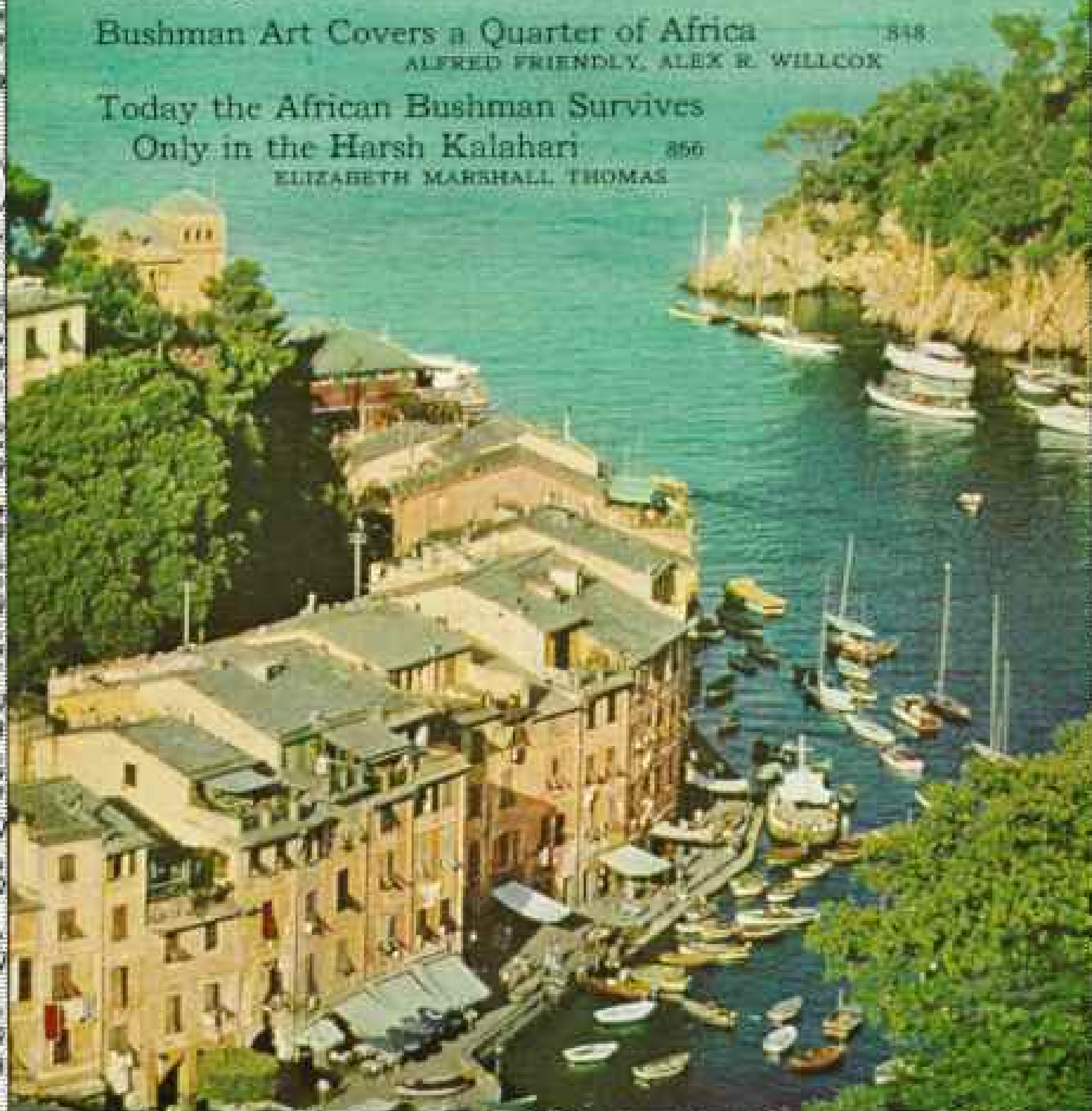


VOL. 123, NO. 6

JUNE, 1963

NATIONAL GEOGRAPHIC

Italian Riviera, Land That Winter Forgot	743
HOWELL WALKER	
Bullfrog Ballet Filmed in Flight	791
TREAT DAVIDSON	
Lonely Wonders of Katmai, Alaska	800
ERNEST GRUENING, WINFIELD PARKS	
Escorting Mona Lisa to America	838
EDWARD T. FOLLIARD	
Bushman Art Covers a Quarter of Africa	848
ALFRED FRIENDLY, ALEX R. WILLCOX	
Today the African Bushman Survives Only in the Harsh Kalahari	856
ELIZABETH MARSHALL THOMAS	



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COVER: Sun-washed houses rimming a blue cove of the Mediterranean compose the magic of Portofino (page 743).

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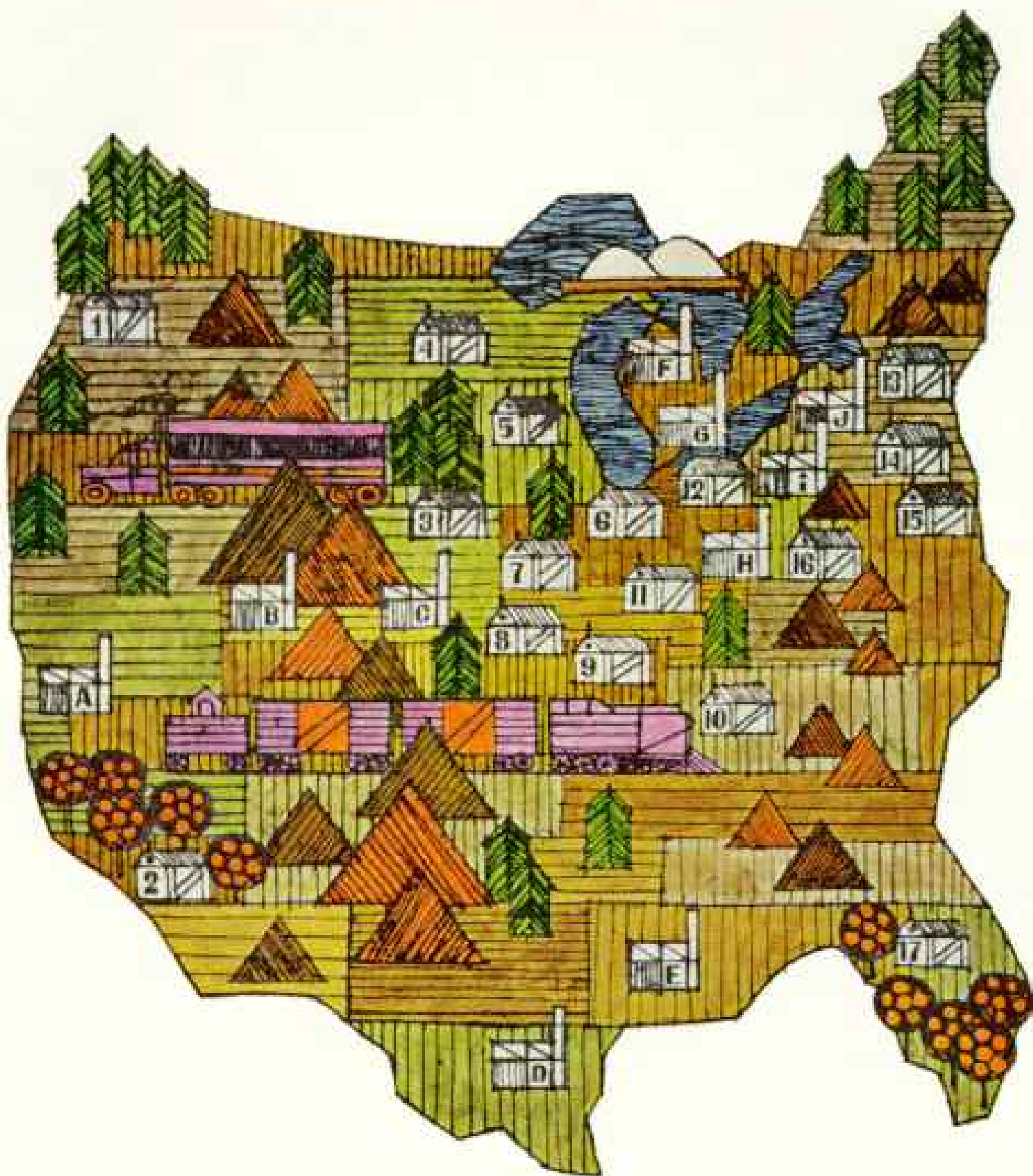
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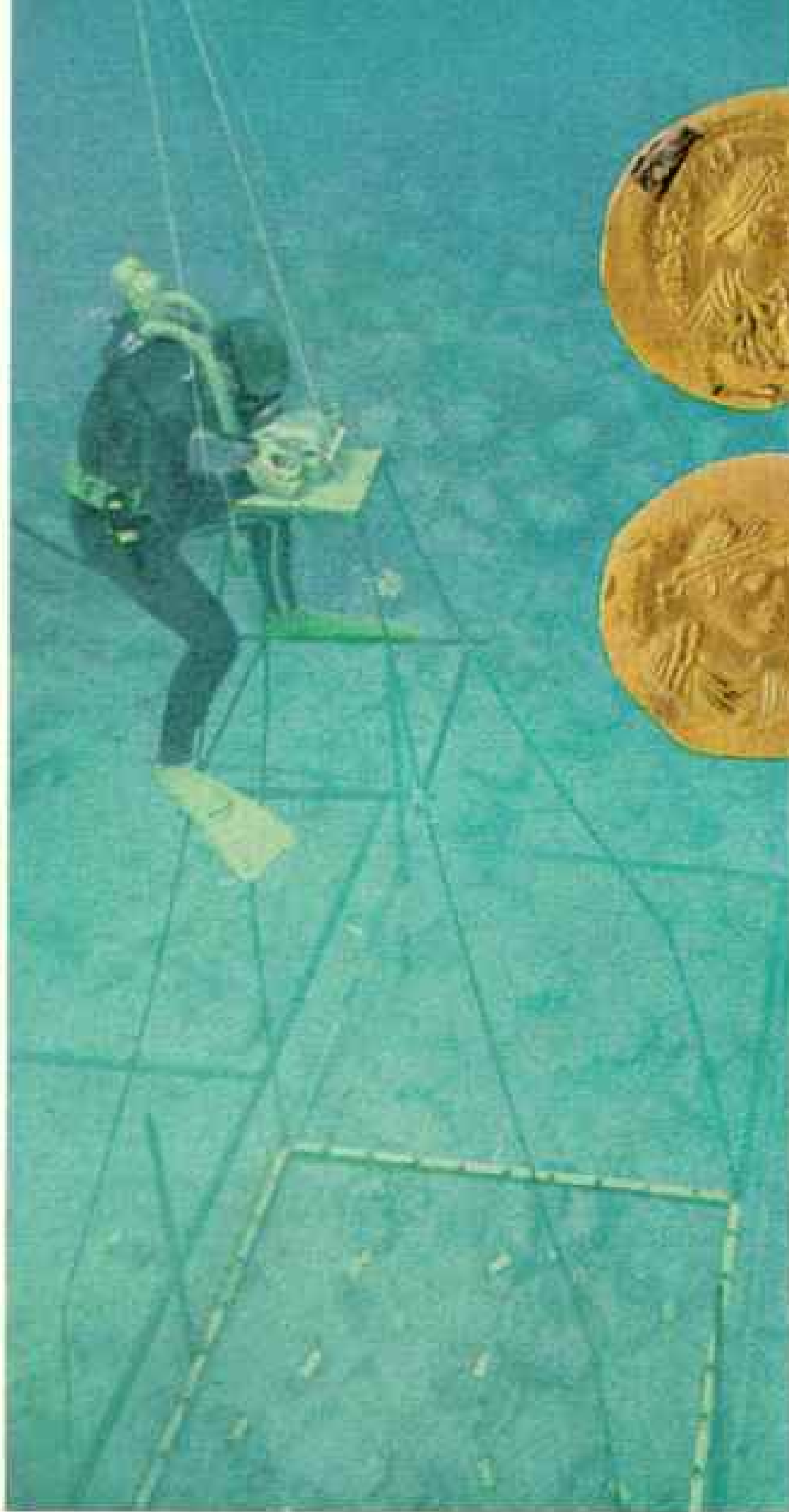
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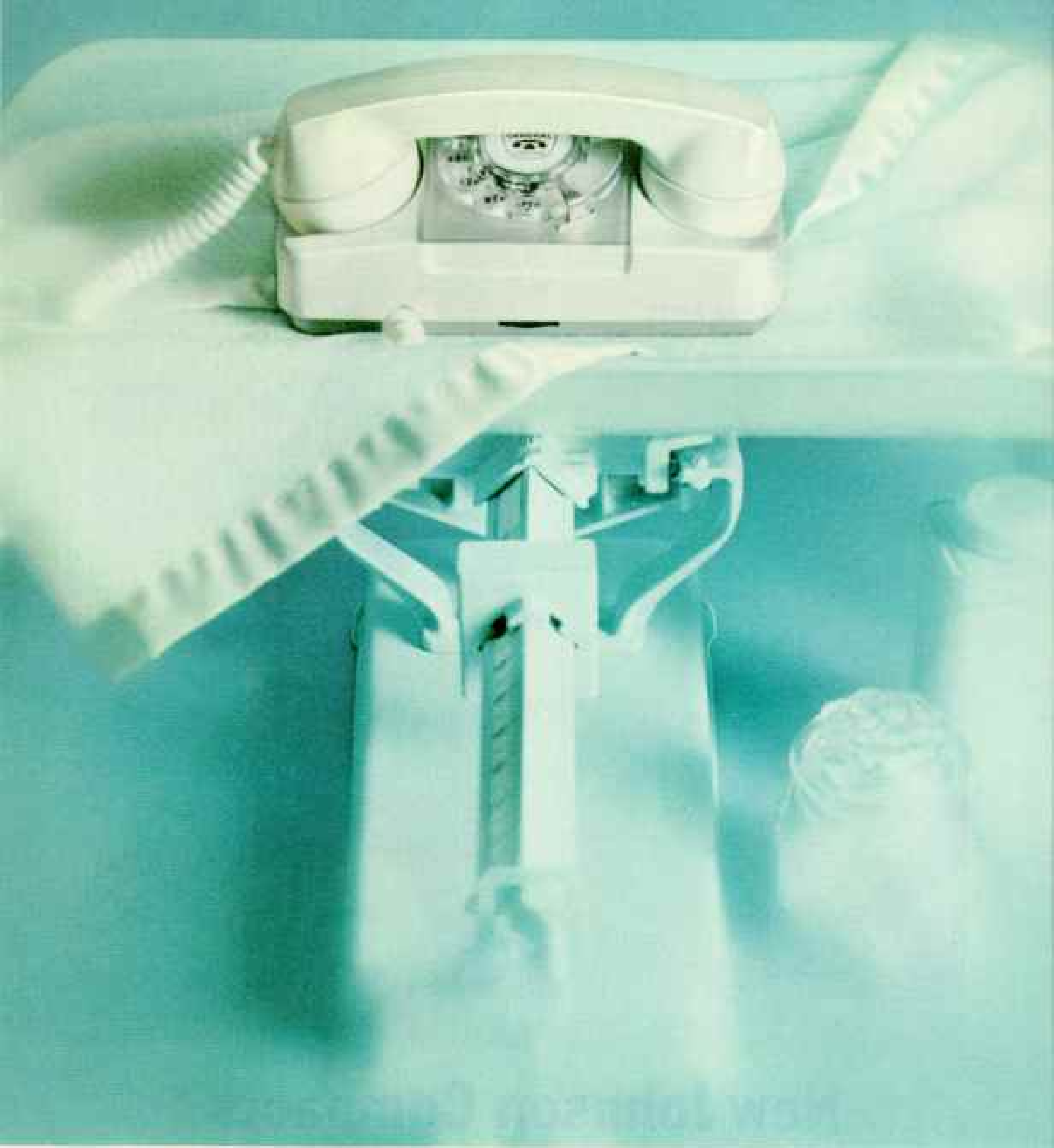
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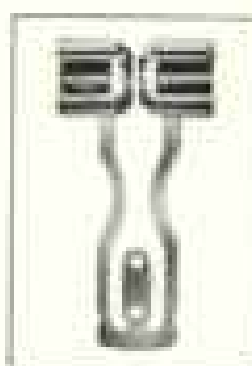


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ACCUTRON "Astronaut" gives local and Greenwich Mean time. Stainless steel case and link band, \$175*



*A rolling
cement "factory."*



*New type
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KNOW YOUR TRUCKS!

Next time you're on the highway, note how many *different* kinds of trucks you see. Nearly every sizeable truck today is *built to order* so that it may move its particular kind of cargo with maximum speed and safety at lowest possible cost. This economical, custom-built transportation helps hold down the delivered cost of *almost every product or service you buy*. The extent to which you depend on—and benefit from—efficient truck transportation can be illustrated in a single statistic: Today, there is one truck at work for every 15 persons in the U.S.A.!

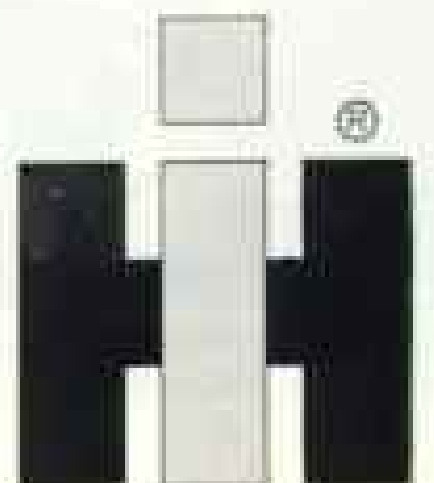
INTERNATIONAL HARVESTER COMPANY

World's largest maker of heavy-duty trucks

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At a sidewalk café in downtown Buenos Aires

Why you'll fall in love with Buenos Aires as you once did with Paris

A love affair with a city is all too rare a thing. You shared one once with Paris. You will share one with B.A.

In Paris, though, you never fell in love to the strumming of gaucho guitars. You never saw *pato*, a kind of basketball played on horseback. Or cruised along canals in your own private launch. You can only do those things in B.A.

You can be doing them the very first day of your vacation if you fly with Panagra's overnight *El Interamericano* DC-8 Jets. Round-trip Jet Economy fare from Miami to Buenos Aires is only \$578. Or, enjoy a 3-week tour of five countries for as little as \$934 including fare.

B.A.—or, to use her full name, La Ciudad y Puerto de Santa María de los Buenos Aires—is a very big town. The longest street in the world is here. So is the widest street. And the biggest opera stage.

And little delights

But, for all its bigness, B.A. remains a town full of little delights. Like the little hats her horses wear in the summer. (It's the law.)

Like the little outdoor theater in the waterfront quarter called La Boca. It's on a street fenced off at one end. People lean out of win-

dows, gather on balconies, laugh, shout, ad lib.

After the show, go along with the crowd to "The Little Fish"—a delightful seafood spot. Or grab a cab to *La Cabaña*. Here, Chateaubriand King Edward VII, the fanciest steak in the house, will set you back about \$1.50.

A day on the pampas

Set aside a day for the gaucho cookout called an *asado*. You'll find it just outside B.A. There's wine, and folk dancing. And a cool breeze called the *pampero* ruffles your hair.

Ready to go? So is Panagra, with the most frequent jets to Peru, Chile and Argentina. There's no change of plane over the routes of National, Pan Am and Panagra.

Panagra is the only U.S. airline specializing only in South American travel. We can help you stretch your time and money. See a travel agent. Or call Pan Am, sales agent for Panagra.

Write for free tour folders to Panagra, Room G-33, Chrysler Bldg., New York 17, N. Y. For our 130-page guide to South American sights, shopping, restaurants, hotels, enclose 25¢.

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of tapestried salons...in the pampering graciousness of dedicated stewards. Enjoy it in the vastness of sun-swept Lido decks...in the hand-crafted detail of your luxurious stateroom...in the evening's entertainment gay and happy as Italy itself. (And if you can't tell a *brun giorno* from a *buona sera*, we'll also teach you Italian en route.) ■ Sail with us and savor *all* of Italy. See your Travel Agent.



Italian Line

Battery Park Building, 34 State Street, New York 4, and 820 Fifth Avenue, New York 10, New York ■ Digits 4-0800
LEONARDO DA VINCI ■ CRISTOFORO COLOMBO ■ SATURNIA ■ VULCANIA ■ Coming in 1964, the two new superliners: MICHELANGELO and RAFFAELLO



Missile engineer Louis Raburn of Tulsa, photographed with the Thor/Delta at Cape Canaveral

"Life Insurance? I've got my G.I. policy!"

"But a MONY man showed me it didn't give my family near enough protection."



Louis Raburn talks with Claude Bradshaw

"I'm worth lots more dead than alive! I told MONY man Claude Bradshaw. With my G.I. policy I figured that I'd crossed life insurance off my list.

"But Claude asked, 'How much income would that provide?' He worked out a MONY plan that included my G.I. policy, and guaranteed my wife a decent income.

"And when he showed me how the plan could help with our boys' education . . . that really sold me!

"I had to start small . . . but I've

built up the program just the way Claude planned.

"In fact, I asked him to set up a MONY Health Insurance plan for us, too. I'm a real booster for Claude . . . and for MONY."

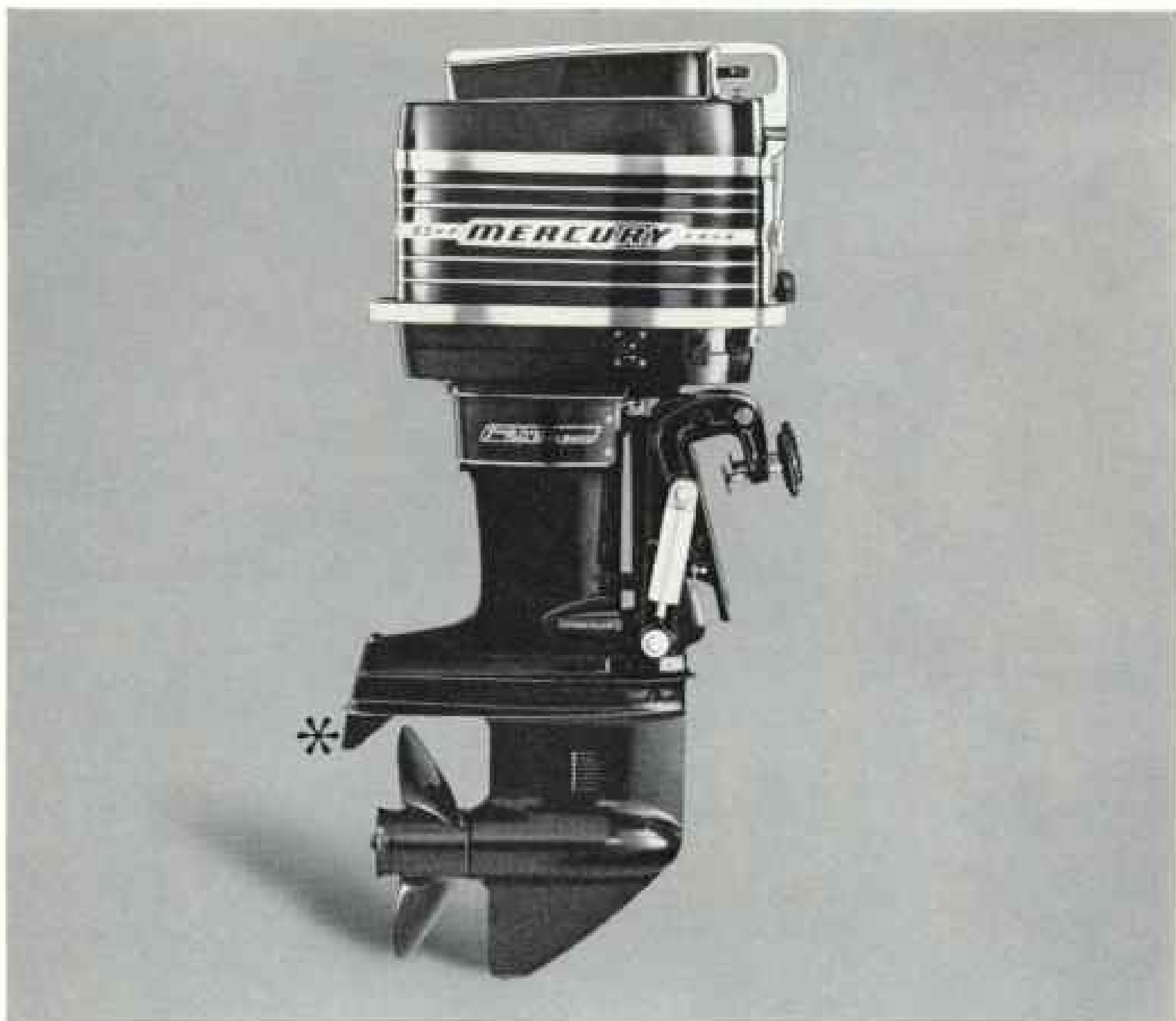
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New Merc 650/65 hp/4 cylinders

One part on a Merc is designed to wear out

* This is a trim tab. It may be adjusted with a simple hand tool to offset engine torque for easy steering. This year, it has been designed to wear out. Here's why:

Up to now, outboarders using bronze propellers in salt water had a corrosion problem. When two unlike metals, such as bronze and aluminum, are submerged in salt water, an action is set up called galvanic corrosion. It is the reverse of plating one metal with another, causing one of the metals to be eaten away.

Mercury's new trim tab is cast from a special self-sacrificing alloy. In salt water, it allows itself to be slowly "eaten away"... thereby protecting the other metal parts of your motor. When your motor begins to steer hard, it's time to replace the trim tab. And,

a new one costs only a buck. In fresh water, it lasts like aluminum.

A small thing, perhaps... but another example of the tender, loving care in design, proving, and production to give you more RUN for your money with Mercury.

MERCURY

100, 85, 65, 50, 35, 20, 9.8 and 6 hp outboards



**MerCruiser Stern Drive
Power Packages • 310, 225,
190, 140, and 110 hp gasoline
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Subsidiary of Brunswick Corp.

The Special K Breakfast that fits so many modern diets

built around the low-fat, protein cereal that tastes good, too



© 1963 by the Kellogg Company

THE SPECIAL K BREAKFAST

4 ounces of orange or
tomato juice—or half a
medium-size grapefruit

1 ounce (1½ cups)
Special K with
1 teaspoon sugar

4 ounces skim milk

Black coffee or tea

(Only 240 calories)

The Nutrition Story of Kellogg's Special K

(One serving of Special K (1½ cups with ½ cup skim milk) supplies 14% of the recommended daily protein allowance for an adult man, and approximately these percentages of his minimum daily requirements as established by the Food & Drug Administration:

Thiamine (B ₁)	44%
Riboflavin (B ₂)	60%
Niacin	51%
Vitamin C	38%
Vitamin D	90%
Calcium	22%
Phosphorus	22%
Iron	36%

The newer knowledge of food (and of food's effect on the body) is carefully reflected in the Special K Breakfast, built around a unique cereal food—Kellogg's Special K.

Those concerned about the amount and type of fat in their diets can enjoy it without a qualm. A serving of Special K (1½ cups) with 4 ounces of skim milk contains only 0.24 grams of fat.

Weight-conscious folks will appreciate the fact that the Special K Menu totals no more than 240 calories. Yet,

it provides the complete high-quality protein (and other nutrients) needed in the early morning to get going.

And finally, the modern dieter knows that breakfast foods chosen must be appetizing. To the taste, to the eye, in the mouth.

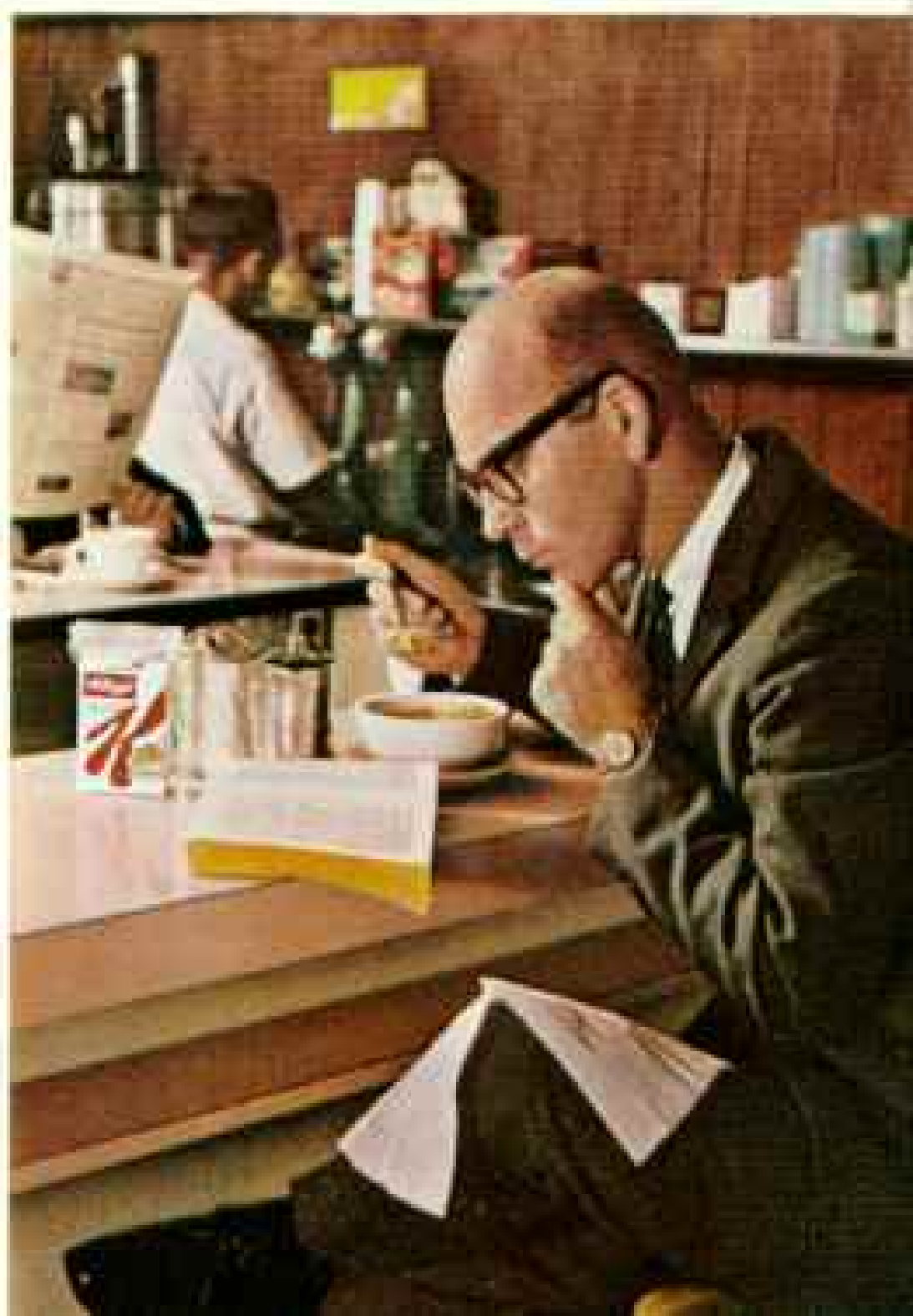
Special K is, indeed, a delicious cereal. Crisp and light, enjoyable week after week, month after month.

Doesn't the Special K Breakfast fit into your diet—or someone's in your family?

"The best to you each morning"

Kellogg's

SPECIAL K



Love Letters to Rambler



J. J. Kohberger

Station Wagon (with stick shift and overdrive). He writes:

"25-27 M.P.G. ON 14,000-MILE ALASKA-TO-MEXICO TRIP"

"You probably know all about driving conditions on the Alaska Highway, such as dust, gravel, potholes, etc. I drove it up and back...visited every town in Alaska.

"Then I came down the Pacific Coast, into Old Mexico. I never had to add water to the radiator during the entire trip, even through the desert where the temperature was 120 degrees.

"I averaged 50 miles per hour...between 25 and 27 miles per gallon of gas.

"I have owned at least 50 cars and I have never had any top the performance of this station wagon."

You get even more ruggedness in 1963 Rambler 6 or V-8 Wagons thanks to new Advanced Unit Construction. And inside you get full headroom, hiproom and legroom for six husky 6-footers.



See your dealer and see why *Motor Trend Magazine* gave the "Car of the Year" Award to Rambler '63.

You can get direct-mail processing by Kodak for your Kodachrome films



KODAK Prepaid Processing Mailer for 35mm slides. Mailers also available for KODACOLOR Film and Prints.

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- 1 Buy KODAK Prepaid Processing Mailers at your dealer's. Price covers the processing cost.
- 2 Mail your exposed film—still or movie—direct to Kodak in the handy envelope mailer provided.



- 3 Get your prints, slides or movies back directly by mail, postpaid.

Look for "Processed by Kodak" on your color slides or movies and "Made by Kodak" on the back of your color prints.

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Kodak electric movie camera
loads in seconds,
has new zoom lens



New! Film cassette
for quick loading!



Battery drive!
No crank—no winding!



Lens sets itself!
Zooms for close-ups!

Maybe you thought zoom movies were complicated—but never again! The KODAK Electric 8 Zoom Camera lets you zoom easily, smoothly, surely—at the touch of a finger. In fact, *everything* about the Electric 8 Zoom Camera is designed for easier movie-making. A battery-driven motor does the work. An electric eye sets the lens automatically. And the KODAK DUEX 8 Cassette actually cuts loading time in half, because it eliminates rethreading. When you've exposed side one, just flip the cassette and keep right on shooting. Try the KODAK Electric 8 Zoom Camera at your dealer's . . . less than \$150. (Batteries extra.)



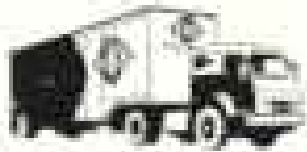
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But to play it safe (in case your husband has a way of losing notes), call the nearby United Agent yourself! He's listed in the Yellow Pages.

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A Vagabond Mediterranean Cruise to Europe this year could be your vacation of a lifetime! A 24-day cruise from New York every month, April-November (cruise of July 10 is 42 days), visiting Lisbon, Tangier, Naples, Genoa, Cannes, Barcelona, Palma, Gibraltar, Madeira. Or, if you prefer, you can cruise over one way, have an extended stay in Europe and cruise back later. Vagabond Cruises are the casual fun-way to Europe: entertainment, Spanish Flamenco Dancers, a champagne party, deck sports, first run movies, wonderful food, and dancing nightly to a Meyer Davis orchestra. The ss ATLANTIC is air-conditioned... with private bathrooms (shower)... and stabilizers. Summer season cruises as low as \$535, round trip Tourist Class, or one way from \$298. Oct. or Nov. cruises reduced to \$382, or \$241 one way. Entire ship Tourist Class except 16 First Class staterooms. See your Travel Agent or American Export Lines.

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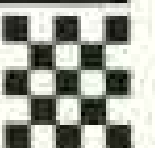
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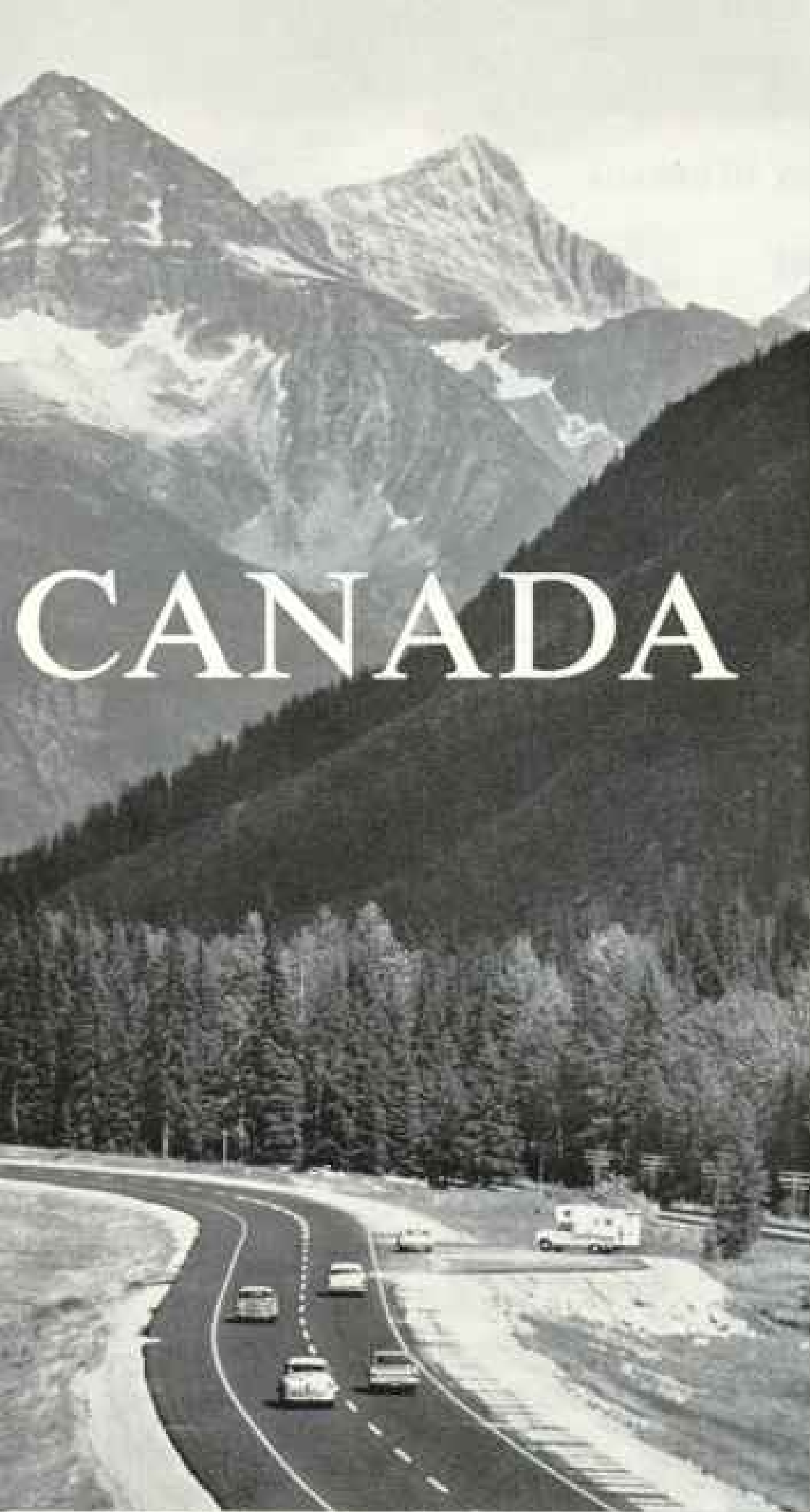
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TCA's Rolls-Royce powered planes will take you almost anywhere in Canada.

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"outstanding achievement of the lensmaker's art"

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the **AUTOMATIC MACRO-SWITAR APOCHROMAT** which gives you precise color fidelity, critical sharpness, f/1.8 speed AND FOCUSES DOWN TO 7" WITHOUT ACCESSORIES. • It is a perfect match for the Swiss ALPA, custom built like a fine Swiss watch, scrupulously quality controlled and unconditionally guaranteed for utmost precision.

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two buckets...

... and a bathtub

—the new MG Sports Sedan. Up front—two genuine sports car bucket seats. In back—a roomy sedan seat, as big as a bathtub—a seat that comfortably holds all the kids, all the packages, all the cats and all the dogs. Yes sir—this new MG is a true sedan—a 5 passenger sedan, with 80% of the car's length devoted to passengers and luggage. (That's because the engine sits crosswise instead of lengthwise.)

And it's got the heart and spunk of a sports car. The world's number one competitive engine — an MG engine ... Dual carburetion ... 4 speed stick shift ... Crunchproof synchromesh gear box ... Speeds in excess of 80 mph.

But in big city traffic, in stop-and-go driving, it's a true economy sedan, getting 24 to 30 mpg. And it can park in a slot. It has 2.7 times as much visibility as the best-selling import, and has curved side windows for maximum shoulder room. Service

and maintenance are at an absolute minimum. It's a family sedan that'll do all the chores, make all the calls and pick up the kids at school. It's a little giant that the ladies will find obedient, faithful, quiet and unbelievably easy to handle.

Ah, but on the road ... when you have it all to yourself ... when you're alone and you want to know that you're really driving an MG ... feel it flatten hills, corner like a cat, hug the road at high speeds ... sports car braking system (disc & drum combination) gives you safer, surer stops. (Few all-out sports cars handle as well or can take as much punishment.)

This car, this MG Sports Sedan—it's not just a new model: it's a new concept—an economical family sedan of sporting character. A car with a revolutionary fluid suspension system (no springs, no shock absorbers.) A smooth-riding car with front-wheel drive—where the engine pulls in-

stead of pushes, giving it greater stability on slippery roads and sharp turns. A car that anyone can drive with comfort and confidence. A car that's bigger on the inside than it appears on the outside, built by one of the world's oldest and most renowned automobile manufacturers, superbly designed in true British Sports Car tradition. A car that is the new size of luxury and the new look of performance. A car that is, all at once, a proper gentleman, a sporting spirit and an elegant rascal.



MG SPORTS SEDAN
\$1898⁰⁰*

*Suggested retail price New York P.D.E. Includes: turn signals; windshield wipers; spare wheel; tool kit; ash tray light; Heater and white-walls optional.

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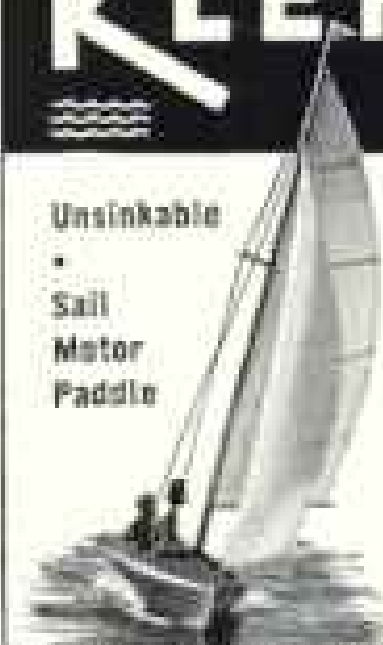
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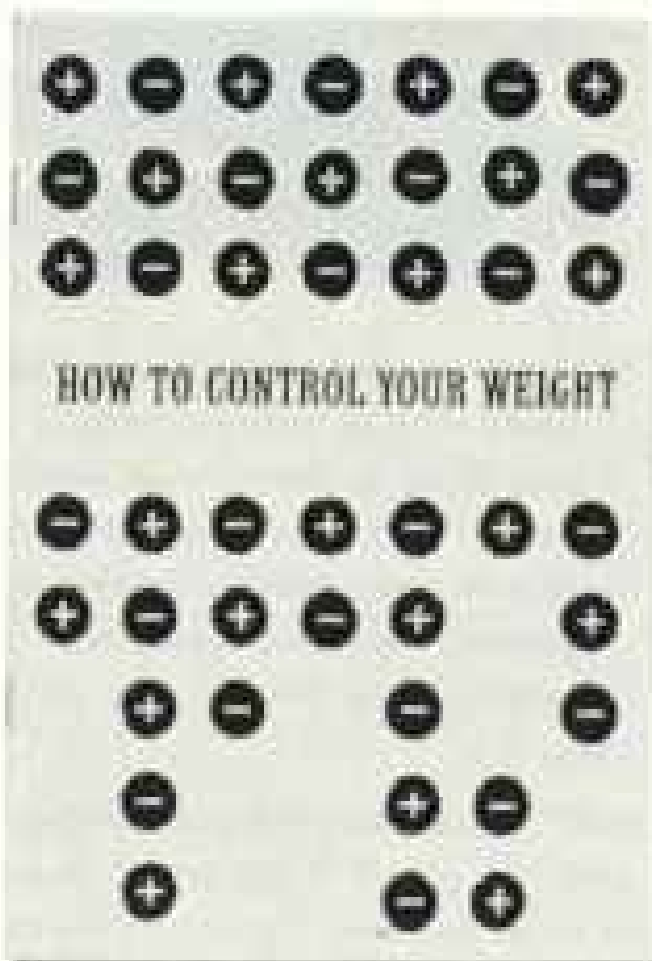


To change this...



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try this booklet from Metropolitan Life...



Perhaps you've heard remarks like these: "I'm going on a quick reducing diet," or "I'll work off this fat with some strenuous exercise."

Either course is wrong and could be dangerous. A safe and sensible reducing program should start with your physician. And for these reasons:

Unwise dieting can cause complications. Strenuous exercise increases the load on a heart that may already be overworked.

So, before you do anything at all about reducing, see your doctor. Let him determine the state of your health and whether your excess weight might possibly be due to some cause other than too much food and too little exercise.

To help you carry out your doctor's advice for a trimmer figure, more vitality, and an improved outlook for better health and longer life, send for this Metropolitan Life booklet.

The medically approved reducing program it outlines could bring your weight down—and keep it down—once and for all.

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In Great Smoky's half-million acres are fifty-three peaks more than a mile high. Its virgin forest grows so dense its moisture keeps a smoky, hazy cloud on the hills; hence the name.

To create these mountains, Nature has raised and leveled many great ranges. The present, Great Smoky, is probably the oldest on earth. During eons of evolution, she has grown a thousand species of flowering plants, with some rhododendrons twenty feet high, acres of different



The beauty of this plant matches its name—
"Heart's-a-bustin'—with love"

colored azaleas, and magnolias with foot-wide blossoms.

You can often see bear and

deer. In the hills, you may hear wild turkey gobbles. More than two hundred birds have been identified.

At Cades Cove, there's a pioneer village to visit. Indians, too. At nearby Cherokee Village, you can watch blanket weavers, or tribal ceremonies unchanged in centuries.



Picnic in the Smokies

Not far away, TVA power dams have created lakes unrivaled for water sports. The world's first and finest atomic museum is at Oak Ridge.

But it is Great Smoky that fills your mind with memories. And stirs pride in your heart for this natural heritage. Future generations, too, will know this pride, for the actions of Congress and of North Carolina and Tennessee statesmen, aided by gifts of wise conservationists; have set this

land aside to be enjoyed by our people... forever to offer them Nature's inspiration and blessing.



Watch!—but don't feed the animals

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A GREAT NAME IN OIL

“THERE IS NOTHING in Italy, more beautiful to me,” wrote Charles Dickens, “than the coast-road between Genoa and Spezzia.”

Anyone familiar with the eastern half of Italy's Riviera knows the tribute is no Dickensian exaggeration. In fact, had I been Dickens, I would have included the western half as well.

A century later I found myself in his place, planning to “extend my knowledge of a noble country, inexpressibly attractive to me.” And the Italian Riviera—the coast of a region called Liguria—exceeded my own great expectations.

Now I know where Elysium is. This fabled paradise, for me at least, lies on the Mediterranean shore, in a 175-mile arc from the French frontier through Genoa to La Spezia (map, pages 746-7).

Liguria Lives by More Than Glamour

To most people the Riviera suggests sunny beaches washed by a blue sea beneath a bluer sky; palms, flowers, and fruit on the bough; music, gaiety, yachts, and sports cars; casinos, expensive restaurants, splendid hotels, and lavish villas; nobles, film stars, artists, writers.

With such resorts as Sanremo, Santa Margherita, and Rapallo, this gilt-edged coast affords a year-round playground.

Playground, yes, but far more than that. There is the everyday life of the Ligurian folk—the people who fish for a living; who toil on terraced slopes to grow grapes and olives, roses and carnations; who skillfully use their hands to make lace, velvet, ceramics, chairs, and violins; who press wine with bare feet; and who open their hearts as well as their doors to make you at home among them.

I lived among these people everywhere on the Riviera—even in Sanremo, a sophisticated resort near the western end of Liguria. From the glistening casino I had only to take a short stroll to reach their homes and shops in the medieval quarter. In a more fashionable district, my hotel stood almost opposite the flower market, where growers brought huge baskets of roses and carnations freshly plucked from the hills that enfold the town and its yacht-crowded harbor.

Breakfasting on my hotel balcony in Rapallo, 20 miles east of Genoa, I looked out over one of the loveliest gulfs in the world. I lunched in palm-filtered sunlight and dined stylishly under the moon.

