tall flares it is conspicuous for miles around—a "pillar of cloud by day," a "pillar of fire by night."

Trade Wind Cools Tropic Isles

As we passed the last flare, rain began to fall—always a noteworthy event, since the Dutch Leewards get only 22 inches all year. The Leewards seldom seem humid. Because of the prevailing 15-mile-an-hour northeast trade wind, the daytime average temperature of 81° F. rarely feels too hot, and the nights, even in summer, are cool. For tourists, this climate is among the world's best. For the residents, however, the meager rainfall means a serious water shortage.

In Willemstad's Mundo Nobo district, we saw what the country is doing about the problem. Managing Director Dr. Engineer G. H. The, a Chinese-Indonesian, showed us the huge desalinization plant that makes Curaçao's fresh water from the sea.

"This is one of the world's largest. It can produce 4½ million gallons a day," Dr. The said. "We have a power plant here, too, and so to heat our evaporators we use the exhaust steam from the turbines that make electricity. We evaporate—or flash—the brine 30 times. Then the water is so pure we must run it through limestone to give it 'water flavor.'"

From Mundo Nobo we struck out westward into the *kunuku*, the countryside. Huge cacti dominated the landscape—one, like our organ pipe, called *datu;* another, somewhat similar but with jointed pipes, called *kadushi* (following pages). In places the *kunukeros*, or countryfolk, had trained the datu into fences, and occasionally were using the fences as washlines, the spines serving as clothespins.

The kunukeros make a jellied soup from kadushi, but they must move fast to beat the goats. Everywhere we looked, those voracious beasts were not only eating kadushi but chomping right through the spiny datu fences. Curaçao has about 10,000 goats, and though a prime source of meat they are pests, running free wherever appetite takes them.

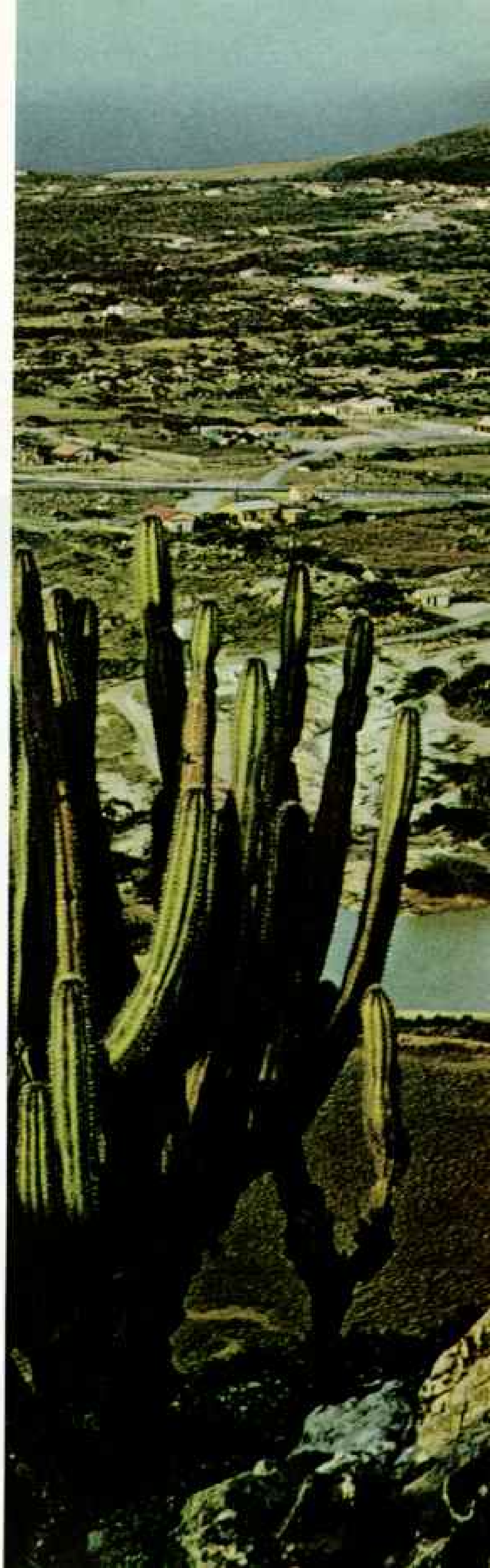
Who owns them? That depends on circumstances. Suburbanites maintain that if you run over a goat, every kunukero will swear it is his. If a goat eats your whole garden, no one owns him!

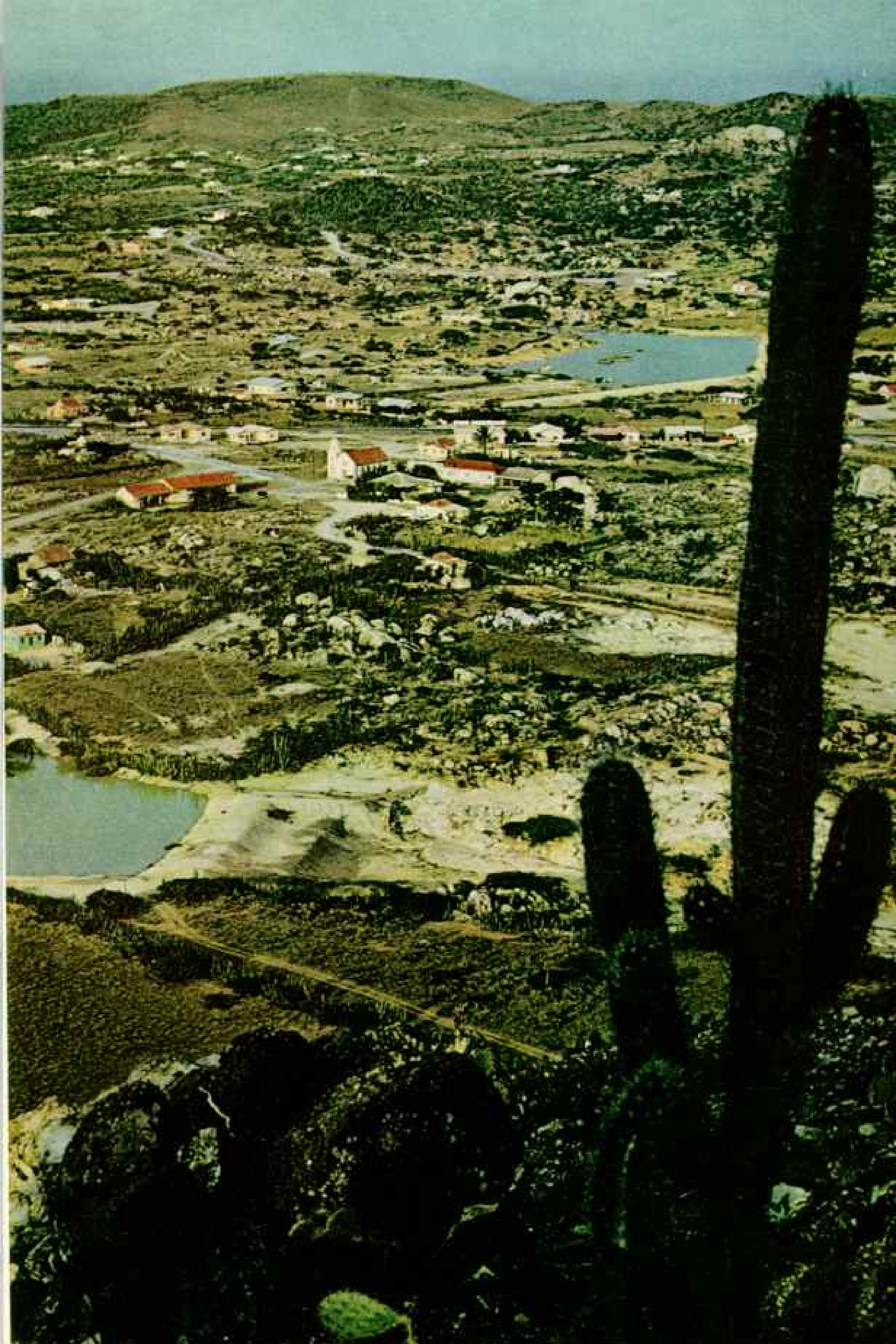
Shortly the flat landscape began to change. Hills rose in ever larger billows, and thick tropical greenery intermingled with the cactus. Everywhere the divi-divi, or *watapana tree (Caesalpina coriaria)*, blown by the northeast trade wind, pointed its crown infallibly southwest. Tamarind formed thick arches over the road. Manchineel proliferated, offering poisonous little green apples to the unwary. Ahead, conical Sint Christoffel Berg

Staircase of old slave dwellings tilts down Berg Altena Street in Willemstad. Many of today's occupants descend from slaves freed in 1863. Pastel colors brighten walls here and throughout the city—legacy of an early Dutch official who banned white houses because their glare in the sun hurt his eyes.

DAPPLED EMERALD WATERS *off Aruba buoy a catamaran driven by the trade wind. White sand beaches, luxury hotels, and gambling casinos make this semi-arid isle a lodestone for vacationists.*

On the Hooiberg, or "Haystack"—at 548 feet one of low-lying Aruba's highest points (right)—three kinds of cactus lift spiked limbs: kadushi, *left, flat-padded* infrow, *and saguaro-like* datu, *often used for fences.*





poked up—highest peak in the Dutch Leewards at 1,220 feet (map, page 123).

We reached Westpunt Baai, near the island's northwestern tip, just as the rain stopped. Climbing a wooded cliff overlooking the deserted beach, we changed into bathing suits. Below us the bay, edged with fine white sand, sparkled green and blue. We went down to swim in the delicious water, and afterward broke out our picnic lunch.

Kitchen "Eyes" Scared Away Ghosts

Turning homeward then, we passed several 18th-century *landhuizen*, plantation mansions built on hills looking out to sea. At Landhuis Jan Kock, owner Dr. J. W. M. Diemont, a veterinarian, showed us around.

The kitchen had the typical décor of Dutch colonial days: big white dots scattered over red walls. "The kitchen slaves painted them on," the doctor explained. "They are eyes to scare the ghosts away."

Outside, Dr. Diemont pointed down the hill to where pink and violet salt pans lay, long disused. He told us that the Dutch West India Company built the original Jan Kock house for the first supervisor of those pans. The production of salt by the natural evaporation of brine in the tropical sun had been the earliest industry in the Dutch isles. Slaves literally "sent to the salt mines" had the hardest lot of all.

The inequities of those bad old slave days are pretty much forgotten, and one of the greatest unifiers has been Papyamentu, the Dutch Leewards language spoken with equal zest by college graduates and kunukeros. I took my first lesson in it from May Henriquez, a Curaçaoan translator of English, French, and Spanish classics into the native tongue.

May began by giving me her translation of a musical entitled *Laiza, Porko Sushi*, meaning "Liza, Dirty Pig." Set to local folk tunes, it had run for 15 triumphant performances. I gained some idea of the difficulties of Papyamentu when May told me that I knew this work as *My Fair Lady*.

But the explanation is simple, really: In *My Fair Lady*, as in Shaw's *Pygmalion* on which the musical was based, the heroine Eliza Doolittle—whom a professor of speech turned into a fair lady—began life as a grimy Cockney flower vendor. To the humble folk in the Curaçao audience, her lowly origin would be the point to stress.

"You must translate not only words but also context," May said. "Since we have no flower girls here, I made Eliza a Curaçaoan peanut vendor outside Willemstad's Cinelandia movie house. The line her teacher used to test Eliza's progress—'The rain in Spain stays mainly in the plain'—I made *'E mucha muhé a bai saka un hèmber di awa na pos*—The girl went to fetch a pail of water at the well.' Since Papyamentu is a language and not just a dialect, we have upper- and lower-class accents. The way a country girl pronounced those sounds would give her away."

Though, as May's test sentence indicates, much of the Papyamentu vocabulary derives from Spanish, the language probably began with Portuguese. Because Sephardic Jews from Portuguese-speaking Brazil were prominent in Curaçao in the 17th century, Portuguese became the language of trade; smugglers, slavers, and slaves turned it into Papyamentu by giving it dashes of Dutch, English, Arawak, and African tongues.

. . . But Not for a Roasted Priest

This cosmopolitan language springs from a cosmopolitan history. Curaçao's first known foreign arrivals, the gentle Caquetios, an Arawak tribe from Venezuela, named the island. (For what, no one knows, but certainly not, as was once suggested, for *cura asado*, Spanish for "roasted priest.")

Then, in 1499, Curaçao got officially discovered by Amerigo Vespucci. Spain ruled until 1634, when, in the course of the Netherlands' Eighty Years' War for independence from Spain, the Dutch seized Curaçao, and two years later Aruba and Bonaire.

The struggle for the Windwards was more prolonged. In 1644 Peter Stuyvesant, governor of Curaçao, lost his right leg trying unsuccessfully to take Sint Maarten. But he went on to fame as the peg-legged director-general of Nieuw Nederland. From his capital at Nieuw Amsterdam—now New York City—he also governed the Dutch West Indies.

During the American Revolution, Dutch traders on Curaçao and Sint Eustatius supplied the Americans with ammunition and goods, and the British did not forget. In 1800 and again in 1807 they seized the ABC's and reappropriated the Dutch Windwards (which they had taken and lost many times before). In 1816, however, the Dutch regained all six islands by treaty.

For the next hundred years, the colonies lived chiefly on trade; then, in 1915, Shell Curaçao started building a refinery to process oil from Venezuela. It revolutionized the economy. Standard Oil's Lago refinery went up on Aruba in 1929 and redoubled prosperity (page 133). People from the four other Dutch islands flocked to Aruba and Curaçao to find jobs in oil.

But in the late 1950's automation arrived, and unemployment in the islands eventually reached 20 percent. Oil jobs declined from 19,200 to less than a quarter of that today.

To replace the lost jobs, the government gave every encouragement to the tourist industry, and since the country's first luxury hotel went up in 1957 on the waterfront in Willemstad, tourism has tripled. Curaçao, Aruba, and Sint Maarten have the biggest, most luxurious hotels; Bonaire has a large modern hostelry and several small ones; Saba has an elegant little hotel perched high on its volcanic cone; Sint Eustatius offers country inns. Big hotels in Curaçao, Aruba, Bonaire, and Sint Maarten have gambling casinos.

Because of minimal or no import duties, all the islands present severe temptations to visiting shoppers. A French liqueur that costs $9 in Washington, D. C., can be had for $3. For a gold ring exquisitely fashioned into flower form by Brazilian jewelers, my wife extorted $65 from me—but I had to admit it was incomparable at the price.

Charles Fuhrmann, president of the jewelry firm of Spritzer & Fuhrmann, with 23 shops on four islands, marvels delightedly at how the word has gone round. When a big cruise ship comes in, the crowds are so huge and so eager his shops have to rope off the doors and hand out numbered entrance tickets.

Curaçao, first among the islands in variety, beauty, and quality of its shops, must yield to Aruba on beaches. Along almost all 23 miles of Aruba's southwest coast runs the islands' finest, longest, widest stretch of white sand.

Aruba—48 miles west of Curaçao (map, page 123)—attracts vacationists (mostly from the United States) in such volume that dinner at our hotel came in two sittings, and I overheard customers making next year's reservations as they checked out. Oddly, however, many rarely set foot on the beach. Hordes of "casino collectors" crowded round the roulette wheels, blackjack tables, and "one-armed bandits," constantly disputing among themselves the comparative kicks of casinos they had known, measuring them against some place they called Vegas.