(Continued on page 747)



June
1963

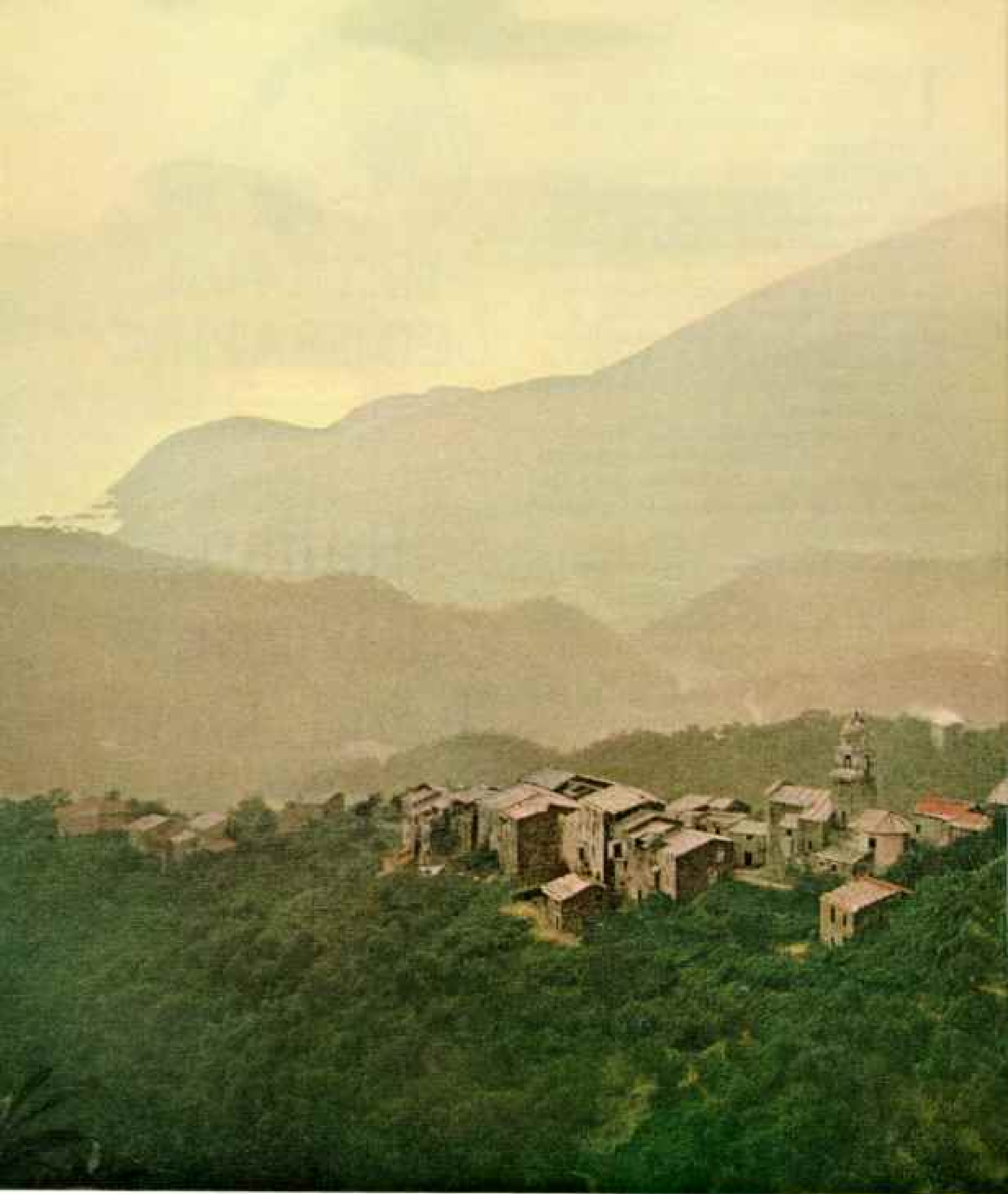
NATIONAL GEOGRAPHIC

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Italian Riviera, Land That Winter Forgot

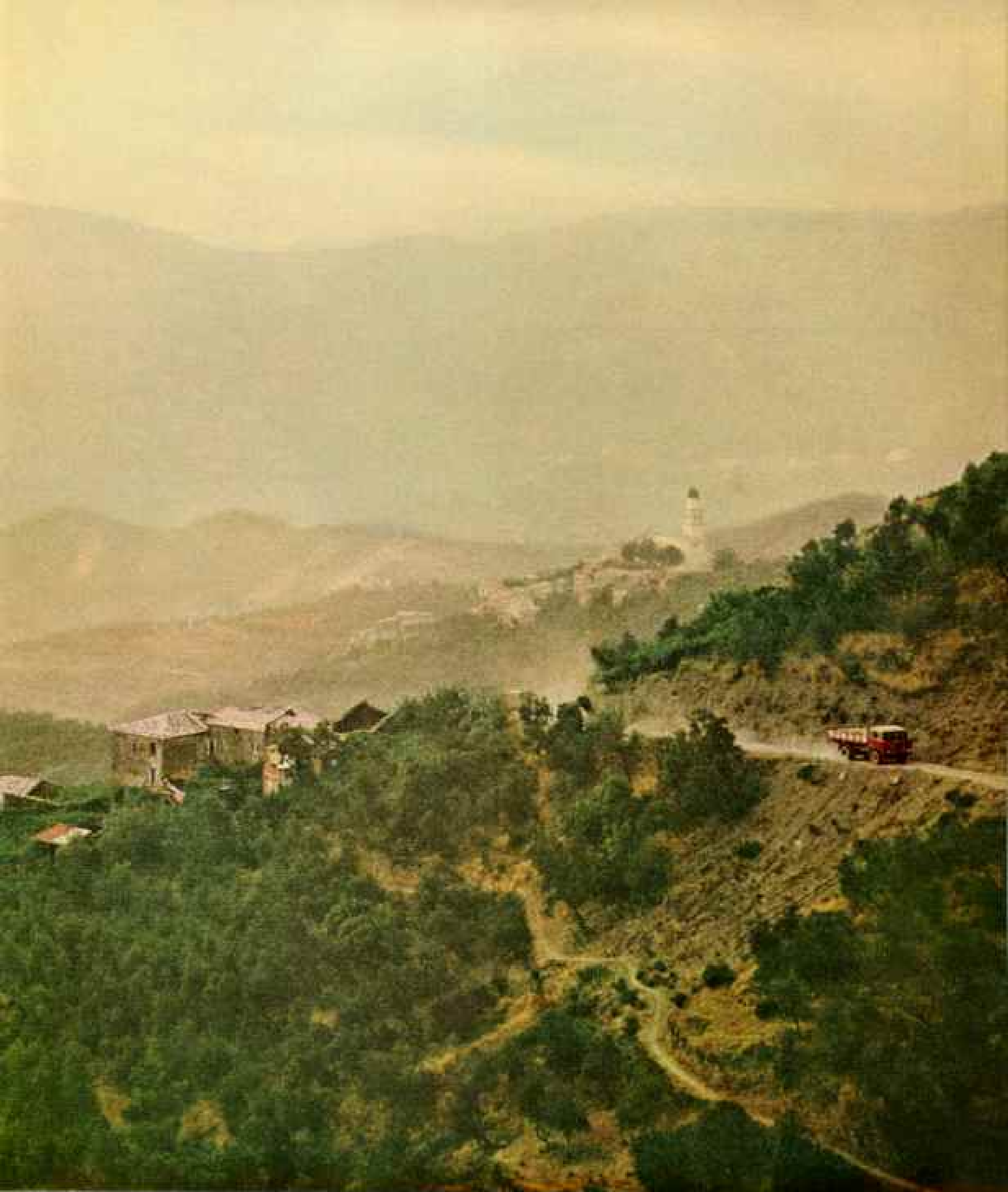
By HOWELL WALKER
Senior Editorial Staff

*In fishing villages
on the Coasts of the
Rising and Setting Suns,
visitors can choose
between lordly luxury
and the simple world
of the Ligurians*



Haze of gold, a blessing of the dying sun, envelops mountainous folds of the Italian Riviera. Villages of Chiesanuova (left) and Legnaro (right) nestle in ceries overlooking the Mediterranean. They appear lost in a timeless dream, but the roar of a truck, at work on a new road at right, signals an awakening. Soon motor-borne visitors will claim even this pocket of a wonder world that winter forgot.

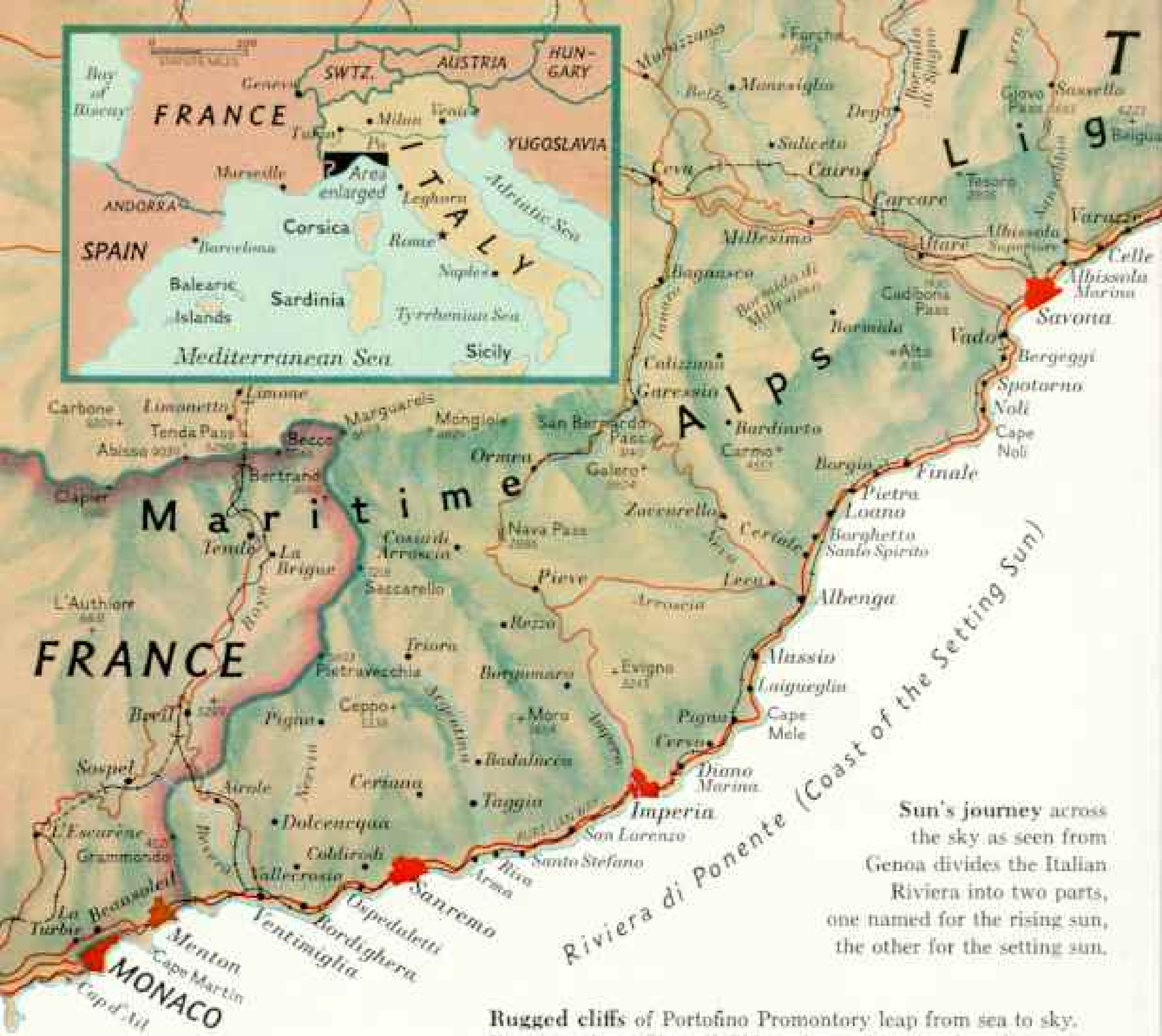
The Italian Riviera, its back shielded from icy blasts by an arm of the Ligurian Apennines, looks forever south toward the sun and into the mirror



AGGALHROWE BY HOWELL WALKER, NATIONAL GEOGRAPHIC STAFF © 1952

of the Mediterranean. Villages and towns, linked by the rippled ribbon of roads cut into living rock, cling to mountainsides or crowd sandy coves at the narrow shoreline. Adding bounty to beauty, groves of lemon, orange, and olive trees, patchwork fields of flowers, and grape-clad terraces surround the islands of habitation.

Since the time of the ancient Romans, men have sought this coast as a refuge for refreshment. And so today. By boat and bus, by train and car, travelers cross the earth to share with hospitable Ligurians a place in the sun.

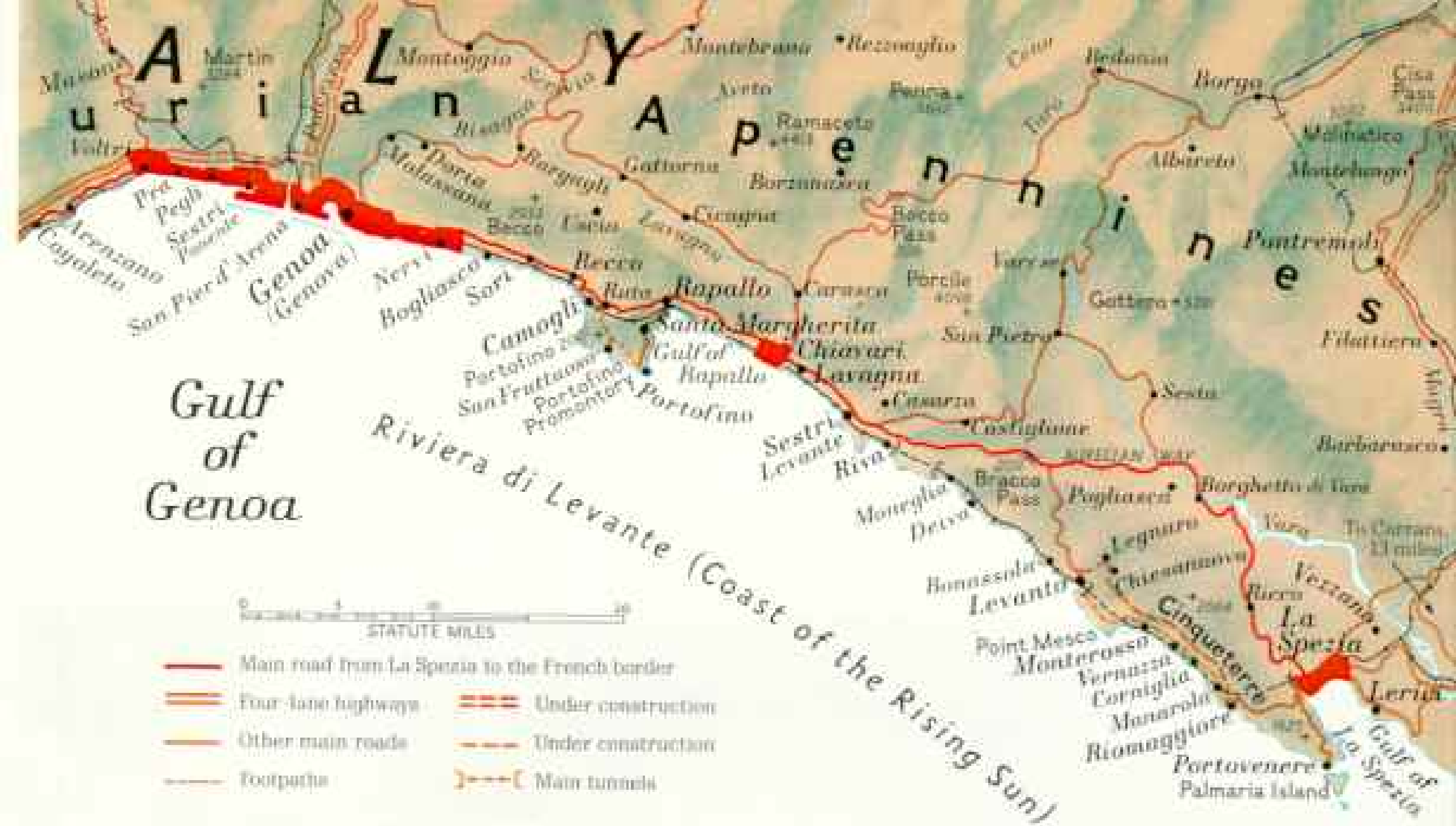


Sun's journey across the sky as seen from Genoa divides the Italian Riviera into two parts, one named for the rising sun, the other for the setting sun.

Rugged cliffs of Portofino Promontory leap from sea to sky. Passenger boat *Citta di Chiavari* can skirt the shore because the Mediterranean plunges deep, leaving few shoal outcrops.

MAP DRAWN BY LISA BIANZOLI, COMPILED BY EUGENE W. SCHMELZ, CHROMOCOLOR BY NATIONAL GEOGRAPHIC PHOTOGRAPHER ALBERT WILSON © N.G.S.





Gulf of Genoa

But for true Ligurian flavor, I chose one of Rapallo's back-street *trattorias* (eating houses) and feasted on the fruits of the sea and the vineyard: *insalata di pesce*, a combination of mussels, shrimp, and miniature octopuses dipping their tentacles in olive oil, all pleasantly befriended by ordinary white wine.

Here, I thought, is a delightful dilemma: to choose between the glamorous Riviera and the true Liguria. But you can hardly enjoy one without the other; they coexist and intermingle so well. As a visitor, you involuntarily experience a double life, sharing the scene for richer or poorer with marquis and fisherman, stockbroker and grape picker, gourmet and flower vendor.

And this "land of eternal spring" delights visitors in January as well as July. Though the past winter—unusually severe throughout Europe—brought snow and exceptional cold, winter days on the Riviera normally average 50° F. Sea breezes temper the summer days to a pleasant 75°.

In Rapallo's agreeable atmosphere, statesmen from Germany and Russia met in 1922 to draw up the Treaty of Rapallo. "With mutual feelings of good will," they canceled reciprocally all claims to compensation for losses in World War I.

The statesmen, I trust, had time to drive around the luminous Gulf of Rapallo. Along the west shore road I passed sun-flooded beaches that blossomed with bright umbrellas and with bathers nearly as naked as pebbles. Skin divers surfaced and water skiers wove through casual patterns of sailboats.

Everyone seemed carefree. Nobody paid much attention to a roaring sports car as it swerved to miss by millimeters a motor scooter stopping with instant enthusiasm to pick up a pretty girl.

For lunch I went to nearby Santa Margherita, where restaurants around the old port serve some of the most delicious seafood in all Liguria. That day I savored *gamberi* (large shrimp), followed by a firm *sogliola al burro* (sole cooked in butter) and a fine, cold, white wine.

Royalty Relaxes in Portofino

After lunch I continued along the western shore of Rapallo's gulf. Ahead, on a lofty promontory guarding the entrance to a narrow fiordlike harbor, I caught a glimpse of a centuries-old castle surrounded by terraced vineyards and gray-green olive groves.

Not much farther, and Portofino, set like a gem at the head of the miniature fiord, came into sight (next page). Once a simple fishing village, it has emerged as a popular but limited haven for breathtakingly beautiful yachts and the international society that goes with them. The little port was aflutter that day with the flags of many nations.

Terraced slopes of the hidden harbor hold private villas, expensive restaurants, and a hotel justly named the Splendido, where the Duke and Duchess of Windsor have stayed.

I preferred simpler quarters in the heart of Portofino. One evening a boy selling gardenias approached my hotel's outdoor restaurant, where a royal party had gathered.

The boy walked straight up to Prince Juan Carlos de Bourbon, elder son of the pretender to the Spanish throne. Watching from a nearby table, I wondered whether *noblesse* would oblige the handsome young prince to buy the whole tray of flowers.

No. He simply picked out two, fished in his pockets to pay the boy, then resumed a conversation with his guests. The prince was sitting in plain view of passers-by, but nobody stopped to stare at the man who might one day be a monarch. On the Italian Riviera

he was just another summer visitor, even as I.

At Portofino I met Luigi Durand de la Penne, without learning until later that he was a marquis. He was tall, wiry, fair, and casually dressed in blue sport shirt, faded khaki trousers, and moccasins.

Luigi led me through aged arcades where women made lace by hand, and down lanes that have never known an automobile; no cars are allowed in the village proper. We edged between shops offering almost everything from antiques to bikinis; and passed



fishermen and fishwives, yachtsmen, and the usual holiday throngs, excited as strangers beginning a pleasure cruise.

On another day I learned from a friend about the December night in 1941 when Luigi led five other frogmen of the Royal Italian Navy into the harbor of Alexandria, Egypt, and blew up three British ships: a tanker and the battleships *Valiant* and *Queen Elizabeth*; Luigi himself sank the *Valiant*.

The incredibly courageous feat gave Italy naval supremacy in the Mediterranean for

the next several months. In 1945, after their nation had joined the Allies, these frogmen received official recognition. And it was the English captain of HMS *Valiant* who, in a gesture honoring gallantry of a former enemy, pinned Italy's highest military award, the *Medaglia d'oro al Valor Militare*, on Luigi's chest.

Being Luigi, he himself never mentioned the story to me.

One morning Luigi said to me, "My friend Galeppini would like to meet you. Come out

a fishing village that has sheltered seafarers since the days of ancient Rome

749

RESEARCHED BY SILBERT W. BRONKHORST, NATIONAL GEOGRAPHIC STAFF





REARRANGED BY HOWELL WALKER (ABOVE) AND GILBERT W. VERGAMINI, NATIONAL GEOGRAPHIC STAFF. © N.G.S.

Luxury apartments and sidewalk cafes rim Portofino. History notes that Richard the Lionheart stopped here in 1190 on his way to the Holy Land. Medieval Castle Brown (upper right), named for an Englishman who once owned it, is open to the public. To protect Portofino's charm, Italian law forbids any change that would alter the village's outward appearance.

Day's outing over, youngsters help sailors pull their boat out of the water at Portofino.



with me. I'll show you where to find him."

With Natale Galeppini, a businessman who made his home in Portofino, I went to lunch in Genoa. We chose a restaurant atop a skyscraper rising above the inferno of traffic in the piazza called Dante.

"There lies all Genoa, in beautiful confusion," Dickens had rightly observed.

I looked almost straight down upon the site of Christopher Columbus's boyhood home, now surrounded by modern construction. Close by stood a 2,100-year-old column, a relic of Roman settlement. And less than a block away towered the medieval Soprana Gate (following pages).

I gazed over a gray sea of slate roofs whose domes suggested reefs and whose steeples might have been buoys. Streets meandered like streams through deep, dark canyons into sunlit piazzas rich in fountains, churches, and palaces.

Distant villas with terraced gardens climbed the steep hills that make the metropolis an enormous amphitheater. Its arena is the ship-filled harbor. Around the port, Italy's largest, Genoa grew up.

This city of 768,000 sea-minded souls is the geographical, historical, and logical capital of the Ligurian coast. It stands roughly midway along the Italian Riviera's 175-mile shore.

"Geography," said Galeppini, "pushed the Ligurians into the sea. Their steep, rocky land was too poor for farming; they had to look elsewhere for food and livelihood."

Genoa Gave the World Great Seafarers

Galeppini explained that at first these people were just small-scale fishermen, but in time they became real seafarers. There were adventurous navigators like Columbus and Andrea Doria, one of the 16th century's greatest admirals and statesmen. Liguria's ships traded with the world, and the traffic made Genoa an important commercial center.

Genoa today has huge shipyards and steel works, indirectly financed and controlled by the state. The city serves as the principal port for the inland industrial areas of Milan and Turin, and for much of Central Europe as well.*

Some 10,000 ships turn around in the harbor during an average year. Genoa's thousands of stevedores are dwarfed by up-to-the-minute loading and unloading facilities. Though destroyed during World War II, the rebuilt and re-equipped port is now more ac-

tive than in prewar days; so Genoa's business is better than ever.

This I realized as I squeezed through the crowded, shop-lined streets leading down to the harbor, or up to the more elegant levels of expensive stores, hotels, and restaurants. I passed outdoor markets selling fresh fish, fruits, vegetables, and flowers; watched ironmongers, carpenters, bookbinders; climbed dark stairways to see ivory carvers in one house, filigree workers in another.

Along the larger, more fashionable streets such as Via Roma, shopwindows exhibited

*See "United Italy Marks Its 100th Year," by Nathaniel T. Kenney, NATIONAL GEOGRAPHIC, November, 1961.

Octopus hangs limply from the hand of a fisherman in Portofino. He killed his catch by turning the globular body inside out. The flesh may be boiled, baked, or fried; chopped into bits, it adds flavor to soup.

KODACHROME BY GILBERT N. GREENHILL © N.A.A.







Every Stone Speaks of History in the Crowded Panorama of Genoa

Twin-towered Soprana Gate at lower left rose in 1155, when the city feared invasion by the German emperor Frederick Barbarossa. Nearby stand the 12th-century Cloister of Sant' Andrea and the ivy-covered house on the site of the boyhood home of Columbus. Via Dante at center leads to the Piazza De Ferrari with its central fountain. Tower at left identifies the Cathedral of San Lorenzo. This view looks northwest from the 31st floor of Genoa's tallest office building.

Standard bearer recalls bygone glory during Genoa's annual Columbian Celebration. Emblem shows St. George the dragon killer, the city's patron saint. Medieval pageantry continues for a week in October to honor Columbus, discoverer of America and Genoa's favorite son.





ALBERT WOLDRAF (ABOVE) AND HOWELL WALPER © N.Y.S.

Shopping for a sweater, a Genoese bargain hunter tries one for size. Stalls and shops jostle one another along the labyrinthine alleys of the old quarter. Some passages are so narrow that a pedestrian may touch opposite walls with his outstretched finger tips.

Wall-to-wall Laundry Catches Sunlight in a Canyonlike Byway of Old Genoa

Trungoli (trough) di Santa Brigida, a quiet nook in the busy city, slopes off the Via Balbi, a street of palaces. Hemmed between hills and the sea, Genoa suffers from a shortage of space. Buildings grow upward because they lack room to spread out.

again and again down to the sea by which Genoa lives.

Friend led to friend, and one day Giulio Tobino, an associate of Natale Galeppini, walked with me to the waterfront to visit St. George's Palace, which dates from 1260. At the beginning of the 15th century it became the seat of the Bank of St. George, founded to simplify the handling of the Republic of Genoa's scattered debts. To raise money, the bank sold bonds to the republic's wealthy citizens.

The bank succeeded not only financially but politically. To it the republic entrusted the government of Corsica and its Black Sea colonies at Constantinople and in the Crimea.

"The Bank of St. George was one of the first true banks in the world," Tobino told me. "For 400 years it was the brains, the heart, the soul of Genoa."

Tobino pointed out a statue of Francesco Vivaldi and said, "That man invented compound interest."

Then Tobino translated the inscription written in 15th-century Genoese patois, explaining the principle of this system still used by the world's bankers.

Galeppini and Tobino were so generous with their time that at last I protested. Tobino chuckled.

"Whatever the Genoese do and however magnanimous it may seem," he said, "you can always be sure they're thinking of it as an investment."

He was right in a way—it was an investment in friendship.

Genoa splits Liguria into the Riviera di Levante (Coast of the Rising Sun) and the Riviera di Ponente (Coast of the Setting Sun). Thus at the city of beautiful confusion you

masterful restraint in the arrangements of jewelry, china, silverware, and fine-tooled leather, lamps, antiques, books, and paintings. In subterranean passages that let pedestrians reach the other side of traffic-treacherous boulevards, I saw still more luxury items artistically displayed in highly polished and well-lighted showcases.

But the busy byways, those alleys too narrow for vehicles, were irresistible to me. Always I gravitated along them toward the port. Fish market, flower stalls, ship chandlers, taverns; smells of spicy food and roasting coffee, wet rope, oilskin, brine, and tar; a sailor's hearty laugh, then the basso blast of a departing liner—all these tugged me





Franciscan friar, 85-year-old Caro Fidele, tugs at his forked beard as he strolls in Genoa.

Pig-tailed *signorina* in Riomaggiore selects a bunch of plump, amber grapes, basis of *sciaccheta*, the Cinqueterre's prized sweet wine.



THE FRIAR (OPPOSITE) BY ALBERT WOODBURY AND
 BOBACHOWSKI BY HOWELL WALKER © N.Y.C.

find yourself in the position of the donkey between two bales of hay. Which to take first? It doesn't matter; both are delectable.

Since the coming of man, a steep-walled stretch of the Riviera di Levante has baffled road builders, even the Romans. True, the Genoa-Rome railway tunnels the region with what is sometimes called the "mole's highway." But only recently have engineers begun work on a coast-road project that will take years to complete.

Upon the roadless reach of the Riviera di Levante I hoped to find the out-of-the-way places I like best. Where the main route to La Spezia turns inland and struggles over the Bracco Pass, I took a lesser road that dead-ended in blissful isolation at Levanto by the sea. There I put the car to bed in the erstwhile cloister of a 17th-century monastery and unpacked my walking shoes.

Levanto, itself enchanting in an out-of-the-way sense, showed signs of not remaining so. The new highway would make it more accessible. But still, on the hills behind the town, I could watch the last rays of sunset



Horsehair plume adorns the burnished helmet of a *corazziere*, a member of the President's Guard. This elite unit paraded last year in Genoa during the annual Columbian Celebration.

ILLUSTRATION BY GIBBELL WALKER

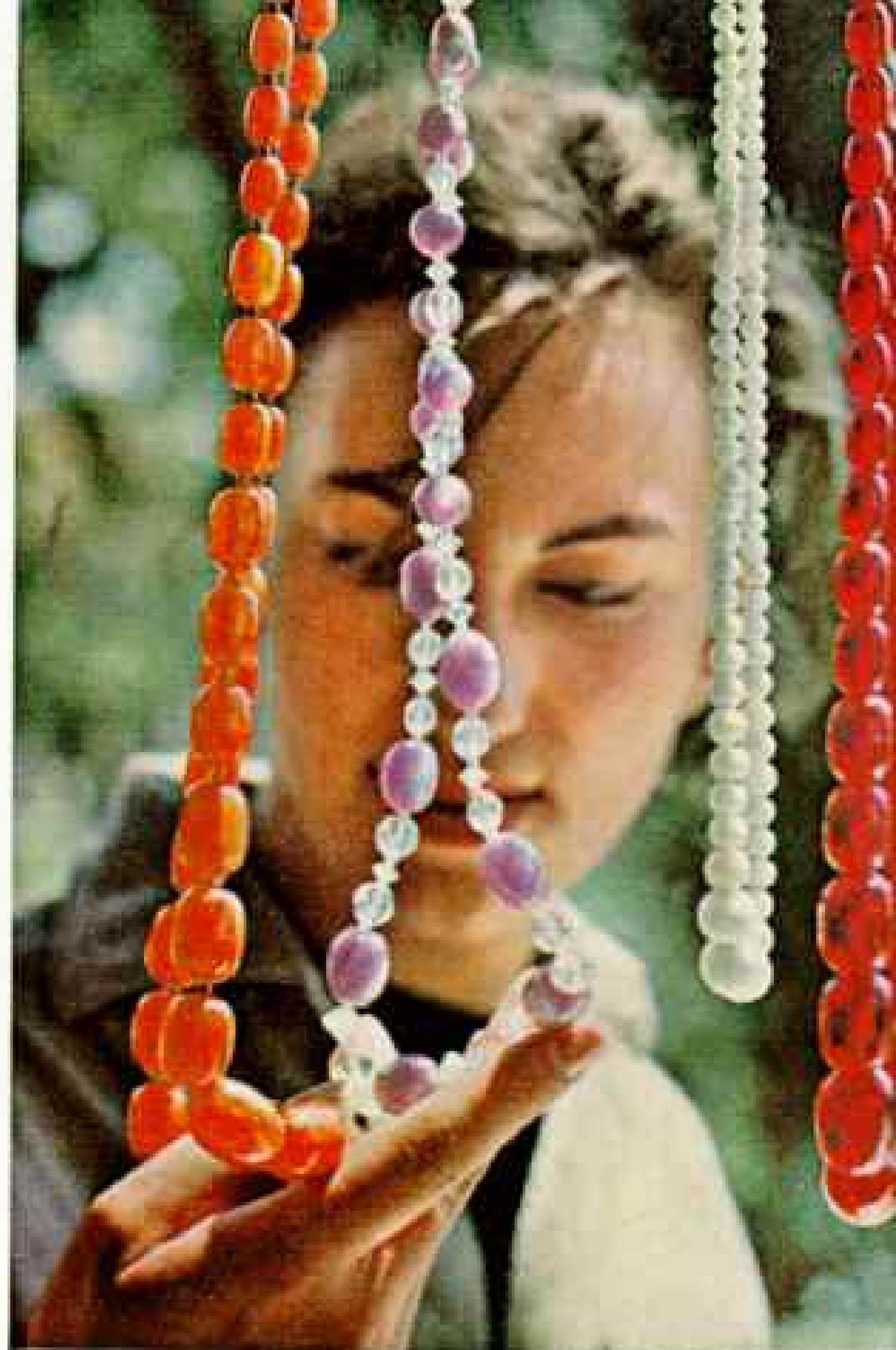


ILLUSTRATION BY GILBERT W. GREENBERG © R.S.C.

Finger tips and eyes of a pensive Italian shopper appraise an array of brilliant strands in Ventimiglia.

Final facial smooths the classic features of a marble figure in the Studio of Sculpture, Carrara.



AS VENTIMIGLIA (JEWELRY) AND CARRARA (SCULPTURE) UPPER LEFT, BY ALBERT BOLDRETT

Bobbins fly in the nimble fingers of an elderly Santa Margherita lace-maker. Her art is gradually dying out.



turn a lonely church to gold and hear its evening bells answer a woman's song floating richly across the valley.

Levanto was my starting point for the remoter Cinqueterre (Five Lands). Of this region and its five villages a 16th-century Ligurian historian wrote:

"They cover fifteen miles of land... and here one can see the value of human ingenuity and how much it can achieve, as by its industry it provides that which nature denies; for this steep and rocky district where it is not only difficult for goats to climb but even for birds to fly... is full of vineyards where in certain places men must let themselves down with ropes to gather the grapes from which such perfect wine is made."

The Cinqueterre villages are, from west to east, Monterosso, Vernazza, Corniglia, Manarola, and Riomaggiore. All, like their adjacent vineyards, hang from the precipitous coast, dangling their feet in the sea. All make uncommonly good wine, the best of which is a sweet amber dessert wine called *sciaccheta*.

Luxury liner, the *Leonardo da Vinci* returns to her home port of Genoa with pennants flying. Tug nuzzles her toward a berth.

Italy's busiest port, Genoa traces its origin back to pre-Roman times. The city gives the industrialized Po Valley an outlet to the sea. Modern apartments climb the hill beyond the harbor.

Piled high with marine and garden delicacies, a table tempts diners at the Trattoria Rina, a Genoese restaurant. The display includes fish, lobsters, tomatoes, pears, and a mixture of shellfish known to Italians as *frutti di mare*—"fruits of the sea."

From Levanto I could reach any of the villages by local trains along the mole's highway, or I could go by boat, or I could walk. I tried each way, and was ultimately convinced that the most rewarding, even if downright exhausting, was on my own two feet.

My walks were necessarily punctuated by frequent rests. On the donkey trail that is the main road from Monterosso to Vernazza I sat in the welcome shade of an olive grove. A stone bridge, looking even older than the gnarled boles around me, arched a nearby brook. The monodic song of a locust only deepened the solitude. The rest of the Italian



PHOTOGRAPHS BY NATIONAL GEOGRAPHIC PHOTOGRAPHER ALBERT MOUQUAT © N.G.S.

Riviera—and the world—seemed far away.

As I walked the roller-coaster trails of Cinqueterre, I tried to imagine all the labor behind the terraces I threaded. Early Ligurians realized that vineyards needed as much sun as they could get, and protection from Alpine winds as well. The Cinqueterre's coast, walled on the north and facing south, admirably met these requirements. There was one deficiency, enough to discourage any grape growers except those of the Cinqueterre: The rock-faced slopes rose too sheer to hold soil.

So these coastal Ligurians built terraces that stepped from sea level to lofty horizon (pages 764-5). They hauled earth from the hinterland, spread it on the level beds, and planted vines.

In Vernazza I asked a resident how men of the Cinqueterre make a living if they do not cultivate vineyards and olive groves.

"They keep small shops and fish a little," he said. "But many of the men go away to work for steamship lines sailing out of Genoa. They take jobs as seamen, mechanics, stewards; some become officers. Others work at the naval arsenal in La Spezia or on the railway. But even the seamen try to arrange for home leave to help with the grape harvest."

Sunday Crowds Storm Cinqueterre

On the rare occasions when I used the train, I normally bought a ticket. Just as normally nobody collected it. Once, in haste to make the 9:39 from Levanto to Vernazza, I failed to get a ticket. I tried to even the score and my conscience by buying two for my return journey. Still no collection.

But, of course, the time I raced down to Corniglia's station and hastily jumped on a departing train, the conductor immediately





PHOTOGRAPHER ALBERT KOLDAK © N. S. S.

Pint-size car, further compacted by collision, rolls through Genoa under one-horse power. The automobile met disaster in the ever-increasing traffic of the Italian Riviera's largest city.



Encroaching apartments rise near the mouth of the Bisagno River, traditional haunt of Genoese fishermen. Despite new developments, the men continue to beach their boats near the Corso Guglielmo Marconi, a modern boulevard. Canvas shrouds the hull at right.

Since the end of World War II, Genoa has grown until today its population nears 800,000.

Little boy black wears a *grembiale*, or smock, to classes in Genoa. Ink spots cannot be seen on the practical garment, which boys retain until fourth grade. Girls wear *grembiales* of blue or white.





Fancy footwork squeezes juice from freshly gathered grapes near Chiesanuova. Trousers rolled up and head bowed to avoid overhead beams, this wine maker treads the fruit just as his ancestors have for generations. A screen keeps stems, skin, seeds, and pulp from dropping into a vat below that holds more than six hundred gallons.

Women of Riomaggiore Balance Crates of Grapes

Bound for market in La Spezia, wives hold their bundles high as they await a train. Crates contain choice fruit for eating, not wine making. Gaudy covers preserve the velour, a dewy film that enhances the value of table grapes.

Chest-deep in work, a vintner of Pogliasca scrubs fermentation vat inside and out. Each season his family winery, established in 1749, presses ten tons of grapes.

BOARDSHIPS (BELOW) BY
ALEXIS MOLLYNAT © N.A.A.





THE STACCHIONE (ABOVE) AND FERRAGHORE (OPPOSITE, UPPER) BY HOWELL MALKER, NATIONAL GEOGRAPHIC STAFF © N.G.S.

fined me several times the price of my missing ticket.

Summer Sundays, I found, were no time to use the Cinqueterre trains. The crowds from Genoa and La Spezia were overpowering. As I pressed through the throng on one station platform, I felt a tiny hand clasp mine. Looking down with difficulty, I saw at my knees a girl so small and lost that she had mistaken me for her father.

Even though I succeeded in boarding a Sunday train at Monterosso, I could not get off at my destination in Riomaggiore. Oncoming passengers in a torrential wave forced me back into the carriage. I had to travel to the end of the line at La Spezia and wait 40 minutes for another train to carry me back to Riomaggiore. This time I stood by the door.

That happens on Sunday. Of a weekday the Cinqueterre settles into the quiet routine I found so restful in Riomaggiore when I first knew it. Brief excitement came only with the daily mail. Then the village postwoman simply stood in the middle of the main street with a batch of letters and called names. A few minutes later Riomaggiore recovered its sleepy composure.

This, regrettably, could not last forever. While friends and I were returning from a

boat trip along the Cinqueterre coast one afternoon, a new era rolled into Riomaggiore on four wheels. Children rushed to the rocky landing to spread the news.

"*Macchina! Macchina! Macchina!*" they cried out.

The first automobile ever to enter the village had been driven from La Spezia.

Riomaggiore Surrenders Its Privacy

Now that the coastal highway from La Spezia has coiled around the cliffs to Riomaggiore (page 766), automobiles, thick as grape gatherers at harvest time, stream into this little community suddenly beset with a gigantic parking problem.

At the same time, in nearby areas, rock blasting and the rumble of road-building machinery report the advance of what you and I might consider the Cinqueterre's enemy.

"How do you feel about the new road?" I asked 28-year-old Jack Raffellini who lives in Riomaggiore.

"Well, of course, the young people are happy about it," he answered. "It means they can now go to the movies in La Spezia and not worry about catching the last train back to Riomaggiore. With the road, they can drive home when they please."

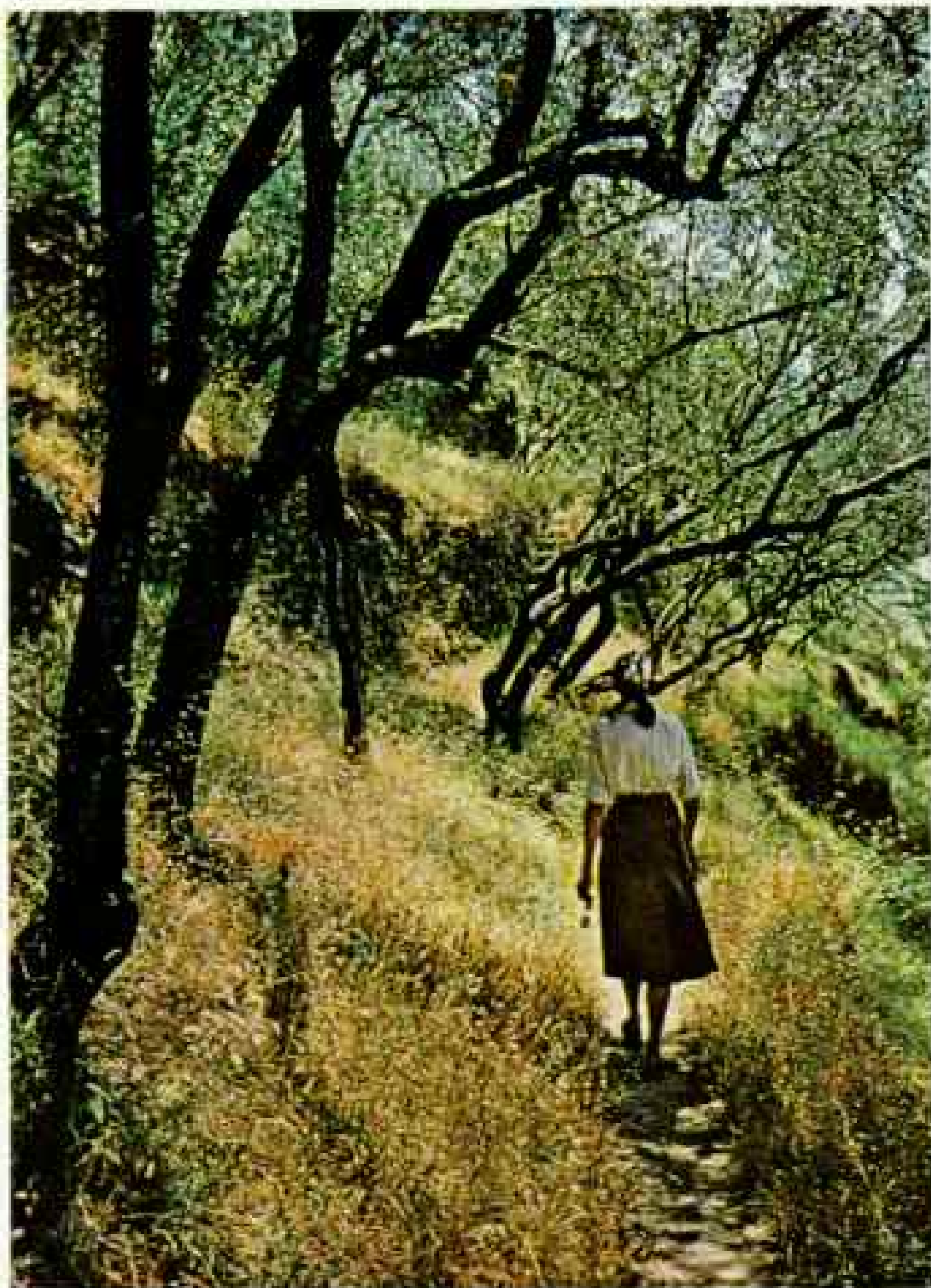
(Continued on page 768)

LAYER-CAKE MOUNTAIN looms above Riomaggiore in the Cinqueterre, or Five Lands. Terraces date from days of the Roman Empire, when Ligurians hauled soil to the rock slopes, anchored it with stone walls, and planted grape vines. Men must let themselves down by ropes to reach the steepest vineyards. Motorboat leaves trail of ripples on the glassy sea.

PHOTOGRAPH BY JORRELL BALLET © A.S.P.







Olive trees shade the trail—the main coastal thoroughfare—connecting the five villages of the Cinqueterre, a small world bounded by mountain and sea.

Rock-anchored Manarola Crowns a Sea-girt Cliff

Winding steps cut in stone serve as streets. Fishermen use wooden rollers to haul their boats up the staircase ramp, beyond reach of the sea. Windows look out on a Mediterranean in various shades of blue.

New highway from La Spezia curls into Riomaggiore, first Cinqueterre town linked to the rest of the Riviera by road. When completed, the route will bring this whole mountainous coast within range of motorists.

766

PHOTOGRAPHS BY HOWELL WALKER, NATIONAL GEOGRAPHIC STAFF © N.G.S.





"And how," I asked an elderly man, "do you feel about it?"

"It means the end of our tranquillity," he replied with sadness.

But the middle-aged cafe operator welcomed the growing flow of traffic and said, "Maybe I will build the first hotel in Riomaggiore."

Promising to return to Riomaggiore for the grape harvest, I went east to La Spezia, at the head of a gulf that forms what Napoleon considered one of the best harbors on earth. Upon it Italy built a mighty naval base.

During World War II La Spezia, Italy's naval-base equivalent of Norfolk, Virginia, lost much of its old character under severe bombing. But I found it well rebuilt and lush with palm-proud boulevards, an esplanade of red, pink, and white oleanders, and a green central park around a huge floral arrangement altered each day by gardeners to give the correct date.

Tragedy Remembered at "Gulf of Poets"

A seven-mile drive along the western shore of La Spezia's "Gulf of Poets" took me to Portovenere, a far older community than its medieval houses would suggest (page 774). Roman galleys called at this Port of Venus on their way to Gaul. Petrarch praised its setting at the tip of a rocky peninsula.

England's Lord Byron liked to swim in its wave-raked grotto, where a plaque records "the immortal poet who as a daring swimmer defied the waves of the sea from Portovenere to Lerici."

Lerici? It curls around a cove on the opposite, or eastern, shore of the gulf, four and a half miles across. A massive 13th-century castle, now a youth hostel, dominates the resort town and its fishing port. Less than a mile away stands the seaside villa occupied in 1822 by Byron's compatriot and fellow poet, Percy Bysshe Shelley.

Of this, his last residence on earth, Shelley said: "I still inhabit this divine bay, reading dramas and sailing and listening to the most enchanting music."

It was from here that Shelley sailed for Leghorn in the *Don Juan*, expecting to return in a day or so. He never did. A sudden summer tempest destroyed his craft and his life, both fragile.

The body washed ashore and, at the suggestion of Shelley's friend Edward John Trelawny, was burned on the beach accord-

ing to pagan custom. The flames did not, however, consume the poet's heart. At the last moment Trelawny snatched it from the fire; later it was given to Shelley's widow.

Though I left Lerici and headed northwest again for Genoa, I remained in a realm of poets. Dante, for one, haunted the entire Ligurian coast. It inspired some of his descriptions in *The Divine Comedy*. The French writers Lamartine and Flaubert also lavished lines on the beauty of the region.

Chiavari Lives by Chairs

I crossed a lovely little river to enter Chiavari, and saw chairs everywhere—finished, unfinished, simple, elegant. Men carried them along arcaded streets that Dante trod. Women sat in doorways, reeding chair bottoms. Apparently the whole town made chairs.