The tourist influence has so pervaded the Aruban scene that even the wildlife seems affected. The yellow-bellied bananaquit *(Coereba flaveola)*, known as the sugar thief, appeared in bold flocks every morning as Hannah and I breakfasted on our balcony. The greedy little things raided our marmalade and strawberry jam shamelessly. And not content with exploiting the guests, two pairs decided to become guests themselves. They established nests in the light fixtures of a main passageway of the hotel. I wondered,

Hearts and flowers join painted freckles on the face of a costumed lass during Carnival in Oranjestad, Aruba's capital.

Armored in tinsel, mock Siamese legions lay siege to Oranjestad's streets during the rollicking Grand Carnival Parade (following pages). Steel bands and countless noisemakers add to the cacophony. Clubs on the island spend weeks fabricating elaborate costumes for the annual pre-Lenten celebration.

facetiously, whether they were relying on the heat of the light bulbs to incubate their eggs, so that they could be freer to pursue their recreational activities.

For Hannah and me, exploring the intriguing geography and history of Aruba was recreation enough. The landscape, more barren than Curaçao's, is also more dramatic: spooky grottoes, natural coral bridges, gigantic boulders in gigantic heaps.

Near Ayo we came on Aruba's weirdest rock pile. Diorite monoliths, weighing hundreds of tons each, suggested animal shapes, faces, free-form sculptures. They lay in jumbled clumps, as if some peevish baby giant had tired of playing with his blocks.

With so little rain on Aruba, what force carved them? Geologists once guessed the sea, because the erosion appears mostly on the stones' southwest sides. That was the direction from which the sea, blocked off by high ground to the north, would have attacked. But geologists today credit the strange sculpturing to atmospheric influences—wind, sun, and temperature variations, abetted by the scant rain.

The mystery of the huge grottoes that honeycomb the limestone cliffs along Aruba's north shore is historical rather than geological. Inside the caves, painted Indian signs challenge scholars with their cryptic hints of Aruban life before the white man came.

Dr. Johan Hartog, Aruba's government librarian and chief historian, told me: "The Arawaks probably took the ceilings as the vault of heaven; therefore, many symbols look like representations of sun, stars, smoke. But there are snakes, lizards, and hands, too; they are magical, and a few are more or less similar to totem signs painted by some Indian tribes in the States."

I asked Dr. Hartog whether there were still Arawaks around.

He replied, "The Caribs all but annihilated the Arawaks elsewhere in the Caribbean, but they bypassed the ABC's. Both Spaniards and Dutch kept Aruba Indian for centuries. They liked the way the Indians handled horses and cattle, and so they made Aruba a breeding farm run by Indians. Until the late 1700's, they kept out both white settlers and Negro slaves. That is why you see so many Indian features in faces here, rather than Negro. But pure Arawaks—no, we do not have them. They say the last pure Arawak here died in 1860."

Like burnished pillboxes, tanks store oil at Esso's Lago refinery on Aruba. Flares and smoke plumes pivot in the grip of the northeast trade wind.

Each day the plant transforms more than 400,000 barrels of Venezuelan crude oil into a variety of fuels. Its gargantuan output is rivaled only by refineries at Amuay Bay, Venezuela, and Abadan, Iran. Curaçao (pages 120-21) ranks close behind.

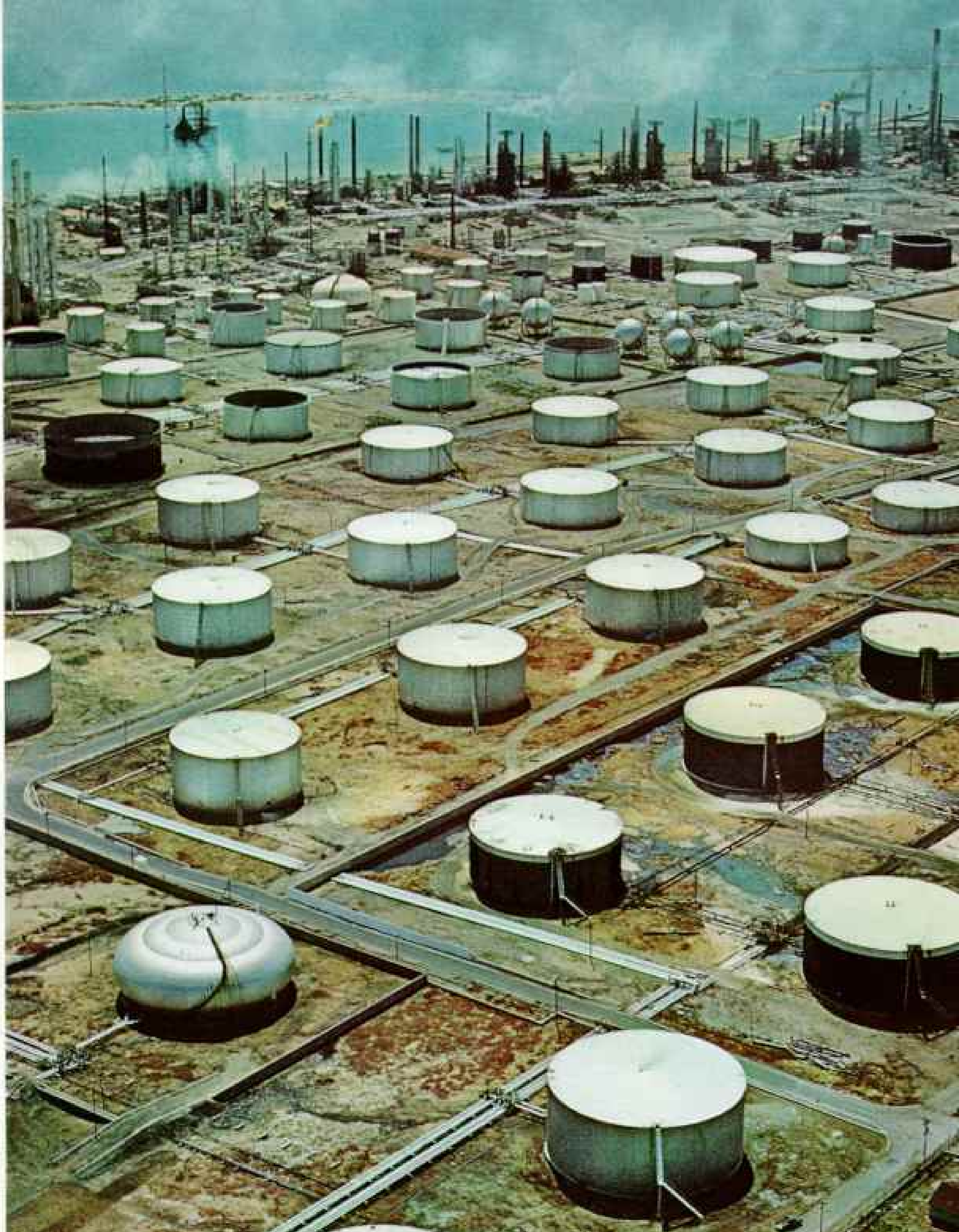
Sun fires the helmets of workers as they replace pipes corroded by ammonia, a petroleum by-product.