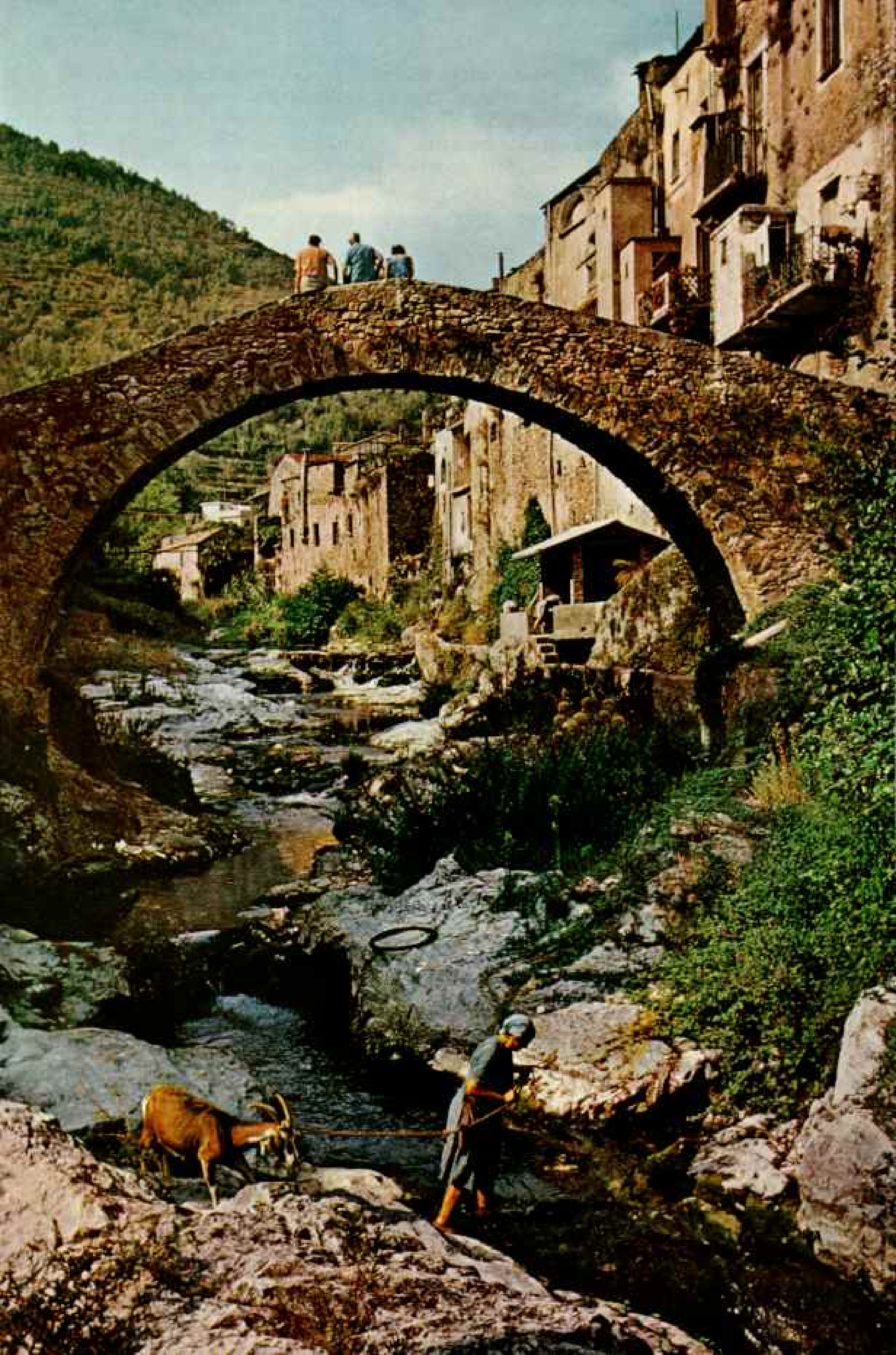
Guido Chiappe showed me through his factory, where much of the work is done by hand. We started on the ground floor beside a pile of beech, the only wood Chiappe uses, and ended up in a vast room stacked high with chairs cleverly designed to combine lightness and strength, grace and comfort.

The Chiappe plant annually produces approximately 25,000 chairs, of which 3,000 go to the United States. Better make that 3,002; I ordered a pair of Chiappe chairs for my living room.

Apart from Chiavari's sedentary obsession, a violin shop eight feet wide tempted me in to watch Giuseppe Castagnino repairing an instrument he said was 200 years old. Castagnino also told me that he had made more than 400 violins—all of them by hand. Before I left, I learned that some of his customers live as far away as California.

Along the Italian Riviera I saw many church-steeple clocks credited to Federico Terrile (page 779). So I decided to stop in the small seaside town of Recco between Chiavari and Genoa to visit the factory. The original plant, founded by the great-great-grandfather of Giuseppe and Vittorio Terrile, the present directors, was leveled by World War II bombs; the family firm rebuilt the factory from the ground up.

Medieval stone bridge spans the Neva River beside Zuccarello, a village near Albenga. Houses wall one side of the ravine. Beyond the arch, a housewife scrubs her laundry in a public washing shed.



Fleet of yachts drops anchor at Santa Margherita, a resort on the Portofino Promontory. "I could see that Italy was really booming," reports photographer Gilbert M. Grosvenor, "when I found this many pleasure craft in one harbor." Apartment houses ring the harbor; villas, palaces, and the modern Park Hotel Suisse (left) command the wooded

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heights overlooking the water. Santa Margherita combines two small towns that Napoleon merged and named Porto Napoleone. The name stuck until 1815, when Liguria was incorporated into the Kingdom of Sardinia. Today the harbor shelters the boats of international visitors as well as yachtsmen from busy Genoa, 20 miles away.

771

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"We still have a long way to go," Giuseppe told me. His customers? "Everywhere in Italy; also the West Indies, Yemen, and Africa," he said proudly.

"And soon," added Vittorio, "we'll finish a clock for a modern church in Argentina."

As we left the main workshop, Giuseppe invited me into a temporary office in the family dining room. His mother came in from the garden to offer us plums still covered with early-morning dew. He poured out vermouth, but neglected his own glass to rummage through a desk for newspaper clippings.

The accounts told how the Terriles, despite the destruction of their factory in the war, have never foregone their feeling for time and tradition. On each clapper of the clock-tower bells they install, they stamp the image of Galileo Galilei, 17th-century Italian astronomer and patron of their trade.

After bidding the Terriles a reluctant fare-

well, I drove to nearby Camogli to go fishing with Giuseppe Bozzo. At 4:30 of the appointed morning my alarm clock rang. I walked through the rain-wet emptiness of the streets down to the port. Fishermen dressed for the weather were preparing for the day's work.

Musical Buoy Guides Fishermen

In the shelter of an arcade that led to the quay where Bozzo moored his boat, I envied a dozen cats and kittens huddled snugly on a heap of net. It was a poor sort of morning for man or beast; however, I had gone out with Bozzo the previous evening when he set his net, and now I wanted to see him haul it in.

He soon emerged from the gloom, followed by Lorenzo and Agostino, his crew members.

As the first faint light streaked the sky, we neared the fishing grounds. We came to a buoy, an empty wine bottle on a slab of cork.

(Continued on page 777)

REDACHROMED BY GILBERT M. BRIDGEMAN, NATIONAL GEOGRAPHIC STAFF © N.G.S.



Fisherman entwines baby mussels in strands of a seed rope before planting them in a watery bed (opposite).

Gourmet's garland is pulled from the sea off La Spezia about 18 months after planting. The rope now holds thousands of mature mussels.

Stakes suggest harbor defenses; actually they support ropes of mussels growing in La Spezia's shallow waters.





ARRANGED BY GILBERT W. STUBBINS FOR LACOSTE



Portovenere Fishermen Mend Nets Before a Day of Work Afloat

Houses walling the town's harbor front formed stout defenses against invaders during the Middle Ages. Strategically situated on a peninsula, Portovenere once withstood siege when citizens greased its rocky shore to prevent Aragonese attackers from landing there.

Petrarch sang of Portovenere as a place of love, the haunt of Venus, who gave it her name. Dante, Byron, and Shelley also loved this coast, and so its waters came to be known as the "Gulf of Poets."

Gathering his net, this fisherman at Sestri Levante loops it over his shoulder to avoid unnecessary tangles.





Seeking shade, bathers retreat under colorful umbrellas that stud beaches along the Riviera near Albenga. Mountains shelter the shore from winter winds to give the area a mild climate the year round.

Vivid design and vibrant color distinguish the pottery of Albisola, an important ceramics center since the 15th century. Entire families work at the art in small shops along the Sansobia River, whose bed provides clay used by the industry.

From the bottle's neck dangled three lead bullets on bits of string. The bobbing buoy caused the lead to ring against the glass and guide the fishermen through the dark to their net.

Agostino hauled in the net. Only at long intervals did he pause to extricate a fish, usually a disappointingly small one. So Bozzo had plenty of time to tell me the name of each: *occhiata* (black-tail), *leccia* (yellowtail), *orata* (gilthead), *palamida* (bonito), *calamaro* (squid), and *sarpa* (gold line). At the end of the 1,000 feet of net, the men were little richer than when we left the harbor.

The tunny fishermen who took me out in their boat one day were also having a hard time. They told me that between the months of April and September they usually netted a total of 50 tons. But now the season was nearly over, and they had caught barely 14 tons.

I felt sorry for these fishermen. All the same, they showed not a sign of self-pity. With Italian humor they accepted the bad season with the good.

Port That Launched 1,000 Ships

Camogli's name stems, quite possibly, from *casa* (house) and *moglie* (wife); hence, "home of the wives." Why? Because the husbands are usually away at sea.

Camogli has long led a seafaring life (pages 778-9). In the 19th century, when it reached its heyday, it was known as "the port of 1,000 sails." Its ships carried much of Genoa's trade, but they always returned to Camogli for year-



SCULPTURES BY GILBERT R. GREENBERG, NATIONAL GEOGRAPHIC STAFF © N.G.S.

ly overhaul. Then the crews could rejoin their families for a while.

With the coming of the steam age, Camogli's maritime prestige began to drift away, but it still has one of Italy's foremost nautical schools.

This Istituto Tecnico Nautico Cristoforo Colombo, founded in 1876, trains some 400 students at a time. Entering at the age of 13 or 14, the youths take a five-year course. After the first two years they can elect to major in engineering or in navigation. They will be among the chief engineers and captains of Italy's merchant marine.

Driving west from Camogli, I passed through Genoa and entered the Riviera di Ponente, the Coast of the Setting Sun. Along this western half of the Riviera I felt at first that I had left behind the best of the Ligurian shore. One gay resort led to another, as the road followed an esplanade flanked by many

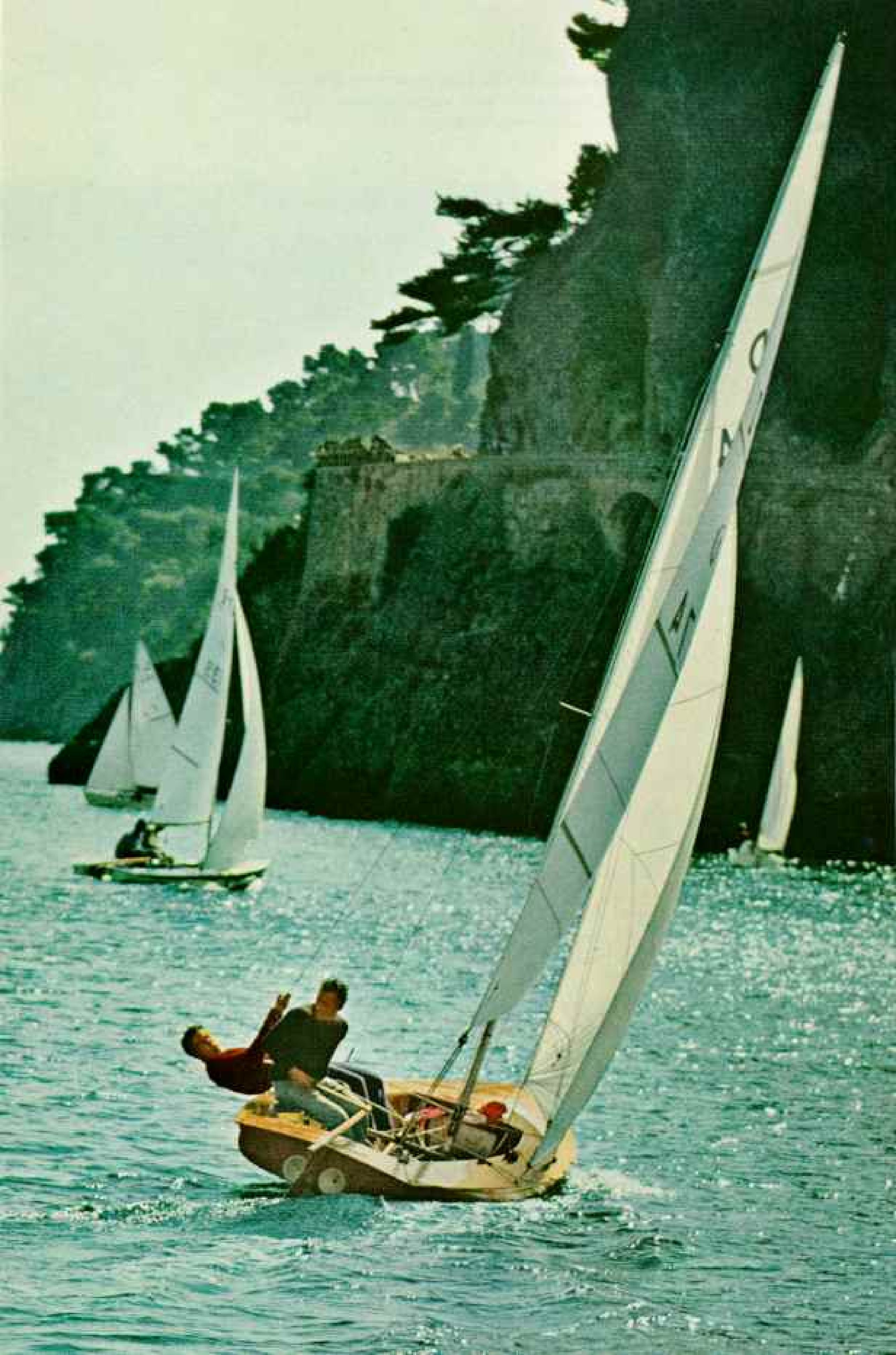
Confident captain parades his ship near the rocks of Camogli. On the bright fringe of beach all eyes follow the exciting passage. Famed during the 19th century as "the port of 1,000 sails," Camogli sent its

778



mariners on globe-circling voyages. But the men always returned to home port and the welcoming Church of Santa Maria Assunta (right). Clock in the bell tower was made at nearby Recco (text, page 768).





cabarets and crowded beaches. Amplifiers blaring currently popular songs added to the carnival atmosphere.

I missed then the wild loneliness of the Cinqueterre, its hard-won vineyards, the silent olive groves, the isolated villages.

But once I had penetrated the glamorous façades that mask Ponente towns, I found the small back streets full of charm and people living as they always had, unconcerned with the transient gaiety of the boulevards and lidos. Inside the old quarters lay a different world.

Apparently no one has told residents of Cogoleto that the birthplace of Christopher Columbus was nearby Genoa, for they have not removed the inscription from the house where they claim he was born.

Seafaring Savona has its own Columbus, a native son, Leon Pancaldo, who sailed aboard one of Magellan's ships on man's first journey around the world. The ship never reached its destination, but Pancaldo survived disease and imprisonment and eventually returned home long after his fellow voyagers.

Also mindful of the past, the village of Noli keeps its medieval character and a 12th-century castle. And Albenga cherishes the oldest of Liguria's Christian monuments, a fifth-century baptistry with an exquisite mosaic of blue and pale gold.

Just beyond Albenga one enters the "Riviera dei Fiori" (Coast of Flowers). Extending from Alassio to France, this stretch of the Ponente deserves its name. Plantations of carnations and roses blanket the sun-drenched slopes from the Mediterranean shores to the foothills of the Maritime Alps. During the flowering season the hillsides are heavy with scent and ablaze with color.

Whistle-Blast Starts Morning's Business

To see the plants at their best, one should visit the region in winter when they blossom en masse. It was early autumn when I saw the flower market in Sanremo; yet the volume of business amazed me. A vast shed was divided into three sections, with one end reserved for roses, the center for carnations, and the other end for mixed blooms. The growers

Hiking to windward, a sailor jockeys for the lead in an end-of-season regatta near Portofino. Spectators follow the race from a road running along a narrow ledge on the wooded cliff.

Surf buggy crosses the wake of a motorboat off Santa Margherita, a favorite vacation resort on the Gulf of Rapallo. Bikini-clad oarswoman may row to nearby Portofino if the waters are calm.



PHOTOGRAPHS BY ALBERT WOODWY (OPPOSITE) AND GILBERT M. GROVESON, NATIONAL GEOGRAPHIC STAFF © R. G. S.

Riviera sun nourishes terraces of carnations

PLANTATIONS on ledges that rise from sea to mountain summit establish the Italian Riviera as the flower garden of Europe. Carnations and roses grow the year round, especially during the winter months. Many go by train, plane, and bus to winter-bound countries of Europe as well as to Italian cities.

Wide-brimmed hat shades a Sanremo gardener who sets stakes for carnation plants. The stakes will support strings woven between the stems of the flowers to keep them upright in stiff breezes.

Hybrid carnations win praise at Sanremo's Flower Experimental Station: the "Salvator Rosa" (upper) and the golden "Sphinx."

Irrigating carnations, Sanremo farmers encourage rapid growth. Blooming bougainvillea vines at right hide a retaining wall.

782



ACCENTUATED BY E. ANTONIO STEWART LEFT AND BELOW





AND HOWELL KALPER, NATIONAL GEOGRAPHIC STAFF © N.G.S.



brought covered baskets, each three times the size of a laundry hamper, to their appointed places. Buyers milled everywhere.

Exactly at 6:00 a.m. a whistle set off the rustle and bustle of uncovering the baskets of roses—but only the roses. The sellers, looking justifiably confident, stood by while professional agents and everyday clients passed along the rows. Soon, satisfied customers were leaving the shed, clutching big bunches or moving whole baskets of red, yellow, and white roses. In less than 30 minutes this section of the hall had sold out.

Carnations Climax Flower Show

A second whistle at 6:30 on the dot of the market clock signaled the beginning of mixed-flower sales. As if in a precision drill, the growers stooped in a body and removed the brown-paper or calico covers from their baskets. Gladioli, tuberoses, *Settembrini* (September flowers or little daisies), anemones, asparagus ferns, strelitzia, and some I couldn't identify, filled the air with fragrance.

As the mixed-flower business waned, excitement over carnations built up. It was like waiting for royalty to make an appearance. All attention froze on the central section of the shed.

At precisely 7:00 the whistle blew once more. Again there was the precision drill, with all the sellers bending in unison like Moslems at prayer in a mosque carpeted with carnations.

Carnations—red, pure white, perfect pink, yellow, orange, and pastels in subtle blends. Their scent—clean and cool as the autumn morning. I could almost feel it as one feels mist in wet woods.

Where do all these flowers go? Some fill local orders. But special flower trains speed the bulk to Switzerland, Germany, Sweden, Norway, and to Italian cities. Some countries prefer certain colors in certain seasons. Germany, for instance, would receive most of the autumnal red carnations.

Privileged Palms Supply Holy City

I visited the flower farm of Pietro Farina near Sanremo. Far larger than the average, this plantation employed 50 field-workers to tend 550,000 carnation plants. An additional staff of 30 persons cuts 20,000 flowers each day in spring and fall.

Ever marketing new varieties, the Farina farm created the "Princess Grace" (of Monaco). A bouquet of these red-and-white flowers was sent to the Princess' parents in Philadelphia, Pennsylvania.

What carnations are to Sanremo, palms are to Bordighera, a town lying near the western end of the Riviera. Bordighera's palms have the unalterable privilege of supplying the Vatican with Palm Sunday fronds.

Bordighera earned this unique distinction in 1586. That year, in the presence of Pope Sixtus V,

Petal tossers ride a float in the annual Battle of Flowers at Ventimiglia. When these girls threw bouquets of carnations, bystanders retaliated, and a storm of blossoms engulfed the streets.



Flowery clown takes the prize in the festival's best-float contest. Thousands of red and pink carnations provide fabric for his frock coat and bell-bottom trousers.



Adorned with flowers, a scallop-shell boat parades slowly down a palm-lined avenue. Farmers, architects, and engineers toil for months to create these floats.

Bemused toddler strolls a path littered with blooms.





engineers struggled to erect the Egyptian obelisk that stands today in St. Peter's Square. A crowd was allowed to watch, according to one story, on condition of absolute silence. Save the architects in charge, anyone who dared give advice would be put to death.

When the obelisk was almost erect, a loosening of the ropes threatened disaster. Among the onlookers stood Captain Bresca, whose family lived near Bordighera. Now this captain, a good seaman, instinctively shouted "*Aegua ae corde*" (water the ropes). The engineers followed his advice. The cords shrank and pulled the obelisk upright.

Far from ordering the seaman's death, the Pope asked Bresca what reward he wished

for his valuable help. The captain requested—and was granted—the right to send palms to the Vatican each Holy Week. His hometown of Bordighera carries on this tradition.

Statue Stands on Sea Floor

I had promised friends in Riomaggiore that I would return to the Cinqueterre for the grape harvest. On the way, though, I could not resist a visit to San Fruttuoso, that little jewel huddled in a cove, like a pearl in its oyster, against the hilly shore between Camogli and Portofino. As no road leads to San Fruttuoso, I took a boat from Camogli for the 40-minute trip.

We rounded the rocky base of a bluff, steered

Sightseeing boat disgorges passengers at San Fruttuoso, a remote fishing village accessible

PHOTOGRAPH BY HOWELL WALTON

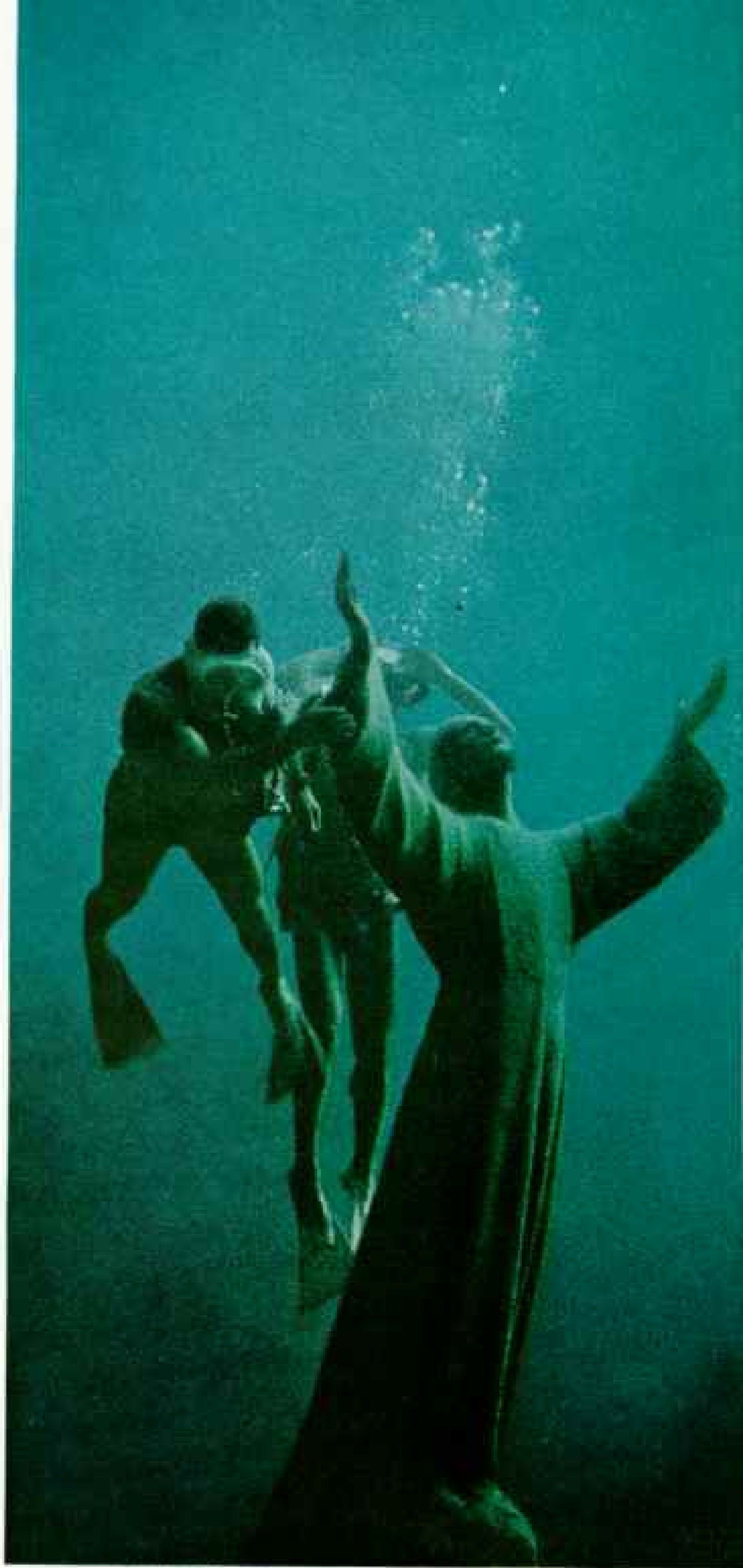


into a very small harbor, and docked within yards of a 12th-century abbey. Around the cove huddled the dozen stone houses of the fishing community. Directly behind the strip of shingle rose the somber bulk of Portofino Mountain; it made of San Fruttuoso a medieval toy, an exquisite trinket for a doge's daughter.

You see it all in a single glimpse. All, that is, but a bronze statue beneath the water. This is the Christ of the Deep in His holy temple, the sea, put here on the floor of the bay in 1954 to calm the sea and protect those who take their living from it.

only by water and mountain trail

NATIONAL GEOGRAPHIC STEVE WILSON



PHOTOGRAPH BY NATIONAL GEOGRAPHIC PHOTOGRAPHER ALBERT WOLDERT

Christ of the Deep lifts arms in blessing for all who have died at sea. The bronze statue, bought with contributions from sailors and water sportsmen from across the world, stands in 56 feet of water on the floor of San Fruttuoso Bay. Two divers, members of a special underwater unit of the *carabinieri* (national police), give the statue its annual cleaning.



I could stay no longer in San Fruttuoso; it was the grape-picking season in the Cinqueterre. And so, one September morning, shortly before seven, Jack Raffellini of Riomaggiore and I set out for the vineyards that rise like green walls around the town.

Grape Gathering Starts at Dawn

Already gatherers were descending with grape-filled baskets, 100-pound loads on the shoulders of men, lighter ones on the women's heads.

We reached the highest terraces to see women snipping bunches with scissors. The sun had just topped the eastern ridge.

"Why such an early start?" I asked.

"Because grapes with velour—the dawn velvet—sell better than those without it," Jack said. "Later on, the sun burns it off."

Since Riomaggiore had no hotel, Enrico Raffellini, owner of one of the two eating houses there, kindly offered me a room in his home. I took my meals, of course, in my host's trattoria, justly named "La Grotta." The cave-like dining room, carved from living rock, was cheerful and congenial. I ate with the family and lingered with them at the table after dinner. Often friends dropped in to join us for coffee or a glass of sciaccheta.

One evening we discussed the coming grape festival, called *Sagra dell'uva*. Signor Raffellini described the celebration's origin as spiritual. He said it sprang from the heart, a vine-grower's thanksgiving for a good harvest.

Riomaggiore dressed up in its Sunday best for the *Sagra dell'uva*. Colored lights, flags, and balloons decorated the main street.

Visitors streamed early into town. Special trains brought hundreds. All morning the throngs milled up and down the main street, admiring the decorations, but particularly the grape exhibits.

Judges deliberated over the displays. Then, after the prizes had been awarded, the public pressed around the stands to buy the grapes. And vendors, dispensing wine for as little as 25 cents a quart, had considerably more customers than bottles.

Toward evening, visitors sat in the street

around jugs of wine and bunches of grapes. They drank and ate and sang and laughed. Many, who had every intention of getting home early, ended up at a dance near the station. When I put out my light at midnight, Riomaggiore was still celebrating the *Sagra dell'uva*.

But the next morning, Riomaggiore went back to its vineyards at first light. There were still grapes to harvest for market, and for wine making, too.

After most of the table varieties have been picked, the *vendemmia* (grape gathering for wine) begins in earnest, and nobody worries about velour. Then, whole families turn to the task before an unseasonable rain can wreak its havoc. It is a moving spectacle to see lines of men, women, and children filing down from the vineyards, each carrying a share of the harvest.

Riomaggiore has no central or commercial winery, and so individual households press the fruit of their own vineyards. For ordinary red or white wine the grapes—stalks, stems, and all—are dumped into wooden tubs or large vats where men with bare feet trample them to a pulp (page 762).

Each Grape Squeezed by Hand

But the making of Cinqueterre's prize wine—sciaccheta—is quite another story. For this delicate nectar only the choicest bunches of amber grapes are tenderly collected and hung in the sun some 15 days to increase their sugar content.

Then families pluck them, grape by grape, from the stems and squeeze them between loving hands. The juice ferments three weeks or so; the longer the stronger.

What if easier ways of gathering and pressing grapes exist elsewhere? Riomaggiore and the rest of the Cinqueterre prefer their own methods, which have weathered the centuries well. This beautiful region, in its solitude, has cultivated a taste for the wine of independence, and, like a good wine, the region has acquired character with age.

Now I go away, knowing that I can return by a road that is bound to change the face of the Cinqueterre. Why should I feel sad or disenchanted? After all, this is the land of the Ligurians. And along less remote reaches of the Italian Riviera, where the sea washes the sun-drenched shores, other generations of Ligurians have survived inroads on their ageless ways of life.

THE END

Wicker baskets of grapes ride the shoulders of harvesters down the mountain to Pogliasca, where vintners make a wine similar to the dry wines of the Rhine Valley.



Bullfrog Ballet

Filmed in Flight

Article and photographs by
TREAT DAVIDSON

FROGS were far from my mind that Sunday dawn when for the first time the quiet of my home in Warren, Pennsylvania, was shattered by a deep croaking. Abandoning hope of sleep, my wife and I discovered that a bullfrog with a six-inch body and eight-inch legs had invaded our lily pond.

We worried that he might gobble up our fantail goldfish. But we found, after some days, that he did not bother them at all. Reassured, we accepted him and named him Paul.

Paul refused the oatmeal we fed our goldfish, and my granddaughters Mary and Ann feared he would starve. But a bit of research convinced me that Paul's "fast" was merely a normal frog's insistence on a

Lured by liver on a wire, a bullfrog bursts from the water. Forked tongue, hinged to front of jaw, will capture the bait.



moving meal. He liked to jump for his food.

If some insect appeared nearby, Paul's preliminary moves were slow, but once he was ready, he acted with unbelievable speed. He would face in the proper direction, then jump horizontally or vertically or at any angle in between. The insect simply seemed to evaporate. Paul seldom missed.

To amuse the children, I fastened earthworms to a wire and dangled them from the end of a fishing rod. Paul reacted vigorously. Soon he became so tame that the children held contests to see how high he would jump. Sometimes he shot two feet straight up.

Frog's Jump Too Fast for Man's Eye

Paul's swift leaps posed a challenge to me as a photographer. Trying to catch sharp pictures of a frog in mid-jump is very difficult, and I soon saw why. Paul moved so fast that every exposure was blurred.

Thereupon I got in touch with Dr. Harold E. Edgerton, Professor of Electrical Measurements at the Massachusetts Institute of Technology. Dr. Edgerton, aided by research grants from the National Geographic Society, had invented speedlights that could flash as fast as 1/15,000 of a second. Surely they could freeze our frog's fastest motion.

Thanks to Dr. Edgerton, I obtained a set of these revolutionary lights. But Paul was still too quick for the human part of my photographic setup. I could never be sure just when he would leap. Several rolls of film showed Paul sitting, or simply a beautiful splash—nothing in between.

The answer was a technique I had devised to photograph a leaping trout.* I coupled a photoelectric cell with a thyratron tube, a normal component of a radar circuit. This

*See "Freezing the Trout's Lightning Leap," by Treat Davidson, NATIONAL GEOGRAPHIC, April, 1958.

Bull's-eye! Angle of head at this stage of the jump forces the frog to "fly blind," but it makes a direct hit. Tapered ends of the tongue wrap around the target.

Handlike forelimbs stuff liver into the mouth. In this fashion a frog swallows countless insects, occasional mice, small turtles, and even birds. Fingers rake away from the mouth those objects failing to pass the taste test. These acrobatic exercises were photographed in a lily pond near the author's studio in Warren, Pennsylvania.





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Author pulls a string that jiggles bait above an electric eye. Frogs break the light beam and trip the shutter of camera at right.

A frog will try to swallow almost anything that moves. However, scientists have observed that the creature, when surrounded by immobile insects, will starve rather than strike at a still target. Boys catch frogs on a bit of red flannel dangled from a fishing pole.

His Eyes Retracted, a Bullfrog Blasts Off

After spotting his prey, the frog jumps almost blind; at other times the eyes bulge out to watch behind as well as ahead. Each year this water-to-air missile zeroes in on thousands of insects.



Seventeen-inch Bullfrog Makes a Double Handful

Nearly two-thirds of a bullfrog's length lies in powerfully muscled jumping legs. This jumbo three-year-old, a male raised in Louisiana, weighs $1\frac{1}{4}$ pounds.

Gourmets relish plump frog legs, which taste somewhat like chicken. Fresh legs sold in the United States usually come from the wild. Frozen legs generally are imported from Japan, where the American species has become acclimated to wet rice fields.



EDUCATION BY TERRY DAVIDSON © NATIONAL GEOGRAPHIC SOCIETY

was used as an ultra-fast mechanism to activate the speedlights, which were synchronized with my camera shutter. Thus, only $1/77$ of a second after Paul broke the light beam, the speedlights flashed, the shutter clicked, and I had a picture.

This invaluable kind of electronic photography revealed clearly how a bullfrog leaps.

First he retracts his eyes, for protection and streamlining. Next he protects them further by closing translucent lower lids. He rises into the air with his forelimbs hanging. His tongue, attached to the front of his mouth (not to the rear as our tongues are), flips over his chin; it wraps around the target, like the weighted end of a swinging rope (page 792).

Near the top of the leap, his forefeet move forward, to help push the prize into his mouth (page 793). Then he falls back into the water.

This happens so fast that the naked eye perceives only a blurred frog and a splash.

Frogs That Went to College

Paul was only the first of my frog models. Obliging young neighbors, notably nine-year-old Billy Bowler and his brother Alex, caught fine Pennsylvania-grown frogs for me at a dollar each. Friends airmailed specimens from Florida and Louisiana, where these bullfrogs (*Rana catesbeiana*) tend to be especially large—because they do not hibernate as northern frogs do, and the warm climate permits year-round growth.

But I was still unsatisfied. My backyard equipment permitted only one picture per jump, so my analysis had to be pieced together from many pictures of different jumps.

Now I was eager for sequence pictures of a single jump, to get clues to the frog's uncanny accuracy in hitting moving targets.

Again I must thank Professor Edgerton, who invited me to M.I.T. to try speedlights even faster than those I had been using. And so I found myself one day in an electrical engineering laboratory in Cambridge, Massachusetts, staring at a frog that sat on a workbench. I waited tensely. But nothing could induce that lazy frog to move.

Finally Bob Schildkraut, the electrical engineer helping me, placed a coil that generates a harmless spark half an inch behind the frog. Then he flipped a switch. When the blue of the spark had cleared from the air, the frog was gone too.

We launched many frogs—without hurting any of them, simply startling them to jump exactly when we wanted them to. But nine out of ten of the leaping amphibians did not land in the pan we had set out for them.

I chased frogs under piles of unused apparatus. I gashed my hand retrieving one from beneath a radiator. But nothing could mar my joy now. I was getting what I had come for: full-color, multiple-exposure photographs of the jump of a frog, showing in stage-by-stage detail what our eyes see only as a single blur of motion.

Each time Bob set off a spark—and with it, a frog—he triggered the speedlights, freezing eight successive stages of the leap on a single piece of film (pages 796-7).

For me, those pictures rewarded nearly ten years of curiosity and effort. At last I had my clues to the accuracy of the frog's jump.



The frog does not see his target as he nears it; his nose blocks the view from his retracted eyeballs. But if he is off course near the beginning of his jump, he will sight the target with one eye or the other. Then his built-in homing mechanism takes over: He alters course by twisting his rear flippers, giving his body a little "English," and zeroes in.

Frogs do not eat under water, as alligators and turtles do. But apparently they will swallow any food they can get into their mouths, provided it moves above water. Occasionally they vary their diet of insects with small turtles, mice, sparrows, ducklings, and even smaller frogs. Whatever the prey, biologists have learned, it will become a target only if it moves. Otherwise the frog does not rec-

From Launch to Splash, a Jump Lasts Less Than Half a Second

Eight stages of this leap were recorded by the author in Dr. Harold E. Edgerton's laboratory at the Massachusetts Institute of Technology. High-speed lights that flicker 20 times each second with a flash duration of 25 millionths of a second froze the motion—about 10 miles an hour. Twisting legs corrected the flight path and kept the amphibian on course.

Dr. Edgerton's lights are so fast that they appear to stop a bullet on film.

Chorus line of frogs in the laboratory is an illusion. Actually a single leaper struck these graceful poses in its mid-air flight.



KUNZSCHWENK © NATIONAL GEOGRAPHIC SOCIETY





PHOTOGRAPHIC APPROXIMATELY LIFE SIZE

Bullfrog tadpoles hatch from a translucent egg mass laid among water plants, in this case spear-shaped *Vallisneria* leaves (above and below). Easy to raise in aquariums, "polliwogs" thrive on cooked spinach and meat.

Tadpole's hind legs sprout first, then the forelimbs. Soon lungs will replace gills, and the tail will disappear. In its life cycle, the frog repeats the achievement of its ancestors—the fish that exchanged swim bladders for lungs, and fins for legs.



FOURACHEVEL © NATIONAL GEOGRAPHIC SOCIETY

Air-breathing Bullfrog Remains Faithful to Water, His Home as a Tadpole

When danger threatens, the frog returns to his native element, where his skin absorbs oxygen dissolved in water. In winter he can remain submerged in mud for months. This frog rests among feathery leaves of *Myriophyllum*, a popular aquarium plant.

ognize it as food. A bullfrog surrounded by living but immobile insects would starve to death.

In each pond, the strongest frog is king and takes his station where food is most plentiful. As I learned when trying to photograph several frogs together, the top frog will keep all the others from eating until he has completely stuffed himself and is too bloated to move. Paul played his kingly part to the hilt.

Frogs Spark Discoveries

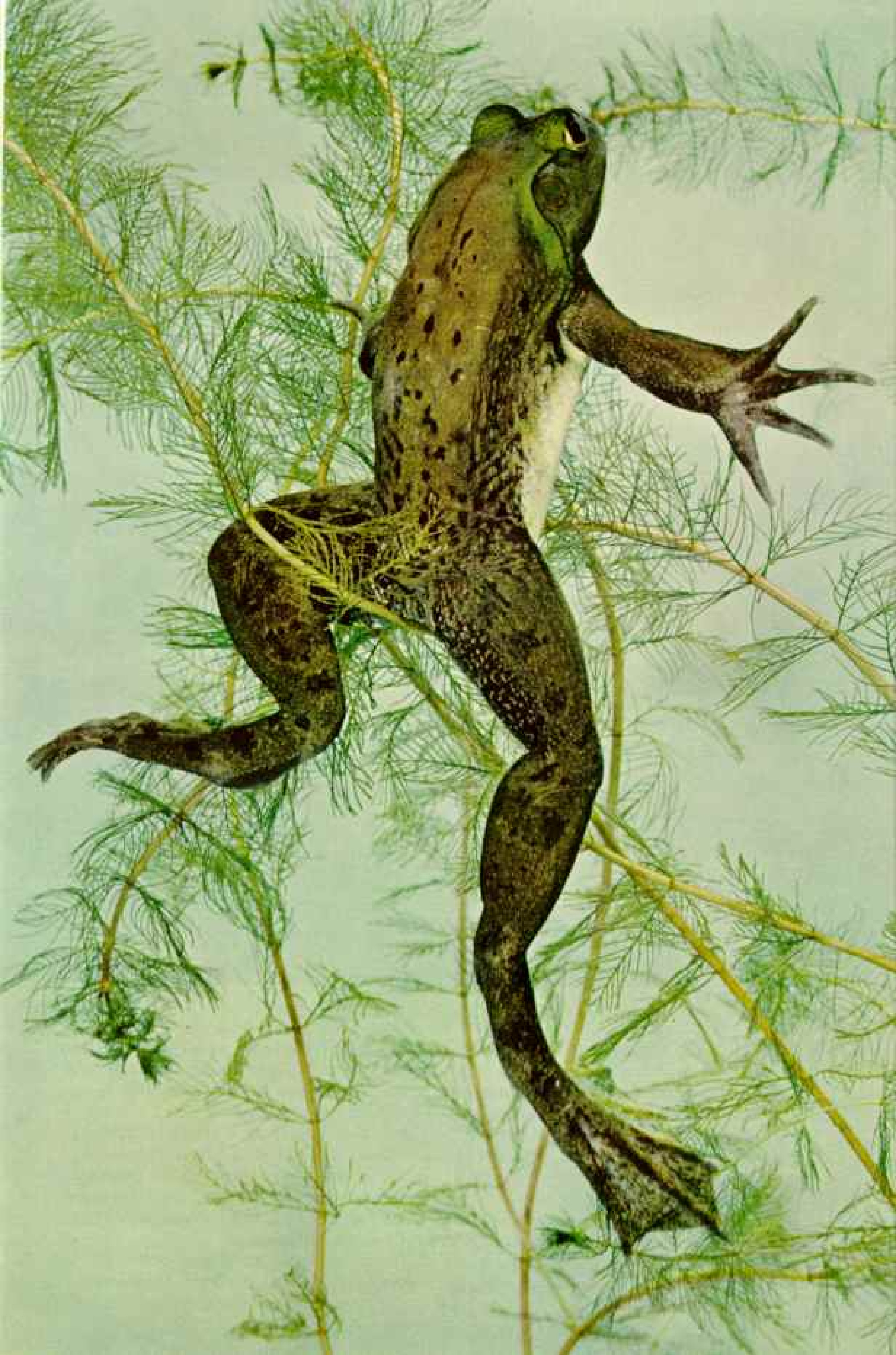
A pet as well as a model, Paul inspired me with an abiding affection for frogs. Few people appreciate how much mankind owes to these amphibians—for keeping insects under control and for contributing to the advancement of science.

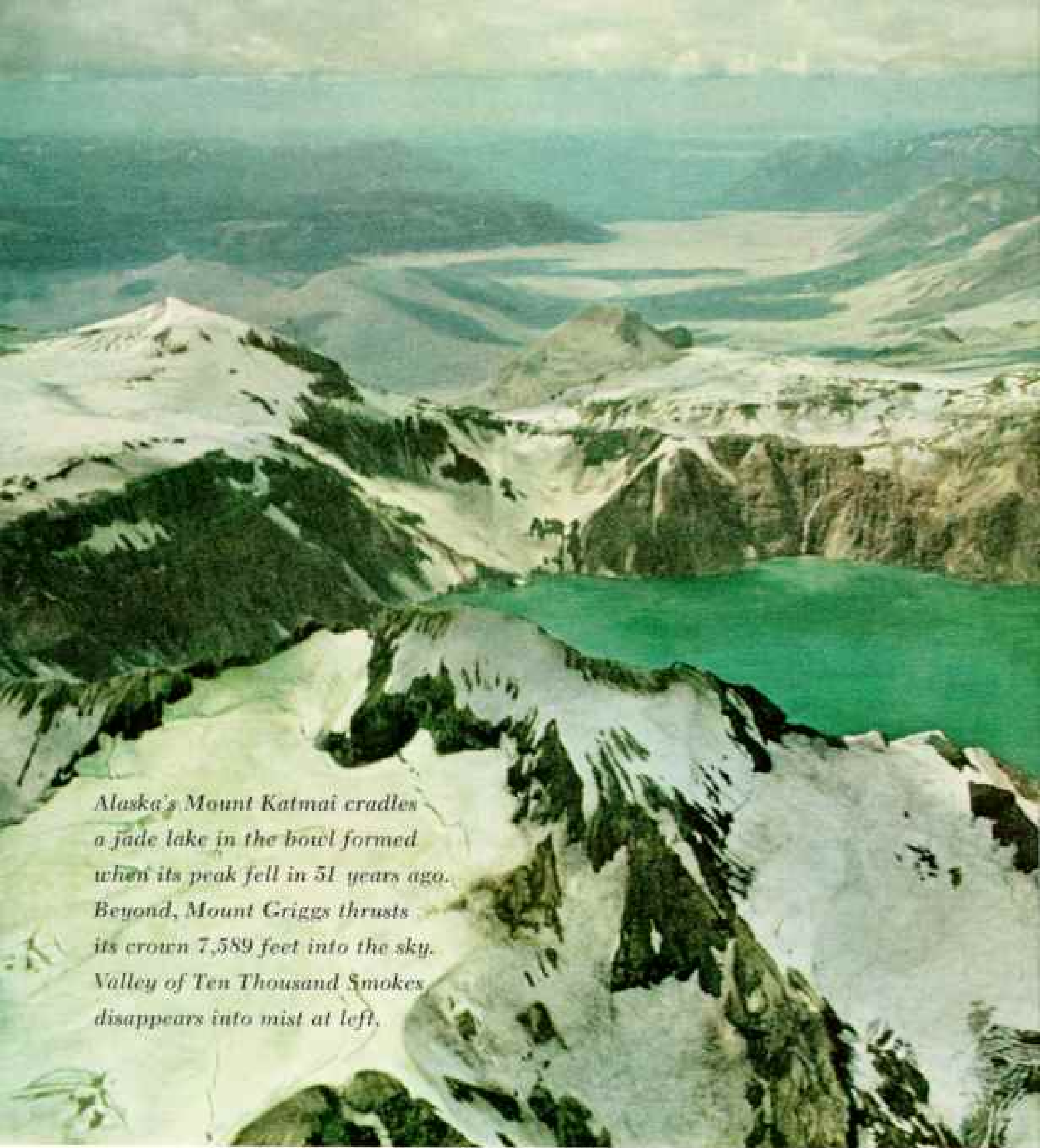
Thus in the 1780's, the twitching of a frog's leg, in the laboratory of the famous Italian anatomist Luigi Galvani, provided a far-reaching clue. His experiments demonstrated that the movement was electrical in origin. Inspired by his countryman's work, Alessandro Volta invented the chemical cell, or battery, which was responsible for the amazing development of electrical science in the 19th century.

Today frogs are useful in laboratories everywhere. Their upkeep costs practically nothing. And they are vertebrates, like man; therefore experiments with them provide clues to human physiology.

Paul's appetite, I must add, proved to be his undoing. After gorging himself on earthworms, he would hunt insects in our garden at night under a light, or crawl between the logs of a woodpile for spiders. One day he disappeared. Long afterwards I came upon his mummified body in the woodpile. Just as he caught his last spider, a log must have slipped, and not even his quick reflexes and his strong jumping legs could save him.

THE END





Alaska's Mount Katmai cradles a jade lake in the bowl formed when its peak fell in 51 years ago. Beyond, Mount Griggs thrusts its crown 7,589 feet into the sky. Valley of Ten Thousand Smokes disappears into mist at left.

I STOOD LAST summer in Alaska's Valley of Ten Thousand Smokes, where few men have walked and no man has lived, and half a century flashed backward before me to June 6, 1912. On that day, one of the most tremendous volcanic eruptions in recorded history rocked this remote corner of the earth where North America and Asia meet.

The late Dr. Robert F. Griggs, leader of a series of National Geographic Society expeditions to the scene, reported that if such an eruption had occurred at New York City, it

would have been heard as far away as Chicago; if the winds were right, sulphuric acid in the fumes could have eaten clothes hanging on the line in Denver.

By 1918, largely as a result of these expeditions, the steaming-hot, tortured geography of this part of the Alaska Peninsula had been set aside by President Woodrow Wilson as a great national monument to nature's awesome power.

Today, as befits our largest state, 4,215-square-mile Katmai National Monument—



© NATIONAL GEOGRAPHIC SOCIETY

with its still faintly smoking valley—far outstrips all other United States national parks and monuments in size. Glacier Bay National Monument, also in Alaska, ranks second with 3,554 square miles and Yellowstone National Park is third with 3,472.

Katmai (pronounced “cat-my”) is about four-fifths as large as Connecticut, and more than twice the size of Delaware (map, page 804). Yet its remoteness and rugged terrain have made it

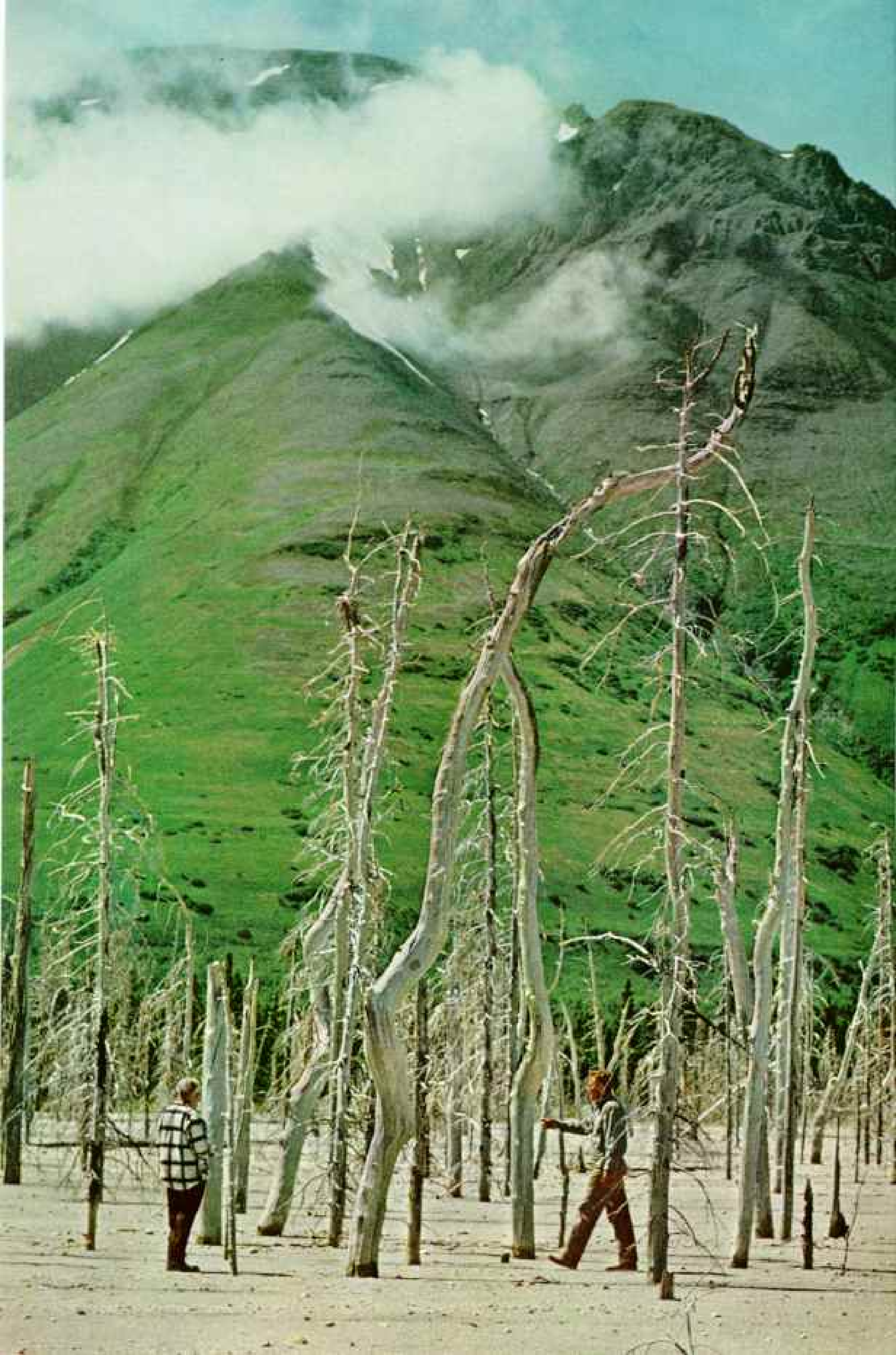
Lonely Wonders of Katmai

By ERNEST GRUENING

United States Senator from Alaska

Photographs by WINFIELD PARKS

National Geographic Staff



one of the least-seen units in the National Park System. Only about 900 persons have visited it in the last two years.

As I stood there in June, 1962, just fifty years after the eruption, vigorous efforts were being made to open the wonders of this national monument to more people.

Just how successful were these efforts? And what is it like to walk on a volcano half a century after its rage is spent? As a United States Senator from Alaska, I was making it my business to find out.*

With me, fittingly, had come two representatives of the National Geographic Society, which a generation ago had done so much to make these wonders known.

Falling Ash Buries Kodiak

The Valley of Ten Thousand Smokes and I go back a full half century together. Word of the volcanic cataclysm reached the United States slowly. In Boston, where I was working as a newspaperman, the news was not received

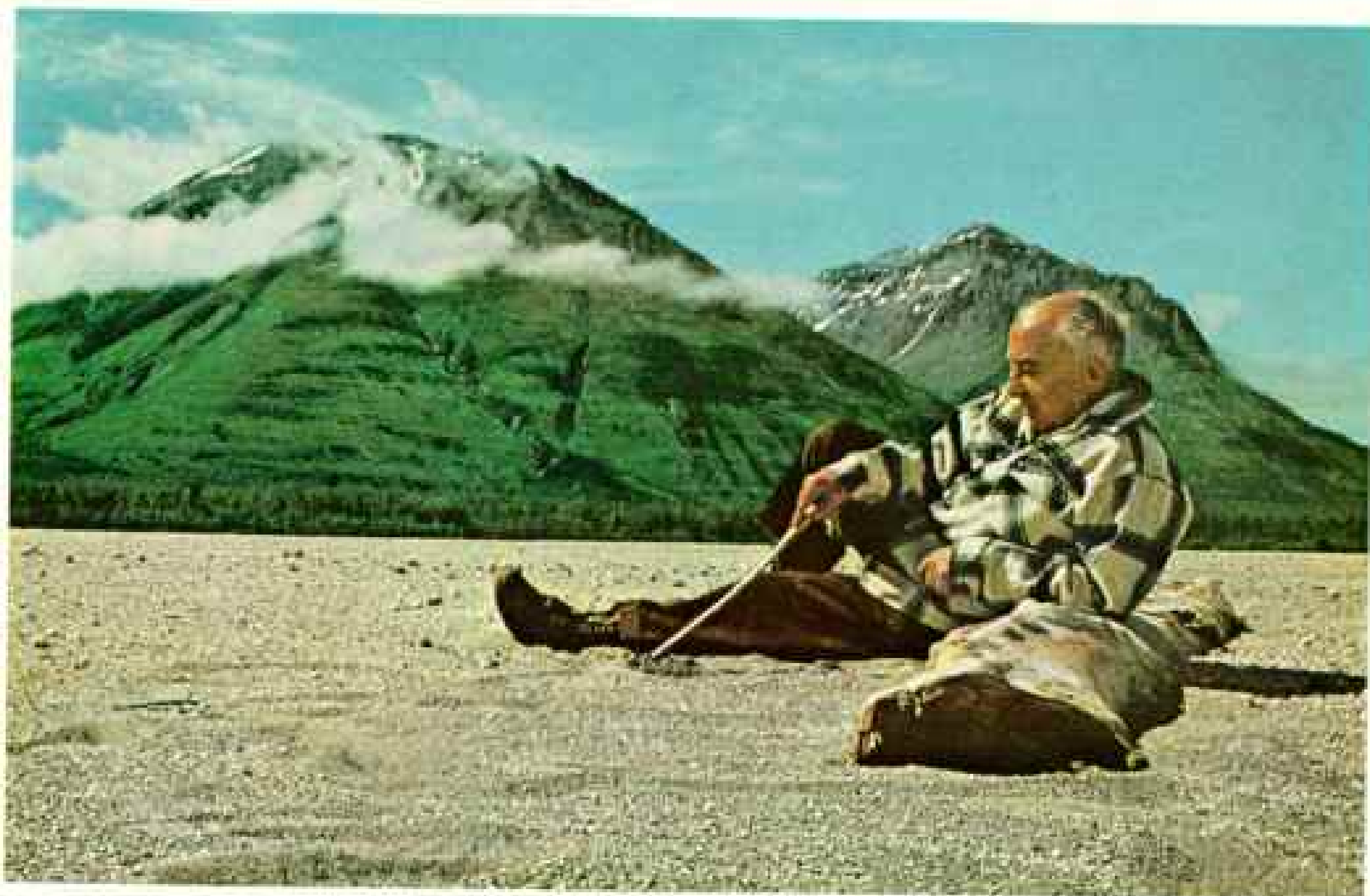
until three days after the event. It came from Cordova—360 miles from the eruption—and gave few details.

Yet in the August, 1912, issue, which must have gone to press shortly after the eruption, NATIONAL GEOGRAPHIC carried a nine-page article and 11 photographs on the volcanic upheaval. They showed the heavy deposit of ash and pumice at Kodiak, 100 miles from Katmai: roofs caved in, interiors of homes filled, a blanket of white ash resembling snow piled in drifts to a depth of 12 feet.

Capt. K. W. Perry of the U. S. revenue cutter *Manning* wrote from Kodiak that ash fell almost constantly for three days: At 1 p.m. on June 7 it was impossible to see beyond 50 feet. At 2 p.m. pitch darkness had set in, and men bumped into each other on the decks.

If this was taking place 100 miles from the eruption, imagine what the upheaval itself must have been like. It covered an area of

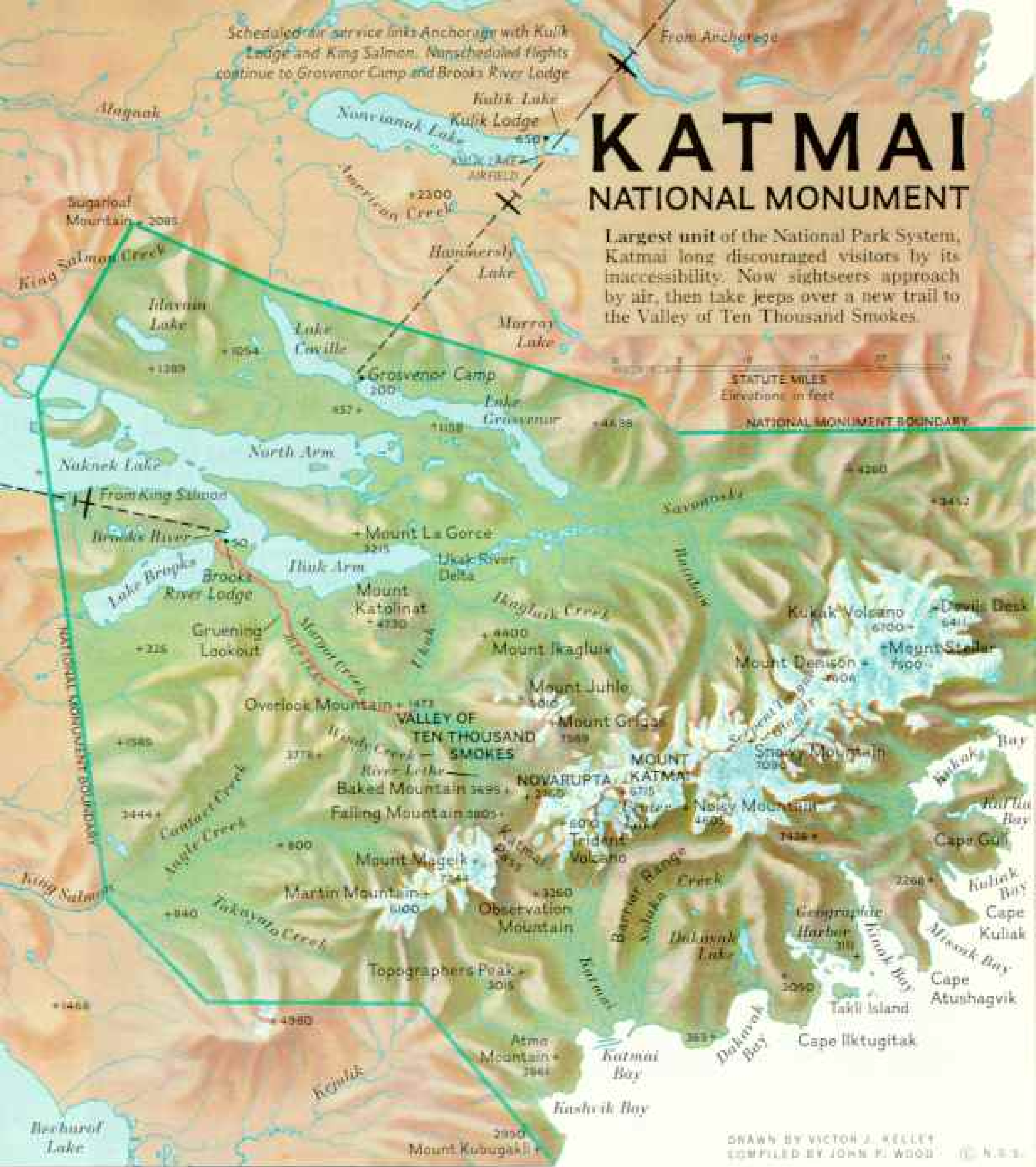
*See "Alaska Proudly Joins the Union," by Ernest Gruening, NATIONAL GEOGRAPHIC, July, 1959.



ERNEST GRUENING © NATIONAL GEOGRAPHIC SOCIETY

The Author: New York City-born Ernest Gruening first looked toward Alaska in 1898 when, as a lad of 11, he was intrigued by the Klondike gold rush. In 1934 he was appointed Director of the Division of Territories and Island Possessions, Department of the Interior; in 1939 he became Governor of Alaska and a leader in the fight for statehood. He was elected one of Alaska's first United States Senators in 1958. Here he rests during a hike along the Savonoski River. Behind him rise two peaks of Mount Katolinat.

Ghost forest died in 1912 when the swollen Ukak River smothered it with pumice from the eruption.





Fearing a williwaw, a violent wind with gusts up to 100 miles an hour, the author's party makes fast its Cessna 180 beside the Savonoski River.

about 30,000 square miles with a layer of volcanic ash. The account I give is based on scientific evidence gathered by Dr. Griggs.

Beginning around June 1, 1912, earthquakes shook the northern Alaska Peninsula, and most of the natives living there fled to safety. Then, with a thunderous roar, the face of Falling Mountain let go.

A hurricane caused by the avalanche roared down the 15-mile-long valley; a great cloud of dust from the mountain darkened the sky. The entire region rocked in the throes of tremendous subterranean convulsions.

Suddenly, at the southeastern end of the valley, a vent—later appropriately named Novarupta—opened (page 814). From it, and from a hundred new fissures in the valley floor nearby, boiled up white-hot melted rock. Tremendous columns of incandescent pumice leaped hundreds of feet. New volcanoes were formed, belching flame and rock and sand. Down the length of the valley poured this river of seething, sandlike material, covering an area of 42 square miles to a depth in places of 700 feet or more.

Then Katmai erupted violently. For 60 dreadful hours the holocaust continued, and some seven cubic miles of volcanic debris were ejected.

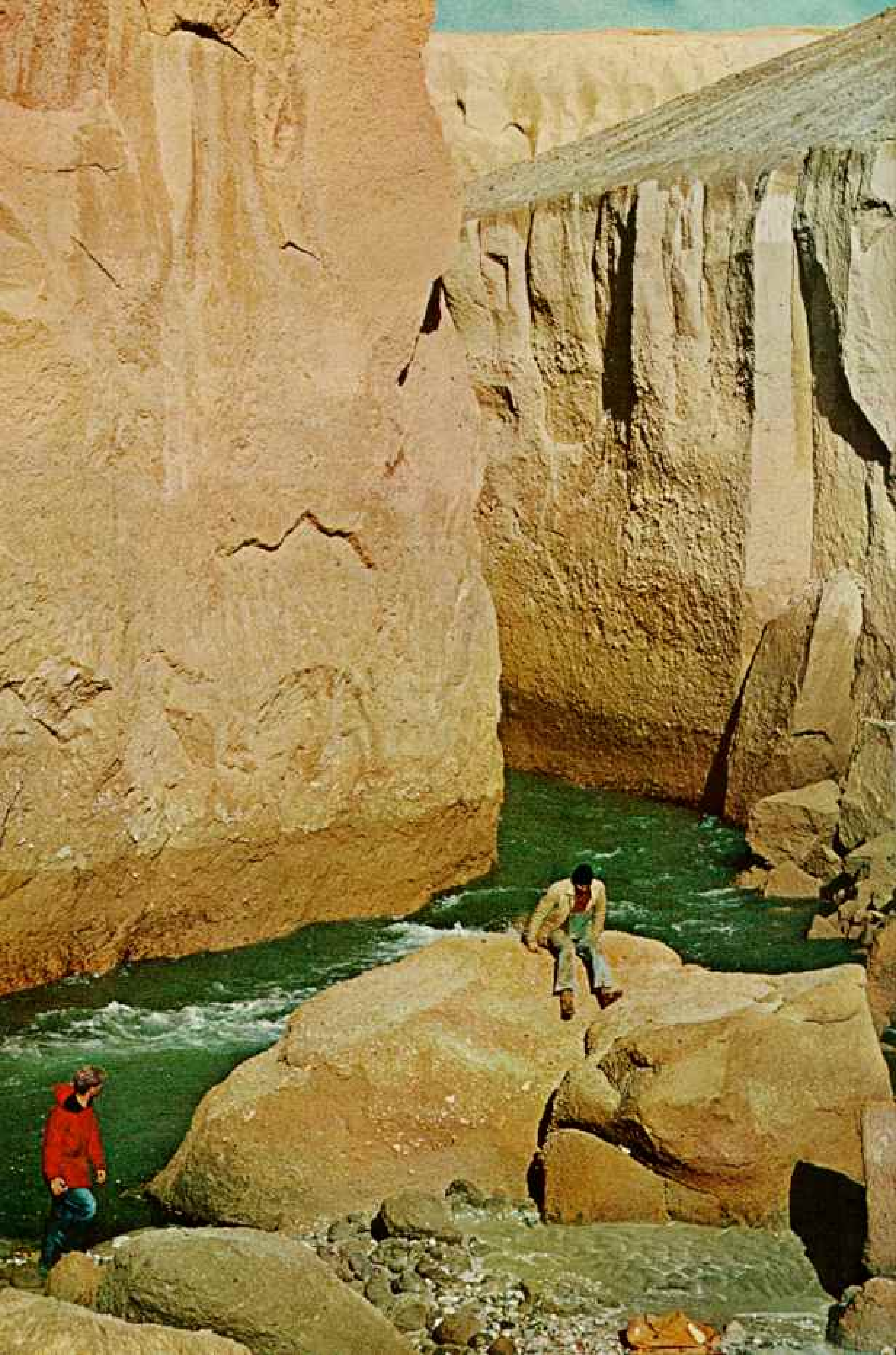
Then . . . silence.

Four years later, leading the third of seven National Geographic Society expeditions to the area, Dr. Griggs came upon the scene of the inferno. It was here that he discovered and named the Valley of Ten Thousand Smokes.³

³The eruption, valley discovery, and subsequent explorations were reported in six NATIONAL GEOGRAPHIC articles, beginning with "Volcanoes of Alaska," by Capt. K. W. Perry, August, 1912. Dr. Griggs's last article, "Our Greatest National Monument," appeared in the September, 1921, issue. In 1927, the National Geographic Society published the results of its findings in a 340-page volume by Dr. Griggs, *The Valley of Ten Thousand Smokes*.



APPROACHING BY NATIONAL GEOGRAPHIC PHOTOGRAPHER WINFIELD PERRY © N.G.S.





RENDERING BY SETTING FOUNDRY © NATIONAL GEOGRAPHIC SOCIETY

Pale-pink cliffs box a canyon in the Valley of Ten Thousand Smokes. River Lethe, warmed by volcanic fires, easily erodes the ash, sand, and pumice.

"It was at once evident," he wrote, "that one of the great wonders of the world had been discovered [pages 810-11]."

"The whole valley," reported Dr. Griggs, "as far as the eye could reach was full of hundreds, no thousands—literally, tens of thousands—of smokes curling up from its fissured floor. . . . Some were sending up columns of steam which rose a thousand feet before dissolving. . . ."

"The first glance was enough to assure us that we had stumbled into another Yellowstone Park—unseen and unsuspected by white man and native alike. . . ."

Unfortunately, the Valley of Ten Thousand Smokes has remained virtually "unseen and unsuspected." It lies deep within Katmai National Monument, and Mount Katmai itself is 265 miles southwest of Anchorage with mountainous, untraveled terrain between.

But today, as you read this, a new, 22½-mile trail wide enough for a car is opening from the nearest civilization—Brooks River Lodge—to a knoll above the foot of the val-

Sixty-mile winds whip a pumice dust storm and create a mistlike effect in the distance. Alders seize a foothold along Windy Creek at left.

ley. From now on, a short ride replaces an extremely difficult hike—or, in my case, an airplane landing that I wouldn't want to make very often. There is no airfield in the valley. Indeed there is none in all of Katmai National Monument. But don't misunderstand: The airplane is vital to Katmai.

Lake Named for Society's President

To reach the monument, visitors fly from Anchorage either to King Salmon, a small community and Air Force station 16 miles from Katmai's western boundary, or to Kulik Lodge, a fishing camp above the northern border. From there a floatplane carries them to water's-edge cabin camps at Brooks River or on Lake Grosvenor (maps, pages 804-5).

An irregularly shaped area, the monument extends 105 miles east to west, 80 miles north to south. Lake Grosvenor takes its name from Dr. Gilbert H. Grosvenor who, as President of the National Geographic Society and Editor of its magazine from 1899 to 1954, guided

(Continued on page 812)



Niagara of Incandescient Ash Cascades
From Novarupta: an Artist's Conception

In a moment the avalanche of ash, accompanied by hot, tornadolike winds, will destroy the woodlands. Distant Mount Katmai trails a plume of



PAINTING BY GEORGE LOGOSKIEN © NATIONAL GEOGRAPHIC SOCIETY

dust and gases; within minutes its white-flanked peak will crumble. In some places the green valley floor will be covered with 700 feet of ash and pum-

ice from this 1912 eruption, Alaska's most violent explosion. No hydrogen bomb could match its cumulative release of energy.



J. S. BEHRE (LEGEND)



Ten Thousand Smokes Puff From the Valley in 1917

"The whole valley as far as the eye could reach was full of hundreds, no thousands—literally, tens of thousands—of smokes curling up from its fissured floor," reported Dr. Robert F. Griggs, who discovered the valley by accident in 1916. "It was as though all the steam engines in the world, assembled together, had popped their safety valves at once and were letting off surplus steam in concert... Sleep that night was impossible... I had seen enough to know we had accidentally discovered one of the great wonders of the world."

During National Geographic Society expeditions, scientists sometimes plunged through suffocating vapors and walked on hot, boggy earth to trap gases for chemical analysis. Lacking wood, they cooked over natural steam. Today most of the fumaroles have vanished.

Hot vapor surrounds a photographer taking pictures of the valley's fumaroles in 1918.

Fumarole warms the hands of visitors in the summer of 1962. One of a dozen or so surviving smokes, the sulphurous vapor felt like a Turkish bath.



ROBERT F. GRIGGS



REIMAGINED BY NATIONAL GEOGRAPHIC PHOTOGRAPHER WINFIELD PARKS © N.G.P.



REDACHREMER © NATIONAL GEOGRAPHIC SOCIETY

Puffs of pumice fill the arms of Mitzi Parks, the photographer's wife. Expanding gases left the holes when blobs of molten lava shot out of volcanic vents and cooled into featherweight pumice as they flew through the air. Mrs. Parks found that the soft stone could be cut with a knife.

Pumice pebbles float like corks on Naknek Lake.



the exploration of this remote valley.

Fifteen air miles southwest of Grosvenor Camp lies Brooks River Lodge. And about 24 miles southeast of the lodge begins the Valley of Ten Thousand Smokes.

I first saw the valley in the summer of 1961, from the air. But it had been my ambition for half a century to walk there, to see it close up. Last summer I finally did. The trail was still being built, so with National Geographic staff men Winfield Parks and Robert Jordan, I flew in.

Smokes No Longer Hide Panorama

A floatplane carried us east from Brooks River Lodge 17 miles to the confluence of the Ukak and Savonoski Rivers. Waiting for us on the Ukak River Delta, a natural airfield one and a half miles wide, was a single-engine Piper Cub with huge balloon tires. Bush pilot Ed Seiler had flown it there from the Kulik Lake Airfield.

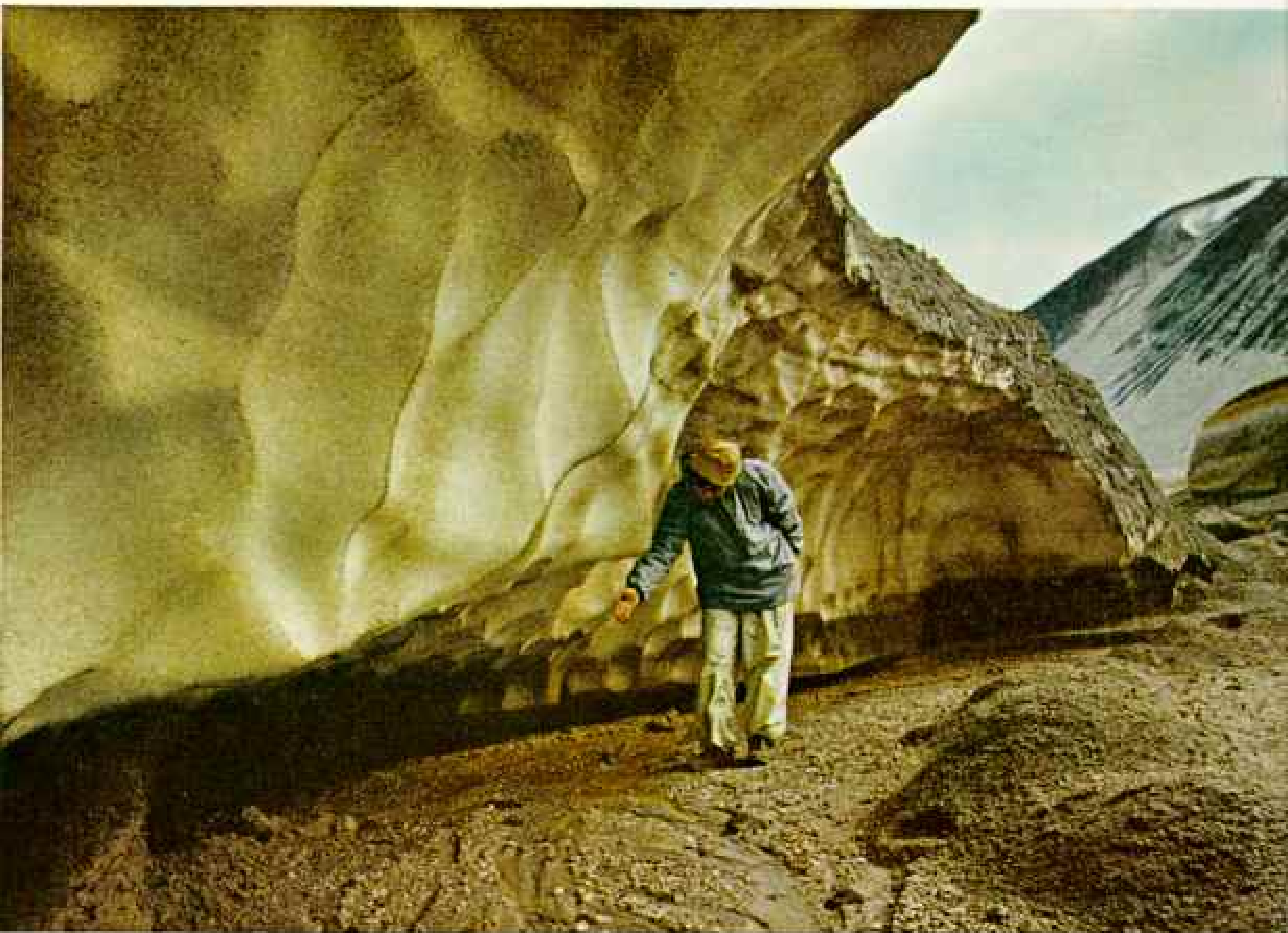
Since the plane was a two-seater, he flew us over the mountains and into the valley one by one. I went first. Though I knew what to expect, I was startled when the volcanic wonderland came into view.

The smokes were almost gone. Steam from buried rivers and springs in the baking substrata once had risen through vents in the valley floor as far as the eye could see. Now there were perhaps a dozen smoking fumaroles. The water might still be there, but the valley had cooled.

Seiler set the tiny plane down, its oversized tires bounding up the slope of Baked Mountain (page 817). I squeezed out, and he taxied around to fly the 17 miles back to the Ukak River Delta for Win and then Bob.

Just above me a lonely fumarole slanted its plumes skyward. I walked up to it, peered down its gaping throat, and warmed my hands in its moist heat. The discoverers of the valley fried bacon and baked cornbread over such vents. Once, when they were cooking, acid in the fumes ate holes through their aluminum pans.

Looking about, I realized that the



PHOTOGRAPH BY NICHOLAS LEONARDI FOR NATIONAL GEOGRAPHIC PHOTOGRAPHER MITZI PARKS © N.G.S.

Snowbank refrigerators and fumarole stoves make Katmai National Monument a natural kitchen. Overburdens of ash and pumice preserve this half-century-old drift. Thaw water drips into Mitzi Parks's hand along an edge exposed by a rivulet.

dying of the smokes was not all a loss. I knew that this cooler phase of the valley's life also interests volcanologists, geophysicists, and other scientists. More important to Katmai's future tourists, no longer do myriad steam clouds hide the eerie panorama of the valley.

Here is a pastel wasteland like no other, a vast solitude of mountains and desert and desolation; a land of snowfields and glaciers and airy pumice stones and deep crevices; a never-never land where sun and rain and fog and drizzle take turns and a volcano could go off at any time.

Williwaw an Ever-present Danger

I asked myself: Is this what it will be like when the world is ending? Had I not known where I was, I'd have thought it was the moon.

Now I heard the sound of the returning plane; and, after still another round trip, both Bob and Win had joined me on the slope of

Baked Mountain. We watched as the pilot painstakingly pegged the plane to the ground.

"Why so careful?" Bob asked.

"Might get a williwaw," Ed Seiler explained—the sudden high wind and rain which, in that location, funnels through Katmai Pass at the valley's head. "It's more than 35 miles to hike from here to Brooks River Lodge. I'd rather not walk out."

But come what may, we were in the valley, and around Baked Mountain lay Novarupta. We began hiking.

Walking in the volcanic debris of the valley, I soon found, is strenuous work—particularly for a United States Senator who has been too long at his desk. It is like trudging through desert sand, only worse.

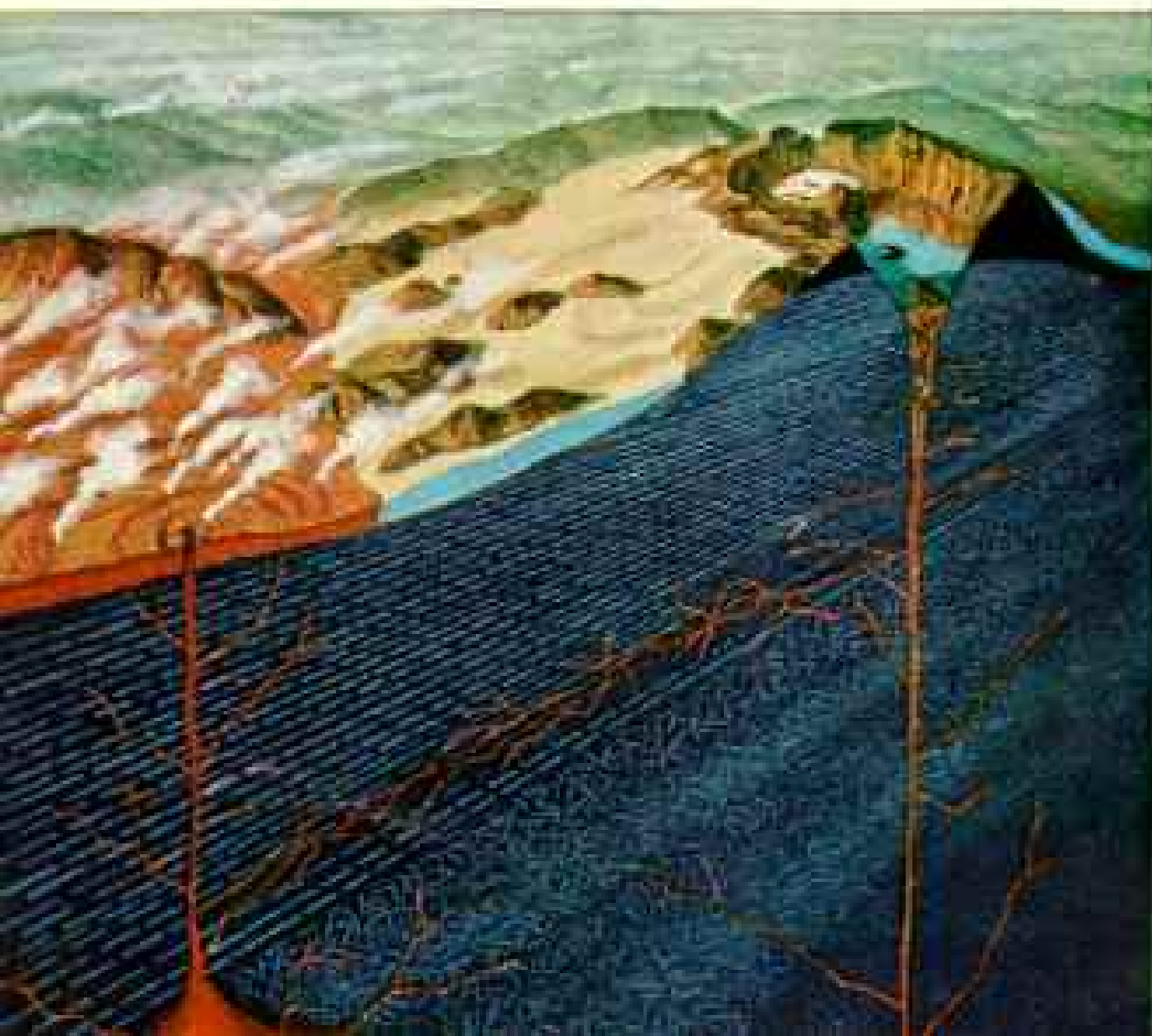
Scramble down the bank of a watercourse and your feet slip out from under you. Haul yourself up the other side and the sharp sand skins your hands. Walk where valley floor meets mountain slope and you don't see the



DIAGRAM BY NATIONAL GEOGRAPHIC ARTIST ROBERT C. MATHIE



© NATIONAL GEOGRAPHIC SOCIETY



snow lying there: Wind-blown ash and pumice, an excellent insulator, camouflage it. Down you go again.

Struggle up Novarupta's still-steaming side and you leave tracks deep as a bear's on the puttylike incline. Suddenly one foot breaks through and you sink to your knee. Perhaps a smoldering cavern lies beneath. You don't stay to find out.

In this fashion I made my way to Novarupta's edge, noting that my companions also were puffing a bit. Once there, we forgot our aches: Now we could see what had happened here.

This had been one of many beautiful mountain valleys in the region. The lower reaches of the valley had been covered with balsam poplar, birch, and white spruce, interspersed with bog. Wildlife had been plentiful: caribou, bears, wolves, wolverines, and lesser fur bearers, and numerous kinds of land and water birds.

Undercut by Novarupta, Katmai's roof falls in

EARLY National Geographic expeditions found Katmai decapitated and assumed it had blown its top. But Dr. Garniss H. Curtis, Professor of Geology at the University of California, believes that Novarupta, a new volcano six miles away, felled its giant neighbor by siphoning off its underlying magma. Measuring each layer of ejected material, Professor Curtis observed that all activity centered around Novarupta; the layers became thinner as they neared Katmai. Novarupta subsided after hurling more than seven cubic miles of pumice, rhyolite, and dust. Some soared well into the stratosphere.

Roaring column of lava (top) rushes through a crack in sedimentary strata from a chamber below Novarupta. Pumice and ash spread across hundreds of miles. Ash flow buries the valley, in places 700 feet deep.

Molten rock drains through a conduit from Katmai to Novarupta. Katmai belches vapor and dust, then collapses within a few hours. A lake 2½ miles across eventually fills its caldera (opposite).

Ground water, vaporized by hot ash, steams from fumaroles to create the Valley of Ten Thousand Smokes. Cooled lava plugs Novarupta's vent and the conduit to Katmai.

Eskimos traveled along this lovely glacial trough in the days before the white man came; it was part of their route across the peninsula. Later, the Russians went through it journeying from their Kodiak Island settlement to the Bering Sea. The route was largely abandoned after the Russian era, except during the gold rushers' stampede to Nome.

Then came June, 1912, and premonitory earthquakes.

Daylight Darkened by Volcanic Haze

According to Garniss H. Curtis, Professor of Geology at the University of California, the vent, Novarupta, opened with cataclysmic force. A column of pumice and ash was hurled 25 miles into the stratosphere. The sound was heard 750 miles away in Juneau. Almost before this ash had settled to the ground, new white-hot melted rock boiled up from this vent and from a hundred new fissures in the valley floor nearby.

Standing on the volcano's rim, we could see the beachline left by this flow on the mountains cradling the valley; it had frothed 900 feet and more above the valley floor.

And at Novarupta itself, as the volcanic activity slowly subsided, a plug of viscous rhyolite 1,300 feet in diameter had welled up to seal off that great vent. Looking at it, I marveled at the titanic force that had thrust this lava plug, weighing millions of tons, up from the depths of the earth (pages 818-19).

Yet this was but a small part of the story. The seven cubic miles of ejected ash, pumice, and rock fragments loaded the atmosphere. It darkened the days and created brilliant sunsets as far away as Nova Scotia, across the North American Continent. It made that summer cooler in the Northern Hemisphere—the haze absorbed some of the sun's heat. All this from a volcano-rimmed valley in the northern part of the Alaska Peninsula.

As I paused on Novarupta's edge, the valley



CONDUCTED BY DR. WILSON L. HARTMAN © NATIONAL GEOGRAPHIC SOCIETY

Glaciers grow in the jaws of Mt. Katmai where molten rhyolite bubbled only 51 years ago. Scientists welcome such an opportunity to study the birth and growth patterns of glaciers whose approximate age is known. Volcanic heat far below the lake's bed still keeps the water in Katmai's caldera ice-free all winter.

lay before me to the west. I saw no roads, no buildings, no human touches. I saw no bushes, no trees: There would be no wood for cooking or for comfort. I could see nothing growing.

On my right rose 7,589-foot Mount Griggs, Katmai National Monument's second highest peak, named for the valley's discoverer. (Mount Denison, the tallest, rises to 7,606 feet in the northeast part of the monument.) On my left was Falling Mountain, which lost much of its face when the valley was born; beyond it rose glacier-hung Mount Mageik.

I turned and looked east. Immediately before me was Novarupta's steaming lava plug, some of its rhyolite boulders as large as a big tent. Behind it was a divide.

Out of sight beyond the divide were other volcanoes of the Aleutian Range, part of the volcanic belt that circles the earth: snow-vested Trident Volcano, still fuming from a month-old explosion; and near it Mount Kat-

mai, headless, with a caldera cradling a lake 2½ miles wide (pages 800-01).

My eyes roamed this awesome scenery full circle and came to rest on our distant airplane, perched like a red fly on a huge sandpile. Reluctantly we headed for it; I was visiting Katmai during a brief Senate recess, and there were other parts of the monument to see. Win Parks and his wife Mitzi and Bob Jordan later would return to this area and camp in the valley.

New Eruptions in 1962 and 1963

As pilot Seiler freed the plane from its moorings, he gave us a new picture.

A few weeks earlier, he said, he flew over Mount Katmai and noticed that part of the water in its caldera was seething from thermal activity; perhaps half an acre was involved. A few days after that he landed in the valley to pick up equipment left by volcanologists.

Author's party sits down on a strange landing field, the Valley of Ten Thousand Smokes. Oversized, underinflated tires helped the red-winged Piper Cub stop in a volcanic wilderness, a land gashed, creviced, and denuded of vegetation like a shell-torn battlefield. Two men come toward Baked Mountain, where drifted ash covers snow. To the west looms Buttress Range, between Windy Creek and River Lethe.

Cooking without steam, visitors prepare lunch. Half a century ago they could have boiled eggs over one of the thousands of fumaroles that dotted the valley. Today only about a dozen steaming vents are left (page 819).





Smoldering Lava Plug 1,300 Feet Across Caps the Tomb of Dormant Novarupta

Here in 1912 one of the mightiest eruptions in historic times created the Valley of Ten Thousand Smokes. Steam and hot earth hint at an inferno still bubbling.

From a distance, lava boulders sealing the vent look as small as pebbles, but some approach the size of small houses. On one such boulder Dr. Griggs's partner, C. N. Fenner, inscribed his name in 1921. It is still visible today. Centuries from now, when the soft earth erodes away, the harder plug may form a massive column like Devils Tower, Wyoming.

While Robert Jordan adjusts his camera, Mrs. Parks kneels to investigate a fumarole. In seconds the steam blistered her hand.

Crust breaks under the weight of a man. Near the plug the ooze still smokes.



"Suddenly," Ed told us, "Trident Volcano—next to Katmai—blew up with a big roar, like thunder reverberating from a cloud. Smoke mushroomed up to 20,000 feet—jet-black at first, then gray with puffs of snow-white steam.

"I flew over Mount Katmai a day or two later. The activity had subsided. It's my guess that Katmai and Trident are linked together."

The two continue to make news. This past April another explosion lofted steam clouds to 30,000 feet. Air Force pilots who investigat-



STACHURSKI © NATIONAL GEOGRAPHIC SOCIETY

ed found both Katmai and Trident smoking.

It was time to leave. Ed ran the plane along the valley floor, and he and I were airborne. We flew to the valley's foot and then banked right and coursed north nine miles to land on the Ukak River Delta. He returned for Win and then Bob, and presently all of us stood there—well out of the valley but still within its shadow of death.

The Ukak River drains the Valley of Ten Thousand Smokes. Over the years it has

braided itself into a broad plain where it flows into the Savonoski River. A mile away, where the plain began, was a stark forest of dead trees. Pumice carried from the valley by the Ukak had choked them to death.

We walked to the forest. Half a century ago it had been a spruce woodland. Now the trees were silvered skeletons, bleached sentinels in a shimmering desert of pumice, smooth to the touch (page 802). A few held hawk nests. Beside me, sharply etched in the gritty pum-

ice, I saw the cloven hoofprints of a moose.

A floatplane circled overhead, then skimmed to a landing on the river. We walked back to the delta's point as the plane taxied to shore. John Walatka, Katmai veteran and longtime bush pilot, had come to fly us back to Brooks River Lodge. Ed Seiler would take the wheelplane to the Kulik Lake Airfield.

John supervises the camps at Brooks River and Lake Grosvenor, in the national monument, and three others just outside.* The concessionaire is Northern Consolidated Airlines, which serves the area by daily propjets from Anchorage. Ray Petersen, President of Northern Consolidated, and John Walatka established the camps in May, 1950.

Before John would take us to Brooks River Lodge, however, he had something to show us. He pointed to the river's far shore.

"Alaska brown bear," he said.

These beasts are the largest carnivorous land animals, weighing up to 1,600 pounds. This one looked every bit that large to us.

"Relax," our calm friend told us. "That

bear doesn't want any part of you, either."

True. He detected us almost immediately—bears have an acute sense of smell but poor eyesight—and padded off into a thicket.

"There are plenty of red salmon in the river now," John said. "He'll be back."†

Bears Feast on Red Salmon

As summer wore on, the bears would become sated with salmon, scooping them from the water and taking only one or two bites out of each fish before discarding it. Then wolves, foxes, coyotes, otters, eagles, and ravens would feast.

The salmon run was growing heavier each day. The beautiful silver sockeye were reddening as they returned from the sea to spawn in their native waters. Soon they would die, completing a four- to five-year life span.

We dined that night on salmon at Brooks

*See "Alaska's Warmer Side," by Elsie May Bell Grosvont, NATIONAL GEOGRAPHIC, June, 1956.

†See "When Giant Bears Go Fishing," by Cecil E. Rhode, NATIONAL GEOGRAPHIC, August, 1954.

Alaska Brown Bear, Land's Largest Flesh Eater, Weighs up to 1,600 Pounds

Three times as heavy as a lion, the brown bear stands as much as nine feet high. Despite its great size it usually retreats from humans. Photographer Parks crept within 50 yards of this animal while it slept beside the Savonoski River. Awakened by a plane, the bear rushed toward the hollow where the unarmed Parks crouched. Then it changed course. Meanwhile a wolf came within seven feet of Parks but failed to see him.





BY TETACHROMS (SEPIA) AND REDACHROME BY NATURAL CHROMOPHIC PHOTOGRAPHER WINTFIELD PARKS © N. S. S.

Bald eagle, the national emblem, returns to its nest. Outside of Alaska, only about 5,000 bald eagles are left in the United States.

Homely eaglet protests as photographer climbs to its eyrie. The parents circle overhead. Alaska bald eagles appear to be holding their own.

River Lodge. Cooks Ken and Lydia McLennan spread a bounteous table, and this was the piece de resistance.

"A couple of days here," I had to say, "will undo a month's dieting."

The McLennans beamed.

Some of the world's finest fishing lies but seconds from one's cabin, whether at Brooks River or Lake Grosvenor, which I visited next morning. There, cook Charles Blue specializes in the fluffiest of pastries, the lightest of cakes. After all, rainbow, Dolly Varden, and lake trout and grayling are commonplace on his menu.

Twenty feet from his cook tent the water rushes through the narrows between Lakes Grosvenor and Coville. Young Chuck Petersen, son of the President of Northern Consolidated Airlines, was





casting in the swift water. A deft flick of his rod, and the fly arched far out in the current.

"I'm usually a three-cast man," Chuck said. "Three casts, no fish, I quit. I'm spoiled!"

On his second cast the barbed fly hooked a 3½-pound trout.

I began to understand why so many fishermen return to Katmai's waters. Ray Petersen told me that since 1950, when the camps opened, some 7,500 guests have been accommodated, many of them repeaters.

Over the years, sturdy cedar cabins with running water and bunk beds have been replacing the original canvas-covered frame

King salmon is angler's delight at Brooks River Lodge. Such catches are common.



4804CH0002 © NATIONAL GEOGRAPHIC SOCIETY

cabins. Their construction is a major task, as all equipment, building material, and furnishings must be flown in from Anchorage. Cargo planes must land in winter on the frozen surface of the lake.