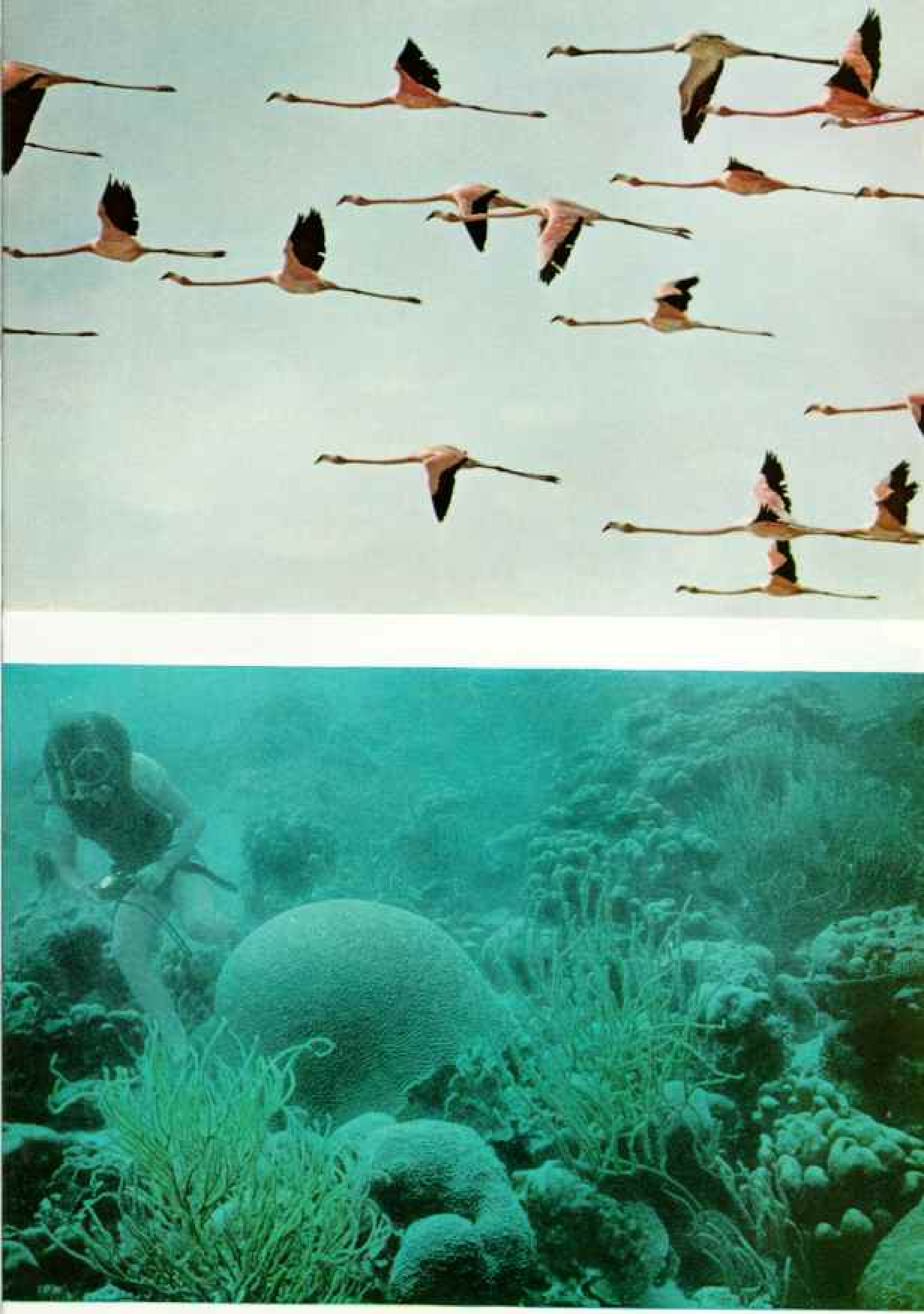
Pink Flamingos Brighten Bucolic Bonaire

The Arawaks came originally from Venezuela, 17 miles away, and Venezuela still wields great influence in Aruban life. It sends its oil to be refined at Standard Oil's Lago plant and its tourists to be tanned on the peerless strand. But on Bonaire, easternmost of the Dutch Leewards and farthest from Venezuela, neither Venezuelan nor U. S. tourists have yet made a great splash.

The Bonaireans are beginning to chafe under their blessed seclusion. They do not

(Continued on page 137)





Fair Bonaire, nature's mini-kingdom

THE GET-AWAY-FROM-IT-ALL atmosphere of Bonaire appeals not only to vacationists but also to the shy and beautiful pink flamingos *(Phoenicopterus ruber)* that make their homes on the island's salt lagoons.

During World War II, when the planes of U. S. defense forces shattered the sky's calm over the U-boat-threatened Dutch Leewards, the flamingos disappeared. In 1947, after the hubbub of war had faded, they overcame their fear and returned to the breeding grounds.

In limpid waters off Klein (Little) Bonaire, a skin-diver (left) finds a garden of coral. The island's offshore waters are noted, too, for their teeming game fish—barracuda, tuna, sailfish, and kingfish.

On a seldom trod strand of Lac bay (right), a lone swimmer fossicks for sea shells amid a treasury of sun-lacquered rocks.

KODACHROMES © N.G.S.

Pinched between salt and sea, Philipsburg sits on a Sint Maarten sand bar. The northern part of the island—St. Martin—belongs to France. Creamy-tinted pans, which once yielded salt for export to Holland as a fish preservative, are being filled at one end for a one-street expansion of the little capital. Booming tourism and a busy fishing industry help make Sint Maarten the only part of the Netherlands Antilles to enjoy full employment. Saba, 25 miles distant, thrusts above the horizon.

Big face and loud tick of a duty-free watch win a buyer in a Philipsburg jewelry shop.

like being patronized by Curaçaoans and Arubans. Least developed and populous of the Dutch Leewards (though second largest island of all the Netherlands Antilles), Bonaire does not yet earn her way in the union. Her economy relies heavily on government grants, a fact which impels some Curaçaoans and Arubans to treat her cavalierly as a Cinderella they support.

For myself, though I am only touristically a Prince Charming, I fell in love with Cinderella—simply because she *is* Cinderella. Rustic, far from the madding crowd (her capital "city," Kralendijk, has a population of 850), Bonaire retains old-fashioned charms that her sisters have traded for the pottage of progress.

Though tourists, especially scuba divers, are increasingly discovering the beauties of Bonaire's reefs and coves, the island's everyday life revolves on a bucolic axis. Twenty thousand goats crop its cactus. Pink flamingos (pages 134-5) flutter over its rainbow-hued salt pans. And everywhere, acre upon acre, the succulent aloe plant spreads its fleshy, spine-edged leaves to the sun.

In one thing at least Bonaire leads: It produces more of the aloe's incredibly bitter medicine than any of its sisters. While visiting the government aloe plantation called Amboina, I touched the severed end of an aloe leaf to the tip of my tongue—and tasted its acridity for hours afterward.

Manager Niki Tromp told me: "The natives have always known the aloe can cure. If their chickens get sick, they throw a live plant in the pond where the chickens drink. They also use the juice for burns and mix it with syrup to make cough medicine.