Anglers Arm-weary With Success

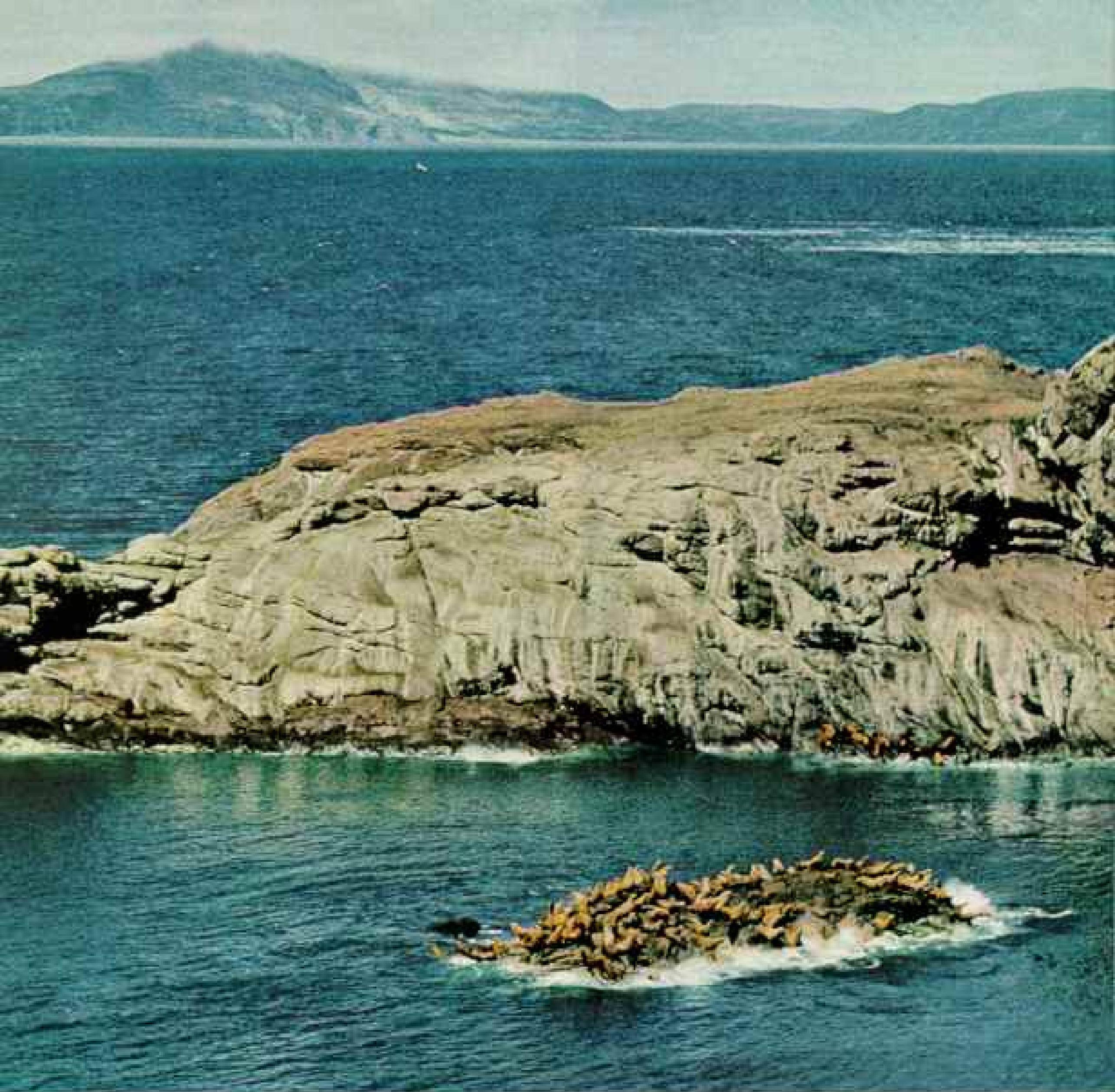
Back at Brooks River Lodge that afternoon, I chatted with fishermen who were so busy landing salmon that they complained of being arm-weary. That night a dozen or so of us sat around the fire talking of the superlative fishing that so small a group of us had all to ourselves. Even if Brooks Lodge had

Bearing a biologist's red tag, a sockeye vaults a cascade more than six feet high.

Anglers hook sockeyes in the Brooks River. To spawn, most salmon return unerringly from the open sea to their home streams. There they rarely eat, but they will sometimes take a fly.

After spawning, the salmon die, completing their four- to five-year life span.





been filled to its 50-visitor capacity, we would still have been a small island of people surrounded by the vast solitude of Katmai. Here was the greatest national park unit of all, and I doubt if there were at that moment 100 human beings in all its length and breadth.

President Wilson was thinking of Katmai's potential as a scenic wonderland when he proclaimed it a national monument in 1918. It was enlarged in 1931 and again in 1942 to protect the moose, bear, red fox, mink, Canada lynx, and other land animals outside the Valley of Ten Thousand Smokes, and the seals, sea lions, and other marine life along the coast of Shelikof Strait.

In addition to the Valley of Ten Thousand Smokes, Katmai National Monument now encompasses a mountain and lake country of unsurpassed beauty and has more than 125 miles of ocean bays,

Steller Sea Lions Cover an Islet in Shelikof Strait off Katmai

When the photo plane's roar became audible, the island changed color as brown sea lions plunged into the sea and exposed the rock beneath. Other seals—dots in the water at far right—also ducked.

Katmai National Monument was enlarged in 1942 to include a coastal wonderland of fjords and peaks.

Alarmed sea lions hit the water to escape the airplane. The Steller weighs up to 2,200 pounds and spans 10 feet from nose to tail.



— PHOTOGRAPHS BY ROBERT P. JORDAN (SEALS) AND WINFIELD PARKS, NATIONAL GEOGRAPHIC STAFF © N.G.S. —





Floatplane takes off from Lake Grosvenor, named for Dr. Gilbert Grosvenor, longtime President and Editor of the National Geographic Society. Swiss anglers cast for trout.

Preview of dinner spreads before guests at Brooks River Lodge as cook Kenneth McLennan hefts two fat salmon. Visitors reach the camp by bush plane from King Salmon and Kulik Lodge.





ARND BRONKHORST © NATIONAL GEOGRAPHIC SOCIETY

fjords, harbors, lagoons, and sharp mountains rising sheer from the water.

Fishing, boating, hiking, and climbing amid beautiful scenery, flights over the volcanic areas—these have been Katmai's major attractions. But I had for some time thought that something was lacking: a trail that would open the sequestered Valley of Ten Thousand Smokes to the sightseer. The lifeless expanses of pumice, the dome of Novarupta, and the other geophysical landmarks on which rampageous nature had engraved its story must, I felt, become accessible.

Wilderness Trail Blazed to Valley

In Washington I had taken the matter up with Conrad L. Wirth, Director of the National Park Service, urging that such a trail be built. Happily, my pleas had registered, and the first eight miles of the 22½-mile trail were now a bumpy reality (map, page 804).

For more than half an hour Project Supervisor Robert L. Davis and I lurched and jolted over the bulldozed ground. His four-wheel-drive station wagon pulled us through deep mud here and hub-deep powdery pumice

there. We drove through dense spruce forest and heavy brush, across marshland and up rugged hills. Mile 8 was coming up—end of trail at that time.

We crested a hill and there was the bulldozer, grading the side of still another incline. Bob Davis braked our sturdy little vehicle, and I opened the door.

"Look out," he called after me.

I walked toward the bulldozer, wondering why he had cautioned me. Then my feet went off in separate directions and I sat down. Hard! The machine had bladed down to last winter's ice—and this was July.

Somewhere along the trail, I understand, there is now a place facetiously called Gruening Lookout!

Ice, Davis told me, contributed to the trail-building problems. Pumice also caused difficulty. A twelve-inch layer of this volcanic ash, deposited when the Valley of Ten Thousand Smokes was created, covers the area. It does not compact easily, and gravel was not readily available for the roadbed.

But the scenery is worth the effort. From Mile 8, I could see miles across Naknek Lake



ILLUSTRATION © NATIONAL GEOGRAPHIC SOCIETY

White pumice beach delights air-ferried picnickers on sky-blue Dakavak Lake

to 3,215-foot Mount La Gorce, named for John Oliver La Gorce, who served the National Geographic Society for 54 years and guided the Society and its magazine as President and Editor from 1954 to 1957. Opposite it rose massive, 4,730-foot Mount Katolimat, guardian of the valley.

The trail, which will be completed in time for this summer's visitors, threads a region rich in wildlife. Spruce grouse come to it to pick up pebbles and to dust themselves, and seldom, I am told, can one travel its length without seeing brown bear, wolf, or moose.

At the end of the trail, on a knoll called Overlook Mountain, the National Park Service has built a 24-by-28-foot building, a sort of visitors' reception center, which affords a magnificent panorama of the valley. Its roof is anchored by 3/8-inch cable as insurance against occasional hurricane-force winds.

Visitors will ride jeeps from Brooks River Lodge to the knoll. A footpath will lead from the overlook building to the Ukak River, approximately 1½ miles away, where visitors

will cross a small bridge. From there, marked trails will direct hikers through the valley, avoiding the deep canyons eroded in the soft volcanic debris, past some of the fumaroles that are still steaming.

Future visitors will be guided by such trails to Novarupta's dome, and to other volcanoes—Mageik, Katmai, Griggs.

Bulldozers and Truck Flown to Katmai

Building the trail itself was difficult, but that was only part of the problem. All equipment and material had to be flown to King Salmon—106,000 pounds of building material alone—plus two bulldozers, a truck, and two four-wheel-drive station wagons.

Since there were no roads then in Katmai National Monument—and the trail is the only one today—all equipment was driven to Brooks River Lodge in winter over lake ice.

That night over coffee at Brooks River Lodge, talk turned to what was described as "Katmai's most scenic part"—the section along Shelikof Strait. Its bays and fiords and

lagoons; its sharp, cloud-draped peaks; its glaciers curving like wide turnpikes through the mountains; its deep valleys and snug harbors—all these were remote and rarely viewed by the tourist.

When I heard about the attractions along Shelikof Strait, I felt a pang. I would be unable to see them, for my time in Katmai was nearly spent. But Win and Mitzi Parks and Bob Jordan promised to tour the area and give me a report.

They chartered an airplane that night, arranging for it by radio. The next noon they took off in Ed Seiler's four-place floatplane.

The first thing they noted, they told me later, was the way the spruce woodland abruptly gave way to open tundra, a hodgepodge of green and brown rock-pitted hills. This was the meeting of two different life zones: the Arctic, characterized by the tundra, and the Hudsonian, with its white spruce forest.

Soon the shafts and peaks of the Aleutian Range became distinct—snow-capped mountains without names; lakes at the foot of some of them, moose standing in one or two of the lakes. Then Shelikof Strait appeared on the horizon and, far beyond, the hazy form of Kodiak Island.

"Want to see sea lions?" Ed Seiler asked. He circled some small brown islands just off the coast, and the rocks changed to a lighter color as the brown animals covering them leaped into the safety of the sea (pages 824-5).

They were cruising along the southeast boundary of the monument now, and Katmai Bay came into view. Here was the six-mile-wide flood plain of the Katmai River. One of the greatest torrents of all time had poured into the sea over this plain.

During the birth of the Valley of Ten Thousand Smokes, part of Mount Katmai fell into the canyon at its foot, damming the Katmai

Solo bather, Senator Gruening enjoys Lake Brooks. He estimated its temperature at 60°

PHOTOGRAPH BY NATIONAL GEOGRAPHIC PHOTOGRAPHER WIRFIELD PARKS © N. G. S.





ADAPTED FROM BY DR. WILBUR L. ARTHUR (1926) AND NATIONAL GEOGRAPHIC PHOTOGRAPHER WINFIELD FRANK © N.G.S.

River. A 905-acre lake, 400 feet deep, was impounded. The dam broke in 1915, and the flood swept down the river valley 15 miles to the sea in one mighty wave. It was ten feet deep and six miles wide when it emptied into Shelikof Strait.

Now the Katmai River was but a few feet wide, a silver ribbon on the golden delta.

Ed Seiler piloted the plane on up the coast and turned inland to land on isolated Dakavak Lake for a picnic lunch on a beautiful wide crescent of white beach (page 828).

Then the four flew over Serpent Tongue Glacier and sighted little-known Kaguyak Volcano, in the northeast part of Katmai National Monument. There was a serene lake in its crater; a small cone rose from the lake.

At two in the afternoon the pilot pointed the plane southwest, and across the monument they flew. As they came down the Savonoski River, they spotted bear tracks in the sand, and then saw the bears themselves—five of them in as many minutes.

They landed on Naknek Lake in front of Brooks River Lodge, their tour finished. I asked them later whether the seacoast of Katmai is really its most scenic section. The answer was one I myself would probably have given: There is no single most scenic area; all of Katmai is superb.

I remember something National Park Service Ranger Dave Bogart, Katmai's ranger-in-charge, said: "Most of our national parks and monuments are known for one feature or



another. In Katmai we have them all—and space to boot. Man doesn't dominate here."

I have often thought that Alaska's greatest potential may be as a vacationland. Those few men and machines breaking trail to the Valley of Ten Thousand Smokes were working, as the National Park Service Act of 1916 specifies, to make the natural wonders of parks and monuments available "... for the enjoyment of future generations."

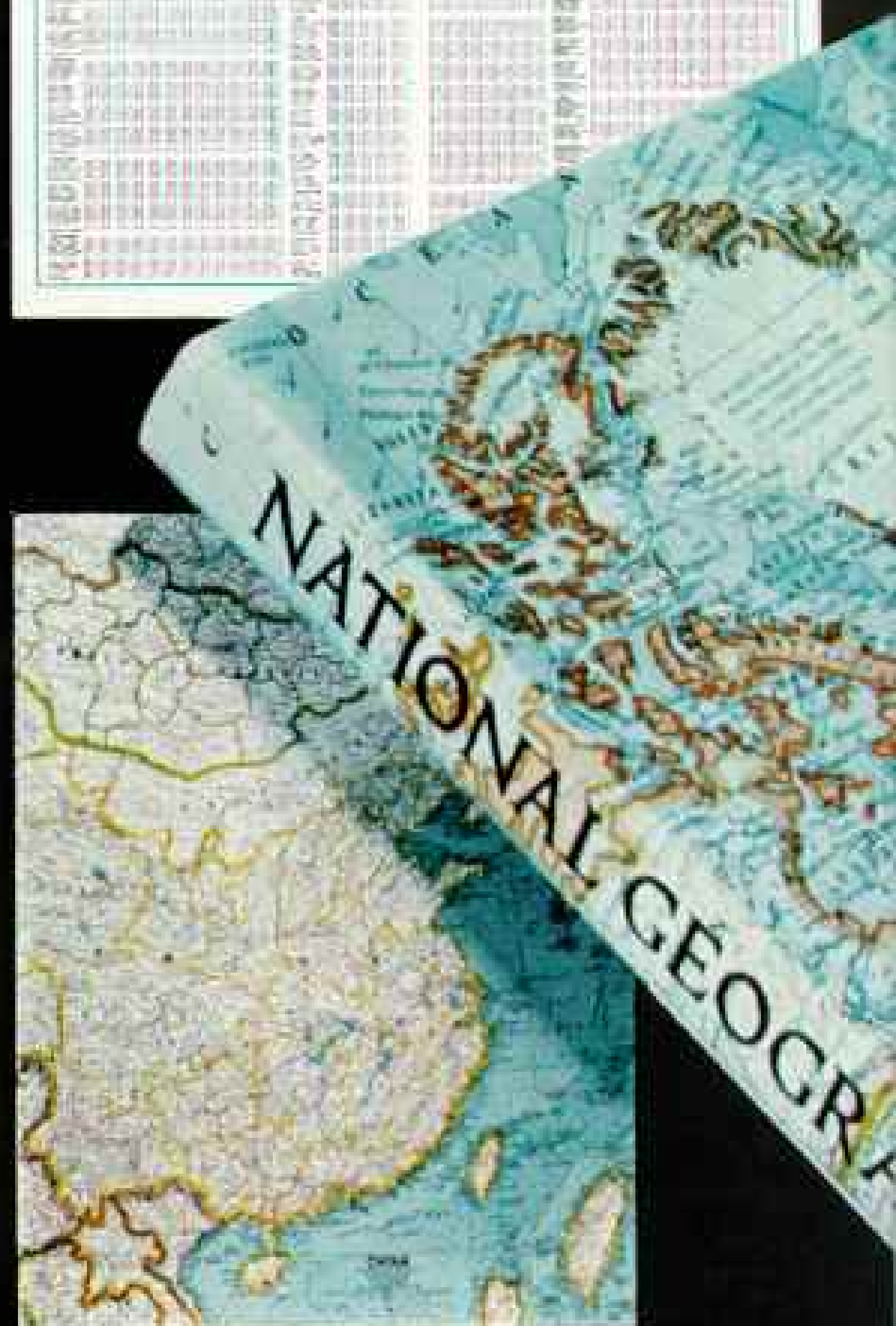
This spring, three state ferries began plying the new Alaska Marine Highway, sailing the calm "Inside Passage" waters on a 44-hour voyage from Prince Rupert, British Columbia, to Haines and Skagway, stopping en route at Ketchikan, Wrangell, Petersburg, Sitka, and at Alaska's capital, Juneau. Each carries 500 passengers and 108 cars. The Marine Highway saves 1,515 miles of driving. From Haines to Anchorage, air jump-off point for Katmai, is a 785-mile drive along the Alaska Highway.

With Katmai National Monument's fabulous Valley of Ten Thousand Smokes now readily accessible, with trim new ferries bringing in more and more tourists, part of Alaska's potential becomes reality. THE END

Canyons carved by streams lace a pumice plain. As visitors thread the new jeep trail to the Valley of Ten Thousand Smokes, this vista will welcome them. Distant Katmai (opposite page, center) rises amid the snow-mantled Aleutian Range.

Katmai's first jeep trail, hucked by bulldozers, links the valley with Brooks River Lodge, 22½ miles away. Visitors will journey in four-wheel-drive jeeps, then take to marked paths that skirt 200-foot canyons.



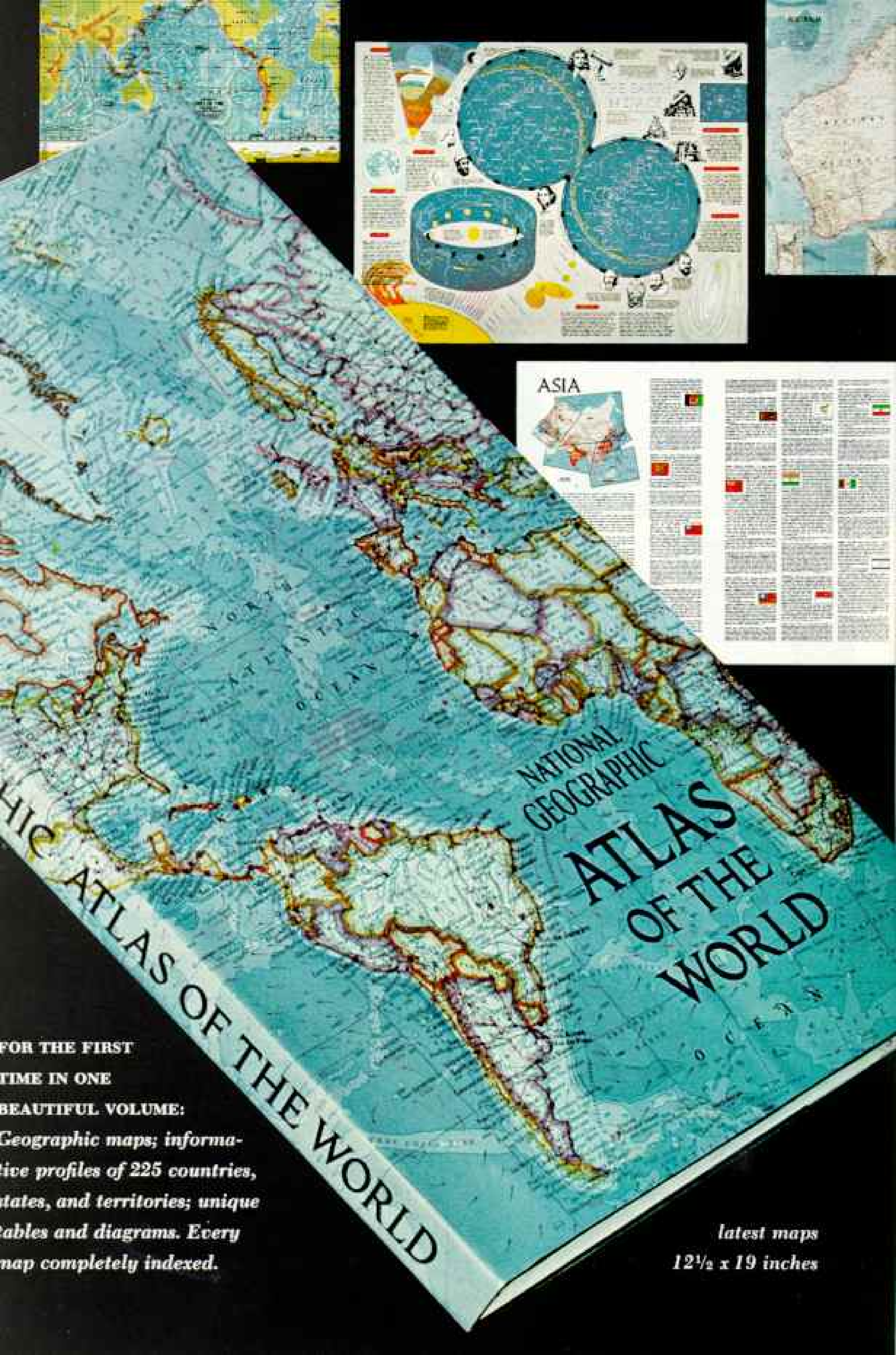


A National Geographic Atlas of the World!

This had been a dream of our Society since its earliest days. What an atlas it could be! We would design it for the layman, the school child and his teacher, the businessman, the military officer, the news editor—and the scientist, too.

It would include a collection of superb National Geographic maps . . . text vignettes of every country . . . a big index to serve as a handy key to 125,000 place names—all combined in a single volume.

The dream was a great one. But to produce such an atlas would be a prodigious job. We would need scores of new map plates. Cartographers



NATIONAL
GEOGRAPHIC
**ATLAS
OF THE
WORLD**

**FOR THE FIRST
TIME IN ONE
BEAUTIFUL VOLUME:**
*Geographic maps; informa-
tive profiles of 225 countries,
states, and territories; unique
tables and diagrams. Every
map completely indexed.*

*latest maps
12½ x 19 inches*



Many steps bring together color and information from eight separate drawings in a finished page for the Society's new *Atlas of the World*. Bending over a sheet of translucent plastic, the cartographer at left inks rivers and shorelines for the North America Map. Artist at lower left adds a place name to the nomenclature sheet. Draftsman below uses tweezers to peel an opaque coating, exposing areas that will appear ocean blue. Technician adjusts four-ton camera at right which photographs a sheet (seen in reverse) showing political boundaries.



would have to map literally the entire world anew. The cost would be enormous.

"Why don't you buy existing plates from other map publishers?" someone suggested. "You could update the old plates the way so many other atlas publishers do."

But such a book could never meet National Geographic Society standards.

New Mapping Concept Stirrs Excitement

So we came up with an original idea. Previously, we had distributed each year four large wall maps as supplements to the NATIONAL GEOGRAPHIC. The series covered the world, but the maps were too big for an atlas. At the same cost, we could send members seven smaller Atlas Maps—25 by 19 inches. In addition, the Society could produce five extra sets of map plates each year to speed up completion of the volume.

Now was just the time for such a project. World War II and a rash of postwar changes had so transformed the geography of our planet that nothing short of a complete

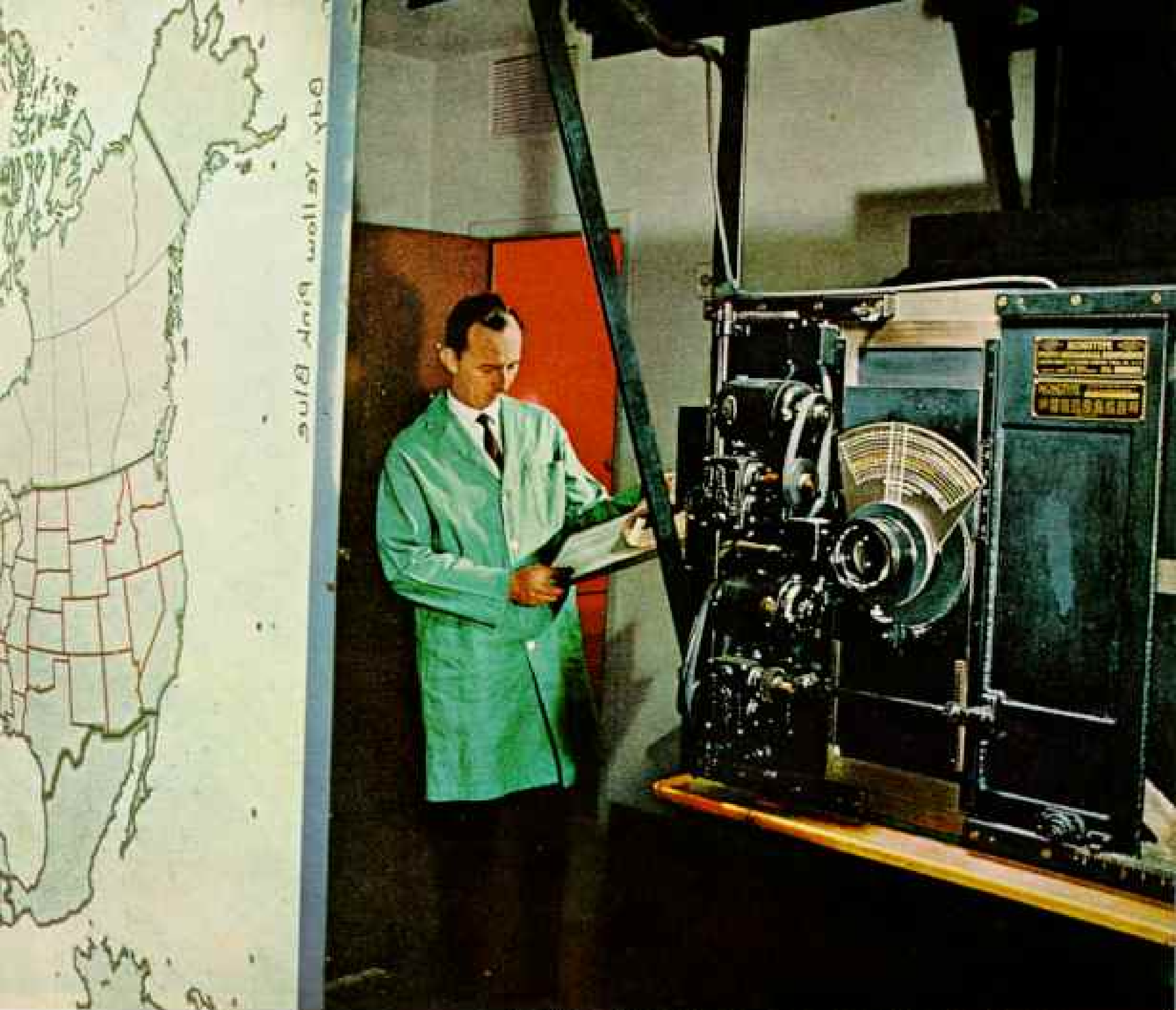
world remapping program would do the job.

On a crisp morning early in 1957, Chief Cartographer James M. Darley and I presented this idea to the Society's Board of Trustees. With us we carried a mock-up of an atlas with rough sketches. We explained that these Atlas Maps could be published and keyed to timely articles in the magazine. The Trustees enthusiastically agreed.

Our cartographers started work. They aimed at an extraordinary production schedule of one map plate each month. New cartographers were recruited and trained; the mapping staff doubled to 65 skilled map makers. The first Atlas Map (Southeastern United States) was mailed to members with the January, 1958, NATIONAL GEOGRAPHIC.

Your enthusiasm overwhelmed us. Letters poured into our mail rooms. "The new size is so handy and convenient," people wrote. "We plan to save every map."

To help members keep the series in an orderly fashion, we devised the Atlas Folio. Almost 270,000 members ordered the Folio;



APPROXIMATED BY NATIONAL GEOGRAPHIC PHOTOGRAPHER G. ANTHONY STEBBY © N.G.S.

whole families began the hobby of map collecting, pasting in each Atlas Map as it arrived. They are still doing it; the Southwest Asia Map included with the May, 1963, issue is the 38th in the continuing series.

Since the first Atlas Map appeared, some 2½ million new members have joined our Society. From them and many others we have been receiving insistent inquiries as to how soon they could acquire a complete atlas for themselves or for gifts. The answer is *now*.

The **National Geographic Atlas of the World** is the biggest project ever attempted by your Society. Never before have we gathered so much geographic information into a single publication. Our goal was to produce the one most useful atlas in the whole world. I think we have succeeded.

Lowell Thomas, the veteran broadcaster and explorer, called this Atlas "an answer to every traveler's dream; an Atlas that not only provides the finest maps available, but puts at your finger tips all the information necessary for planning a trip—and enjoying it!"

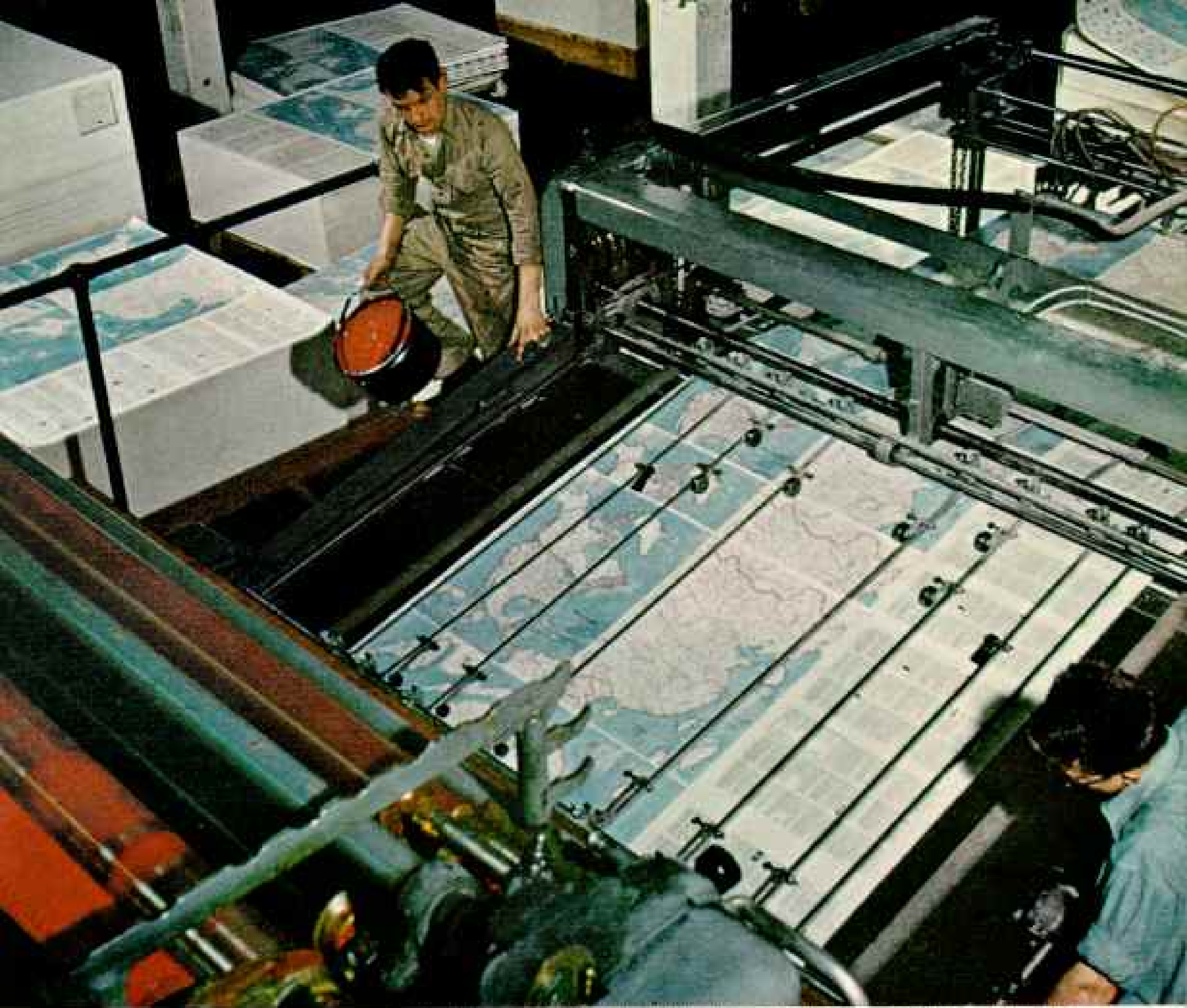
Your Society cartographers have revised every chart in the Atlas Series—and added some 37 pages of maps still undistributed as supplements. We have prepared 36 pages of informative text. And most important, we have indexed this monumental work so that it can take its place among the great reference works of world cartography.

"How can a layman judge the worth of an atlas?" people often ask me. One criterion, geographers agree, is the scope of its index. The 127,071 names in ours make it by far the most detailed in any American world atlas.

Maps Chart Ocean Currents and Winds

Every map and page of our new Atlas reflects the latest geographic discoveries. For usefulness, for accuracy, and for timeliness, we feel that no existing atlas can exceed the Society's great new volume.

Many cartographers take a relaxed view of oceanography and are content to color the seas a uniform blue. But our Atlas is different. We fill the oceans with surface currents, pre-



PHOTOGRAPHS BY NATIONAL GEOGRAPHIC PHOTOGRAPHERS E. ANTHONY STEWART AND JOHN E. FLETCHER © N.G.S.

Coloring a continent, a new offset press at A. Hoen & Company in Baltimore, Maryland, prints twelve pages at a time. Here the North America Map (pages 834-5) will make two passes through the press, producing 11 colors under rigid quality controls.

vailing winds, and underwater features as well as depth soundings.

Says Capt. Jacques-Yves Cousteau, Director of Monaco's Oceanographic Museum: "In the past, *Calypso* oceanographic expeditions have carried National Geographic sheet maps as our favorites for the big picture of ocean areas; now we have this magnificent collection in a single volume. . . . The ocean charts

alone . . . make this Atlas a superior one."

A wise man once observed that "a good map carries more information per square inch than any other printed medium." He was quite right. But few people realize how exciting maps can be to read.

How many deep-sea adventures are represented on these Atlas Maps! You recall the drifting ice island T-3: Its Arctic course is shown since 1947. This floating research base was lost to science for months when it grounded in shoal waters off Alaska in 1960.

Island's Hidden Twin Revealed

You can locate missile ranges, great-circle routes for airliners, and even newly discovered ocean currents making cartographic debuts.

Find the lonely island of St. Helena, Napoleon's last home, and nearby you see that, geographically speaking, St. Helena is not isolated at all. It has a twin, a towering

Demand for the National Geographic Atlas of the World has been building for years! Order now to be sure of obtaining yours. . . request later billing, if desired. **Standard edition:** Flexible, leather-grained plastic cover—\$18.75. **Deluxe edition:** Hard-bound in striking cloth cover with matching slipcase—\$24.50. Please specify name to be stamped in gold on cover. Available only from National Geographic Society, Dept. 88, Washington 6, D. C.

seamount only 85 fathoms below the surface.

Your new Atlas uses conventional mapping symbols, but we have added new ones. With them, you can find the Arctic tree line and the DEW line. You can follow warm and cold currents and trade winds, identify coral reefs. You almost feel the balmy breezes of a tropic isle when you study the South Pacific.

Even the end papers carry information: A sky chart locates earth in space; great geographers and their discoveries are pictured. Common map projections are explained; readers see how cartographers depict the round earth on flat paper.

Special tables aid the traveler. For example, if you plan a July visit to Quito, Ecuador, on the Equator, you can find that the average daily low temperature is a coolish 44° F. You definitely need a topcoat.

The text of the Atlas gives bright vignettes of every independent country in the world, with reference facts on area, population, religion, language, resources.

How many world problems the Atlas explains! Consider the sprawling mass of Asia with 29 percent of the world's land. Yet only one-tenth of Asia is fit for the plow—and the continental population increases by *32 million people a year*.

The text gives the facts *behind* the maps. For instance, maps show the great Siberian rivers called the Lena, the Ob', and the Yenisey emptying into the Arctic Ocean. But the text adds the information that spring warmth "thaws their middle courses earlier than their ice-blocked mouths, flooding huge stretches of plain and forest."

This unique Atlas clarifies such things as the difference between the island peoples of Polynesia, Micronesia, and Melanesia. And the rainfall on Canada's Pacific Coast takes on new meaning when we read that well-watered fir trees grow bark as much as a foot thick.

Flags of All Nations, Even 30 Newest

We look up facts about ocean tides, and we find that solar and lunar attractions "make continents bulge as much as six inches" and "people gain and lose a fraction of an ounce."

With every country's biography, its flag is printed in full color—even Yemen's newly adopted flag, and flags of the 30 nations that have become independent since 1957.

"During the days of Hitler's rampages, we had difficulty keeping maps up to date," Chief Cartographer Darley told me. "But recent independence has brought map changes far faster than Hitler."

Jim Darley knows his changing maps. He



STYLING BY ROBERT S. DAVIS © N.G.S.

Deluxe edition of the Society's Atlas of the World includes matching slipcase and gold-stamped lettering with owner's name. Standard edition (page 833) has flexible cover.

has worked in cartography since 1914. During World War I, he helped pioneer aerial mapping at the headquarters of Gen. John J. Pershing. Lives depended on his accuracy. The same devotion to accuracy has marked his 42 years with the National Geographic Society. For the Atlas project alone, Jim Darley and his cartographic staff have logged more than one and a half centuries of man-hours!

We paid particular attention to binding. Mechanical tumbling tests made on hard and flexible covers assured durability. So that all double-page maps could be opened flat, we insisted upon a new type of "perfect binding." But thanks to wide interest and a large printing order, we can offer the volume at a price within the reach of every member.

Now this large and careful task is finished. Our Atlas is ready for history's next exciting move. When future headlines suddenly spell out an unfamiliar border town in the Himalayas, or an obscure bay in Cuba, or a back road in Togo or Viet Nam—these great maps already have the details.

Never has the need for a complete atlas been greater. To fill that need, we offer the National Geographic Atlas of the World.

Melville Bell Grosvenor

Escorting Mona Lisa to America

BY EDWARD T. FOLLIARD

When the world's most famous portrait visited the United States, a 28-year dream came true for this veteran White House reporter of the Washington Post

PARIS WAS in a ferment the day I arrived, and I had had something to do with it. One of the most beautiful and best-loved ladies in the city was about to leave on a long ocean voyage—not a thing for Parisians to take lightly.

The lady was Leonardo da Vinci's masterpiece, the Mona Lisa, most famous portrait ever painted. Though her beauty was undimmed by age, it was undeniable that she was more than 450 years old and therefore fragile. The Paris newspaper *Le Figaro* protested that the trip might ruin her, and a radio commentator warned that "American gangsters might kidnap her."

Lady of the Louvre Sails West

But by midweek it became official. "The French Government," a communique announced, "is confiding the painting of Leonardo da Vinci, the Mona Lisa, to the President of the United States for several weeks." For me, the hope of half a lifetime was being realized.

You may wonder what interest a Washington newspaper reporter who usually covers the White House could possibly have in the Mona Lisa coming to Washington. The story, and the interest, began 28 years ago, when Andrew W. Mellon, former Secretary of the Treasury and one of the world's richest men, told me of his plan to build a magnificent art gallery for the Nation.

His vision came true in only seven years. It became the beautiful National Gallery of Art in Washington, D. C.

Mine took longer: I yearned for the day when great art from foreign museums would be shown in our National Gallery—specifically and particularly the Mona Lisa.

This became almost an obsession with me, and in 1948—after the famous German collection of works by Rembrandt, Rubens,

Raphael, and Titian had been exhibited in Washington—I wrote to my friend Henri Bonnet, the French Ambassador, to ask if we could borrow the Mona Lisa. The ambassador could give me no encouragement.

Fourteen years later I was still trying. On May 11, 1962, André Malraux, French Minister of Cultural Affairs, was guest of honor at an Overseas Writers luncheon in Washington, and I asked him the same question. He did give me encouragement, a lot of it.

President and Mrs. John F. Kennedy had exhibited an almost unprecedented interest in the cultural life of the country. The great influence of the White House was on my side.

And now at last, after eight months of negotiations between Washington and Paris, not only was Mona Lisa coming to America, but I was in Paris to be one of her escorts and to cover her trip as I usually cover the travels of Presidents.

Officials of the French Line arranged for the great lady to travel on the *France*, in first-class cabin M-79. The adjoining cabins were assigned to around-the-clock guards and principal officials sent with her—Jean Chatelain, Director of French Museums, and Maurice Serullaz, Curator of the Louvre.

I had cabin M-120, not very far away. The first evening, after talks with M. Chatelain and M. Serullaz, I wirelessly a dispatch that the masterpiece was finally on the way. Then, looking ahead, I realized that I had a problem. My editors had asked me to wireless a

Leonardo da Vinci's Mona Lisa remains "the subtlest homage that genius has ever paid to a once living face," in the words of André Malraux. Wrote Walter Pater: "Perhaps of all ancient pictures time has chilled it least."





Plastic foam cushions Mona Lisa as she descends into a packing case at the Louvre. "Confided" by the French Government to President Kennedy, Leonardo da Vinci's 4½-century-old masterpiece left Paris for its visit to the United States on December 14, 1962, and returned to the Louvre on March 12, 1963.

Airtight aluminum box (below) holds the portrait immovable in grooved polystyrene. Slab in a workman's hand will fit below the lid. Anxious officials at the Louvre keep watch.

**Liner *France*, Portrait Aboard,
Heads Out of Le Havre in a Fog**

On the Atlantic, relays of French guards watch the precious cargo in a passenger cabin. Braces protect it against rolling seas.

Customs inspectors in New York affix a sticker to the shipment and pass it without examination.

AP/WIDE





AN ILLUSTRATION BY RAY LAWSON



REAR: ILLUSTRATIONS BY NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT F. VIGOR © N.G.S.

story a day from the liner. Fine—but what was I to write for the next four days?

The heroine of the story was in her air-conditioned crate in M-79; Messrs. Chatelain and Serullaz had told me all they were going to tell me, and so there I was, a newspaper reporter with nothing to report.

"What am I going to do?" I mused. "Dream up something?"

Suddenly I was humming the refrain of an old song: "I'll See You In My Dreams." Not a bad idea, I thought. I would see Mona Lisa in my dreams and so have something to write about.

That night, dinner began with caviar and progressed through a series of elaborate courses which undoubtedly helped me dream. In fantasy, I wandered into M-79 to pay my respects to the lady. Mona Lisa, of course, has learned lots of languages from the millions of travelers who have gazed at her over the centuries.

"Shall I address you as Signora or Madame?" I asked, bowing as I imagined a Versailles courtier would have done.

Lisa could not have been more cordial. She had somehow escaped from her crate and stood leaning against the starboard wall.

"In the beginning, when dear Leonardo painted me in Florence," she said, "you would have called me Signora. But I have spent the last 446 years in France—that is, except for the time I was stolen in 1911 and retrieved in Italy two years later. Therefore, I suppose you should address me as Madame. But why don't you just call me Lisa?"

"*Merci*," I said, thrilled by my progress. "My name is Edward, or as the French say, Edouard. Now for some questions."

I asked the big one first.

"Lisa," I said, "people have been speculating for centuries about your smile. They have described it as enigmatic, mysterious, baffling, and so on. You have a chance to help me scoop the



KOUACHEDZI BY NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT F. SIESEN © N.G.S.

world. Tell me, please, just what does that smile mean?"

A long silence and a continued exposure to that same enigmatic, mysterious, and baffling smile made it evident that I'd get nowhere with that question. Lisa firmly but graciously steered the conversation to her life in Florence at the peak of the Renaissance.

"Let's see," I said. "You would have been about 13 when Columbus sailed across the Atlantic and made his great discovery. Was there much talk about this in Florence?"

"No, not at the time," Lisa said, explaining that news traveled slowly in those days. "But you do know, don't you, Edouard, that your part of the world got its name from one of my townsmen, Amerigo Vespucci?"

Lisa then told me her own life story. Deliberately, I thought, she ignored the controversy that surrounds nearly every facet of her history. Had four centuries dimmed her memories, or was she simplifying for me?

Her maiden name, she said, was Lisa Gherardini, and she came from an undistinguished family that could not provide her with a dowry. When she was 16, it was arranged for her to marry Francesco del Giocondo.

"He was rich, twice a widower, and 20 years older than I," Lisa said. "My married name, Giocondo, explains why I am variously referred to as Madonna Lisa—Mona Lisa, for short—and La Gioconda. The French call me La Joconde."

Lisa was 24, and had suffered the loss of her only child, a girl, when her husband commissioned Leonardo da Vinci to paint her. This was in 1503, when Leonardo was 51. He was already famous, and destined to be immortal if only because of one painting—"The Last Supper."

Lisa sat for Leonardo for at least three years—1503-06. She would come to his studio late in the day, when the light is soft and, as Leonardo observed, "gives most grace to faces."

As the master painted on the wooden panel, he had musicians and readers in the studio, so that there would be melody and poetry while she sat with folded hands.

The famous lady called my attention to a comment of Leonardo's recent biographer, Antonina Vallentin—that in the Renaissance period people liked "slender women with girlish faces poised on long, slim necks."

This same writer described La Gioconda as "robust" and "well-developed," but in a later paragraph added:

"And yet this thoroughly bourgeois woman, ripened and not very happy and not particularly unhappy, had been able to fascinate Leonardo more than any other woman he met in all his life."

Perhaps this was one reason Leonardo never turned the painting over to Lisa's husband, but carried it wherever he went—to Milan, to Rome, and then across the Alps to France, claiming that it was not yet finished. He settled in France in 1516, at the invitation of King Francis I, in the Château de Cloux, near the king's palace at Amboise. Leonardo had suffered a severe stroke and did not have long to live. He wrote his will on Easter Eve, and died May 2, 1519.

Leonardo Sold Lisa, but Never Delivered

King Francis I is reported to have paid Leonardo 4,000 gold crowns for the Mona Lisa, but even he did not get immediate possession. The master kept the painting hanging on a wall of his chateau to the day he died.

Thereafter La Gioconda belonged to Francis I and to the kings and emperors who fol-

lowed him. She dwelt at Fontainebleau, at Versailles, and at the Tuileries, where in 1800 she adorned Napoleon's bedroom wall. Fittingly enough, she has hung in the Louvre next to a Titian portrait of Francis I.

Before docking in New York, I dreamed up another chat with my friend. What did she think, I asked, about all the fuss in Paris over her trip to the United States. One commentator had said: "You don't ask a beautiful woman to come to you—you go to see her."

"That was very kind, Edouard," she replied, "but why shouldn't I go to your country? Over the years, millions of Americans have come to see me. Not only American tourists, but also your brave doughboys of the First World War and your GI's of the Second. So I say, why should I not go to Washington? I think I owe the Americans a visit."

Sometime later I almost suspected that the brilliant André Malraux also had communed with Lisa in a dream. In moving words he expressed a similar thought.

This was after the Mona Lisa had been ushered through customs in New York with her entourage and escorted to Washington. She traveled in regal style, in a black van guarded by a Secret Service detail.

Butter - and - sugar masterwork by ship's baker causes merriment as the *France* arrives at New York. Hand on true picture's case, John Walker, Director of the National Gallery of Art, Washington, D. C., takes custody of Mona Lisa from Jean Chatelain (center right), Director of French Museums.

Stevedores Muscle the Portrait Ashore

Secret Service agents shepherd the coffer along a red carpet in New York. Save for a kidnaping in 1911 by an Italian workman who thought the masterpiece belonged in Italy, Mona Lisa is making her first trip outside France since Leonardo brought her to the court of Francis I in 1516.





BY IYALHPOMI (LADIES) AND KADICKORRE BY ROBERT F. FISHER © N.Y.C.

Air-conditioned Truck Bears Mona to Capital

En route from New York, Leonardo's lady stops for no red lights. Her guardians find the Lincoln Tunnel cleared of traffic; they breeze past toll booths.

Author Folliard lunches as the caravan stops for gasoline. He tells Secret Service man John Campion, "France asked us to treat Lisa like a sovereign, and we are."

Mr. Folliard won the coveted Pulitzer Prize for national reporting in 1947.

Escorted by state troopers, her seven-car motorcade rolled serenely through New York's Lincoln Tunnel and the Baltimore Harbor Tunnel, both cleared of traffic. The Lady of the Louvre ignored red traffic lights during her 236-mile journey.

It was at the inaugural ceremony in the National Gallery of Art, Smithsonian Institution, on January 8 that Minister Malraux turned to President Kennedy and said:

"There has been talk of the risks this painting took by leaving the Louvre. They are real, though exaggerated. But the risks taken by the boys who landed one day in Normandy—to say nothing of those who had preceded them twenty-five years before—were much more certain. To the humblest among them, who may be listening to me now, I want to say, without raising my voice, that the masterpiece to which you are paying historic homage this evening, Mr. President, is a painting which he has saved."

In one of our dream talks aboard ship, Lisa had shown a little apprehension. She was worried, I gathered, that she might seem old-fashioned and out of style alongside Mrs. Jacqueline Kennedy and some of the other elegant ladies at the inaugural ceremony.

I think President Kennedy and Minister Malraux took care of that.

"Other illustrious portraits can be compared to this one," said M. Malraux. "But every year a few poor deluded women think they are Mona Lisa, yet not one ever thinks she is a figure by Raphael, by Titian, or by Rembrandt. When the liner *France* left Le Havre, among usual bouquets sent aboard for the living lady passengers, one bore a card, unsigned, that read, 'For Mona Lisa' . . .