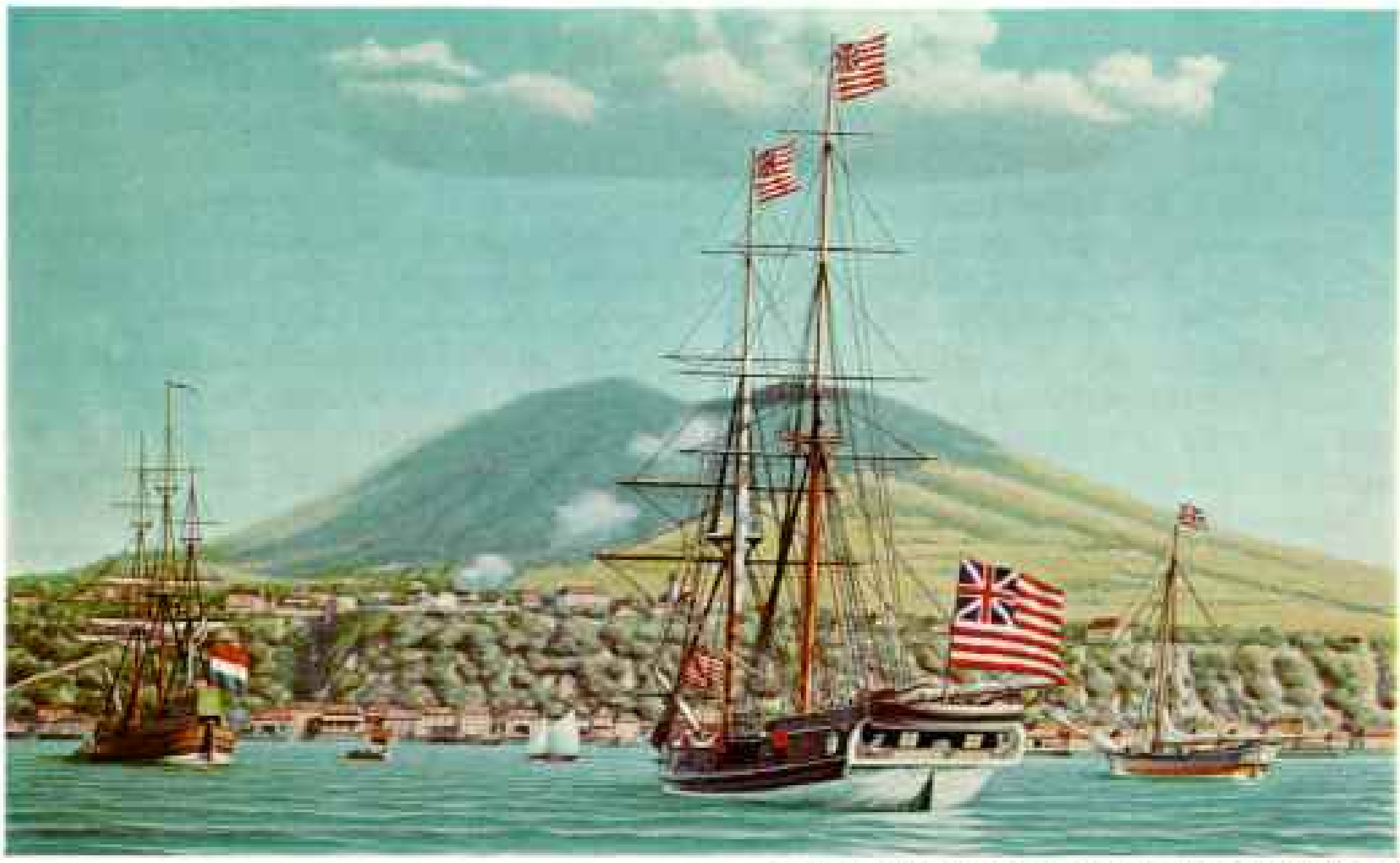
"Here we produce only resin and gel. See that lady. . . ." He pointed to a gloved, booted, straw-hatted woman wielding a sawed-off machete. "She cuts the leaves and puts them in that trough to let the juice run out naturally. We boil it down and export the resin for use in laxatives and remedies for fever, high blood pressure, and ulcers. We also scrape out the gel that remains in the leaves—for cosmetics and sunburn lotions."

Sunlight on Sea Water Yields Salt

Another natural chemical product, salt, is making a comeback on Bonaire. After the Dutch freed their slaves in 1863, the extensive Bonairean salt pans fell to ruin because no one wanted to do the grueling work. Modern machinery has made salt-pan operation feasible again, and a Pennsylvania company has spent millions to build new pans.

The flat land on which the salt pans were first laid out probably gave Bonaire its name. The pseudo-scholarly derivation from the French *bon air* (good air) is valid meteorologically but not etymologically. The Spaniards recorded phonetically the Arawaks' name for their island: *Bojnaj*, pronounced something like Bo-nah, and possibly meaning "low country."

Indeed, the salt area lies so low that the Dutch had to put up obelisks for ships to find their particular cargo. The colors of these markers, still standing, gave the pans their



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present names: Blue Pan, White, and Orange.

The real colors of the pans do not correspond to the obelisk colors. Fuchsia, violet, rusty pink, they take their hues from algae. The beauty is a living, changing thing. A pan can be an orchid shade in the morning, pink in the afternoon.

Some pans have almost the same orange-pink color as the flamingos *(Phoenicopterus ruber)* that inhabit them. There seems to be a connection. Jeweler Jules Heitkönig, who has a tiny zoo behind his Kralendijk shop, showed me three big flamingos he had adopted as sick chicks; they were a dirty white.

"The *chogógo*, as we call him, loses his color when taken off his salt-lake diet," Jules said.

The flamingos on the pans are only a fraction of the thousand or so pairs that frequent Bonaire. Their main breeding place is Pekel Meer, a salt lagoon where they tend the odd little mud mounds on which they lay their eggs. We also saw large flocks on Goto Meer, which spreads beneath 787-foot Brandaris, Bonaire's highest peak. From time to time a flock would rise suddenly, fifty pairs of wings beating the blue sky into a pink froth.

Dutch Windwards Drip Greenery

It was time for us to go skyward ourselves—northeast to the 3 S's (map, page 123). The two-and-a-half-hour flight transported us to another world. With twice as much rain as the three southern islands, Sint Maarten, Sint Eustatius, and Saba drip greenery. Instead of lying low on the horizon, they soar—all the way to Saba's peak, at 2,854 feet the country's highest point.

"Golden Rock": Sint Eustatius earned its sobriquet along with great wealth as a hub of colonial trade. Now it slumbers, a volcanic gem, near the British isle of St. Kitts, background.

First foreign salute to a U. S. warship boomed from Dutch guns on Statia when the Continental Navy's *Andrew Doria* arrived in November 1776. The ship flies the Grand Union, predecessor of the Stars and Stripes.

Brooding ruins of Lower Town, once a thriving commercial area, recall Britain's revenge on Statia for supporting the rebel Thirteen Colonies. During British-Dutch hostilities in 1781, Adm. Sir George Rodney plundered the island. Today few vessels drop anchor at her port.

If the ABC's seemed tiny to us, the 3 S's seemed minuscule. Saba, 5 square miles; Sint Eustatius (commonly called Statia), 8. Sint Maarten-St. Martin, a single isle, is a split personality—the Dutch segment measures 13 square miles, the French segment, 20.

We marveled that this scanty real estate could have been the cause of so much international strife. Not till 1816 did the 3 S's definitely become Dutch. Before that, Sint Maarten changed flags 16 times, Saba, 12, and Statia, 22. The English and Dutch were particularly bitter antagonists in this political Ping-Pong game. So contrary were their views that the English called the local islands under their control the Leewards, while the Dutch called their islands the Windwards.*

The English snatched the 3 S's so often that when they finally departed they left their language behind, and it is still spoken in the accents of the old British sea dogs. Place names have a lusty Anglo-Saxon swing: Naked Boy, the Devil's Cupper, Hell's Gate, Tumble Down Dick Bay. The two streets that comprise Philipsburg, Sint Maarten's capital, on a sand strip fronting Great Bay, are called, with Britannic forthrightness, Front Street and Back Street.

*Yachtsman Carleton Mitchell describes these islands in "A Fresh Breeze Stirs the Leewards," NATIONAL GEOGRAPHIC, October 1966, and in *Isles of the Caribbees*, a National Geographic Special Publication.

Wave-pummeled coast of Saba can turn a routine delivery of goods into a battle of man and muscle versus sea and rock. Before completion of the island's diminutive airstrip (page 143) in 1963, all goods came ashore in this harrowing fashion; most still do.

Excursionists from a cruise ship (right) shuttle via power launch to and from Fort Bay, one of two barely accessible ports of entry on the volcanic isle's nearly perpendicular shore. From here a sinuous road angles up to precipice-clinging settlements above.