"Leonardo gave to woman's soul that idealization which Greece had given to her features. The mortal being with the divine gaze triumphs over the sightless goddesses."

In expressing the Nation's thanks, President Kennedy said:

"At the same time that the creator of this painting was opening up such a wide new world to Western civilization, his fellow countryman from Italy, Columbus, was opening up a new world to a new civilization. The life of this painting here before us tonight spans the entire life of that new world. We citizens of nations unborn at the time of its creation are among the inheritors and protectors of the ideals which gave it birth.

"Leonardo da Vinci was not only an artist and a sculptor, an architect and a scientist, but a military engineer, an occupation which

he pursued, he tells us, in order to preserve the chief gift of nature, which is liberty. In this belief he expresses the most profound premises of our own two nations."

Mona Lisa occupied her place of honor in the National Gallery for 27 days, and 674,000 Washingtonians and others came to pay their respects. In about the same time in New York's Metropolitan Museum of Art more than a million people looked upon her famous smile.

An occasional visitor expressed disappointment. "What's all the fuss about?" demanded one. "It's just a woman smirking." But far more typical were the reactions of the thousands who found Mona Lisa "delightful," "thrilling," "enchanted." Said a Washington cab driver who came to see her:

"She's still packing 'em in after 400 years. Some babe!"

Visit Stirred New Interest in Art

John Walker, Director of the National Gallery, who accompanied her back to Paris, pointed out that more people came to see this painting than had ever attended a football game, a prize fight, or a World Series.

"But the important thing is not how many people were attracted to her," he commented, "but that she acted as a catalytic agent. Her visit caused an esthetic explosion in the minds of many of those who saw her.



Car lights aglow, the entourage rolls up to the National Gallery on a dull December afternoon.

Guard keeps TV vigil over a treasure locked behind the triple doors of an air-conditioned vault.

PHOTOGRAPH BY (CLOCKWISE FROM LEFT) NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT F. SIEGHEM © N. G. S.

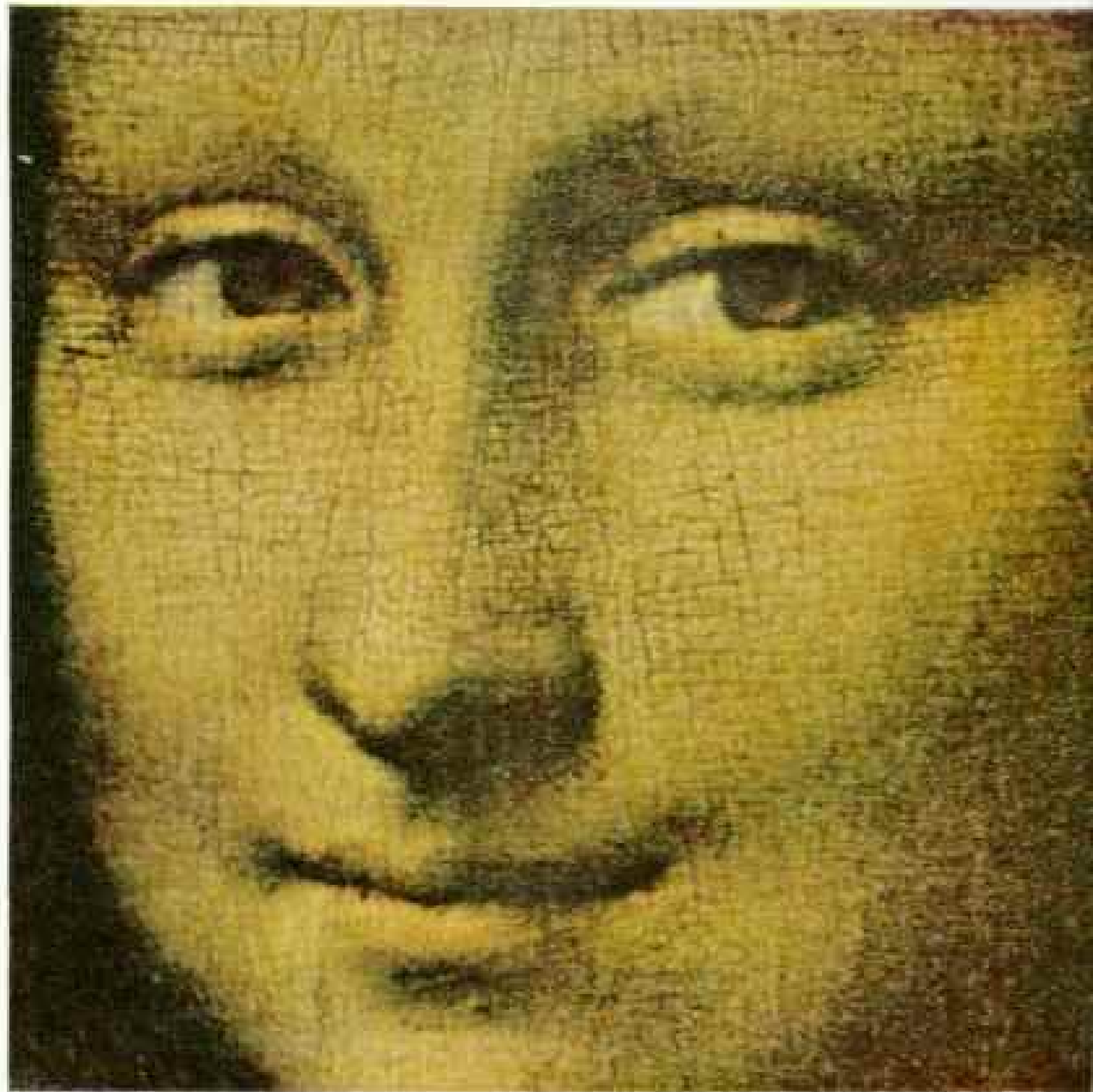




White-capped Marine honor guard flanks a presence that British art critic Walter Pater called "expressive of what in the ways of a thousand years men had come to desire." Viewers move in hushed awe, though no sign reads "Quiet." National Gallery welcomed 674,000 visitors in 27 days—more than half the normal attendance for an entire year.

First-nighters include Mrs. John F. Kennedy, French Cultural Minister André Malraux (front), Mme Malraux (left), French Ambassador Hervé Alphand, and Mme Alphand.

President Kennedy expresses his Nation's thanks to France on the exhibition's opening night. Mona Lisa stopped in New York's Metropolitan Museum of Art on her way home. In 26 days there she was seen by more than a million people.



LEONARDO DA VINCI © R.A.S.

Unfathomable smile has puzzled 15 generations of art lovers, who have called it "living flesh," "that subtle expression," and the "smile that does not smile." This detail is shown actual size.



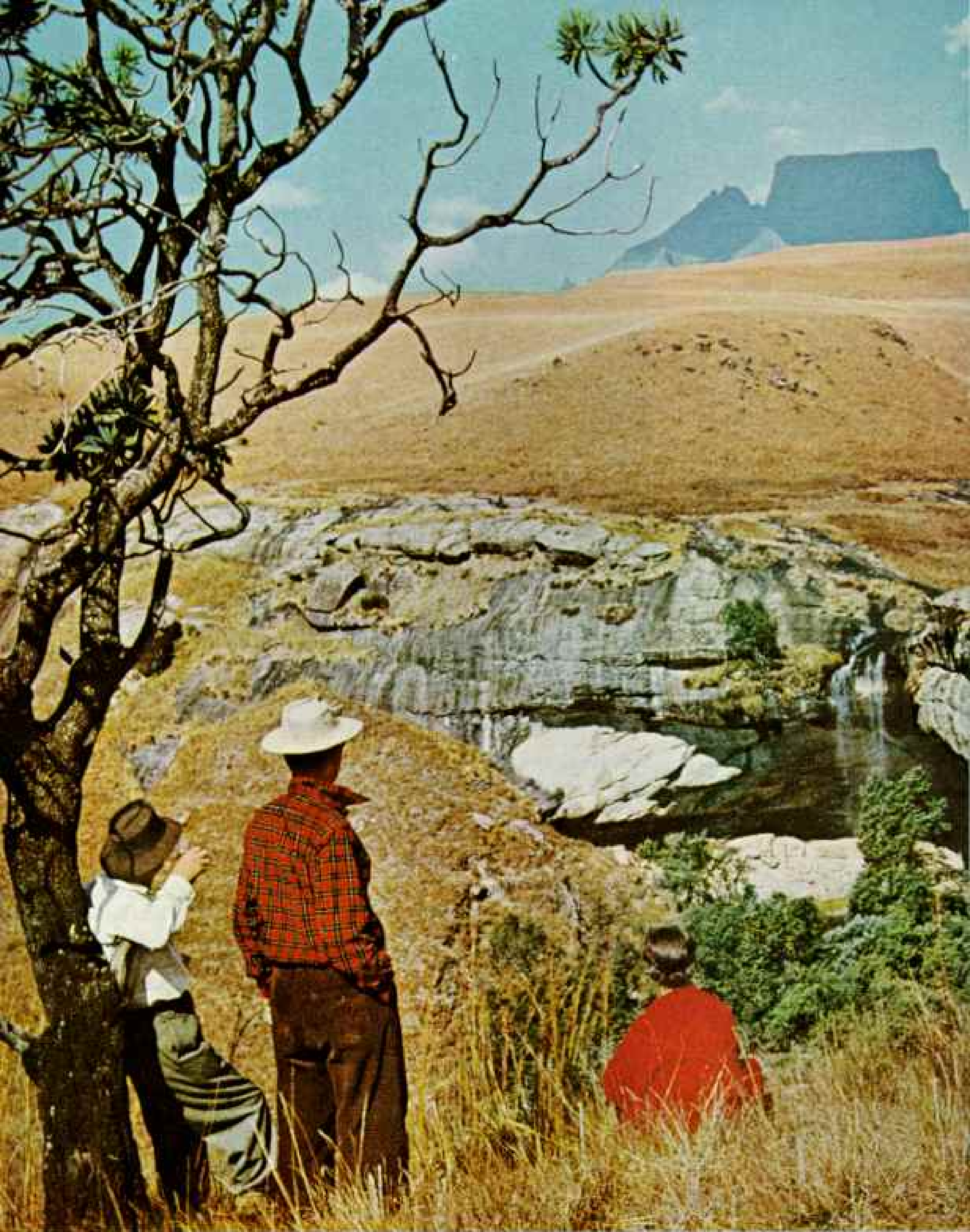
"Perhaps some of them came because of the publicity that surrounded the visit, but I roamed through other sections of the National Gallery while the Mona Lisa was in Washington, and found those areas packed with visitors who had come to see one picture and had stayed to see the whole collection. They must have gained something from that; since the Mona Lisa has left, our attendance has been unusually high.

"People came to see the Mona Lisa because they knew she represented a peak of artistic achievement, a summit of human creativity. Perhaps afterward they felt they shared a little in Leonardo's genius.

"This great painting stirred some impulse toward beauty in human beings who may never have felt that impulse before."

After such a compliment, there should be a trace of satisfaction in the smile as Mona Lisa relaxes once again in her old home at the Louvre.

THE END



Africa's Bushman

By ALFRED FRIENDLY

Photographs by ALEX R. WILLCOX



ESTERHUYSEN © NATURAL GEOGRAPHY MAGAZINE

In Natal's Drakensberg, water trickles over the lip of Eland Cave, one of thousands of lofty rock shelters where African Bushmen painted stories on stone.

Lively rheboks—a species of antelope—and a hunter with stick on shoulder survive the elements on a sandstone wall of the Xen Stream Shelter in Natal.



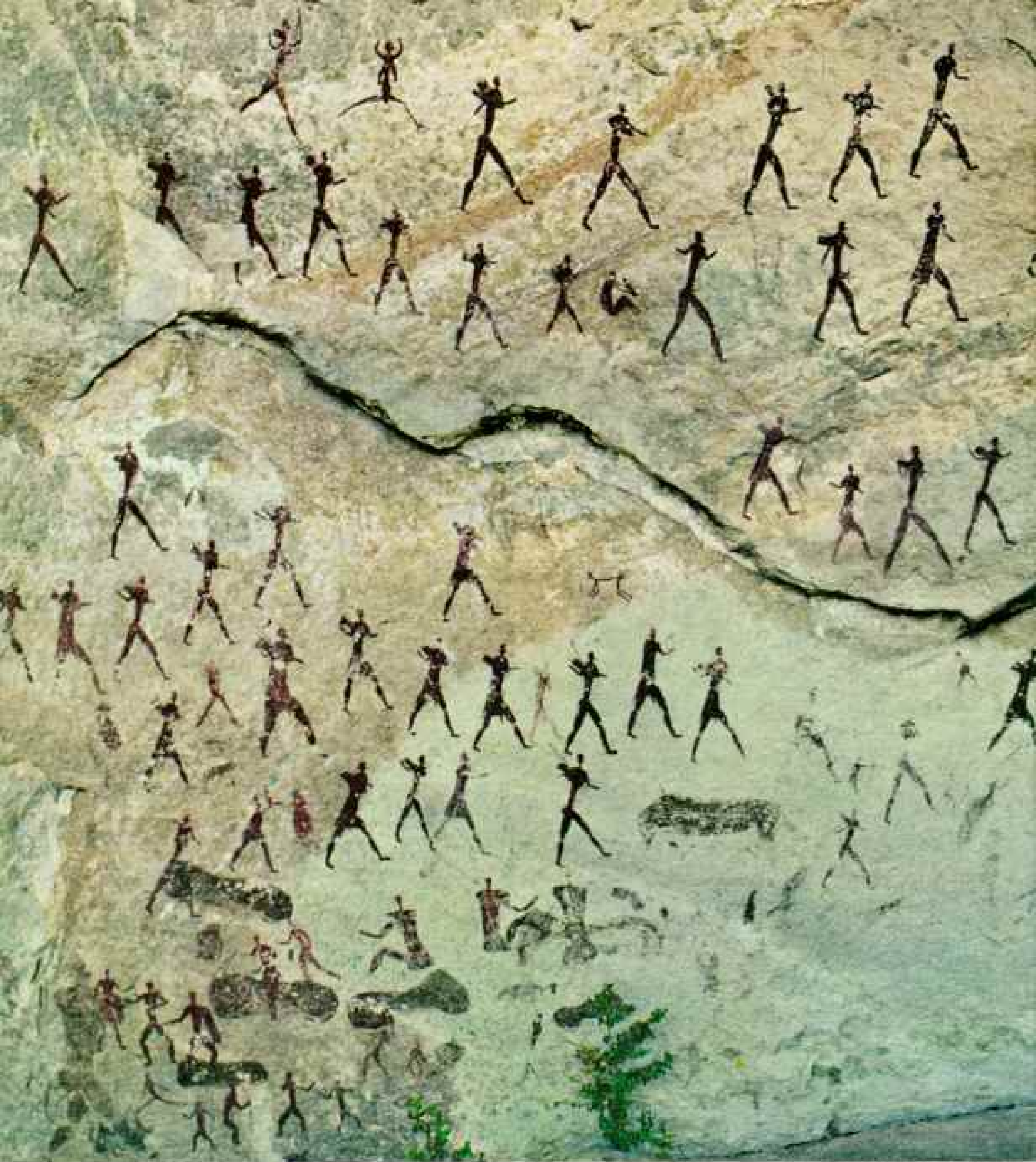
IMAGINE AN ART GALLERY that stretches over a fourth of a continent. Imagine that gallery filled with thousands upon thousands of exhibits, each one a gem or a collection of gems, displayed against a natural backdrop of mountain, valley, or broad savannah.

Such is the gallery of Bushman paintings in Africa, fabulous and infinitely rewarding to the observer, whether art lover, naturalist, archeologist, or mere sightseer. It begins in Tanganyika and stretches down the eastern side of the continent to the Cape of Good Hope Province, then northward up the west side of Africa (map, page 851).

For his canvas the Bushman artist had stone; his paintings were murals on the walls of his rock shelters, where centuries of wind and water had carved out retreats. Most are only a few yards long and a few feet deep,

Art Treasures

Remote rock shelters preserve a rich legacy of primitive paintings



RODACHROME BY KUP BOEL, NATIONAL GEOGRAPHIC

Bushmen parade on walls of Sani Pass. Standing hunters bear quivers of arrows; other men sit

under a protective overhang. In these *abris*, or shelters, protected from the worst of wind and weather, the Bushmen made their lodgings. Thence they watched for game below them; thither they carried back their kill. There they feasted or starved, made weapons and tools, wrought their magic, played their music, recounted their stories, loved, lived, and died. And against the back walls of the shelters, wherever the space was smooth

enough to invite their tiny brushes, they painted their endless paintings.

The artist's models were those things he knew best: himself and his people, their dances and magic, their religion, enemies, and battles. But his favorite subjects were wild animals and the hunt, the never-ending chase for meat, which was for the Bushman the focal point of his life.

The paintings range from life-size repre-



beside kills.

localities, I had the good fortune to see a dozen or so. The visit fulfilled a dream cherished for several years, a dream that was born from passing—and tantalizing—references to Bushman painting in books about prehistoric art that survives in European caves. A tour of Lascaux, France, and several other of the

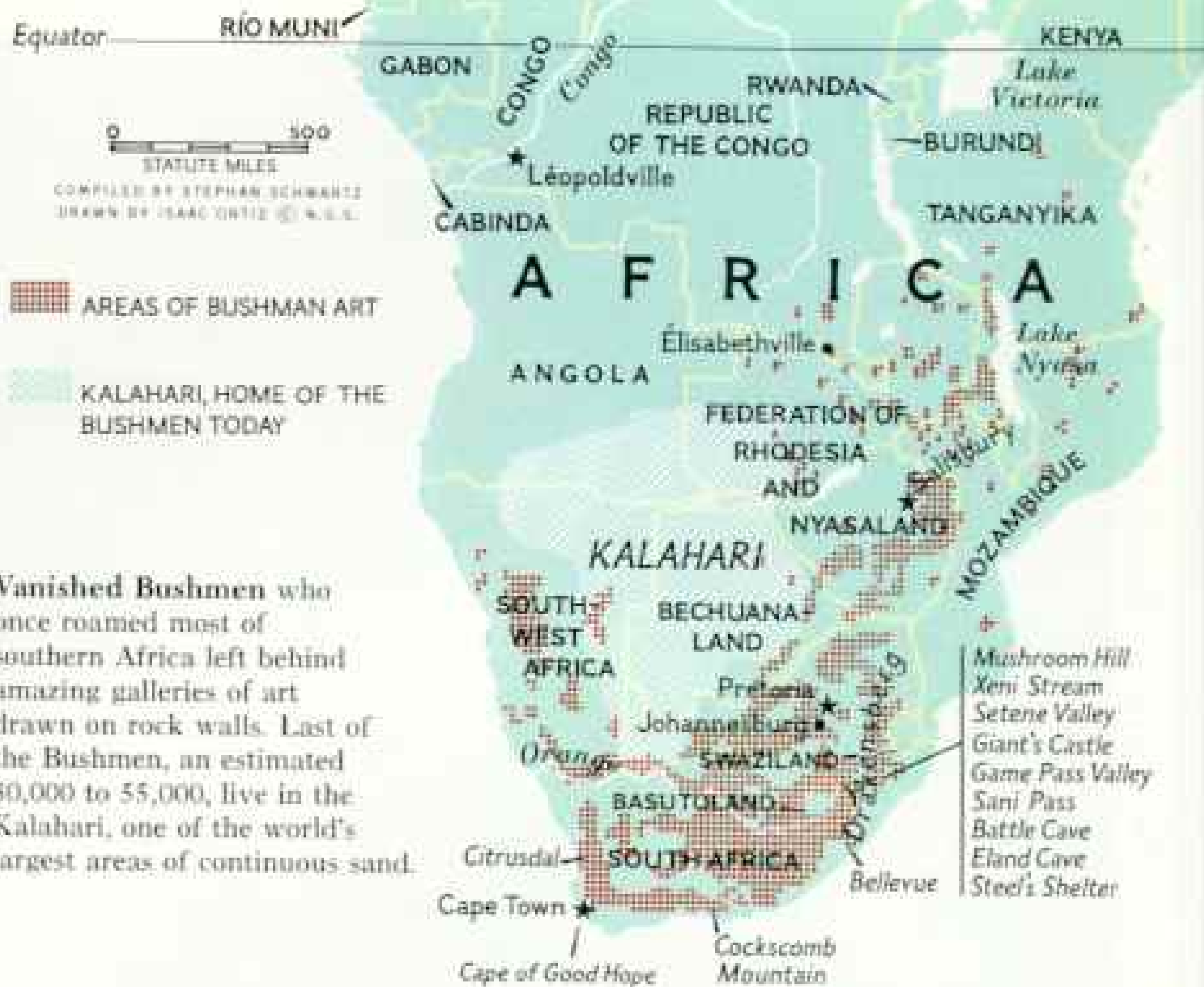
*For a vivid description of these prehistoric murals, see "Lascaux Cave, Cradle of World Art," by Norbert Casteret, NATIONAL GEOGRAPHIC, December, 1948.

Vanished Bushmen who once roamed most of southern Africa left behind amazing galleries of art drawn on rock walls. Last of the Bushmen, an estimated 30,000 to 55,000, live in the Kalahari, one of the world's largest areas of continuous sand.

presentations to—more often—little figures only inches high. The animals portrayed encompass almost the entire African fauna known to the Bushmen: elephants, giraffes, felines, serpents, birds, fish, and the Bushmen's principal diet—rhebok, eland, springbok, hartebeest.

The paintings are, if not countless, then at least uncounted. Anywhere from one or two to several score figures adorn each site, and more than 2,000 sites have been logged in the Republic of South Africa alone. Many more doubtless await discovery.

Of these thousands of localities, I had the good fortune to see a dozen or so. The visit fulfilled a dream cherished for several years, a dream that was born from passing—and tantalizing—references to Bushman painting in books about prehistoric art that survives in European caves. A tour of Lascaux, France, and several other of the



magnificent painted caves of the Dordogne had infected my wife and me with a happy but incurable passion for Old Stone Age art.*

It led to ten years of reading and book collecting, and to the discovery that early man had worked as an artist not merely in southern France and northwestern Spain but widely over the face of the globe—in eastern Spain, extensively throughout the Sahara, and even in Australia. But in most abundance, it appeared, prehistoric artists spread their works in southern Africa.

A trip of political reporting for my newspaper provided the chance for my wife and me to turn from the books and see the paintings themselves. Once I set foot in Africa, I spent as much time searching them out and studying them as my conscience and a tolerant publisher would allow.

Interest in Bushman Art Opens All Doors

Letters of inquiry written to likely names from books and bibliographies provided a foretaste of that incredible hospitality and kindness that the residents of Africa shower on their visitors. The mere fact that I wrote of my interest in Bushman art was the touchstone. Letters flowed back from experts in museums and universities, all of them generous in advice and offers of help. The writers, when I met them later, were better than their word, giving their time and patient teach-



PHOTOGRAPHER BY HEP HODG

Hunters head home with their kills in this painting from Game Pass Valley. Animal tails dangle

ing far beyond what I had any right to ask or expect.

I wrote to Berry D. Malan, then Director of the Archaeological Survey of the Union of South Africa, thinking he would be the most knowledgeable authority. His response was an offer to accompany us. It was a marvelous invitation and we accepted at once. Without his guidance we could not possibly have found, let alone reached, many of the sites we visited, nor viewed them with such delightful companionship.

Malan turned out to be as charming as he was expert. Serene and gay, he possessed a good humor incapable of being ruptured except by one phenomenon: When, after a stiff climb to a Bushman shelter, he beheld the initials of the ubiquitous breed of Kilroys scratched over the paintings, his rage was as hot as it was justified.

What follows on these pages I learned from

Berry Malan, from other kindly scholars, and from books. Of the books, the most fascinating and rewarding for the layman is *Rock Paintings of the Drakensberg*, by Alex R. Willcox.* The majority of the photographs which illustrate this article are his, made over long years of tramping through that wild and beautiful land.

It is tempting to say that a visit to the Bushman paintings opens up an entirely new world. It is true, too, but the difficulty comes with the word "new." To be sure, the paintings were probably made in the past several hundred years—recent in archeological terms. But in everything save the dates, the Bushmen and their world are old. They were Paleolithic men, survivors of the Old Stone Age. They and their era are gone.

Only a relative handful of Bushmen still cling to life in the Kalahari, and even they

*Max Parrish and Co., Ltd., London, 1956.



ORIGINAL GEOGRAPHIC STAFF © A. G. S.

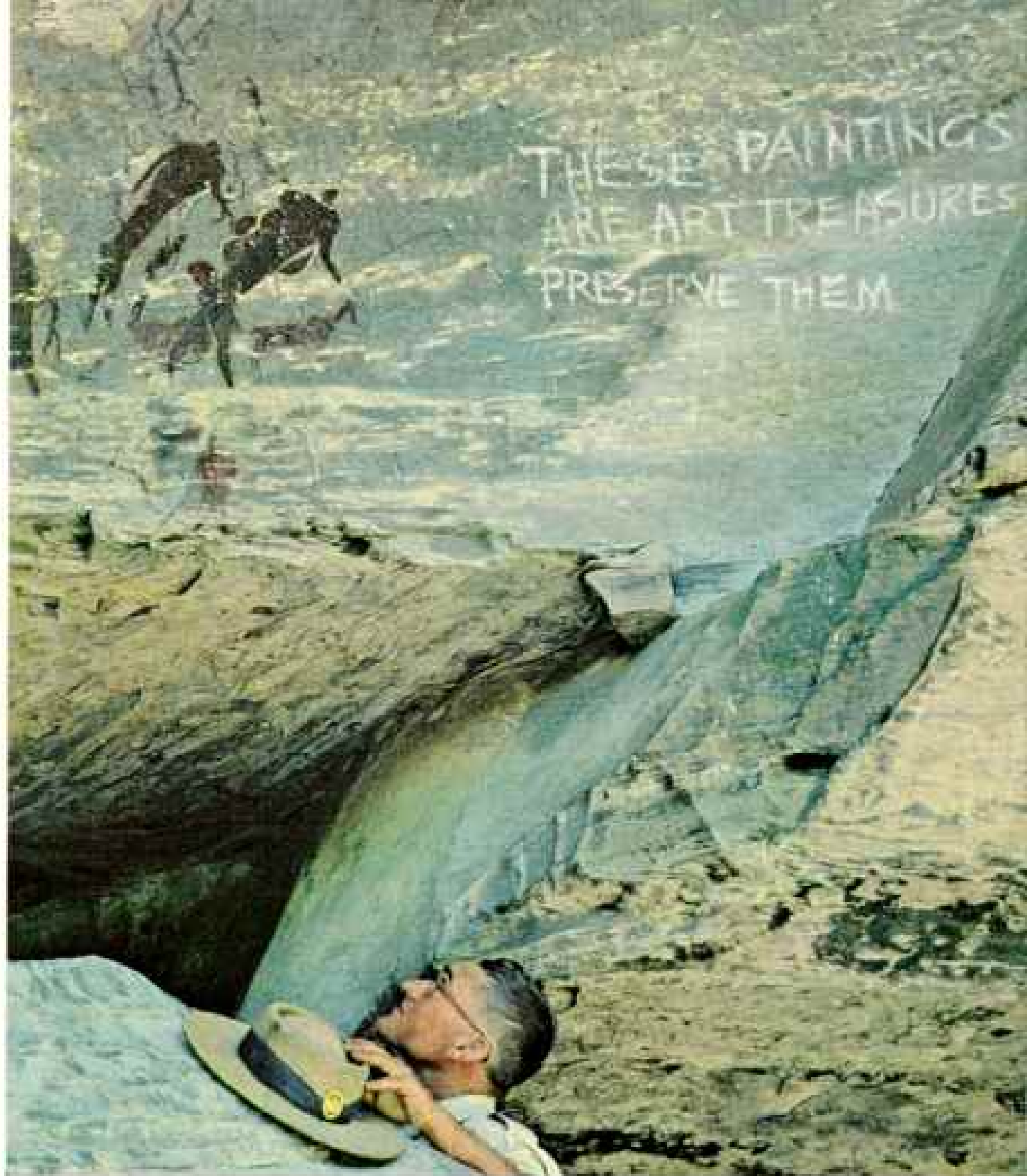
from men's cloaks.

may disappear through miscegenation or inability to adapt themselves to Westernization (page 866). But the life and world of these tragic remnants wandering in the arid veld today are no more those of their Bushman artist-forebears than, say, the life of an Indian farmer in Yucatán is that of the warrior, sculptor, engineer, and astronomer of the Maya civilization.

Bushman Origins Buried in the Past

Let us look, then, at the Bushman in his better days, when the world was younger and man was more in harmony with it.

The Bushman was in southern Africa long before the white man, and before the arrival of the Negroid tribes that now constitute the bulk of the population. Alone of the Africans, the Bushman seems



Two tall hunters in animal-head masks have been painted on a wall already decorated with hartebeests. Above are small running figures. Chalked sign pleads for preservation of these paintings in Giant's Castle.

As if sensing danger, a pregnant rhebok perks up her ears on a Setene Valley wall.



REPRODUCED BY ALICE R. WILSON

to have no tradition of coming from somewhere else.

To be sure, there is much in his art astonishingly similar to the rock paintings in eastern Spain, North Africa, and the Sahara. One suspects that the Bushman forebears must have had contact with peoples to the north. But if so, it must have been millenniums ago.

Stone Age Survived in Bushman Ways

In all respects, the early Bushman was the classic Old Stone Age man. He was a hunter and food gatherer; he had no agriculture whatsoever. As a hunter, he had no fixed abode, being obliged to follow the game on its migrations. Accordingly, he had only the fewest and lightest possessions: stone, bone, and wooden weapons and tools; a weighted stick to dig edible roots and tubers; a few skins for clothing or for the rigging of a wind-screen when he was encamped away from his beloved rocks. He spun no cloth, made almost no pottery, domesticated no animals. His vessels were gourds and shells of ostrich eggs, the source of his jewelry as well.

The fine South African writer Laurens van der Post gives us a moving portrait of the Bushman of old.* Van der Post recalls how, as a small boy growing up on a farm near the Orange River, he asked his grandparents, and other old-timers who had known the Bushman, to describe him.

"They said he was a little man," Van der Post writes, "not a dwarf or pigmy, but just a little man about five feet in height. He was well, sturdily and truly made. . . . His ankles were slim like a race-horse's, his legs supple, his muscles loose, and he ran like the wind, fast and long. In fact when on the move he hardly ever walked but, like the springbuck or wild dog, travelled at an easy trot. . . .

"His skin was loose and very soon became creased and incredibly wrinkled. When he laughed, which he did easily, his face broke into innumerable little folds and pleats of a most subtle and endearing criss-cross pattern. My pious old grandfather explained that this loose plastic skin was 'a wise dispensation of Almighty Providence' to enable the Bushman to eat more food at one feasting

than any man in the history of mankind had ever eaten before. . . . In a good hunting season his figure was like that of a Rubens' Cupid, protruding in front and even more behind. . . .

"His skin never burnt dark in the sun. He moved in the glare and glitter of Africa with a flame-like flicker of gold."

I saw him as Van der Post had described him, in the first painting to which Berry Malan led me. From our starting point, the Drakensberg—the Dragon range of the Republic of South Africa—we had walked along the sides of valleys of such soft and satiny greenness as I had not seen since Ireland. Past a series of crystal waterfalls we marched, along trails and streams in the shadows of magnificent and dramatic peaks, each seeming to vie as to which should be greener. Suddenly, Malan headed straight up a slope.

My wife and I followed upward for what, I suppose, was only 600 or 700 feet, but seemed like the ascent of the Matterhorn itself. Finally, gasping, unable to speak, we came to a shelter where an outcrop of stone thrust from the mountaintop, rising gray and fortresslike from the sea of green below. A typical Bushman site, it was an abri at the base of what is called, appropriately, in Afrikaans, a *kran*, or rock "wreath," crowning the hill.

Art Opens Window on a Bygone World

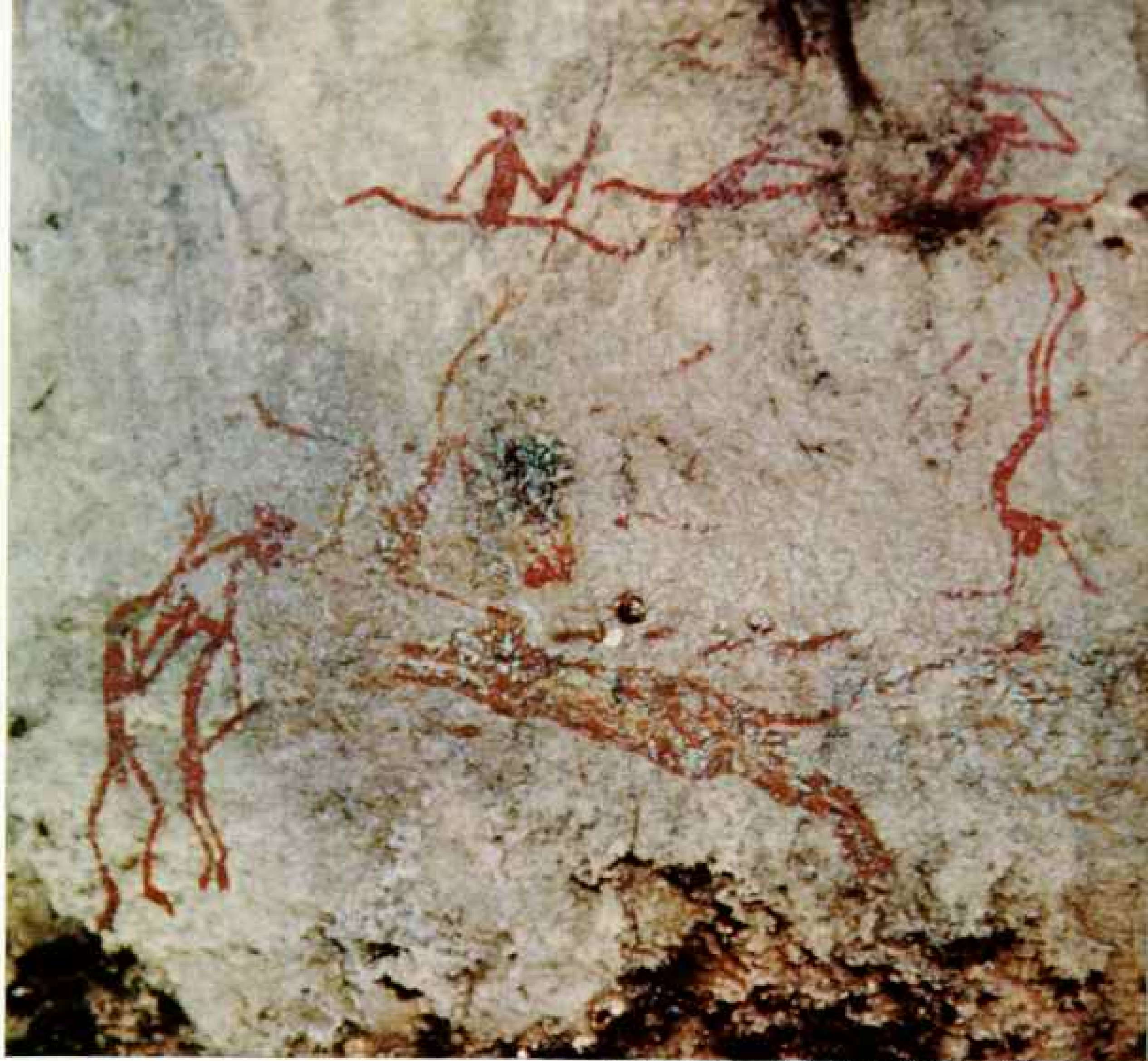
I was to see many more of these sites, always at the end of a gasping climb. There would always be the *kran*, the floor of the shelter nestling 20 or 30 feet below the great overhang, and the breathtaking view—if we had any breath to spare by then—of the intricate verdant valley system below and of the giant peaks beyond, range after range growing ever bluer to the far horizon.

But this first shelter was for me the most exciting. There, on one rock wall, in an area not more than ten feet square, was a textbook of Bushman art, and I realized why Malan had taken us there for our initiation. Here was the essence of the Bushman's world: illustrations of the most central aspects of his life, his times and his temperament, examples of the basic techniques of his artistry, revelations of his arsenal, his religion, his economics—even of his disposition.

Equally fascinating, here were posed for

The Author: A Washington newspaperman for most of his professional career, Alfred Friendly has been managing editor of the *Washington Post* since 1955. One of his special fields of interest is African affairs.

**The Last World of the Kalahari*, William Morrow & Co., New York, and Hogarth Press, London. © 1958 by Laurens van der Post.



ETCHING BY ALLEN W. WILLIAMS © NATIONAL GEOGRAPHIC SOCIETY

Tableau tinged with fright and humor depicts a hunting party's surprise encounter with a leopard. Two Bushmen have been knocked head over heels by the charging beast, while another pair cling together in terror. Men at top, their legs spread wide, flee the scene. Pictograph appears in the Mushroom Hill Shelter of the Cathedral Peak area.

the viewer the deepest question marks about the Bushman, the enigmas, the unanswered and perhaps always unanswerable queries of this profoundly mysterious people:

Artist's Brush Tells of Near-tragedy

The realization that the stone wall was both the open page of knowledge and the poser of dark questions was to come to me later. The first impression was sheer delight in the art for its own sake.

Here was a fresco of three Bushmen running like mad—the expression “flat out” came to mind—charging as if pursued by the devil himself. It was a classic demonstration of that ever-running characteristic of the Bush-

man which the old-timers had spoken of to Van der Post.

And here, to the left, a Bushman artist told a story, half terror, half comedy, as readily comprehensible now as it was hundreds of years ago when he related it with his brush. “A few of us,” the message clearly read, “were going along on the hunt when this leopard jumped us. Two of us went head over heels—you never saw anything so ridiculous. Two others grabbed each other, paralyzed with fright. You should have seen the rest of us make tracks!”

And here below were the elands, in duns and buffs, beautifully rendered, tenderly painted, by artists who knew of them every-



EXHIBITED BY ROSS H. WILCOX (©) NATIONAL GEOGRAPHIC SOCIETY



Titan of his domain and the Bushman's as well, an elephant browses in Citrusdal Cave, western Cape province. To paint, the hunters used a brush made from the hairs of the tail or mane of the black wildebeest. For fine details, they resorted to pointed pieces of bone. Horns of small antelopes served as paintpots.



Like bombers in formation, birds soar across the ceiling of a cave on Cockscomb Mountain. Six-inch ruler shows wingspreads averaging about a foot. Artists rarely painted flocks of birds, preferring the larger game animals. Mineral oxides provided their pigments: from iron, shades of red, brown, and yellow; from zinc, a white; from manganese, a black. Animal fat, milk, blood, urine, or honey seem to have been used to bind the minerals.

thing to be known. In these, and in hundreds of other representations of animals that I was to see, one sensed that artist and subject were one; that the portrait was built out of perfect understanding.

And now, on the same rock wall, was something very different, something as mysterious and enigmatic as the leopard and the running Bushmen were self-evident. Here was magic: two figures, upright, about eight inches high, with human bodies but antelope heads, delicately drawn, beautifully shaded, in tawny reds and white. One figure, steatopygous—that is, excessively fat about the buttocks—was heavily decorated there and on the thighs with white dots. The other figure wore a *kaross*, the knee-length cloak of hide worn then by men as well as women.

Bushmen in ritual dress? Or Bushmen on the hunt, wearing the skin of an animal as camouflage? Hardly. A careful look disclosed that the figures had hoofs instead of feet, and that each had one hoof in place of a hand. In the other, the human hand, one figure held to its mouth a long curved object resembling a hunting horn, with two pear-shaped white bulbs on the shaft. The other figure held a similar object, but it was straight, had only one bulb, and was not held to the lips.

Musicologists at the University of the Witwatersrand in Johannesburg have remarked on these objects' remarkable resemblance to the Greek *aulos*, a form of reed flute. One immediately recalls the mysterious figure in the French cave of Trois Frères—a wizard or god, also cloaked with the hide and head of a beast, in this case a bison—with a short, bowed instrument to his lips.

Art Reveals Mythology and Religion

We deluged our friend and guide with questions. What did he make of it? Malan grinned, and from his answers I began to learn something else: The more knowledgeable the Bushman student, the less dogmatic his judgments, and the more readily he admits the gaps in his understanding.

But Malan recalled to us what Dr. W. H. Bleek, the classic authority on Bushman lore, had written in 1874. Bleek felt that these animal-headed Bushmen represented sorcerers; he found them somewhat reminiscent of the Egyptian mythological representations in which animal heads were placed on human bodies. Bleek added: "This fact of Bushman paintings illustrating Bushman mythology . . . gives at once to Bushman art a higher character and teaches us to look upon its products not as the mere daubings of figures for idle pastime, but as a truly artistic conception of the ideas which most deeply moved the Bushman mind and filled it with religious feeling."

In the past 25 years, the pace of archeological development in southern Africa has been tremendous. If it continues at the same rate, much of what is now baffling will be clarified. But for the time being, even



the wisest of the prehistorians puzzle over the mysteries that stare from the wall of this shelter—on Mushroom Hill in the Drakensberg—and from the walls of thousands more over southern Africa.

As the days passed and we were led, puffing and panting, to other shelters, each fascinating and beautiful, we pelted Malan with hundreds of questions. Some he could answer, for some he ventured hypotheses, and for others he amiably observed that our guesses were as good as anyone's.

What were the pigments? Here the answer is fairly well established. The basic colors come from iron and other metallic oxides, ground fine, possibly roasted, then mixed with some binding material—probably animal fat, though possibly milk, blood, honey, or urine. At any rate, they had a marvelous power of penetration into the sandstone, and hence a great durability.

On one climb, Malan pointed to a nodule of stone, about the size of a small fist, half exposed in a matrix of sandstone boulder. Such nodules, he explained, were formed in cavities in the sandstone in the dim geologic past; Bushman artists pried them out, split them neatly in half, and often found within them small deposits of the metallic oxides that made their paints. Next day, rummaging on the floor of a shelter, my wife found one of the stone halves. The hollow was the size of half a walnut—a perfect, albeit empty, prehistoric paint package.

Why, exactly as in the French and Spanish caves, did the Bushman artists sometimes blandly paint on top of pictures already there, until the overlays were three or four deep—and why, occasionally, did the artists just as carefully *not* cover what was already limned on the rock?

One guess is that parts of the wall were



PHOTOGRAPH BY RAY POOL, NATIONAL GEOGRAPHIC (LEFT) © R.G.L.

Tawny Elands Dominate a Mural Beneath a Beetling Ledge

Bushmen favored high shelters. This ledge in Natal's Game Pass Valley offered the extensive view they needed to watch for game or enemies. Nature Reserve Warden Robert Wright and his wife inspect the gallery.

One theory is that the act of painting was itself potently magical, giving the painter power over his subject. Accordingly, desirable as it was to paint an animal as perfectly as possible, so that he would fall the readier victim, it was dangerous to seek the same kind of power over one of your neighbors.

Yet this explanation leaves me unsatisfied, for the Bushman was also scrupulous in not painting the face of the Bantu—his mortal and ultimately successful enemy. A multitude of unmistakable representations of the Bantu march menacingly along the walls of Bushman shelters. They are portrayed always as huge, lowering monsters—to the little Bushmen, the Bantu must have seemed giants—often in black paint, carrying clubs and shields. And always the faces are stylized things, apelike on occasion, but never with an attempt at realism.

Nimble Bushmen Born to Heights

Why, I complained bitterly one day to Malan, did the Bushmen insist on choosing the shelters at the very top of every slope, with its lung-bursting, leg-aching climb? We were just leaving a shelter, inching our way across the nearly sheer face of a hill. Suddenly, five feet ahead of me a duiker, a tiny South African antelope about two feet tall, jumped from his resting place.

"Don't run, little duiker!" my wife pleaded. But he was on his way. In 20 seconds he made a descent that later took us 20 minutes to negotiate.

"Look," said Malan. "To the Bushman the climb was no harder than to the duiker. He was used to it from infancy.

"Why should he not have chosen the shelter at the top? The view was longer and his position safer."

"How hard would it be to excavate for his tools and artifacts?" I asked Malan at one shelter. There was no answer, and I assumed he had not heard me.

Five minutes later, when I turned from the face of the shelter, Malan was at my side with a handful of stones. He had not bothered to

more sacred than others. Another suggestion, more plausible in the light of the deep religious sense in Bushman life and art, is that the *act* of painting was sometimes more important than the result.

Why, when the artists knew the animals they painted so well—as evidenced by the superb draftsmanship and perspective—were the animals so often given the wrong colors? Again we have only theories.

Perhaps the Bushman was limited as to available pigments. Often, however, he had a most variegated palette. One Bushman, slain in Basutoland about 1866, and the last known painter of his band, was found to have ten small pots of animal horn slung around his belt. Each pot contained a different color.

Why—again as is the case in the French and Spanish caves—is the human face never painted realistically, but only as a blob, or in completely stylized, nonrecognizable form?

Fortresslike cliffs that sheltered rock painters loom above a valley near Sani Pass.

Mysterious figures cloaked even to the tops of their heads move among the elands in a detail of the Game Pass frieze (preceding pages). Small bowmen race above them.



ROCK PAINTINGS BY KIP RUSSELL, NATIONAL GEOGRAPHIC STAFF © N.G.S.

dig for them, but had merely gone to the drip line—the spot exactly below the edge of the overhang, where the drops of water had cleared away the dirt for an inch or so and exposed the pebbles.

Shelter Yields Archer's Tool of Stone

All the pieces were of a stone quite different from that of the krans and shelter we were examining; all, therefore, had been brought there. For the most part they were fragments—discarded chips from stones that the Bushmen had shaped. Among them, however, was one perfect tool—a stone about three inches long with a notch finely chipped out, leaving a semicircular knife edge. It was clearly an instrument with which a Bushman of old had shaped the shafts of his arrows.

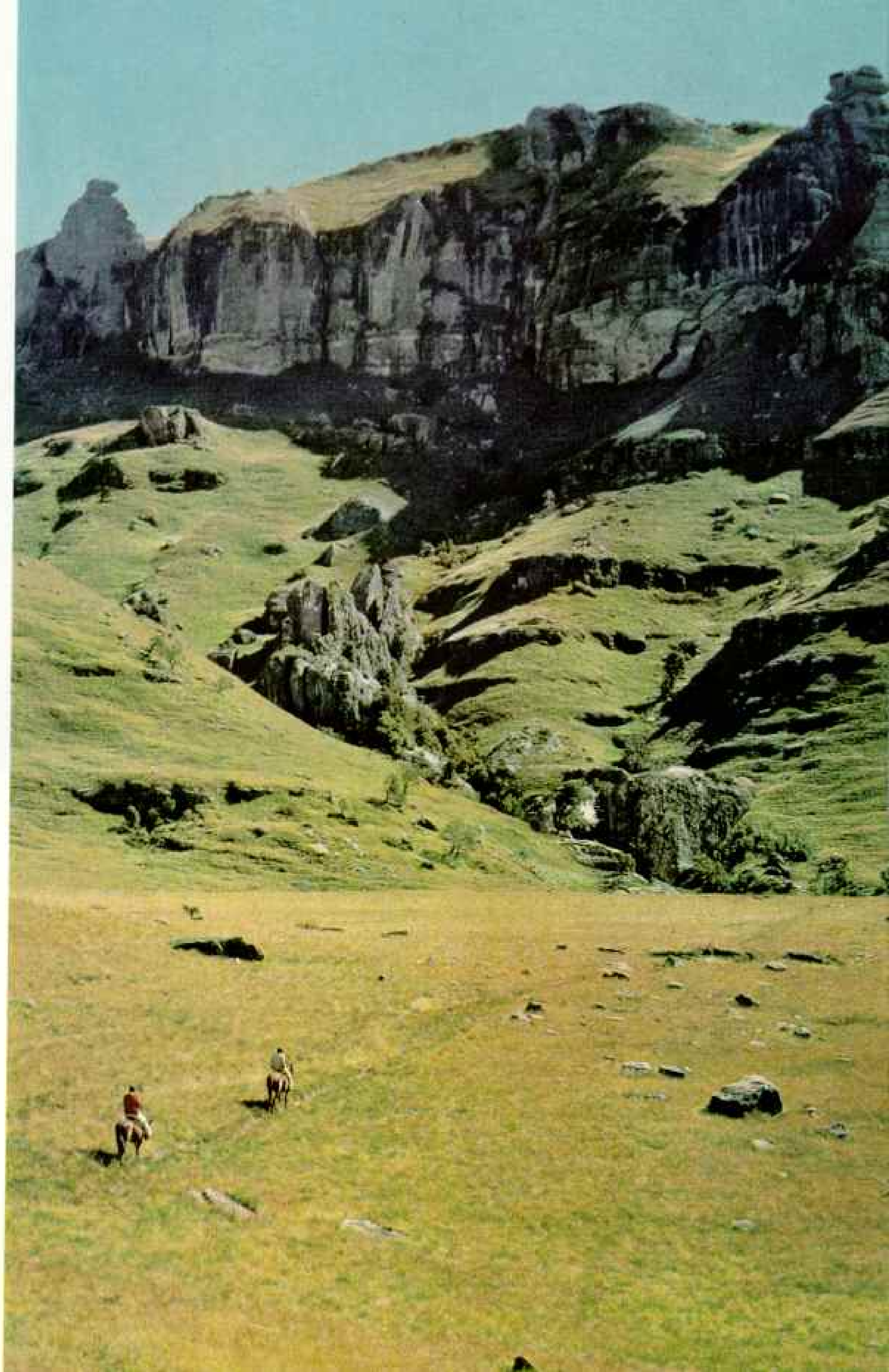
A final and all-absorbing question: How old are the paintings? To this, Malan was willing to risk only a cautious answer. He believed that under exposed conditions—and

all African rock art is in natural light, for there are no paintings inside caves, as in Europe—the colors were unlikely to last more than 1,000 years.

Some, obviously, were much more recent. He showed us rock paintings of oxen, certainly no older than 350 years, for it was not until the early 17th century that the Bantu brought cattle to the area. There are others of soldiers with guns and horses (page 864). They could certainly not have been painted until 1820, and perhaps were as recent as 1870.

If most of the paintings we saw were, as we guessed, from 300 to 800 years old, this is not to insist that the Bushman did not paint for centuries or even millenniums before. But the older paintings, if such there were, may have disappeared by now.

I was not disappointed in learning that the renderings were, in archeological terms, comparatively recent—mere youngsters compared to the art of the French and Spanish





Defenders of a shelter fight off attackers in Battle Cave. Women at left hold back two

caves, which is 10,000 to 30,000 years old. Indeed, what I found most intriguing was the fact that Paleolithic man—very little advanced beyond the Ice Age hunters of the Pyrenees and the Dordogne—was painting the same kind of pictures up until less than a century ago.

The temptation to compare the Bushman's pictures with those of the great French and Spanish caves is irresistible. I think the older art vastly more dramatic. Its figures are generally larger, more overpowering, fraught with darker magic. Almost all are heavy with purpose—ritualistic to assure good hunting or fertility of the great herds of bison and reindeer and prehistoric cattle.

Some of the Bushman paintings are full of magic and ritual too, but many seem to me to be the work of men who painted just for the sheer joy of it. Dozens of them simply told stories. The murals from Battle Cave, shown

on these pages, are as clear and animated a representation of a prehistoric fight as John Trumbull's canvas is of the Battle of Bunker Hill.

During an earlier trip to Southern Rhodesia, Leslie Stuart, Director of the Rhodesian National Parks, led me to a rock painting near Salisbury that gave a vivid account of how some Bushmen drove a buck into a field of boulders, where he became hopelessly trapped in a maze of huge stones. Any reader of *Field and Stream* would recognize the situation instantly.

Gaiety Marks Bushman Masterpieces

Gaiety—ebullient, animated joy—marked Bushman art for me. Again with Leslie Stuart as guide, I saw a scene of prehistoric dancing—a wild fandango to the accompaniment of flutists, a prehistoric bacchanal which could inspire any modern-day poet to a Keatsian



matchstick men. Arrows fly at right; one man walks away holding a wounded arm

"Ode on a Rhodesian Mural": "Forever wilt thou love, and she be fair!"

Van der Post, who masquerades as essayist and explorer but who is really a poet, sings the truest song of the Bushman artist and his creations:

"His paintings show him clearly to be illuminated with spirit; the lamp may have been antique, but the oil is authentic and timeless, the flame was well and tenderly lit. Indeed, his capacity for love shows up like fire on a hill at night. He, alone of all the races of Africa, was so much of its earth and innermost being that he tried constantly to glorify it by adorning its stones and decorating its rocks with painting. We other races went through Africa like locusts devouring and stripping the land for what we could get out of it. The Bushman was there solely because he belonged to it. Accordingly he endeavoured in many ways to express this feel-

Leaping like ballet dancers, two spearmen wear head crests in Game Pass Valley. Authorities ponder why Bushmen painted animals as realistically as possible yet rendered men in stylized form.



EXTRACTED BY ALAN R. WILSON (D.R.S.)



Wearing the heads and skins of bucks, Bushmen on the ceiling of a shelter in Giant's Castle prepare for a hunt or, possibly, for a ritual. Protruding buttocks of the man at right—a physical characteristic called steatopygia—is common among Bushmen today.

Recent Bushman painting in Bellevue Shelter shows a big-game hunt by horsemen wearing military uniforms and carrying rifles. The area knew neither horses nor uniforms before 1820, so the mural must have been done after that date; it may have been painted as late as 1870. The primitive artist portrayed the soldier's uniform and his brick-red steed with surprising accuracy.



ing of belonging, which is love. . . ."

When I was a child I recall that the first book I ever read, not counting the *Sunbonnet Babies*, was Howard Pyle's *Robin Hood*. I remember how, before the last chapter, the author warned the reader that if he was not prepared for sadness, he should stop there. I can do no less than offer the same caveat before completing this account with a word about the Bushman's end.

For all practical purposes, he has been exterminated, ground between the upper and nether millstone of white and black occupation of southern Africa. The dreadful history should stain the conscience of the black man as it surely harrows the soul of the white—and no American dare take a morally superior view, for the parallel of our own westward expansion and of crimes against the Indian is much too close.

The essence of the matter is that the pioneer settlers, fanning out from Cape Colony in the 18th and 19th centuries, and the Bantu, migrating with inexorable drive, squeezed the Bushman off his hunting land and out of his way of life.

Both white settlers and Bantu were agriculturists and pastoralists; they needed and took land, the land the Bushman needed for hunting. His game was steadily destroyed. Even when he had retreated to terrain that the new occupants were not tilling or grazing, the white man and the black could not live with him as neighbors. With his ancient habit, the

Bushman took for food whatever he could catch that had four hoofs; he failed to differentiate between wild game and cattle.

Reprisals inevitably followed. The Bushmen responded with counterreprisals, killing a beast or two for food and then hamstringing the rest of the herd in revenge. Throughout the literature of this tragic era runs a repeated cry which seems now to have in it as much of a hidden lament as it did then of open rage: "You can't tame the Bushman."

He was indeed untamable. Magnificently adjusted to his environment, so superbly qualified for the life he led, so at one with nature and the land, with the beasts and bees and bushes which gave him his food, it is not farfetched to think of him as a kind of perfect animal. And it is not unnatural that the white settlers saw him as an animal, and untamable.

The process of exterminating the Bushmen went on for about 200 years. The last refuge for some groups was in the Drakensberg, lying in part in the Basutoland of today. The last organized resistance there was in the 1860's, with a few lonesome and fugitive holdouts shot there as late as 1890. Other groups moved into the Kalahari, that howling wasteland stretching from Bechuanaland through parts of the Republic of South Africa and on into South-West Africa, Northern Rhodesia, and Angola. Their descendants are there today.

Artists Left a Poignant Legacy

Remote, shy as animals, and rarely seen, the last of the African Bushmen live in what to us would be intolerable deprivation, in an environment so harsh that it seems as if nature had diabolically contrived conditions to guarantee them perpetual anguish. Yet, as Elizabeth Marshall Thomas makes clear on the following pages, and in her beautiful and moving book *The Harmless People*, the Bushmen retain no little of the wondrous qualities that marked them when their world was young.



EXTRACT FROM © NATIONAL GEOGRAPHIC SOCIETY

Mane and tail streaming, the plunging horse at top gallops into an eland hunt in this painting at Steel's Shelter. Perfectly balanced rider carries whip and spears.

Miniature horse and rider at lower left may have been drawn by a Bushman child imitating the paintings of his elders.

They are a happy and laughing people, still magnificent trackers, tireless runners, unerring archers, makers of potent poison for their arrows. They are indefatigable all-night dancers, singers of haunting songs, tellers of myths and folk tales that would have quickened the hearts of the Brothers Grimm (and would have been instantly recognized by them as falling in the mainstream of primitive peoples' storytelling).

The future of the Bushmen in the Kalahari remains uncertain. The picture they make is poignant. And yet, in a certain sense, it is anticlimactic. For the Bushman of the verdant valleys and grassy plains is gone. The painters of the rock have vanished.

Their legacy is our treasure, an art collection that is pure and enchanting, fresh as dawn yet mysterious as night. The painted rocks these African artists left us are both the portrait and the product of man when he was new—and closer to nature than he will ever be again.

THE END

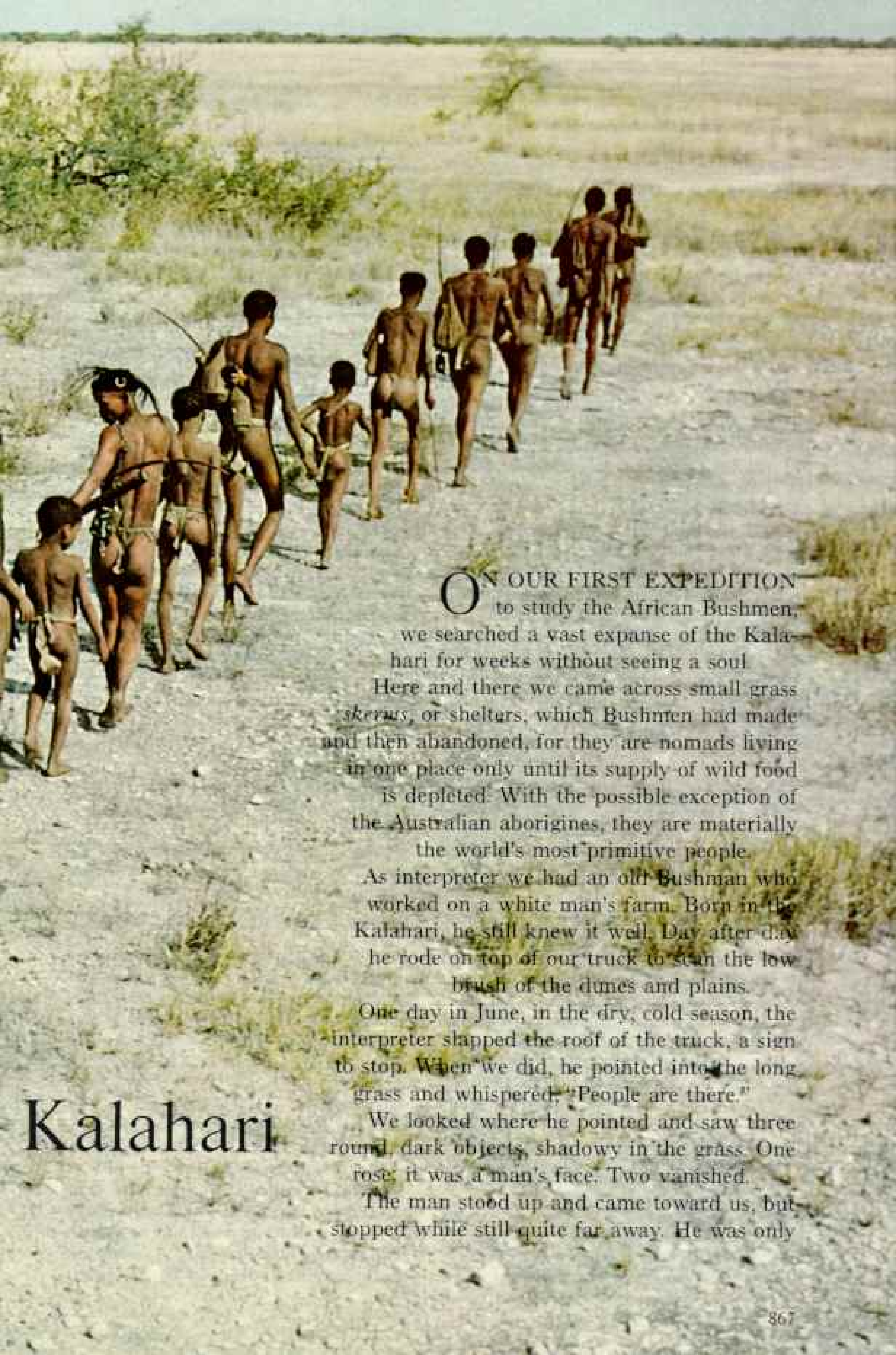


By ELIZABETH MARSHALL THOMAS

*Photographs by LAURENCE K. MARSHALL
and other members of the Marshall Kalahari Expeditions*

*CARRYING ALL their worldly possessions,
a band of southern Africa's fast-disappearing
Bushmen trudge off into the veld. The
shy nomads wring a bare existence from a
forbidding wasteland of heat, thirst, and thorns.*

Bushmen of the



ON OUR FIRST EXPEDITION to study the African Bushmen, we searched a vast expanse of the Kalahari for weeks without seeing a soul.

Here and there we came across small grass *skerags*, or shelters, which Bushmen had made and then abandoned, for they are nomads living in one place only until its supply of wild food is depleted. With the possible exception of the Australian aborigines, they are materially the world's most primitive people.

As interpreter we had an old Bushman who worked on a white man's farm. Born in the Kalahari, he still knew it well. Day after day he rode on top of our truck to scan the low brush of the dunes and plains.

One day in June, in the dry, cold season, the interpreter slapped the roof of the truck, a sign to stop. When we did, he pointed into the long grass and whispered, "People are there."

We looked where he pointed and saw three round, dark objects, shadowy in the grass. One rose; it was a man's face. Two vanished.

The man stood up and came toward us, but stopped while still quite far away. He was only

Kalahari

about five feet tall, and he stood on very straight slender legs. His arms were thin and he carried no weapons. He wore a leather loincloth, nothing more, but at his side hung a skin bag by a string over his shoulder.

He said nothing and did not raise his hand in greeting, but watched us with a shy, hopeful expression, a tiny, ingratiating smile.

We got out of our trucks slowly to offer him tobacco. He came closer, and we saw that his face was creased with wrinkles. It was much darker than his brown body because, we learned later, he had rubbed it with fat and a black paste.

Discarded Cartridge Case Serves as Pipe

He took the tobacco carefully and put it into his skin bag, not daring to smoke it, as Bushmen sometimes suspect strangers of putting poison in tobacco. But our interpreter asked also for tobacco, which he smoked to show there was no harm in it.

At this the Bushman squatted on his heels. He took from his bag a copper tube which once had been a cartridge, stuffed it with tobacco, lighted it with a match given by the interpreter, inhaled, held his breath, inhaled twice more, held his breath for a very long time, spat, and inhaled again. Then finally, as we watched fascinated, incredulous that anyone could hold his breath so long, he breathed out a great blue cloud of smoke—a visible sigh of pleasure.

"Ah," said the interpreter, equally pleased.

Both he and the newcomer were Kung Bushmen, members of one of several language groups in the Kalahari. Others are the Auen, Ko, Naron, and Gwikwe Bushmen. In all these languages, clicks of the tongue act as consonant sounds.

In this curious clicking language the Bushman told us his name, which was Kwi. Then he called softly toward the long grass, where two women, three boys, and an old man ap-

peared. It was the rest of Kwi's family band.

The two women wore leather capes, or *karosses*, the cured skins of antelope. In the pouch of one woman's cape rode a baby, his eyes above his mother's shoulder. The pouch of the other woman's cape bulged with sticks for fuel.

The women were shy, barely raising their eyes to look at us. They were Kwi's wife Kushe and her unmarried sister, Ungka. His baby was Gao, nicknamed Little Gao. The old man was his father-in-law, Old Gau (page 880).

Because Bushman names are rather limited in number—we once met a Gao with two wives, both named Kushe, and two daughters, both named Xama—they give each other distinguishing names or nicknames. Sometimes these are honorary: Kwi Hunter, Male Toma, Old Gau. Sometimes they are endearing: Baby Nisa, Little Gao. And sometimes derogatory: Gao Big Feet, Crooked Kwi, Lazy Kwi.

The last was the Kwi we had just met, nicknamed Lazy because he was not a good hunter.

We asked him where his family was living.

He gestured vaguely toward the long grass.

We asked if we could camp beside him, to talk with him and learn how Bushmen live.

He nodded, plainly afraid to refuse. But, he said, he was moving to a new place.

We asked if we could move with him.

He nodded again.

We asked where he was going, and he turned his hands palm up to imply he didn't know.

For a moment we were baffled. Then we asked if he was going to join other Bushmen.

He said politely that he was.

Perhaps, we said, we could take him there.

Lazy Kwi did not say no, so we invited his family onto the trucks.

Bushmen Disarm When Meeting Strangers

At that, Lazy Kwi, Old Gau, and the oldest boy went back to get their bows and arrows. They had hidden them in the grass, for Bushmen always disarm before greeting strangers. To greet someone while carrying a weapon would show belligerence, which is extremely rude.

Lazy Kwi, we suspected, did not want to show us where his people were. But after consulting with his father-in-law, he pointed at last, the truck lurched, and we were off.

We later learned that Bushmen are so intimidated by Europeans and Bantu people that they are afraid to refuse any request.

This intimidation is not hard to understand when one considers the rifles of Europeans,

The Author: Mrs. Elizabeth Marshall Thomas joined her parents, Mr. and Mrs. Laurence K. Marshall, on three of their seven Kalahari expeditions. Recognized as authorities on the Kalahari Bushman, the Marshalls have worked closely with the Smithsonian Institution and the Peabody Museum of Harvard University, which has sponsored publication of their scholarly reports. Their research is also the subject of Mrs. Thomas's fascinating book *The Harmless People* (Alfred A. Knopf, Inc., New York, N. Y., 1959). Mr. Marshall, the expedition leader, took many of the photographs for this article. Others were made by his son, John K. Marshall, and by Anneliese Scherz and Daniel Blitz.



KUDRACHOWE © NATIONAL GEOGRAPHIC SOCIETY

Strumming songs she herself composed, Khuana, a young matron, plays a *guashi*, one of the Kung Bushmen's few musical instruments. She wears leather armlets fashioned by her hunter-husband. Ostrich-shell beads dangle from her hair. Cheeks and forehead are scarified for beauty. The *guashi*, made from a hollow log, has five sinew strings.



ILLUSTRATION BY LAURENCE A. MARSHALL © NATIONAL GEOGRAPHIC SOCIETY

Jolting through high grass of Bechuanaland Protectorate, the author, Elizabeth Marshall Thomas, drives the lead vehicle on one of her parents' seven expeditions. Thorn trees raise their heads above the wasteland.

870

Umbrella shades camera and photographer's helper. John Marshall, the author's brother, prepares to film a boys' game at Gautscha Pan, in South-West Africa.





MAP BY LOUIS CORPUS BY SCHMIDT © N.E.S.

Civilization relentlessly encroaches on the harsh Kalahari, where the last of the Bushmen live. Under the impact of European ways, the people's life is changing. A Bushman Affairs Commissioner, appointed by the government of South-West Africa, now teaches one group to grow crops. Other onetime nomads work as road builders.



or their trucks with big wheels and roaring motors, or their great height and their weight, almost twice a Bushman's own.

When a Bushman meets a European, hears his loud voice, and looks up at the strange hat that shades him or down at the boots that are more complicated than anything Bushmen make, it is not surprising that he dares not cause offense.

In the law courts of South-West Africa and Bechuanaland Protectorate, Bushmen often plead guilty to crimes they never committed. A large and frightening magistrate demands to know if the Bushman prisoner before him shot one of the white farmer's cattle, and the Bushman, trying to seem agreeable, smiles shyly and says yes, yes he did. Courts try to take this tendency into account.

The racial origin of Bushmen is still in doubt. They are a small, slight people, as hard and strong and slender as the thorn trees among which they live. Their skin color is brownish yellow, though dust and sunburn make it seem dark brown. Bushman infants show the Mongolian spot, a triangle of dark pigment at the base of the spine which fades as the child grows older.

Bushmen are not warriors. They avoid strife and quarreling, and they consider non-Bushmen to be rash, dangerous, given to fits of temper—as unpredictable as lions. This concept is illustrated by the Kung word *goma*, meaning "animal without hoofs" and used for non-Bushmen as well as for lions, leopards, and hyenas.

Farmers in need of laborers make what amount to slave raids among the Bushmen, sometimes kidnaping a child or children, knowing that the parents will follow. Pay, if any, is small, and workers are not allowed to leave the farms. All this is, of course, against the laws of every territory in which Bushmen roam. But in the vast, wild Kalahari, the law is not easy to enforce.

Perhaps Lazy Kwi was humoring us by coming, lest we should be angry and do him harm. He compromised; he did not take us to his people, but he took us to water, something of great importance in the dry veld.

The water hole was at a place called Gatscha Pan in South-West Africa (map, above). Near evening, our trucks came over a rise of ground, and we saw a huge dish-shaped depression, dazzling white in the sun. It was an enormous salt pan, a shallow lake in the rainy season, from December to March, but



Back erect beneath a 70-pound load of child and firewood, a wife returns from a day's search for edible roots and berries.

Ostrich-egg omelet cooks in a pot obtained by Bushmen in trade with the Bantu. Empty shells are valued as water canteens.

KUDACHROME © NATIONAL GEOGRAPHIC SOCIETY



at this time of year the water had long since sunk away, leaving a white film of brine on a surface hard as pavement.

Lazy Kwi showed us, at the eastern rim, a cluster of long green reeds. Beneath them was the water hole, which, we later found, was deep and permanent.

Kushe and her sister began to gather grass. When they had two large piles, they broke branches from a little tree, thrust them upright in the ground, and arched them together, then laid the grass over them and tied each shelter once around with sinew string. That was all (page 875). Kushe, Lazy Kwi, and the children moved into one hut. Kushe's sister took the other.

This left no hut for Old Gau. To give himself a spot where he could feel he lived, he thrust a little stick upright in the ground and put his things beside it. This completed the *werf*, or camp, which was under the branches of a single large tree.

The two men then "rolled a fire," as Bushmen say—spinning one hardwood stick in the tinder-filled hollow of another.

As Lazy Kwi's palms reached the bottom of the stick, his father-in-law began rolling at the top. In no time the tinder smoldered, the flame was blown upon and nourished, and a pile of dry branches was set alight.

In all the months we stayed there, no one needed to roll another fire, for as new Bushmen arrived, which they did during the days that followed, they lighted their fires from Lazy Kwi's. Always somewhere, in someone's pile of ashes, an ember could be discovered and revived.

Fire is very important to Bushmen. It is "a man's thing"; women never use fire sticks.

When a large group of Bushmen moves to a new site, two old men kindle the first fire at a special place, apart from the skerms. Everyone takes a brand from the first fire, and when all the *werf*'s

fires are kindled, the first is allowed to go out.

The little ceremony seems a bow to the importance of fire, which cooks, protects, gives warmth and light, and provides a place to be; at night Bushmen do not sit in their skerms but around their fires, their hands cupped under their chins.

At first, says a Bushman story, only one little bird had fire, and he was very selfish with it. He shared with no one and even hid his fire sticks, so that no one would learn the secret. But one day the Great God spied on the bird, learned the secret, and stole the fire sticks away.

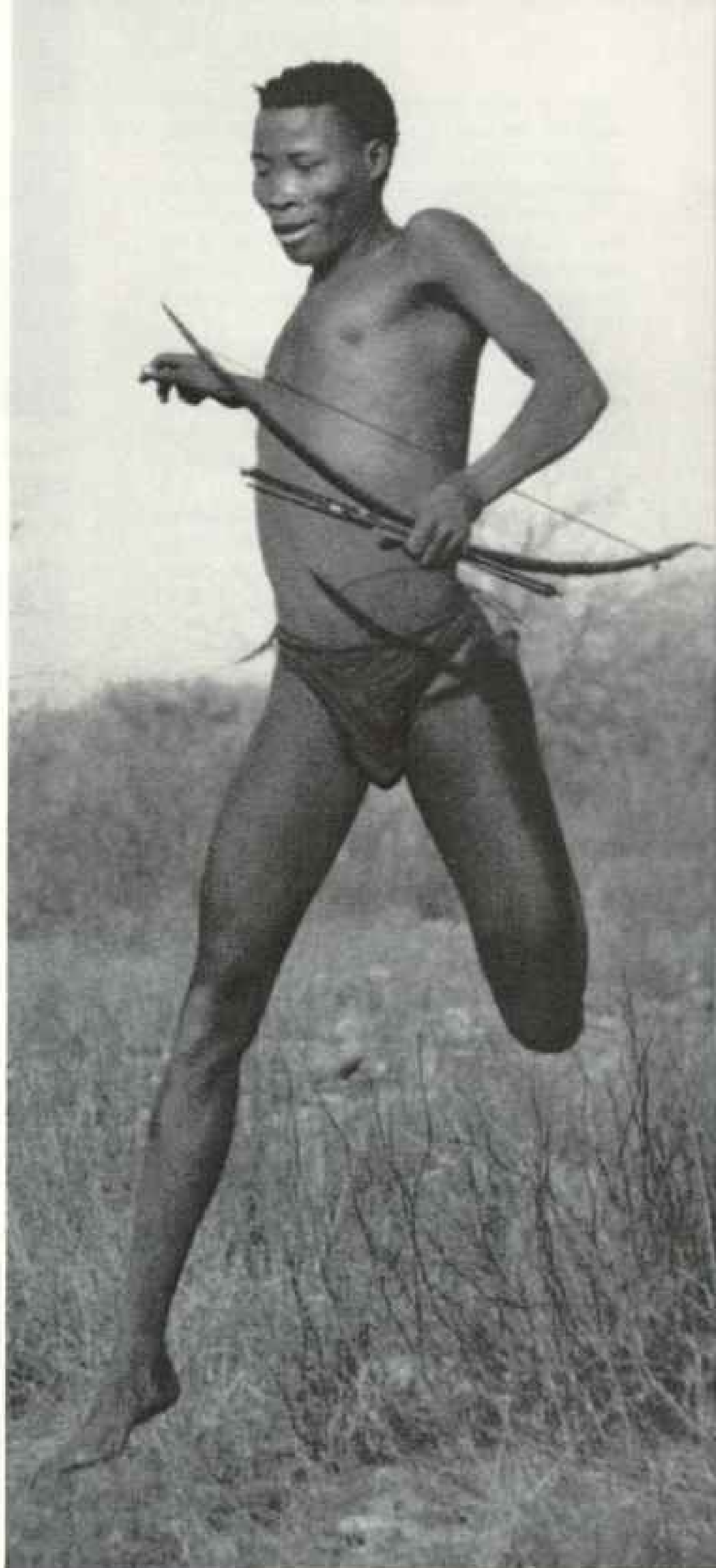
The Great God was so angry because the bird had not shared that he broke the fire sticks into a hundred pieces and flung them into the veld. Ever since that day all the people in the world have had fire, because, as Bushmen say, "There is fire in every tree."

Aunts and Uncles Come Too

One morning shortly after we arrived, we found two Bushman hunters at the werf with Lazy Kwi. We gave them tobacco, but they kept their distance for a day. When they were convinced that we were friendly, they vanished—to return a day later with their wives. The next afternoon they were followed by their parents, their brothers, their aged aunts and uncles, the aunts' and uncles' children, and the children's children. In no time at all the great, dry bush around the pan echoed with voices, showed the bristling grass tops of skerms, and at night was alive with fires.

Ordinarily, so many people would not be settling at Gautscha in July. Until October, the worst time of the drought, there is food throughout the veld and water in small, impermanent water holes or in the trunks of hollow trees. Only when life elsewhere becomes impossible do large groups congregate at the permanent water holes.

The Bushmen had come to



Hunter Crooked Kwi, so named because of a stooped shoulder, runs to head off a wildebeest and shoot it with poison arrows. He resembles running warriors in rock paintings (page 863).

Gautscha now because word had spread that we were there and gave presents of tobacco, salt, and beads. Besides, we caused a welcome diversion by handing out paints and paper.

By now it is generally accepted that Bushmen made the famous rock paintings in the mountains of southern Africa (page 848). Curious to see what would happen, we asked the Bushmen to draw for us.

The adults were too shy at first, but the children drew beautifully. They made animal tracks, moving their free hand to imitate the head motion of the animal; then they drew fine, delicate stick figures of the animals themselves.

At last the grownups painted too, laughing at each other and themselves as they did so. I asked one man what he was drawing that amused him so much, and he said, "I don't know. I tried to draw a gemsbok."

The artists who made the rock paintings had a tradition of painting. The Bushmen at Gautscha Pan, of course, did not. But the paintings they did resembled the rock paintings in some ways—in the fineness of line, in the slender, long-legged animals, and in the fact that various objects were sometimes painted as though seen from above.

874 Many people did not want to paint. In-



Delicate stick figures sketched by young Bushmen on a white wall near Okwa Pan, Bechuanaland, are similar to the rock art of their ancestors throughout southern Africa.



Long-legged cow, hand print, wooden pot, and patterned apron dominate the painting of a hunter who presented it to the author at Gautscha Pan (left). Tracks of game birds appear at upper center.

Art classes beneath a shade tree at Gautscha Pan appeal to both children and adults. Mrs. Thomas passes out paper and colors to see what will happen when today's Bushman tries to paint (above).

Playing House, Girls Build a Toy Skerm

Often the children have watched their mothers erect grass shelters like the one in background in less than an hour. Bushmen keep belongings in skerms but prefer to sleep in the open beside fires.





stead they would crouch in our camp every morning to observe, without seeming to do so, everything we did.

Bushmen think it rude to stare, ruder still to ask a question, which implies suspicion. Unknowingly, we asked them many questions, but once, when we asked one of the headmen if he had any questions he wanted to ask us, he replied, "No, we trust you."

Cooperation the Key to Survival

Trust, peace, and cooperation form the spine of Bushman life. The trust has its automatic aspects; the peace is sometimes clung to tightly, like a lid clamped to a boiling pot;

and the cooperation or sharing is often brought about by veiled, insidious remarks: "Look at him there, admiring his knife while we have nothing." Likely as not the man with the knife will thereupon give it away.

By maintaining these three virtues, Bushmen live where otherwise they might not. Ill will would be intolerable in a community of five or ten people, all dependent upon each other and all residing within a few feet, perhaps in an area so remote that they would not see a new person for seasons. Uncooperativeness would be fatal to old people, sick people, women with new babies, anyone unable to make the long trips for food.

Almost all adult Bushmen practice medicine at one time or another. They dance with knees bent and bodies leaning forward; some wave animal-



Refusal to share is a sin to Bushmen. A person who refused to share food, they say, would be "like a lion, eating in the veld alone."

Headman Returns Prized Bit of Wire

In the two years we lived in the area, we knew of no case of stealing. Far otherwise, for when we left Gautscha after our first expedition, the headman of one of the bands ran after our departing trucks to return to us a six-inch length of wire we had discarded or dropped, though the wire would have made him an arrowhead. It would have cost him perhaps as much as a large antelope hide if he had obtained it in trade with the Bantu

tail wands. Ankle rattles of dried cocoons swish as feet thud against ground. In frenzy, the medicine men shriek, trample fire, pick up coals, and

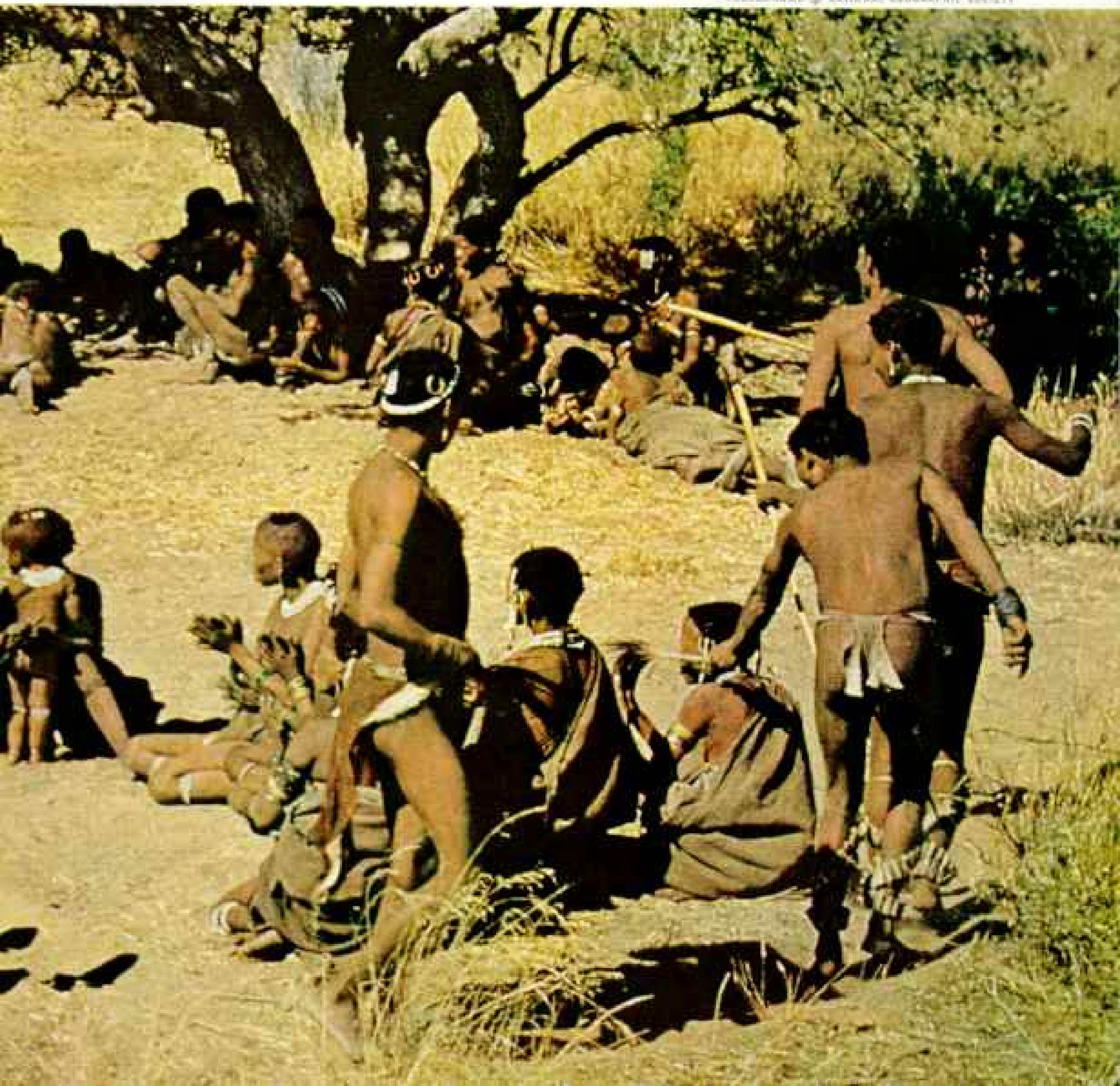
people near Nyae Nyae. We gave him the wire, of course, though he had not expected it.

That first trip was made with my parents, my brother, and several other people from the United States, under the auspices of the Peabody Museum of Harvard and the Smithsonian Institution.

On the two later expeditions which I accompanied—seven have been made in all between 1951 and 1960—our good reputation was established and the Bushmen welcomed us as friends.

Rights to dig roots for food, to drink water, and to hunt in any given area, we learned, are the province of the Bushman band in that

set fire to their hair. Often they go into a deep trance, the "half death"; they become stiff, froth at the mouth, and lie still.





Mother nurses baby as she dances. Girl at left has shaved part of her head, a popular style.

Mimicking father—a medicine man—a boy stamps his feet and waves a staff. Minutes later he fell to the ground, moaning and panting in imitation of the shaman's trance. Ankles carry the strings of dried cocoons used by adult dancers.



area. Its headman personifies the band's rights, and his permission to dig the food and drink the water must be asked by any newcomer. But permission is seldom refused.

Headmanship passes from father to son. At Gautscha, where the oldest son of the late headman had abdicated to live with his wife's people in the north, the husband of the old headman's daughter was serving as temporary leader until the old headman's youngest son, a crippled boy, grew up.

Lame Gao Wins Right to Be Headman

We were at Gautscha when the crippled boy became the headman. He told us that his leg had withered when he was a child because of his family's negligence. On a long trek when he complained of a sore leg, they

refused to stop to cut and suck the sore place in the Bushman manner of healing. The leg got worse, crippling him forever.

A boy can neither marry nor act as a headman until he has become a man, and he cannot be initiated into manhood until he has successfully hunted a large game animal, something which we thought would be impossible for Lame Gao to do. And yet he did it.

He had hunted many times with almost incredible effort, but without success, when one day he saw a kudu in a clump of bushes. Stealthily he hobbled toward it and propped himself on his crutch to shoot it. The arrow flew true and struck the animal.

A Bushman arrow is small and light; the head is not much bigger than a thumbnail and the shaft is a reed (page 882). But the



POBACHPONE, BY LAWRENCE H. MERRILL © NATIONAL GEOGRAPHIC SOCIETY

Constant conversation fills the air as Bushmen relax in their *werf*, or village. A loquacious people, fond of tobacco, they sit and smoke in the scant shade of a thorn tree. Men speak of successful hunts and of the fat bucks they hope to kill.



STUDACHOWE © NATIONAL GEOGRAPHIC SOCIETY

Mongolian eye fold and flat nose characterize Old Gau, a typical Bushman. Years beneath a torrid sun have browned and wrinkled his yellow skin. How and when his ancestors came to southern Africa remain a mystery.

arrow is poisoned, and within a day or two even the largest antelope is staggering and dying.

Lame Gao's kudu was duly found dead, and the meat was used in his initiation.

In the late afternoon most of the men went with Lame Gao to the shade of a tree, somewhat apart from the werf. There they boiled the kudu's meat. From the foam of the boiling they made a paste which they rubbed into cuts on his body. The cuts, made by one of the men, were very small: cuts between the eyes to give him good vision, cuts on legs and arms for strong legs and sure aim, cuts above the breastbone to bring him strong lungs. Cuts on one side of the chest showed that he had been initiated with a female kudu.

The process made Lame Gao a man. After that he was the band's headman.

Toma Acts to Prevent Bloodshed

The headman does not exert authority or make decisions for the band. However, we once saw Toma, who was the temporary leader at Gautscha before Lame Gao became headman, intervene in a marital quarrel.

A woman named Dikai ran away with a man named Gao, leaving her husband but taking her two children. The husband was so angry when he found his wife gone that he began to sharpen his spear to kill his rival.

Toma thereupon followed the eloping couple into the veld, spoke softly to the wife to persuade her to return, and reproached her lover.

"You have brought shame on your parents and all your people," Toma said. "We are brothers. Do not begin a fight."

The woman was as embarrassed as her lover, and she explained, by means of a diagram with straws, that she and her children had slept on one side of a row of bushes while her lover slept on the other side; hence nothing had happened that could not be mended.

Her children, she said, "cried for

Boy bags a guinea fowl. Gishay, Old Gau's son, stalked the bird for hours before sending an arrow through its neck. He remains a junior hunter, ineligible for marriage until he makes his first big kill.

their father," and she, for one, would be happy to return. She did, to the relief and pleasure of her husband, who put away his spear.

Kung Bushmen permit divorce and remarriage, as well as polygamy. A marriage can be dissolved at any time by mutual consent. We knew several men with two wives and heard of one who had had four. Bushmen like to marry a pair of sisters—because, they say, sisters are not as likely to be jealous of each other.

Among Bushmen a married couple and their children is the basic social unit, as it is with us. The wife gathers the vegetable food and the man does the hunting.

Girl, 8, Betrothed to Boy, 16

On our first expedition we witnessed a betrothal, and the following year we saw the wedding. It was the engagement and marriage of a girl named Nai to a handsome boy named Gunda. He was sixteen, she was eight.

There was no real ceremony connected with the betrothal, which was for the most part an agreement between the parents. Because Bushmen do not have domestic animals, produce, or objects to give as dowry or bride price, it is expected that the young man, upon his engagement, will present an antelope to his future bride's parents. This Gunda did, for he was already a hunter.

At the time of the wedding a year later, the usual ceremony was held. This, though so small as to be almost unnoticeable, is extremely important because there is no ceremony connected with any subsequent union.

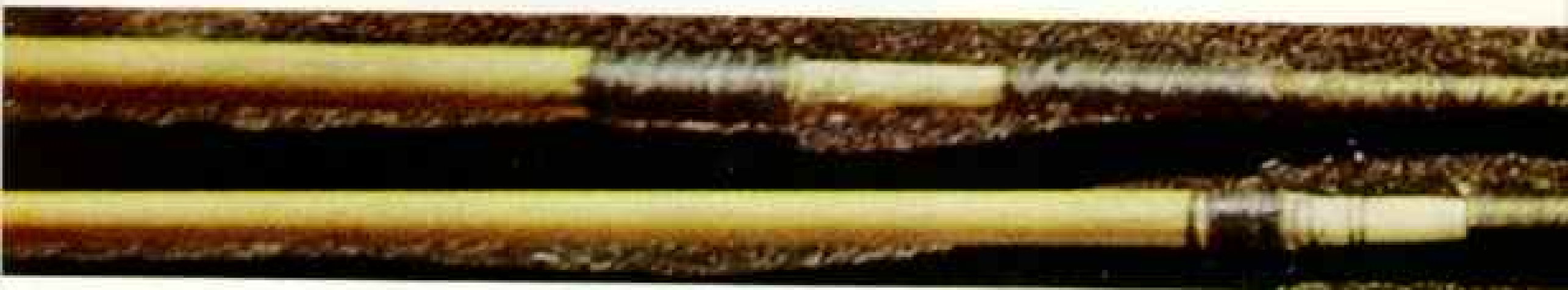
The mothers of the young couple built a skerm for them and kindled a fire there with embers from their own fires. Then, in the



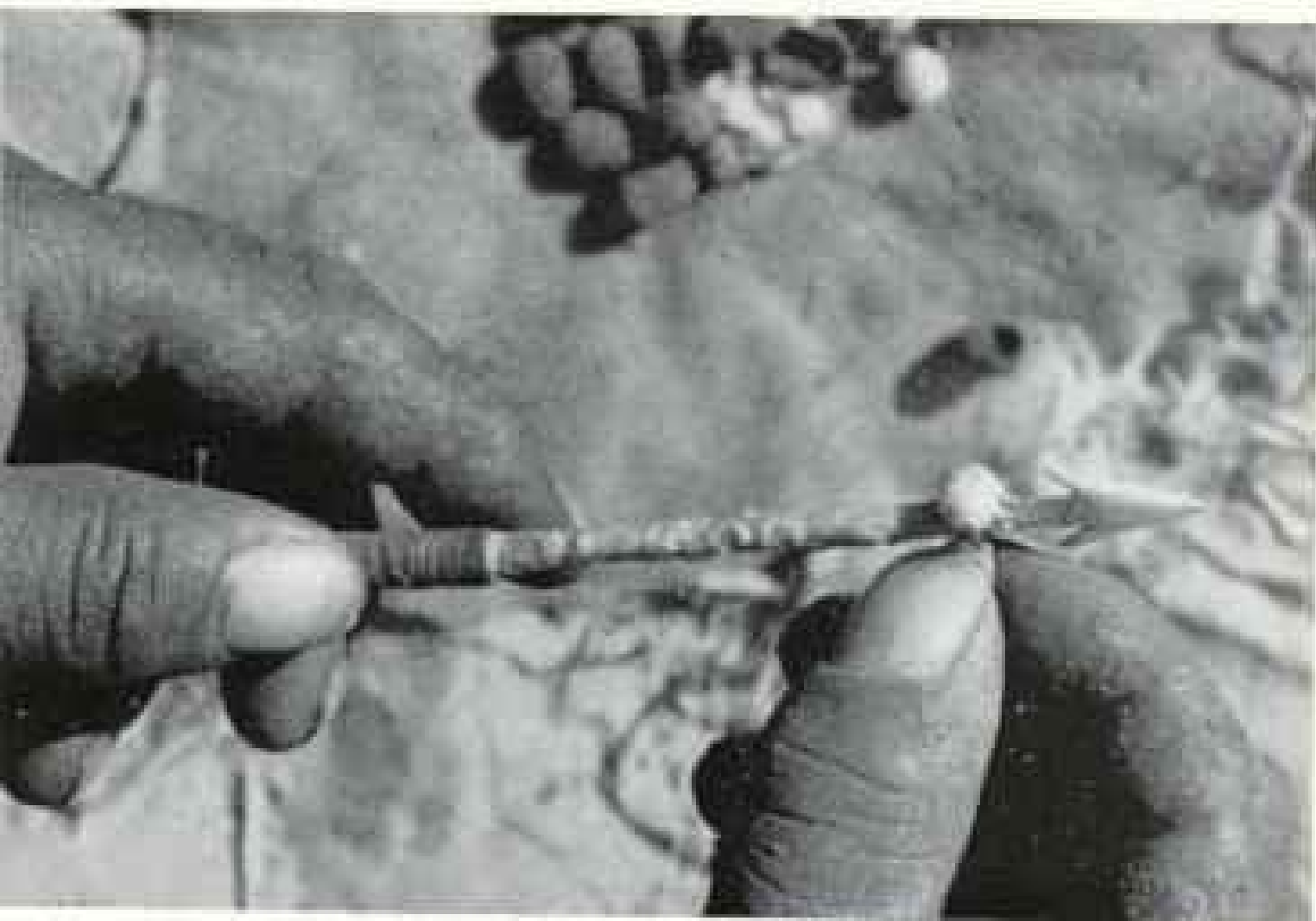
SCOTT WILSON © NATIONAL GEOGRAPHIC SOCIETY

evening, Gunda's wrists were seized by his friends, who led him to the new skerm. Nai was wrapped in a kaross and carried to him by her friends, three little girls not much older than herself.

No one seemed to pay much attention. In fact the young couple were taboo to older people. No feast was held, no dances danced nor songs sung. Only a few little children came to sit with the now married young couple for a short time, before darkness came.



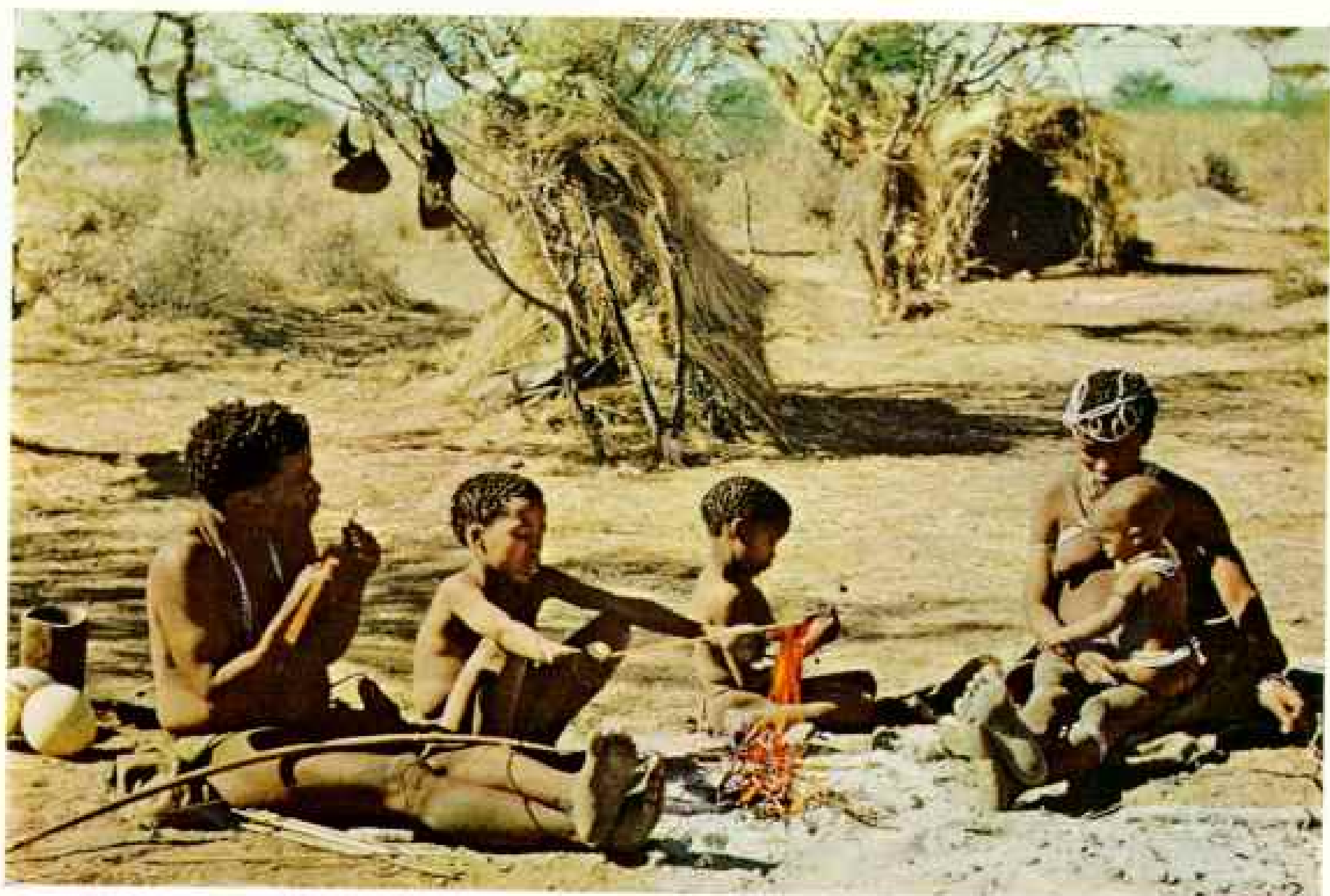
Bone-tipped reed arrows, coated with poison, span two feet. Shafts fall away, leaving the heads embedded.