High and dry in Upper Hell's Gate

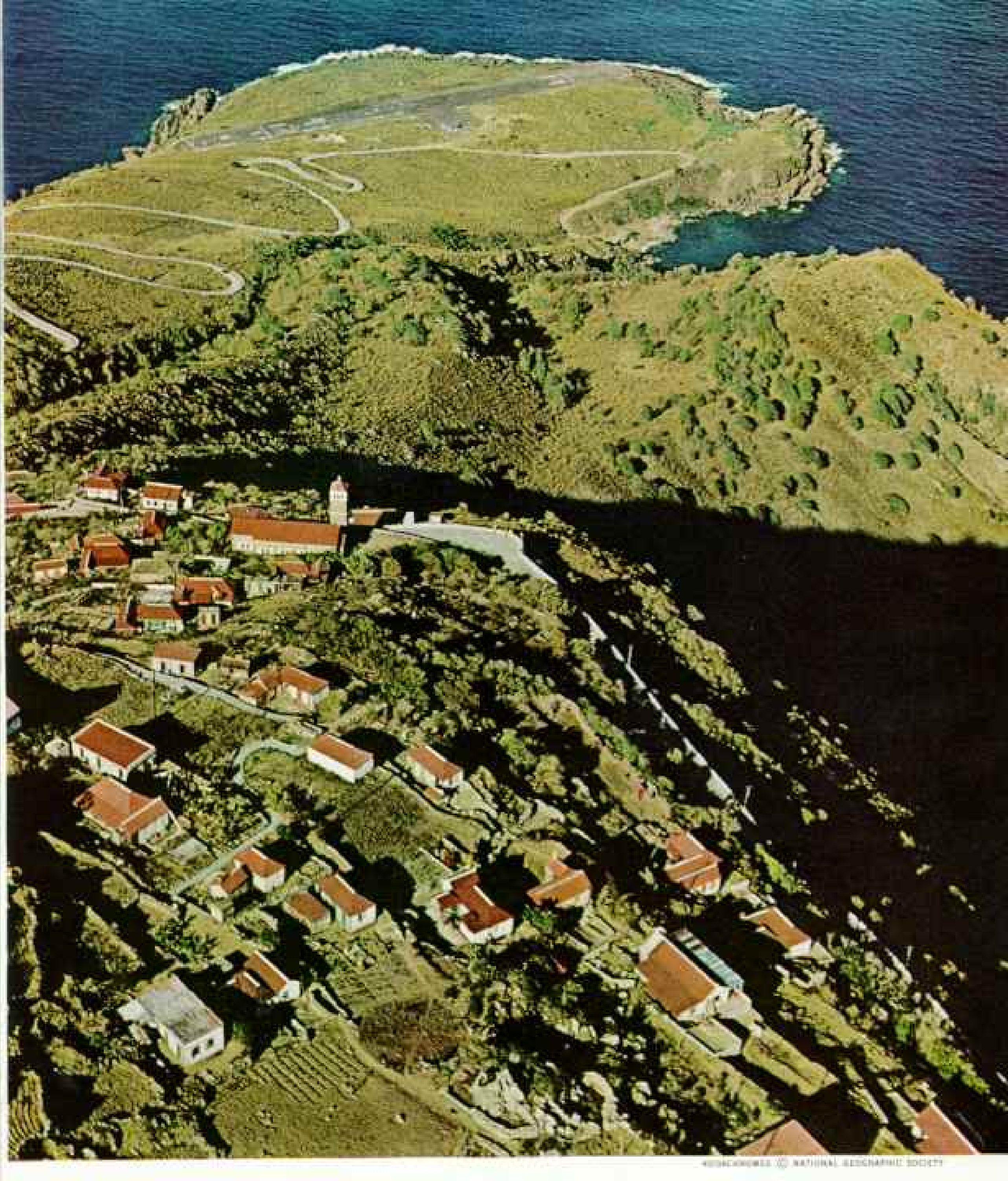
RED-RIBBED FRAME of a cabin cruiser perches far above the sea. In Saba's cloud-high Upper Hell's Gate, the author came upon this boat-to-be where no boat should be. Builder Lesley Johnson and his family were assembling the ribs beside their house (near left edge of picture at right), intending later to take them to the seaside for reassembly and planking.

Saba's airstrip slices a volcanic spur beyond Lower Hell's Gate. Like an aircraft carrier's deck, it ends in thin air at both ends. The 1,300-foot strip accommodates STOL (short takeoff and landing) aircraft. Saba's long-isolated people now turn from fishing and farming to winning the tourist dollar with their most valuable resource: spectacular scenery.

To provide a third street, the government is filling in obsolete salt pans behind the town (page 136). Natives are offering odds that it will be named New Street or Other Street.

Sint Maarten, most populous and prosperous of the Windwards, has put together elements of Aruba and Curaçao to create a booming resort: fine sand beaches, luxury hotels, elegant duty-free shops, and, in Philipsburg, an authentic 18th-century town that, on a small scale, rivals Willemstad in architectural flavor. Thanks to tourism, Sint Maarten, alone of all the Dutch isles, has achieved full employment. Indeed, Sint Maarten also employs almost a thousand workers from French St. Martin and British Anguilla.

Wondering about the curious division of the island between the French and Dutch, I asked a resident and got the traditional tale: In 1648 Dutch and French settlers living



on opposite sides of the island averted war by agreeing to fix a border line peaceably. They set a Dutchman and a Frenchman back to back and sent them racing round the shore. The border would be drawn from the starting point to the place where they met. The Frenchman ran with Gallic verve, but the Dutchman tired and sat down to revive his spirits with a bottle of gin. And that is why the French now own the larger portion.

A good story, but the division was actually made quite prosaically. The French retained the larger northern part, from which they could keep an eye on the British on Anguilla. The Dutch kept the south with its fort and salt pans, though they agreed to share the pans with the French.

The pans, which sent salt to cure Holland's favorite fish, the herring, have long been out of business, but Sint Maarten now has its own

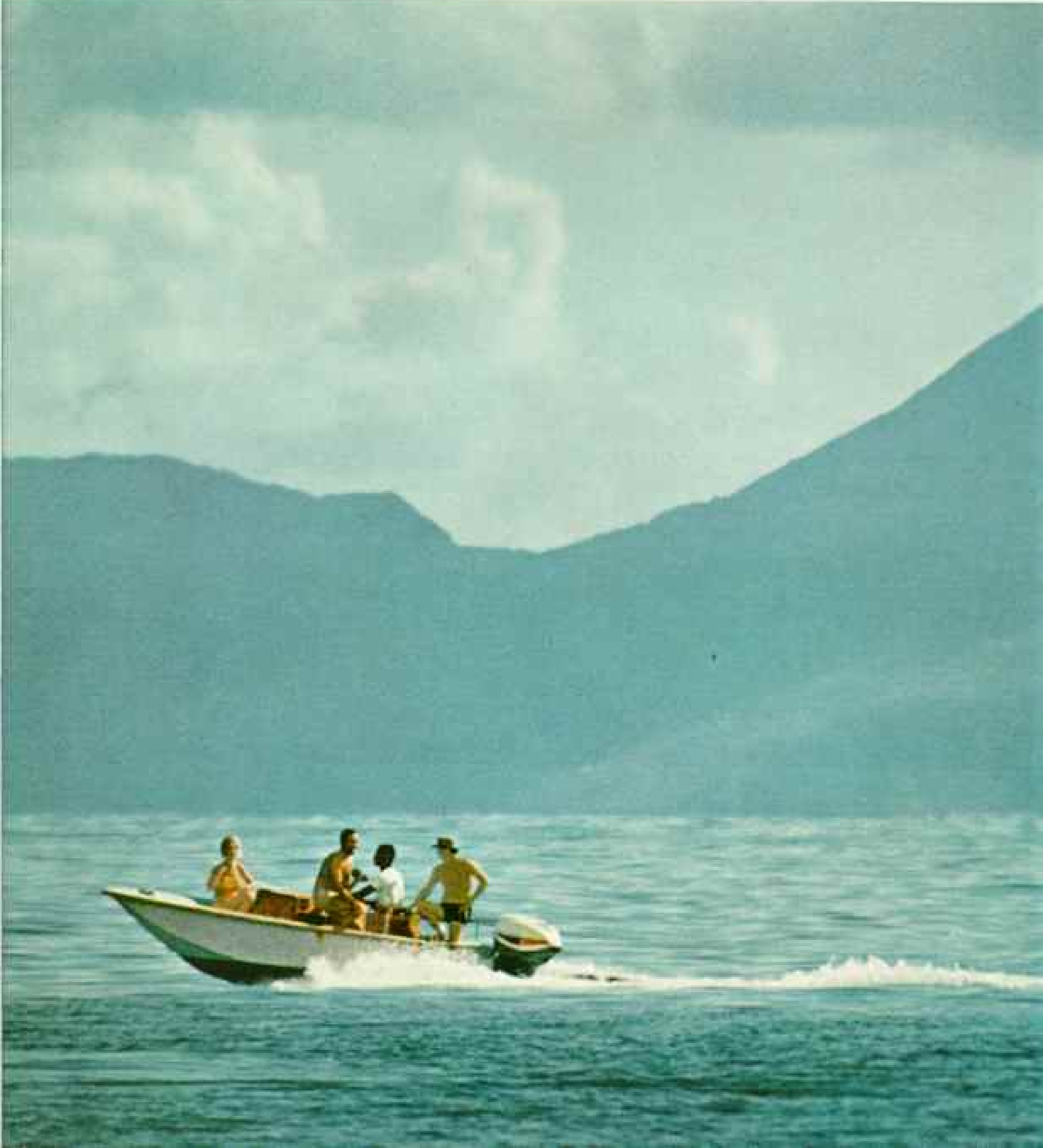
large-scale fishing industry. A Japanese company called Curaçao Pioneering runs a large fleet of deep-sea vessels out of Philipsburg. They range a thousand miles or more, taking mostly tuna and marlin and freezing them aboard ship.

On Statia, 30 miles to the south, fishing is still an old-fashioned affair, complete with fish stories. One local angler told me that occasionally someone caught and ate a poisonous fish—but nothing to worry about.

"The best remedy for the pizen fish, thanks be to God," he said, "is gin, with a bit o' potato juice."

There I was, folk medicine and all, right back in the 18th century—and only 30 miles from sophisticated Sint Maarten. Oranjestad, around which most of Statia's population of 1,300 lives, looks like an old engraving of an English village, circa 1795. The poignant ruined stone churches, the crumbling above-ground burial vaults, and the tumble of

Saba's lava crags seem to float on the sea beyond a water skier off Sint

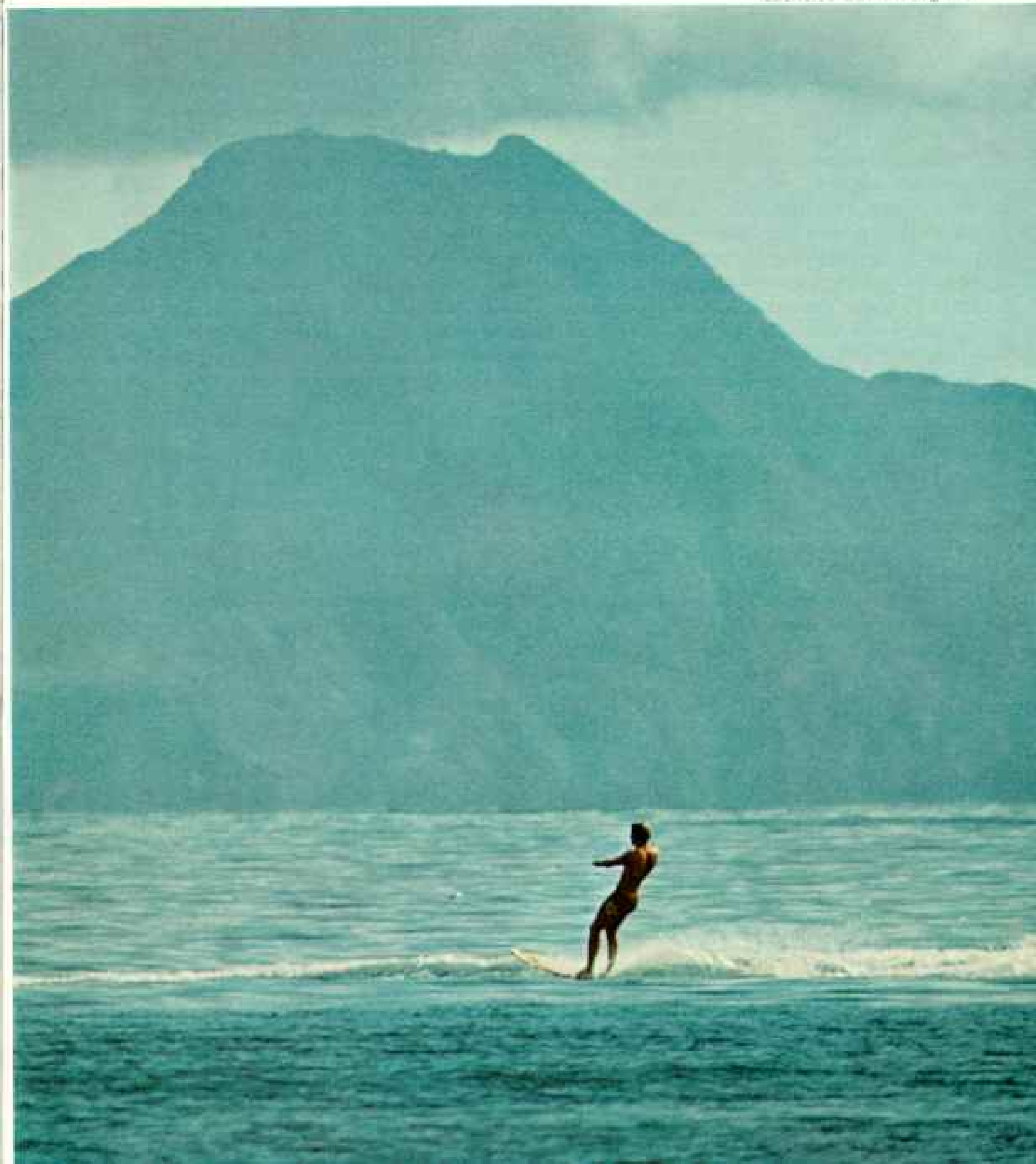


wrecked warehouses in the bayside Lower Town (page 139) give little indication that this was once a great center of world trade in the days of sailing ships.

For more than half a century the volcanic island of Statia thrived as the Golden Rock, the Diamond Rock. Envious neighbors bestowed the names in token of its wealth, derived from a lucrative commerce in slaves, sugar, and munitions. During the American Revolution, the United States was Statia's most eager customer. Good business made good friends, and Statia became the first foreign port to salute a United States warship.

On November 16, 1776, the brigantine *Andrew Doria* entered Statia's roadstead, dipped the Grand Union (the Stars and Stripes had not yet been born), and fired a salute. Johannes de Graaff, Statia's commander, ordered a return salute (page 138). When the British learned of this outrage, they protested to the Netherlands, and De Graaff was called home

Maarten. Telephoto lens shrinks the between-island distance of 25 miles.



to explain. He argued that he had fired only 11 salvos, not the traditional 13, and so it really did not count.

This reasoning failed to satisfy the British, and they also continued to resent Statia's poaching on their trade monopoly with the British Caribbean colonies. In 1781 they took their revenge when Adm. Sir George Rodney seized Statia and plundered 10 million dollars' worth of goods.

English Gardens on a Dutch Isle

Statia's close neighbor, Saba, 15 miles northwest, having nothing much to be plundered, simply absorbed English invaders. Today there are many more English family names on Saba than Dutch. Its little settlements blend English village with Dutch town. Bright-painted Dutch-style houses have tiny dooryard gardens, which, with the typical British penchant for privacy, are jealously guarded by neat white picket fences.