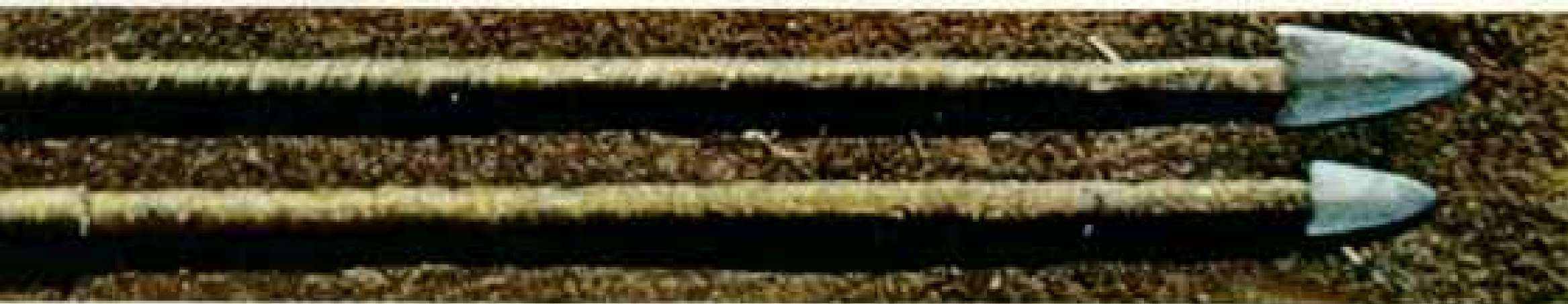


Crushing a beetle pupa, a hunter rubs its juice behind the arrowhead. One drop kills a man if it enters the bloodstream. For safety, tips are not treated.

Headman Toma enlists the aid of his young sons in drying freshly poisoned arrows over a campfire.

Pupa of the beetle *Diamphidia simplex* yields the powerful arrow poison. Bushmen find the insects encased in earth.





KESACHORNER © NATIONAL GEOGRAPHIC SOCIETY



Hunter's fingers, bent in the shape of horns, silently signal that he has sighted a hartebeest.

Before her marriage Nai was just one of the little girls who danced and played a game of toss with a melon. Sometimes, at her mother's urging, she would go to the veld to dig wild roots, but sometimes she would not.

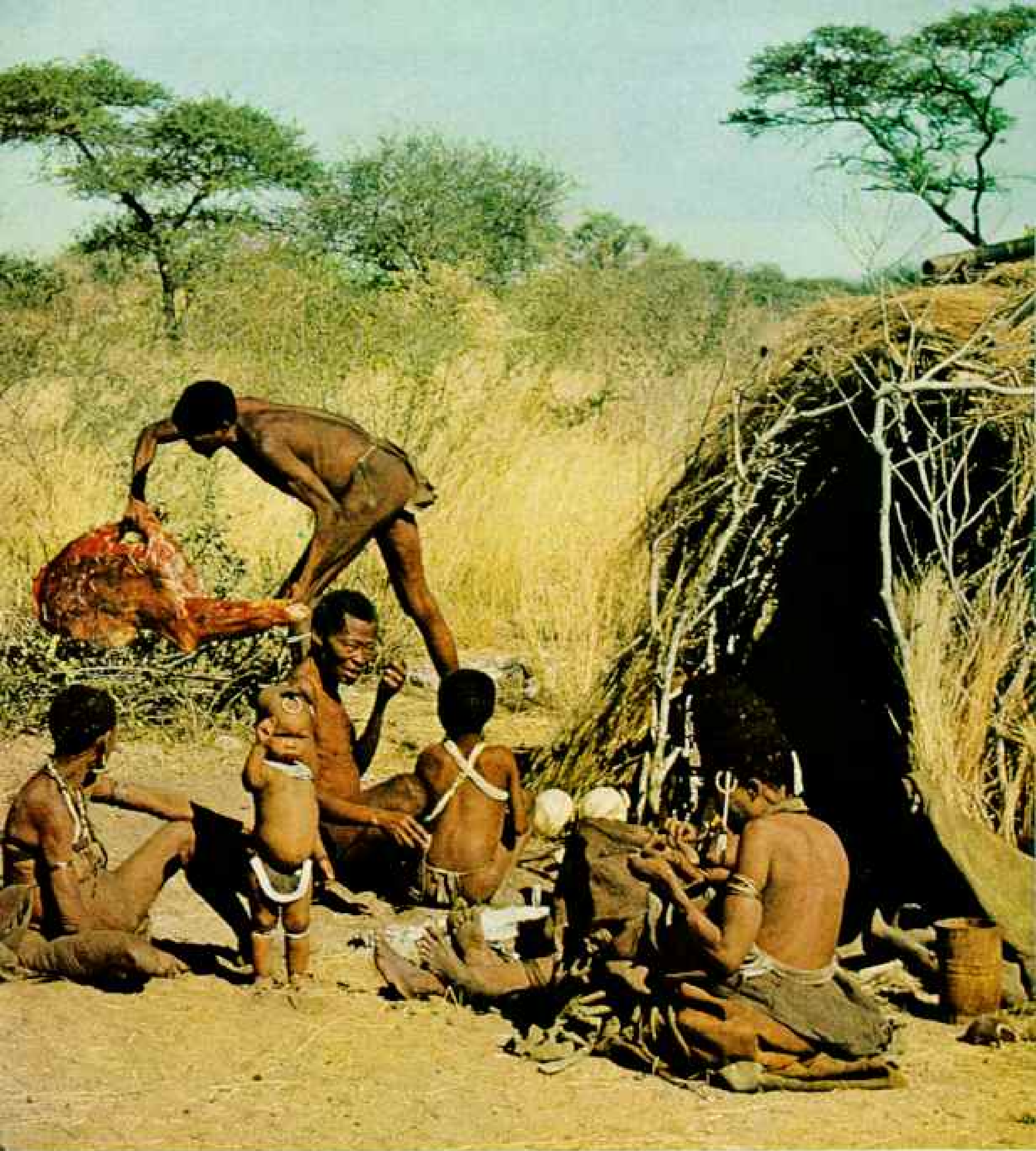
"You are lazy," her mother would scold.

But on the morning after her wedding, Nai awoke at the side of her husband rather than at the side of her grandmother. Her husband went off to hunt and would return at night hungry, so that morning she too took a short digging stick (which, like a ski pole, is adjusted to the size of its owner) and went with the women to the veld. She came home with roots in her little *kaross*, and that night her husband shared them.

After the girl reaches puberty—never before—the two live as man and wife. Although Bushmen may take a second wife, they usually do not do so until after they have lived with their first wife for several years.

Skinner's spread a *gembok* on leaves to keep the carcass clean. Nothing is wasted. Hide is tanned for a cloak; bone marrow is eaten. Cooked blood goes to the aged with poor teeth.





**Hunter Carves a Kudu's Haunch;
a Dozen Families Will Share His Kill**

Gao Big Feet's poison arrow was the first to pierce the kudu's hide; thus he had the responsibility of distributing the meat. He hacks off chunks for the family of Short Kwi, not a member of his band but a hunter who earlier shared one of his kills with Gao Big Feet. Beast's head and horns lie beside the skerm. Baby girl at center wears a small leather apron.

Bushmen say the sun brings death, and so it does, to plants and beasts and people in the drought of the year. That is why no ceremony is held when the sun is strong.

Lazy Kwi once told us the story of how death came to the world. It happened, he related, when the hare had a fight with the moon. The hare argued that creatures that die should be buried, lest their corpses stink. The moon contended that creatures that die should come to life again.

The hare became angry and scratched the



KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

moon's face with its claws, making marks that are there to this day. The moon split the hare's lip with a hatchet.

Each had the fate it argued for; that is why the moon grows thin, dies, and comes to life again, but when a hare dies, it dies forever.

"And people, too," said Lazy Kwi. "We, too."

Bushman men, possessed of strong legs and great endurance, sometimes run game antelope down, simply wearing them out until they drop with exhaustion. But usually Bushmen hunt with their poison arrows.

The poison is extracted from the pupae of beetles found in the earth beneath infested marula trees. A few drops of the poison squeezed onto an arrow are enough to kill an antelope; one drop of it can kill a man (page 882).

Women must have nothing to do with arrows or weapons or hunting. Before a hunt, a man must not embrace his wife if he is to be successful.

We heard of a man who violated this rule before a buffalo hunt. When the buffalo charged the hunting party, the other men shouted as they ran, "This is what happens!" When they came back to find the guilty man gored and trampled, they said to his corpse, "We told you so."

Hunter Shoots, Then Goes Home

Usually, at the start of a hunt, men leave the werf before the sun rises, when the air is still cold and little wraiths of mist are rising from the veld. The men separate, each going his own way, or perhaps two by two, rarely in larger groups.

When game is sighted, the hunter stoops and trots forward with only his back showing above the grass. Bushmen say that in the stooped position, even on an open plain, they look like small animals, not like men, and the antelope feels easy about them.

When a man is near enough, he shoots as many arrows as he can, then runs after the prey to shoot again, going back to find his arrow shafts only when the animal is hopelessly far away. Then he goes home.

The other men know from the hunter's behavior that he has shot something, though he must not say so, for this would bring bad luck. The next morning many men go with him to track the wounded animal down.

On one hunt while we were there, five Bushmen followed a wounded kudu almost thirty miles through very rough country, untangling its tracks from those of two small herds of kudus it had joined briefly. They found it at last—almost entirely eaten by lions. Only a scrap of the animal's skin and some of the bones could be salvaged to carry home. The hungry people cracked the bones for marrow and roasted the scrap of skin in the coals.

My brother John was once with several Bushmen who found a wildebeest almost dead of poison. Surrounding the wildebeest was a pride of lions who were preparing to take it for themselves. The hunters, announcing their prior claim to the wildebeest in



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Garlands of lily blossoms crown girls of the Kung group. Woven ostrich-shell headband serves the one at left as a collar.

Children frolic the day long. Most Bushmen are born with a dark mark, the so-called Mongolian spot, at the base of the spine.



respectful terms—but flinging sticks, stones, and lumps of sod as they spoke—marched right up to the lions. The lions rumbled and growled for a while but finally gave way.

My brother had no weapon, only a camera, and the hunters' poison would have killed the lions too late if they had decided to stand their ground. Yet the men did not seem to think they had done anything especially brave.

"This is what we do to lions," one of the hunters said.

Boys begin hunting when mere toddlers, making toy bows and thorn arrows and stalking beetles or caterpillars. By the time they are ten or eleven they begin to accompany their fathers on hunts, learning to stalk and track and to keep from getting lost.

It is a terrible thing to be lost. There is a Bushman song about a man lost in the veld who sees, just at evening, another man sitting near some trees.

The lost man runs toward him, thinking with relief and pleasure that there will be two at the fire that night, to talk and keep each other company, but when he reaches the trees he finds that the figure he thought was a man is only an old stump.

Bushmen express in songs, which do not have words, the arduousness and difficulty of their lives. A group of Gwike Bushmen with whom we stayed on our third expedition have a song called "Bitter Melons," which

expresses the feelings of a person who finds that the wild melons he has depended upon for water are yellow and dry.

There are no permanent water holes in the Gwikwe country. In the dry season people must get their liquid from melons and from roots which they scrape, then squeeze the scrapings for moisture.

Damp Holes Save the Drought-stricken

During the worst droughts the Gwikwe dig shallow holes for themselves in the shade of trees and line the holes with the squeezed root scrapings. They save their urine, pour it on the scrapings, and lie in the holes during the heat of the day. The evaporating urine causes them to lose less moisture by perspiring. In the evening they get up and try to find more roots which will sustain them another day.

Bushmen mark in their minds the exact location of such roots, for being able to find one during a severe drought may be the difference between life and death.

Once John and I prevailed upon a Bushman to show us where he remembered a *bi* root growing. When we came to the center of an enormous plain with no tree or bush to mark the place, Gai stopped and, glancing

around for a moment, pointed suddenly with his toe. After trying hard to see, we noticed a tiny shred of a vine wound around a grass blade; no part of the vine still touched the ground, as the vine had dried and parts of it had blown away.

Gai had known where the *bi* was, he told us, because he had walked by it months ago in the last rainy season when the vine was still green. He had assumed that it was still there because only his own people used the territory around it, and if one of them had taken it, he would have heard. Bushmen talk all the time about such things.

Squatting near the vine and digging with his hands, he soon had exposed it, two feet down and dark in shadow. He seized it and tore it from the earth.

It was shaped like a monstrous beet but had a hard, barklike crust and was gray and hairy. Gai held it high, looked at it with a satisfied smile, and said what nice water it would be.

Bushmen must deal with the spirits of the dead if misfortune is to be avoided, for the spirits bring death, hunger, and disease. Since the name of the spirits must not be uttered under ordinary circumstances, Bush-

Sled ride in the veld. Using a discarded cape, boys pull toddlers across the dust. Bellies are distended, not by gorging or starving, but by a swaybacked posture.

887

PHOTOGRAPHS BY LAURENCE S. MARSHALL © NATIONAL GEOGRAPHIC SOCIETY



men dance at night to call them and curse them for what they have done.

We attended many such dances while we lived by Gautscha Pan. Usually on a night when the moon was full, we would hear the voices of a few women singing, then the sound of clapping. Walking toward the sound at one of the werfs, we would find a dance, lighted by the moon and fire.

Around a special fire sit the women, who clap and sing wordlessly in falsetto. Behind them, in a circle, dance the men, their legs strung with cocoons filled with fragments of ostrich eggshell. The voices play one against the other in a variety of patterns at counterpoint with the clapping and the rhythmic stamping of the dancers.

The clapping and the hard, dry shake of the rattles make varied rhythms of their own, so that the sound of a dance, while enormously precise and intricate, emerges as a musical whole, like the music of an orchestra, yet with variations often too subtle for detection by an untrained ear.

Bushmen do not need, and do not enjoy, a heavy, simple, unifying beat. They have no drums or other percussion instruments except rattles at dances—only their ears and legs and hands and voices, and their extraordinary, delicate control.

Dancers Work Themselves Into a Trance

All Bushman men are medicine men; all have the power to cure, to purge the evils brought by the spirits of the dead. But some men have stronger curing powers than others. These are the ones who, when the dance has been in progress for an hour or more, when the fire's heat and the exercise of dancing have warmed the magic medicine in the men's bodies, scream and tremble and fall to the ground in trance.

On our first expedition, at the first dance we attended, we were alarmed when we saw the trances, for we had not heard of them and did not know what was happening. One of the men who lay shuddering on the ground was Lazy Kwi.

He stood up presently, still in trance, and brushed his hand over his face. Then he staggered from one person to another, leaning over each one, placing his hands on the person's chest and back, and moaning. After a moment of this he would throw up his head and shriek, then move to another person.

He came to us. His hands on our chests

and backs trembled like birds' wings. He did not intend to harm us; he was curing us. His moan sucked illness and evil from our bodies into his own; his shriek threw the illness from him, up to the spirits of the dead. They come, when they hear the Bushmen dancing, to hover in the air, or to hide just beyond the firelight, behind the dark trees.

Short Kwi—Little, but All Man

In the time we stayed near Gautscha, there was a dance every month or so, oftener if misfortune occurred.

On one of our last expeditions a man named Short Kwi was bitten on the leg by a puff adder. When we found him, his leg was already gangrenous and beyond cure. We brought him to our camp, and during the night his leg broke off, to the grief and horror of everyone there. In the morning some members of our expedition took him to the hospital in Windhoek, South-West Africa.

That night, and the next night, and the next, people danced, for Short Kwi was very popular, an exceptionally able hunter despite his small stature. Men put coals on their heads, setting their hair afire. Men in trance ran through the dance fire, then rushed into the veld to hunt and curse the spirits, to chase them away. Each morning when the sun came up, men were prostrate on the ground in trances. The bushes around the dance site were white and heavy with dust.

We left the Kalahari shortly after that, saying we hoped to return.

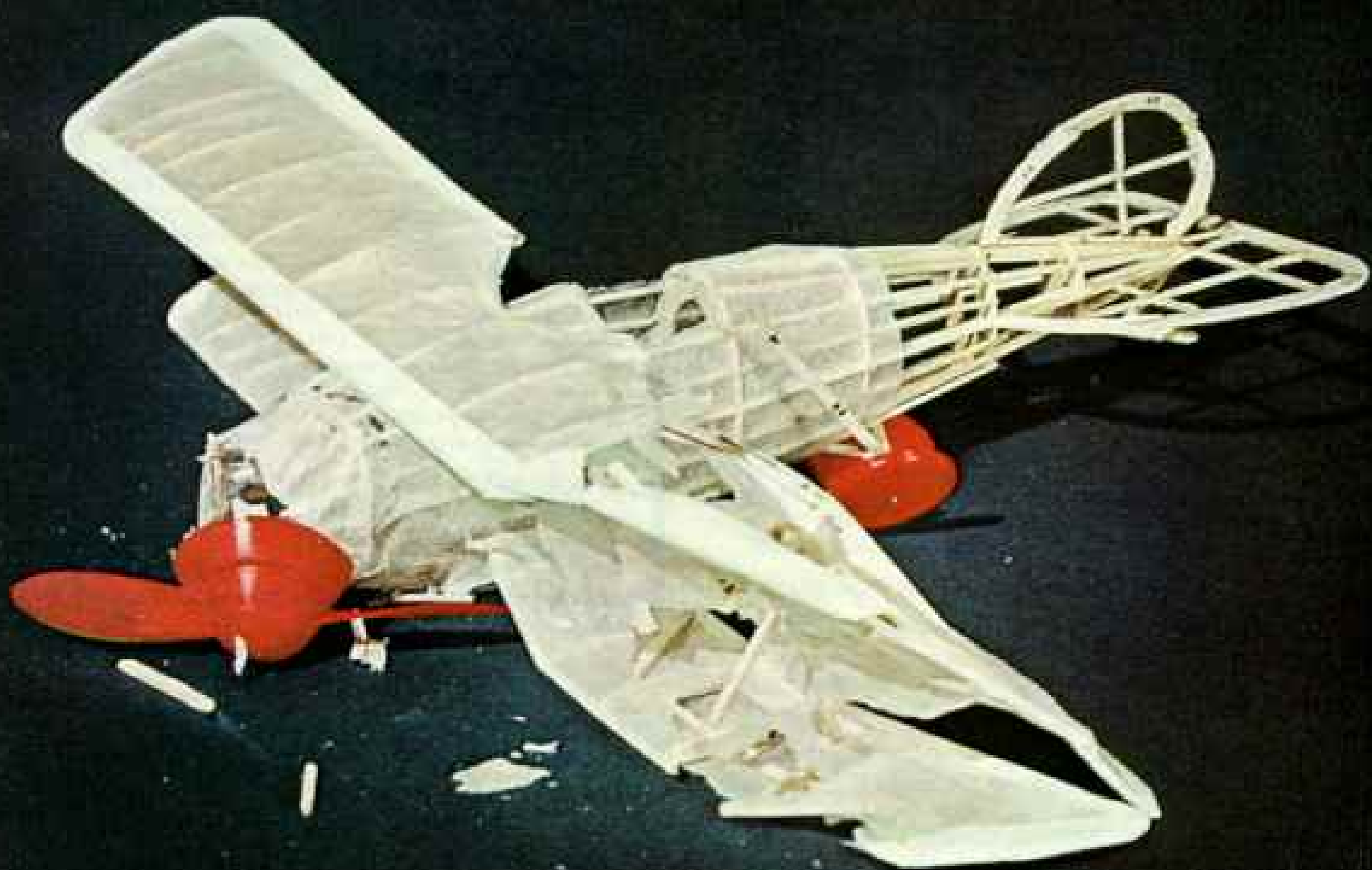
"We shall listen for your trucks," said Lazy Kwi.

We made arrangements for Short Kwi to be brought back by a government truck after being fitted with a peg leg. This would be better than a metal leg, which could not, in the veld, be mended or replaced.

A year or so later my brother returned to the Kalahari once more. He found that many Bushmen had been listening for our trucks, and as a result, when white farmers had come to raid for laborers among the Bushmen, they had mistaken the white farmers' trucks for ours. Many Bushmen had been taken, among them Lazy Kwi.

Short Kwi, on the other hand, was living in the veld, but far from our old camp at Gautscha Pan. When eventually he got word of my brother's arrival, he set out on the peg leg to find him, and walked a hundred miles to pay him a call.

THE END



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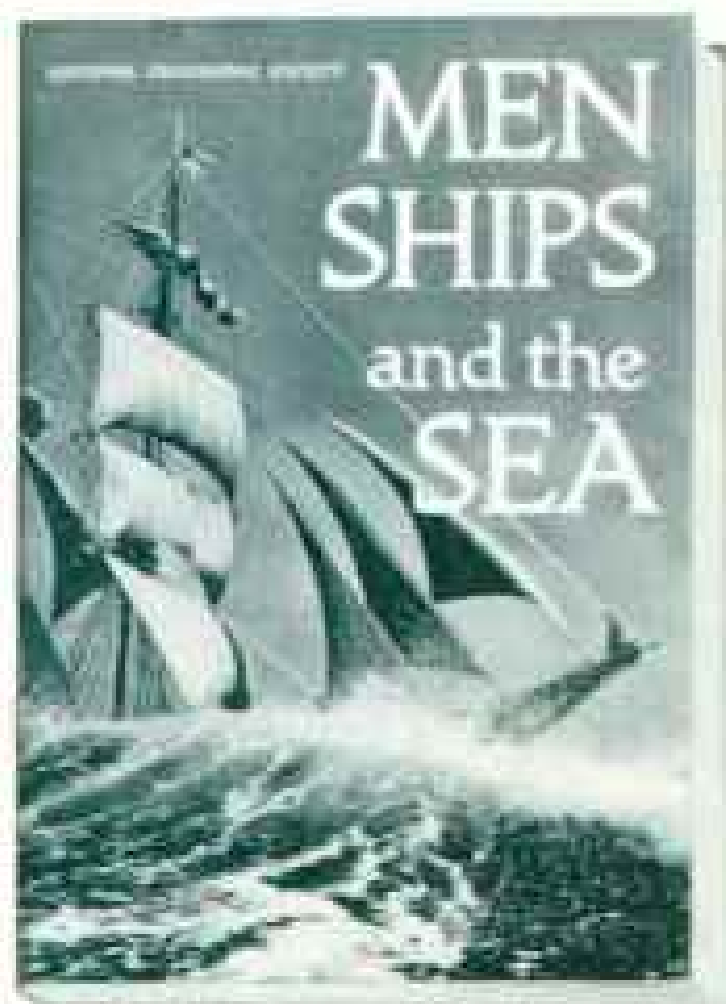


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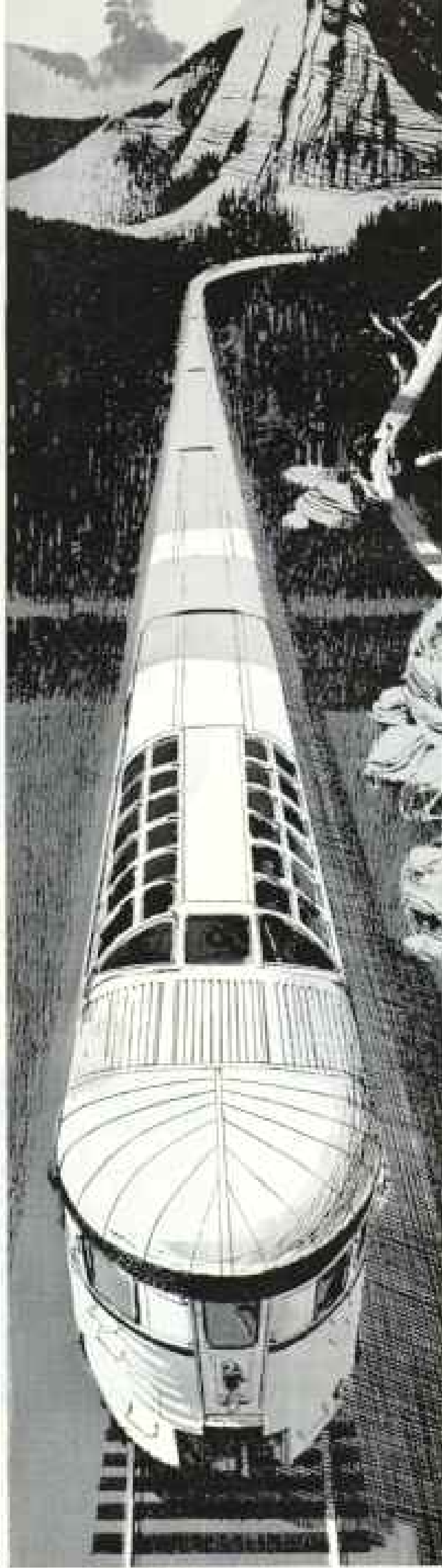
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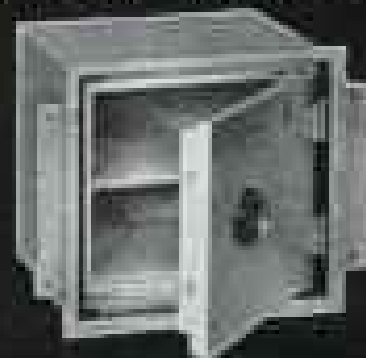
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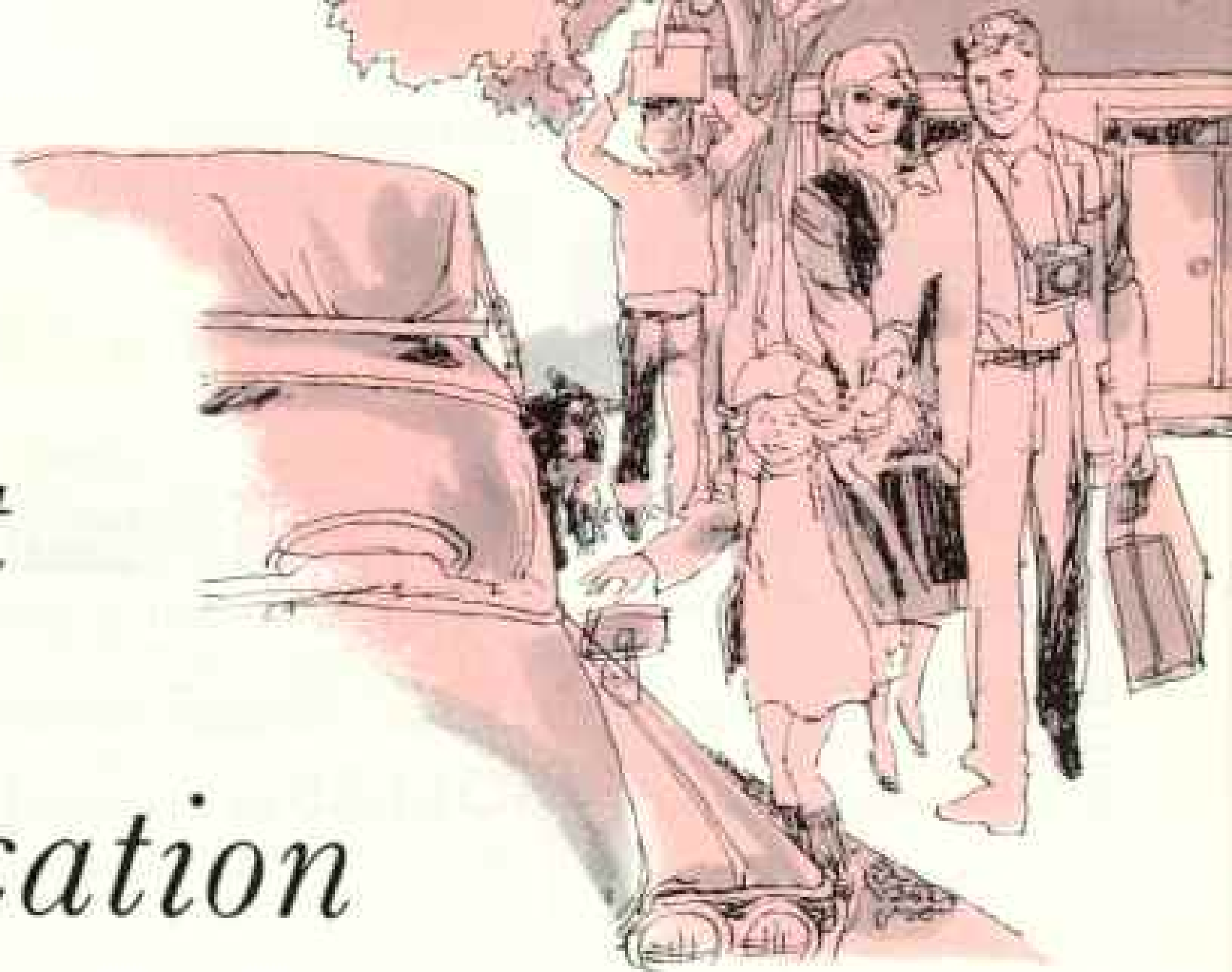
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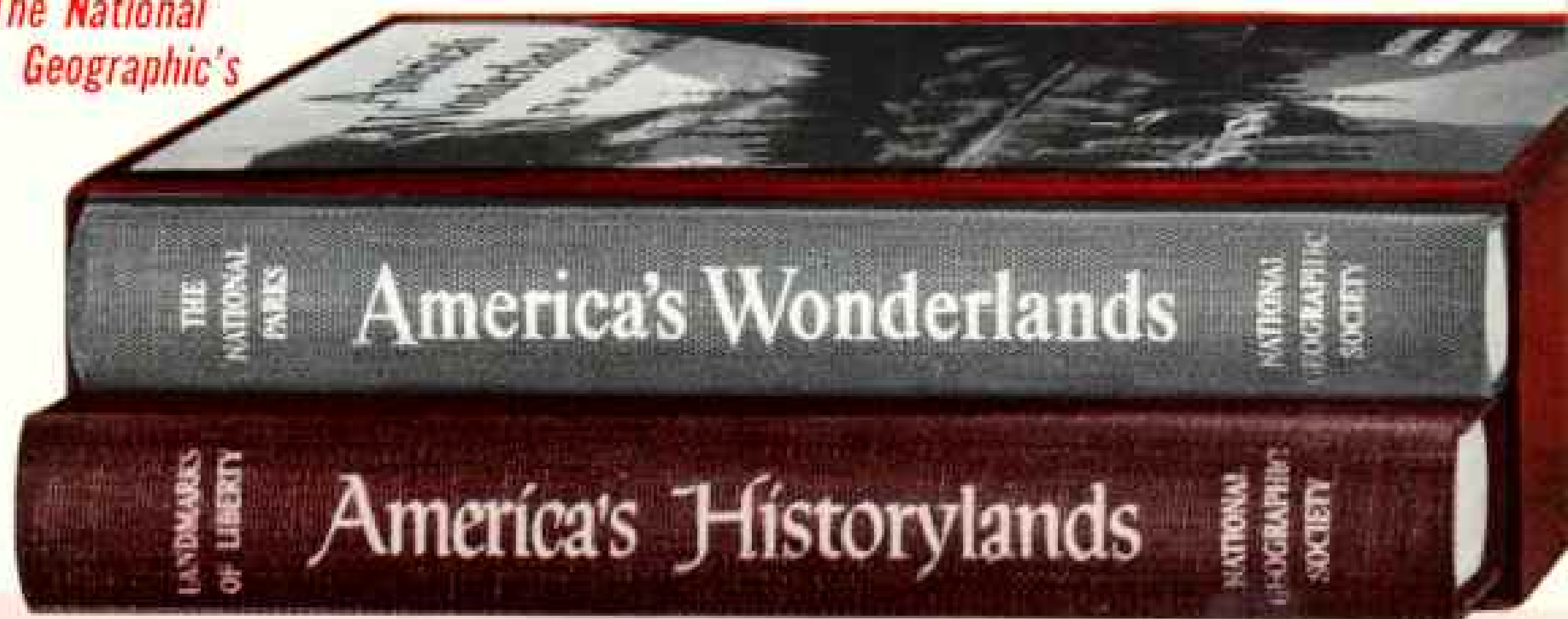
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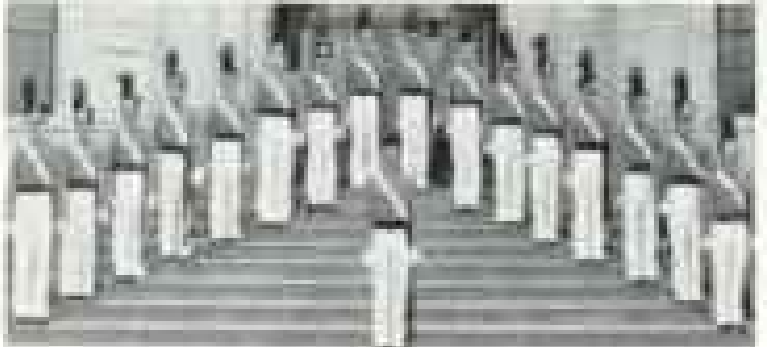
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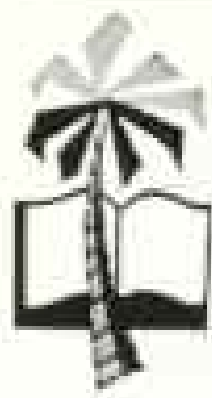
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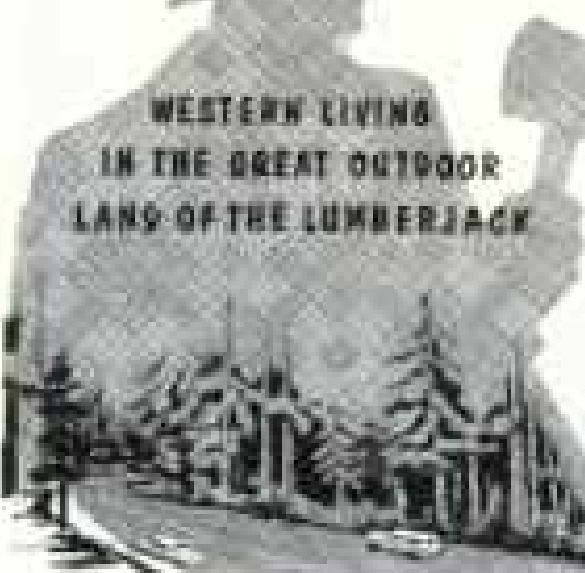
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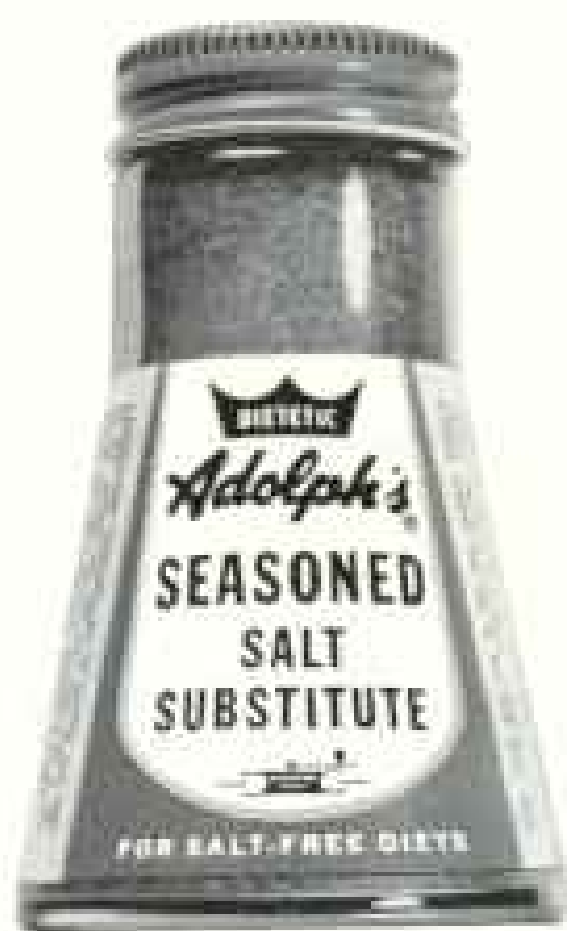
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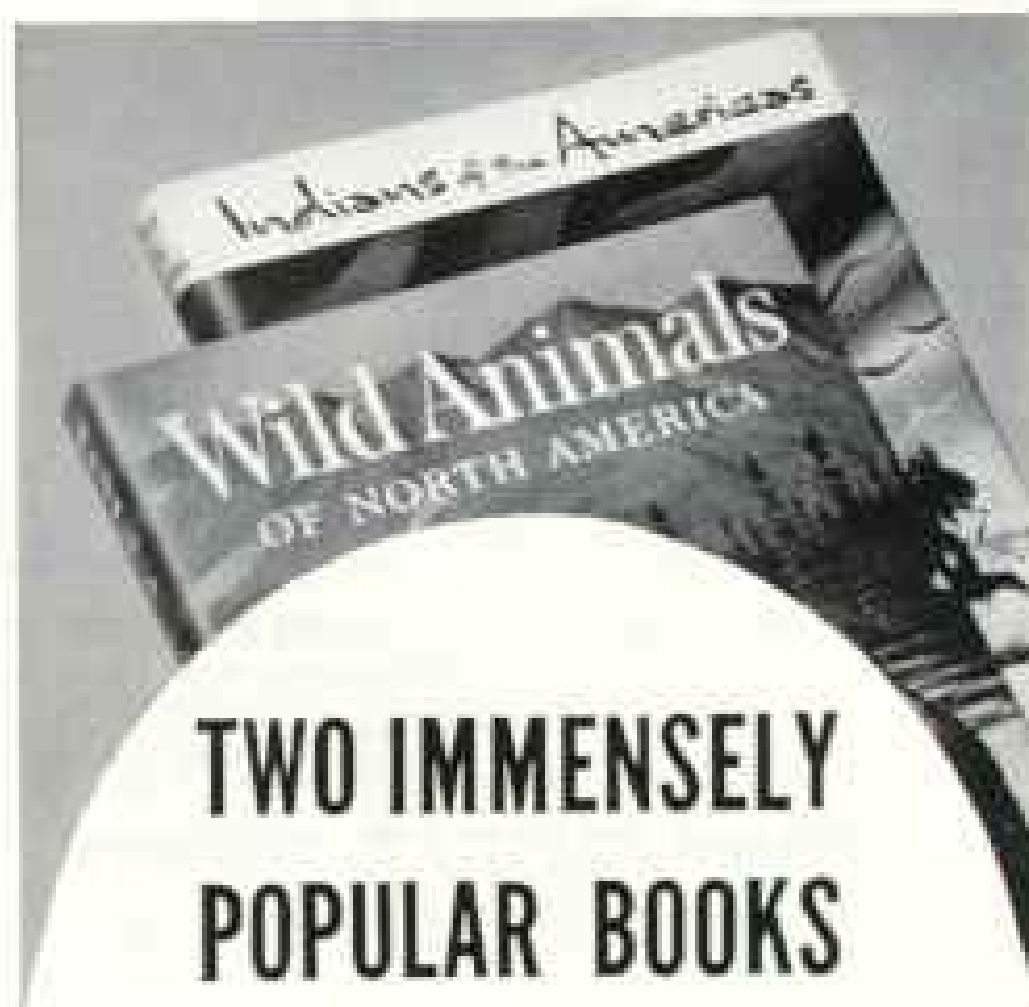
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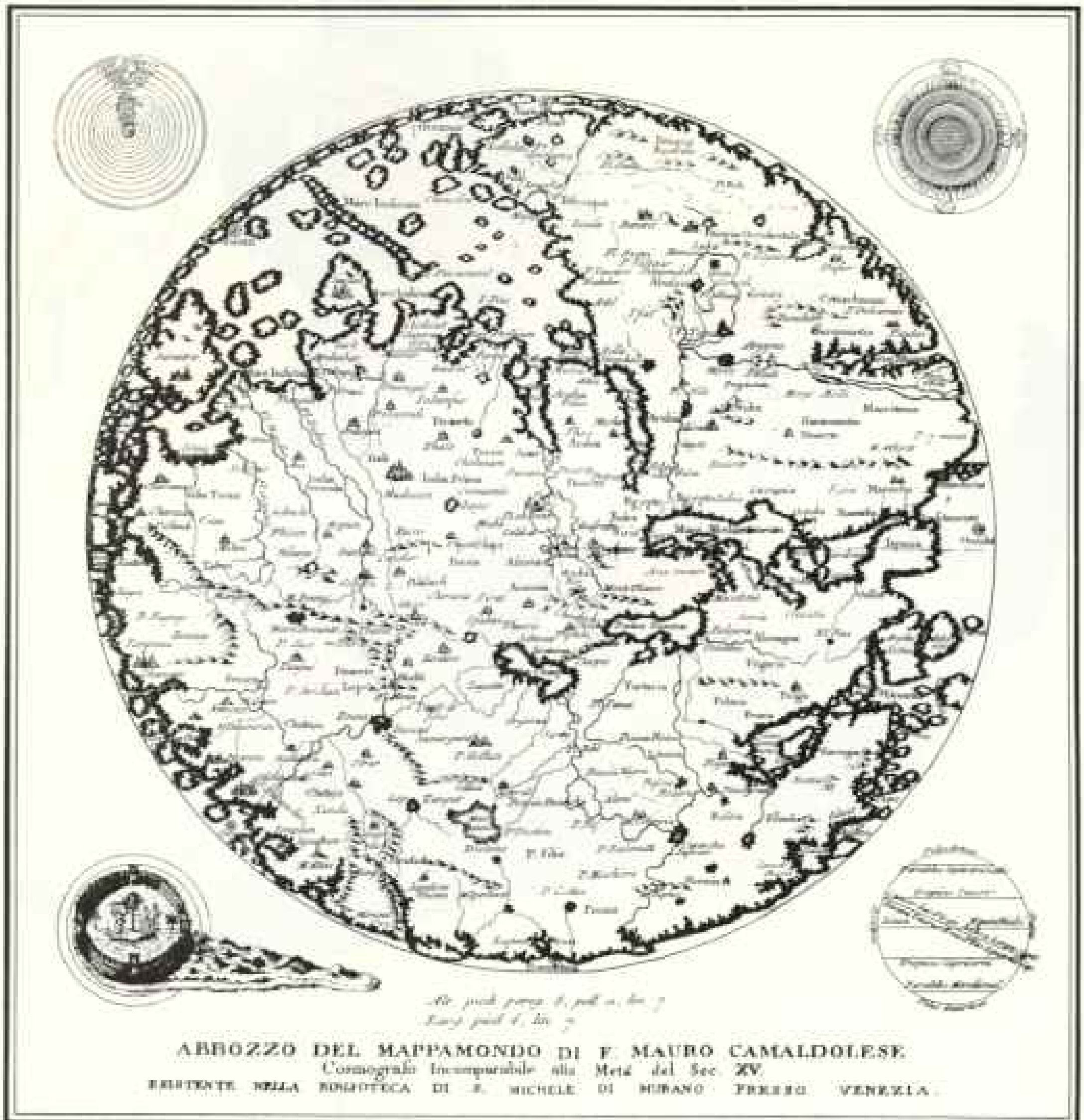
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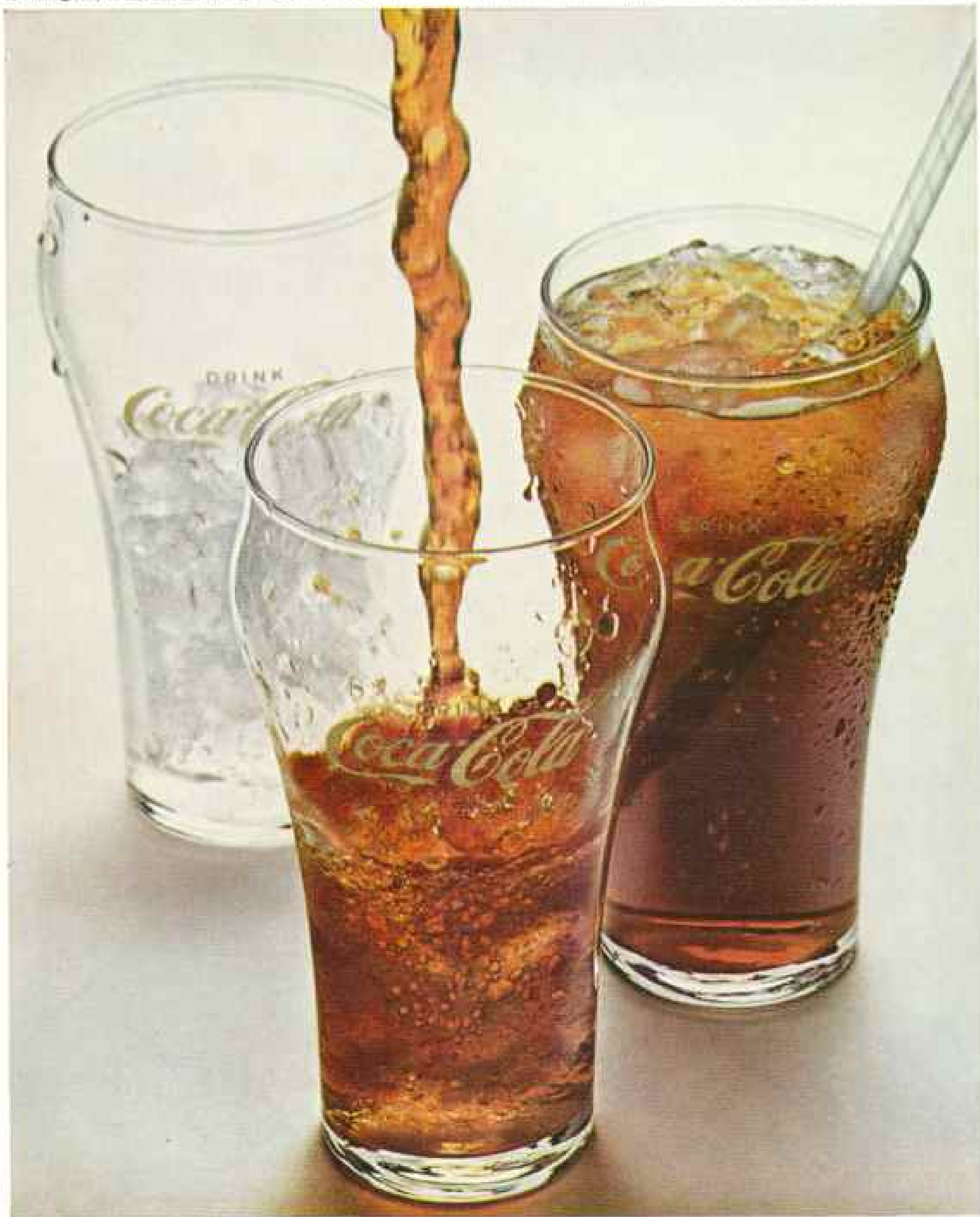
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