Rising steeply from the sea to almost 3,000 feet, Saba is an overawing mountain viewed from its base. Viewed from a plane seeking the 1,300-foot runway notched into one flank, it can be downright intimidating.

The pilot of the small Dornier 28 STOL (short takeoff and landing) plane that shuttles from Sint Maarten invited me into the cockpit to observe the approach. As we rushed at the tiny airstrip (which ends in a precipitous drop to the sea), I asked him anxiously, "Has anyone ever done this before?"

He laughed. "Don't worry. We've never missed. With this plane we can make it in half the runway." We did, and nothing to it—for the pilot anyhow.

A taxi took me from the landing strip up the sinuous road to Lower Hell's Gate (page 143). From there the driver led me up a steep flight of more than 150 steps cut into the rock to Upper Hell's Gate, Saba's highest village, 1,400 feet above the sea.

In the yard of a cliffside house stood the frame of a 32-foot boat with red ribs 10 feet high (page 142). Historians decry the legend that Sabans once built large boats on the heights and lowered them to the sea by pulleys. But the builder of this boat was doing something very close to that.

"He won't use pulleys," the driver explained. "He's just framing-up here. When he sees the fit is right, he'll take her apart and carry her down rib by rib to Cove Bay, and put her all together there. She'll be a two-engine cabin cruiser to take tourists fishing."

Tourism is just beginning on Saba, which badly needs a new industry. Sabans used to voyage afar as seamen, but now the island's remaining residents find nothing much to do but farm and fish. Certainly Saba has attractions tourists will find nowhere else. The views alone are worth the trip. At Windwardside a picturesque but modern cliff-edge resort hotel offers the finest vista in the islands.

Just beyond my balcony a cascade of lush vegetation plunged to the sea like a green Niagara—but eight times as high. Across blue water rugged Statia rode the horizon. Above me mists ran wispy fingers through the dense ferny locks of Mount Scenery's dome.

Scenery, highest of the four peaks that surmount Saba, consists of lava extrusions from a vent now choked up. If Saba had a crater, it would probably be atop Scenery; it would not be 2,000 feet down at The Bottom, in spite of the long-held belief that The Bottom, Saba's capital, got its name because it was built on the floor of an ancient crater. The name is an English misinterpretation of the original *De Botte*, which means "the bowl" in the old Zeeland dialect.

Antilles Get a Hug, a Kiss, and a Kick

With my visit to Saba, my exploration of the Netherlands Antilles came to an end. These little islands, so scattered and diverse, had impressed me. How had all their contrasting, even contradictory, elements been pulled together into a dynamic country—one of the most prosperous in the Caribbean?

Last time I visited Curaçao I put the question to my old friend Japa Beaujon, special assistant to the minister-president. A bald-pated Puck, he replied in his characteristically emphatic way. "How?" he exclaimed. "How do we do it? With a hug, a kiss, and a kick! Yes, we leaders must kick when necessary, too! But in Dutch—do you know?—a kick is the same as a spade—the word *schop* means both things."

He snatched a ceremonial spade from a corner of his office and brandished it. "We only kick, of course, very gently, so that all will dig in and work!"

From what I know of Netherlands Antilleans, none are just kicking their heels: 216,000 strong, they quickstep ahead, *schoppen* smartly at the ready.

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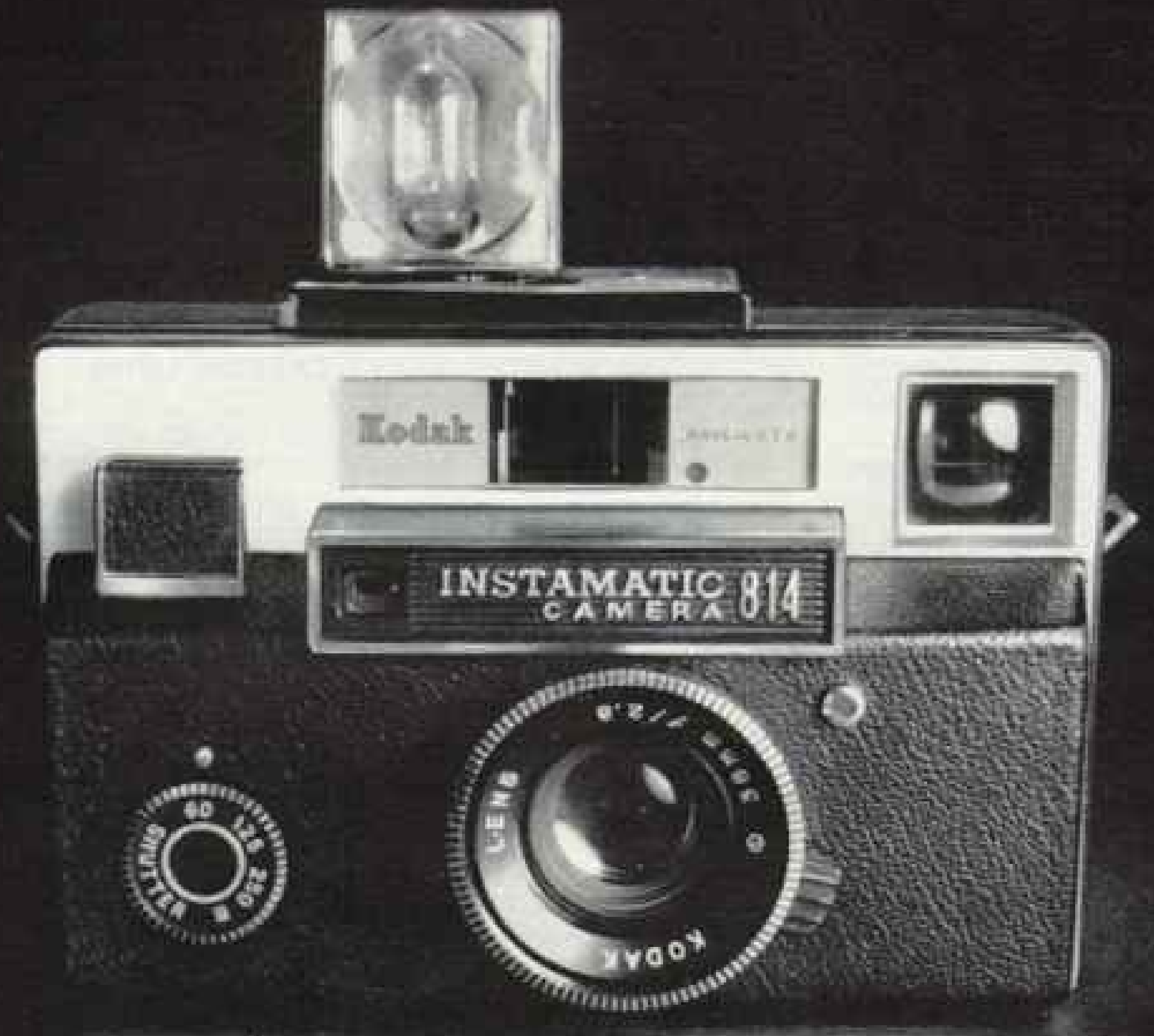

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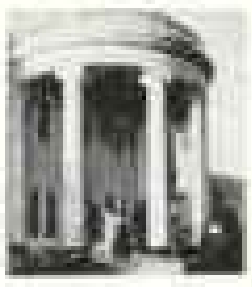

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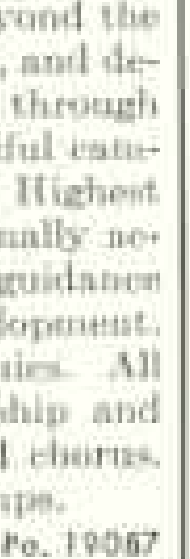

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